



Paper to be presented at the DRUID Academy 2013

on

DRUID Academy 2013
at Comwell Rebild Bakker, Rebild/Aalborg

Knowledge Types and Professional Firms: Using Organizational Structures and Division of Labour as Innovation Strategies

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Abstract

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[State-of-the-art] Few industries have experienced as dramatic growth in recent years as knowledge intensive business services. Yet these firms are still little understood. This study aims to make a substantial contribution to understanding the competitiveness of professional service firms (PSFs) by examining three things: the knowledge base at the heart of their activities, their organisational structures, and the divisions of labour (and knowledge) that they implement. Whilst there is a great deal of research on the organisational components of knowledge (e.g. people, processes and systems), very few empirical studies have attempted to directly relate knowledge types to firms' organisational structure. Theoretically, hierarchical mechanisms in organisational structures of work facilitate the sharing of information that leads to the generation of new and innovative knowledge, but the codification and sharing of knowledge also imply costs, and a redistribution of power within organizations.

[Research gaps] This research started from the premise that there are three main gaps within the PSFs and knowledge literature. First, little research has focused on the study about the specificities of each professional service and their comparison. In an attempt to address this problem, this research seeks to study temporary project teams in different types of professional service firms, through a comparative analysis of the management consultancy and architecture sectors. Second, even though scholars studying change in professional and knowledge intensive firms have implicitly

considered the notion that knowledge-based innovation emerges from on-going work and is then embodied in organisational structure, little of the prior research has directly examined organisational structure, hierarchical relationships and division of labour as a way to generate and exploit new forms of knowledge. Third, there has been a shift in the studies of innovation, from a focus on manufacturing firms and scientific and technological disciplines towards knowledge based services. As a result of a knowledge-based society, management theorists have increasingly addressed their efforts towards the understanding of new 'types' of knowledge (and the ability to create and exploit organisational knowledge) as well as the intangible nature of their services and products as a strategy to develop a sustainable competitive advantage. Thus, from a practical point of view, the understanding of the relationship between structure, hierarchy and division of labour, will help firms coordinate their resources and produce the knowledge needed to undertake innovative activities.

[Theoretical arguments] Through the analysis of the nature of tasks within temporary project teams, and its distribution between different hierarchical roles, this research aims at understanding the process of knowledge creation in different professional firms and its ultimate impact on innovation and firm's competitive advantage. The study is therefore informed by the knowledge- and resource-based views of the firm, which relates to the capacity of firms to successfully create knowledge, as well as theories of power, which relate to the dissemination of that knowledge.

Given the multiplicity of sources and inputs of information accessible to management consultancy and architecture firms, this research seeks to examine the interdependency and labour division within project teams, and their impact in the generation and exploitation of tacit and codified types of knowledge. The research question being addressed in this study is therefore: 'How does organisational structure affect the creation of knowledge and innovation in different professional firms?'

[Method] This research question will be addressed through a two-phase methodology that draws upon the consultancy and architecture services in the UK. Firstly, a descriptive analysis of documented information provided by the firms will be undertaken (e.g. project teams structure, timesheet allocation and job descriptions). Secondly, a multiple case studies approach will be applied (e.g. semi-structured interviews and direct observation). Through a sequential approach, the aim is to (i) capture the main practices and organisational structures of each professional firm, and (ii) integrate this information with an interpretative in-depth analysis of project team's tasks, processes and interactions.

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Abstract

Few industries have experienced as dramatic growth in recent years as knowledge intensive business services. Yet these firms are still little understood. This study aims to make a substantial contribution to understanding the competitiveness of professional service firms (PSFs) by examining three things: the knowledge base at the heart of their activities, their organisational structures, and the divisions of labour (and knowledge) that they implement.

Whilst there is a great deal of research on the organisational components of knowledge (e.g. people, processes and systems), very few empirical studies have attempted to directly relate knowledge types to firms' organisational structure. Theoretically, hierarchical mechanisms in organisational structures of work facilitate the sharing of information that leads to the generation of new and innovative knowledge, but the codification and sharing of knowledge also imply costs, and a redistribution of power within organizations.

Through the analysis of the nature of tasks within temporary project teams, and its distribution between different hierarchical roles, this research aims at understanding the process of knowledge creation in different professional firms and its ultimate impact on innovation and firm's competitive advantage. The study is therefore informed by the knowledge- and resource-based views of the firm, which relates to the capacity of firms to successfully create knowledge, as well as theories of power, which relate to the dissemination of that knowledge.

Key words: knowledge types, organizational structures, division of labour, tasks, project teams, innovation and professional firms (particularly management consulting and architecture firms).

1. Introduction

In an emergent knowledge based economy, organisations focused on the selling of credence goods are being pressured to use new knowledge as a strategy to create value to their clients and maintain business competitiveness (Bessant and Rush, 1995, Miles et al., 1995, Anand et al., 2007). Different types of knowledge and efficient knowledge management capabilities may be determinant for a firm's level of performance (Nonaka, 1994). In fact, knowledge is, according to knowledge-based theory, the most valuable resource of the firm (Kogut and Zander, 1993, Spender, 1996a, Grant, 1996). This theory is grounded in the resource based view (Penrose, 1959, Wernerfelt, 1984, Barney, 1991, Foss, 1997, Barney, 2001), which suggests that firm resources and capabilities affects the performance, growth and competitiveness of the firm (Teece et al., 1997, Eisenhardt and Martin, 2000, Winter, 2003).

