

# Examining the Canvas as a Domain-Independent Artifact

**Pedro Antunes**

LASIGE, Faculdade de Ciências, Universidade de Lisboa  
Universidade de Lisboa, Lisboa 1749-016, Portugal  
Email: padantunes@fc.ul.pt  
**Corresponding author**

**Mary Tate**

School of Information Management  
Victoria University of Wellington  
PO Box 600, Wellington, 6140, New Zealand  
Email: mary.tate@vuw.ac.nz

The popularity of Osterwalder's (2004) business model canvas has led researchers to develop analogous artifacts in a variety of domains. However, we still lack a conceptual foundation explaining the essential and common characteristics of the canvas, regarded as domain-independent artifact. In this study, we focus on how the canvas helps representing and theorizing about a particular behavior or structure. We develop a framework for canvas design, which characterizes the canvas design at the surface and deep levels. While the surface level concerns a lightweight representation, using components and implicit relationships, the deep level involves theorizing about a particular behavior or structure, using a systems perspective and considering a static and a dynamic view of the canvas. The proposed framework is demonstrated in a case addressing the design of the research contribution canvas. This study contributes to a domain-independent conceptualization of the canvas, which can be used to design canvases in various domains.

**Keywords:** Canvas, Canvas Design, Knowledge Representation, Systems Theoretical Perspective.

## 1 Introduction

Dynamic environments require the ability to examine alternatives and make decisions based on “good enough” information. They also require a high level of communication between stakeholders to be conducted quickly and effectively. This has driven interest in lightweight tools for planning, developing options, and acting. One hugely influential example is the business model canvas developed by Osterwalder (2004).

Osterwalder's (2004) business model canvas is a very popular artifact, which supports business model generation (Osterwalder & Pigneur, 2010). It has been widely used by executives, entrepreneurs and strategists to identify and analyze business value (Fielt, 2013; Sparviero, 2019; Wirtz et al., 2016). It has also been extensively investigated by researchers in various fields, including service design, creativity and innovation, strategy making, technology road mapping, and digital transformation (Amit & Zott, 2015; Carter & Carter, 2020; Van Waes et al., 2018).

This is not restricted to the development of business models. Professionals in many contexts find the need for a lightweight conceptualization, planning and communication tool to enable them to cope with dynamic environments. Suddenly, canvases are everywhere. For instance, we find canvases addressing social enterprising (Sparviero, 2019), creativity (Carter & Carter, 2020), innovation (Martins et al., 2015), service design (Ojasalo & Ojasalo, 2018), modular platform development (Eisape, 2019), and scientific theorizing (Gregor, 2017). The variety of canvases developed in different domains suggests there is a generalized, domain-independent approach for canvas design. It is therefore timely to investigate the characteristics of the canvas that lead to its popularity and usefulness.

Business model canvases have been celebrated for a most significant characteristic, *business modeling*, i.e., representing how organizations generate value using a set of ontological elements or components: value propositions, key partners, activities, resources, customer relationships, customer segments, and channels (Osterwalder & Pigneur, 2010). However, this explanation of the canvas emphasizes the business domain, while concealing some important characteristics of the canvas design. We still lack a conceptual foundation explaining the canvas design. Such a conceptual foundation would clearly separate the characteristics pertaining to the targeted *domain* and the essential characteristics of the canvas seen as a domain-

independent information *artifact*, which concerns how information is captured, structured and used (Chatterjee et al., 2020). Such separation would help apply the canvas design to different domains.

In this research, we propose a domain-independent conceptual foundation that explains the canvas design according to two conceptual levels: at the surface level, the canvas *represents* selected behaviors or structures based on ontological knowledge about the domain and using components and implicit relationships; at the deep level, the canvas *theorizes* about behaviors or structures using a systems theoretical perspective. In other words, we conceive the canvas as lightweight on the surface and detailed on the inside.

The study is organized as follows. First, we review different views over the canvas. Second, we analyze the conceptual foundations of the canvas from an Information Systems (IS) perspective. Third, we propose a domain-independent framework for canvas design. Fourth, we demonstrate the use of the framework in the analysis of a canvas design. Finally, we discuss the implications brought by the framework and provide some concluding remarks.

