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SUBJECT AREA: ORGANIZATIONAL Strategy And Behavior

## Innovation and Business Model: a case study about integration of Innovation Funnel and Business Model Canvas

*Inovação e Modelo de Negócio: um estudo de caso sobre a integração do Funil de Inovação e o Modelo Canvas*

*Innovación y modelo de negocio: un estudio de caso acerca de la integración del Embudo de Innovación y el Modelo Canvas*

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### ABSTRACT

Unlike the past, currently, thinking about innovation refers to a reflection of value co-creation through strategic alliances, customer approach and adoption of different business models. Thus, this study analyzed and described the innovation process of company DSM, connecting it to concepts of organizational development strategies and the theory of business model. This is a basic interpretive qualitative research, developed by means of a single case study conducted through interviews and documentary analysis. This study enabled us to categorize the company business model as an open, unbundled and innovative model, which makes innovation a dependent variable of this internal configuration

of value creation and value capture. As a theoretical contribution, we highlight the convergence and complementarity of the “Business Model Canvas” tool and “Innovation Funnel,” used here, to analyze the empirical case.

**Keywords:** Innovation. Business model. Innovation funnel. Business model Canvas.

### RESUMO

Diferentemente do passado, pensar em inovação atualmente remete a uma reflexão de cocriação de valor por meio de alianças estratégicas, aproximação com o cliente e adoção de modelos de negócios diferenciados. Dessa forma, analisou-se e descreveu-se, neste estudo, o processo de

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inovação da empresa DSM, interligando-o aos conceitos de estratégias de desenvolvimento organizacional e à teoria de modelo de negócio. Trata-se de uma pesquisa qualitativa interpretativa básica, desenvolvida por meio de um estudo de caso único. Permitiu-se com este estudo categorizar o modelo de negócio da empresa como uma tipologia aberta e desagregada, além de evidenciar sua característica inovadora em múltiplos epicentros, o que faz da inovação uma variável dependente da configuração interna da empresa. Como contribuição teórica, evidenciou-se a convergência e complementariedade da ferramenta “*Business Model Canvas*” e o conceito “Funil de Inovação”, utilizados neste estudo para analisar o caso empírico.

**Palavras-Chave:** Inovação. Modelo de negócio. Funil de inovação. Modelo Canvas.

## RESUMEN

A diferencia del pasado, pensar en innovación se refiere actualmente a una reflexión de la co-creación de valor a través de alianzas estratégicas, enfoque al cliente y la adopción de diferentes modelos de negocio. Este estudio examina y describe el proceso de innovación de DSM, conectándolos a los conceptos de las estrategias de desarrollo organizacional y de la teoría del modelo de negocio. Se trata de una investigación cualitativa interpretativa básica, desarrollada por un estudio de caso realizado a través de entrevistas y análisis documental. Este estudio permite clasificar el modelo de negocio de la empresa como una tipología abierta y desglosada, además de poner en relieve su función innovadora en varios epicentros, lo que hace que la innovación sea una variable dependiente de la configuración interna de la empresa. Como contribución teórica destaca la convergencia y complementariedad de herramientas “*Business Model Canvas*” y “Embudo de Innovación”, que utiliza este estudio para analizar el caso empírico.

**Palabras clave:** Innovación. Modelo de negocio. Embudo de innovación. Modelo Canvas.

## I INTRODUCTION

While scholars of classical administration focused their studies on the internal management of organizations, more contemporary researchers focused their analyses on the externalities of these environments, as it was apparent that these directly influenced the productivity of the firm (AHN, 2002), which impacts strategic market development diversifications and organizational growth (ANSOFF, 1957; CHANDLER, 1990; PENROSE, 2006). To Tsuja and Marino (2013), these externalities, characterized by uncertainty and environmental complexity, impact and even determine the type of innovation practiced by the company.

Such differences in organizational management approach were also addressed in the work of Schumpeter (1988), which indicted innovation as an important factor for the breakup with the state of stabilization of the companies, thus changing their production patterns. In this context, the process of innovation development was addressed and limited by the author to an internalization of knowledge, with no organizational interactions with external entities.

The approach of more contemporary authors, on the other hand, recognizes that innovation should not be viewed as an isolated event, but as a process oriented to an articulated concatenation of various activities and entities involved in this challenge (NAGANO, STEFANOVITZ, VICK, 2014). This is to untie limitation of innovation, and promote an approach of the company to elements external to the organization, which later came to be known as open innovation (CHESBROUGH, 2003) sustained mainly in the value co-creation theory (PRAHALAD, RAMASWAMY, 2000) through strategic alliances, company closeness with the customer and adoption of differentiated business models, able to sustain this opening to the market (OSTERWALDER, PIGNEUR, 2010).

In this view, two approaches have been structured to highlight the dimensions of value creation and the dynamic process of development of innovation: the “Business Model Canvas – BMC” and the “Open Innovation Funnel.”

It is in this context of strategic change and innovation development process that the DSM (Dutch State Mines) is inserted, company focus of this study. With over 100 years of existence, the company has gone through several strategic directions that culminated in its current configuration, guiding it substantially to innovation, as evidenced by market diversification and development of new products. This is a global company of Dutch origin, based on science and innovation in the areas of health, nutrition and materials.

The convergence of theory with empirical case allows the characterization of the DSM as an open business model, based on externalization and internalization of knowledge for the development of innovation. We also detected that the company is structured in a disaggregated business model of product innovation (OSTERWALDER, PIGNEUR, 2010), which positions it as an intermediate in the innovation development process for the company, when inserted in the open innovation system. This diversity of performance places the DSM as an innovative business model in multiple epicenters, showing that the innovation process dependent on this internal configuration is to create, deliver and capture value.

Accordingly, by means of an empirical case analysis, we managed to correlate the “*Business Model Canvas*” tool with the “*Funnel of Innovation*”, thus identifying a complementarity of the two approaches.

Based on the foregoing, this empirical research, based on a single case study (MERRIAM, 1998; YIN, 2005), mainly intended to: understand the DSM innovation process along its evolutionary context, and show a theoretical approach of the innovation funnel concept with the Business Model Canvas tool. The specific objectives sought to: i) understand the development and growth strategy of DSM throughout its history; ii) understand the company’s innovation process from the perspective of the innovation funnel;

and iii) understand and describe the organization’s business model from the Business Model Canvas.

## 2 THEORY

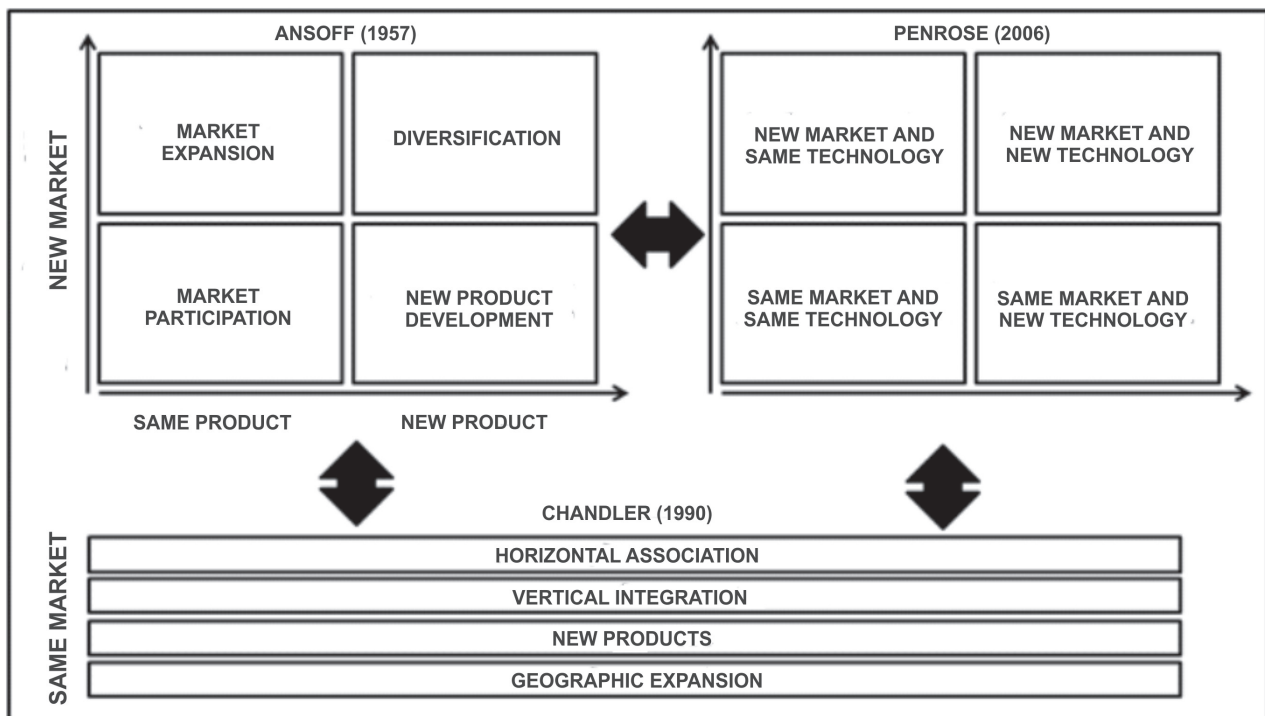
### 2.1 Market development strategies and firm growth