Known by their knowledge intensity nature, professional service firms reflect today the great transformation in organisational methods and objectives of the modern business economy. Von Nordenflycht (2010) offers an analysis about multiple sources of PSFs distinctiveness. This framework focuses on the three PSFs' most cited features: *(a) knowledge intensity* - Professional services firms have as their main outputs the knowledge and intellectual skills of their workforce. They are characterized by specialized personal that bring value to the organization through their complex knowledge and experience in a specific field; *(b) low capital intensity* - This feature indicates that the production of these firms (PSFs) is not based on substantial investment in machinery, equipment or inventory. Instead, human capital is the main working tool; and *(c) professionalized workforce* - The term "professional" might be distinguished by knowledge base (based on complex knowledge and intellectual specialized employees), ideology (norms and ethic codes disseminates by professional associations and education) and self-regulation (control mechanisms over the professional practice according with expertize, values and ethic). These specific organisational features have allowed a set of service companies to emerge, with the aim of helping other organisations deal with internal business issues. Services such as architecture, marketing, engineering, IT services, legal, accountancy and management consultancy are examples of sectors that provided inputs to other companies, based on their knowledge and skills. Their growth confirms the orientation of companies towards new strategies, IT systems and to change, mostly increased by the actual knowledge based social-economy (Miles et al., 1995).

Considering the current competitive and strongly dynamic business environment, a considerable number of professional firms have become project team-based (Diefenbach and Sillince, 2011, Robertson and Swan, 2003, Strambach, 2008). This structural strategy seeks to act as a facilitator of the firms' higher performance and innovation capacity (Gibson et al., 2007). With its roots in the 1950s, the term 'project' continues to be associated with a 'proposal', of an idea or a solution (Grabher, 2002). Defined as 'a set of diversely skilled people working together on a complex task over a limited period of

time'(Goodman and Goodman, 1976)p.494), this provisional systems allows the share and combination of knowledge through a variety of sources and influences (Grabher, 2004). In the professional firms' context, the work is provided by dynamic groups of people that work together in a specific project and that are again reallocated for a different challenge. These are knowledge workers who organise on a temporal basis to develop a particular solution (Edmondson and Nembhard, 2009). Firms whose organizational outputs are dependent on project team's performance are typically reliant on the way individuals accessed and managed their resources portfolio (Gardner et al., 2012). The resources of a firm are constituted by all the organisational assets that contribute to its sustainable competitive advantage (Barney, 1991). These assets could be both tangible or intangible, human or material (Wernerfelt, 1984), and when they are rare, inimitable and non-substitutable (Barney, 1991), they contribute to a firm's efficiency and effectiveness. Knowledge management consists of a valuable strategy of generation, codifying and transferring knowledge within an organisation (Leila et al., 2006).

In the study of knowledge, Polanyi (1966), and Kogut and Zander (1992) have focused on the distinction between two organizational forms of knowledge: *information* ("knowing what something means") and *know-how* ("knowing how to do something") (p.386). The first form refers to facts and symbols and the second to practice and accumulated knowledge, that enables an efficient application of that expertise. In knowledge management literature, innovation and performance of a firm are largely dependent of its tacit knowledge. The way companies manage their tacit content – in form of products, processes, organisation and skills – represent their distinctive capabilities and assets (Gertler, 2003). Although part of the tacit knowledge is considered to be 'personal' knowledge (Nonaka and Takeuchi, 1995b), there is also another significant part that is developed through 'on the job' mechanisms which consider all the necessary organisational interactions, sharing of values, common language and culture (Nonaka et al., 2000). Firms are different in their information and knowledge, and it is argued, that this is reflected in the way they succeed in the market. According to Kogut and Zander (1992), organisations develop new knowledge and abilities through the recombination of their existing competences. More recently, Asheim and colleagues (2005) have suggested, that there are three different knowledge bases: 'synthetic', 'analytical' and 'symbolic' (SAS model). According to the authors, these different knowledge bases represent 'different mixes of tacit and codified knowledge, codification possibilities and limits, qualifications and skills required by organisations and institutions involved, as well as specific innovation challenges and pressures' (p. 6).

Organisational design research has focused on two main topics: (i) the impact of organisational design on the firm's performance and (ii) the evolution of organisational designs over time (Egelhoff, 1991). This paper will focus on the first topic which has been associated with the *fit* between organisational design and a firm's strategy, and also to the relationship between that fit and the firm's performance (Daniels et al., 1984, Egelhoff, 1991). According to Galbraith (1973), one of the main goals of an

organisation is to assure an efficient management of information processing. Therefore, in order to gather data, transform data into information, and disseminate and store the information in the organisation managers develop suitable configurations of structures, processes and information technologies (Galbraith, 1973, Egelhoff, 1991, Narayanan et al., 2011). The Information Processing Theory (IPT), suggests that effective organisations are able to fit their abilities to gather, transform, store and communicate information according to their organisational requirements (Galbraith, 1973, Egelhoff, 1991, Narayanan et al., 2011). Consequently, information processing is commonly associated with the ability to access particular knowledge types and information transfer through different organisational structures and processes.

Following these considerations, this research seeks to emphasise the crucial dynamics between work teams in professional firm's context. Firms cannot create knowledge by themselves. It is through the interaction between different individuals within the group that knowledge creation happens. Organisational teams provide the needed context that will allow the transformation of data and information in meaningful and shared knowledge (Nonaka and Takeuchi, 1995b).

Even though scholars studying change in professional and knowledge intensive firms have implicitly considered the notion that knowledge-based innovation emerges from on-going work and is then embodied in organizational structure (Anand et al., 2007), little of the prior research has directly examined organisational structure, hierarchical relationships and division of labour as a way to generate and exploit new forms of knowledge. Therefore, the theoretical motivation of this research is to provide a more complete understanding of the nature of knowledge at the heart of professional firms, and in examining the relationships between 'knowledge bases', organisational design and the creation of new knowledge in these firms. Particular focus will be placed on tasks undertaken by professionals in management consulting and architecture practices, as sub-sectors of professional service firms. The examination of how project teams distribute their internal work and the analysis of the nature of those tasks will be of crucial relevance to the understanding of different organisational dynamics and their relationship with knowledge creation, innovation and competitiveness in professional firms.

