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**Article**

## Main determinants of new services development in ICT firms: A theoretical approach

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## MAIN DETERMINANTS OF NEW SERVICES DEVELOPMENT IN ICT FIRMS: A THEORETICAL APPROACH

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### ABSTRACT

Although there are several studies about innovation and New Services Development (NSD), investigations about innovation in ICT firms are rare, in particular identifying the attributes that generate NSD in ICT firms in a single study. Thus, the objective of this research was to identify the attributes that generate new services in ICT firms, and from these, to develop an explanatory diagram of this phenomenon. The available literature indicates that marketing attributes (market research, promotion strategy, price policy, current product portfolio, selling strategy and selling channel), environmental attributes (legal and normative environment, technological change, competitors' actions, customers' actions and providers' actions) and attributes of organizational structure (technological configuration, skills and abilities, know-how, internal processes, interdepartmental communication, R&D, production pace and decision making pace) influence NSD in ICT firms. The main academic contribution of this research is thus the proposal of an initial explanatory model of NSD in ICT firms.

**Keywords:** New Services Development (NSD); Information and Communication Technology (ICT); Services Innovation

### 1 INTRODUCTION

Since the 1960s, there has been outstanding growth in the literature on services innovation because of the development of the services economy, which has mostly been caused by increasing consumer demand (Miles, 2001). Considering that every innovation activity has as its final objective better firm performance, innovation then becomes the main factor for boosting productivity, especially now that globalization has unified markets and the supply chain, stimulating competition (OECD, 2005). This has been observed by Santamaria, Jesús Nieto and Miles (2012), who stated that the services market has become the driving force of the economy and one of the main contributors to boosting productivity owing especially to the substantial growth in ICT use.

Barras (1986), Moore and Benbasat (1991), Edvardsson and Olsson (1996), Froehle et al. (2000), Bettencourt et al. (2005), Menor and Roth (2007) and Santamaria, Jesús Nieto and Miles (2012) presented IT as a tool within New Services Development (NSD). Nevertheless, even at a worldwide level, there are few studies about NSD in IT or ICT firms. This, plus the fact that, according to Santamaria, Jesús Nieto and Miles (2012), innumerable factors might be important determinants of services innovation, brings us to the following research question: which are the attributes that generate new services in ICT firms? Thus, this research's general goal is to identify in the available literature the attributes that generate new services in ICT firms. As a specific goal, it seeks to develop an explanatory diagram of the factors that generate NSD in ICT firms.

This research seeks to contribute to the literature by providing a systematic view of the attributes that generate new services in ICT firms. This research also aims to contribute to better NSD management in ICT firms, since according to the Oslo Manual (OECD, 2005), a firm's innovation activities depend on the variety and structure of its relations with information sources, knowledge, technologies, practices and human and financial resources.

It is important to know how to identify ways of implementing different types of innovations, as much as their impact, as the impact on firm performance and on economic change depends on specific kinds of innovation (OECD, 2005). In order to accomplish these goals, we initially study innovation in KIBS (Knowledge Intensive Business Services), innovation in ICT firms, NSD and the attributes that generate NSD in ICT firms. Subsequently, the explanatory models are proposed. Finally, the final considerations are exposed.

### 2 THEORETICAL REFERENCES

#### 2.1 INNOVATION IN KIBS



The importance of knowledge and innovation in modern economies justifies the growing interest of researchers in studying KIBS. Since the mid-1990s, there has been a remarkable increase in academic focus on KIBS as well as its roles and functions in innovation systems (Muller and Doloreux, 2009; Lin, 2012). Many definitions for KIBS can be found in the available literature. Miles et al. (1994) defined KIBS as services involving economic activities that aim at the creation, accumulation and spreading of knowledge. Toivonen (2006) defined KIBS as specialized firms that render services to other firms and organizations. The definition introduced by Hertog (2000) described KIBS as private firms or organizations that depend strongly on professional knowledge. That is, knowledge or experience related to a specific subject, be it technical or techno-functional, that aims to provide products and intermediary services based on knowledge. In addition, Bettencourt et al. (2005) defined KIBS as firms whose added value in their primary activities consists of the accumulation, creation or spreading of knowledge in order to develop a personalized service or a product solution that satisfies the client's needs.

