Characterization of a minimal model for SDP through a systematic review of literature.

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Abstract

Several authors in the literature sought to develop systematic models of Service Development Process (SDP) in order to guarantee the success in this process. However, companies do not yet have a strategic focus on SDP and are still lacking appropriate skills and structures to support them. This study aims at characterizing a minimal model for SDP. To this end, this study relied on the identification of common features and phases of the main models of SDP in the literature. The SDP existing models were chosen using a systematic literature review, which included a comparative study of fourteen models. Systematic review was chosen for this study mainly because it allows the incorporation of the contributions of a greater volume of relevant results, allowing the evaluation of the consistency and generalization of the results. The proposed minimal model presents nine stages and details, in depth, eight key activities included in two of the phases. The stages and activities are: Strategic Planning (definition of competitive criteria, segmentation definitions, market positioning definition and ideas management), Project Planning, Informational Project, Conceptual Project, Detailed Project (process definitions, definitions of skills and knowledge, physical structure definitions and prototyping), Production Preparation, Launch, Market Monitoring and Discontinuation. The purpose of the characterization of a minimal model is to standardize the language, consolidate essential activities and facilitate the understanding of SDP, serving as support for companies that aim at simplifying the systematic development of their services or to provide guidance for companies that have no structure for this process.

Keywords: service project; systematic review; models of SDP.

1 Introduction

Services have been responsible for the occupation of labour and the generation of wealth in many countries. This fact reflects the tendency of increase in the participation of services in Gross Domestic Product (GDP). However, many services are involved in an environment of aggressive competition and in markets in a constant state of transformation (D'AVENI, 1994). The companies then proceeded to pursue the strategy of adopting new services and continuous improvement of already existing services, seeking to ensure the quality of these services for their customers. Given this dynamic, the way the new services are developed and launched is becoming increasingly important in order to ensure good performance and the advantage before competition (FITZSIMMONS; FITZSIMMONS, 2005).

The nature of services, focused on the lack of tangibility, is among the causes of the difficulties to ensure their quality and design them (LEVITT, 1981). In order to make the service more visible and manageable, it is important to develop an appropriate service project. Such development may constitute a key element for ensuring the quality once the release has happened (MA et al., 2002). According to Shostack (1984), flaws in services arise from human incompetence and the lack of a systematic method for design and control, and the development of a new service is characterized by trial and error. A systematic structured language is able to boost the ability of companies to develop them (MELLO et al. 2005). The service project takes place within the Service Development Process (SDP).

Several authors in the literature sought to develop systematic models of SDP in order to guarantee the success of this process (COOPER; DE BRENTANI, 1991). Observing the recognized Gap Model in Quality of

Service of Parasuraman et al. (1985), the application of project concepts and service process helps in reducing the gaps between the service expected by the customer, the perception of management on those expectations, the service specifications and the service itself. What is noted, in fact, is that companies do not yet have a strategic focus on SDP and are still lacking appropriate skills and structures to support the process (EASINGWOOD, 1986; EDGETT, 1993; MARTIN; HORNE, 1993; SCHEUING; JOHNSON, 1989).

In this sense, the objective of this study is to identify common characteristics and phases of the various models of SDP in the literature, raised through a systematic review, in order to obtain a minimal model for the SDP, aiming at making this process easier to be managed and repeated by the service companies. The contributions of this study are presented in five sections. After this introduction, the second section provides considerations about the research method. Then in the third section, the literature review is presented with a comparative analysis between the models studied. The fourth section presents the results, addressing the phased structure of the SDP minimal model. Finally, the last section presents the conclusions of this study, also describing suggestions for future studies.

2 Method

This study is a research of applied nature with objectives of an exploratory nature, since it makes a qualitative survey of publications in relation to SDP. The survey of publications was carried out using the method of systematic review of the literature.

Systematic review is a form of research that uses the literature on a particular topic as a primary source of data. Therefore, the review is dependent on the quality of primary sources, and consists in a type of research that provides a summary of the evidences related to a strategy of interest intervention. The intervention, i.e., the interest objective is set right at the beginning of the method, which develops through stages that allow searching, critical appraisal and synthesis of selected information. This method is suitable to integrate information from a number of separate studies that may have conflicting and/or coincident results (LINDE; WILLICH, 2003).