This paper is divided into four core sections. In Section two a brief characterization of professional firms is presented. In Section three the proposed conceptual framework and a brief review of literature is covered, including the research questions and objectives. In Section four the research method and strategy, timetable and future working plan of the research is presented. Finally, in Section five the originality of this study and its contribution to knowledge is detailed.

2. Knowledge management in Professional Firms

Project teams are organised in a functional way, with roles and responsibilities according to their hierarchical level, but they are subjected to a second and informal structure, which is framed by project team relationships, symbolic and subjective forms of power and pressures. This power frames mechanisms of coordination such as division of labour, milestones and revenues (Grabher, 2002). Indeed, in professional organisations, roles and positions between people are well defined and structured (Diefenbach and Sillince, 2011). There is a differentiated vertical structure between professionals, expressing a culture of seniority, where status, symbols, formal levels and attitudes are typical and recognised in the profession (Diefenbach and Sillince, 2011). Professional firms are highly hierarchical and they strongly differentiate structural levels in terms of their remuneration, status and benefits (Ackroyd and Muzio, 2007, Kirkpatrick and Ackroyd, 2003).

Muzio and Ackroyd (2005), in their study of labour process within legal firms, have confirmed many of the trends advanced by Freidson (2001) in his work 'Professionalism: the third logic' in 2001. The latter anticipated that professional firms will become more internally stratified and with a bigger differentiation between professional elites (such as partners or senior managers) and lower level professionals – the former benefiting from greater rewards and privileges. In this sense, elites' responsibilities are highly related to leading and controlling practices, strategic planning and development; while, lower level professionals and support staff are mainly concerned with operational problem solving and routine activities (Muzio and Ackroyd, 2005). According to the authors, this new work organisation and labour division in professional firms is resulting in considerable organisational changes that affects the experience of work, increases internal competition and work intensification, and the decrease in rewards and the professionals' career progression to a partnership level (Diefenbach and Sillince, 2011).

In the last decades, several studies about professional firms have proposed to understand the way innovation is manifested in knowledge-based industries (Bessant and Rush, 1995, Miles et al., 1995, Howells, 2006, Wood, 2009) and today, we are able to better distinguish them from the manufacturing sector. However, as stated by a few authors (Von Nordenflycht, 2010, Malhotra and Morris, 2009) there is a lack of research in the study of the specificities of each professional services and their comparison. Parallel to this problematic, there is another one, more related with the creation of new knowledge in professional firms. In fact, little consideration has been given to internal activities undertaken by professionals in knowledge based services. Although the Community Innovation Survey (CIS) represents an important source of quantitative data on services innovation, the data is essentially focused on sectorial classifications and formal Research and Development (R&D) expenditures. Therefore, CIS statistics fail to analyse other kinds of internal activities, e.g. new knowledge in management forms of

business models (Miles and Green, 2008, Roper et al., 2009, Tether, 2003). Indeed, many activities of service companies are not described in terms of research and development indicators. Therefore, related with the R&D topic, it seems crucial to analyse the type of tasks undertaken by professional firm's employees and their relationship with formal R&D type of activities. In an attempt to address these problems, this study seeks to contribute to that body of knowledge with theoretical advancements to the literature on management consulting and architecture firms.

The selection over these two particular industries is based on the following reasons: first, they both are characterised as sub-sectors of the professional firms' industry; second, they both have an organisation based on temporary project teams, which constitutes this research unit of analysis; third, together, these two types of firms apply the three different knowledge bases (analytical, synthetic and symbolic) in different degrees.

3. Conceptual Background and Research Questions

The conceptual approach of this research combines acknowledged views from prior research literature with ten in-depth preliminary interviews. This process of encouraging "the involvement of those who experience and know the problem domain" (Van de Ven, 2007, p.100) in the problem definition and theory building represents an attempt to enrich the theoretical basis¹ of the research. Insights from qualitative data provided by ten professional consultants (five of them holding a Partner position in five well established consulting firms) support most of the arguments presented in this study. From these, few questions were developed concerning the relationship between organisational structure (and division of labour), knowledge bases and firm's knowledge creation.

The concept of knowledge has been diversely classified (e.g. Huber, 1991, Nonaka and Takeuchi, 1995, Spender, 1996) and as mention earlier, few scholars have focused their work in the distinction between tacit and codified forms of knowledge (Nelson and Winter, 1982, Nonaka, 2008, Ryle, 2009). The former is based on experience and it is apprehended through informal procedures of learning by doing (individual task of problem solving) and interaction (in a collective context). As in the relationship between the teacher and the trainee, social context provides the learning environment through observation, imitation, feedback and repetition (Polanyi, 1966, Gertler, 2003, Nonaka, 2008). In fact, to Maskell and Malmberg (1999), tacit knowledge is totally dependent on practical work. On the other hand, codified or explicit knowledge is more precise and formal, and can be easily codified, transferred and documented. Nonaka (1994, 2008) emphasised the relationship between these two forms of

¹ Process defined by Van de Ven (2007) as an "abduction" method (see also Peirce, 1955; Zahra & Newey, 2009)

knowledge as the necessary conditions for the generation of knowledge and learning processes within organisations.

