

Towards a taxonomy for Business Service Innovation - Literature Review

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1. Introduction

A vast number of studies have compared innovation in service and manufacturing sectors, with the aims of showing that service firms are in fact innovative and of investigating whether any differences exist. However, comparing services and manufacturing is not enough to understand service innovation; the service sector is very heterogeneous and we need to examine the diversity of service firms in order to inform effective policymaking.

The more service firms are recognized as innovators, the more important capturing this diversity becomes. This was pointed out by Tether (2003). Old 'one-size-fits-all' theories of service innovation placed all service firms as adopters or supply dominated. This view made it less important to account for heterogeneity. However, changing understanding of service firms as (a potentially diverse group of) innovators requires greater look at the variety of services – activities, strategies and innovation processes.

Service firms range from the most technological to the least advanced...and everything in between; diversity that is arguably far greater than that within the manufacturing sector (Miles, 2005). Personal services typically involve basic skills and technologies, and are organized on a small scale. In hotels, restaurants and catering, the focus is on food preparation and delivery, entertainment and experiences. Tourism has elements of distribution and experiences, and is highly dependent of culture, events and nature. Health, social and education services rely on a mix of high and low level skills and a strong or full presence of the public sector as a provider. Distributive services range from transports and logistics, which rely heavily on physical capital and infrastructure, to retail and wholesale trade to technology intensive telecommunications. Financial, insurance and real estate services are typically large scale firms with a heavy reliance on advanced information technologies. And business services range from manual services such as cleaning and other office and building services to administrative services such as accounting and law, to technical services such as computing and engineering.

The term services cover a broad range of activities. In the private sector, there are activities such as wholesale, retail, hotels, restaurants, transport, communication, financial services and business services. In the public sector there are service activities within education, health, administration and defence. Furthermore, manufacturers also produce services or have a lot of service activities in house. The focus of this study is business services. Activities within business services go from advertising, creative technical, testing and legal services, to computing, research and industrial cleaning. Even though the business activities differ, they have several common features: the services serve businesses rather than end consumers and are therefore often an intermediate before final consumption; they are more traded than most other services, and some are becoming increasingly global in their delivery and production.

As stressed above, the diversity (and ubiquity) of services means that it is not enough to analyse services as one group in comparison with manufacturing. And, the immaterial nature of services implies that services should be considered as activities and not tangible objects. Hence, it may often be instructive to examine services in terms of activities instead of firms.

On the other hand, if we are going to understand this diversity and its implications for service innovation policy, a simplifying framework is needed to capture the most central features of service activities. A main objective of the ServINNo project is to develop a taxonomy for business service innovation that captures diversity in business services in a meaningful way. This paper provides an overview of relevant literature typologies of services and service innovations and key elements towards the development of a services typology.

2. Service typology literature

Most of the literature that addresses variations in services are found in the professional service firm research (e.g. Hansen et al., 1999; Løwendahl, 1992; Løwendahl, 1997; Maister, 1993). However, the unit of analysis has rather been professional service firms (Løwendahl, 1992; Løwendahl, 1997), type of projects (Maister, 1993) and knowledge management strategies (Hansen et al., 1999) than professional services. We argue that professional service work (PSW) can be found in labour intensive and capital intensive organizations as well as in knowledge intensive organizations. The table below (table 1) summaries analytical focus, key dimensions and types of professional service work in previous research.

Løwendahl (1992, 1997) argues that professional service firms can choose between three different generic strategies – output based, client relation based, and creativity based strategies. She suggests that regardless of industry these three strategies seems to coexist (Løwendahl, 2000). However, it seems difficult for any firm to deliver superior performance based on multiple strategies simultaneously. The two fundamental dimensions driving differences across firms are the characteristics connected to the *resource base* (the role of the professionals in value creation) and *the strategic focus* in terms of what kind of superior value the firm seeks to deliver to its clients (types of projects). These dimensions are deduced from four critical dimensions that make professional service firms fundamentally different - repetitive versus ad hoc service delivery, individual versus team-based delivery, personal versus proposal-based service sales, and finally, application of existing versus development of new solution (Løwendahl, 1997, 2000). In addition she argues that the maturity and the size of the firm are relevant in order to explain professional service firm heterogeneity.

