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Colaboração Externa no Processo de Inovação de uma Fashion Industry

External Collaboration in the Innovation Process of a Fashion Industry

Sidney Matos Mendes[†]

Abstract

This article aims to contribute to the studies of open innovation, the global innovation, and product development processes. The collaboration of external suppliers in the innovation process of an organization was researched; which was understood as an open innovation performance. As the fashion industry makes part of the organizations that deliver constant innovations, it was chosen, as a study object for this article, an international organization that has a subsidiary in the state of São Paulo. Six professionals were interviewed. They were directly involved in the clothing development. Using a qualitative methodological approach, with case study method and content analysis for data treatment, it was verified that the independence of action and adoption of open innovation occurs along the different phases of the innovation process.

Keywords: External Collaboration; Innovation Process; Fashion Industry.

Resumo

Este artigo busca contribuir com os estudos de inovação aberta, inovação global e processos de desenvolvimento de produto. Foi pesquisada a colaboração de fornecedores externos sobre o processo de inovação de uma organização; o que foi entendido como uma atuação de inovação aberta. Sendo a fashion industry parte de organizações que entregam constante inovações, foi escolhida, como objeto de estudo para este artigo, uma organização internacional que tem uma subsidiária no estado de São Paulo. Foram entrevistados seis profissionais que atuavam diretamente no processo de desenvolvimento das coleções. Fazendo uso de abordagem metodológica qualitativa, com método de estudo de caso e análise de conteúdo para tratamento dos dados, constatou-se que ocorre a independência de atuação e adoção da inovação aberta entre as diferentes fases do processo de inovação.

Palavras-chave: Colaboração Externa; Processo de Inovação; Fashion Industry.

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Introduction

The innovation process (IP) is adopted by organizations when they operate in highly combative environments (Silva, Bagno, & Salerno, 2013) in the search for production and maintenance of a competitive differential. Because there is no homogeneous theoretical model for all industrial sectors, the most significant and implemented ones will be described, among them: the Innovation Funnel, the Stage-Gate - qualification filters, the Value Chain, the Open Innovation and the Flow of Global Innovation. Based on the understanding of these models and the difficulty of adopting a single useful model for environments subject to national and international exterior collaborations, the influence of exterior collaboration on the innovative product-development process is questioned.

To answer this question, the main objective was to analyze how the IP can adapt to the breakdown of property with the influence of exterior collaborators. Also, secondary objectives were established: I) the elaboration of an IP model that can be adopted in collaborative environments; ii) the identification of the exterior collaborators performance in the IP, the owner's scope opening; and iii) validation of a framework model with independent phases in the owner's performance, occurring a disaggregation of the proprietary scope.

To achieve these objectives, we used the qualitative methodological approach, which allowed the data collection necessary to carry out a single case study following the model of Eisenhardt (1989). In this data collection, semi-structured questionnaires were used, in which six professionals who work through the collection development process, coordinators or analysts, had the knowledge to distinguish and identify moments in which exterior collaboration influenced.

In this context, two possible propositions were visualized: I) for the influence of external collaborators, the phases of the IP must be disaggregated by the proprietary scope; that is, they can be opened or closed, carried out by the internal professionals of the companies or by suppliers external; ii) even with the adoption of an open innovation process, the phases are dependent and are not influenced by external collaborators, remaining constant and equal regardless of the relationship with suppliers.

To justify this research, we have looked at the growing adoption of international suppliers in the production processes of many products, sometimes technological capacity, or cost reduction. Given the lack of adoption of innovation management in some industrial sectors, as in the case of the fashion industry, coupled with constant descriptions of PI (Cooper, 1990; Wheelwright, & Clark, 1992), which do not fit exclusively with these scenarios (Chesbrough, 2003), it is sought to identify the existence of a process where the phases can be disaggregated to adaptation of the organization IP to the environment and better performance of other channels in the supply chain.

The fashion industry, the object of this research study, has representation in the national market, being the second-largest employer among the transformation industries. Formed by more than 32 thousand companies operating in the federal territory, for the Brazilian Association of the Textile and Apparel Industry (Abit, 2016), it represents approximately 5% of GDP. This industry generates products in the form of seasonal collections offered every six months, containing varied clothing and accessories in the finish, size, and price. Making use of much technologies, essentially low tech, this sector has been rich in information to collect, test and validate the proposed framework.