Miles et al. (1994) divided KIBS in two groups: "traditional professional services (P-KIBS)" and "new-technology-based services (T-KIBS)". P-KIBS are those services that make intensive use of new technologies, such as business, management and accounting services and market research, among others. T-KIBS are related mainly to ICT as well as to technical activities, such as ICT services, engineering and consulting, among others. In the early 1990s, Wood, Bryson and Keeble (1993) referred to the innovative influence that KIBS may have over their customers by mentioning that the service sector exerts an independent and significantly innovative influence when these are based on knowledge.

## **2.2 INNOVATION IN ICT FIRMS**

Since its first appearance, ICT consists of a permanent process of innovation (Laudon, 1985). Innovation in ICT has been characterized as a movement process divided into three phases that merge with one another: invention, innovation and spreading (Mansfield, 1988). An invention is a new idea or product that may or may not have an economic value. Innovation is the process through which inventions take shape and become usable. Spreading is the dissemination of the ability to produce and/or use an innovation and of its practical use (King et al., 1994; Vandecasteele and Geuens, 2010; Buss, Lima and Costa, 2011; Kunz and Hogreve, 2011; ).

Research on ICT innovation has become more popular over time, since innovation itself has assumed greater importance as an organizational competition factor (Hamel, 1998). According to Clark and Guy (1998) and Nadler and Tushman (1999), ICT became not only beneficial, but also essential to the long-term good standing of organizations, industries and societies. During the past four decades, ICT has been among the sectors that have presented the highest growth in the amount of innovations, and the forecasts for future development seem to be just as positive (Freeman and Perez, 1988).

Fichman (2004) argued that organizations in possession of specific attributes come up with a greater amount of ICT innovation. Such organizations may fit an innovative profile. The underlying logic is that firms that fit this profile will have larger returns on innovations as they can innovate more easily, economically and effectively or still have a greater opportunity to use the benefits that innovation gives them (Fichman, 2004; Lin, 2012).

Licht and Moch (1999) noted that most firms from the ICT sector hope their innovative activities will improve the productivity of their customers, strengthening their capacity to increase their productivity. In this way, the productivity effect of innovations in the ICT industry must be expected for their customers and not for the ICT industry itself. Moreover, one of the main characteristics of innovation in ICT firms is NSD.

## **2.3 THE DEVELOPMENT OF NSD**

The contribution of management investigators to the study of NSD has been limited to conceptual tables (Bitran and Pedrosa, 1998; Li & Huang, 2012; Voss et al., 1992), but some studies are based on NSD practices (Froehle et al., 2000; Noon et al., 1997). NSD is an important conductor of service competition; however, there is still the need for more studies about this theme to improve our comprehension about the resources and necessary activities to develop new services. Until recently, the principle usually accepted was that new services simply happen and they are not generated by means of formal development processes (Menor, Tatikonda and Sampson, 2002).

Evidence suggests that the efforts of service innovation are usually accomplished in a non-systematic way (Thomke, 2003; Li & Huang, 2012). However, the study of Mainardes, Silva and De

Souza Domingues (2010) outlined the importance of determining the NSD processes offered by firms in a structured way, generating an increase in the success probability of the new developed service.

De Jong and Vermeulen (2003) stated that innovations in services may be divided into two types of processes: (i) NSD processes, which are formally managed in great scale and resemble R&D projects in the manufacturing industry and which are commonly used for radical innovations and (ii) those processes that adopt a less formal approach to develop incremental improvements. For these types of innovations, services sectors tend not to adopt formal systems to manage the NSD process. Despite the broad approaches of NSD, its generator factors and processes and the importance of NSD for service firms, NSD is still a phenomenon to be completely unveiled, especially in ICT firms.

## 2.4 NSD GENERATOR ATTRIBUTES IN ICT FIRMS

From analyzing the existing literature, we noted that many NSD generator attributes have been examined by authors. However, rare are studies that group and synthesize these attributes, and this study was developed to bridge this gap. In a broad way, these attributes refer to marketing factors, the environment in which the firm is embedded and the organizational structure.

### 2.4.1 NSD GENERATOR FACTORS

The studies of Easingwood and Storey (1993, 1996), Storey and Easingwood (1998), Dutta, Narasimhan and Rajiv (1999), Cooper and Kleinschmidt (2000), Harmancioglu, Grinstein and Goldman, 2010 and Wu (2013) showed that marketing attributes are crucial for the identification, idealization and selection of NSD in service firms, including ICT firms. However, the studies of Bitner, Brown and Meuter (2000), Van Riel and Lievens (2004) and Burt (2009) stated that when it is about NSD, service firms, including ICT firms, are sensitive to the environment in which they are embedded. Tushman and O'Reilly (1986), Cooper and Kleinschmidt (1993), Storey and Easingwood (1993) and Menor, Tatikonda and Sampson (2002) also pointed out that organizational structure is directly linked to NSD in service firms, including ICT firms. According to the literature, three factors are responsible for NSD generation in ICT firms. Their relation is presented in Figure 1.