TABLE 1: Unit of analysis, key dimensions and types of professional service work in previous research

UNIT OF ANALYSIS	KEY DIMENSIONS	SUGGESTED TYPES	STUDIES
Resources and strategic focus	Repetitive versus ad hoc service delivery Individual versus team-based delivery Personal versus proposal-based service sales Application of existing versus development of new solutions Maturity Size	Output based (solution) strategies Client relation based strategies Creativity based (problem solving) strategies	Løwendahl (1992, 1997)
Client needs	Expertise Experience Efficiency Maturity	Brains Grey haired Procedure	Maister (1993)
Value configuration	Value creation logic Primary technology Main interactivity relationship logic Primary activity interdependence Key cost and key value drivers	Value chain Value shop Value network	Stabell & Fjeldstad (1998)
Knowledge management strategies	Economic model Knowledge management strategy Information technology Human resources	Codification Personalization	Hansen, Nohria & Tierney (1999)

Maister (1993) argues that the firm's leverage is a pre-eminent factor when it comes to the professional service firm's ambition of delivering outstanding client service, satisfying the professionals and achieves financial success. Firm's leverage is understood as the composition of the resource base and in particular the ratio of junior, middle-level, and senior staff in the firm's organization. The heterogeneity among professional service firms is defined by client needs. The types of client needs lead to three types of practices or projects which distinguish professional service firms – expertise (brains), experience (grey haired) and efficiency (procedure). In *brains* the client's problems are at the forefront of professional and technological knowledge, or at least very complex. The professional service firm are typically hired because they are smart, and the projects are usually conducted by middle-level and senior staff. Each project is often one of a kind. The second type is the *grey haired* where the clients typically hired the firm because they have relevant experience and has practice at solving the particular type of problem. Typically more junior staff is involved in solving grey haired problems compared to brains. The third type of projects is called *procedure projects*. The client may have the ability and resources to perform the work itself, but turns to the professional firm because they can perform the service more efficiently. Of the three project types, the procedure projects usually involve the highest proportion of junior time relative to senior time. Maturity is also an issue discussed by Maister. He argues that the more mature the professional service firm gets, the more likely it is to increase the proportion of juniors compared to seniors, and take on projects that are

similar to what the firm has undertaken earlier. In other words, the professional service firms tend to move towards procedure projects and grey haired projects as they mature.

Stabell and Fjeldstad (1998) argue for three generic types of value configurations – value chain, value shop and value network. They build on Porter (1985) and Thompson's (1967) typology of long-linked, intensive, and mediating technologies. They have several categories to distinguish the three value configurations (Stabell and Fjeldstad 1998:415). Variations in several organizational characteristics explain the three different value configurations. For our purpose the value creation logic, the primary technology, the main interactivity relationship logic, the primary activity interdependence, and the key cost and value drivers (competitive advantage) are the most relevant. When it comes to PSW the value shop is the most predominant configuration. The value creation logic is based on (re)solving customers' problems and the production process relies basically on intensive technology. The main interactivity relationship logics are cyclical and spiralling. This means that the flow of activities are iterative between activities and cyclical across the activity set (Stabell & Fjeldstad, 1998). The wheels-within-wheels metaphor (Simon, 1977) is used to explain the relationship between the activities in the value shop. The activity interdependence in a value shop configuration can be of all three types suggested by Thompson - pooled/standardization, sequential interdependence/planning and reciprocal interdependence/mutual adjustment (Thompson, 1967). Pooled interdependence is coordinated by standardization, and is least costly in terms of communication and decision effect. Sequential interdependence is coordinated by planning and is intermediate in effort required. Reciprocal interdependence is coordinated by mutual adjustment and is most demanding of communication and decision effort. Stabell and Fjeldstad argue that competitive advantage is primarily gained by focusing on increasing the organization's reputation. We also argue that some types of PSW are similar to the value chain configuration (Porter, 1985; Stabell et al., 1998), e.g. software development and laboratory experiments are more characterized by the application of a long-linked technology rather than an intensive, but still it can be defined as PSW based on the characteristics of the people involved in the production process, the interaction with the client, and the intangibility of the service. The value creation logic of the chain is based on transformation of inputs into products. The relevant metaphor is the production line. The main interactivity relationship logic is sequential and the primary activity interdependence is pooled and sequential. The competitive advantage is primarily gained by focusing on the cost side (scale and capacity utilization).