Systematic review was chosen for this study mainly because it allows the incorporation of the contributions of a greater volume of relevant results, rather than limiting the conclusion to just some authors, allowing the evaluation of the consistency and generalization of the results (AKOBENG, 2005). Table 1 shows the steps that make up the systematic review proposed by Sampaio and Mancini (2007), arising from adjustments to the work of Domholdt (2005), Law and Philp (2002) and Magee (1998). Also in Table 1 for each stage of the review, the operationalization for this study is explained.

Table 1: Structure of the Systematic Review

Steps	**Operationalization for the study**
To define the scientific question;	How to group the common characteristics of SDP models into a simplified model?
To identify the databases, set keywords and search strategies;	Some of the periodicals that were used in the inquiry, indicated by Google Scholar database, were published in Journals such as: *Harvard Business Review*, *European Management* and *Journal of Services Marketing*. Documents of the German standardization, DIN (2008), were used in the the making of this paper as well as service research centers, Fraunhofer (2008), and domestic theses, such as Mello (2005). For the research in the databases the following keywords were used: *New Service Development* and *Service Design*. In this study, 'cross references' of publications were employed as search strategy, thus allowing the finding of older works on the subject.

To establish criteria for the selection of articles;	The works selected for the study met the following eligibility criteria: (i) the existence of phased SDP models, which would be clearly identified and characterized by its authors, (ii) works that represent analysis units from different countries, (iii) representative works from different periods of time, (iv) studies of different groups of researchers, and (v) works with SDP models developed for different areas (sectors) of services.
To carry out searches in the databases and compare searches of the examiners;	The search for SDP models was carried out in a month. There was no comparison between the searches of more than one examiner, as the two investigators worked together to compose the journal base, organized in Mendeley software, always evaluating the number of citations as a relevance identification factor of the works to be read.
To apply criteria for selecting the articles and justify exclusions;	Sixteen papers were collected, of which fourteen were selected for comparison. The exclusions of two models are justified for those being developed for specific companies, making it difficult to generalize the results.
To critically analyze and evaluate all the studies;	The models for the SDP were organized and compared according to the nine-stage structure of the consolidated management model for Product Development Process (PDP) of Rozenfeld et al. (2006). The phases are: Strategic Planning, Project Planning, Informational Project, Conceptual Project, Detailed Project, Production Preparation, Release, Market Monitoring and Discontinuation. The PDP area perspective was the chosen option, considering that it is an area of increased volume of research in national scope and therefore to draw a parallel of the contents allows them to be more easily understood.
To prepare a critical summary synthesizing the information;	In the literature review a comparative figure (Figure 1) was elaborated for the fourteen models evaluated in depth, thus making it possible to generate a general characterization of the analysis units, identifying key countries, study groups and sectors that are concerned with the SDP systematization. The figure also allows the identification of macrophases of some models and the drawing of parallels between the phases of the models studied.
To present a conclusion supplying the evidence.	The information of the fourteen papers was synthesized engendering a minimal model for the SDP. The minimal model aims at valuing the main innovations introduced by each author, but also praising the information repeatability between the studies - the consensus. A summary table was elaborated (Table 2) with the inputs and outputs of the SDP phases, in order to make the understanding of the results easier. In addition to the phases, eight key activities were outlined in the summary table, four constituents of the Strategic Planning phase and four of the Detailed Project phase. An option was made in highlighting these activities with a view that they had particular responsibilities in relation to the dimension of service quality.

Source: The authors

3 Comparison between the Models for SDP

The fourteen models selected in the systematic review were used for the comparison between the models for SDP. The phase by phase result of this comparison is shown in Figure 1, in which the models are arranged in chronological order of creation in the x-axis and in chronological order of occurrence of the phases in the y-axis. And the y-axis is also distributed according to the scope of the nine stages of the PDP generic model of Rozenfeld et al. (2006). For the models that have macrophases, these were placed to the left of the model with the phases belonging to each one differentiated by intercalating dotted rectangular boxes and not dotted. Only half of the models presented has the macrophase organization.

