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Research Article

Business Model Analysis from the Activity System Perspective: A Design Science Research

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Abstract

Understanding a business model is at the core of organizational strategy, competitiveness, and business sustainability. Descriptive approaches to understand business models are often based on the analysis of their components by looking at organizational assets, resources, plans, and competencies. Although there are numerous contributions in the literature, few guidelines are offered regarding an Activity System perspective, in a prescriptive rather than a descriptive way. In this study, we propose a pragmatic solution to help cover this literature gap and to extend on previous studies. A Design Science Research approach was adopted including a multicase study of four business companies we examined in order to create a method for business model analysis from an Activity System perspective. The resulting artefact of the study is illustrated with data from the empirical cases. Three analytical movements are described as well as prescribed: dimensions analysis (i.e., business definition, customer segment, value proposition, profit logic, critical factors of value proposition, and Activity System); visual representation including illustrations of its Activity System; and competitive analysis including prospection for changes and innovations. Finally, the artefact is discussed in relation to its quality, utility, and usability.

Keywords: business strategy; business analysis; business model; business planning; value creation.

Introduction

A business model (BM) is a set of activities articulated to promote value, and the perspective of Activity System (AS) in literature is a promising way for describing and understanding it (see Amit & Zott, 2001; Zott & Amit, 2010). However, the literature on BM, so far, provides little insights and guidelines on how to analyze it from an AS perspective in a prescriptive rather than a descriptive way (Maucuer & Renaud, 2019; Pauwels, Clarysse, Wright, & Van Hove, 2016; Sosna, Trevinyo-Rodríguez, & Velamuri, 2010). Moreover, Foss and Saebi (2016), in a large systematic review of 150 studies on BM innovation, suggest that there is limited convergence between theoretical and empirical data in business model literature.

Amit and Zott (2012, 2015) and Zott and Amit (2010, 2013) suggest that the use of the AS perspective on BM analysis offers a promising way to explain value creation with important effects for organizational strategy, competitiveness, and even for understanding business sustainability. However, they do not offer any prescriptive solutions about how to do that in a systematic manner. Moreover, literature on BM is mostly descriptive and it is often difficult to connect empirical data and assumptions made in BM analyses.

Our study contributes to address this theoretical and methodological gap by extending Amit and Zott (2015) work while using Design Science Research (DSR) (Dresch, Lacerda, & Antunes, 2015) to empirically generate a prescriptive method for BM analysis from an AS perspective based on the study of four business cases. Additionally, we demonstrate how DSR provides a promising way to address this gap and a contribution to management literature.

The article is structured as follows: firstly, we present the perspective of BM based on AS concepts; secondly, we engage the issues of strategy and competitiveness in BM and AS; thirdly, the DSR approach adopted is explained, followed by the presentation of the artefact developed along the research; finally, we conclude with a discussion on further developments and use of our artefact.

Business Model from the Activity System Perspective

A business model (BM) analysis explains how companies perform business through an articulated set of activities in order to create and deliver value to stakeholders (Zott & Amit, 2010). The Activity System (AS) perspective offers a way to understand how value is created since it explains what companies actually do through their activities (Amit & Zott, 2012; Frankenberger & Sauer, 2019; Spieth, Schneider, Clauß, & Eichenberg, 2019; Troxler & Wolf, 2017). In this study we define AS as a set of interdependent activities involving human, physical, or capital resources with a specific purpose (Zott & Amit, 2010). The way those activities are arranged depends on the company's background and strategy and it has important impacts on competition (Porter, 1996, 2004), resource allocation, and development (Amit & Zott, 2001; Barney, 1991; Saebi, Lien, & Foss, 2017), and dynamic capabilities for innovation (Achtenhagen, Melin, & Naldi, 2013; Teece, 2007; Teece, Pisano, & Shuen, 1997).

Interdependency among activities is a fundamental characteristic. It is necessary to comprehend how activities are interconnected in a systemic manner (instead of just looking at each activity separately) (Zott & Amit, 2010). Relationship among activities can be very close and, when a change happens in the organization, it is difficult to identify which elements are resonating with each other (Demil & Lecocq, 2010).

Companies perform many activities to project, produce, commercialize, and deliver their products. There are different types of activities, some of them trend towards strategic and others towards operational functions (Porter, 2004). In this sense, these activities can be analyzed in different degrees of resolution. In a BM approach, the main activities analyzed are those related to value creation. Zooming-in can reveal further supporting activities.

Zott and Amit (2010) define design elements as the parameters that can help us to characterize an AS. They are: Content (i.e., which activities should be considered), Structure (i.e., how activities relate to each other), and Governance (i.e., who performs the activities). From an AS perspective, the constellation of activities of a system is not necessarily circumscribed within an organizational domain, since some activities, for example, can be performed by customers, partners, or suppliers.

According to Amit and Zott (2012), drivers of value creation in an AS, known as design themes, should also be considered. They are: Novelty (i.e., innovation in the Content, such as new activities), Structure (i.e., set of relations among activities), Governance (i.e., new forms of management and control), Lock-in (i.e., mechanisms that keep consumers or partners attached to the company AS), Complementarities (i.e., result from synergy among activities that promote more value when connected), and Efficiency (i.e., avoidance and control of losses through transaction cost management).

In Amit and Zott (2012) and Zott and Amit (2010), the word design refers to characteristics that provide particular forms and patterns (i.e., Elements and Themes) to an Activity System. They can be considered requirements (i.e., proprieties) of an Activity System and adopted beforehand for strategy formulation, business planning, and even as guidelines for analyses of an existing system. In this sense, they can influence the development of the solution concept (Wieringa, 2014).