Hansen, Nohria and Tierney (1999) have a particular focus on knowledge management. However, their paper is of particular relevance since their study object is management consulting which is a type of PSW. They argue that management consulting companies can gain competitive advantage in two fundamental ways; by applying a codification knowledge management strategy or a personalization knowledge management strategy. Hansen et al. argue that the two types of knowledge management strategies cannot be combined. They will undermine each other.

Therefore, underlying the categorization of what creates competitive edge for the management consulting companies is a belief that these firms have different production logics and variations in the activity set. Hansen et al. suggest that economic model, knowledge management strategies, use of information technology and human resources policies explain variations in the production logic of management consulting companies. The reuse and the expert economic model are visible in management consulting. These two models have clear overlaps to Løwendahl's output based and creativity based strategies, and Maister's efficiency and expertise projects.

Based on previous research on professional services, **degree of standardization and degree of client interaction** seem to be two important categories that distinguish professional services. In addition, several have described types of services. Table 2 summarizes previous research addressing types of services.

3. Categorization of business services

Several researchers have also developed taxonomies of business services. In the following we present some examples of previous taxonomies.

Thomas (1978) uses six main categories of services based on the characteristics of their resources. The services are divided into two groups - equipment based services and person based services. Lovelock (1983) uses distinctions related to the objects of the services. Reich (1991) proposes a typology based on education and value creation. Løwendahl (1999) looks at different services according to variations in input factors and types of service delivery. Fitzsimmons and Fitzsimmons (2004) look at characteristics of services. Ramírez (1999) focuses on that value is mutually created by the customer and the producer. His research shed important light on the issue of client interaction. The most interesting input from these categorizations is Ramírez' description of the relationship between the service provider and the customer in value co-production.

TABLE 2: Unit of analysis, key dimensions and types of services in previous research

UNIT OF ANALYSIS	KEY DIMENSIONS	SUGGESTED TYPES	STUDIES
Resources	Six main categories of services based on their resources: Equipment based services versus person based services	<p>Equipment based services: Automated (e.g. machine-sales, car washing machine, mini bank, phones) Combined with unskilled labor (e.g. taxi, cleaner, cinema) Combined with skilled labor (e.g. air traffic services, mechanical digger work)</p> <p>Person based services: Based on unskilled labor (e.g. gardening, guard services, cleaning) Based on skilled labor (e.g. plumber, electrician, catering, hair saloons) Based on professional labor (e.g. lawyers, doctors, consultants, accountant)</p>	Thomas (1978)
Object of the services	Object versus individuals versus organizations	Objects (e.g. garden, house, car) Individuals (body and soul) Group of individuals or organizations	Lovelock (1983)
Education and value creation	Routinized versus in-person services versus symbolic analytical	Routinized services through standard processes and rules; in person services demands personal presence with individuality (waiter, hairdressers, secretaries); symbolic-analytical includes manipulating and analyzing symbols (researchers, designers, investment bankers, consultants)	Reich (1991)
Service delivery	Different services according to characteristics with the service delivery process	Change, improvement or maintenance of physical products Services through vicarious activities (real estate) Services through competence (lawyers) Services as intermediary (agents) Services through communities and risk reduction (insurance) Services through access to infrastructure (hotels, fitness studios, car rentals) Services through interaction with others (theatres, restaurants)	Løwendahl, (1999)
Value creation	Value creation related to actors role and interactions	Do it yourself Sequential value creation (McDonalds) Sequential value creation with feedback loop (module based orders – Volvo; measure based orders; tailor made orders) Simultaneous presence (the service is made on/with the customer - hotels; or the customer takes part in the value creation process – course) Intermediary presence (telecom services, travel agencies)	Ramírez (1999)

In addition two typologies have been developed by SINTEF KUNNE, one is related to professional service work and the other is related to international services. Kvålshaugen, Carlsen et al (2005) have identified seven types of services related to degree of standardization and client integration:

- **Specialized services** – this type of service work typically involves a high degree of customization to unique client needs and has a strong component of personal interaction with clients, both in specification of deliverables and in the subsequent work performance. The content and sequence of work activities are normally unique to the contract, though they may rely on higher order methods, recurrent concepts and idiosyncratic language terms. Some explication of conceptual tools is normal, but the basis for advanced levels of practice performances normally remains tacit. Specialized services typically entail informal and close-knit coordination with large amount of autonomy and little predetermination of work processes.
- **Standardized services** - are adaptations of ready solutions to client specifications. This activity system presupposes that groups of client requests are sufficiently predictable and recurrent to justify standardization, *and* that the work activities necessary to meet such demands are of a reasonably explicable, repeatable and stable nature. Standardization means matching of activity patterns with demand patterns over time. Much of the content and sequence of work activities is predetermined. The degree of explication of methods and processes is high, and junior staff is often assigned responsibility for subsets of activities. Coordination may nevertheless be substantial due to dependencies between sets of standardized activities, for example between various forms of projecting in construction. The source of competitive advantage here is ability to reap margins from mass customization of high quality services to low cost.
- **Service with product** - is the twin of standardized services and has many of the same characteristics. The difference lies in the degree to which the design of what is offered is predetermined internally or by clients, and if some (large) part of the service may be produced for stock. The two activity systems are partially overlapping areas along a spectrum rather than mutually excluding categories. Indeed Løwendahl's (1997) 'adaptation of ready solutions' applies to both categories. However, unlike 'standardized services', 'products with services' typically imply emphasis on proprietary product designs. Also, production and consumption may be separated. Relative to the conceptualizations made by Stabell and Fjeldstad (1998), 'standardized services' are value shops whereas 'products with services' are value chains. The difference between the two activity systems is most easily illustrated by the difference between 'proprietary software' and 'software made to order' (however foreseeable and repeatable the latter may be). Other examples show more subtle differences.
- **Radical innovation services** - are geared to bring about radically new methods, concepts, theories, services and products. The demand for novelty and departure from established ways of working and thinking results in a set of work activities where the source of competitive advantage is creativity and ability to explore the outskirts of one or more domains. Work is only partially based on end user

specifications and participation. Third party involvement from funding institutions, e.g. research associations or internal venture funds, is normal in all phases of work. Paradoxically, while radical innovation services often imply lower degrees of explication than for specialized services, they frequently also allow junior staff in key roles. Lack of previous experiences may be outweighed by knowledge of upcoming fields and fresh approaches. For the same reasons, work is often interdisciplinary.

- **Integrated solutions** - as an activity system presupposes a buying pattern where a sufficient amount of clients are willing to outsource the integration of an entire set of services and products tailored to meet a complex need. This activity system thus means partly or fully taking over a set of client activities. The basis for competitive advantage here is the holistic understanding of a set of complex needs and the ability to combine the best available services and products to meet that need. Project management needs to be mastered at very high performance level. Client needs are normally unique, though recurrent patterns of solutions allow predetermination of modules of standardized services and products. Integrity on behalf of client needs may mean choosing competitors as subcontractors in areas where they have parallel and superior services to ones own organization. Client interaction is typically very high during specification, testing and implementation, and less intense during production.
- **Management for hire** - entails leasing of individuals to clients for temporary management of projects or functions. This activity system is the twin of integrated solutions services. The main difference is less interaction with – and greater freedom from, one's mother organization, and even higher degrees of interaction with clients. The persons that are hired by the client organizations typically have backgrounds as managers of integrated solutions services, though their function in the client organizations is not limited to such activities. The source of competitive advantage rests on the ability to combine good individual client relationships with the accumulation of attractive management competence on the relevant management domains. Hence, there is a mixture of individually and organizationally controlled resources.
- **Information handling** – this activity system originates from the quality and knowledge of a set of defined information resources, not distinct user needs or methods. These information resources are maintained and often made available for a variety of specific uses. Information management services typically underpin other activity systems, and direct end user contact may be modest. A survey service of the business intelligence unit of an international consulting firm may serve as an example. Over the years this firm has developed an advanced consumer segmentation tool and collected extensive data sets on psychological profiles of consumers in various countries. This information resource is used actively in single client consulting (specialized services), as the basis for handling recurrent requests on consumer behavior (standardized services) and a subscription service (products with services).