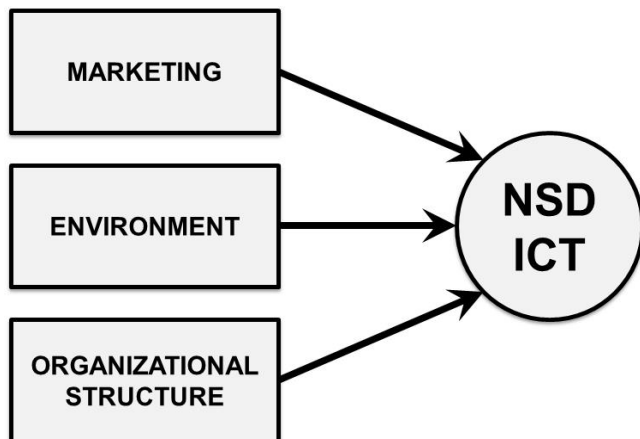


Figure 1: A general model proposal of the NSD factor generators in ICT firms  
Source: Own elaboration

Therefore, by observing Figure 1, we note in the literature that marketing, the environment and organizational structure have been the basis for NSD in service firms, including ICT firms, but studies that have dealt with the three of them together are still rare. As we went deeper into previous studies, we identified that each factor has a set of attributes that identified the NSD attribute generators in ICT firms related to marketing, the environment and organizational structure.

### 2.4.2 MARKETING VARIABLES

The studies of Neslin (2002), Grewal and Levy (2007, 2009), Kopalle et al. (2009), Puccinelli et al. (2009) and Grewal et al. (2010, 2011) identified the generation of NSD in service firms, including ICT ones, when the Promotion Strategy proves inefficient in the market and the Price Policy shows that the

market is saturated. Complementarily, Easingwood and Storey (1993, 1996), Storey and Easingwood (1998), Dutta, Narasimhan and Rajiv (1999) and Cooper and Kleinschmidt (2000) pointed out in their studies that the inefficiency of the variables Selling Strategy and Selling Channel taking the service firms to NSD.

On the other hand, the research of Storey and Easingwood (1993), Cooper et al. (1994), Van Riel and Lievens (2004) and Van De Vrande et al. (2009) pointed out the variable Market Research as responsible for the new market needs of service firms. Similarly, Easingwood and Storey (1993) and OECD (2005) highlighted the importance of the variable Current Product Portfolio on NSD in the case of the low selling performance of the current Portfolio. Marketing factors may then be divided into six variables, as observed in Figure 2.



Figure 2: Proposal of the Marketing variables model of the NSD generators in ICT firms  
Source: Own elaboration

**2.4.3 ENVIRONMENTAL VARIABLES**

Dabholkar (1996), Parasuraman, Zeithaml and Malhotra (2005) and Burt (2009) pointed out that NSD can be generated in service firms by Customers’ Actions in terms of opportunity identification, praise, complaints or even of the canceling of services/contracts. As an NSD generator in service firms, these authors also identified Suppliers’ Actions when these alter the goods provided, thereby generating opportunities or threats and leading to NSD. For Miles (2001) and OECD (2005), the variable Legal and Normative Environment, by means of increasing or decreasing the demand that forces firms to follow them, results in NSD in service firms, including ICT firms.

De Brentani (1995) and Storey and Easingwood (1996) checked that the variable Market Technological Change forces organizations to adapt to new technologies to remain competitive, generating NSD in service firms. Finally, Roth (1993), Cooper and Kleinschmidt (1995), De Brentani (1995), Storey and Easingwood (1996) and OECD (2005) highlighted the variable Competitors’ Actions as a generator of NSD in services firms, including ICT firms, as long as these actions affect the organization. To sum up, five variables were identified that compose the environment factor. These variables are shown in Figure 3.