Organizational Strategy and Competitiveness

There are many opportunities for business model (BM) configurations through the adoption of new technologies and discovering new consumer needs; it can even promote BM innovation (Casadesus-Masanell & Zhu, 2013; Saebi & Foss, 2015). We understand that BM analysis enables organizations to become more competitive in four perspectives. First, managers and entrepreneurs may articulate their resources and activities to take it into a new configuration for fulfilling market opportunities (Amit & Zott, 2001, 2012; Bojovic, Genet, & Sabatier, 2018). Although changes in BM are necessary, they are hard to achieve because it involves several elements of the organization: from the acceptance of employees to the persistence of the

organization in the initial moments in which the model is consolidating yet it is not having the expected results (Chesbrough, 2010).

Second, a BM analysis helps to understand how competitors act in an industry. It is possible to compare BMs that compete in the same industry to understand the differences in how they create and deliver value. By expanding it to many companies, such analyses may lead to a sectorial panorama (Casadesus-Masanell & Zhu, 2013).

Third, strategic thinking in BM enables to instantiate future arrangements and design of activities. In this sense, a manager may design and compare alternative BMs, prospecting for competitiveness and/or sustainability (Casadesus-Masanell & Zhu, 2013; Teece, 2010). This process may contribute to increase managers' repertory of knowledge, business, and market solutions and develop foresight. It also provides a viable and pragmatic way for understanding the continuous adjustment between strategic formulation and implementation (or in Teece's dynamic capability terms, the continuous dynamic of firms sensing-sizing-transforming) (Zott & Amit, 2010).

Fourth, BM may represent itself as an innovation when companies present a novelty in the way they do business (Amit & Zott, 2012). Such creation and reinvention, beyond continuous improvement, seek to offer a disruptive competitive advantage necessary to remain effective in an environment where the game rules change rapidly (Snihur & Wiklund, 2019; Voelpel, Leibold, & Tekie, 2004; Yip, 2004). Therefore, innovation is not only related to laboratories and the development of new technologies and products, but rather to new configurations of BMs and its ASs (Chesbrough, 2007).

Design Science Research Approach

We adopted a Design Science Research (DSR) approach seeking to generate a solution (i.e., an artefact) for business model (BM) analysis from Activity System (AS) perspective (March & Smith, 1995; van Aken, 2004). Based on steps proposed by Dresch, Lacerda and Antunes (2015), the research design adopted was organized in three phases (as illustrated in Figure 1): exploratory, development, and consolidation. In the development phase, a multiple case study (Yin, 2012, 2015) was conducted with focus on four companies from two different industries in order to explore empirical data of BM and AS.

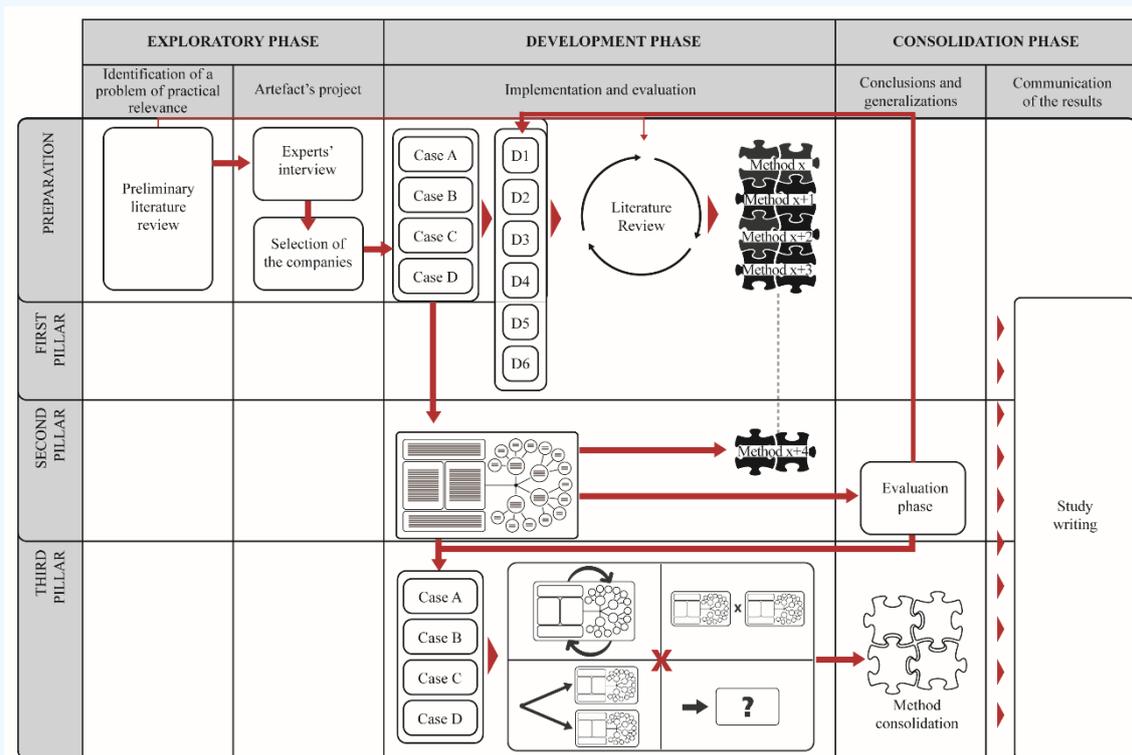


Figure 1. Research design

Exploratory phase

The exploratory phase corresponds to the identification of a problem of practical relevance, obtaining an understanding of the existing empirical solutions, and the preliminary projection of the artefact itself.

We reviewed the literature on BM, AS, and their related available methods. The perspective of components for BM analysis is the mainstream and it is described in several theoretical (e.g., Afuah & Tucci, 2001; Alt & Zimmermann, 2001; Chesbrough & Rosenbloom, 2002; Johnson, Christensen, & Kagermann, 2008) and empirical studies (e.g., Osterwalder, 2004; Osterwalder & Pigneur, 2010; Osterwalder, Pigneur, Bernarda, & Smith, 2014). However, while empirical studies present BM analyses, they do not provide any systemic method to understand how singular components result in real value propositions.