Breunig and Hydle (2005) have used 3 types of services; Repetitious, Unique and Continuous. Based on knowledge processes and collaboration in international business networks, some critical distinctions between activities that affect operational, organizational, and strategic issues in international organization were observed. The distinction between the three types of services is according to activity. These distinctions have managerial implications, and several organizations will have parallel types of activities whilst the organizational structure favors only one type.

- **Continuous services** are present all the time. These services are so embedded in everyday work activities that it is only in situations of system failure that users become aware of them. We have observed that these services are amenable to a pricing strategy of license- or subscription design. Contracts are often quite detailed, with technical descriptions of support and level of involvement from the service provider. This type of service requires attention and investments in the system and effective utilization of ICT.
- **Repetition services** are tailored to solve recurring problems. Such services address known problems where a solution can be provided e.g. through analysis. Thus prices and deliveries can be specified. These services may be subject to industrialization of processes as methods and procedures can facilitate the service performance. Industrialization implies less dependency on individuals and context. Consequently, this type of service requires attention and investments in methods, processes, procedures, and best practices.
- **Unique services** address problems that are new or unknown. Sometimes the service is to identify the problem itself. This type of service comprises advice and consultancy services that require expertise, good judgment, and tacit knowledge. The service is more complex, experience- and judgment based. It is difficult to standardize this type of service because individual qualities and relations are often determining factors. It is also difficult to predict and specify the delivery in advance, thus we have observed that a pricing strategy of hourly rates is commonly used. Furthermore, we have noted how this type of service requires attention and investment in grooming the organization's human resources.

ECON/Menon (2005) base their typology on Stabell and Fjeldstad (1998) which is presented earlier in this paper. In addition to production of goods (value chain), problem solving (value shop) and mediation (value network), they propose two additional types of generic services - support services and experience services. The goods production are services connected to goods production (services provided by manufacturing firms); problem solving services are services that provides solutions to customers' specific problems; assisting services are assisting services to customers, such as cleaning, security, and food services; distributive services are distribution of both material and immaterial products; and leisure services are services providing entertainment and/or experiences.

4. Towards a typology of service activities

Key insights of the literature above are that the service typology focuses on how services are delivered with particular emphasize on how the activities are performed, e.g. central characteristics of the activity set. The unit of analysis is services not organization. By applying this approach we also capture services that are performed in manufacturing companies along with services performed in service organizations.

There are several categories that can explain why we have different types of services such as:

- degree of standardization/customization (e.g. Hansen, Nohria, & Tierney, 1999; Kvålshaugen, Carlsen, Gjersvik, & Mortensen, 2005; Løwendahl, 1997; Maister, 1993; Reich, 1991; Schmenner, 1986),
- degree of client interaction/client co-production (e.g. Bitner, Faranda, Hubbert, & Zeithaml, 1997; Kvålshaugen et al., 2005; Larsson & Bowen, 1989; Lovelock & Gummesson, 2004; Løwendahl, 1997; Ramírez, 1999),
- major resource input (labor intensive/capital intensive/knowledge intensive) (e.g. Hansen et al., 1999; Lovelock & Gummesson, 2004; Løwendahl, 1997; Reich, 1991; Schmenner, 2004; Thomas, 1978),
- individual or team service delivery (e.g. Løwendahl, 1997),
- client needs (e.g. Lovelock, 1983; Maister, 1993),
- value configuration (activity set) (e.g. ECON/Menon, 2005; Stabell & Fjeldstad, 1998)
- relationship coordination (interactivity relationships logic) (e.g. Stabell & Fjeldstad, 1998), and
- degree of perishability (possibilities of storing, reusing, reselling, and returning services) (e.g. Lovelock & Gummesson, 2004).

4.1. The categories

Two categories, or dimensions, that have central importance in service activities are degree of standardization and degree of client interaction. These categories are found to create variations in service delivery in previous research. Standardization means matching of activity patterns with demand patterns over time. The opposite of standardization is customization. The service delivery can be described with regard to repetitive versus ad hoc service delivery, and application of existing versus development of new solutions. Degree of standardization is addressed as a variable that causes variation in service delivery by Hansen, Nohria, and Tierney (1999), Kvålshaugen, Carlsen, Gjersvik, and Mortensen (2005), Løwendahl (1997; 1999), Maister (1993), and Reich (1991).