## **2 Views Over the Canvas**

### **2.1 The domain-dependent view**

Osterwalder's (2004) business model canvas is commonly referenced as inspiration of a multitude of canvases developed in a variety of scientific domains including economy (Daou et al., 2020), digital design (Eisape, 2019; Strulak-Wójcikiewicz et al., 2020), engineering (Lauff et al., 2019), and research (Gregor, 2017; P. John et al., 2016). Since most canvas designs have been inspired by Osterwalder's (2004) artifact, it is no surprise that a large body of research follows the same design approach. This includes: 1) reviewing knowledge about the problem domain; 2) define an ontology aiming at improving understanding of selected behavior or structure; and 3) developing a simplified representation, using a set of generic level descriptors, which helps lay out the value of the representation. (Baden-Fuller & Morgan, 2010; Demil & Lecocq, 2015; Osterwalder, 2004)

The problem with this domain-dependent view for canvas designers is that there is no clear separation between the properties of the representation (canvas) and the properties of what is represented (domain, selected behavior or structure). Researchers wishing to design a canvas for a different behavior or structure, or different domain, end up using basic ideas (e.g., review knowledge, define ontology, and develop a simplified, if not stereotyped, representation), and lack a proper foundation for canvas design.

### **2.2 Other views**

Business model canvases are relevant organizational artifacts. As such, it is no surprise that researchers have taken interest in their sociotechnical nature (Demil & Lecocq, 2015). According to this view, a business model canvas has a dual nature (Demil & Lecocq, 2015; Jarzabkowski & Kaplan, 2015): it inhabits social and material worlds. In the social world, the canvas supports sensemaking, collaboration, coordination and co-creation, where users explore and shape the artifact to create and capture value (Cavalcante, 2014; Ojasalo & Ojasalo, 2018). In the material world, the canvas offers an image of a particular behavior or structure using a set of components and relationships, which help interpreting or re-interpreting the object of interest (Osterwalder & Pigneur, 2010). It also helps communicating both within and outside the organization, and helps aligning images when changes are required (Demil & Lecocq, 2015; Van Waes et al., 2018). The canvas can also be circulated to support and coordinate action (Demil & Lecocq, 2015).

The problem with the sociotechnical view is that it has been mainly studied in relation to the business domain, with which it has natural affinities. Studies of canvases developed in different domains are still missing, and therefore the sociotechnical view is still imprinted by the business perspective.

Recently, several researchers have also taken interest in the cognitive aspects of business models in general and business model canvases in particular. Some researchers point out that these artifacts stimulate visual thinking about organizations or other complex target domains (Fielt, 2013; Osterwalder & Pigneur, 2010; Täuscher & Abdelkafi, 2017). Others suggest that these artifacts also stimulate a dynamic understanding of value creation (Cosenz & Noto, 2018; Martins et al., 2015). The business model canvas is also considered to facilitate sensemaking and storytelling for organizational change (George & Bock, 2011; Pianesi, 2019). However, the discussion has again been mainly focused on the business model domain, rather than isolating

the canvas as a domain-independent artifact with intrinsic properties. Furthermore, the cognitive view emphasizes the canvas use over canvas design. Even though canvas designers should be cognizant about how their canvases may be used, the cognitive view moves the focus of attention away from the artifact itself.

In summary, even though we find a large body of research on the nature and purpose of the canvas, especially in the business domain, such knowledge has been hard to autonomize and generalize. Next, we discuss the theoretical foundations of the canvas, focusing on domain-independence and generalized characteristics.

### **3 Theoretical Foundations for the Canvas**

A longstanding tradition of the IS field is the diversity of IS artifacts that are considered (essentially everything that is human-created and concerns information), and the diversity of viewpoints (e.g., organizational and sociotechnical) adopted to research IS artifacts. The canvas, as a human creation that holds critical knowledge about a particular behavior or structure, is therefore a relevant IS artifact (Osterwalder, 2004).

Moreover, the particular characteristics of the canvas make it highly relevant to the IS community. A fundamental reason is that the canvas allows us to theorize about a particular behavior or structure (Weick, 1989). Such theorization uses concepts, categories and relationships to describe and articulate essential building blocks, or propositions, about the selected behavior or structure (Demil & Lecocq, 2010).

Another reason is that the canvas also falls in a longstanding IS tradition of creating representations of real-world phenomena (Recker et al., 2019). Finally, the IS community is also interested in theorizing about the canvas from the artifact design point of view (Gregor & Jones, 2007). After all, Osterwalder's (2004) business model canvas, which ignited many other canvas designs, was designed according to the IS design science paradigm (Hevner et al., 2004). Next, we discuss two essential levels of analysis, which help understanding the canvas.

#### **3.1 Representation level**

The canvas can be considered as a "simplified representation" of a particular behavior or structure (Osterwalder, 2004, p. 14). The simplified representation utilizes a small set of ontological constructs to put together explicit knowledge about the selected behavior or structure.

The representation helps understanding, analyzing and managing the selected behavior or structure. For instance, the business model canvas helps understand the business logic that supports "the 'activity of buying and selling goods and services' and 'earning money' of a company (Osterwalder, 2004, p. 14). This is accomplished by representing the business logic on a high level of abstraction (Osterwalder, 2004; Wirtz et al., 2016). In fact, some researchers characterize the business model canvas more as a meta-model than a model, because of its high level of abstraction, which only enumerates and clarifies a critical set of concepts necessary to represent a business (Massa et al., 2017).