Whilst scholars of classical administration focused their studies on the internal management of organizations, more contemporary researchers focused their analysis on the external characteristics of the companies, since it was apparent that these externalities directly influenced the productivity of the firm.

In this context, Ahn (2002) pointed out that this focus change caused a considerable diversification in the type of efficiency covered by the organizations. According to the author, without the knowledge of market characteristics, especially with regard to competition, organizations were oriented to efficiency based on short-term gains, marked by the positive amount of the difference in prices and production costs. For the author, the understanding of environmental peculiarities caused the companies to focus their efforts to what he called dynamic efficiency, oriented to long-term gains and diversification based on market development strategies and firm growth.

This development was addressed by Ansoff (1957) from the structure of the product and market matrix, used to determine growth opportunities of an organization’s business units through four strategies: a) market penetration (when a business grows in a known market with established products); b) product development (when a business grows in a known market with the development of new products); c) market expansion (when a business grows into a new market with established products, and d): diversification (when a business grows into a new market with the development of new products).

Similarly, authors Penrose (2006) and Chandler (1990) also addressed this issue. For the



**FIGURE 1** – Strategic models approach

**Source:** The authors

## 2.2 Evolution of the word innovation

For a better understanding of different approaches to innovation, we guided this topic

initially to promoting a brief conceptual review of the subject, based on major authors who approached it, in order to highlight its theoretical evolution over time.

**CHART 1** – Definitions and evolution of the innovation concept

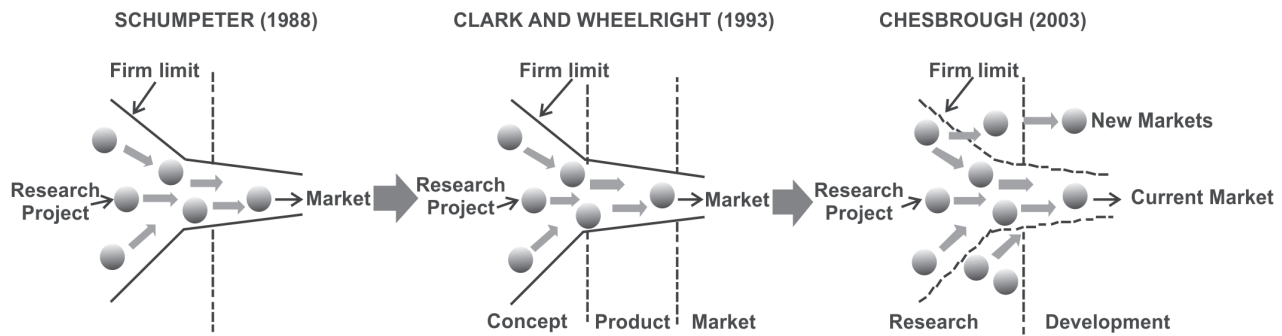
Author / Year	Definition of innovation
Schumpeter (1988)	An idea, a sketch or a model for a new or improved device, product, process or system, capable of marketing and able to promote wealth gains.
Drucker (1989)	An approach that aims to explore opportunities and ways of differentiation, based on an uncertain technological process.
Clark and Wheelwright (1993)	New knowledge generated within or outside the organizational environment through the establishment of partnerships.
Affuah (1998)	New knowledge to offer a new product or service that customers want and need.
Hitt, Ireland and Hoskisson (2002)	Process to create a commercial product based on an invention.
OCDE (2005, p. 55)	“Implementation of a product (good or service) new or significantly improved, or a process, or a new marketing method, or a new organizational method in business practices, workplace organization or external relationships.”
Chesbrough (2003)	Way to promote ideas, thoughts, processes and research in order to improve product development, provide better services to customers, increase efficiency and enhance the value added from external partnerships.
Davila, Epstein and Shelton (2007)	Approach related to the creation and structuring of a new organization aiming to keep it alive in the market. It is related to the creation of new knowledge in technology and business model.
Tidd, Bessant and Pavitt (2008)	Innovation refers to the development of new technologies for the development of new products and services. This is the way the organization acts to the changes and may act as a source of satisfaction of customers and employees.
Biancolino, Maccari and Pereira (2014, p. 415)	“Implementation of new products, services, production methods, processes, raw materials, markets, marketing methods, organization and market structures.”

**Source:** The authors

Since the twentieth century, innovation has been studied by the theory of economic development of Schumpeter (1988). According to the author, technological innovation can promote a disruption in the economy, taking it from the stabilization state and thus changing production patterns that evoke in search for differentiation between companies, and represent the economic development of a country or a particular region. Regarding the process of innovation, the author established three stages evidenced by: i) invention (idea generation); ii) innovation (commercial exploration); and iii) diffusion (spread in the market), and linked to large companies the greater ability to integrate and engage in that process. In the author’s view, that proposition is explained as, in his conception of innovation, this process was exclusively restricted to the internal environment of organizations and therefore efficiently feasible for those with larger size and more resources.

A Chart 1 analysis shows that the contemporary approach to innovation unlinked the interdependence of innovation from the

domestic environment, this being increasingly linked to organizational externalities, which later came to be known as open innovation (CHESBROUGH, 2003). In the concept of open innovation, previous resources to innovation extrapolate the firm’s environment and are allocated to customers, competitors, business partners, external R&D, and other entities holding valuable information for the development of new products and markets. Clark and Wheelwright (1993) developed a model called “innovation funnel,” whose main objective was to guide the activities of external agents and organizations looking for new creations. According to the authors, the dynamics of this funnel is interactive between the areas involved and the flow of creation allows for feedback, review and recreation whenever necessary. Figure 2 depicts the “innovation funnel” initially applied to the closed innovation model with the due developments here addressed and directed to Chesbrough (2003) model.



**FIGURE 2** – Innovation model evolution

**Source:** Prepared by the authors, based on the original theoretical models.

The review above infers about a possible approach of Chesbrough’s (2003) open innovation funnel with the Ansoff’ (1957) matrix, mainly regarding to the growth strategies of the firm through the introduction of new products in markets already established and opening of new markets. We can also see that, from breaking the barriers of the firm and integration of its internal environment with external elements, the Chesbrough’s (2003) model promotes innovation from what Prahalad and Ramaswamy (2000) called co-creation of value, thus structuring the innovation project together with the needs identified by the market. It is also what Osterwalder and Pigneur (2010) later termed the active business model in open platform.

Thus, by identifying congruence between the themes and understanding that innovation is an important value for the development of contemporary organizations, the focus of this

study now turns to work the issue from the perspective of the business model theory prepared by Osterwalder and Pigneur (2010).