While some authors (Spender, 1996b) have tried to identify the distinction between social knowledge and individual knowledge, Tsoukas (1996) states that ‘individual knowledge is possible precisely because of the social practices within which individuals engage – the two are mutually defined’. In fact, Kogut and Zander (1992) states, that knowledge is not only held by employees, but also by what a firm can do. The authors identify organisations as social communities, where the generated products and services result from individual and social expertise, shaped by specific organising principles. These principles reflect a way of work in the organisation and are revealed through activities and procedures that structure social relationships between individuals. Therefore, knowledge created and shared by a specific community is generated under a set of organisational codes that is specific to each company (Kogut and Zander, 1992).

Firms tend to invest in different forms of knowledge and expertise - ‘combinative capabilities’ - according to their potential with regards to the creation of new developments and future growth. Organisations provide the tools to create and transfer social knowledge, that is further diffused between individuals, groups and related networks (e.g. suppliers and buyers) through a common language and organisational principles and working as a social community (Kogut and Zander, 1992). The crucial role of tacit knowledge in the process of innovation is undeniable. However, it is also important not to ignore the role of explicit or codified knowledge and the way they can complement each other. As stated by Blacker (1995) ‘knowledge is multifaceted and complex, being situated and abstract, implicit and explicit, distributed and individual, physical and mental, developing and static, verbal and encoded’ (p.1033). Gertler (2003) reminds us about the importance of a balanced management of codified and tacit learning. Organisations need to strategically plan their investments in training, research and development activities, human capital expertise and education. This investment will allow a better development of tacit and codified knowledge through employees and through firms.

3.1 Knowledge Bases – Synthetic, Analytical and Symbolic (SAS Model)

In the late fifties, Drucker created the term “knowledge worker” and claimed that in a knowledge society, knowledge is the most important resource of a firm (1993). This capability has gained reputation among companies as a way of producing intellectual abilities to generate solutions and increase organizational performance (Zuboff, 1988; Grant, 1996; Swan and Newell, 2000). There is a relevant literature that focuses on different aspects of knowledge, such as the distinction between tacit and explicit knowledge (Polanyi, 1966, Nonaka and Takeuchi, 1995a) and on the organization and structures of knowledge (Tsoukas, 1996, Spender, 1996b).

In the last decades, many different taxonomies of knowledge have been advocated (Kakabadse et al., 2003). In this particular paper, the Asheim and colleagues (Asheim and Coenen, 2005, Asheim et al., 2005) knowledge taxonomy will be adopted. The authors have considered that the process of innovation in firms is formed by their particular knowledge base – ‘analytical’, ‘synthetic’ and ‘symbolic’. The ‘analytical knowledge base’ requires a greater level of qualification and specialised skills related to people’s ability for abstraction, analytical thinking and empirical testing. Due to its cognitive and formally based process, analytical knowledge is developed under recognised models and predefined methods, that are framed by systematic and organised structures and relationships, such as R&D departments or university links (Asheim et al., 2005). Analytical knowledge based companies tend to be more reliant on scientific knowledge and internal or external research studies as an input for the development of innovative products or processes (Asheim et al., 2005). Therefore, the organisational outcomes of these firms often results in rational models, frameworks and information, that are codified in documented reports or official patents (Asheim et al., 2005). Innovation, in this type of knowledge, is frequently achieved through radical changes of products or processes (Asheim et al., 2005).

On the other hand, a ‘synthetic knowledge base’ is less focused on research and development activities. Nevertheless, when these actions are undertaken, they are frequently product or process reliant, and are developed as a specific solution to a problem. Thus, rather than consisting of pure basic and abstract research, synthetic knowledge is more concrete, practical and solution oriented (Asheim et al., 2005). Due to the relevance of effective know-how and problem resolution by knowledge application, tacit knowledge is more dominant in a synthetic knowledge base organisation. Innovation results from practical experience and organisational interaction between different business actors (customers and suppliers), and it is focused on the efficiency of innovative solutions by knowledge application and/or new combinations of current knowledge (Asheim et al., 2005).

Finally, a ‘symbolic knowledge base’ is transmitted through signs, symbols, images, narrative and sounds and it is essentially relevant to media, fashion and advertising industries, whose business models involve the constant creation of innovative and creative designs, ideas, products and services (Asheim et al., 2005). In this knowledge base, qualifications need to be related to the ability to undertake symbol interpretation and manipulation which strongly depend on tacit knowledge and also, on socialisation and interaction between professional communities. Innovation is achieved by the modification and recombination of current knowledge in innovative outcomes (Asheim et al., 2005).

Considering this threefold classification (see Figure 1), it is realistic to note that, although each sub-sector of knowledge intensive firms could be associated with one specific type of knowledge, the majority of these companies combine different knowledge bases at different degrees (in a continuum that goes from analytical knowledge to symbolic knowledge) (Strambach, 2008).

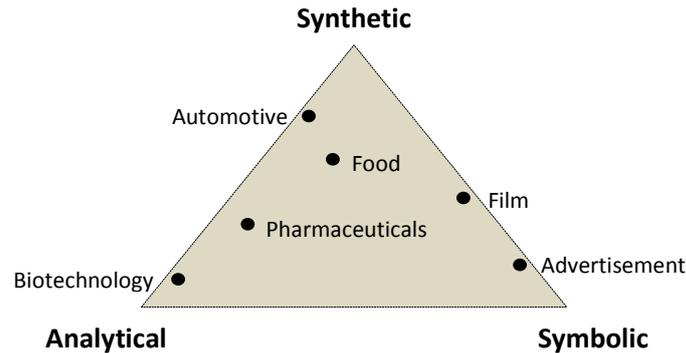


Figure 1 – Knowledge bases and industries: empirical examples (source: Asheim and colleagues, 2005)

The knowledge management of firms combines the organizational processes, technological systems, individual behaviours and information repositories. All together, they contribute to the organizational ability to systematically gain, store, access, retain and re-utilize knowledge coming from diverse sources (Eschenfelder et al., 1998). Van de Ven and Drazin (1985) and Grant (1996) considered that by assuming each firm's specificities and knowledge bases, managers can accomplish equally high levels of effectiveness, although applying significantly different knowledge integration strategies.