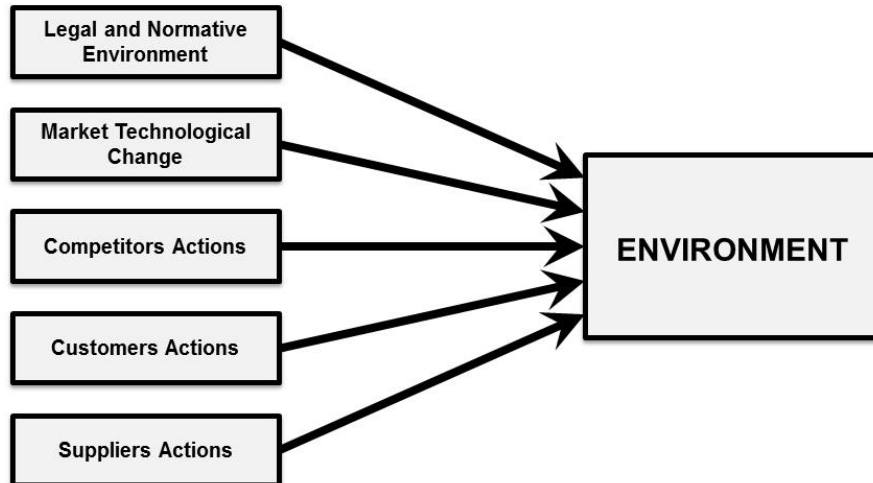


Figure 3: proposal of the variables model of the NSD generators in ICT firms related to the environment  
Source: Own elaboration

#### 2.4.4 ORGANIZATIONAL STRUCTURE VARIABLES

Lievens and Moenaert (2000) and Menor, Tatikonda and Sampson (2002) mentioned the skills and abilities of the team as a motivator of NSD in service firms, including ICT firms. They also identified the attribute Know-how when this pushes up the appearance of ideas that have NSD as a consequence. Storey and Easingwood (1993) and Shapira (1997) verified the existence of the variable Technological Configuration since the hardware and software that the organization has at its disposal drive NSD. These authors also identified the variable Decision Making Pace, which may interfere in the approval of NSD in service firms.

Moorman (1995) and Lievens and Moenaert (2000) presented the variable Interdepartmental Communication when it facilitates and makes possible the appearance and use of ideas that result in NSD in service firms, including ICT ones. However, Keller (1994), Montoya-Weiss and Calantone (1994), Gallouj and Weinstein (1997), OECD (2005) and Miles (2005) indicated as an NSD generator in service firms the R&D variable when it is responsible for the conception and development of new services. Finally, in the research by Storey and Easingwood (1993), Ittner and Larcker (1997) and Bayus, Jain and Rao (1997), the variable Production Pace was presented as a factor that motivates NSD in service firms, including ICT firms. The organizational structure factor may thus be divided into eight variables as can be seen in Figure 4.

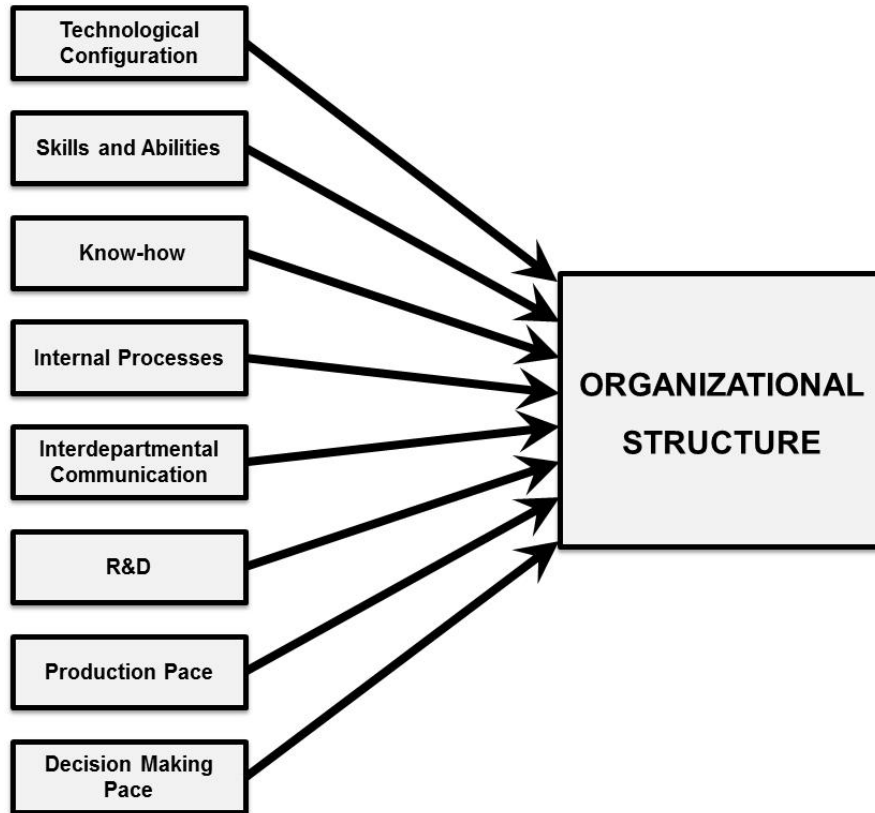


Figure 4: Proposal of model of the variables that generate NSD in ICT firms related to Organizational Structure

Source: Own elaboration

### 3 PROPOSED MODEL

To be able to systematize the factors that generate new services in ICT firms, Table 1 was developed.