A preliminary version of the artefact was devised from the literature and examined with three subject matter experts (SME). Table 1 illustrates the profile of them.

Table 1

SME occupation and profile

SME	Occupation	Profile
1	Professor and coordinator of a university research area	Bachelor's, Master's, and PhD in Administration. He is one of the coordinators of a university research area; involved in many projects in the technology park at the university; member of strategic committees of the university; professor in Administration for over seven years, lecturing in the fields of entrepreneurship, strategy, and innovation.
2	Professor and business consultant	Bachelor's in Accounting; Master and PhD in Administration. Senior business consultant and university professor for 19 years. Main areas of expertise include strategy, competitive analyses, and financial analyses.
3	Business executive	Bachelor's in Administration and Master's in Strategic Design. Executive with experience working in business acceleration programs. Expertise includes new companies and startups business model development and evaluation for over two years.

We conducted individual semi-structured interviews that lasted one hour and twenty minutes in average. The main objective was to fulfill pragmatic issues not covered in the literature, such as how to describe an AS in practice and explore ways to organize a protocol for data gathering with c-suite executives.

The interviews with SME were guided as follows: first, selection of a BM to be analyzed for the sake of the interview (SME were free to suggest any business case they were familiar with to focus on); second, identification of a customer segment; third, definition of value proposition; fourth, identification of essential activities for value creation; and, fifth, revision of the analysis performed (i.e., from the first to the fourth step) in order to design a preliminary protocol for the case studies and evaluation criteria for designing the artefact (i.e., delivering a method for BM analysis based on key business dimensions; delivering a set of constructs for characterizing the BMs during the analytical phases; delivering a visual representation of BMs based on AS).

Development phase

The definition of the cases to be studied was an essential part of the artefact design. We selected two competing companies from two different industries (or market segments) in order to allow the exploration of differences and similarities. The c-suite executives were business leaders or founders with strategic and systemic view of their business. As recommended by Tremblay, Hevner, and Berndt (2010), during the artefact design we assessed these executives several times in order to make sure the development would have pragmatic and value-added purpose. Table 2 describes the market segment, type of business, and characteristics of the empirical cases.

Table 2

Empirical cases

Market segment	Type	Cases	Description
Pet food industry	Business-to-Business (B2B)	A	Company A is a long-time established pet food company with its own supply chain, manufacturing food, branding, distribution, and sellers' teams. It provides different pet food types to pet and non-pet-related market stores.
		B	Company B is a new entrant that outsources most of its activities, even using an US company exclusive formula. It has an outsourced production facility and small teams of sellers.
Booksellers	Business-to-Consumer (B2C)	C	Company C is an established bookseller with a physical store and a loyal customer base. It offers a passionate and highly qualified staff.
		D	D is a new industry entrant based on online subscriptions that constitute a community of readers. It sends out boxes of books to customers (usually non-best sellers) monthly, including a "surprise" book, and an exclusive deluxe edition.

During the development phase, data were primarily gathered by means of interviews with the c-suite executives. At least two rounds of interviews with each c-suite executive were carried out: the first round related to the development phase; and the second round especially related to the consolidation phase. Data from interviews were also combined and compared with data from documents (e.g., brochures, emails to clients, companies' websites) as well as observations during visits and consumer experience of each product/service (e.g., buying from pet food companies as customer or retailer).

The development of the artefact can be summed up in three pillars. First, we started examining the dimensions of BM as currently established in the literature (i.e., D1–Value proposition, D2–Customer segment, D3–Profit logic, D4–Activity system). During the empirical work, another two dimensions emerged (i.e., D5–Business definition, D6–Critical factors of value). The resulting dimensions of the study are presented in Table 3.

Table 3

Dimensions

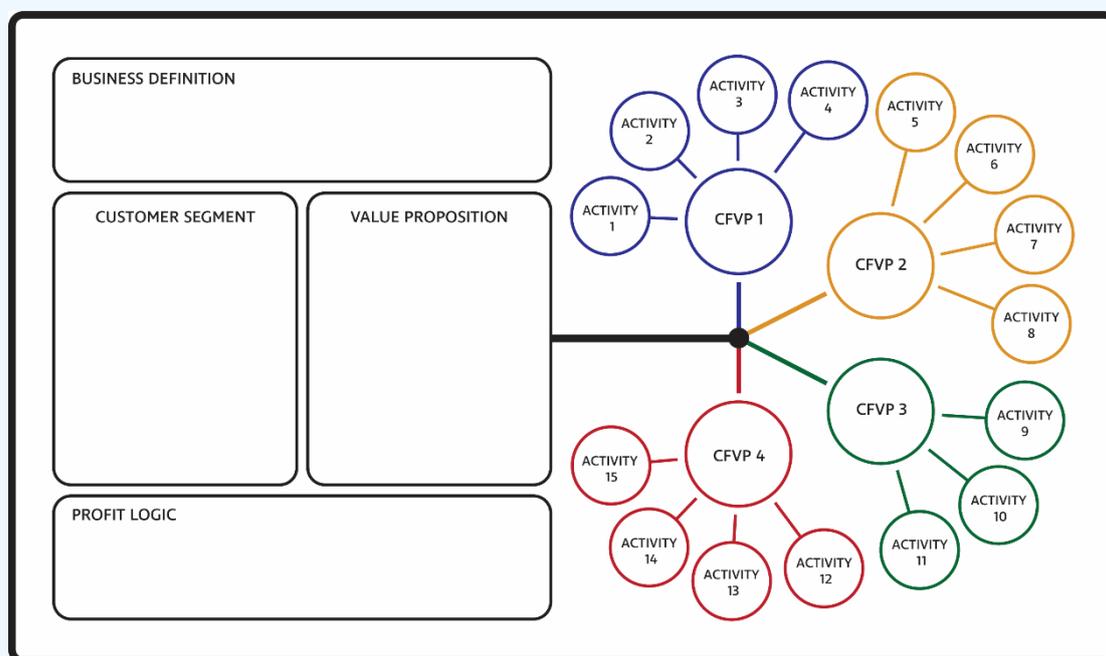
Dimensions	References
D1 Value proposition	Mission (Alt & Zimmermann, 2001); Customer value (Afuah & Tucci, 2001); Value proposition (Chesbrough & Rosenbloom, 2002; Osterwalder, 2004); Customer value proposition (Johnson et al., 2008).
D2 Customer segment	Structure (Alt & Zimmermann, 2001); Scope (Afuah & Tucci, 2001); Target customer (Osterwalder, 2004); Market segment (Chesbrough & Rosenbloom, 2002); Customer value proposition (Johnson et al., 2008).
D3 Profit logic	Revenues (Alt & Zimmermann, 2001); Price and revenue (Afuah & Tucci, 2001); Revenue model and cost structure (Osterwalder, 2004); Cost structure and profit potential (Chesbrough & Rosenbloom, 2002); Profit formula (Johnson et al., 2008).