### 2.3 Business model and innovation

By business model, we understand **the logic to create, deliver and capture value for the organization** (OSTERWALDER, PIGNEUR, 2010) based on a platform that connects resources, processes and company suppliers (NIELSEN, LUND, 2012). The concept of the authors refers to what Teece (2010) characterized as a logical articulation of data and other evidence supporting the value proposition for the customer in order to deliver that value and ensure a sustainable competitive advantage in the market.

Chart 2 helps understand the business model concepts.



**CHART 2 – Business model definition**

Author	Year	Definition of business model
Timmers	1998	Architecture for product and service flows including a description of the business activities and its sources of income.
Stewart and Zhao	2000	How the company aims to make profits and sustain them over time.
Amit and Zott	2001	Structure prepared to create value.
Plé, Lecocq and Angot	2008	Choices made by a company to make profit. These include resources and expertise to create value through products operated by the firm, internally or externally.
Casadesus-Masanell and Ricart	2010	How the organization creates and delivers value to its stakeholders.
Osterwalder and Pigneur	2010	Logic of creation, delivery and capture of value by an organization.
Zott, Amit and Massa	2011	How a company does business and creates value.
Nielsen and Lund	2012	Coherence of the strategic choices of the company, which enable relationships to create value at its operational, tactical and strategic levels.

**Source:** The authors

Based on Chart 2, regardless of the adopted point of view, we identify the existence of a common thread among the different authors listed: all agree that the business model concept is mainly structured on the fundamentals of creation and value capture by the organization.

When sub-segmenting the business model and characterizing the “open business model” pattern, Osterwalder and Pigneur (2010) approached the concept of Chesbrough (2003) who defines it as a model to be used by companies to create and capture value systematically from the opening of the process of research to outside groups, and that may occur “from outside in” (when the organization brings ideas, technologies

or external intellectual property for its development processes and marketing of products), or “inside out” (when the organization sells or licenses its intellectual property, technology, or any other feature not used).

In this context, Osterwalder and Pigneur (2010) developed the Business Model Canvas tool – BMC, with nine dimensions that cover the three conceptual pillars of the business model definition: i) creation of value (key partners, key activities, and key features); ii) delivery of value (channels, customer segment, and customer relationships); and iii) capture of value (cost structure and revenue structure), as shown in Figure 3.



**FIGURE 3 – Business model canvas – BMC**

**Source:** Osterwalder and Pigneur (2010).

Chart 3 assists in better characterization and understanding of the nine dimensions identified by Osterwalder and Pigneur (2010) in the BMC.

**CHART 3** – Nine dimensions of BMC

Nine dimensions	Definition
Customers segments	Different groups of people or organizations that a company seeks to reach, serve and create value.
Customer Relationships	Types of relationships that an organization can adopt to their specific customer segments.
Channels	How a company communicates and reaches its customers to propose value.
Value proposition	Package of products and services and which values are delivered to the customer segments.
Key resources	Most important resources for the business model to work.
Key activities	Most important actions a company has to take for its business model to work.
Key partners	Network of suppliers and partners that makes the business model work.
Income sources	Money a company generates from each customer segment.
Cost structure	Costs involved in the operation of a business model.

**Source:** Prepared by the authors, based on Osterwalder and Pigneur’s (2010) concepts

Thus, the goal of Osterwalder and Pigneur (2010) when creating the BMC was to establish a simple and relevant concept, having any company be able to describe and manipulate its business model to create new strategies, challenge its preconceptions and efficiently and effectively create value.

Unlike other existing models in the literature (HEDMAN, KALLING, 2003; LECOCQ, DEMIL, WARNIER, 2006; JOHNSON, CHRISTENSEN, KAGERMANN, 2008), the BMC is considered the most complete model in the business model theory, as it addresses, in detail, the relationship of all internal and external organizational components, and shows how these relate to create and capture the value proposed by the organization.

Therefore, the focus of this study now turns to the review of methods and then the empirical analysis of the data supported by the theory in this chapter. As we understand that innovation is the focus of this research, as well as the strategic foundation of the empirical case, we will adopt it as the central proposal of the BMC and give equivalence to it from this moment, to what was characterized as “value” by the abovementioned authors.

### 3 METHODOLOGY – CASE STUDY

In this study, we proposed to analyze the company DSM, a global organization of Dutch origin, based on science and innovation in the areas of health, nutrition and various materials. The company is currently listed on the NYSE Euronext and has 23,500 employees responsible for the annual net sales of 9 billion euros. The company offers innovative solutions under the product perspective (DAVILA, EPSTON, SHELTON, 2007; FREIRE, 2002; TIDD, BESSANT, PAVITT, 2008), with the central aim of promoting improvements in society and performance of world markets, and has in its portfolio products such as food and dietary supplements, personal care products, animal feed, pharmaceuticals, medical and automotive devices, paints, electronics, life protection products, alternative energy and bio-based materials.

It is a century-old organization, founded in 1902 within the government, originating from the coal mines market. Throughout its history, it was privatized and changed its scope for innovation in life sciences products and science materials.



The innovative feature of the company is clearly evident when analyzed from the perspective that, currently, according to the internal financial statements, more than 20% of its total sales are related to products that are innovative, patented and registered by the company. As an example of this innovation, we highlight the *Dyneema* technology invented and patented by DSM in 1979. This is a synthetic fiber made based on polyethylene, 15 times stronger than steel, used in a variety of applications such as clothing and personal and vehicle ballistic protection, medical sutures, commercial fishing nets and high performance strings, such as gloves resistant to cuts. It appears that, since its invention, there has not yet been a similar product in the market, produced according to the *Dyneema* specifications.

Just as *Dyneema*, the company currently has more than 10 registered products, ensuring, to the organization, awards and international recognition as an innovative company, such as biotechnology products, awarded as innovative products in 2011 in Canada (MAXPRESS, 2011), and recognized for its revolutionary manufacturing technology in 2014 (WORLD MARKETS BIO, 2014) by *Sustainable Bio Awards*.

Thus, the choice of DSM was intentional and not random (EISENHARDT, GRAEBER, 2007), as we understand it is a company with innovative products, source of information for the contextualization and approximation of theory and practice. This research is therefore structured on a basic interpretive qualitative

methodological base, developed by a single case study (MERRIAM, 1998; STAKE, 2000; YIN, 2005) in order to identify categories that outline the study process to enable its description, interpretation and understanding (MERRIAM, 1998), thus enabling confirmation and practical extension of existing theory (YIN, 2005).