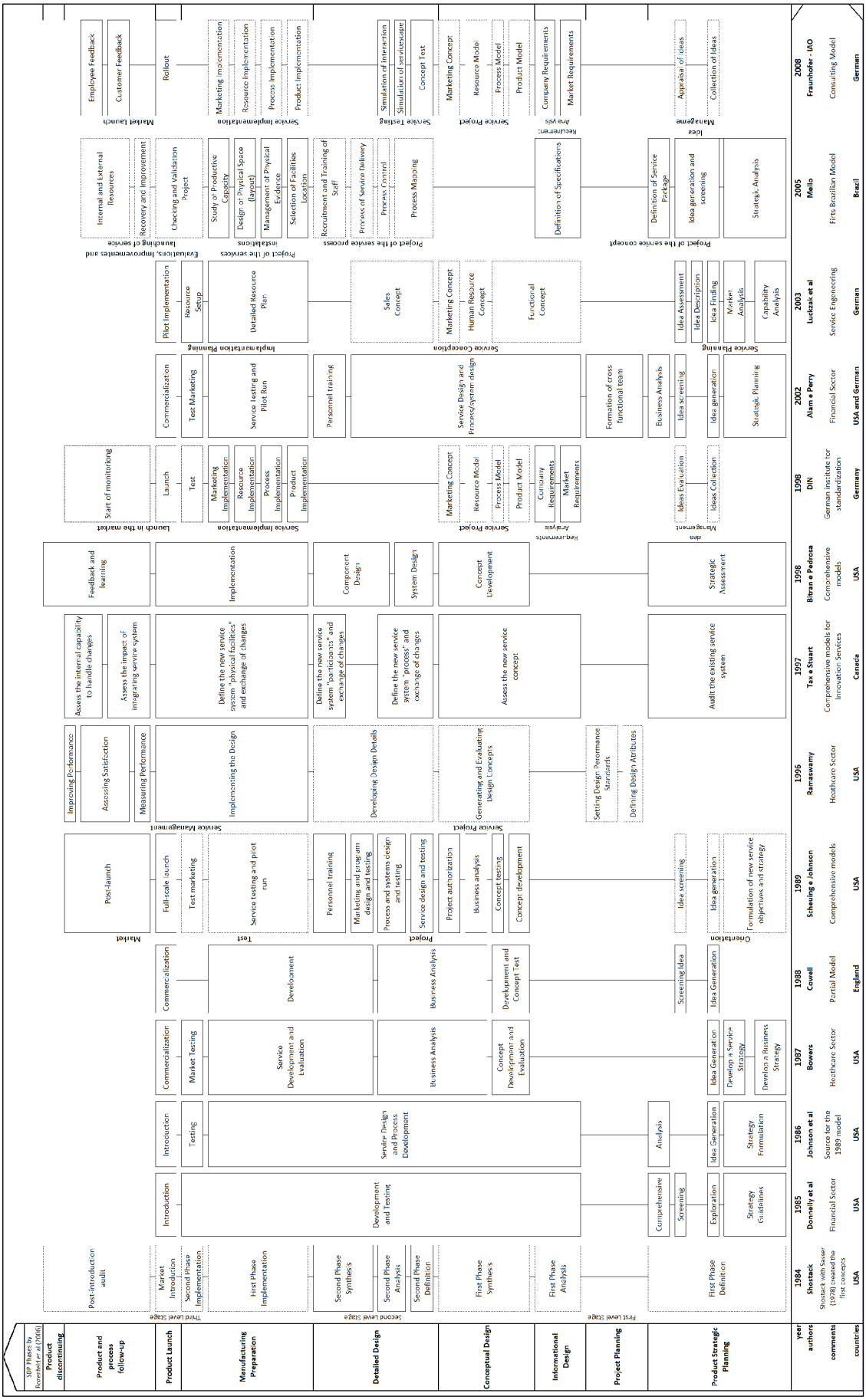

Figure 1: Literature models for SDP.

It is possible to see that there is a balanced distribution in the amount of models portrayed in the last three decades; six of the 80s, four of the 90s and four of the post-2000 period. It can also be noted that half of all evaluated models are American. Although the model of Shostack (1984) have been the first for the study area, the model of Scheuing and Johnson (1989) is still currently the most commonly reported one by authors. One of the reasons for such recognition is its greatest level of detail, which is composed of fifteen stages. The average of phases in the sampled model units is ten phases. The financial and health sectors were the first to demand greater rigor in SDP and therefore, models were developed for this need, as Donnelly et al. (1985) and Alam and Perry (2002) for the financial sector, and Bowers (1987) and Ramaswamy (1996) for the health sector.