3.2 Organisation design: hierarchy and labour division

The context and environmental issues affecting an organisation determine the challenges and opportunities that must be handled, in order to achieve success (Ven et al., 1976, Miles and Snow, 1978, Gresov and Stephens, 1993). Information is a valuable resource helping organisations to solve and manage these issues and, according to the information processing view, organisational structure has a significant impact on the way information is managed and used to resolve environmental challenges (Thompson, 1967, Galbraith, 1973, Turner and Makhija, 2012). Barnard (1938), Simon (1947/1997) and Chandler (1962) have studied organisational structure and its impact on a firm's performance. Their work explored the role of organisational structure in the way information is disseminated and embedded in organisations, allowing them to achieve better results than through the individual performances of their elements (Csaszar, 2012). Information processing theory, which has received the attention of scholars in the past three decades, sought to explain the impact of organisational design in the process of information flow (Turner and Makhija, 2012). Despite the recognition of this view as an important contribution to the understanding of how organisations work, recent theorists have called the attention for their dynamic nature which goes beyond of a focus on the information processing. As living organisms, interaction and tacit knowledge is of great importance and have significant implications in the organisation (Nonaka and Takeuchi, 1995a). Simon's perspective of organisation is based on a

passive relationship with the context and its environment. The author considered that the adaptation and change in the information processing structure is the main strategy to face environment's challenges. On the opposite, Nonaka and Takeuchi (1995a) argued that 'the organisations acting on the environment not only performs effective information processing but also creates information and knowledge by itself' (p. 39). In fact, according to the authors, this organisation's perspective as a mechanism for 'information processing' does not explain the innovation activity of firms, since this process involve more than the information processing from the outside. To Nonaka and Takeuchi (Nonaka and Takeuchi, 1995a), the process of innovation in an organisation involves also the creation of new knowledge from the inside out.

The fit of an organisational design is the main purpose of complex and dynamics environments (Chandler, 1962, Galbraith, 1973). Thus, in order to assure organisational control and coordination, traditional firms tend to apply mechanisms and instruments of hierarchy (March and Simon, 1958, Thompson, 1967, Fjeldstad et al., 2012). Simon (1962: 468) provides the following notion of hierarchy: 'a complex system in which each of the subsystems is subordinated by an authority relation to the system it belongs to'. In other words, in a hierarchical organisation, employees of higher levels have the power to solve lower level issues, due to their wider perspective of the firm and its environment (March and Simon, 1958). The mechanism of hierarchy is applied in the goal setting, planning, resource allocation and the management of interdependencies (Fjeldstad et al., 2012).

As discussed before, in consultancy and architecture firms, there is an organisation based on the work of temporary project teams. They are organised in a functional way, with roles and responsibilities according to their hierarchical level (Diefenbach and Sillince, 2011). To analyse the effect of a project teams' structure in the production of knowledge, two opposite structures will be considered in a continuum: 'mechanistic' and 'organic' structures (Tushman and Nadler, 1978). The first one – mechanistic – is characterised by fixed rules, specialised jobs and hierarchical division of labour and distribution of tasks. In contrast, the organic type of structure is characterised by the participation of all members in decision-making (interactive mechanisms), flexible procedures, responsibilities and rules, multiple and more complex tasks and greater interdependence among the elements of the team. According to Tushman and Nadler (1978), less structured relationships will reduce the amount of information processing, but will increase the amount of access to new information and also, the ability of adaptation and response to new situations. These trade-offs may be analysed over the following components of information processing: information gathering, interpretation and synthesis (Turner and Makhija, 2012).

An organisational structure should reflect the orientation strategy of the firm and its environmental demand. In situations where the environmental context is stable, organisations can predict the

problems that may arise and the solutions to deal with those problems. This, results in a greater need to anticipate the processing of information. Mechanistic organisational designs work in favour of these needs, through a hierarchical division of labour. This distribution ensures a better definition of tasks and behaviours within project teams, through the application of clear procedures and organisational rules (Turner and Makhija, 2012). In less dynamic contexts, organisations are able to determine the tasks between employees, and by doing this, they are giving individuals the opportunity to focus on their specific mission and limit their need to coordinate their activities. This mechanism improves the expertise of the employee and decreases mistakes (Turner and Makhija, 2012), contributing to efficiency in information processing. Contrary to this, when the organisational environment is more dynamic and uncertain, firms have more difficulty in the prediction of difficulties and their resolutions. In these situations, rules and procedures are less effective and there is a need for greater flexibility in the way employees and project teams are going to manage appropriate information (Turner and Makhija, 2006). According to (Tushman, 1979), in situations of greater uncertainty, there is a greater need for efficient information processing.

With a focus on management consultancy and architecture firms, this study aims to examine the inter-relationship between three things: the knowledge base at the heart of their activities, their organisational structures (the divisions of labour and knowledge that they implement) and the firm's knowledge creation. Considering the close relationship between an organisation's knowledge base and its innovative process (Asheim and Coenen, 2005), the inter-relationship between the mentioned variables will also provide information about the effect of the organisational design on innovative performance in the context of professional service firms. According to Strambach (2008) 'knowledge base refers to the key dimension of knowledge considered relevant for innovative activities of an industry'.