#### **3.2 Theoretical level**

The theoretical level confers a theoretical perspective to the canvas, operating over a particular behavior or structure as a selection and structuration mechanism, identifying the aspects of interest to the researcher (Burton-Jones et al., 2015).

Burton-Jones et al. (2015) identify and characterize three theoretical perspectives mainly used in the IS field (Table 1): variance, process and systems. The variance perspective defines a set of properties and values, which are related through covariation. Using such an approach we may understand the effects of value changes (in independent variables) on the particular behavior or structure (observing the dependent variables). Alternatively, the process perspective refers the manner in which states change over time (Niederman, 2021). This allows us to understand what happens with the behavior or structure over time. Finally, the systems perspective characterizes the particular behavior or structure using wholes, parts/components, relationships, properties, and the notion of change brought by the interactions among parts/components. Considering the main relationships and properties, we find structural relationships (whole/part compositions), configuration relationships (how components are arranged in a system over time),

interactions (between components), and emergent properties, which arise from interactions among the parts/components of a system.

**Table 1. Theoretical perspectives adopted by IS research (Burton-Jones et al., 2015)**

Perspective	Main concepts	Main relationships and properties
Variance	Properties, values	Covariation
Process	Entities, events, states	Sequencing of events and state changes
Systems	Wholes, parts/components, change	Structure (whole/part compositions), configuration (of components), interactions (among components), and emergent properties (arising from interactions)

Several characteristics of the canvas position it within the systems perspective, rather than the variance or process perspectives. One characteristic is that the canvas operates at the structural level, identifying and representing a set of components (elements or building blocks) relevant to explain a particular behavior or structure or to express beliefs about them (Burkhart et al., 2011; T. John & Szopinski, 2018; Sparviero, 2019). For instance, Osterwalder’s (2004) business model canvas theorizes about a business using nine structural components: customer segments, value propositions, channels, customer relationships, revenue streams, key resources, key activities, key partnerships, and cost structure.

With few exceptions (e.g., Cosenz & Noto, 2018), most canvases identify a set of structural components but do not commit explicit relationships between them. The relationships exist at the ontological level and must be implicitly understood by the canvas users. Relationships are not usually represented to focus on the essence and lower the adoption barrier by users (Caetano et al., 2017; Osterwalder & Pigneur, 2010).

Another common characteristic of the canvas, which is consistent with the systems perspective, is that it does not have a starting point, as several epicenters can be used to start developing the canvas (Osterwalder & Pigneur, 2010). Finally, the canvas is considered to provide a holistic representation of the selected behavior or structure. It “really is a *system* [our emphasis] where one element influences the other; it only makes sense as a whole” (Osterwalder & Pigneur, 2010, p. 148).

Interestingly, even though the canvas seeks to characterize a particular behavior or structure using a systems perspective, it has been criticized for “lack of systemic perspective” by not explicitly modeling the interplay between and within its components (Cosenz, 2017, p. 4; Demil & Lecocq, 2010). Such criticism reflects conflicting views regarding the canvas being either an IS model, which is expected to exhibit certain information modeling qualities such as representation fidelity and ontological completeness (Recker et al., 2019), or the canvas being a theorizing device, which supports reflective and discursive practices (Hassan et al., 2019). In fact, the canvas could be seen as a very lightweight “notation” (Green et al., 2006) that provides a common vocabulary for discussing a problem or opportunity and allows the exploration of alternatives. In general, there is a trade-off between lightweight representations that facilitate flexibility, exploration, and communication (Green et al., 2006), and more highly specified modeling notations that are more explicit and complete, and require detailed and extensive modelling grammars to be learned (Recker et al., 2010).

In our approach to explain the canvas, we integrate the two levels discussed above. Next, we develop a conceptual framework for canvas design, which will be used to explain the canvas.

#### **4 A conceptual framework for canvas design**

Based on semiotics and in particular Pierce’s triadic conception of object, sign and interpretation (Beynon-Davies, 2018), we view the canvas as participating in a triadic relationships (Figure 1). The first element in this relationship is the particular behavior or structure that is the target of inquiry. The second element is theorizing, which structures knowledge about the selected behavior or structure. The third and final element is the canvas.

The canvas simultaneously 1) creates a representation of the selected behavior or structure and 2) helps theorizing about that behavior or structure. The canvas operates as a representation using a systems

theoretical perspective, which contemplates structure, interaction and emergent properties (see Table 1). Next, we further discuss how the canvas supports theorization.

