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Innovation in Services – Theoretical Approach

Abstract

The aim of this article is to present the evolution of theoretical studies on service innovation. The author also attempts to put these different approaches to service innovation into order and to indicate the possible forms of service innovation that emerge from these researches. In further part of the article the issue of the availability of statistical data and its relevance to the possible forms of service innovation, as well as some changes that has been implemented recently in order to improve this relevance, are discussed.

1. Introduction

Services dominate advanced economies, accounting for about three quarters of their gross value added and employment and they are the only part of advanced economies to have expanded in terms of employment in recent years (see OECD or Eurostat database). What is more they have increased substantially, in terms of their importance as inputs to other sectors of the economy. But the contribution that they make to innovation and competitiveness remains largely unexamined, by analysts and politicians alike.

For a long time services have been perceived as non-innovative activities. Such a perception was a result of technological approach to innovation, deriving from manufacturing innovations, that are usually based on technological content. Unfortunately, it is not relevant to service innovations, as in their case non-

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technological aspects are of greater importance. This situation, perceived by some researchers as a paradox, is precisely described by Gallouj: “While services (as a sector) and the service relationship (as a mode of coordination between economic agents) are now essential characteristics of contemporary economies, innovation is another. Thus modern economies are both service economies and economies of innovation. Paradoxically, they are not regarded as economies of innovation in services, that is as economies in which service firms’ innovation efforts are proportional to their contribution to the major economic aggregates. It is as if services and innovation were two parallel universes that coexist in blissful ignorance of each other” (Gallouj, 2002(a), p.xii).

However, the situation is changing, and in the light of observed changes it is not possible to ignore service firms’ innovation activity any more. Many service industries have now reversed their subordinate relationship with manufacturing industry in matters of technological innovation. In other words, they produce their own technical systems, either by themselves or within a power relationship favourable to them. This is the case, for example, with automatic cash dispensers, cleaning robots and cooking and refrigeration equipment for fast-food restaurants. It also applies to certain large distribution chains that exert pressure on their suppliers and impose specifications so precise that it indeed becomes possible to speak of suppliers of technology dominated by service users. Another phenomenon is the active role played by knowledge intensive services in their clients’ innovation processes (particularly those in manufacturing industry). Whether the innovations relate to organisation, strategy, products, etc., these service providers assist their clients in a variety of ways, to differing degrees and at different stages in the innovation process. It is no exaggeration, therefore, to speak of “consultant-assisted” model of innovation (Bessant and Rush, 1995, pp. 97–114; Gallouj, 2002(b), p. 151). What is more we can observe the increasing convergence and interdependence between manufacturing goods and services. In a result vertical linkages that tie together different groups of manufacturing and service are becoming a crucial factor of competitive advantage in the new economy (Windrum and Tomlinson, 1999, pp. 391–408; Di Cagno and Meliciani, 2005, pp. 149–171; Guerrieri and Meliciani, 2005, pp. 489–502; Castellacci, 2008, p. 981).

In the light of these changes, the development of a comprehensive, integrative theory, that would be relevant also to service innovation, is of great importance. On the base of such a theory it should be possible to develop some new indicators, more appropriate to measure innovation activity in services. Some adjustments in this field could already be observed (Oslo Manual 2005, CIS 2008), but they are still not sufficient. Without further ones innovation

activity in services will continue to be underestimated by researchers and by politicians.

The aim of this paper is to analyze the evolution of different approaches to the issue of service innovation, and the possibilities to evaluate the importance and dynamics of different forms of service innovation on the base of available statistics.

2. The evolution of theoretical studies on service innovation

Until the 1980s very little research was undertaken on innovation in services, or indeed on services in general. The subsequent literature on innovation in services can be identified into: **technological**¹ and **non-technological approach**. A separate category constitutes a **synthesis** or **integrative approach**.

2.1. Technological approach (Flikkema, Jansen, van der Sluis, 2007, pp. 543-545; Gallouj, 2002(a), pp. 2-18)

It focuses on technological change. Innovation in services are equated or reduced to the introduction of technical systems (material transport and processing systems and, above all, information and communication systems) into service firms and organizations. These studies are by far the oldest and most numerous, which has contributed to some extent to the overestimation of the technological dimension and to the underestimation of other aspects of innovation in services. The main argument in favour of such an approach is that: service industries are becoming increasingly technology and capital-intensive and until relatively recently they were often driven primarily by the adoption of industrial technologies.

In the literature on service innovation, the technological approach is often identified with the assimilation approach, whereas according to Tether (Tether, 2006, pp. 4-6) the assimilation approach followed the period of neglect.

¹ In the literature we can also find the term “technologist”, instead of “technological” approach.

Neglect approach² – for a long period of time services were thought to be laggards with regard to innovation – they were assumed to be uninteresting adopters of existing technologies rather than producers of new technology. Innovation were perceived relatively narrowly, both in terms of focusing on technical advances, largely embodied in machinery, equipment and other goods (such as new drugs), and the processes involved with the development and commercial introduction of new, technologically advanced goods.