The extent of value co-production is another variable that explains variations in service delivery. Degree of client interaction is related to how involved the client/customer is in the service delivery. Normann (1984: 16) describes services as “the result of social acts which takes place in direct contact between the customer and representatives of

the service company". Inspired by Normann, Ramírez presented the concept of value co-production in an article in *Strategic Management Journal* in 1999. Value co-production can be understood in terms of how the provider and client coordinate their work (co-production) and in the process both create and capture value (transformation). Degree of client interaction has been applied as a variable that explains variation in service delivery by Kvålshaugen et al (2005) and Ramírez (1999). Examples of variations caused by degree of client integration are sequential value creation, sequential value creation with feedback loop (e.g. module based orders – Volvo, measure based orders, tailor made orders), simultaneous presence (e.g. the service is made on/with the customer - hotels; or the customer takes part in the value creation process – course), and intermediary presence (e.g. telecom services, travel agencies) (Ramírez, 1999).

The following table addresses the different generic service types and suggests various characteristics associated with them. The table contains a broad list of characteristics, some differing greatly in terms of importance.

TABLE 3: Characteristics of the various services

CHARACTERISTICS	TYPE OF SERVICES			
	Specialized services	Expert Services	Standardized services	Client Services
Services	Specialized services	Expert Services	Standardized services	Client Services
Degree of Standardization	Low	Low	High	High
Degree of Client Interaction	Low	High	Low	High
General examples within professions	Report from lawyers, engineering services	Diagnosis medical doctors, commission research	Routinized services, product with services, solution based services, tourist	Management recruitment, house consultants
Descriptions of types of services	Which laws apply related to a specific problem; which standards apply related to product launch in a new market	What is the issue and how to solve it? Understanding the type of problem that is not clear, could be unknown. Trying to find relevant and different solutions	The issue and ways of solving it is known. Type of problem/challenge and method to solve the problem/go about is clear. Methods are known and outcome is known	Methods are known, but outcome is tailor made to each client
Types of delivery	Advice; guidance; answer to questions	Diagnoses, tailor made descriptions/advice related to a concrete problem	The delivery is known to the customer before advices are asked for.	Strategic roadmaps, descriptive ways of working with an entire set of challenges
Types of knowledge input	A lot of formal knowledge and experience ex ante; applying existing knowledge on a specific problem	Existing formal knowledge and experience applied in a new setting;	Formal knowledge and experience applied to known challenges.	Formal knowledge applied to unknown challenges.
Types of situations and solutions	Known situation, known solutions	Unknown situation and unknown solution	Unknown situation, known solutions	Known situation, unknown solution
Types of investments	Infrastructure, formal knowledge	Formal and informal knowledge, personal contacts	Formal knowledge, infrastructure and methods	Informal knowledge, personal contacts, and methods
Types of management	Line management	Project management	Process management	Trust based management

Characteristics	Type of Services			
Type of innovation	Innovation related to distribution of tasks; diffusions of FAQs; innovations related to efficient infrastructure for information	Innovation related to problem solving, cooperating patterns with boundary expertise; CoPs	Innovation related to new and better practices/processes to perform the work; better methods.	Innovation related to customer relations and trust based developments; Innovation related to methods
Dependent on people	Not dependent on a specific person	Dependent on personal contact and personal skills	Not dependent on a specific person, but high skills	Dependent on personal contact, specific persons and skills
Learning/training requirements	General specialists with quite a broad area of expertise	Highly specialised with a sound understanding of customer requirements/ translation skills	Deeply specialised into one area	General client understanding and generally specialised into different areas
Daily learning	From procedures, standards, laws; from the framework the problem is occurring	From the challenge of both activity and client	From activity, products, tasks at hand; from method	From client, and method
Types of payments	Hourly rates; Service Level Agreements	Hourly rates	Fixed rates	Service Level Agreements
Cost drivers	Capacity utilization ¹ Scale ²	Capacity utilization Learning ³	Capacity utilization Scale	Capacity utilization Learning
Value drivers	Reputation (external) Service quality	Reputation (external) Learning ⁴	Reputation (external) Service quality	Reputation (internal)

¹ Capacity utilization is primarily related to billable hours.