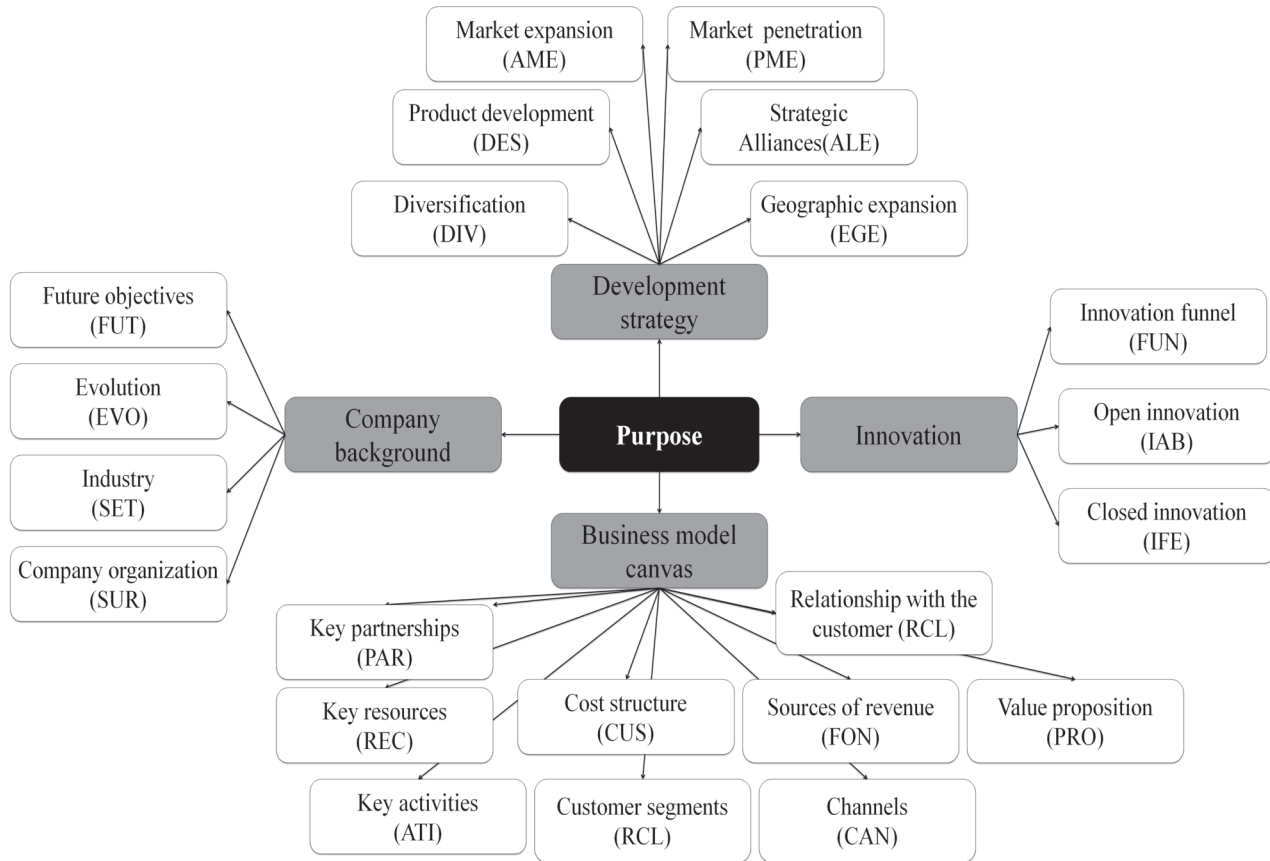
With regard to data collection, the research was based on the concepts of Yin (2005), using mainly secondary data (internal data, news, videos) and interview with an innovation expert of company, conducted by means of a semi-structured questionnaire in a narrative tone. We also used interviews of Chief Information Officer (CIO) and managing director of DSM, provided to the portal “Global Corporate Venturing” in April 2012. Thus, the interviews were identified in this study based on classifications evidenced in Chart 4.

**CHART 4** – Data collection

Interviewee	Operation
Interviewee 1 (E1)	Innovation expert
Interviewee 2 (E2)	Chief Information Officer (CIO) of DSM
Interviewee 3 (E3)	Managing director of DSM

**Source:** The authors

Finally, the content analysis was structured according to Flores (1994) by transcribing and reducing the interview, followed by the identification of 22 categories divided into four meta-categories, as shown in Figure 4.



**FIGURE 4 –** Categorization system

**Source:** Prepared by the authors, based on Flores’s (1994) theory.

#### 4 RESULT ANALYSIS

This chapter aims to analyze the empirical categories identified in light of the previously presented theory. Therefore, the analysis is divided into three stages, aligned with the purpose of this study: analysis of the DSM growth strategy; analysis of the innovation process from the perspective of open innovation and the innovation funnel; and analysis of the company’s business model, based on the BMC.

##### 4.1 DSM growth strategy analysis

With regard to the development strategy, we observed that the four strategic pillars previously mentioned by Ansoff (1957) were an

integral part of the evolutionary process of DSM: i) market penetration; ii) product development; iii) market expansion; and iv) diversification.

Similarly, such evidence is congruent with Penrose (2006) and is supplemented by the use of vertical and horizontal associations and growth through geographic expansion (CHANDLER, 1990). Some of these findings, as well as the macro understanding of organizational change, echo in the speeches of E2 in an interview given to the “Global Corporate Venturing” portal:

*DSM began as a coal mining company. It experienced several stages in our history, we increasingly became a company of raw materials for chemical and plastic products and then a company of specialties for innovation [...] Once established*

*in this sector, our focus turns to growth in emerging economies through the development of new products.*

As mentioned above, despite all the theoretical evidence found in practice, some stand out as strategic drivers at different times experienced by the company. We therefore identify two major strategic moments of DSM. The first one marked by market diversification and product development, which led the company in the mining sector to a performance in the field of innovation in life sciences and materials. And the second one evidenced by the

growth and development in this area from the use of associations and geographic expansion as a driving lever of market penetration, as well as by development of new products and technologies (ANSOFF, 1957; CHANDLER, 1990; PENROSE, 2006).

Chart 5, presented below, shows the company's macro events during its 111 years of existence, allowing the context of such events on Ansoff's (1957) and Penrose's (2006) theory, and the inference of the possible strategic trends, designed and engineered by the company for the year 2050.

**CHART 5 – DSM growth strategy**

Year	Strategy	Ansoff / Penrose
1902	The company appears in the Netherlands as a mining company	-
1906	Focus on the production of a single product: coal	PM
1919	Chemical activities start	DIV
1930	Production of first fertilizer	NP
1939	Construction of a central research laboratory aimed at innovation	DIV/NP
1952	The company focuses on the market of synthetic polymers	DIV
1959	Polyethylene production in the chemicals market	NP
1973	The last coal mine closed, giving way to oil and natural gas	DIV
1983	Focus on ensuring the ability to scale, market consumer guarantees and product diversification	PM/NP
1990	Change of focus to develop products for the pharmaceutical, food and materials industries	DIV
1990	Development of innovation-based products for this new sector	NP
1991	Acquisition of pharmaceutical company ACF Chemie	PM
1998	Acquisition of Company Gist-Broacades (developer of pharmaceutical and food products)	PM
2000	Acquisition of Catalytica Pharmaceuticals in the USA	PM/ AM
2002	Sale of petrochemical plant, in order to focus only on the life sciences industry and materials	PM
2003	Roche Vitamins acquisition which was renamed as DSM Nutritional Products	NP
2005	Acceleration of growth of innovation and product portfolio	NP
2005	Acquisition of NeoResins, the leading producer of resins for paints, coatings and adhesives	DIV
2007	Divestment of products not related to life science and materials	PM
2010	Strategic reorientation aiming at performance in line with the 2050 global megatrends	PM/NP/AM/DIV
2011	Joint Venture with Sinochen Group	AM
2013	Several acquisitions aimed at innovation in products and activities in other countries (growing in BRICS)	DIV / AM

Key: PM (Market penetration); AM (Market expansion); NP (New products); DIV (Diversification)

**Source:** The authors

The analysis of Chart 5 shows and proves the importance of innovation and market diversification had in DSM growth. These are two approaches that permeated the entire organizational history and were essential in the construction of the current scope of activity.

We also noted that subsequent to the entry of new products and development activities in new markets, the company used penetration strategies (ANSOFF, 1957) to ensure ability to scale its production as well as consumption guarantees of its products in the market where it operated. This search for greater penetration makes up the essence of the new stage of the company and can also be evidenced by divestment strategies of products that were not related to core organizational business. These divestments are related to the expansion strategy and geographic expansion made via strategic partnerships. This evidence echoes in E1 speech, as follows:

*DSM made a number of disposals over its history, you can see that with the closing of the coal and then with the petrochemical activities [...] Often, we use strategic alliances to achieve these divestments, transferring part of our activities to our allies and taking the opportunity to expand territorially through these alliances.*

These approaches adopted by the DSM were essential in positioning it as an innovation company in the life sciences and materials sciences. Thus, the current positioning of the company, designed for the megatrends of year 2050, is against data released by the National Association for Research and Development of Innovative Companies - ANPEI (2010), which points to a global deficiency present in these sectors in 2050. In congruence with these needs pointed out by the association, the analysis of Chart 5 shows that DSM has undergone a