Formed by seven moments, the following will be presented: I) a bibliographic description of IP approaches, such as the stage-gate, innovation funnels, open innovation, value chain and global innovation flow model; (ii) the proposals are then drawn up; (iii) shortly afterwards the methodological approach used is presented; (iv) the results of the analyzes are discussed; v) the discussion of the results is presented; and vi) finally, the research is concluded with the final considerations.

Theoretical Reference

Technological changes are important and crucial to economic growth, whereby companies can keep up-to-date, making technological innovations to differentiate themselves in a combative local, global, and global market (Freeman, & Soete, 2008; Schumpeter, 1961). The production of innovation occurs through many stages to

transform ideas into consumer goods, services or processes, which will generate differentiation and, finally, competitive advantage (Silva et al., 2013).

For Tidd and Bessant (2015), IP addresses the management of information and knowledge inputs, with outputs of products and services, using control tools to achieve objectives, and making better use of available resources. For the effectiveness of this management, it has to take into account the structure of the organization, the behavior patterns of the teams involved and business planning (Tidd, & Bessant, 2015), which makes it difficult to define an IP model as unique and efficient management of the various forms of innovation management.

The different models of PI were well studied and defined by Rothwell (1994), who proposed five generations of technological innovations associated with the strategic evolution of the company between 1950 and 1990. For Silva et al. (2013), the models of the original and second generations are simple and linear; while in the third-generation models, there are combinations of technology or market to trigger the process within linearity, with return between phases; already, in the fourth generation, models favor parallel activities, aided by alliances; and in the fifth generation, innovation is seen as an integrated process between relationships in the process.

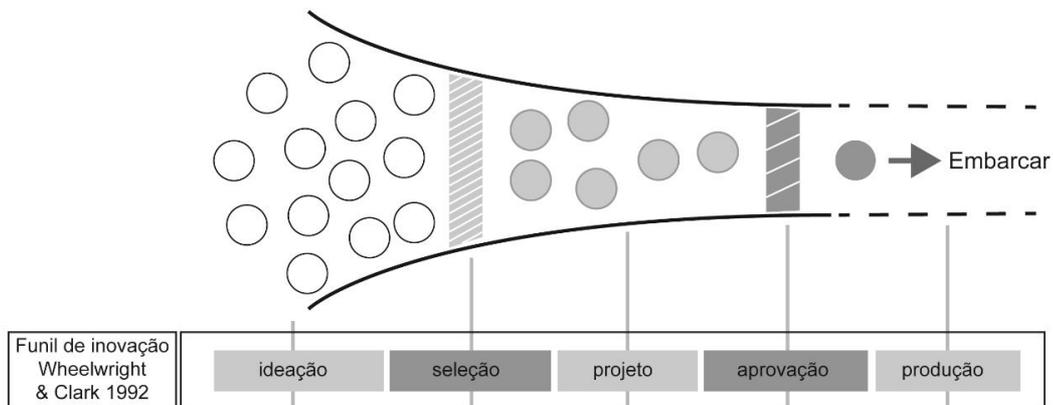
The original generation is represented by Cooper (1990) and Wheelwright and Clark (1992) with their models called Stage-Gate, which have development validation ports and the Innovation Funnel that favors the capture of ideas. The Stage-Gate model is focused on new-product development (DNP). Cooper (1990) describes the need to dismember the process in pre-determined inter-functional and parallel stages, where at the end of each stage, there is a gate for control and validation, which allows for the verification of process evolution and (Silva et al., 2013).

In the present study, it was observed that, This model was widely used in sectors of high technological complexity known as hard tech, such as automobile, pharmaceutical and machinery industries (Gavira, Ferro, Rohrich, & Quadro, 2007), and is built in the interest of constant checks and approvals, for make use of a large amount of resources invested in the process.

Wheelwright and Clark's model (1992), the Innovation Funnel, is described by the association that good processes have wide "mouths" and narrow bottlenecks to

facilitate the capture of ideas both internal and external. This model becomes efficient with the use of filters that select the best ideas that will receive an investment of resources when deployed (Silva et al., 2013). Suitable for resource-scarce environments that often have many early ideas, it is a model focused on consumer goods industries and markets, as they need more agility in launching new products to remain competitive in low- or medium-technology sectors (Gavira et al., 2007; Silva et al., 2013). In Figure 1, it is possible to observe the representation of this process and its phases.

Figure 1 - Innovation Development Funnel



Source: Wheelwright e Clark (1992, p. 124).