FACTORS	AUTHORS
MARKETING	Easingwood and Storey (1993, 1996), Storey and Easingwood (1998), Dutta, Narasimhan and Rajiv (1999); Cooper and Kleinschmidt (2000); Harmancioglu, Grinstein and Goldman, 2010; Wu (2013)
ENVIRONMENT	Bitner, Brown and Meuter (2000) and Van Riel and Lievens (2004); Burt (2009)
ORGANIZATIONAL STRUCTURE	Tushman and O'Reilly (1986); Cooper and Kleinschmidt (1993); Storey and Easingwood (1993); Menor, Tatikonda and Sampson (2002)

Table 1: NSD determinants in ICT firms

Source: Own elaboration

As shown in Table 1, the factors identified in the literature as NSD generators in ICT firms were the marketing actions taken by firms, the firm sensitivity to the environment in which it is embedded and the influence that the organizational structure of the firm has over NSD. This means that ICT firms are motivated towards NSD by specific factors.

Marketing has been a relevant factor because the relations the firm has with its market, mainly current and potential Customers, gives it the opportunity to carry out NSD (Dutta, Narasimhan and Rajiv, 1999; Wu, 2013). Therefore, such firms have marketing professionals that possess a rich source of new ideas and opportunities because they are the connection between the firm and the market. Another

relevant factor is the environment in which the firm is embedded. This external force indicates to ICT firms the need to carry out NSD, demanding from them a constant sweeping of the environment, no matter if it is micro or macro (Burt, 2009). The last factor is organizational structure. The ICT firm needs to have the relevant financial, human or physical resources to accomplish NSD. It is no use analyzing the environment constantly and identifying opportunities by means of marketing professionals if the firm does not have the adequate structure for NSD (Menor, Tatikonda and Sampson, 2002). In summary, these factors are interrelated and must be generated as a group.

Each factor is made up of a group of variables that generate NSD. To detail the variables that generate new services in ICT firms, Table 2 was developed, where the variables are grouped into marketing, environment factors and organizational structure. When analyzing Table 2, one can see that marketing's group of indicators are part of the daily lives of ICT firms. The main question is whether the firm must use such indicators to identify NSD indicators, something that sometimes is not detected. It is natural in moments of sales falling that managers blame the market for such a fall. That is, many times we waste the opportunity to generate new services from the answers that the market gives to the marketing activities of the ICT firm. Therefore, it is necessary to stimulate marketing professionals to continuously evaluate their marketing indicators (selling and promotion strategies, performance of selling channels, product portfolio, price politics) and conduct surveys with the market (Easingwood and Storey, 1993; Puccinelli et al., 2009; Van De Vrande et al., 2009). These indicators show opportunities for NSD, something sometimes not taken into account by the managers of these organizations.

Table 2 also shows several environment indicators that can lead ICT firms towards NSD. The environment where the organization is embedded offers opportunities and threats and this requires a follow-up from the organization's managers. To identify what can favor or harden the good processes of the firm, it is necessary to follow customers, providers and competitors continuously (Dabholkar, 1996; Burt, 2009). These can indicate the need for changes in the firms and thus they require attention. The other two indicators are especially relevant for ICT firms. One, without doubt, is technological change. People who work in the sector must follow the changes and understand how they affect the business, as a technological change may eliminate or reduce significantly the ICT firm's business. That is, NSD offers an alternative to potential environmental threats or even opens new opportunities (Storey and Easingwood, 1996). The last indicator is the legal and normative environment. As this environment has been computerized, several opportunities have arisen to make NSD an alternative for ICT firms to use such opportunities (Miles, 2001). On the other hand, a change in legislation may be a potential threat when the ICT firm provides services that a customer needs to adhere to the legislation. In this case, NSD may be fundamental to providing new legal requirements.