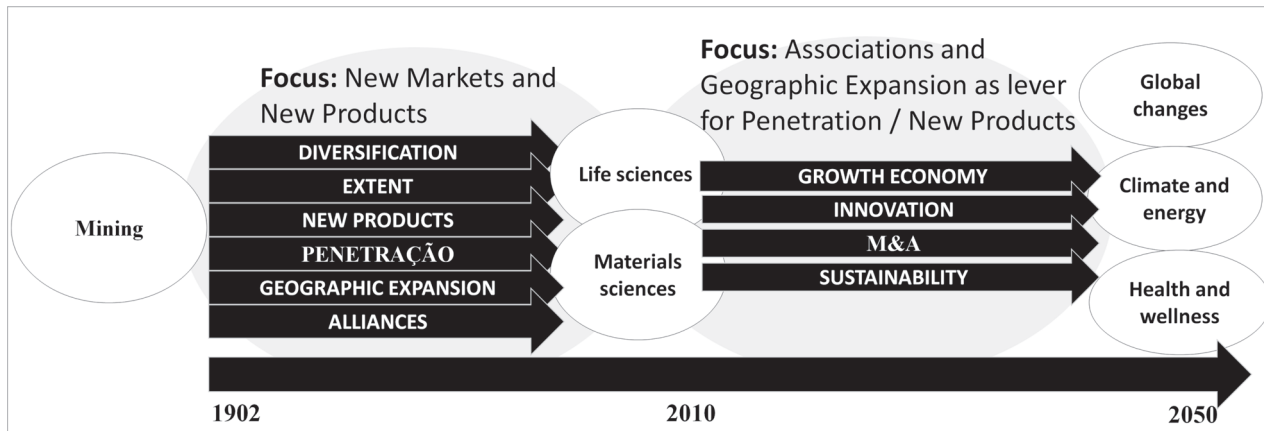
strategic review in order to move towards three global megatrends: i) global changes (to meet the shortage of food in 2050); ii) climate and energy (to meet the lack of energy sources in 2050); and iii) health and wellness (aiming to fill the gap of the growing demand for health and nutrition solutions), which determines and explains the extent of the organization's product portfolio.

To be prepared to meet these megatrends, the company's strategy has been modified and is now structured on four vertices: i) expansion of activity in growing economies; ii) product innovation to meet future social deficiencies; iii) use of acquisitions and partnerships to grow and acquire skills; iv) investment in sustainability, in order to produce the lowest possible social impact, with the innovation of its products. From this perspective and seeking a rapprochement with the studied theory, we found that, to meet future social demands, DSM's strategy does not abandon its essence, but focuses primarily on associations and geographic expansion as a lever to increase market penetration in BRICS countries and the development of new technologies and products.

This information can be verified by means of indicators, as pointed out in interview with E1.

*Once established in this sector, our focus is now to meet future global trends [...] By 2015 we hope to have an organic sales growth by 5-7% per year, with 50% of net sales in high-growth economies (which currently total 40%). [...] We had the goal of achieving 80% of innovative ECO products in our pipeline by 2015, which today has reached the level of 94%.*

Thus, we sought to synthesize the strategic development of the company in Figure 5, which shows these two moments experienced by the organization: transformation in life sciences and materials; and preparation to meet the future megatrends.



**FIGURE 5** – DSM development strategy over time

**Source:** The authors

Therefore, and as we understand that the development of new products is a predominant strategy across the historical context of the company, we direct this study to analyze the DSM innovation process.

**4.2 DSM innovation process**

In this topic, we intend to evaluate the importance of innovation for DSM and understand its creation process and interconnection with other external and internal elements. As noted in previous analyses, innovation was a key element in the evolutionary process of the company and, today, is one of its most important strategic pillars.

From this perspective, innovation is addressed in the company as a source for creating shared value, sustainable for all organizational stakeholders, which refers to the concept of co-creation of value and open innovation (CHESBROUGH, 2003; PRAHALAD, RAMASWAMY, 2000), as can be seen in the words of E1:

*We work today with the concept of the innovation funnel. This is a model that allows a relationship with all stakeholders [...] At the tip of the funnel, we have a kind of external R&D, guided by various entities in the market that feed the R&D of DSM, which, in turn, is also quite*

*strengthened, mainly because we have an internal innovation center focused on the development of new products.*

The speech of the interviewee refers to a dual innovation development process in the company, conducted from an innovation center able to develop new ideas internally (SCHUMPETER, 1988) or connect the company to external entities through strategic partnerships (CHESBROUGH, 2003). This duality is also addressed by E2 in an interview for the “Global Corporate Venturing” portal:

*... Today I'm also the head of the DSM innovation center management, which was created to support and enable innovation of the company. The center has both a new corporate product development role and a leading role across the company to promote the acceleration of innovation, and this includes even acceleration through strategic partnerships.*

The open innovation concept applied by DSM points to a marked development of strategic partnerships and alliances (CHANDLER, 1990) that aims to exchange information, increase internal expertise and cost reduction. We found, however, that partnerships established permeate between two types: a) strategic alliances between



competitors not oriented to cost reduction and capacity building; and b) coopetition between competitors (OSTERWALDER, PIGNEUR, 2010), oriented to the sharing and understanding of the process of competing companies. These two possibilities can be verified by respondent E1 speech, when asked about the existing members in open innovation funnel of the company:

*... As I told you earlier, we have a kind of shared innovation [...] then our partnerships for the development of innovation occur with customers, with universities, to which we are very close [...] and competitors, which somehow enable us to exchange knowledge [...] Another important member refers to joint ventures, new technology-based companies in which we invest in favor of return on innovative products.*

An important element pointed by the interviewee refers to venturing, a kind of startup that receives funding from DSM aimed at creating innovative products and services in health, nutrition and materials. To explore emerging markets and technologies with these partners, DSM improves its growth potential through innovation and also establishes mutual benefits and learning opportunities together, thereby incorporating the concept of co-creation of value pointed by Prahalad and Ramaswamy (2000). These can be checked and supplemented through E3 speech, also in an interview with the “*Global Corporate Venturing*” portal:

*Our goal with the capital venturing is to create strategic options for DSM, such as access to new technologies, markets and different business models. With it, we seek a healthy balance between “co-marketing” and the “co-development” [...] We are evolving, our next step is to use this model in high growth economies such as China, India and Brazil.*

Once we understand the importance of innovation for the development and growth of DSM and the elements present in its open operating model, the focus of this study was to understand the innovation process and synthesize it by addressing the open innovation funnel.

We found that the DSM’s innovation process is structured into three macro phases (research, development and implementation), in line with what was covered by Clark and Wheelwright (1993). These phases are limited by a VAR (value assurance review) committee, which Kotler (2000) characterized as a control point. This is a committee, consisting of senior executives of DSM, experts in nutrient sciences, life sciences and materials, accounting for a full assessment of the value of each innovative project included in the innovation funnel. In this context, at the end of each phase, or at any stage of the process, the VAR committee is called on to evaluate the project and may decide between approval, cancellation or recycling. These decision tradeoffs echo in Clark and Wheelwright’s (1993) theory, thus indicating that the funnel is a flow of creation that allows the feedback, review and re-creation of a product when necessary and at any stage of the process.

Another feature of DSM’s innovation funnel refers to the end to end presence of a support team of marketing, business intelligence and market scouting professionals responsible for acceptability analysis and understanding of the product demand in the market. These characteristics also echo the theory through studies of Cooper, Edgett and Kleinschmidt (2002) which point, by means of the stage-gate system, to the fact that the market characteristics and understanding of customer needs permeate the innovation process from the initial phase, when analyzing the opportunities offered by the product, until the final stage, when we seek to understand its acceptability in the market.

A final characteristic inherent in the practice of innovation in DSM refers to the licensing process. In this context, two approaches may be used by the company. The first one relates to what is called “licensing in,” used to gain access to intellectual property generated by third parties and thus take advantage of such innovation in the market. The second one refers to what is called “licensing out,” used to create value through technology produced internally in the company. It is therefore a source of alternative income from licensing the use of its innovation by third parties.