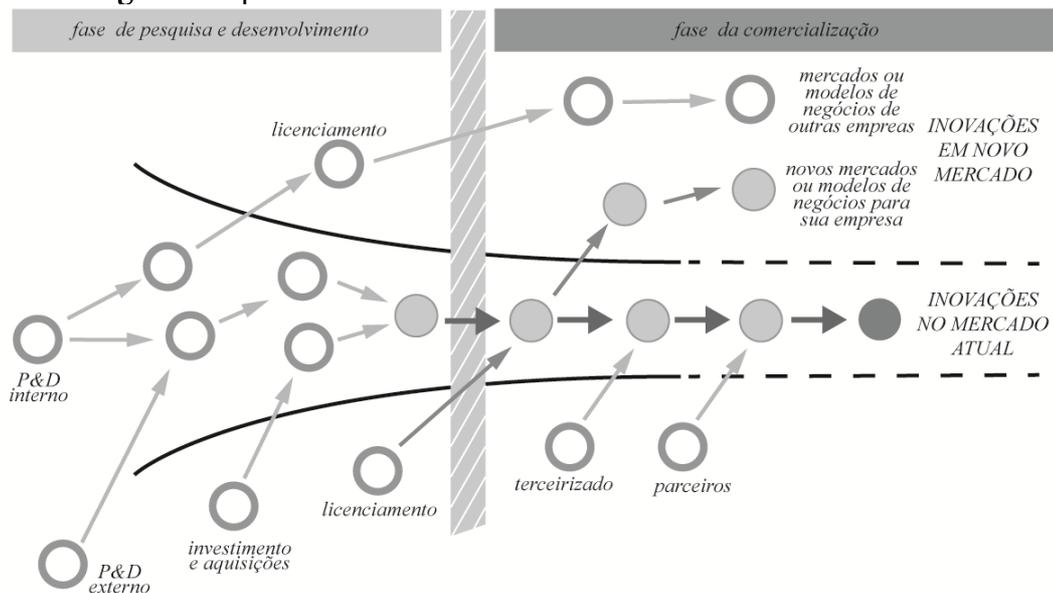
Following for the third and fourth generation, IP models are more unclosed and integrated, involving industry interactions, horizontal collaboration, flexibility, and process reviews (Rothwell, 1994). The best known are open innovation, the value chain and the flow of global innovation.

Chesbrough's (2003) open innovation model questions the valuation of knowledge and endogenous technology and the consequence and need for protection of intellectual property. At Figure 2, it is possible to see the representation of process interactions with sources of exogenous knowledge, exterior to the process, built on five principles: i) not every intelligent and innovative professional will work for a single organization, so it must be found and explored knowledge and experience outside the company; ii) external R & D can have significant value, and the organization's inside R & D needs to take ownership of it; iii) it is not required to be the generator of innovation

to profit from it; iv) making good use of internal and external ideas makes it a winner; v) must find new ways to profit from the intellectual property generated.

For Gassmann (2006), the open innovation model compares with environments with low protection barriers, in globalized scenarios, where adaptation is needed. Lazzarotti and Manzini (2009) describe that open innovation can occur in four distinctive ways, varying in the need to open the process, is: I) closed innovators: they are companies using external knowledge only for a specific phase of the process; II) specialized employees: these are companies with knowledge on how to work with many distinctive employees, but all of them are concentrated in the same phase of the innovation funnel; III) integrated collaborators: they are companies which have the development process open at all stages, but only for some partners; iv) open innovators: they have high relationships with partners and an open development process.

Figure 2 - Open Innovation Model



Source: Chesbrough (2003).

The Hansen and Birkinshaw (2007) value chain model is indicated in situations where the company has good customer service as a business guideline. Resulting from Rothwell's 3rd generation (1994), product development takes place through alignment and interconnection between sectors, with a broad and integrated view of the firm's IP (Demonel, & Marx, 2015).

Recognition of interaction between sectors and the merging of technology pushed by the company or driven by the market generate a nonlinear and systemic logic in the "chain" (Rothwell, 1994). The value chain model takes place in three stages: generating ideas, converting ideas into production and disseminating ideas. What Hansen and Birkinshaw (2007) propose in this model is the involvement of the strategic and operational dimensions of the company without losing its main value, without a weak or poorly managed block (Demonel, & Marx, 2015).

