

# **Building a taxonomy for innovation in service**

**José Carlos Jacintho**

Instituto Federal de São Paulo (IFSP),  
Rua Dr. Pedro Vicente, 625 - CEP 01109-010, São Paulo/SP, Brazil  
Universidade Paulista (UNIP)

Rua Dr. Bacelar, 1212 - CEP 04026-002, São Paulo/ SP, Brazil  
jcj5847@yahoo.com.br

**Márcia Terra da Silva**

Universidade Paulista (UNIP)  
Rua Dr. Bacelar 1212 - CEP 04026-002, São Paulo/ SP, Brazil  
marcia.terra@uol.com.br

**Rodrigo Franco Gonçalves**

Universidade Paulista (UNIP)  
Rua Dr. Bacelar 1212 - CEP 04026-002, São Paulo/ SP, Brazil  
[rofranco@osite.com.br](mailto:rofranco@osite.com.br)

## **Abstract**

This paper's main purpose is to develop a taxonomy of innovation in services, based on a systematic literature review. As results, we expect to map the foundations of the theme, identify the related key terms and trace the evolution of publications, as well as the boundaries of theories involved.

**Keywords:** Taxonomy, Innovation in Service, Key Terms, Boundarie.

## **INTRODUCTION**

Whereas the service sector has acquired, from the second half of the twentieth century, prominent position in the productive activity and increases its relative importance in wealth composition and employment of nations, representing approximately 70% of GDP, it should be noted that there is a gap when it comes to assessing the actual impact of the service sector in sustaining economic development.

However, the industry servitization and the industrialization of services, highlight the need for comprehension of innovation in services and its developments. In fact, the services are searched less than the manufacturing, there comes the gap. Despite the business, academic and government concerns about the services segment, the relevant factor is the dominant paradigm of consolidated technological innovation by the manufacturing industry.

Hence, the challenge posed in this article is to design an innovation taxonomy services leading to the understanding of the organizational aspects of innovation in the short and long term.

Nevertheless, there is a strategic and operational phenomenon that insists on putting a question on research involving innovation in services: there is innovation in services, that is, the service sector has the capacity to generate endogenously innovation, or are just results and values modified the manufacturing activities? In that case, what the difference between the innovation in services and the manufacturing sector innovation?

According to studies and surveys of the Community Innovation Survey - CIS 2 of the European Union, there is innovation in services, and this innovation not only appears on the companies applying high-tech services such as software and telecommunications, but these innovations also include companies with diversity of activities in services.

Thus, to achieve your goals, this article is divided into five sections, including this introduction and the conclusions. So we have a section devoted to theoretical, as subsections including a brief history, the concepts and definitions and considerations on the systematic review of the literature. A second section deals with the methodology used in the article. The third section deals with the proposal of a taxonomy for innovation in services.

## **OBJECTIVE**

Through a systematic literature review to propose the conception of an innovation taxonomy services.

## **THEORETIC REFERENCE**

### **Innovation in Services: History, Concepts and Definitions**

The development of the theoretical framework on innovation in services dates back its origins to economic theories and concepts on service activities. Several authors have highlighted the importance of innovation and services as drivers of economic development.

This article aims to build a taxonomy of innovation in services. To accomplish this underlies its development on three core concepts: the first deals with theories about services; the second concept works innovation and third conceptualizes and ranks the innovation in services.

For (Smith and Skinner, 1982) and (Say 1821) defined services as a product which is consumed at the time of production; already (Fuchs 1968) and (Singelmann 1974) showed the coproduction of services, that is, the interaction between producer and consumer to produce a service. On the other hand, (Stanback 1980) points out that, unlike goods, services can not be stored and or transported.

However, (Hill 1977) extended the concept of services pointing out that service is a change in a person's condition or in possession of an asset as a result of the initial economic activity that turns it into another economic unit that meets a specific demand.

Thus, it is necessary to highlight the economic role played by the service activities raised by several authors. (Machlup 1962) shows that in the mid-twentieth century the service activities already accounted for about 30% of US GDP.

This is where innovation becomes fundamental for the economy. Thus, in the early twentieth century, (Schumpeter 1982), addressed the concept of "creative destruction" that is, the constant quest to create a new product / service or process capable of destroying the old ones; so old

paradigms are replaced by new, all guided by the search for new sources of profitability. It consisted essentially in innovation cycles called by Schumpeter's "monopoly profits".