Similarly, Chesbrough (2003) also addressed the issue of licensing in open innovation theory. For the author, internal products, technologies, knowledge and intellectual property, can be monetized to be available to external groups through these licensing, joint ventures or branches. Chesbrough (2003) distinguishes this licensing in two types that embrace “outside-in” innovation (licensing in), when the organization brings ideas, technologies or external intellectual property for their development processes and marketing of products, or “inside out” innovation

(licensing out), when the organization sells or licenses its intellectual property, technology, or any other unused resource

Thus, we structured Figure 6 in order to summarize and incorporate these procedures to open innovation model elements, and align them with the theory discussed herein. As we understand that this template is in the context of the open business model concept (OSTERWALDER, PIGNEUR, 2010), this study is focused on the analysis of DSM’s innovation process in the light of the theory of Business Model Canvas.

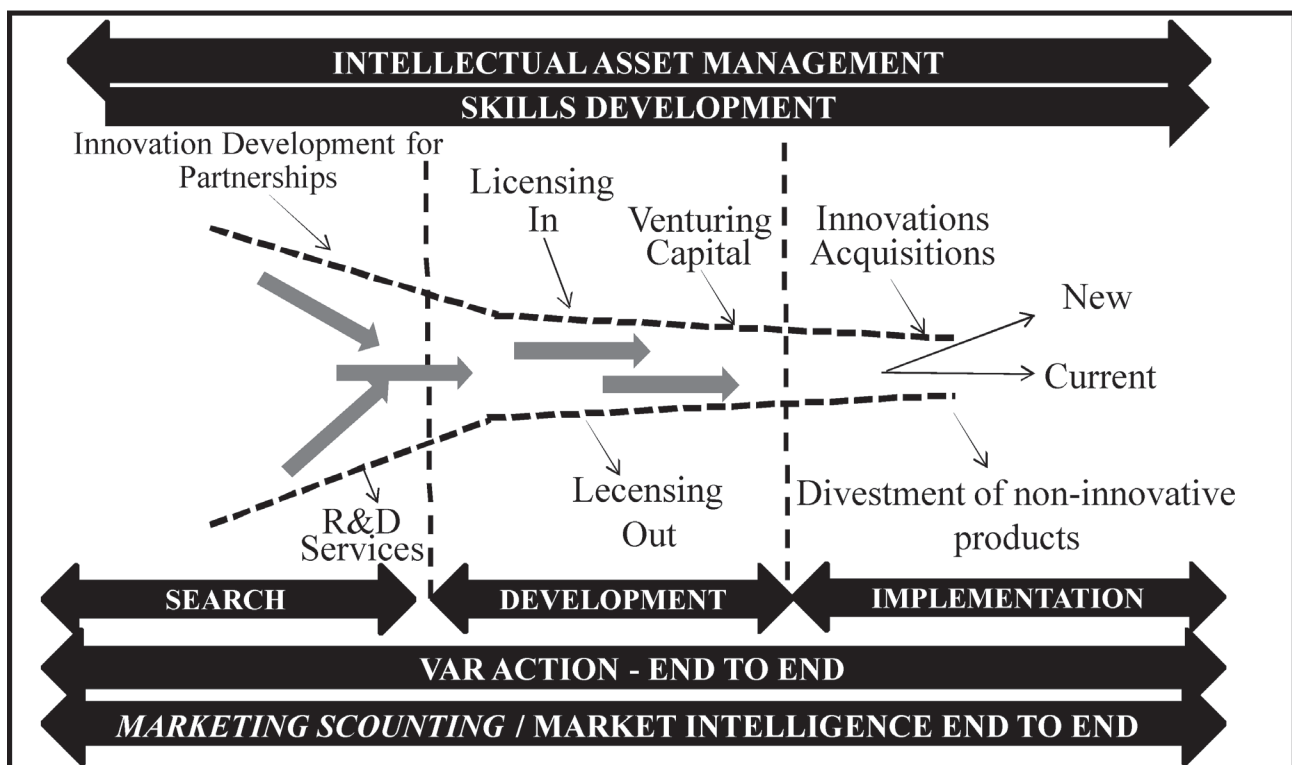


FIGURE 6 – DSM innovation funnel

Source: The authors

#### 4.2 Business model canvas applied to dsm

Returning to the definition of business model as the “logic of creation, delivery and capture of value by an organization” (OSTERWALDER, PIGNEUR, 2010, p. 14), this topic aims to understand and describe the DSM innovation development process, based on the Business Model Canvas – BMC tool, matching and evidencing innovation with the central concept

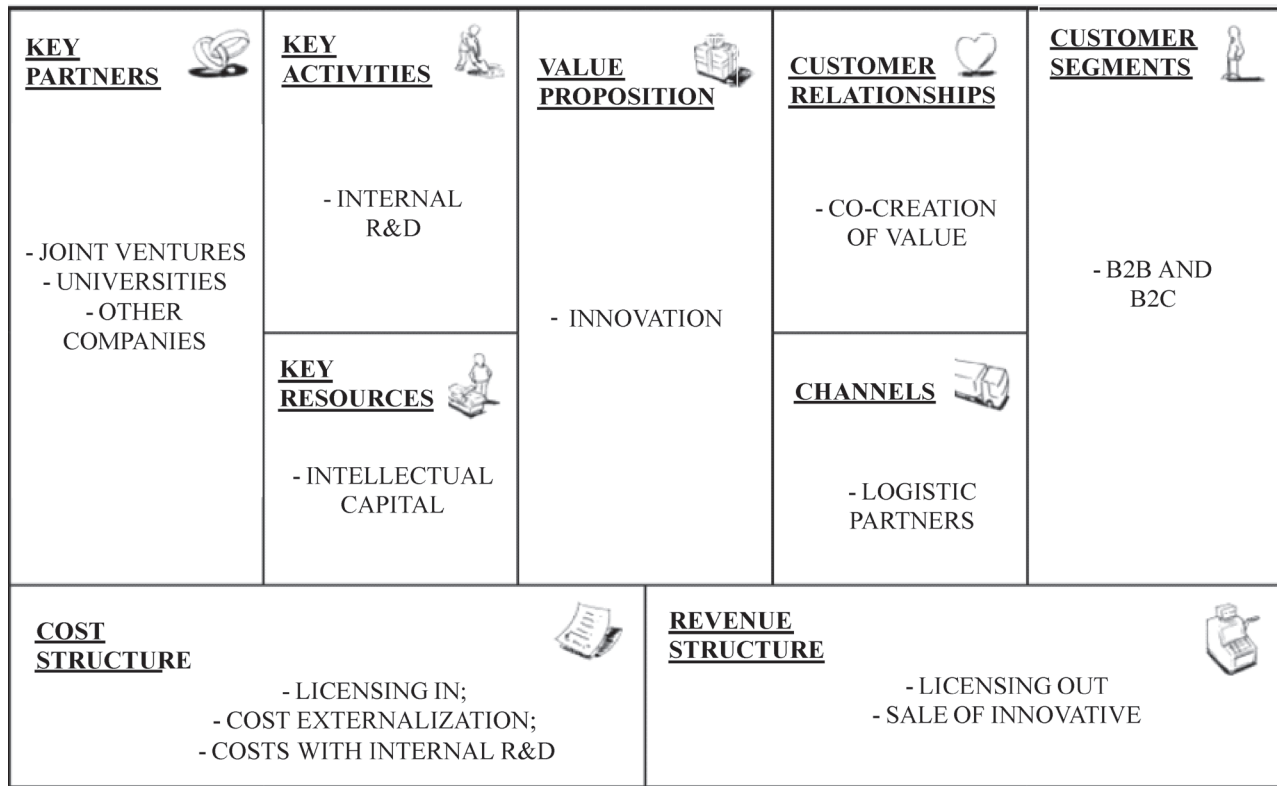
of “value,” presented by the abovementioned authors.

Thus, we seek to expand the vision previously presented by the innovation funnel, based on the use of the nine dimensions of BMC, with the possibility of **providing a theoretical contribution included in the approach of these two concepts.**

Thus, the DSM business model, in accordance with the BMC, in short, involves

the following (then summarized by Figure 7):  
 a) value propositions: primarily based on the innovation; b) key activities: R&D; c) Key features: intellectual capital; d) key partners: universities, joint ventures, suppliers and other companies that help DSM in sharing skills and knowledge for the development of innovation; e) customer

segments: multilateral market in the B2B and B2C segments; f) customers relationships: based on co-creation of value; g) distribution channels: logistic partners; h) cost structure: licensing in and internal R&D; i) income sources: sale of resources and licensing out.