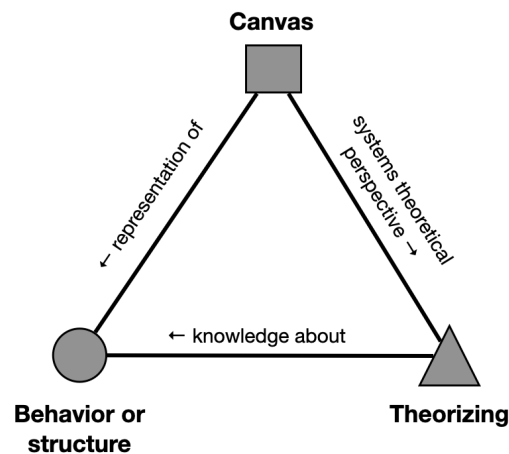


Figure 1. Using the canvas to theorize about a particular behavior or structure

#### 4.1 Theorizing with the canvas

As noted earlier, the canvas provides a way to theorize about a selected behavior or structure using the systems theoretical perspective discussed by Burton-Jones et al. (2015). Such conceptual view promotes a holistic conceptualization, as the primary emphasis of the systems perspective is the overall system and its interactions (Burton-Jones et al., 2015). This avoids reductionism when considering the selected behavior or structure.

The notion of theorizing does not imply that canvas designers intend to apply or develop theory; it essentially refers to what Weick (1995) designates as “disciplined imagination”, i.e., developing a framework for abstracting, generalizing and relating. The diagrammatic nature of the canvas also contributes to collaborative theorizing, as diagrams help identifying, relating and communicating concepts, and making assertions. Furthermore, the canvas can be seen as an implied proposition about the selected behavior or structure, which identifies “pathways of influence” (Weick, 1995, p. 389).

Aligning with this conceptual foundation, canvases have been observed to promote holistic viewpoints. For instance, discussing the business model canvas, Osterwalder et al. (2005) note that “[i]n our opinion, a business model needs to be understood as a much more holistic concept that embraces all such elements as pricing mechanisms, customer relationships, partnering and revenue sharing”. Working in a different domain (creativity), Carter and Carter (2020) also note that the canvas “has become a popular tool for business design as it provides a holistic, one-page view of a business’s concept”. Many other researchers also highlight this important characteristic of the canvas (Cosenz & Noto, 2018; Demil & Lecocq, 2015; Fielt, 2013). Therefore, the holistic viewpoint embraced by the systems perspective is foundational for the canvas.

Besides holism, the systems perspective, especially in combination with a lightweight representation, also confers flexibility to the canvas (while the variance and process perspectives confer simplicity) (Burton-Jones et al., 2015). Flexibility gives users the capacity to adapt, extend and relate the canvas in different ways (Fielt, 2013). Flexibility allows users to develop new approaches using the canvas and cater for different purposes and contexts (Fielt, 2013). Flexibility is usually regarded as an important characteristic of the canvas (Fielt, 2013; Fritscher & Pigneur, 2014; Osterwalder, 2004).

Regarding the level of abstraction, the canvas is not too particular to cover every detail of the selected behavior or structure, but still not too general to fail distinguishing main differences between individual instances of the selected behavior or structure (Burkhart et al., 2011). For instance, Massa et al. (2017) note that the business model canvas offers a scaled-down representation of a generic business model, which only considers a set of critical components. Others note that the canvas can mix different levels of abstraction, as different components may not be presented at the same level (Ching & Fauvel, 2013).

The notion that the canvas provides an intermediate level of abstraction emphasizes the relationship between the canvas and its users through visual thinking (Cavalcante et al., 2011). As canvases provide simplified

abstractions, visual thinking is considered indispensable to generate useful imagery about the selected behavior or structure (Täuscher & Abdelkafi, 2017).

Unlike theories, which utilize clear and coherent mechanisms to build theoretical constructs about a phenomenon (Shepherd & Suddaby, 2017), or models, which formally predict the structure and behavior of things (Wand & Weber, 1990), canvases work with abstract principles (Cavalcante et al., 2011). For instance, the business model canvas defines principles for each canvas component, e.g., value propositions concern a bundle of products and services, represent value for customers, and are based on organizational capabilities (Osterwalder, 2004). This kind of theorization around principles offers a frame of reference (architecture) for analyzing the selected behavior or structure (Wirtz et al., 2016).

The intermediate level of abstraction that is characteristic of most canvases has been criticized for not making the relationships between the canvas components explicit, e.g., articulating causes and effects or dependencies between activities (Cosenz, 2017). On the other hand, by not making the relationships explicit, users have more flexibility to use the canvas in different ways, for different purposes, and in different contexts (Baden-Fuller & Morgan, 2010; Fielt, 2013). Several researchers highlight a variety of purposes associated to canvas usage, such as strategizing, design and value creation (Achtenhagen et al., 2013; Carter & Carter, 2020; Ojasalo & Ojasalo, 2018).