The phased models for SDP can be reduced to the following sequence: (i) to understand the needs of consumers, (ii) to transform those needs into the service concept and (iii) to plan the process, structure, support and infrastructure for this new concept (BOWERS, 1987; SCHEUING; JOHNSON, 1989). In general, the models lack a vision of Project Planning in how it is structured in PDP. The generation and screening of ideas appear as phases in the models, unlike the PDP in which they are usually treated as activities. Moreover, few models for SDP deal with a particular phase for the Informational Project and Market Monitoring and none of the models suggests a phase for the Discontinuation.

As for the Production Preparation phase, only in the late 90s it began to have their activities broken down into independent phases for some models of SDP, as in the German models DIN (1998) and Fraunhofer (2008). These two models are nearly equal in its phases, since the model DIN (1998) is in force in the German standardization. For this reason, the Fraunhofer Institute, this provides business consulting, ends up using it as base.

4 Results and Discussions

In this section, the nine generic phases in which the models for the SDP were compared in Figure 1 were analyzed. The main contributions of the authors have been identified, in order to have those incorporated into the minimal model for the PDP, presented at the end of the section.

The first generic phase is the **Strategic Planning**. It contains the strategic definitions concerning the services, defining the focus and giving priority to a few competitive criteria (quality dimensions) in accordance with the type of service according to its volume and variety (gradually increasing through the levels of professional services, service shops and mass services) and company size. For making decisions before the competitive criteria, the definitions before the segmentation and market positioning are important (GIANESI; CORRÊA, 1994). Segmentation is the definition of consumer groups with common characteristics, identified based on demographic and psychographic data. The positioning is more comprehensive and involves: identifying customer needs, segmenting, mapping segments according to the needs and attractiveness, estimating the ability of competitors and identifying niches and opportunities.

According to Papastathopolou et al. (2001) the identification of the strategic roles is necessary, as well as the review of historical performance, the specification of research categories to be explored and the distribution of individual tasks and responsibilities. Fraunhofer (2008) suggests a portfolio structuring and catalog analysis on the services offered, standardization and modularization of services and strategies to internationalize the services. Tax and Stuart (1997) stress the importance, in this phase, of first understanding the role of consumers and the effective benefits they expect.

It belongs to this phase what the DIN standards (1998) conceptualizes about the ideas management, and many models describe this as a phase. This deals with the generation and selection of ideas for the service. Therefore, it involves both the development team, especially the front-line employees, and users in order to formulate the problem and the possible solutions. Focus groups and interviews are important means to raise ideas. According to Mello (2005), the main criteria for selecting ideas are: market considerations, strategic plans, management decisions and competition analysis.

In the **Project Planning** phase, in the literature on product development, the information is documented and then begins the management of a new product through a project method, such as the PMBOK® guide, with the approval of the Project Plan as the result of this phase (ROZENFELD et al., 2006). Due to the lower maturity of SDP models compared to those of PDP, the project management scope is not detailed. The ten-phase model of Alam and Perry (2002) is about isolating the formation of a multifunctional team as a phase, which addresses the question of human resources selection and the responsibility activities of each employee within the new project (determined in team meetings). The nomenclature of 'project' is adopted by Ramaswamy (1996), who focuses on trying to measure the project performance to ensure the quality of service that will be delivered to customer. The project becomes an indicator of the stability and reproducibility of service performance.

The **Informational Project** phase, translated from the product development process language, is responsible for defining the specifications (attributes) of the service, through surveys of customer requirements. The choice of specifications depends on the degree of customer involvement with the company (Swan et al., 2002). In addition to the technical statements, statements that express expectations or needs of customers must meet project standards (RAMASWAMY, 1996). The analysis of customer requirements must be measurable and verifiable to relate them to a new service opportunity. It is necessary to determine, besides market requirements, the prospects of the company, formulating clear and unambiguous requirements for the concept generation (FÄHNRICH; MEIREN, 2007). Silvestro et al. (1990) name two types of specifications for services: hard measures and soft measures. To translate the customer voice in technical specifications, the literature suggests the use of *Quality Function Deployment* – QFD. There are several domestic studies showing the application of QFD in service, such as the works of Ribeiro et al. (2001) and Magnago and Danilevicz (2009).

In the **Conceptual Project**, solutions are defined for the requirements raised. The functional structure of a service can be understood as parts of its process. One way to obtain the parts of the process begins with the hierarchizing of requirements. With the requirements hierarchized, it becomes possible to produce a transfer graph as a means to define the tasks that will make up the architecture of the new service. Along with the task, the classification about their type begins, and according to each type, it is possible to carry out the interdependence analysis between tasks, thus defining the structure of the parts of the process (LUCZAK et al., 2007).