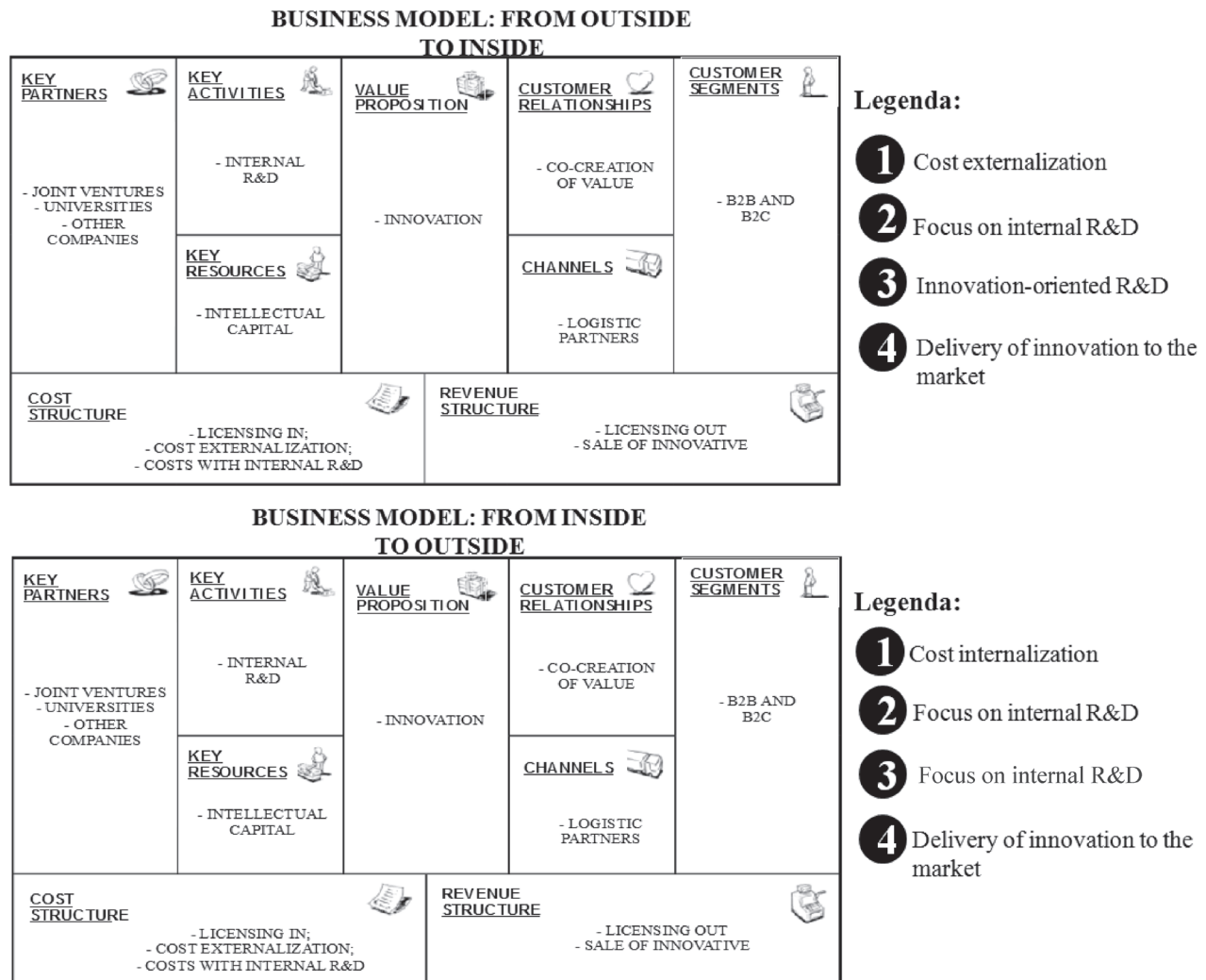


**FIGURE 7** – BMC of dsm oriented to innovation

**Source:** The authors

The BMC analysis of the company allows us to find, in line with the concept of open innovation by Chesbrough (2003), that DSM operates in what Osterwalder and Pigneur (2010) defined as “open business model,” used to create and capture value systematically by collaborating with external partners. In the authors’ view, as in open innovation, this collaboration can happen “outside in,” exploring outside ideas within the

company, or “inside out,” providing external groups with internal ideas and resources. In this aspect, we detected that the DSM has a strengthened and flexible structure capable of acting and producing innovation in both models presented. Thus, we structured Figure 8, in order to better understand the operation in these models.



**FIGURE 8** – Business model: “outside-in” and “inside-out”

**Source:** The authors

From analyzing the models, we can infer that even with a dual action, in both cases, DSM guides the development of new products for the co-creation of value (1) with the customer (PRAHALAD, RAMASWAMY, 2000), here translated by the search for understanding of future megatrends. Despite this similarity, the essence of the models is marked by singularities in the cost structure and the organization’s revenue structure.

In the first model, we saw marked cost externalization, mainly marked by the “licensing in” practice for universities, joint ventures and other companies that develop technology (1).

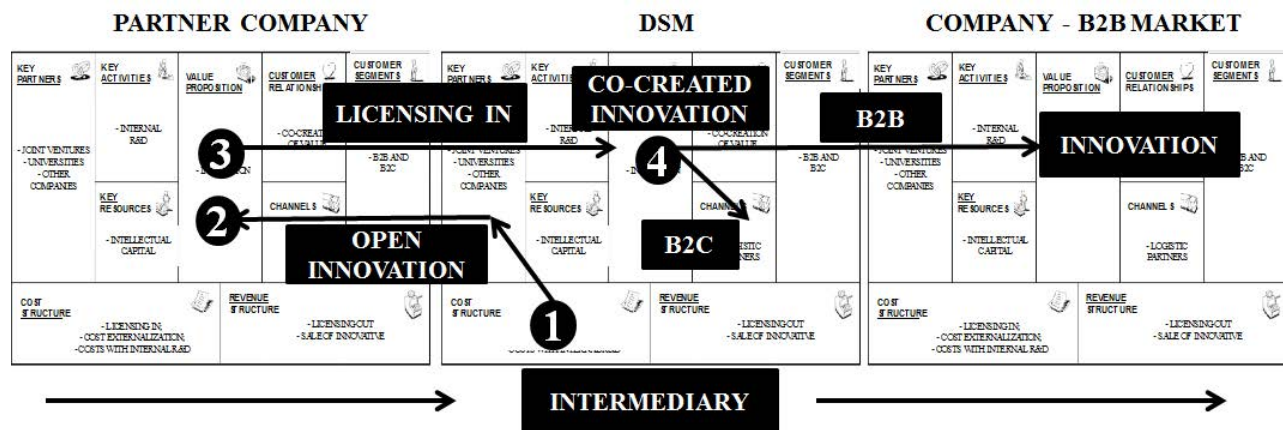
As a result of this partnership and linked to the co-creation of value, the development project is interconnected to the inside of the organization through internal R&D (2), which is strengthened by intellectual capital and, together, are oriented to the production of innovation and spread on the market (3 and 4). In this model, the generation of revenue and capture of value of innovation are essentially evidenced by the sale of innovative products and acquisition of competitive advantage in the market.

A different situation occurs in the model marked as “inside out.” In this approach, innovation costs are internalized and targeted to

the capitalization of internal R&D (1), which is responsible for internal interconnection for dissemination to the market (2, 3 and 4). Thus, contrary to the one presented above, revenue generation is substantially complemented by “licensing out” activities, providing the market the permission to use the intellectual property in exchange for licensing fees.