## **4.2 Static and dynamic views of the canvas**

An important distinction brought by the systems theoretical perspective is that it makes sense of the selected behavior or structure in terms of statics and dynamics (Burton-Jones et al., 2015). Statics concerns the decomposition of a selected behavior or structure in wholes/parts, while dynamics captures how changes affect the whole/parts (Demil & Lecocq, 2010).

Regarding statics, a key concern is defining appropriate components and implicit relationships to represent the selected behavior or structure (Fielt, 2013). Several criteria have been identified to define canvas components and implicit relationships: classification of underlying literature; comprehension of relationships between concepts and action; purpose for using the canvas; representation and suggested points of view; and representation of constitutive components (Burkhart et al., 2011): The approach adopted by Osterwalder (2004) to define the business model canvas consists in reviewing the literature related to business models, and then defining an ontological view “aiming at improving understanding, communication and flexibility” (Osterwalder, 2004, p. 41). This ontology-based approach has been adopted to build other canvases (Eisape, 2019; Lauff et al., 2019; Ojasalo & Ojasalo, 2018; Wirtz et al., 2016).

Researchers have also been characterizing the dynamic aspect of the canvas, considering in particular two types of changes that users accomplish with the canvas: reconfiguration, where changes in a component lead to changes in other components (Berends et al., 2016); and redesign, where users move from an existing canvas to a new one (Cavalcante, 2014; Cavalcante et al., 2011). Researchers have also pointed out that the canvas can also help identify emergent changes in the selected behavior or structure and surrounding environment, which affect an existing representation (Demil & Lecocq, 2010).

Most canvases do not explicitly provide means to visually express changes, even though users are expected to deal with changes on a regular basis (Cosenz, 2017). However, a canvas can form the basis of effective communication about the impacts of change. For instance, causal and temporal maps can be overlaid on the canvas to point out changes, or even map reconfigurations and re-designs (Cosenz, 2017; Cosenz & Noto, 2018; Fritscher & Pigneur, 2014, 2015; Remane et al., 2016). The use of temporal diagrams to overview component changes over multiple iterations has already been used with business models and can be adapted for use with the canvas (Remane et al., 2016). The relatively lightweight nature of the canvas as a means of expression allows multiple alternatives to be explored by users, if this is required in an uncertain and dynamic environment.

## **4.3 Balance as an emergent property of the canvas**

General systems theorists suggest that systems should promote balance (or dynamic equilibrium) where the parts of the system mutually adapt to changes to reduce entropy (Chatterjee et al., 2020). In our context, balance is an emergent property of the canvas, which expresses the notion that the canvas is required to realign the overall logical structure after changes have been introduced in some parts (Fritscher & Pigneur,

2015). For instance, considering the business model canvas as an example, a change in key activities may trigger a change in key resources, which in turn may trigger a change in the cost structure, or new key partners. From a static perspective, there may be no value in representing these ripples. However, for the canvas users it may be valuable to regard the canvas from a dynamic perspective, where managing emergence, reconfigurations and redesigns is an essential aspect of value generation.

Re-aligning a canvas is associated with leaps and drifts. A drift involves reconceptualizing an existing logical structure through active exploration, and a leap involves creating a new conceptualization and integrating it with the existing logical structure (Berends et al., 2016).

Interestingly, some researchers argue that the canvas is in permanent instability. According to this view, the main purpose of the canvas is not reaching balance but instead to continuously track the selected behavior or structure and its environment to find and highlight occurrences that impact the canvas, and then adapting the canvas to the new reality (Fritscher & Pigneur, 2015).

#### 4.4 Framework for canvas design

We now organize the various points discussed above into an integrated framework for canvas design, which regards the canvas according to two levels: surface and deep (Figure 2).