Continues

Table 3 (continued)

Dimensions	References
D4 Activity system	Processes (Alt & Zimmermann, 2001); Activities (Afuah & Tucci, 2001); Capabilities (Afuah & Tucci, 2001; Osterwalder, 2004); Distribution channel, value configuration, partnership, and customer interface (Osterwalder, 2004); Value chain and value network (Chesbrough & Rosenbloom, 2002); Key resources and key processes (Johnson et al., 2008).
D5 Business definition	Empirical work (Markides, 1999).
D6 Critical factors of value proposition	Empirical work (Amit & Zott, 2012; Zott & Amit, 2010).

Second, a framework with the six proposed dimensions was created, in which dimensions were put together in order to find logical interconnections among them. Figure 2 is the resulted generic representation of a company's BM framework.

**Figure 2.** Generic visual representation of a company's BM

Third, with the BM generic representation in hands, another round of interviews was carried out when c-suite executives were invited to analyze and instantiate their businesses according to the model. This process allowed refinements in the artefact.

Although the three pillar phases are presented linearly for the sake of clarity, it is worth stressing that it was the result of a cyclical process (i.e., theory/method – empirical data – theory/method – empirical data – etc.): We gathered data about the companies; we described their BM; we compared them with the literature along the analyses; we continuously compared the results of the cases studied and we returned to the companies multiple times for refinement. According to

Given (2008), “recursivity refers to the cyclical nature of qualitative research where all procedures can be undertaken repeatedly until a specific condition is met” (p. 746).

Findings were compared with the available literature in order to refine and re-design the method, therefore resulting in the final artefact of this study. Since data collection and analyses of the cases happened in parallel, it is not possible to define individual contributions for the final product. All the four cases helped to create the final artefact.

Consolidation phase

In the consolidation phase, we compiled and compared results from the four cases in order to deliver the final artefact (i.e., the business model analysis method). The interviews with SME as well as the first-round with c-suite executives helped to establish the preliminary version of the artefact. During the second-round of interviews, the first BM representations were scrutinized for its validity. Once the models were assumed to be valid, we explored their potential for competitive analysis purpose. Finally, the c-suite executives were questioned (a) about their experience while analyzing their BM in light of AS perspective and (b) about the pragmatic value of the resulting BM representation in order to explore the utility, quality, and efficacy of the artefact (Hevner, March, Park, & Ram, 2004). Further discussions about the resulting artefacts are presented in sixth section.

Data analysis

We used multiple sources of data (e.g., interview, observation, document analyses). Data were cross-checked and compared for triangulation purpose (Flick, 2012; Yin, 2015). Table 4 shows data sources in each phase of the study.

Table 4

Data source

DSR Phases	Data sources
Exploratory phase	Literature review; interview with SME.
Development phase	Literature review; first-round and second-round interviews with c-suite executives; company documents (e.g., brochures, emails to clients, and their websites); observations during visitations in companies, consumer experience of products and services (e.g., buying from pet food companies as customer or retailer).
Consolidation phase	Literature review; second-round interviews with c-suite executives.

Data were transcript and organized in MaxQDA for qualitative analysis following Content Analysis (Bardin, 2009). We also considered field notes from the observations and our perception as customers of the companies' products or services. For the presentation of the results, we used direct quotes because they allow capturing the level of emotion of the interviewees, the way they understand the phenomenon, and their perspectives and experiences (Roesch, Becker, & De Melo, 2000). Since we dealt with strategic market information and we had to make sure that

those c-suite executives would feel comfortable to express their strategic plans, confidentiality and de-identification of data and sources were assured to all participants, therefore preserving their anonymity and that of their companies.

Results: A Prescriptive Method for Business Model Analysis

In this section, we describe the resulting artefact (i.e., the BM analysis method), and we illustrate its presentation with selected empirical data. Three pillars constitute the resulting artefact, as illustrated in Figure 3.