For example, architectural services are expected to combine, to a greater degree, the synthetic and symbolic knowledge bases (Tether et al., 2012, Strambach, 2008). And management consultants are expected to apply analytical knowledge base, coupled with synthetic knowledge base. But can we assume that these subsectors are not differentiated within them? According to Robertson and Swan (1998), management consultancy for example, is a heterogeneous and diverse industry. Its classification as a knowledge-intensive firm tends to ignore the specificities within the sector. Consultancies may significantly differ in terms of organisation, work methods and professionals' expertise, according to the type of consultancy analysed. These firms could go from generalist (dealing with standardised solutions) to specific and from strategic to operational (Robertson and Swan, 1998). Therefore, their business

focus will determine their type of solutions and their specific procedures, which will reflect the knowledge base produced within the organisation.

Effective knowledge management is one of the most important assets of a firm (Barney, 1991, Zander and Kogut, 1995, Nonaka, 1994, Wernerfelt, 1984). One of the dimensions that have been appointed has the reason behind organisations' ability to effectively manage knowledge is the organisational design of firms (Tece et al., 1997, Turner and Makhija, 2006). Actually, organisational structures and processes are frequently associated with a firm's ability to gain, spread, interpret and assimilate knowledge (Tece et al., 1997).

The proposed model of this research study and its key relationships are depicted in Figure 2.

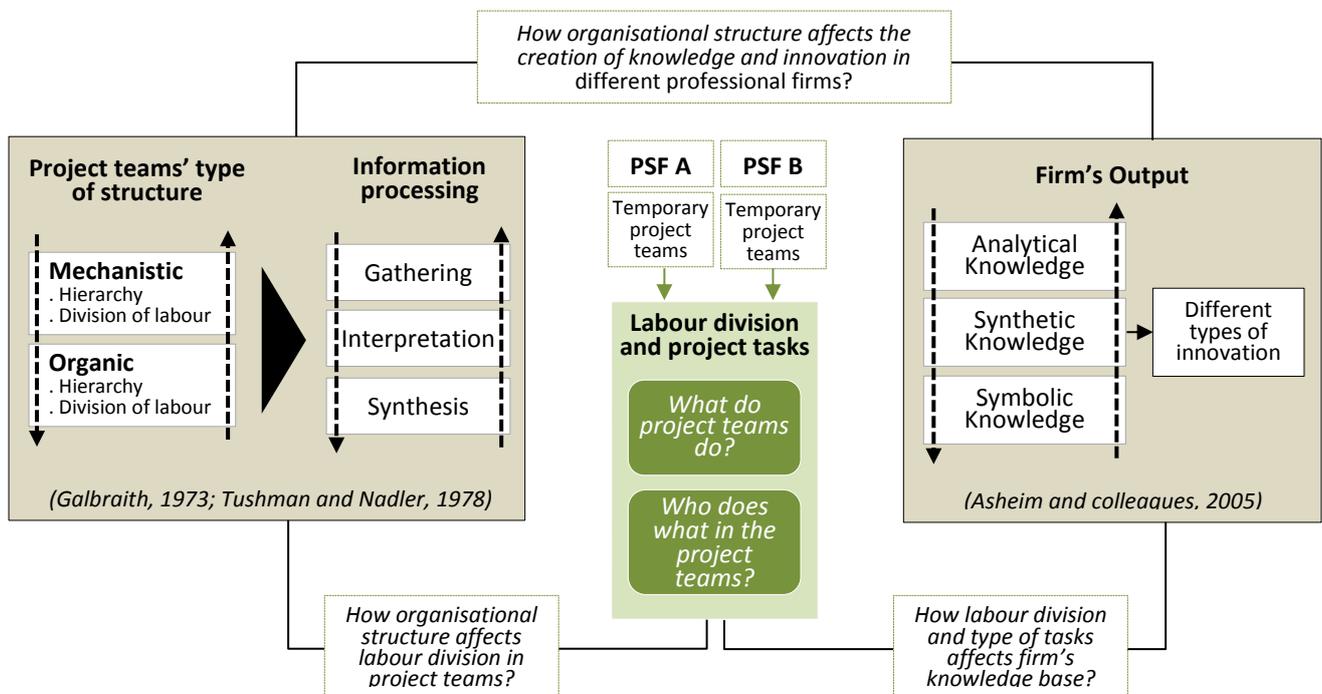


Figure 2 – Model of project team's structure, labour division, task and knowledge bases

3.3 Objective and Research Questions

Considering that organisational structures may vary in the division of labour and responsibilities, nature of tasks, governance principles and mechanisms of communication (Burns and Stalker, 1961, Courtright et al., 1989, Turner and Makhija, 2012), this research study aims to analyse the effect of organisational structure in the knowledge base produced in different types of professional firms. Through the analysis of the nature of task within temporary project teams, and its distribution between different hierarchical

roles, this research aims to understand the process of knowledge creation in different professional firms and its ultimate impact on innovation and firm's competitive advantage.

Research questions and sub-questions of this research include:

Research question 1: Why different professional firms apply different knowledge bases?

Research question 1.1 - How organisational structure affects the creation of knowledge and innovation in different professional firms?

Research question 2: How organisational structure affects labour division in project teams?

Research question 3: How are project teams organised in terms of their labour division?

Research question 3.1 – What is the nature of tasks within the project teams?

Research question 3.2 – How are tasks distributed within project teams? (Who does what?)

Research question 4: How labour division (type of tasks and their distribution) affects firm's knowledge base?

These research questions will be addressed through a qualitative methodology described in the next section of this report.

4. Research strategy

The main purpose of this study is to analyse the effect of organisational structure on project teams' production of knowledge and, in turn, be able to provide information about the impact of structure on the innovative performance of professional firms. As such, the unit of analysis in this research are project teams in both management consulting and architecture firms in the UK. Considering the diversity of these firms (sources of information, work methods and information processing, and business strategies and outputs) the three types of knowledge (analytical, synthetic and symbolic) previously detailed, will be able to be explored since it is expected their differentiated use in these selected sectors. Considering the difficulty of gaining access to specific and detailed documented information, particularly on management consultancies context (Sturdy, 2011, Kipping, 1999), participants will be selected through personal network contacts (of the researcher and its supervisors) and also through the snowball sampling method.