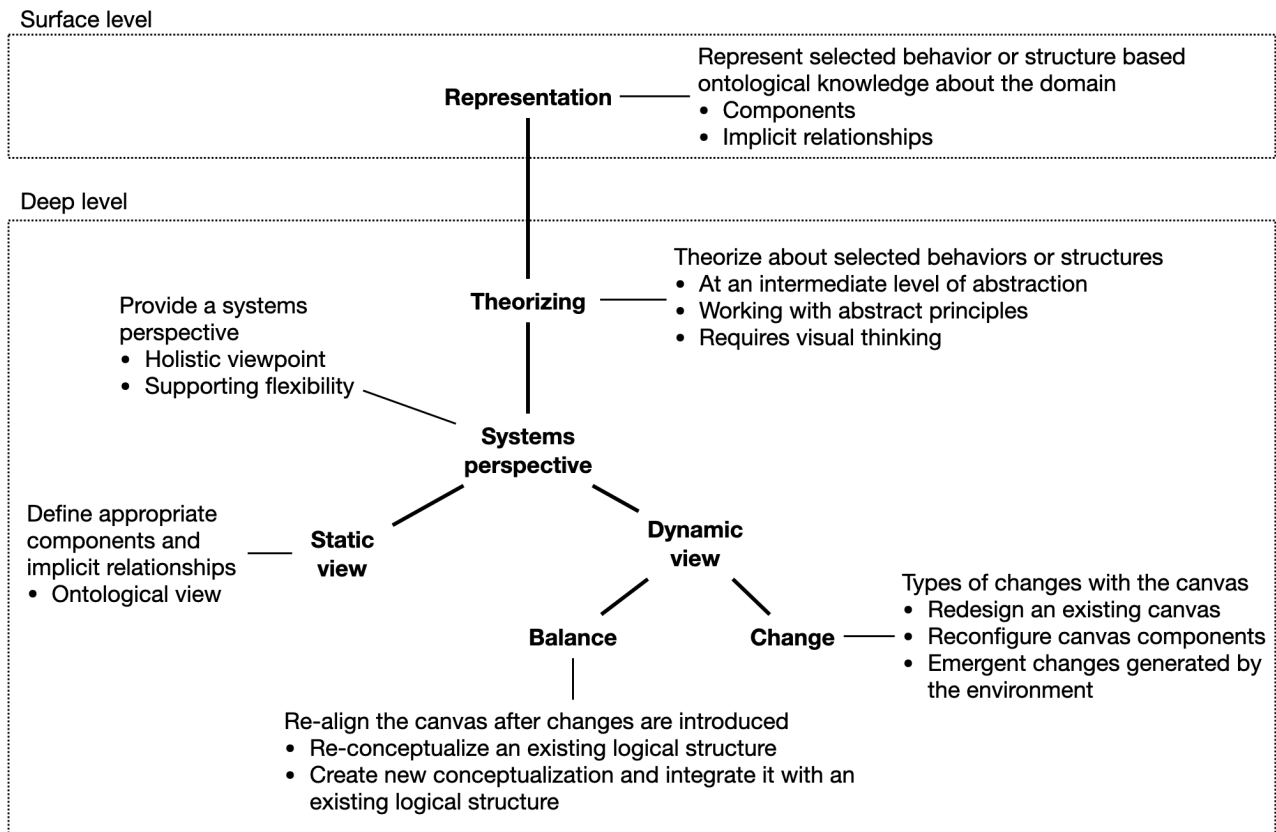


Figure 2. Framework for canvas design

On the surface (Figure 2, top), the canvas is focused on representing selected behavior or structure, which is accomplished using a set of components and implicit relationships that reflect ontological knowledge about the domain. At the deep level (Figure 2, bottom), we find that the main goal is theorizing about the selected behavior or structure.

Theorizing is accomplished at an intermediate level of abstraction, where the designer works out a set of abstract principles. For instance, the service logic business model canvas captures the principle of service logic, which gives primacy to value co-creation between customer and provider (rather than just selling products) (Ojasalo & Ojasalo, 2018).

Theorizing requires visual thinking. The main goal is combining abstract principles with tacit knowledge to make plausible interpretations about the selected behavior or structure. This makes theorizing with the canvas an emergent, action-oriented experience. For instance, users of the platform business model canvas engage with the artifact by asking questions about who are the key users, what are the pains and access barriers for the users, etc. (Eisape, 2019). Theorizing is supported by the systems theoretical perspective. The systems theoretical perspective is characterized by creating a holistic viewpoint of the selected behavior or structure and giving flexibility to the canvas users.

The systems perspective comprehends static and dynamic views. The static view involves the definition of an appropriate ontology about the selected behavior or structure and its domain, while the dynamic view addresses changes and balance. Changes can emerge from two different sources: the environment, and the users. Changes driven by users concern the reconfiguration and redesign of the canvas. Changes driven by the environment reflect emergence.

The dynamic view also involves balancing the canvas after the occurrence of changes. Balance is accomplished either by re-conceptualizing existing logical structures or creating new conceptualizations and integrating them with existing logical structured. More specifically, the canvas is balanced by reconceptualizing principles and/or creating new principles about the selected behavior or structure.

Overall, this framework provides a detailed characterization of the canvas using two conceptual levels. On the surface, the main concern is representing the selected behavior or structure, while at the deep level the concern is theorizing about the selected behavior or structure.

This framework can be applied in various cases including the support to canvas design or redesign, canvas analysis, and canvas use. Next, we apply the framework to canvas analysis with the purpose to demonstrate its applicability.

## **5 Use Case: Canvas Analysis**

The selected case study concerns the research contribution canvas (Gregor, 2017). This case was selected because it concerns a domain (IS) familiar to the researchers and is quite distinct from the business model canvas. Furthermore, the design of the research contribution canvas is explained in detail by Gregor (2017), which helps grounding the analysis on factual assertions.