On the other hand, although many authors, among them (Baumol 1967) and (Pavitt 1984), have as their traditional focus on technological innovation dedicated to manufacturing the research advance towards to establish a integration between products and processes.

So even after (Miles 2005)' claims that innovation rates in services are lower than those for the manufacturing, are marked by him three pillars imported from manufacturing and can contribute to the process of integration services: control quality, modularization of services and application of information and communication technologies.

Therefore, the subsequent studies on innovation (Pavitt 1984), (Saviotti and Metcalfe, 1984), (Miozzo et al. 1993.1995) culminating in the last thirty years in research of the Sundbo, Gallouj, Weinstein, Djellal, Barras, Gadrey and others. However, the level of knowledge on service innovation still requires a theoretical consolidation. The theme of innovation in services has gained importance over the past three decades, especially the aspects of valuation that causes its economic impact on GDP.

So for development of the systematic literature review and better understanding of current taxonomy for the theme "Innovation in services", it proposed a basic historical, starting with the considerations of (Smith and Skinner, 1982) and (Say 1821) on services and (Schumpeter 1982) on the "creative destruction". First, before 1934, began in the eighteenth and nineteenth centuries the first studies on the service sector; between 1934 to 1970, the economic phase and first studies about manufacturing innovation; after 1970 until 1990 and early 2000, consolidation of the manufacturing innovation, but innovation in service beginning its influence in the wealth of nations. Currently the innovation in service is in the stage of maturity and consolidation.

## **Critical Analysis of Models and Theories**

According to the Oslo Manual 3rd edition of the OECD, services can be classified into four groups: services that deal mainly with products, information services, knowledge-based services and services dealing with people. The manual of Oslo still discriminates four types of innovation: product innovation, innovation process, marketing innovation and organizational Innovation.

Moreover, numerous researchers have been devoted in recent decades the development of a theory which can be applied to the innovation in services through to absorb the best techniques and practices of manufacturing and its dynamics, but self-sufficient.

On the other hand, innovation in services has the potential to constitute a new area for exploration research. According to (Gallouj 1998) and (Coombs and Miles, 2000), three approaches can explain and answer questions raised in the introduction:

Technicist (assimilation): it is grounded in the view of an innovation in services as a result of technological innovations developed for the manufacturing sector. Thus, innovation in services is not an independent process of innovation, but an adaptation of the process of technological innovation in industry.

The first approach has been proposed by (Barras 1986) to the model of the three stages, "reverse of the product", unlike that of technological innovations.

Services (demarcation): a service-based approach highlights specific innovation modalities of the service sector in the new service is through the establishment of a basic service to which they are associated incremental innovations in peripheral services; this approach seeks to identify trajectories of intangible services.

Integration (Synthesis): this approach proposes the integration of goods and services into a single theory of innovation and despite specificities of services it considers that innovation involves general characteristics.

Models services innovation: still according to the study (Gallouj 1994, 1998) and (Djellal and Gallouj, 2012), innovations in services can be radical; Incremental; Improvement; Recombination and formalization.

Vectors: according to (Gallouj and Weinstein, 1997) and (Djellal and Gallouj, 2012), there are three vectors to innovation, the direct competence of the service provider; customer competence and the technical characteristics (material and immaterial). Of these studies, the contribution of (De Vries 2006) a service can be set from internal and external expertise and internal and external techniques.

Therefore, from these propositions is possible to conceive innovation in services as an endogenous decision of the organizations and thus recognizes the contributions of expertise from customers to innovation in services and the expansion of the types of innovation, on the other hand not restricted to technological changes.

Dimensions: according to (Bilderbeek et al. 1998), the 4D model of the innovation service is: new concept of service, new interface of clients, new delivery system and technology options. This model shows that innovation in services involves a combination of the four mentioned dimensions.

On the other hand, according to (Den Hertog 2010) the 4D model would not meet the demands for innovation in services and proposed a model with six dimensions. The 6D model adding to other dimensions: new business partner and new revenue model.

Open Innovation: one of the very important concepts for the service sector is the open innovation (Chesbrough 2011). It is the focus on knowledge flows and the need to combine them from multiple sources; there is the user participation in knowledge management in service, in addition to specialized external suppliers.