4.1 Multiple case studies methodology

This research will adopt a multiple case study method in the data collection and data analysis. Thus, the expected sample will be constituted by (at least) two different firms in both management consultancy and architecture firms with a focus on (ideally) two project teams in each firm. This type of study consists of empirical research that examines a contemporary phenomenon in its real context, allows multiple sources of evidence and benefits from the prior development of theoretical propositions to conduct data collection and subsequent analysis (Sayer, 1992, Yin, 2003, Voss et al., 2002, Flynn et al., 1990). More recommended on the study of 'why' and 'how' questions, case study research is an empirical strategy that 'investigates a contemporary phenomenon within its real-life context, especially when the boundaries between phenomenon and context are not clearly evident' (Yin, 2003, p.13). Considering the comparison goal of findings across different project teams in different professional service firms, a multiple-case study methodology will be adopted. This method will strengthen the validity of the findings, through the analysis and representation of contextual similarities and differences between professional service firms (Voss et al., 2002, Flynn et al., 1990) .

4.2 Data Collection

The information will be obtain through the triangulation technique - multiple sources of evidence such as company archives and documentation, interviews, participant and outside observation and physical artefacts - (Flynn et al., 1990, Eisenhardt, 1989) in order to assure the validity and reliability of the study. Each one of these sources will demand different methodological techniques and, in combination with the development of a case study database and a coherent chain of evidence, the study will substantially increase their scientific quality (Yin, 2003, Voss et al., 2002).

The research will be carried out in three phases. The study will start with a **pre-test**. This pre-study aims to obtain a detailed understanding of project teams' organisational division of labour by (i) document analysis of timesheet allocation, teams' composition and job descriptions; and (ii) semi-structured interviews with senior elements of the team, in order to understand project teams' type of structure. Through this method, it is expected to collect information about the use of standard operating procedures, extent of centralisation, job classifications, performance evaluations, employee transfers, task forces and compensation.

Based on the existing literature (Tushman and Nadler, 1978, Turner and Makhija, 2012), project teams will be characterised as having a more mechanistic structure when senior elements of the team indicate that the following dimensions are present: (i) hierarchy's supervision with at least three levels of management; (ii) strong dependence on written rules and procedures of operating; (iii) exhaustive

amount of narrowly defined job descriptions; (iv) inexistence of job rotation; and (v) higher specialisation (no overlapping) of tasks between individuals. On the opposite, project teams will be characterised as having a more organic structure when the following conditions are present: (i) hierarchy's supervision with two or one management levels; (ii) flexibility of action that goes beyond the written rules and procedures of operating; (iii) small amount of wide job descriptions; (iv) existence of job rotation; and (v) tasks based on team-work. This method will allow a classification of each project team (in different professional firms) in a continuum that varies between mechanistic or organic type of structure.

The **second phase of the study** aims to identify the nature of the knowledge at the heart of different 'types' of professional service firms, and to understand the relationships between knowledge bases (analytical, synthetic and symbolic), structure and division of labour. Through the conduction of semi-structured interviews with different hierarchical levels at each project teams (at least one interview with each element of the team), interviews will explore the type of tasks undertaken by each element of the team and the amount of time (as a percentage) that each member of the group devotes to each task (e.g. research, analysis, client interaction, documents/ artefacts' development, training and commercial work).

The use of semi-structured interviews will provide a level of in-depth analysis that more general survey methods on larger samples cannot attain, and consequently offers the overlook of rich and new insights (Eisenhardt, 1989, Yin, 2003). The use of multiple case studies addresses internal construct validity concerns by allowing the results to be replicated across cases (Eisenhardt, 1989). Varying firm types will allow a comparison between different types of professional firms and also, an understanding of the specificities of organisational structure and nature of knowledge within each sub-sector.

4.3 Data Analysis

Interviewees' data will be analysed in three phases. First, interviews will be transcribed and analysed to get a broad idea of the content. Second, transcripts will be entered into the qualitative data management software package QSR NVivo and indexed them by case and interview number (Bazeley and Richards, 2000). Finally, in the third phase, interpretation of findings will be created through multiple iterations between the data and pre-existing theory. Based on Miles and Huberman (1994) guidelines, qualitative data analysis will be undertaken through figures and summary tables that frame the relationships between different variables.

4.4 Preliminary Interviews and Preliminary Findings (work in progress)

Prior to the data collection stage, a series of preliminary interviews were carried out with the following goals: (1) determine how the theoretical concepts of division of labour, hierarchy, knowledge bases and knowledge processes could be analysed, (2) identify the main interactions (communication flows) between the different elements of the team, (3) explore the main sources of information and knowledge utilised by each participant, and (4) identify the main tasks undertaken by each consultant on each hierarchical level. To these aims, two different groups of consultants were interviewed during a two month period. Group one: Five elements from a former project team in a Big Four consulting company. Each one of the elements belonged to one specific hierarchical level within the project team. The former project and the different elements of the team were selected with the help of the project manager, the primary research contact for the research preliminary interviews. After the consent of the lead partner, the consultant team was interviewed. Group two: four firm partners from four different UK consultancy firms.

All the interviews were recorded and notes to capture both verbal and non-verbal expressions of the participants were annotated after each interview. The interview transcripts were analysed together with archival data provided by the primary research contact for the project. The later information included job descriptions of each one of the hierarchical elements of the team, information about each element's time allocation to the project, organisational and professional tenure, and project description and characterisation.