² Scale is related to using the same methods and tools in a larger market (market penetration, market development)

³ Learning as a cost driver is related to doing the tasks more effective and efficient over time.

⁴ Learning as a value driver is related to increased experience is likely to add value to the customers.

5. Service innovation

The aim with the identification of a service typology is to understand how innovation takes place in relation to the different service types, i.e. how organizations renew and create different types of services (the archetypes). There are several examples of describing service innovation in the literature (see appendix 3 for an overview).

Salter and Tether (2006) provide an overview on innovation in services and point to fundamental character of innovation in knowledge intensive service firms (KIFs) as being (p.17):

- the role of highly skilled labor in the creation and exploitation of new solutions (major source of innovation),
- the importance of new organizational practices, such as the use of KM systems, in supporting the realization of new innovative opportunities (process innovations),
- the generative dance between clients and produces as new solutions are negotiated and co-produces between different actors (learning on the boundaries of the organization),
- the key role of social networks in generating and supporting knowledge creation and exchange through brokerage and closures (the importance of social networks in knowledge transfer), and
- the ad hoc or informal organizational form of most knowledge-intensive service firms (self-organizing innovations).

Their research identifies important variables in order to understand how services are created and renewed.

OECD KISA (2006) focuses on service activities, where “Knowledge Intensive Service Activities” is defined as: *“Production or integration of service activities, undertaken by firms and public sector actors – in the context of manufacturing or services, in combination with manufactured outputs or as stand-alone services”* (OECD, 2001, 2003, 2004). OECD KISA project looks at service related innovation from multidimensional nature of innovation and taxonomies based on the sources or drivers of innovation (van Ark, Broersma, & Hertog, 2003) – see also appendix 3 for more details:

- Paradigmatic innovations: Complex innovations affecting all actors in the value chain such as new technologies or regulatory changes
- Supplier-dominated innovations: Technological innovations
- Customer-led innovations: Specific needs articulated by clients
- Innovation within services: Taking place within the service organization
- Innovation through services: Service supplier influence innovation within the customer organization

They present a typology classifying KISA on the basis of their relation to innovation:

TABLE 4: KISAs and types of innovations

TYPES OF KISA	CHARACTERISTIC OF KISA, INTERNAL OR EXTERNAL TO THE ORGANIZATION	CHARACTERISTICS OF INNOVATION
Renewal KISA	Renewal, R&D in any part of the value chain	Innovations in products, processes, services, organizations, markets and value chains. Incremental and radical
Routine KISA	Routine matters (ICT, maintenance, ISO accreditation, market research)	Innovations in company procedures and structures
Compliance KISA	Comply with regulatory systems, taxation regimes	Incremental innovation in procedures, processes, product/service, structures, equipment, facilities and work units
Network KISA	Network of actors; complementary skills	Pre-market stages of innovation, e.g. standards in software

They conclude by stating that innovation in services points to continuous learning and adaptation, innovation is focused around organizational change, emphasizing social technologies, communications, team work and problem solving, that there are poor measures of innovative activities in services, and finally that we lack evidence of that innovation in services hinders the development of policy towards services.

Another promising service innovation typology is presented by ECON/MENON (2005). In their report they present five indicators which are viewed as of major importance for innovation in services. The indicators are divided into *input indicators* as R&D investments, training programs and R&D cooperation, and *output indicators* that are measuring innovation and their effect on value creation and productivity. Variables used are:

- Share of firms having innovation based activities (input indicator)
- Total innovation activity measured in currency (input indicator)
- Share of turnover related to new products (output indicator)
- Mobility indicator (surrounding and output indicator)
- Growth in gross production per employee (output indicator)

Apart from looking at innovation types as product innovation, process innovation and organizational innovation, they look at the linear innovation process following Rogers (1995) in how innovations are created, developed and implemented. They opt for a separation of the innovation process as:

- Generation and development of an idea (generation), and
- Implementation and commercialization of the idea (commercialization)

Furthermore, they discuss other important dimensions of innovation such as degree of change, who the innovation is for, drivers behind the innovation, organizational framework for the innovation and availability of the innovation. ECON/MENON further discusses what kind of innovations that are possible to identify related to the service types. They propose four types:

- Innovation in problem solving
- Innovation in support services
- Innovation in communication services
- Innovation in experience services

Table 5 provides additional details on the different types of innovation.