Many SDP models found in the literature besides determining the process and then detailing its characteristics (Detailed Project), do so in a combined form. The factor that determined the division of Conceptual and Detailed Project is the intensity of the definitions about the new service. In the conceptualization, just one model results of what will be the outcome of the service delivered to the customer, and in the detailed phase, tools and simulations are used for determining the features and controls of the routines. A typical statement of concept should include a description of the problem which is expected to be solved, the reason why the new service will be offered and the outline of its characteristics and benefits and the justification for its purchase (SCHEUING; JOHNSON, 1989).

In the **Detailed Project**, the entire system of the new service is carefully described and, if possible, prototyped. The existing skills, or to be developed, can be divided into three basic topics: (i) Processes, (ii) Skills and Knowledge, and (iii) Physical Structure (PRAHALAD, HAMEL, 1990). The tools to address these issues have evolved and are aiming at materializing the services in order to make them more comprehensible, ensuring the post-release success. That is the case of *ServLab*, a rapid service prototyping laboratory maintained by Fraunhofer Institute, which makes 3D virtual simulations of new services. Besides the physical structure, *ServLab* can also test the process flows and carry out trainings before investing in infrastructure (FRAUNHOFER, 2008).

Regarding the topic of (i) Process, the best known method of service process definition is the *Service Blueprint*, developed by Shostack (1984). Despite having its origin in the flow charts of industrial processes, it is a systematic technique for mapping the processes considering the aspect of customer interaction, valuing the front office contact and the back-office activities. The *Blueprint* allows the team to

see the process flow, and for the critical parts to be delivered to customer, it allows the generation of a *Failure Mode and Effects Analysis* (*FMEA*) of services (LUCZAK et al., 2007).

As for the topic of (ii) Skills and Knowledge, it refers directly to human resource capacities that are involved. Some SDP models highlight this topic in a separate phase calling it 'staff training', as Scheuing and Johnson (1989) and Alam and Perry (2002). Service providers (employees) should be selected and trained for the activities of the new service, and a means of reward for work done should be structured (SHOSTACK, 1987). Understanding the role of the customer in the execution of the service should also be considered to define the skills and knowledge required (BOWEN, 1986). Luczak et al. (2007) propose that the required skills should be identified for each task composing the map of the service process, thus allowing the understanding of the targeted profile of human skills and the classification of the specific skills in: professional, social, individual or (of the) system.

As for the topic of (iii) Physical Structure, which deals with the definition of layout, flows in a space, acquisition of an environment for the service practice, among others, it is one of the least addressed subjects in the SDP models (MELLO, 2005). Ramaswamy (1996) is one of the authors dealing with the tangible structure of services, showing that customers' perceptions of quality may be influenced by attributes such as cleanliness, space, color, lighting and physical layout of the environment where the service occurs. Mello (2005) focused on issues of facilities project, however, it was found that these decisions have direct correspondence with the execution of the project and therefore they were allocated in the Production Preparation phase. Mello (2005) suggests the use of the list of studies of Gianesi and Corrêa (1994) regarding the criteria of location factors for choosing the best place in the region, country, area or specific location of the facilities. The choice between the physical arrangement by product, process or positional, the most commonly used layouts in services (CORRÊA; CAON, 2002). The management of physical evidences, such as standard characteristics of the exterior and interior of the facilities and all materials (facilitating goods) to be provided by the service (HOFFMAN; BETESON, 2003). And also the suggestion to study the productive capacity of services, such as peak demand, queues, efficiency, etc.

The **Production Preparation** in services is included with the implementation activities and service tests. Implementation is the stage of project execution, allowing the validation of the process structure, resources and end result of the new service. The tests are a pilot with the customer, acting to identify the acceptability and the potential improvements of the new service, as much as the marketing program for it (SCHEUING; JOHNSON, 1989). In parallel, the process structure is also tested, allowing a comparison of the expected situation with reality, and making possible the documentation of operational procedures to be followed (BITRAN, PEDROSA, 1998).

The **Launch** is also called Introduction or Commercialization phase by the SDP models. This phase covers the management of the activities of service on a large scale, putting it on access to the entire market. The moment of launch requires a plan with basic decisions about when to do, where, to whom and how to promote this first contact of the company in the market according to the company's strategy (COWELL, 1988).