In innovation studies based on neglect approach, R&D statistics and patents are used as the main measures of innovative activity. Since service firms are often observed to do very little R&D and/or obtain very few patents (despite the large number of engineers and managers now employed in service industries), in the light of such measures of innovation activity, they are generally considered to be marginal with respect to innovation.

The development of “object-based” approaches to identifying and measuring innovations only served to reinforce the understanding that services were uninteresting with respect to the production of new technologies (Pavitt 1984, pp. 343-73; Pavitt, Robson, Townsend 1989, pp. 38-67). The object based studies focused on identifying an outcome of innovation activity – that is innovation, being an object such as i.e. a new drug or a new computer system. As services tend not to produce objects directly (although they may assist in their development), the vast majority of the identified innovations were attributed to manufacturers.

Within the scope of this type of studies the one by Pavitt should be mentioned, as it is very important and highly developed one (Pavitt 1984, p. 343-73). Pavitt built his seminal taxonomy of innovative activities on the base of a huge empirical study carried out in Great Britain (on a database of nearly 2000 significant innovation introduced there between 1945 and 1979). Using a number of criteria and characteristics (particularly sources of technology, types of users and their needs, regimes of innovation appropriation, size of firm, degree of technological diversification, etc.) he broke the economy down into four categories of firms: (1) science based firms, (2) specialized suppliers, (3) scale intensive producers and (4) supplier dominated firms. He considered the first and the second category to be producers of new technologies, the third one to be both producers and demanding users of new technologies, while the fourth

² Much of this neglect can be attributed to the idea which dates back to Adam Smith that it is material wealth that matters, and that it is manufacturing that ‘fixes’ technological advance in the form of new equipment and other goods. Smith famously described manufacturing labour as productive, and services as unproductive. Although his meaning has often been misunderstood to imply services are not valuable, the implication that ‘manufacturing matters’ has dominated two centuries of economic thought.

one to be passively dependent on the others for the supply of new technologies. Pavitt's taxonomy was intended to be universally applicable, but its main shortcoming is that all services were assigned to the last category, within which firms can be characterized as follows: they tend to be small, have no R&D function and they may have difficulty in appropriating innovation through technical means, which forces them to fall back on non-technological procedures such as branding, marketing, etc.; their clients are likely to be more conscious of price than performance and their technological trajectory obeys a logic of cost-cutting. It is obvious thus, that this taxonomy cannot include all the variety of service activities and service innovations, as well. Unfortunately, this well known study consolidated the perception of services as being uninteresting, as far as innovation activity is concerned. Now such perception is less common, but it still exists and it is a major reason why innovation in services remains under-researched (Gallouj, 2002(b), pp. 144-145).

Assimilation approach (Tether, 2006, pp. 6-8; Drejer, 2004, pp. 553-554) – in the 1980s, with the continued growth of services (and the contraction of manufacturing) in advanced economies, services were increasingly hard to ignore, and a small number of researchers set out to explore this very large part of the economy. This phase of research was essentially characterized by the perception of innovation in services as fundamentally similar to innovation in manufacturing (i.e. as the production and use of technological artefacts) and thus it was attempted to study innovation in services using the conceptual tools developed to understand (technological) innovation in manufacturing – it was an attempt to assimilate services into the wider fold of innovation research and thus it is called the assimilation approach.

As an example of such an attempt, particularly bold efforts to develop a theory of innovation in services proposed by Barras, can be seen (Barras, 1986, pp. 161-73). Through research on financial services, Barras observed that contrary to the conventional pattern of innovation through the life cycle of an industry as observed by Abernathy and Utterback (1978) – in which innovation initially focuses on developing new products (and improving quality) before a dominant design emerges, after which innovation focuses on processes (in order to seek out efficiencies to reduce costs) – in (financial) services innovation appeared to first focus on processes (with a focus on the application of ICT to improve the efficiency of back-office functions), before shifting to products (partially through learning but also through the increasing ability to customize offerings, again because of the flexibility afforded by IT systems). Thus Barras not only claimed services may follow a “reverse product cycle” in their innovation activities, but that the application of ICT had brought services into the industrial era – they begin to use an industrial technology appropriate to their

information intensive activities, and reorganize important parts of their work around this. Eventually, they become important independent innovators in their own right.

Although it was clearly based on an attempt to adapt an existing understanding of innovation to services, Barras' model was highly influential, and marked a first step towards theorizing innovation in services. However, his 'one-size-fits-all' model of innovation in services has been subject to considerable criticism, especially as Pavitt introduced his taxonomy, that had strongly suggested there were multiple patterns of innovation in manufacturing, so they should be in services, as well.