These interviews confirmed a few similarities across different types of consulting firms, such as: (1) there is an organization based on temporary project teams with a composition that goes from three to seven hierarchical levels, (2) project teams are selected according to the preferences of the project manager (developed through previous experience on working together), availability of the members and specific expertise required, (3) client projects may have a duration that lasts from two to nine months, (4) project teams vary in dimension, from three to thirteen elements from one single division, and (5) the more senior the professionals, the more they tend to use informal social networks as a source for the required information and knowledge regarding the client project.

These preliminary interviews also suggested interesting dissimilarities between the different types of consulting firms, specially related with the way they access and manage knowledge within the firm. First, although they all use different sources of knowledge to access information and knowledge within their company (e.g. databases, organisational web-based systems, business reports and knowledge sharing meetings) they differ in the way they rely on informal social networks for that end. From this preliminary content analysis two main and contradictory views have emerged. First, from one consultancy firm (more operational one) (type of firm A) the Partner (and other senior elements of his

team) claimed to make a great use of informal social networks in order to prepare for the forthcoming projects and collect crucial information about the client, industry or expertise area:

“The first thing I do – and that I encourage my team to do – is to first send an email to a few people in my network requesting information (...) Other people inside the firm are our main sources of knowledge (...) Everyone should first seek for information near other professionals inside the firm. This is how people learn here (...) Network is everything in this industry”.

From a different type of consultancy firm (a more strategic and boutique one) (type of firm B) the Partner argued that their internal procedures and methodological culture of knowledge management permits a systematic integration of the information after the completion of each client project. And that makes the use of other people only as a last resource:

“Looking for information among other consultants inside the firm is a waste of time (...) that is the last option (about sources of information) we consider when we are preparing ourselves for the next project”.

They also differ in the way they see their firm’s ability to systematically integrate their project team’s knowledge. The Partner from “Firm A” assumed that he knows that knowledge management and integration is necessary in this knowledge business, but there is no methodical way of doing that in the firm:

“We definitely don’t have an effective way of integrating the information and know-how that we generate together with the clients after the end of each project (...) I wish we were better doing that (...) I personally don’t know how that is possible...You tell me (laughing)”.

The Partner from “Firm B” also added the following, while explaining why informal social networks do not work as a main source of knowledge:

“Our main sources of information are the mechanisms provided by the firm and managed by the people. We take good care of our information and we try to keep records of our knowledge (...) how do we differentiate from others? We just recruit intelligent people...90% of our professionals have a PhD degree”.

This preliminary analysis has attracted interest in the differences among various types of professional firms in the way they integrate their project teams’ knowledge. Future developments in this research should also try to analyse the knowledge integration capability of these firms with the different knowledge bases (e.g. The knowledge base of the firm affects a firm’s knowledge integration capability) and also with the professional’s level of education/ employee’s degree (e.g. Firms with a higher

educational level of their employees are more likely to systematically integrate their project teams' knowledge). Many studies have tried to understand how groups manage to coordinate their individual knowledge and transform these into a collective and combined result. The ability of integrating knowledge in a systematic way, instead in an ad hoc way is a determinant for the success of the final solution/ output. A disorganised and disintegrated method of work and communication among different elements of the team can affect the team's performance (Gardner et al., 2012).

Earlier studies have strongly focused on the identification and analysis of knowledge flows among team members, but there is a gap in the literature regarding the way the elements of the team integrate the knowledge inside the project teams in a systematic way (Gardner et al., 2012).

5 Research originality and contribution to knowledge

This research started from the premise that there are three main gaps on PSFs and knowledge literature. First, as stated by a few authors (Von Nordenflycht, 2010, Malhotra and Morris, 2009) little of prior research has focused on the study about the specificities of each professional services and their comparison. In an attempt to address this problem, this study seeks to study temporary project teams in different types of professional service firms, particularly comparing and contrasting management consultancy and architecture sectors. Second, little consideration has been given to the direct analysis of organisational structure (Asheim et al., 2005), hierarchical relationships and division of labour as a way to generate and exploit new forms of knowledge. Therefore, another theoretical motivation of this research is to provide a deeper understanding of the nature of knowledge at the heart of professional firms, and in examining the relationships between 'knowledge bases' (including analytical, symbolic and synthetic), organisational design and division of labour in these firms. Finally, parallel to the previous problematic, there is a recognition between scholars, that in the study of innovation and knowledge based services, there is a lack of research in the analysis of the research and development type of activities (Roper et al., 2008, Tether, 2003). By focusing the study on the division of labour of different types of PSFs, this research will be also focused on the nature of tasks undertaken by different hierarchical roles in project teams. Therefore, the results of this study will offer a relevant understanding of what exactly professionals from these temporary systems do, and to what extent their day-to-day tasks may be considered research and development type of activities.

There has been a shift in the studies of innovation, from a focus on manufacturing firms and scientific and technological disciplines, towards new concerns related to knowledge based services. As a result of a knowledge based society, management theorists have increasingly focus their efforts in the understanding of new 'types' of knowledge (and the ability to create and exploit organisational

knowledge) as well as on the intangible nature of their services and products as a strategy to sustainable competitive advantage. Thus, from a practical perspective, this is an interesting and significant topic. By the understanding of the relationship between structure, hierarchy and division of labour, knowledge based firms will be able to better manipulate their resources in order to produce the needed knowledge and manage important sources of innovation and competitive advantages in their professional service firms.

Acknowledgements

I am grateful to Elaine and Bruce for their strong support; to Alistair for his collaboration on the preliminary phase of this research project and to the companies who participated in the pre-test interviews.

The financial support of the RADMA doctoral studies award is gratefully acknowledged.

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