The **Market Monitoring** is a phase that is included in all activities of post-launch service performance control. Checking if the estimated financial returns are responding to the expectations and if the customers' satisfaction in relation to quality are being met, for example, respectively by using techniques of financial analysis and the ServQual, with information collected through panels, questionnaires and observation of customers. The need for a constant control of the satisfaction is essential, since customer expectations may change after their experiences with the service operations or competitors may provide new standards for quality, creating new minimum levels of acceptable performance (RAMASWAMY, 1996). In this phase, when necessary, there are suggestions for recovery plans for services to drive improvements and not simply pacify unhappy customers. Recovery involves the management of practical problem solving (MELLO, 2005).

The **Discontinuation** phase, which in the product scope suggests actions for withdrawing it from the market, is not shown by the SDP models. However, the authors understand that every service has an end-of-life and, accordingly, before the company ceases offering it, they intend to find opportunities for improvements or upgrades to the services already offered or the generation of ideas for future lauches.

All generic phases, with eight key activities being highlighted, have been incorporated in the minimal model for SDP. Table 2 was developed in order to summarize the contents of this subsection, synthesizing the input and output of each phase and the key activities of the minimal model.

Table 2: Minimal Model for SDP

Phase/Activities of SDP		Input	Output
1	**Strategic Planning**		
	Definition of Competitive Criteria	Market data and review of strategic planning.	Definition of competitive criteria (quality dimensions).
	Segmentation Definitions	Demographics and psychographics of customers.	Definition of consumer groups with common characteristics.
	Market Positioning Definition	Customer segmentation and market opportunities.	Definition of niche market and competitive strategies.
	Ideas Management (portfolio management)	Surveys with stakeholders and idea generation methods.	Survey of preliminary ideas of services to be designed.
2	**Project Planning**	Draft of the new service.	Approval of the project plan, with timelines and budgets, by management.
3	**Informational Project**	Survey of customer opinion and team information.	Definition and categorization of requirements.
4	**Conceptual Project**	Balanced requirements.	Approval of a concept (model) of the process characteristics.
5	**Detailed Project**		
	Process Definitions	Service concept.	Flowchart of the service process.
	Definitions of Skills and Knowledge	Competitive criteria and process characteristics.	Definition of the service provider human resources profile.
	Physical Structure Definitions	Competitive criteria and process characteristics.	Definition of the physical structure of service and facilitating goods.
	Prototyping (simulation)	Process, human resources and physical structure definitions.	Approval of necessary resources.
6	**Production Preparation**	Definitions of the detailed project.	Certification and approval of the pilot test with end customers and resources.
7	**Launch**	Approval of the pilot.	Release of the service.
8	**Market Monitoring**	Performance indicators.	Improvement plans.
9	**Discontinuation**	Analysis of the life cycle.	Remove service operation.

Source: The authors

5 Conclusion

The model of minimal characteristics proposed aims at standardizing the language, consolidating essential activities and making easier the understanding of SDP, serving as support for companies that aim at simplifying the systematization of development of their services or providing guidance for companies that have no structure to this process. It is suggested for companies that aim at simplifying SDP a comparative analysis of their current model with the phase model of this study, identifying their

similarities and differences. The minimal model also aims at demystifying the difficulty of standardization of the development process for service managers and partially covering the gap of research studies on SDP in the same way as PDP.

There are conceptual differences between the Minimal Model for SDP and the PDP reference model used. There was a need to understand how this would be the same frame of reference services. For this purpose, basing the characteristics of the Minimal Model phases using models developed for service literature. The detailed project activities are at greatest difference between the reality of services and products. The definition of process, skills, knowledge and physical structure; and the prototype of the flow of the service are the activities of this phase. Products capabilities and tools to supply this phase are quite different. The same team would be unable to supply this phase for the two realities.

As recommended opportunities for future studies there is the development of a certification scheme for SDP, in the same way as it has occurred with PDP, in which there are minimum standards for the certification of the process, required by ISO, or by company-customer regulations or for operating in a specific industry. The SDP certification gains support in the context of outsourced services, in which it would be a way for the contracting company to know the capabilities and systematization of the provider in relation to SDP. It is also recommended the development of future studies to elaborate a didactic exemplification, applying step-by-step the minimal model of the proposed SDP.

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