Operating as an open business model, structured in “outside-in” approach, it also refers to another type characterized by Osterwalder and Pigneur (2010). This is what the authors called unbundled business model in product innovation. This model is based on unbundled

corporation concepts of Hagel and Singer (1999) and is characterized by an internal segmentation of innovation activities and dependence on technology and external R&D. As it also operates as a multilateral platform, spreading innovation in B2B and B2C markets, this breakdown points DSM as an intermediate in the development of innovation in the B2B segment, and, at the same time, a logistics company dependent on the B2C partner, which makes it active in a business model characterized by end-to-end alliances and associations in the process of innovation and product development, as shown in Figure 9.



**FIGURE 9** – Unbundled business model in multilateral platform

Source: The authors

This multi-type operation makes DSM a leveraged company in an innovative business model. This is what Osterwalder and Pigneur (2010) characterized as innovation in business model from multiple epicenters, as evidenced in the empirical case for the co-creation of value with the customer, “downstream” and “upstream” partnerships, and even the licensing in and licensing out practices in the cost and revenue structures.

Thus, it appears that, based on the theoretical approaches made in this study, the diversity of innovation sources and types of operation is a determining factor for the new product development process, creating a

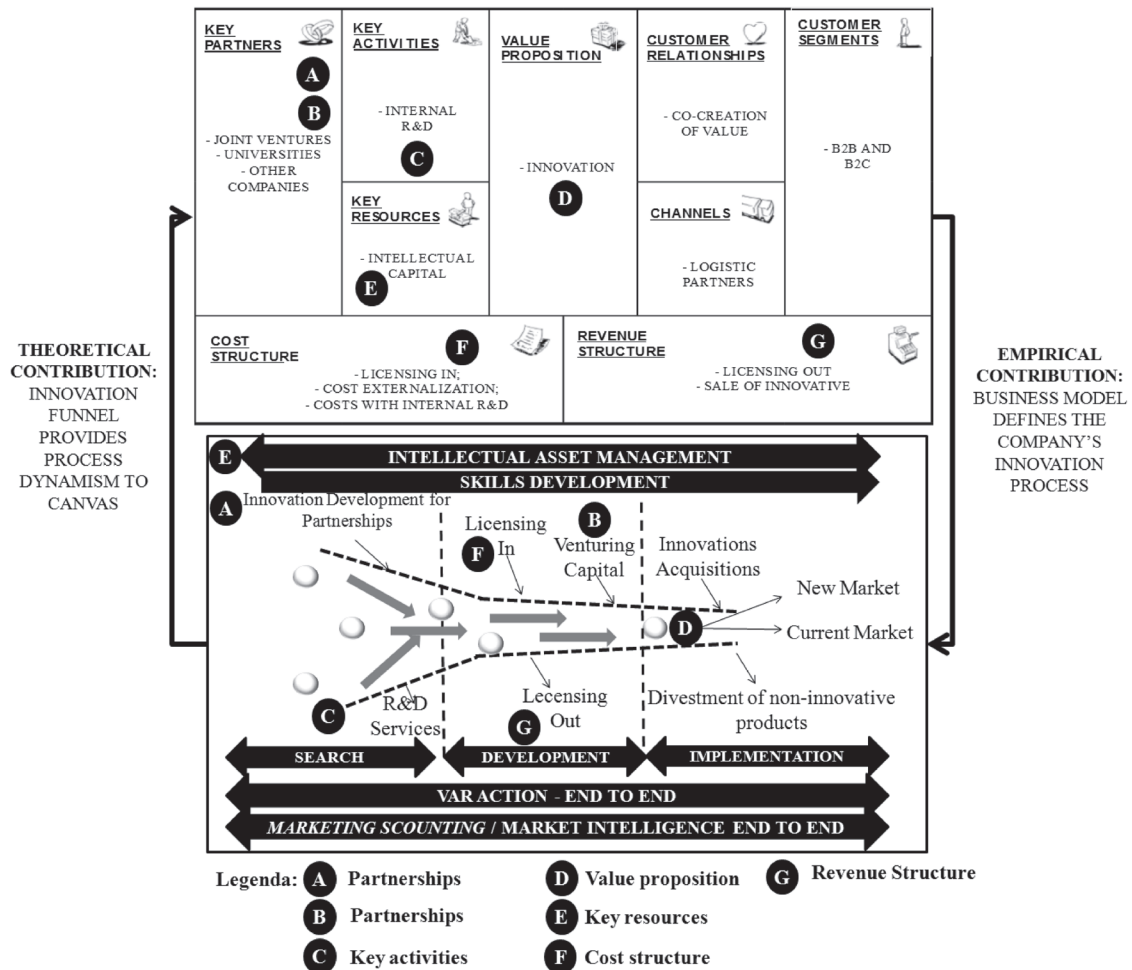
relationship of dependency on innovation vis-à-vis the DSM’s business model, which, as noted, adopts a singularity in the logic of creation, delivery and capture of value.

These inferences are therefore explained when crossed with the E1 statements:

*Innovation is our sport [...] it is what we do every day, especially product innovation, but also innovation in business model, as we work with an end-to-end partnership strategy, often with alliances with suppliers from completely different sectors [...] Anyway, we need it because these are the differences in the business model of DSM that lead to innovation of our products.*

Considering the above, we conclude this study with the structure of Figure 10, **aiming to show the composition of the innovation funnel, structured from the BMC dimensions of the company.** As a theoretical contribution of the study, we draw attention to the complementarity

of the two models, especially when it comes to the static approach of Osterwalder and Pigneur (2010), and the dynamism and process view of Chesbrough (2003), thus allowing for a joint and comprehensive analysis of the innovation development process of the empirical case.



**FIGURE 10** – Business model dependence and model theoretical congruence

Source: The authors

We also observe, by means of Figure 10, that **the Canvas Model dimensions are present and evidenced throughout the innovation process represented by open innovation funnel.** Thus, in the funnel innovation, the following business model dimensions can be found: a) key-partnerships in the research phase; b) key-partnerships in the development phase; c) key-activities in the research phase; d) value propositions in the implementation phase; e) key

features throughout the process; f) cost structure in the development phase; g) revenue structure in the development phase.

## 5 CONCLUSION

This study mainly aimed to understand the DSM innovation process along its evolutionary context, **showing a theoretical approach of the innovation funnel with the Canvas Model.**



The specific objectives sought to: understand the DSM development and growth strategy throughout its history; understand the company's innovation process from the perspective of the innovation funnel; and understand and describe the organization's business model based on the Business Model Canvas. Considering the above, it appears that all the specific objectives have been met and properly integrated in order to achieve the main objective.

As we understand that the DSM is a reference company in the industry, the research was structured as an empirical research from a single case study based on interviews and supported by the analysis of primary and secondary data.

As the main empirical contribution, we identified in this case a dependent relationship of innovation with the business model adopted by the DSM, and that the logic of creation, delivery and capture of value is of paramount importance for the conception and development of a new product.

Therefore, and derived from this finding, other contributions were made possible by this study.

Regarding the development and growth strategy of DSM, we point out the existence of proximity between the empirical practices and academic postulates, with the company being essentially structured in diversification strategies and product development, as well as in the use of associations and geographic expansion as a driving lever of market penetration, outlined to meet the global deficiencies in 2050.

Inherent in the innovation process, we draw attention to a dualistic operation evidenced by internal and external developments related to alliances, joint ventures, licensing practices, and co-creation of value between partners and customers.

The analysis of the business model allowed us to characterize the DSM with an open model typology based on the externalization and internalization of knowledge, and on an unbundled product innovation model, which may operate in an intermediate position in the innovation development process to society when

inserted into the open innovation system.

Accordingly, as a theoretical contribution, by analyzing the empirical case, it is possible to correlate the "Business Model Canvas" tool with the "Innovation Funnel," *thus identifying a complementarity of the two concepts with respect to the static approach of the first one and dynamic and phased view of the second.*

The limitations of this study are inherent in the single case study, and therefore the conclusions obtained here allow an in-depth analysis of a situation in context and cannot be extended or generalized to other organizations with innovation at their essence.

Based on the foregoing, we recommend that new research be conducted in order to deepen the propositions herein formulated, and for a better understanding of the process in other companies strategically structured and based on innovation.

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