The Von Zedtwitz, Corsi, Sørberg and Frega (2015) global innovation flow model identifies, in the decentralization of decision-making power, the breakdown of ownership over IP, which leads to increased creative capacity and the production of innovations in subsidiaries of the organizations (Govindarajan, & Ramamurti, 2011). As is common to find subsidiaries in emerging or developing countries, this model brings a new look at IP, in the interaction between the phases and the locations of the subsidiaries. Based on this theory, Von Zedtwitz et al. (2015) developed the global innovation flow model, encompassing the four phases of Vernon's (1966) development cycle: ideation, development, and primary and secondary market introduction. The main concept of the model permeates the ability to develop countries to generate and produce innovation, hence the association between the model and reverse innovation. Reverse innovation is identified in this flow when global innovation at some point during the IP moves from a developing country to a developed one, but its entry into a developed country (Von Zedtwitz et al., 2015).

Theoretical Proposition

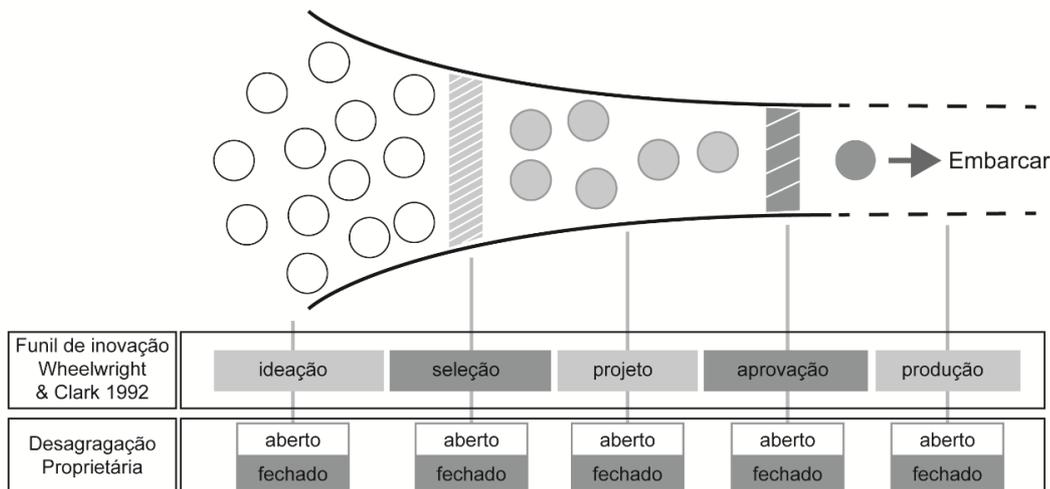
Based on some of the characteristics of the models described above, a framework is proposed in which the PI phases are independent, with a proprietary variable scope disaggregation for each phase. To that end, the favorable characteristics of the models collaborating for the proposal were identified: I) the innovation funnel structure of Wheelwright, and Clark (1992) was chosen because it is believed that this is the most coherent and convergent model with processes of low tech industries; possessing five distinct and objective stages, facilitates the recognition and similarity of processes in several sectors, such as the fashion industry; II) Chesbrough's open

innovation model (2006), the concept of openness was adopted with external collaborators in the process stages, recognizing the sharing from outside to inside and vice versa in the sharing of knowledge and technologies; III) the global innovation flow model of Von Zedtwitz et al. (2015), the decentralization of decision-making power over the phases of the IP was adopted.

The framework is represented in Figure 3, in which it is possible to see the proposed relationship between the innovation funnel models, with open innovation and the flow of global innovation. In order to analyze if there is a property's breakdown between the phases during the process.

This study will work the framework under two propositions, that will be validated with data collection and analysis: I) for the influence of exterior collaborators, IP must be disaggregated by the proprietary scope, which means that they can be opened or closed, carried out by the internal professionals of the companies or by external suppliers; ii) even with the adoption of an open innovation process, the phases are dependent and are not influenced by external collaborators, remaining constant regardless of the relationship with suppliers.

Figure 3 - Integrated Global Innovation Funnel



Source: Model prepared by the author.

Method

The methodological approach adopted in this work is qualitative, and was developed by the deductive-inductive principle, since it is indicated in the existence as

a source and consolidated by a theoretical basis (Pozzebon, & Freitas, 1998). The theoretical study provided the basis for establishing patterns that aided in the construction within the framework and, consequently, the elaboration of the field research, in order to identify the reasons that emerge from the professionals of the companies for the adoption of external knowledge. For a case study, we use the Eisenhardt (1989) model to understand the dynamism present in companies that perform open innovation.