<b>FACTORS</b>	<b>ATTRIBUTES</b>	<b>AUTHORS</b>
<b>MARKETING</b>	Market Research	Storey and Easingwood (1993); Cooper et al. (1994); Van Riel and Lievens (2004); Van De Vrande et al. (2009)
	Promotion Strategy	Neslin (2002); Levy et al. (2004); Grewal and Levy (2007); Kopalle et al. (2009); Grewal and Levy (2009); Puccinelli et al. (2009); Grewal et al. (2010, 2011)
	Price Politics	Barras (1986); Neslin (2002); Levy et al. (2004); Grewal and Levy (2007); Van Heerde and Neslin (2008); Kopalle et al. (2009); Puccinelli et al. (2009); Grewal and Levy (2009); Grewal et al. (2010, 2011)
	Current Product Portfolio	Easingwood and Storey (1993); OECD (2005)
	Selling Strategy	Easingwood and Storey (1993, 1996); Storey and Easingwood (1998); Dutta, Narasimhan and Rajiv (1999); Cooper and Kleinschmidt (2000)
	Selling Channel	Easingwood and Storey (1993, 1996); Storey and Easingwood (1998); Dutta, Narasimhan and Rajiv (1999); Cooper and Kleinschmidt (2000)
<b>ENV IRO</b>	Legal and Normative Environment	Miles (2001); OECD (2005)

<b>NMENT</b>	Market Technological Change	De Brentani (1995); Storey and Easingwood (1996)
	Competitors' Actions	Roth (1993); Cooper and Kleinschmidt (1995); De Brentani (1995); Storey and Easingwood (1996); OECD (2005)
	Customers' Actions	Dabholkar (1996); Cooper and Edgett (1996); Bitner, Brown and Meuter (2000); Parasuraman, Zeithaml and Malhotra (2005); and Burt (2009)
	Providers' Actions	Cooper and De Brentani (1991); Dabholkar (1996); Bitner, Brown and Meuter (2000); Parasuraman, Zeithaml and Malhotra (2005); Burt (2009)
<b>ORGANIZATIONAL STRUCTURE</b>	Technological Configuration	Storey and Easingwood (1993); Shapira (1997); Froehle et al. (2000); Menor, Tatikonda and Sampson (2002)
	Skills and Abilities	Lievens and Moenaert (2000); Menor, Tatikonda and Sampson (2002)
	Know-how	Lievens and Moenaert (2000); Menor, Tatikonda and Sampson (2002)
	Internal Processes	Easingwood and Storey (1993); Cooper and Edgett (1996); Sundbo (1997)
	Interdepartmental Communication	Moorman (1995); Lievens and Moenaert (2000)
	R&D	Montoya-Weiss and Calantone (1994); Keller (1994); Gallouj and Weinstein (1997); OECD (2005); Miles (2005)
	Production Pace	Storey and Easingwood (1993); Ittner and Larcker (1997); Bayus, Jain and Rao (1997)
	Decision Making Pace	Storey and Easingwood (1993); Cooper and Edgett (1996); Shapira (1997); Jensen and Harmsen (2001); MacCormack, Verganti and Iansiti (2001); Van Riel and Lievens (2004)

Table 2: NSD determinants in ICT firms  
Source: Own elaboration

The last detailed factor in Table 2 is organizational structure, which is a necessary requirement for NSD in ICT firms. To use opportunities or minimize threats, the ICT firm needs a suitable organizational structure that allows NSD (Menor, Tatikonda and Sampson, 2002). This means having physical, technological and human resources that favor NSD. In particular, the ICT firm needs a professionalized management where the process of decision making is fast enough to follow market changes. These decisions on NSD must reach all the organization (interdepartmental communication) in a way that technological configurations and staff capacities need to favor the NSD process. An ICT firm with a suitable and prepared structure for the market it serves will have more chances to carry out NSD with a good probability of success (Ittner and Larcker, 1997; Shapira, 1997; Sundbo, 1997; Lievens and Moenaert, 2000; MacCormack, Verganti and Iansiti, 2001).

Considering these aspects and based on Tables 1 and 2, a diagram was developed to identify the variables that generate NSD in ICT firms, demonstrating schematically the proposed model. In Figure 5, we introduce the proposal for the general diagram of the variables of NSD in ICT firms. In summary, the diagram is divided into a general model and specific models produced from the literature. For the diagram and its models to be confirmed as potential determinants of NSD generation, it is necessary to test them empirically.