A second notable attempt to assimilate services into innovation research, using the existing concepts and tools was Miozzo and Soete's adaptation of Pavitt's taxonomy to embrace services (Soete and Miozzo 2001, pp. 162). Like Pavitt, Miozzo and Soete identified different classes of technological service activities into three categories:

1. Supplier dominated sectors –such firms can be found mainly in personal services (restaurants and hotels, laundry, repair services, barber, and beauty services) and in public and social services (education, healthcare and public administration). Firms in the first subsector are generally small, and their in-house R&D, engineering capability, and in-house software expertise are weak. They appropriate less on the basis of a technological advantage than on the basis of professional skills, aesthetic design, trademarks, and advertising. On the other hand, firms in the second subsector are large organizations. Overall, supplier-dominated firms make only a minor contribution to their process technology. Most innovations come from suppliers of equipment, information, and materials.
2. Scale intensive physical networks sectors and information networks sectors – we can divide it into two subsectors:
 - Scale-intensive (or production intensive) physical networks - it involves large-scale processes with considerable division of labor, simplification of tasks, and the substitution of machines for labor. Its development is closely related to the application of modern information and communication technology, initially, at least, with the aim of reducing costs. Firms heavily dependent on scale-intensive physical networks can be found in transport and travel, wholesale trade, and distribution.
 - Information networks - it includes firms dependent on information networks(finance, insurance, and communications).

In both subsectors, while technological innovations may well originate in manufacturing firms, the nature of these innovations will be strongly determined

by service use. Such “service dependent” suppliers, in turn, might provide their large service customers with specialized knowledge and experience as a result of designing and building equipment for a variety of users, often spread across a number of service activities.

3. Science-based and specialised suppliers sectors - science-based firms are no longer confined to the handful of manufacturing sectors such as pharmaceuticals and electronics. The last couple of decades have seen the emergence of an increasing number of business services closely linked to R&D, software, and the development and application of information technologies. In all these sectors, the main sources of technology are the research, development, and software activities of firms in the sector itself.

Along similar lines, and on the base of Italian data, Evangelista classified service firms into four groups (Evangelista 2000, pp. 211-213):

1. Technology Users – they are the least innovative group, and come closest to the archetype of services as being ‘supplier dominated’. These firms rely on technologies bought in from external sources, usually the manufacturing and/or IT sectors. The types of activity within this group include (amongst other things) waste, land and sea transportation; security; cleaning; legal services; travel services and retail. This category accounted for about 80% of all service firms and more than half of employment. The firms in this group tend to be small.
2. Interactive and IT Services – they also constitute a large group, accounting for around a quarter of employment in services. In these sectors, innovation is achieved through close interaction with clients, rather than through internal R&D or technological acquisition. A heavy reliance is placed on developing software and/or acquiring know-how. The activities in this classification include: advertising, banks, insurance, hotels and restaurants.
3. Science and Technology Based Services - these firms are major generators of new technological knowledge, which they then diffuse to manufacturers and other services. Their innovation activities are typically located “up-stream” at the “frontend” of the innovation and knowledge generation chain, with close interactions with public and private research institutions. The activities included here are R&D services, engineering and computer and software services. Although this group accounted for less than 5% of employment in services, it contributed to 30% of service firms’ total expenditures on innovation, showing they are highly innovation intensive.
4. Technical Consultancy Services – these combine characteristics of the science and technology-based services and the interactive services. They carry out internal innovation activities but draw heavily on clients’ knowledge. While all services may be said to have some problem-solving

activities of one sort or another, the technical consultants' main function is the provision of solutions to meet the specific needs of their clients.

Evangelista's work broadly supports the conceptual work of Soete and Miozzo, and argues that innovation in services broadly mirrors Pavitt's conceptualisation of innovation in manufacturing. Indeed, Evangelista concluded that innovation in services shows more similarities than differences to manufacturing – there may be differences in emphasis, but it is a case of shades of grey, not black and white. However, arguably these approaches have taken a rather narrow view of innovation – there is little attention to interaction (for example through delivery innovation, which is important in services), and the focus is still on the production of new technologies.

Gallouj (Gallouj 2002(a), p.3) proposed a bit different classification of technological studies. He distinguished three groups of them:

1. The studies that focus on the economic consequences of the introduction and expansion of (informational) technologies into service firms or industries (they are called thus impact analyses) - it is the largest group in quantitative terms;
2. The studies that draw on the evolutionary approach in order to map out innovation trajectories in services – Pavitt's taxonomy and the subsequent studies based on Pavitt's one (Soete and Miozzo, Evangelista);
3. Barras' reverse life cycle model.