Making use of bibliographic, documentary and field data, this research searches in "books, periodicals and other written documents, the necessary information to progress on the investigation of a topic of real interest" (Lima, 2005). Secondary sources were used to obtain data in the fashion sector, such as IBGE and Pintec. The field research was carried out in a systematized way, since, according to Godoy (1995), the selection and the organization must be free of any manipulation; for this, we did the elaboration of a semi-structured interview with 17 predefined questions elaborated within the concept and phases that are part of the innovation funnel model of Wheelwright and Clark (1992).

In order to perform the data analysis, the Atlas.ti software, indicated by Godoi, Bandeira de Mello e Silva (2006), was used to make use of encoding to be identified and quantified in the collected data. The codifications used for the study are present in Table 1, in which the central categories are identified as process stages, and the specific categories relate these phases to the opening of performance, following the proposal by Strauss and Corbin (2008) in the use by this method.

Table 1 - Coding of the categories used in the analysis

GENERAL CATEGORY	DIMENSION – SPECIFIC CATEGORY
Wheelwright and Clark (1992) - Innovation flow	Proprietary Disaggregation Chesbrough (2006)
1 - Search Ideas	1.1 - Closed Ideation
	1.2 - Open Ideation
2 - Process Selection	2.1 - Closed Process Selection
	2.2 - Open Process Selection
3 - Product Design	3.1 - Closed Project
	3.2 - Open Project
4 - Product Definition	4.1 - Definition Closed
	4.2 - Open Definition
5 - Product Production	5.1 - Closed Production
	5.2 - Open Production

Source: Prepared by the author.

In the search for validation of the data analysis, the Kappa interpretation technique was used, which seeks to test the degree of reliability and accuracy in the respondents' answers (Perroca, & Gaidzinski, 2003). The Kappa coefficient aided in identifying which respondents describe the PI of the collection in a similar way (Fonseca, Silva, & Silva, 2013). Using the SPSS Statistics software, the strength value of agreement between the interviewees was identified. To define parameters of the forces of agreement, the nomenclatures proposed by Landis and Koch (1977) were used to fit the corresponding Kappa intervals. See classification in Table 2.

Table 2 - Measurement of concordances Kappa

Statistics Kappa	Strength of Agreement
< 0.00	Poor
0.00-0.20	Weak
0.21-0.40	Reasonable
0.41-0.60	Moderate
0.61-0.80	Substantial
0.81-1.00	Perfect

Source: Landis and Koch (1977, p. 165).

For the data collection, a company was used that here will be identified by Beta (in the search of secrecy), because it falls within the object of study of the fashion industry. The company analyzed originated in the United States, in the state of New York, and began its activities in 1968 with the creation of its first store, which sold the

creations of the stylist in small quantities to big and trendy department stores. In the 1990s, it began to internationalize its sales in other countries, such as Spain, Japan, France, Switzerland and Singapore. The Brazilian subsidiary, which hosted the interviews, completed 11 years of operations with the Jeans premium line, winning 23 states and a total of 115 franchise stores during the year 2016. With offers of men's, women's and children's clothing lines of brand accessories, the company is a fashion trend-generating brand.

Results

Data collection was performed with six professionals from the product development department of Beta. As coordinators and analysts, all work directly in the development of collections for jeans, men, women, children and accessories. After the interviews and analysis on the data by the quantification of specific content repetition, it was possible to reach the result that is presented in Table 3.

Table 3 - Quantitative result of quotations of the company Beta

Specific Categories	Amount of Quotation per Interview						Total Quotation/ Category	Higher Recurrence in Process
	TK_P	TK_M	PJ_F	BS_V	CI_I	BC_J		
1.1- Closed Ideation	4	12	4	9	8	5	42	Phase of ideation closed
1.2- Open Ideation	3	4	0	5	10	5	27	
2.1- Closed Selection	1	16	5	15	4	3	44	Closed selection phase
2.2- Open Selection	1	9	3	4	3	0	20	
3.1- Closed Project	7	9	3	9	24	10	62	Open design phase
3.2- Open Project	8	12	2	10	13	19	64	
4.1- Closed Approval	2	12	6	4	6	5	35	Closed approval phase
4.2- Open Approval	2	9	0	3	4	1	19	
5.1- Closed Production	14	1	6	10	1	0	32	Open production phase
5.2- Open Production	3	11	10	2	16	7	49	
Total quotation per interview:	88	176	77	131	178	110	760	

Source: Elaborated by the author.