## **METHODOLOGY**

To achieve the proposed objectives in this paper was adopted three phases: the first was developed an exploratory research on the subject of innovation in services; after it elaborated a historical and conceptual positioning, as well as a critical analysis of the main theories involved. The later, the primary sources are identified and passed to the third phase. It is the stage for the design of an innovation taxonomy services consist of the foundations of a systematic literature review by following the steps input, which will takes the research design, processing and output.

### **Systematic Literature Review**

According to (Ramos, A. et al. 2014), a systematic literature review proposes a reconstruction of the conceptual and methodological approach to the choice of the bibliographical sources based on more rigorous procedures and explicit than a revision of the traditional literature.

Also, according to (Ramos, A. et al. 2014), the model results for the systematic literature review consists of goals, research equations for defining the boolean operators, scope, criteria for inclusion, validity criteria, results and data processing.

## **Entrance**

**Problem Definition:** What is innovation in the service sector? Innovation in Service or Service Innovation?

**Objectives:** Search in the literature papers can contribute to the design of a taxonomy for innovation in services.

**Primary Sources:** The primary sources were located, at first, from traditional research of the term "inovação em serviços", in Portuguese of Brazil in Google and then in Google Scholar database. Thus, it has been found around 276,000 papers.

**Search Strings:** Items initially surveyed in Portuguese allowed the setting up of a string of key terms to search and which are related to innovation in services: manufacturing innovation, new services development (NSD), strategy, technological innovation and non-technological, service system, consumer experiences, knowledge intensive services, open innovation and servitization.

Many searches with the mentioned terms used the boolean mode to cross with "innovation in service" or "service innovation". But the focus of the search was concentrated under "innovation in service" and / or "service innovation".

For purposes of this article we used the EBSCO Host - Business Source Premier and ISI Web of Knowledge, from the CAPES database.

**Inclusion criteria:** most cited authors and articles that responded directly to the key terms "innovation in services" and / or "service innovation".

The great difficulty was to identify the boundaries of innovation in services because of its multidisciplinary nature. So, first it was considered historical references of the origins of innovation in services, starting with economy, advancing the work on innovation, definitions of services and its importance in today's globalized economies, to achieve innovation in services and their different approaches.

**Qualification criteria:** the foundations adopted for the study were: check the most cited authors, the relevance of the journal in which specific articles of innovation in services were published, the methodology adopted by the author, the explanatory or descriptive character and the diversity and volume of sources cited by the author.

**Methods and Tools:** the filters are defined on the articles that have undergone revision of experts and in magazines and journals that had a scientific committee to analyze. A second filter for the verification was to establish a framework for work, beginning in 1972.

## **Processing and Analysis of Results**

- Search Step: The processing of the searches were conducted as follows:

**Advanced Search:** title; boolean search mode; publication date (1972 to 2015); font types (all results); fields of research (social sciences and science technology); research areas (business economics and engineering); types of documents (articles).

The table 1 shows the results of search without filters and with filters. The EBSCO filters are: advanced search; boolean search mode; full text; scholarly peer-reviewed journals publication date of January 1972 to October 2015; publication type (academic journal); type of document (article); full text pdf.

*Table 1 – Databases in the period 1972 to 2015*

<b>Database</b>	<b>Ebsco</b>	<b>Web of Science</b>
“Innovation in Services” AND “Service Innovation” without filters	907	889
“Innovation in Services” OR “Service Innovation” without filters	1047	1681
“Innovation in Services” AND “Service Innovation” with filters	204	267
“Innovation in Services” OR “Service Innovation” with filters	239	485

For Web of Science filters are: field of study (social sciences and science technology); research areas (business economics and engineering); types of documents (articles).

The second filtering consisted with the crossing of the terms "innovation in service" and "service innovation" in four periods. Results are showed in table 2.

Crossroads: the search for the intersections considered "innovation in service" and "service innovation" and key terms defined in the search strings. The results are showed in table 3.

The results in table 3 shows that there are several gaps still unexplored by services and innovation in services with potential research sector: develop new services (DNS), technological innovation, knowledge intensive business service (KIBS), open innovation and servitization.

But, the servitization, strategy, KIBS and open innovation are the boundaries between goods and services, may be the exploitation of research; the customer experiences is part of company management and planning of innovations, so it also shows a strong potential trend.