2.2. Non-technological approach (Flikkema, Jansen, van der Sluis, 2007, pp. 545-547; Gallouj, 2002(a), pp. 18-25)

As Gallouj highlighted: "... (material) technology is not an inevitable component of innovation. Innovation can and frequently does take place without the use of technology (a new form of insurance policy, new financial instruments, a new area of legal expertise, a new restaurant format, etc.). This does not mean that these innovations are not or cannot be based on a material technology (computer or telecommunications systems, for example) but that they may in certain cases dispense with them. Like product innovation, process innovation can also be intangible. It can consist of methods, that is it can be like the text of a play or the screenplay for a film that defines the words, action and movements of each individual involved (consultants' procedures, or the methods employed in catering). Some of these methods might be based on technical systems (computerization of recruitment methods), while others might be embodied in tools (legal expert systems), but this is not a necessary condition for

innovation. In other words, it would be wrong to take that innovation takes place only when it is embodied in a technical system. Not to accept this leads to high underestimation of service innovative capacity, so do highly “technologist” national and international indicators of R&D and innovation that are unable to capture non-technological forms of service innovations (in fact only innovation in IT services are properly reflected in these indicators).” (Gallouj 2002(b), p. 149).

Within the scope of non-technological approach we can find the notion of demarcation/distinction approach and the notion of service based approach. It should be noted that, to some extent, they are similar, as they both focus on non-technological aspects of innovation and they attempt to indicate some forms of innovation specific for services.

Demarcation/distinction approach (Tether 2006, p. 8; Drejer 2004, pp. 554-556) – this approach came to prominence from the mid-1990s and it derived from the criticism of the assimilation approach. Much of these studies focused on organizational innovation, and innovation in knowledge based-services such as management consulting, where the role of ‘hard’ technologies was less prominent than in the manufacturing activities, that have been the primary focus of study by innovation researchers.

Initially, this line of research argued that services are different from manufacturing, and therefore it is inappropriate to study innovation in services by merely adapting conceptual and empirical tools developed with technology-based manufacturing, as had been done by researchers working in the assimilation tradition. Instead, it called for the development of some new conceptual and empirical tools, more sensitive to the peculiarities of services – in particular their intangibility, their high dependence on people, and high levels of interaction (Sundbo and Gallouj (Sundbo, Gallouj, 2001) outlined a number of service innovation patterns derived from work in this tradition; “physical” technologies are prominent in only a few of these). Generally, the distinction line of research tended to privilege organizational and people issues, and interactivity, rather than technologies, as the key to innovation in services. These studies represent opposite approach to conventional ones, that argued that the concept of innovation should involve at least an element of technological change and should not be extended to all organizational change, as in the long run it is primarily technological change that drives increases in productivity (Drejer, 2004, pp. 556-560).

Service based approach (Gallouj 2002(a), pp. 18-25) – in this line of research, technology is also considered to be a key element in innovation in services, but it has been noticed that innovation in services cannot be reduced to technological innovation alone. In a result, the existence of particular forms of

innovation specific for services (such as ad hoc innovation, intangible products and processes, etc.) is highlighted. Within this approach we can also find some studies that attempt to produce “local theories” of innovation more closely tailored to particular service industries.

To sum up, it should be highlighted that, with time, the increasing number of researchers from a variety of perspectives studying innovation in services recognize the importance of both technological and non-technological forms of innovation, and indeed the complementarities between them. As a result, most innovation researchers, including the ‘distinction researchers’, now claim to be working in synthesis (or integrative) approach, which seeks to blend traditional (technological) innovation studies with new insights gained from in-depth studies of innovation in services.

Such a shift is, to a large extent, a result of increasing convergence between goods and services. This tendency, widely recognized in the literature, enhance the necessity to build up a more integrated view of the characteristics that innovation takes in manufacturing and in service industries, and to shed new light on the relationships between these interrelated branches of the economy (Castellacci 2008, p. 982).

2.3. Synthesis or integrative approach (Gallouj, 2002(a), pp. 25-26; Drejer, 2004, p. 553; Tether, 2006, p. 9; Flikkema, Jansen, van der Sluis, 2007, pp. 547-548)

The theories in this line of research do not deny the importance of technological aspects of innovation in services, but they take into account the increasing convergence between goods and services. Manufacturing industry is gradually coming to resemble the service sector - i.e. manufacturing companies more often offer a wide range of services, accompanying the sale of manufactured goods or various forms of services now constitute the main component of many industrial goods. At the same time, a reverse trend towards the industrialization of certain services, can be observed - i.e. the formalization of service activities, particularly in large service companies. In a result, modern services and manufacturing become increasingly complex and multidimensional products, including the increasing bundling of services and manufacturing into “solutions”.

The very important issue related to the process of convergence is also the notion of service relationship, understood as a mode of coordination between economic agents in both services and manufacturing. Such relationship is also a key element of modern innovation activity - one of the most striking features

of innovators in modern industries is their attempt to form networks with other innovators in order to obtain access to knowledge (Zagler 2002, pp. 343).