With the analysis of the content, it was possible to identify the process standards of the company Beta by the recurrence of codes identified in the interviews.

For the ideation phase, there were twice as many favorable indications for the completion of the closed process, not corresponding to much openness to external collaboration, possibly because it is a phase in which trends and new technologies are identified.

The selection phase was similar, presenting twice the recurrence in favor of a closed phase, suitable for an activity in which there is a need to adapt the ideas to the productive process of the company. However, in the design phase, the results were different, favoring, by two descriptions, the accomplishment of the activity in an open way; however, it is worth mentioning here the proximity between open and closed; likely due to the variety of raw materials and technologies needed to develop the products of the collection, leading to the pursuit of external knowledge.

Already, in the approval phase, it is well triggered the difference that favors a closed process, again coming to be related at the moment of decision on which products are approved and suitable to the production and commercialization in the stores of the mark called Beta. Finally, the production phase favored an open performance and could be a consequence of the use of exterior suppliers to develop the project, enabling these external collaborators to make and produce the products.

Table 4 - Groupings of recurrences of specific categories of the company Beta

General Result of Quotations by interview of the company Beta						
Categories Specific	TK_P BETA	TK_M BETA	PJ_F BETA	BS_V BETA	CI_I BETA	BC_J BETA
Ideation	Closed	Closed	Closed	Closed	Open	Open
Selection	Closed	Closed	Closed	Closed	Closed	Closed
Project	No ID	Open	Closed	Open	Closed	Open
Approval	No ID	Closed	Open	Closed	Closed	Closed
Production	Closed	Open	Open	Open	Open	Open

Source: Elaborated by the author.

As we have seen, there are few occasions when respondents agree to the process (Figure 4). The only phase that presented complete agreement between the interviewees is the selection when looking for a possible relation to the strategy of the company. As Beta is a subsidiary of the international brand, needs to adapt an entire product concept to the national consumption and style market.

Analyzing this result by the Kappa statistic (Table 5), the concordance results reached levels ranging from low, reasonable and substantial, but, in general, before this result, it is likely to perceive that of the 15 potential relations of agreement, ten are reasonable up, a ratio of more than 66% of reliable and accurate data on the company's collection development process.

Table 5 - Kappa general index of company Beta

Kappa analysis of BETA company						
	<i>TK_P</i>	<i>TK_M</i>	<i>PJ_F</i>	<i>BS_V</i>	<i>CI_I</i>	<i>BC_J</i>
<i>TK_P</i>	0,000	0,250	0,250	0,444	-0,053	0,048
<i>TK_M</i>	0,250	0,000	0,375	0,688	0,333	0,667
<i>PJ_F</i>	0,250	0,375	0,000	0,063	0,333	0,000
<i>BS_V</i>	0,444	0,688	0,063	0,000	-0,071	0,375
<i>CI_I</i>	-0,053	0,333	0,330	-0,071	0,000	0,615
<i>BC_J</i>	0,048	0,667	0,000	0,375	0,615	0,000

Source: Elaborated by the author.

Discussion

The company chooses to undertake some phase of the project externally, in search of performance and superior result, in relation to what it performs on its own. This finding is due to the results obtained during the interviews, which, after analysis, confirmed the existence of the variation between the phases. In the cases analyzed, this occurs at the design phase, due to the expertise that confections have on the different types of fabric and their technical characteristics.

In the case of the production phase, it was unanimous among the interviewees: the use of suppliers favors access to the technology of production, and the vendors' expertise facilitates access to points of sale. Using the classifications for open innovation of Lazzarotti and Manzini (2009), we will have, for the most part, the model of specialized collaborators for the Beta company, since there is a high relationship with suppliers during the process, but with a low opening for the production of innovation, whose opening can vary by type of product line and by professional who manages it.