### **5.1 Representation**

The research contribution canvas identifies five components of a research contribution (Figure 3, right): 1) introduction, which is divided in problem, importance and goals; 2) theoretical background; 3) empirical study, divided in method and results; 4) contribution, divided in theoretical and practical; and 5) interestingness. The selection of components is extensively justified by ontological knowledge about the domain (Figure 3, left). The ontological knowledge was put together through the literature review method, which answered the question “what is theory” and analyzed the theorizing process. Several perspectives on theory, theory types, theorizing contexts, and dimensions and stages in theorizing are discussed and integrated by Gregor (2017), and serve as a foundation for canvas design.

The research contribution canvas reflects a high-level, principle-based conceptualization of research, which operates “as an aid and should not be used too prescriptively” (Gregor, 2017, p. 65). For instance, one important abstract principle that is imprinted in the canvas is that theorizing encompasses four stages, from introduction to theoretical background, empirical study, and contribution (noted in Figure 3 using numbers).

A unique aspect of the canvas design is that it has been tested in workshops with researchers, which resulted in several iterative developments.



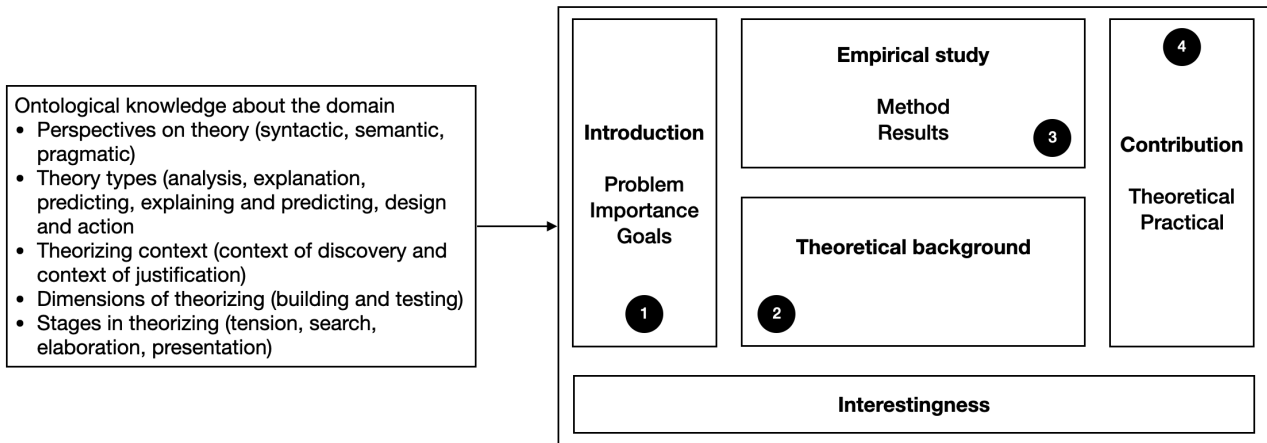


Figure 3. The research contribution canvas design, based on Gregor (2017)

As with other canvases, the research contribution canvas has a set of implicit relationships. They reflect the logical structure of research (Popper, 1980), which starts with a research problem, considers the theoretical background, designs the empirical study, and finishes with research contributions. To this logical structure, Gregor (2017) adds one final element, which completes the story and concerns the demonstration of interestingness (the “so what” question). Gregor (2017) also notes another implicit relationship, as the statement of contribution should link back to the theoretical background, underscoring what has been added to the body of knowledge.

This characterization of components and implicit relationships defines the canvas at the surface level. Next, we analyze the canvas at the deep level.

## 5.2 Theorizing

The research contribution canvas characterizes “what constitutes theory and how theorizing occurs” and explains how “one has made a contribution to theory” (Gregor, 2017, p. 58). The foundation is ontological knowledge about the theorizing process: the process by which scientific theories are developed. Even though Gregor (2017, p. 62) recognizes “there are divergent views on how theorizing should occur”, the research contribution canvas highlights a common set of principles (Figure 4).

The research contribution canvas allows, but also requires, researchers to visually think about their work, using an intermediate abstraction, “a tool developed by the author that researchers can use when preparing an article for publication” (Gregor, 2017, p. 65). The canvas helps to “state clearly what theory you have contributed to and how you have done this” (Gregor, 2017, p. 58). The canvas “can be revised as ideas mature and change” (Gregor, 2017, p. 65), therefore supporting and ongoing process, which involves reciprocal exchanges between the researchers and their research environments.

Gregor (2017, p. 65) notes the research contribution canvas is different from other artifacts that can be used to structure research: “the canvas is different because of its graphical form”. The canvas “is used as a basis for depicting theorizing processes as complex, but with recognizable stages of tension/phenomena, search, elaboration/research and proclamation/presentation” (Gregor, 2017, p. 69).