- Documentation and Archiving of selected articles. Considering the searches conducted in the two analyzed databases, and the consolidation of the results between the years 1972 and 2015, as well as evaluating the overall time for periods of development line, the final results were consolidated in four periods, 1972 to 1990; 1990 to 2000; 2000 to 2010 and 2010 to 2015. On the other hand, the analysis of researched articles on primary sources, highlight the most relevant authors for this research, as well as the journals in which they publish. The information is documented amount of articles found in journals, number of excluded items, quantity of items found in the cross search.

*Table 2 – Boolean search “Innovation in Services” AND “Service Innovation” with filters*

<b>Database</b>	<b>Ebsco</b>	<b>Web of Science</b>
Period 1972 à 1990	7	9
Period 1990 à 2000	21	24
Period 2000 à 2010	89	78
Period 2010 à 2015	87	154

## **Output**

The output stage of the systematic literature review included recording the number of selected papers in each database as the tables 1, 2 and 3 considering the filters specified above. To the proposal of taxonomy, this paper will be considered the most cited journals and the most relevant authors to the innovation in service. The periodicals are Service Industries Journal; International Journal of Services Technology & Management and Research and Policy.

*Table 3- “Innovation in Services” AND “Service Innovation” with filters and crossroads*

<b>Database</b>	<b>Ebsco</b>	<b>Web of Science</b>
New Service Development	1	1
Technological Innovation	2	6
KIBS	1	4
Servitização	1	0
Manufacturing Innovation	0	19
Strategy	1	10
Service System	8	14
Customer Experiences	1	1
Open Innovation	3	10

## **PROPOSAL OF A TAXONOMY FOR INNOVATION IN SERVICES**

The theoretical framework that highlights the fundamentals and the basic history of innovation in services, as well as critical analysis of their models and theories, based on a systematic literature review, allow us to propose a taxonomy, pointing out the origins, the development of studies and trends for future research. On the other hand, the difficulty is in the practical sense, adopting a unique model of innovation for manufacturing companies and the service sector, which by their specific becomes a goal even less feasible. As the service is the most heterogeneous activity sector of the economy, theories and models adopted should be a flexible approach and great capacity for organizational change.

So it's safe to adopt a single approach or a single model would be more appropriate to seek models, type, size and flexible approaches and high adaptability to specific segments?

Thus, the taxonomy proposal was based in the integration of the fragmented theories about innovation in services. The figure 1 shows the involvement of the central dimensions with the elements that make up the border in order to pursue a behavior in companies that can be used the technological expertise of companies within sectors intensive science, intensive information,

operating or based on supplier, but can integrate with non-technological knowledge specifically in order to contribute to the development of management practices.