Table 6 - Opening of the case in the Beta case

	BETA
Specific Categories	Increased recurrence in the Beta process
IDEATION	Closed Ideation
SELECTION	Closed Selection
PROJECT	Open Project
APPROVAL	Closed Approval
PRODUCTION	Open Production

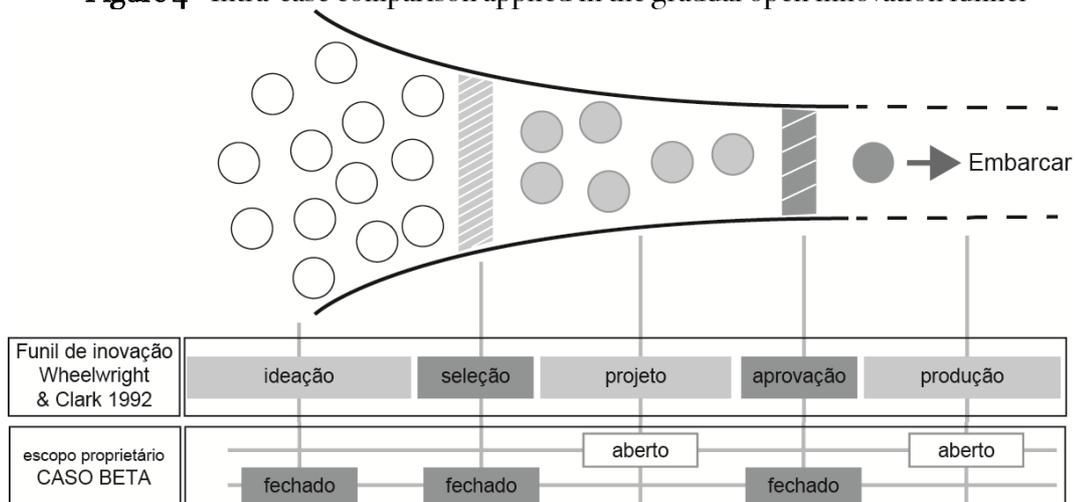
Source: Elaborated by the author.

Analyzing these results from the perspective of propositions, it is observed that the first proposition, which deals with the phases occurring in varied forms, between opened and closed, has become true. As seen in Table 3, it did not occur a lack of testimony for any of the specific categories, which leads us to affirm all forms of action occur in a unique PI, corroborating to affirm the phases are opened to external collaborators influence.

As for the second proposition, which considered the phases dependent, adopting a singular PI model, with all phases closed or all opened, it became false. Checking Figure 4, it is possible to note that a selection phase that occurs in a closed form does not lead to a closed but open design phase.

The same happened with the subsequent phases, which again had the approval closed and the production opened. It was observed that even in the case of a process, in which the completion of one activity leads at the beginning of another, this is not directly associated in the way in which the phase was performed. We identified, through the interviews, that in each phase, the resources used are directed to the finalization of the activity. Here we understand that the definition of the uniquely open or closed model is no longer valid and possible to describe the IP that a company adopts, based in this case of the fashion industry.

Figure 4 - Intra-case comparison applied in the gradual open innovation funnel



Source: Elaborated by the author.

Conclusion

In this research, we sought to understand the management of the IP of an organization and its relationship with the participation and collaboration of suppliers in this process. To analyze this relationship, a framework was used that encompasses funnel theories of innovation, open innovation and global innovation flow. Based on this proposed IP, issues were raised for data collection, which was subsequently analyzed and interpreted.

As for the problem of identifying the influence of external collaboration in the process of innovative product development, it was answered based upon the results found in the interviews conducted and the data analyzed, which pointed to a direct influence on the IP, which needs to be taken into account management that adopts an innovation strategy.

As we have seen as the results, the process can be changeable or adaptable according to the way the organization relates to suppliers, and it is necessary to consider the opening of phases that present better results when external collaborators take action.

After analyzing how IP can be adapted to the proprietary disaggregation, we have identified that the openness of external performance to the organization may have the scope increased to the global context. It can occur from a phase being opened by a

collaboration of international suppliers, taking the scope of analysis to a territorial extension, in which would also occur a geographical breakdown of that phase.

This observation was only possible after the analysis of the interviews, in which it was noticed that in some cases the interviewees described using sources of knowledge and ideas present in places such as Barcelona, New York, and Paris. Fitting here a suggestion for future work.

Regarding the limits of this research, it is related in the study carried out with only one case, and there is a need to collect two more companies from the fashion industry branch to have more comparative data on IP management practices. It is worth noting that the adoption of the innovation funnels phases, as Wheelwright and Clark (1992), as a basis in the construction of the framework, favored the correlation in the organization process with an already known theoretical process, which facilitated the analysis and the case study. However, here we also find another collaboration for future studies that use this model: a proposal to analyze the IP of organizations that work in other industrial sectors.

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