This convergence also means that, there are opportunities in the economics of innovation for mutual enrichment between goods and services - for example, manufacturing activities can draw inspiration from service firms in the development of interactive models of innovation and different forms of innovation, considered to be specific for services, can be applied equally to manufacturing goods. That is why the construction of a general description of innovation is essential for understanding of what the notion of innovation might encompass, in both services and manufacturing industry, and the basic forms it might take.

This research focuses on issues of organizational change, social networks, the development of 'integrated solutions' and a range of other mechanisms to support innovation in services. This shift in emphasis requires incorporation of many tools and theories from outside traditional innovation studies, including organizational behaviour, social networks, marketing, strategy and communications studies. In particular, greater attention has been placed on organizational innovation and how new organizational practices may shape the innovation process in service industries.

Finally, it should be highlighted, that now most scholars working on service innovation subscribe to this approach.

The best known example of this line of research is the **characteristics approach** by Weinstein and Gallouj (Weinstein, Gallouj, 1997, pp. 537-556). It can be called the integrative one as it encompasses both goods and services, it applies both to technological and non-technological forms of innovation and it attempts to develop a general formalization of the product (good or service). This approach is based on the study by Saviotti and Metcalfe (Saviotti, Metcalfe, 1984, pp. 141-151) - according to them, the provision of any type of "product" can be described in terms of a set of characteristics that reflect, on the one hand, the internal structure of the product in question and, on the other, its external properties, i.e. the type of service being offered to users. They divide these characteristics into three main types (vectors of characteristics):

- (1) The final (or use) characteristics of the good (they call it "service characteristics") - these are the characteristics of the product seen from the point of view of the end user, e.g., in the case of a car, its size, performance, comfort, safety features, etc. In general terms they constitute a definition of the services, of the utility being performed by a given good.
- (2) The "internal", technical characteristics of the good - they describe the internal characteristics of the technology, i.e., the characteristics of the various technical mechanisms used to obtain the final characteristics. In

the case of manufacturing product, these characteristics are clearly defined – in a motor car, for example, they would include the type of engine (internal combustion, petrol or diesel, electric engine), transmission, suspension and so on.

- (3) Process characteristics – they relate to the methods by which the good in question is produced, and the technologies and modes of organization involved (the material used, the way in which they are processed, the forms of energy, the organization of the process, etc.). Thus, they include all the technologies (in the usual sense of the term) used in the design, production and marketing of products – in the case of the motor car, the assembly line is a process characteristics.

As far as goods are concerned, the distinction between product and process is widely accepted. The same is not true of services, as here the term “product” frequently denotes a process: a service package, a set of procedures and protocols, an “act”. In a result, in the case of services it is difficult to separate technical characteristics from process characteristics, and thus it is assumed that they are one and the same thing – in other words that processes in all their tangible and intangible forms are, as it were, (partial) replacements for internal technical specifications.

According to Gallouj and Weinstein (Gallouj, Weinstein 1997, p. 540), the absence of technical specifications (in the traditional sense) does not make it impossible to extend and adapt this characteristics approach to services. However, they point out, that the technical characteristics of product (a good or a service) consist of: (1) the tangible technical characteristics (particularly of information technologies, but also of logistical technologies, chemical products, e.g. in the cleaning services, etc.) used to produce the services characteristics, and (2) the intangible technical characteristics: legal or financial expertise, mathematical instruments (economic and financial modeling, operational research methods), consultant’s methods or the (adaptable) standard contract used by legal advisers, for example.

In the case of services, “technologies” involved usually take an intangible form - knowledge and skills embodied in individuals (or teams) and implemented directly when each transaction occurs, rather than in physical plant or equipment. What is more, Gallouj and Weinstein propose to add competences to the above mentioned characteristics. They distinguish two types of competences:

- All the competences mobilized by the service provider – the provision of services (i.e. of service characteristics) is generally the result of a combination of two mechanisms: the utilization of (tangible and intangible) technical characteristics that are based on competences, and the

direct mobilization of competences (i.e. without any technological mediation). It also should be noted that in the case of service activities it is possible that the provision of the service may take place only through the mobilization of knowledge and competences, without a good or a set of goods (material artefact) being supplied - such services are called “pure”, “intangible” services.

- All the competences mobilized by the client – one of the major characteristics of the service provision is the client’s participation, in one way or another, in the production of a service (co-production, service relationship).

To conclude, the most general and most significant representation is that the provision of a service requires both the direct implementation of knowledge and competences (embodied in individual members of both the service provider’s company and the client’s company) and the mobilization of “technical” factors. These factors consist of knowledge that is codified and formalized in such a way that they can be used repeatedly for the provision of similar services or of services of different kinds (depending on whether they are more or less generic or specific). They may be tangible (computer or telecommunications systems) or intangible (modeling methods, legal expertise, etc.), they may be already in existence (use of widely diffused techniques) or be designed or adapted for a specific “product”.