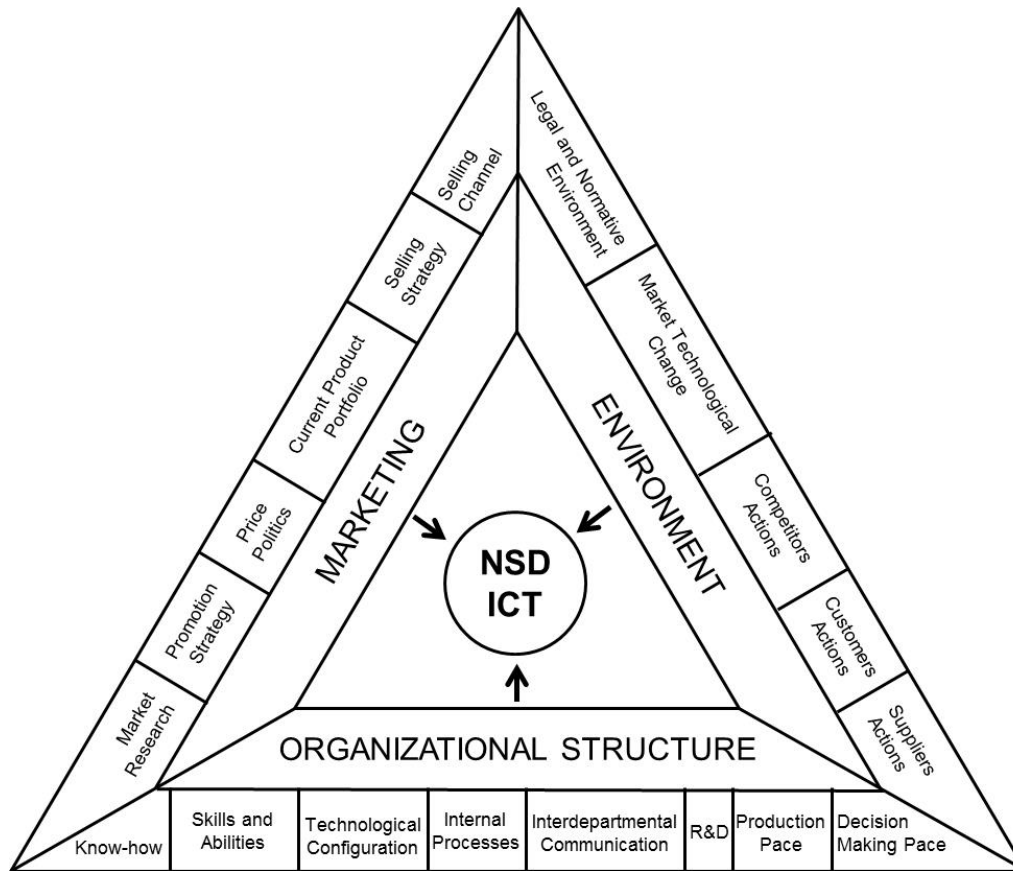


Figure 5: Proposal of a general diagram of the attributes that generate NSD in ICT firms  
Source: Own elaboration

#### 4 SCALE PROPOSITION

The absence in the literature of a scale to measure the diagram that systematizes the variables that generate NSD in ICT firms, this study proposed a scale, as presented in Table 3.

FACTORS / ATTRIBUTES	AFFIRMATIVES AS TO THE GENERATION OF NSD IN ICT FIRMS
RELATED TO MARKETING	
Market Research	1) I understand that the results of the market research done by my firm lead to the development of new services through the identification of new market needs.
Promotion Strategies	2) Every time the promotion strategies (e.g. advertising, direct marketing) adopted by my firm show themselves to be inefficient for the market, I notice that my firm decides to develop new services to raise its results or simply to keep them.
Price Policy	3) When the price policy (e.g. prices used, discounts given, longer time for payment, etc.) of my firm shows that the market is saturated, I notice that it develops new services.
Annual Product Portfolio	4) As far as I understand, the low sales performance of ICT services of my firm is an important indicator that shows the necessity of developing new services.
Selling Strategy	5) I notice that my firm develops new services if the results of our selling strategies stop producing the desired effect.
Selling Channel	6) When selling channels are available (such as e-commerce, new representatives, etc.) that favor the offer of new services, I notice that my firm develops them.
RELATED TO THE ENVIRONMENT	
Legal and	7) I believe that the legal and normative environment in which my firm is