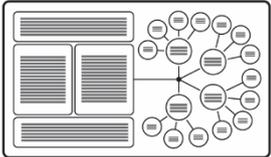
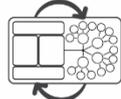
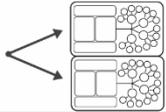
PILLARS	DIMENSIONS ANALYSIS	VISUAL REPRESENTATION OF THE BUSINESS MODEL	COMPETITIVE ANALYSIS	
	Helps to understand how the company creates value through the Activity System.	Offers a holistic view of the Business Model, it enables to identify opportunities for improvement.	Offers a reflection in Business Model competitiveness through four perspectives.	
DESCRIPTION	1) Business Definition a) What c) Who b) How d) How much		Design Themes 	
	2) Customer Segment a) Customer profile b) Expected value		Comparison with competitors 	
	3) Value Proposition a) Product and services b) Set of value attributes		Opportunities for improvement What dimensions should be changed in order to ensure greater alignment in the company's Business Model? What activities should be included, modified or excluded from the Activity System considering the other dimensions?	Instantiate modifications in a BM 
	4) Profit Logic a) Revenue sources b) Cost base			Opportunities for innovation 
	5) Critical Factors of Value Proposition			
	6) Activity System a) Content c) Governance b) Structure			

Figure 3. The method proposed

The pillars may be described as empirical and analytical movements necessary for BM analysis from an AS perspective. The Figure 3 should not be taken as a mere description or a visual map of BM – as often suggested in other studies that come up with representations of BM (e.g., Osterwalder, 2004). Each pillar has an analytical purpose. The following sections describe each pillar and its analytical movements.

First pillar: dimension analysis

The First Pillar helped us to understand how the companies investigated create and deliver value through their Activity Systems. Business definition was the first dimension analyzed. We understand that it expresses the logic of the business: the way the enterprise delivers value (i.e., how) by products or services (i.e., what) to a customer (i.e., who) in order to enable its operation

and monetization (i.e., how much). It represents a big picture of the BM that can be taken as a starting point to guide the analyses of other dimensions.

Defining a business may reveal to be more difficult than it seems, especially when the researcher is not familiar with a particular trade. In Case D, the interviewee said, “we offer an experience.” Then we questioned him how this experience is created? If it is not an experience as an event, what is it made of? Actually, they sell monthly paid book subscriptions; and they try to deliver not only an ordinary product, but a book embedded in a great experience. At this point, we understood that the literature experience was the main value generated by the BM and this general view helped us to deepen in each dimension analyzed.

The customer segment is the group of clients a company wants to generate value for. We realized that, since different customer segments have different value perception, this analysis has to happen before the value proposition analysis phase. In Case B, an example could be a scenario where a dog tutor, who buys pet food in a supermarket because it is easier and cheaper, may not be willing to go to a pet shop specifically for buying a more nutritive and also expensive pet food. Even if it is a prime canine food, made without grains, with no artificial preservatives and gluten free, this tutor might not be willing to spend more money because of it.

The definition of a customer segment helps to describe a customer profile beyond demographics while characterizing expected values. Interviewee from case B said: “We introduced in digital advertising, ‘low carb,’ why? Because it is fashion, because women have ‘low carb’ on their minds, and our food is a low carb product that has almost only meat.” This analysis is not just about understanding the gender of the customer segment but going further and understanding what they think and what they want.

We consider the value proposition as the core dimension for a BM analysis. It represents the main value offered to customers, the pack of products and services and set of attributes that make this pack valuable. The c-suite executives interviewed had some difficulties to express the value proposition in simple sentences, even if they appear to understand it. They usually created narratives to explain why their products and services were bought by their customers. We believe that an unclear vision of value proposition may contribute to create misunderstandings and cloud communication within organization and market. In Case D, the interviewee said, “A Disney of books, we try to create like that,” referring to their value proposition. He was saying in this sentence that the customer experience is important for them and how they see their value proposition in a wide perspective; it is not only about the books they deliver, but also about the feelings that are involved in books’ expectations.

We call profit logic the formula that explains how a company makes money through its revenue sources and cost base. The revenue sources may be critical for a company such as Case D, which uses technology to charge automatically by credit card. The consumers do not need to assign a contract, but as this subscription renews automatically it reduces the probability of cancelling the service. The cost base analysis is about understanding the main cost structure for value creation. Case B, for example, adopts a strategy of cost reduction in the matrix of raw materials used to

produce their pet food; interviewee said: “Why are we putting ostrich? Because one day we want to make one with ostrich meat, so we don’t have to test the distribution chain, we already have a guy who supplies us.” They often prospect suppliers for substitutive products, such as chicken or obligator meat (depending on the price and quality control standards) and they test them to guarantee their food quality.

Critical factors of value proposition (CFVP) are essential factors that underpin the value proposition and represent the main link between it and those activities performed to create value. We elaborate on the CFVP construct as a way to understand how an AS creates value. The CFVP may be determined in two different ways: the first and primary way is based on the value proposition (i.e., what are the critical factors that enable the BM to create and deliver its value proposition?); the second way emerges from the AS analysis (i.e., what does make the AS singular? Considering the activities performed, which are the essentials for the BM?). Case D has its value proposition defined as “to offer unique literary experiences to members who establish a literary community.” Therefore, it must commit to the following CFVP: attract interest in their literary work, create exclusive editions, establish a literary community, and deliver products at home periodically. Each CFVP has a group of activities connected.

An AS represents activities connected to the CFVP. We call primary activities those linked directly to a CFVP and secondary activities those that support the primaries. We recommend choosing three to four primary activities for each CFVP along the analyses. Case D, for example, has four primary activities connected the CFVP to attract interest in their literary works and multiple secondary activities associated as show in Table 5. While an activity is mainly related to a CFVP, it may be connected to another CFVP or even another activity due to interdependencies. We propose to illustrate those activities on a map and link their relationships for better illustrating and understanding resource sharing and synergies.

Table 5

Case D example of primary and secondary activities

Primary activities	Secondary activities
Relate to curators	<ul style="list-style-type: none"> - request list of nominations - schedule interviews for their magazine
Manage topics of interest	<ul style="list-style-type: none"> - review previously submitted themes - search for potential books for the next kit
Create relevant content	<ul style="list-style-type: none"> - write text for the blog - write a story about the author of the book of the month
Disseminate works	<ul style="list-style-type: none"> - recording video content of a box shipped - create clues about the next book surprise

Dimension analysis may be guided by multiple aspects (see Table 6). We propose some memorable and simple sentences in order to guide the description and characterization of each dimension so it can be used in the visual representation of the BM later (the Second Pillar).