On the base of such a representation of the product, Gallouj and Weinstein define innovation as any change affecting one or more terms of one of more vectors of characteristics (of whatever kind – technical, service or competence). These changes are brought about by a range of basic mechanisms: evolution or variation, disappearance, appearance, association, dissociation. They may be “programmed” (i.e. intentional – the product of R&D, design and innovation activity) or “emergent” (i.e. the fruit of natural learning mechanisms). On such a base they indicate six types of innovations:

1. Radical innovation – the creation of a totally new product – a new system consisting of new final and technical characteristics of a new product and a new set of competences that are necessary for a new product is developed.
2. Improvement innovation – the improvement of certain characteristics, without any change to the structure of the system.
3. Incremental innovation – the general structure of the system remains the same, but the system is changed marginally through the addition of new elements to the final or technical characteristics or through the substitution of elements. Innovations based on improvement, can take a variety of forms, and may or may not be based on technical advances in the usual

sense of the term - this may involve for example: the addition of one or two new characteristics to a certain type of product, either by directly mobilizing certain competences, or by adding new technical characteristics; the improvement of certain final characteristics or a reduction in production costs by adding or changing certain technical characteristics. This kind of innovation is very important in practice, but it is difficult to define clearly the boundary between incremental innovation and improvement innovation – i.e. to distinguish the moment at which the new characteristic is added from the one at which a simple improvement is made.

4. Ad hoc innovation – the interactive (social) construction of a solution to a particular problem posed by a given client. It is a very important form of innovation in consultancy services, where the available knowledge and experience accumulated over time are harnessed and put to work synergistically to create fresh solutions and new knowledge that changes the client's situation in a positive and original way. Ad hoc innovations are often produced jointly by the service provider and the client, they usually appear during the process of delivering the service, and frequently are not recognized as innovations until after the service has been provided – thus they are a form of non-programmed innovation, that might be described as emergent, as they arise out of unpredictable rearrangement of existing knowledge and experience.
5. Recombinative innovation – it exploits the possibilities opened up by new combinations of various final and technical characteristics, derived from an established stock of knowledge, and a given technological base or existing within a defined technological trajectory. Two forms of such innovation were highlighted in the field of services: (1) the creation of a new product by combining the characteristics of two or more existing products, (2) the creation of new products by splitting up an existing product, separating out various characteristics and turning certain elements into autonomous product.
6. Recombinative innovation has now become a fundamental mode of creating innovations – it operates particularly in informational and biotechnology industries, but also lies at the heart of the innovation and R&D mechanisms in services. It should be noted that the implementation of this innovation is based on the assumption that the “product” can be broken down into clearly identified and defined elements. In the case of manufacturing industry a product and a production system is readily divisible, but in the case of service industry it is less obvious. Thus, though recombinative innovation also occurs in different kinds of service activities, they require a greater formalization of existing activities, i.e. the

development of “standardized” products and modularization of service production (Sundbo 1994, pp. 245-266).

7. The recombinative model of innovation, particularly important now, has some important implications: there is relative lack of research in classical sense (the production of new knowledge), which results in low costs of such innovation but on the other hand it causes that traditional measures (developed by national and international institutions), based on the criteria of novelty, are not relevant within the framework of this model, and that it can be easily imitated (thus it is difficult to protect it).
8. Formalisation innovation – this model, differently from the previous ones, is not based on qualitative and quantitative variation in technical or service characteristics or competences, but rather on the “visibility” and the degree of standardization of the various characteristics. It consists of putting in place the service characteristics “into order” (specifying them, making them less hazy, making them concrete, giving them a shape) and quite often also the technical characteristics - tangible (equipment, software, etc.) or intangible (e.g. methods, organization, toolboxes). It also constitutes an attempt to clarify the correspondence between these technical and service characteristics. Thus, we can say that the formalization model often precedes the recombinative model. In many services, including knowledge-intensive ones, this formalization model constitutes a genuine “natural trajectory”.

These different approaches fit neatly into what might be described as natural life cycle of theoretical concerns. The technological (neglect and assimilation) approach, as well as the demarcation approach are in the phase of relative decline, whereas the service-based approach is in its mature phase-. The integrative/synthesis approach is emerging and expanding (attempts are now being made to bring goods and services together in a unified approach to innovation).

3. The appropriateness of available statistical data to theoretical research on service innovation

It is widely known that statistical data on services are much poorer than those on manufacturing goods. This is also true in case of service innovation data. On the base of technological approach to innovation, that dominated innovation studies for a long time, indicators measuring innovation activities were developed to measure innovation based on technological change. These indicators are not able to capture innovation activities within service industries,

that usually appear in different non-technological forms (with exception of IT services). In a result, we can speak of high underestimation of innovation activity within service firms.

The main source of information on firms' innovation activities in European countries is the Community Innovation Survey³ (CIS) (Science, technology and innovation in Europe, 2011, pp. 79-92). It is designed to monitor innovation activity and to analyze the effects of innovation on the economy (including competitiveness, employment, economic growth and trade patterns). It refers to innovation activity within both manufacturing and service industries.