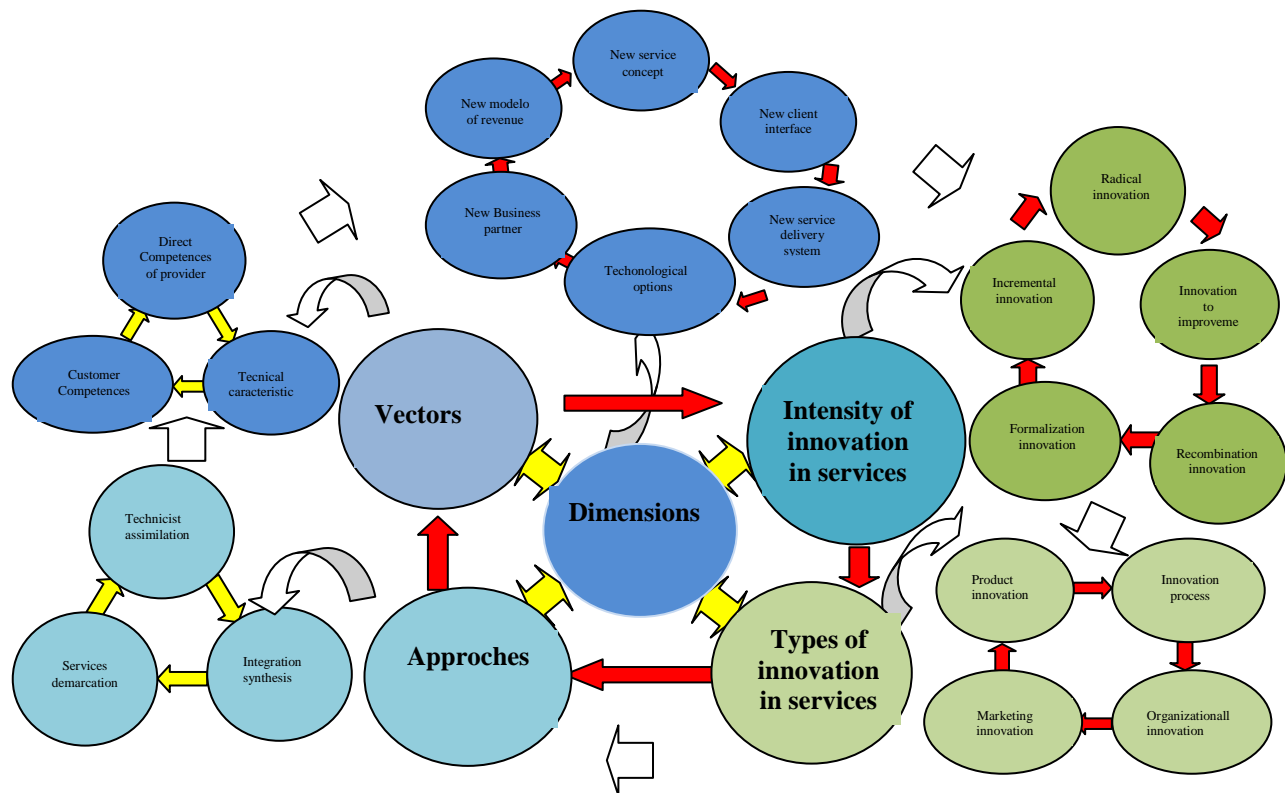


Figure 1 – Proposal of Taxonomia for Innovation in Services

Figure 1 shows the five elements that make up the proposed taxonomy for innovation in services and how they can interrelate. The dimensions of innovation in services that appears in the center of the figure, consists of six strategies dimensions that may have more direct relationship with any of the border elements, as the services segment where innovation is applied. The proposal seeks a balance between all the elements in order to allow greater flexibility in the definitions of the various models that can be applied to every situation in practice of the service sector. So at some point will be required identify the field where innovation will occur in products, processes, marketing or organizational, to give apply the best approach, whether technician, services or integrator. Thus, it may will combine two or more elements of the boundaries between themselves or with the central element with attention to the vectors and intensity of innovation in services. This model needs of the empirical evidences for its consolidation.

## CONCLUSIONS

A systematic literature review was developed specifically focused articles that addressed the theme of innovation in services and / or service innovation and cross some specific areas that have some interface with the service sector. However, as research sought specific areas of business and engineering, with full text in pdf, failed to detect other sources that could expand



the universe researched and probably for that reason did not obtain significant results numerically.

Despite limited research has indicated that there is still a high dispersion between the results found in the databases, partly because of the number of articles related areas of the service sector and in part by the multidisciplinary working theme. It is also noted that much research and many researchers are not committed to the engineering, but the vast majority are from the business area and applied social sciences.

However, through the taxonomy proposed power up will start a theoretical basis with greater involvement of engineering and improve ways of working for innovation in services, even considering the heterogeneity of processes developed for the service sector. Because it is an area of intensive multidisciplinary, the origins of innovation in services is intertwined with the first concepts about economics and services, as well as the beginning of research in innovation.

The evolution of the different theme stages and the most relevant researchers, however, despite the importance of the customers for the development of innovation in services and that many authors insist this opinion, has not yet expresses a guest positioning the user as a collaborator of innovation in services. It is evident from the research that one of the great challenges of the service sector is how to involve and engage the user in the innovation system services.

Therefore, some authors try to explain that innovation in services works experimenting with a new service or a new solution in which several heterogeneous elements and seemingly scattered must interact, trying to absorb and to appropriate consolidated and dominated knowledge, either internally or externally to organization in order to create new business models, new value systems for customer, without losing the notion that push the boundaries of the organization and boundaries of service delivery is guarantee for the perpetuation of the organization with the use of technological devices or non-technological. Innovation in services can not do without technology but requires different actions that are far beyond the technological scope.