Table 6

Dimensions, aspects, and sentences for descriptions

Dimensions	Aspects	Sentences for descriptions
Business definition	How	How does the business deliver value?
	What	What are the products or services offered?
	Who	Who are the target segments?
	How much	How much will it gain for its products and services?
Customer segment	Customer profile	Age, gender, social class? In case of a company: branch, size, market?
	Expected value	Which are the benefits or problems that customers intend to address or solve with products or services?
Value proposition	Products and services	Which are the set of products or services provided to the customers (i.e., manufactured goods, digital products, financial services)?
	Set of value attributes	Which are the essential characteristics for the construction of the value proposition specific of that company?
Profit logic	Revenue sources	How does the business generate revenue?
	Cost base	How does the structure of cost constitute? What are the most significant costs? Are they variable or fixed? How does cost influence value creation in the business?
Critical Factors of Value Proposition (CFVP)	CFVP through value proposition reflection	What are the critical factors that enable the BM to create and deliver its value proposition?
	CFVP through Activity System perspective	What does make the BM Activity System singular? Considering the activities performed, which are the essential factors for the BM?
Activity system	Content	What are Primary Activities? What are Secondary Activities? How are these activities performed? What are the main resources of the activities? What activities are not included in the BM analysis and why?
	Structure	Which activities have a high degree of interdependence and interrelation? What activities are related to different CFVP? How is the synergy among activities or resource sharing?
	Governance	What are the activities performed by customers or partners? If the activities are carried out by partner companies, what is the degree of their relationship and dependence? If the activities are executed by the customers, what are the gains? What are the risks of disappointing the customers?

Second pillar: visual representation of the BM

The Second Pillar provided the c-suite executives with a systemic understanding to their BM. The visual representation of the BM offers a holistic view of it. It helps to present the main results of the dimension analysis (the First Pillar), in order to enable organizations to identify opportunities for improvement. In addition, it offers a more visual and objective language, which allows for a holistic understanding, while becoming an important tool for BM communication. In order to identify opportunities for improvement, the following questions were proposed: What dimensions should be changed in order to ensure greater alignment in the organization's BM? Which activities should be included, modified, or excluded from the AS considering the other dimensions of the BM? Figure 4, for example, illustrates the business model of Case B.

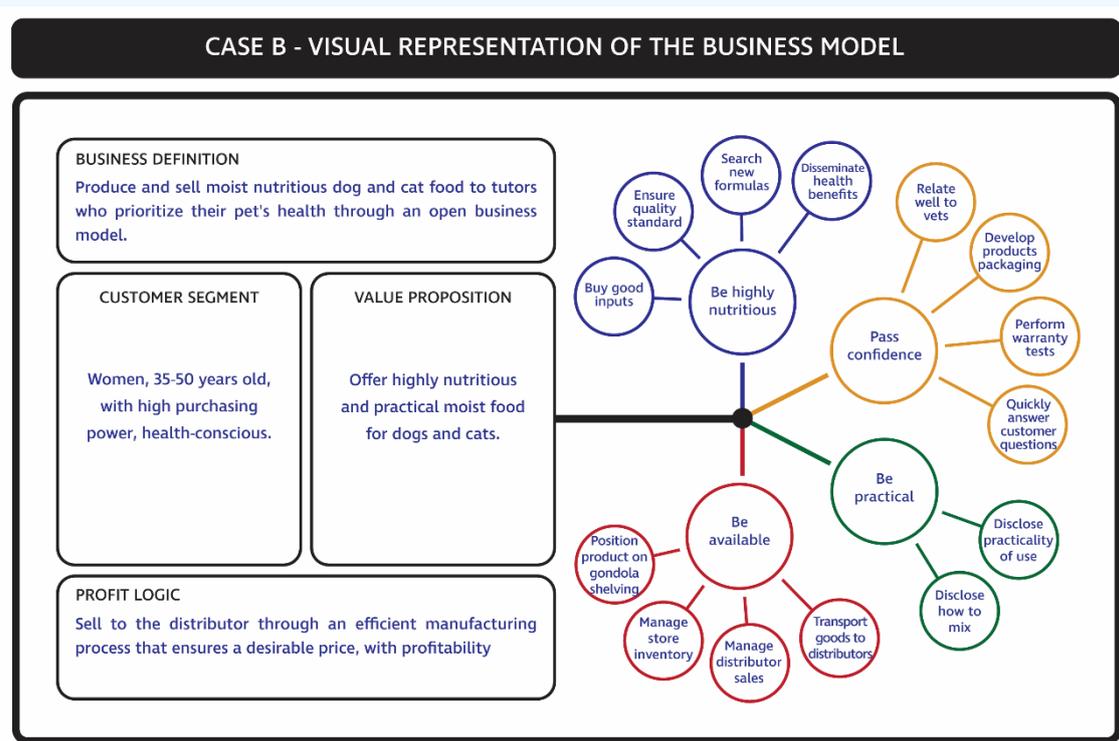


Figure 4. BM of case B

A preliminary version of the BM was presented to each c-suite executive in order to explore what dimensions should be changed and which activities should be included, modified, or excluded. In Case B, for example, we decided to include the keyword practical in the value proposition. Although we describe the food as easily mixed with dry food, we understood that the value proposition was more than this. It is practical because it provides a complete and balanced food ready to eat. If it is compared with dry food, there is no difference.

When we were reviewing the AS, we understood that fast response to clients' doubts should be included, because this is important for the CFVP Pass confidence. If a client's dog has food poisoning, for example, the company shall respond rapidly to avoid crisis propagation. We also made some minor adjustments such as change manage store sales for manage distributor sales. The distributors are intermediates responsible for sales in general. We also excluded activities when necessary.