The first pilot survey was run in 1993, and so far six collection rounds have been launched. CIS covers the EU Member States, candidate countries and Norway.

In the interests of comparability across countries, Eurostat, in close cooperation with the EU Member States, developed a standard core questionnaire (starting with the 2000/01 round), with an accompanying set of definitions and methodological recommendations. At each survey round improvements were made and new concepts were developed and added.

According to CIS 2008, in most analyzed countries the proportion of innovative enterprises was generally higher in manufacturing than in services (the opposite was true only in Luxembourg, Hungary and Portugal) (Science, technology and innovation in Europe, 2011, p. 85). More detailed CIS data collected in Poland, show that in Poland service industries are generally less innovative than manufacturing ones (Działalność innowacyjna przedsiębiorstw w latach 2006-2009, 2010). Such a conclusion, thus evident, may seem strange, if we take into account, that high-tech services play more important role in EU economies (including Poland) than high-tech manufacturing (referring to the number of firms, value added, employment, turnover, gross operating surplus) (Wyszowska-Kuna, 2011) – in case of knowledge intensive services, the domination of services is much higher. This proves that innovative activity of service firms is still highly underestimated.

This underestimation of service innovation capacity has one more, very important implication – service firms running innovation activity, as being perceived as less innovative than manufacturing ones, receive less financial support from public institutions. According to the latest CIS in Poland, in years 2006-2008, only 10,4% of service companies running innovative activity received public financial support, in comparison with 21,5% in case of

³ The legal basis for the collection of these statistics is Regulation 1450/2004 of 13 August 2004 implementing Decision 1608/2003/EC concerning the production and development of Community statistics on innovation.

manufacturing industries – in more details the share of service innovative companies that received financial support from domestic institutions accounted for 4,7%, and from the EU for 6,1%; whereas the same share for manufacturing innovative companies accounted for 10,2% and 14,6% respectively (*Działalność innowacyjna przedsiębiorstw w latach 2006-2009, 2010*, pp. 25-26). On the base of these data, it is possible to conclude that innovative activity among service companies still gets much less attention from institutions responsible for innovation policy not only in Poland, but also in the EU.

Another important issue is an inappropriateness of available data to different forms of innovation emerging from theoretical studies on service innovation. For example, the definition of innovation used in CIS was not relevant to the forms of innovation distinguished in the characteristics approach – the one that is regarded to be of great importance now. In the latest CIS, launched in 2009, some important changes have been introduced - on the base of the Oslo Manual 2005⁴ (Oslo Manual, 2005, pp. 88-89), a wider definition of innovation was implemented, including not only product and process innovations, but also organizational and marketing ones, and a distinction was made between enterprises with technological (PP) and non-technological (NPP) innovation⁵.

These four types of innovation are defined as follows (Science, technology and innovation in Europe, 2011, pp. 151-152):

A product innovation is the introduction of a good or service that is new or significantly improved with respect to its characteristics or intended uses. This includes significant improvements in technical specifications, components and materials, incorporated software, user-friendliness or other functional characteristics.

Process innovation is the implementation of a new or significantly improved production or delivery method. This includes significant changes in techniques, equipment and/or software. Process innovations can be intended to

⁴ *Oslo Manual* gives methodological guidelines and defines the concept of innovation. It should be also mentioned that CIS 2008 is based on the NACE Rev.2 classification of economic activities, in accordance with Annex IV of Commission Regulation No 973/2007, whereas the previous CIS surveys were based on NACE Rev.1.1.

⁵ This was for the purposes of comparability with previous data collections, since fewer questions in the harmonized questionnaire are related to organisational and marketing innovation than to product and process innovation. However, the question on innovation expenditure was still limited to product and process innovation in order to maintain continuity with earlier versions of the CIS.

decrease unit costs of production or delivery, to increase quality, or to produce or deliver new or significantly improved products.

Organisational innovation is a significant change in the enterprise's business practices (including knowledge management), workplace organisation or external relations, intended to improve the firm's innovative capacity or performance, such as the quality or efficiency of workflows. It must be the result of strategic decisions taken by management; it excludes mergers or acquisitions, even if for the first time. Organisational innovations usually involve changes to more than one part of the firm's supply chain and are less technology-dependent than process innovations.

Marketing innovation is the implementation of a new marketing method involving significant changes in product design or packaging, product placement, product promotion or pricing. Marketing innovations are aimed at addressing customer needs better, opening up new markets, or newly positioning a firm's product on the market, with the objective of increasing the firm's sales. It excludes seasonal, regular and other routine changes in marketing methods.