TABLE 5: Service innovation typologies

UNIT OF ANALYSIS	KEY DIMENSIONS	SUGGESTED TYPES	STUDIES
Service innovations	Firms' innovations, with a focus on who develops the innovation. The services are supposed to be universal to all services such as intangibility, inseparability, heterogeneity and perishability (Zeithaml, Parasuraman, & Berry, 1985)	<p><i>Supplier dominated innovation</i> - innovations (new technology) that are adopted from other (i.e. manufacturing) firms. While the firm is not involved in the development of the new technology, its implementation may involve organizational change.</p> <p><i>Innovation within services</i> – in this type, the development and implementation of the innovation takes place within the firm itself. It may involve both technological and non-technological changes.</p> <p><i>Client-led innovation</i> – the innovation is driven by users needs and may be developed in cooperation with customers.</p> <p><i>Innovation through services</i> – the firm develops and implements an innovation for a customer (i.e. it is an innovation for the customer, and not necessarily for the firm itself)</p> <p><i>Paradigmatic innovation</i> – an innovation that affects all actors in a value chain</p>	de Jong et al (2003) and van van Ark, Broersma, & Hertog (2003)
Techno-logical innovation	Make categories of innovation based on characteristics of the industry	<p><i>Supplier dominated sectors</i>: Public or collective goods (education, health care) and personal services (food and drink, hairdressers, etc)</p> <p><i>Production-intensive sectors</i></p> <p><i>Scale-intensive sectors</i>: Services involving back-office administrative tasks (IT)</p> <p><i>Network-sectors</i>: Services dependent on physical networks (transport, telecom, insurance)</p> <p><i>Specialized technology suppliers and science-based sectors</i>: Software, business services, technical and design services</p>	Miozzo and Soete (2001)
Innovation related to service types	Different product-, process- and organizational innovations that are possible to find related to the service types. Major focus on product, process and organizational innovations	<p><i>Innovation in problem solving</i>: Product innovations (new concepts, brand names for packages); process innovations (tools for diagnoses, analysis); organizational innovations (related to competence and incentive systems)</p> <p><i>Innovation in support services</i>: Product innovations (new services for outsourcing); process innovations (standardization of work processes, certifications); organizational innovations (administrative systems)</p>	ECON/MENON (2005)

		<p><i>Innovation in communication services:</i> Product innovations (new ways to communicate and communication of objects); process innovations (effectiveness and automation of interfaces); organizational innovations (customer segmentation)</p> <p><i>Innovation in experience based services:</i> Product innovations (surprise element); process innovations (storing and distribution of experiences); organizational innovations (coordination challenges)</p>	
Multidimensional nature of innovation	Service innovation is placed in the middle with five dimension	Technology and product related dimensions, Delivery system related dimensions, Organization related dimensions, New network and value chain configurations, and Customer interaction related dimensions.	(Kuusisto, 2005)
Knowledge intensive service activities related to innovation	Characteristic of KISA, internal or external to the organization	<p><i>Renewal KISA:</i> Innovations in products, processes, services, organizations, markets and value chains. Incremental and radical</p> <p><i>Routine KISA:</i> Innovations in company procedures and structures</p> <p><i>Compliance KISA:</i> Incremental innovation in procedures, processes, product/service, structures, equipment, facilities and work units</p> <p><i>Network KISA:</i> Pre-market stages of innovation, e.g. standards in software</p>	OECD KISA (2006)
Relations between service characteristics and innovation characteristics	Service characteristics are: Intangibility, inseparability, heterogeneity, perishability and information intensity, which in turn influence innovation process, type and results.	<p><i>Innovation process:</i> Formality, centrality, management support and decision making responsibility, professionalism, cooperation, customer orientation, resource requirements, time and frequency of development, project synergies</p> <p><i>Innovation type:</i> Standardization, making it explicit, service combination, co-production, degree of innovation, synergy of innovation, resource base, innovation quality, customer adaptation, segment adaptation</p> <p><i>Innovation results:</i> Process quality, service quality, customer value and adoption, economic results</p>	SNF, by Per E. Pedersen (2005)

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