Third pillar: competitive analysis

The Third Pillar offered opportunities to explore strategic issues related to the companies' BM. Once the researcher or analyst has a visual representation of the BM (and its AS), it is then possible to (a) identify the current design themes, (b) compare with models of competitors, (c) instantiate modifications in order to explore strategic decisions, and (d) reflect about opportunities for innovation.

We adopted the design themes, based on Amit and Zott (2012) and Zott and Amit (2010), which are sources of value creation: novelty (the extent in which the Activity System adds innovation and differentiation), lock-in (the extent in which the Activity System retains customers), complementarity (the extent in which activities of the system complement each other and generate synergic use of resources), and efficiency (the extent in which the activities of the system promote cost reductions/savings). By looking to them, researchers or analysts should explore content, structure, and governance of the activities in the system. Table 7 provides important guidelines for such analyses.

Table 7

Design themes and elements guidelines

Design themes and design elements	Novelty	Lock-in	Complementarities	Efficiency
Content	Are there any new activities in this system of activities?	Are there activities that retain customers?	Are there activities that participate in the AS specially to generate more value?	Are there activities that help reduce costs?
Structure	Is there a differentiated way of articulating activities?	Are arrangements conducive to customer retention?	Are there activities that complement each other to generate more value?	Are there any cost-saving arrangements?
Governance	Are there new ways of governing activities?	Is there an influence on who performs the activity in lock-in generation?	Is there any influence on who performs the activity in the generation of complementarity?	Are there activities in which the role of implementing agents reduces costs?

We understand that these four sources of value creation may be presented in a BM with different strengths (e.g., very strong, strong, neutral, weak, very weak). Our analysis focused on the strongest ones and those we found promising to deepen in the value creation system.

An understanding of the business logic of companies competing may emerge when comparisons with competitors are made (i.e., examining similitudes and differences among Activity Systems). The comparison of different BMs, for example, may highlight reasons why some competitors in the same industry have similar value propositions and customer segment despite delivering different values. At the same time, it helps to identify valuable resources and instantiate opportunities for innovation and differentiation.

For example, Cases A and B have a similar value proposition, both of them offer healthy pet food to a customer segment who cares a lot about their pets. But these cases have different AS: while Case A is based on a vertical integration design with most activities performed by its company, Case B has an outsourcing model based on many partnership and contract arrangements.

Even though the comparison with a competitor may be more difficult when carried out by a player with limited knowledge about a competitor's strategy, it is still a valid step and exercise of competitive analyses or benchmarking. During our field work, comparisons were often made while participants were reflecting on their competitors' BM and AS. Questions about the value

proposition of competitors and activities performed by them were often discussed for analysis of competition.

Instantiated modifications in a BM constitute a strategic exercise of elaborating scenarios of the AS and their implications for competition (Casadesus-Masanell & Ricart, 2010). For example, during the case studies we instantiated scenarios where Case B would sell a pet food subscription, especially to customers who have dogs with special needs. These customers constitute a potential segment of clients who need to buy every month the Case B kind of food, although it may feel pricey for them. The subscription format would guarantee regular income for the company, create a kind of lock-in, and generate discounts for a yearly contract. While instantiating a BM and its AS, executives or analysts may prospect future scenarios and study strategy formulation.

Opportunities for innovation are evidenced when a BM presents a novel design theme (Zott & Amit, 2010). Case D, for example, is a new entrant with a different BM. We examined that there is innovation possibilities to establish new business from their experience in creating a literature community and developing an application platform. The company could make this application as the main product and offer a curatorship for different books (where they recommend books and also create a social network to connect readers) charging monthly per user.

Discussions: A Set of Outcomes and Evaluation of Artefact

The DSR approach adopted in this study resulted in a set of outcomes each one addressing different classes of problems identified in the literature and during interviews with SME (first, exploratory phase): (a) delivering of a method for business model (BM) analysis based on three pillars (i.e., dimension analysis that provides a definition of a company's BM; visual representation of BM that allows exploring primary and secondary activities; competitive analysis for instantiations and prospection of business configuration); (b) delivering a set of constructs that may be adopted to characterize a BM in each analytical phase (i.e., Business Definition, Profit Logic, Client Segment, Value Proposition, Critical Factors of Value Proposition, Activity System; Opportunities for Improvements; Opportunities for Innovation); and (c) delivering an illustrative map of BM for analyses and instantiations.

As we mentioned in previous section, Consolidation phase, we had three main moments of artefact evaluation. First, we improved the protocol by reviewing questions and focusing on the business dimensions analyzed as a starting point. We learned that mapping activities should come after the understanding of such dimensions because it usually becomes visible while doing that. Once an Activity System is mapped, they are perceived as relevant for business analysis. One participant, for example, established a direct connection between activity, value perceived, and strategy. He analyzed the importance of buying ingredients like tomato and flour in an Italian restaurant: "It's a purchasing activity, a bureaucratic activity, but if this activity is poorly developed a differentiated pizza will not happen."

Second, the BM illustrations we created were scrutinized by c-suite executives during the second-round interviews. All of them mentioned that the visual representation of BM is an easy tool to communicate important features of their business to co-workers and partners. Third, we conducted four competitive analyses. While doing that, c-suite executives were able to instantiate, look for change and innovation opportunities, and formulate business strategy.

The artefact evaluation is summed up in Table 8, considering Hevner, March, Park and Ram (2004) criteria of quality, utility, and usability.