The above mentioned changes show an increasing awareness of the importance of non-technological forms of innovation, that are common in case of services. However, the question arises about the appropriateness of this new, wider definition of innovation to the characteristics approach. To analyze this, we can try to compare four types of innovation deriving from Oslo Manual 2005 and CIS 2008 to six forms of innovation deriving from the characteristics approach. The conclusions from this analysis are as follows:

- The definition of product innovation refers to the definition of radical innovation (a new product) and improvement innovation (a significantly improved product). It is arguable, if it also refers to incremental innovation, because incremental innovation means that the system is changed marginally, through the addition of new elements to the final or technical characteristics or through the substitution of elements, whereas product innovation means significantly improved product.
- According to the characteristics approach, in case of services product and process quite often means the same, thus no distinction is made between them.
- In the light of the definition of organizational innovation, it seems possible to say it may take a form of formalization innovation –new, more formalized methods are examples of organizational changes. It is possible to say that, if organizational innovation takes a form of significant change referring to external relations, it may result in the creation of ad hoc innovation.

- In the light of the definition of marketing innovation, it is possible to say it may take a form of improvement or incremental model of innovation, and if marketing innovation is aimed at addressing customer needs better, it may also result in the creation of ad hoc innovation.
- The definition of innovation presented in Oslo Manual 2005 and CIS 2008, seems not to include the recombinative model of innovation. It is very important shortcoming of this definition, because Gallouj and Weinstein claimed it is the most important form of innovation now. What is more, recombinative model has very important implications for firms' innovative activity, i.e. the low cost of such innovation.

To sum up, we can say, that the appropriateness of this new definition of innovation to the characteristics approach is still not sufficient. In a result, on the base of available data, it is still not possible to evaluate the importance and the dynamics of innovation models deriving from the characteristics approach in the whole service industry, and within particular branches of service industry.

4. Conclusions

1. In the evolution of the studies on service innovation we can observe:
 - a shift from emphasis on the technological to non-technological aspects of service innovation – in more details it is a succeeding shift from neglect approach to assimilation one, then to demarcation and service specific ones, and finally to integrative/synthesis approach;
 - an increasing awareness that services not only use innovations created in manufacturing industries, but they are also active participants of innovation process - in some cases we can even speak of suppliers of technology (in manufacturing industries) dominated by service users.
2. The necessity to develop an integrative approach is a result of increasing convergence and inter-relevance between manufacturing goods and services, and the importance of vertical linkages between them to the competitiveness of present economies. The characteristics approach is the best known and most important study in this line of research. We should expect the development of further research based on the characteristics approach, as the theory of service innovation is still in its infancy, and a comprehensive theory relating to all products is indispensable for understanding innovation activity in modern economies.
3. Among different models of innovation distinguished in the characteristics approach, an ad hoc model is indicated as specific for

services, specially for consultancy services, whereas a recombinative model, that follows a formalization model is indicated as the most important now. It should also be noted that the formalization model (being a result of formalization process that we can observe in some service industries) reflects an increasing convergence between goods and services – with the formalization process services are becoming more similar to goods.

4. On the base of technological approach to innovation, that dominated innovation studies for a long time, indicators measuring innovation activities were developed to measure innovation based on technological change. These indicators are not able to capture innovation activities within service industries, that usually appear in different non-technological forms (with exception of IT services), which results in the high underestimation of innovation activity within service firms. This situation has very important implication - service activities are considered to be less innovative than manufacturing ones, and in a result they receive less attention not only from researchers, but also from politicians, which is reflected in lower financial support from public institutions, both in Poland and in the EU. Thus, further research to develop more appropriate indicators measuring service innovation activity are key to increase the awareness of real service innovation capacity and to enhance the attention and support it receives.
5. Recently some efforts were made to improve the situation – on the base of the third edition of Oslo Manual (2005), non-technological innovations were added as a separate category and a wider definition of innovation was implemented, including not only product and process innovations, but also organizational and marketing ones (CIS 2008). These changes show an increasing awareness of the importance of non-technological forms of innovation, that are common in case of services. However, these changes are still not sufficient. The definition of innovation used in CIS, despite some positive changes, is still not clearly relevant to different models of innovation deriving from the characteristics approach. Its main shortcoming is that it does not refer to the recombinative model of innovation, that according to the characteristics approach is considered to be the most important now. Thus, some other changes are necessary to enable the evaluation of the importance and dynamics of these different forms of innovation in the whole service industry and within particular branches of service industry.

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Streszczenie

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Celem artykułu jest przedstawienie ewolucji teoretycznych badań nad innowacjami w usługach. Autorka podejmuje również próbę uporządkowania różnych podejść do kwestii innowacji usługowych oraz wskazać możliwe formy tych innowacji, wyłaniające się z analizowanych badań. W dalszej części artykułu, podejmowana jest kwestia dostępności danych statystycznych oraz ich adekwatności, jeśli chodzi o możliwość zastosowania do analizy różnych form innowacji usługowych. Omawiane są również wprowadzone ostatnio zmiany, mające na celu poprawę adekwatności tych danych.