## **Bibliography**

- Barras, R. 1986. Towards a theory of innovation in services. *Research Policy* **15** (4): 161-173.
- Baumol, W.J. 1967. Macroeconomics of unbalanced growth: the anatomy of an urban crisis. *American Economic Review* **57**(3): 415-426.
- Bilderbeek, R. P.D. Hertog, G.Marklund, I.Miles. 1998. Services in innovation: knowledge intensive business services (KIBS) as co-producers of innovation. Oslo: Step Group **SI4S Synthesis Paper** (S3): 1-59.
- Chesbrough, H. 2011. Bringing open innovation to services. *Mit Sloan Management Review* **52** (2): 84-92.
- Coombs, R., I.Miles. 2000. Innovation, measurement and services: The new problematique. In J.S. Metcalfe & I. Miles (Eds.), *Innovation Systems in the Service Economy, Measurement and Case Study Analysis*. Boston, MA: Kluwer Academic: 85-103.
- De Vries, E. 2006. Innovation in services in networks of organizations and in the distribution of services. *Research Policy* **35** (7):1037-1051.
- Den Hertog, P., A.A.W.Vander , M. De Jong. 2010. Capabilities for managing service innovation: towards a conceptual framework. *Journal of Service Management* **21**(4):490-514.

- Djellal, F., F.Gallouj. 2012. Two decades of research on innovation in services: which place for public services? In: International Eiburs-Taips, 1.,19-20 abr. 2012, Urbino. Anais. Urbino: University of Urbino.
- Fuchs, V.R. 1968. The service economy. Columbia University Press, New York.
- Gadrey, J., F. Gallouj, O. Weinstein. 1995. New modes of innovation: how services benefit industry. *International Journal of Service Industry Management* **6** (3): 4-16.
- Gallouj, F. 1998. Innovation in reverse: services and the reverse product cycle. *European Journal of Innovation Management* **1**( 3): 123-139.
- Gallouj, F., O. Weinstein. 1997. O. Innovation in services. *Research Policy* (26): 537-556.
- Hill, T.P. 1977. On goods and services. *Review of Income and Wealth* **23**(4): 315-338.
- Lancaster, K.J. 1966. A new approach to consumer theory. *The Journal of Political Economy* **74** (2): 132-157.
- Levitt, T. 1976. The industrialization of the service. *Harvard Business Review*. Watertown, **54**(5): 63-74.
- Maclup, F. 1962. The production and distribution of knowledge in the United States. Princeton University, New Jersey.
- Manual de Oslo 2005. Diretrizes e para coleta e interpretação de dados sobre inovação 3ª edição (translation of *The measurement of scientific and technological activities – proposed guidelines for collecting and interpreting technological innovation data:OECD Oslo Manual* (1997)).
- Miles, I. 2005. Innovation in services. In: Fagerberg, J., Mowery, D., Nelson, R. (Ed.). *The oxford handbook of innovation*. Oxford University Press: 433-458.
- Pavitt, K. 1984. Patterns of technical change: towards a taxonomy and a theory. *Research Policy* **13** (6): 343-373.
- Per Carlborg, P., D. Kindström, C. Kowalkowski. 2014. The evolution of service innovation research: A critical review and synthesis. *Service Industries Journal*, **34** (5): 373-398.
- Ramos, A.,P.M. Faria, A. Faria. 2014. Systematic review: contribution to innovation in Educational Research.Rev. diálogo Educ.**14** (41): 17-36.
- Saviotti, P.P., J.S. Metcalfe. 1984. A theoretical approach to the construction of technological output indicators. *Research Policy* **13**: 141-151.
- Say, J.B. 1821. A treatise on political economy; or the production, distribution, and consumption of wealth. Printed for Longman, Hurst, Rees, Orme and Brown. Available at <http://archive.org/details/treatiseonpoliti02sayjuoft> (accessed date December 21, 2015)
- Schumpeter, J. 1982. Teoria do desenvolvimento econômico (translation of *The theory of economic Development*, 1934). Abril Cultural São Paulo.
- Singelmann, J. 1974. The sectorial transformation of the labor force in seven industrialized countries 1920-1970. *American Journal of Sociology* **83**(5): 1224-1234.
- Smith, A., A. Skinner. 1982. The wealth of nations: books I-III. Penguin Classics, New York.
- Stanback, T.M.J. 1979. Understanding the service economy. Johns Hopkins University Press.
- Sundbo, J., F. Gallouj. 1998. Innovation in services. Oslo: Step Group **SI4S (S2) Synthesis Paper** (3): 1-59.