Normative Environment	embedded contributes to the development of new services either through the increase in demand, forcing us to follow them, or through the decrease in demand, forcing the firm to offer new services (or the current ones significantly altered) to be different in the market.
Market Technological Change	8) I notice that the firm has to develop new services constantly to adjust to technological changes in the market or keep itself competitive after these changes have occurred.
Competitors' Actions	9) When a competitor takes an action that affects me, I believe that it stimulates us to develop new services to keep our market share or even to increase it.
Customers' Actions	10) I notice that our customers' actions lead us to develop new services through the opening of opportunities, praise, complaints and even the cancelling of services/contacts.
Providers' Actions	11) When our providers alter the services/products offered (change in price, quality, quantity or delivery time, among others), I notice that when using the opportunity or dealing with the threats, my firm develops new services.
<b>RELATED TO ORGANIZATIONAL STRUCTURE</b>	
Technological Configuration	12) I notice that the technological configuration (hardware and software) that my firm has at its disposal motivates the development of new services.
Skills and Abilities	13) I notice that the skills and abilities of my firm motivate it to develop new services.
Know-how	14) From my viewpoint, the know-how my firm possesses boosts the creation of ideas and consequently the development of new services.
Internal Processes	15) I believe the processes and procedures of my firm contribute to the development of new services and guarantee its development as specified.
Interdepartmental Communication	16) I believe that the interdepartmental communication model we have makes possible and facilitates the appearance and use of ideas, which results in the development of new services.
R&D	17) My firm owns an R&D area that is responsible for the conception and development of new services.
Productions Pace	18) I notice that the production pace is a relevant factor in the development of new services.
Decision Making Pace	19) As I see it, the decision making pace we have allows the approval of the development of new services in a short time; otherwise, lots of opportunities would be wasted.
<b>RELATED TO NSD GENERATOR FACTORS</b>	
Marketing	20) The marketing actions taken by my firm are relevant to the identification, idealization and selection of the development of new services.
Environment	21) As far as the development of new services goes, our firm is highly sensitive to the environment in which it is embedded, through technological changes in the market, changes in legislation or even the actions taken by customers, providers and competitors.
Organizational Structure	22) Our organizational structure is directly linked to the continuous development of new services.
<b>RELATED TO NSD IN ICT FIRMS</b>	
General Affirmative	23) We continuously develop new ICT services.

Table 3: The proposed scale to identify the attributes that generate NSD in ICT firms

Source: Own elaboration

The scale presented in Table 3 was developed from the general diagram of the NSD generator variables in ICT firms (Figure 5). As it is a scale proposed for this study, we point out that the same still needs to be tested and adjusted in future studies. Hence, we suggest the accomplishment of a pre-test and the calculation of Cronbach's  $\alpha$  coefficients in order to validate the reliability of this scale.

## 5 CONCLUSIONS

The general objective of this study was to identify in the literature those variables that generate new services in ICT firms. According to the results presented in Tables 1 and 2, we identified that these variables are related to:

- Marketing, especially the variables market research, promotion strategy, price policy, current product portfolio, selling and channel strategy;
- The environment, namely the legal and normative environment, technological market change and competitors', customers' and providers' actions;
- The organizational structure referring to technological configuration, skills and abilities, know-how, internal processes, interdepartmental communication, R&D, production pace and decision making pace.

As a specific objective, this study developed an explanatory diagram of NSD generator factors in ICT firms. After the study, it was possible to develop a general diagram of the NSD variables (Figure 5).

In terms of innovation studies, KIBS, NSD and ICT, this study presented academic contributions to propose an NSD model specifically for ICT firms, which are important KIBS representatives. The importance of this study for the literature is clear because given the great importance of ICT firms for the world economy, investigations about innovation in ICT firms are rare. As the study of NSD remains scarce in the environment of ICT firms, the diagram developed is an initial explanatory model of a phenomenon that deserves to be tested in future studies.

In terms of practical implications, there has been a great technological evolution in recent times based on the easy diffusion of knowledge that comes with the evolution of the Internet, which facilitates the availability of and search for information, and globalization. Thus, competition among firms has gotten stronger, mainly in the sector of services because this may be imitated. In this way, for ICT firms to stay competitive in the market, it is more and more necessary that they innovate and develop new services. Therefore, the model developed herein may be an important guide to the NSD process, thus helping the managers in these firms.

A limitation of this research was the fact that NSD studies are rare, specifically in ICT companies, and thus that several variables had to be identified by analogy to other service segments. As a suggestion for future studies, this study recommends the accomplishment of specific studies for ICT companies, where the models, diagrams and scale proposed in this study could be empirically tested. Further, the perceptions of firm owners versus operational personnel could be researched and new models containing the attributes of each step in the NSD process could be identified and created.

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