Table 8

Artefact evaluation

Criteria of evaluation	Evidence	Source of evidence
Quality	Improvement of the first version of the artefact with the experts.	SME 1, 2, and 3.
	Overall dimensions were accurate with c-suite executives' vision.	Second-round of interview with c-suite executives.
Utility	A document that provides a comprehensive and systemic notion of the business and its value creation.	Statement made by c-suite executive of Case C, during the second-round interviews.
	It seems an easy tool to communicate features of the business to co-workers and partners.	Statement made by c-suite executive of Case B, during the second-round interviews.
Utility	Specialist's view that Activity System is directly related to the organization's strategy.	Statement made by SME 2.
Usability	Fast and easy understanding of the visual representation of the business model.	Second-round of interview with c-suite executives.
	C-suite executives working together on analyzing the fourth dimension and improving the dimensions.	Second-round of interview with c-suite executives.

Our proposed artefact is a method for business model analysis. It has three pillars: dimension analysis, representation of BM, and competitive analysis. First, the dimension analysis examines how a company creates value through its AS. The notion of dimensions was already proposed by Afuah and Tucci (2001), Chesbrough and Rosenbloom (2002), Christensen, Johnson, and Rigby (2002), and Osterwalder (2004). Likewise, literature reviews by Morris, Schindehutte, and Allen (2005) and Wirtz, Pistoia, Ullrich and Göttel (2016) show that there is no consensus on the main components of BM. We believe our dimension analysis presents the main components and expands them through the AS examination, as previously suggested by Amit and Zott (2001, 2012). Furthermore, the critical factors of value proposition (CFVP) emerged from our empirical work as an important contribution to define relations between primary and secondary activities. Like Osterwalder (2004), we also advanced in proposing guiding questions for investigating business dimensions – especially those related to the Activity System perspective.

Second, the visual representation of BM and its AS prove to be a valuable tool for business analyses consistent with Osterwalder and Pigneur's (2010) Business Model Canvas. During the artefact development, we adopted (as a reference) Porter's (1996) Activity System framework, but

we decided to include other dimensions in order to have a deeper understanding of the businesses analyzed. Porter's Activity System (1996) added contributions in relation to his previous Value Chain analysis (Porter, 1996, 2004).

However, his Activity System still requires a more instrumental and prescriptive way to generate its representation for business analysis purpose. While Zott and Amit (2010) recognize the importance of Activity System for BM analysis and extend notions of business dimensions, type of activities, and configuration of systems, they do not offer a prescriptive way on how to carry it out. Also, our artefact in this study is slightly different from Osterwalder and Pigneur's (2010) Canvas, because it indeed considers the Activity System and shows how to generate it during the analysis.

Third, the competitive analysis may be proposed when the BM representation is completed. The design themes are based on works of Amit and Zott (2012) and Zott and Amit (2010) (i.e., four sources of value creation: Novelty, Lock-In, Complementarity, Efficiency). In our case studies we found that a company may often present a predominance of one or two sources of value creation. Therefore, we purpose to analyze it one by one and find out the most relevant ones in the AS. Our artefact offered some guiding questions for this analysis, also considering each one of the design themes.

The comparisons with competitors aim to examine similarities and differences between business models and Activity Systems. Porter (2004) proposed a framework in which competitors with the same strategy are arranged in groups. The perspective is a structural analysis within industries aiming to understand the competitive strategy. We do see similarities between Porter's strategic groups and our approach but there are some notable differences. The business model view understands that there are numerous ways to capture and deliver value (Teece, 2010), which depends on the set of activities and how they are performed, as well as who performs them (Zott & Amit, 2010). Our analysis does not intend to understand the pet food or book industries, rather we examined at each company to understand how their BMs differ and why.

Instantiate modifications in a BM enable researchers or analysts to reflect about company's future. The notion of business model offers a holistic view, which explains why BM studies are receiving more attention among scholars of strategy (see Foss & Saebi, 2018). Casadesus-Masanell and Ricart (2010) understand strategy as an exercise of describing, designing, and instantiating business models; in this study we attempted to generate an artefact for instrumentalizing this strategic exercise.

Opportunities for innovation may be explored when considering novelty in the design themes (Zott & Amit, 2010). Teece (2010) states that developing a successful BM is not enough to assure competitive advantage: companies should innovate their BMs just like innovating in products and process. Business model innovation is not easy to achieve (Chesbrough, 2010), but at least companies must try to innovate and our artefact aims to look at opportunities for it.

Conclusions

In this study, DSR offered a valuable course of work in order to generate a possible solution for a theoretical problem: literature on BM has worth stressing the need to adopt an Activity System perspective, but without providing guidelines on how to operationalize such analysis from a methodological stand point. Based on Amit and Zott (2001) and Zott and Amit (2010) conceptual categories of BM from an Activity System perspective, our empirical work resulted in a roadmap for such analyses based on the three pillars presented in fifth section, Results.

The study of four business cases in two industries provided a rich empirical field for testing and applying theoretical concepts while establishing the proper condition for contrasting BM Activity Systems in the same industry (i.e., Case A versus Case B; Case C versus Case D). By such comparison, distinctive features of each case brought about possibilities to instantiate strategic changes in the architecture of value creation, innovation, and competition.

The Design Science Research approach allowed the development of a pragmatic solution for BM analysis in light of AS, in addition to offering valuable contributions to discuss a set of problems identified in the literature of business modeling.

We recognize that the final BM analysis of the four companies constitutes representations mainly based on the understating of their top leaders. Future researches should also explore multiple views by also listening to managers, workers, partners, and customers in order to understand how a business design creates value (or helps to foster its co-creation, assuming that customers may take part in the process of value creation). Likewise, it is important to mention that we were not looking for a descriptive validity in our analysis of the empirical cases; instead, we seek to generate a valid prescriptive and pragmatic solution to guide business model analysis in light of Activity System perspective to contribute with this literature gap.

Future studies should consider investigate how secondary (and even tertiary) activities generate synergy with each other. We also recognize that our resulting artefact also needs further applications in order to test its pragmatic value in a more comprehensive way. In this study, we focused on the generation of the artefact by means of DSR approach. Likewise, future studies should focus on exploring its potential for strategy formulation and innovation.

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