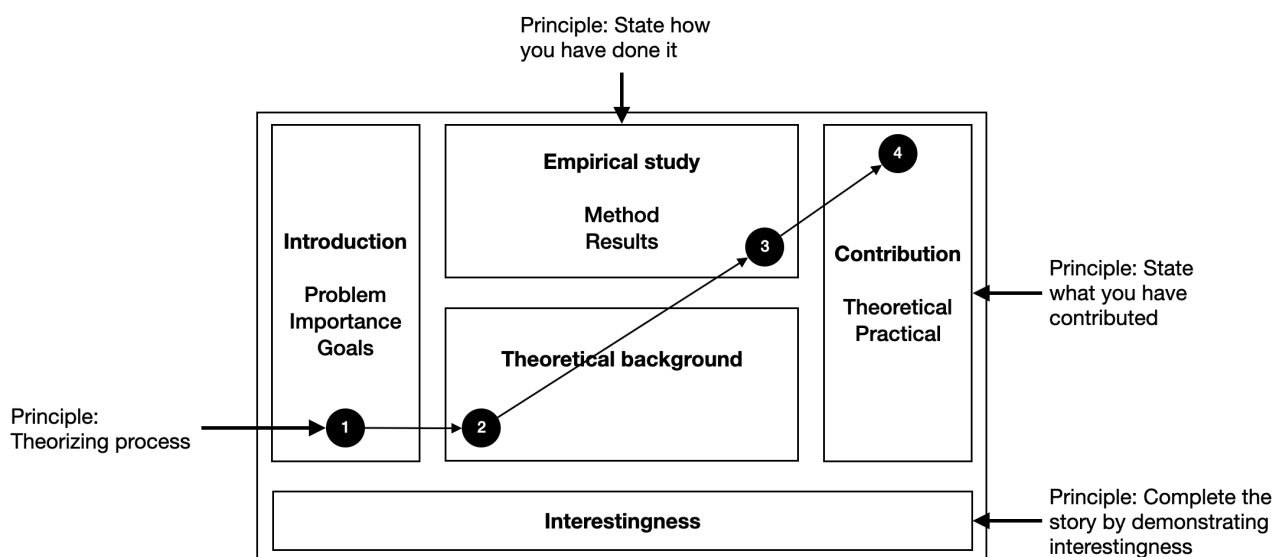


Figure 4. Principles underlying the research contribution canvas design

### 5.3 Systems perspective

Regarding the systems perspective, the research contribution canvas characterizes “what constitutes theory and how theorizing occurs” and explains how “one has made a contribution to theory” (Gregor, 2017, p. 58). This is accomplished through a holistic representation of research. Gregor alludes to this holistic representation, noting “[t]he point of preparing the canvas is to expose the underlying argument in an article at a high-level, so one can separate ‘the wood from the trees’” (Gregor, 2017, p. 65). The flexibility aspect of the canvas is also noted: “[c]urrent thinking suggests that a pragmatic perspective on theory is appropriate, where different kinds of theories are recognized as being used depending on the purposes of researchers” (Gregor, 2017, p. 69).

### 5.4 Static and dynamic views

The research contribution canvas provides a static view over research, which defines a set of ontological components and relationships underlying scientific knowledge. This static view corresponds to what Popper (1972, p. 14) designates as “products of thought-processes” in the scientific domain. They stand in logical relationships. However, Popper (1972) also highlights the importance of the mental experience, or thought-processes, of the researcher that produces theory. These thought-processes involve the exploration of mental states, tentative theories, and new problems, which may emerge throughout the research (Popper, 1972).

Besides the static view, the research contribution canvas also supports a dynamic view of research, as researchers explore emergent problems, adjust methods and explore tentative contributions. The dynamics of research is characterized by the emergence of problems, goals and potential contributions to research. For instance, the empirical study may be redesigned or reconfigured to increase interestingness (Figure 4). Gregor (2017, p. 62) characterizes the theorizing process as dynamic and involving the “context of discovery” (thought-process) and the “context of justification” (product of thought-process), or theory building and theory testing. Considering this background, the research contribution canvas has to be understood as both a static artifact representing the logic of research, and a dynamic artifact supporting “an iterative process of imagination, initial hypothesizing, testing and data gathering until a researcher believes that a new theory provides a reasonable account for what is observed” (Gregor, 2017, p. 62).

The dynamic view also involves balance. In the case of demonstrating research contributions, balance requires aligning the mental experience (thought-process) with the contribution to theory (the product of the thought-process). Gregor (2017, p. 65) identifies one particular element of balance in the research contribution canvas, which was missing in the first design iteration: one should be able to link the contribution back to the theoretical background “to indicate exactly what theory has been contributed to and how”. The motivation for this redesign was a personal experience of a journal article rejection, “which, in hindsight was warranted because of a failure to make this link explicit” (Gregor, 2017, p. 65).

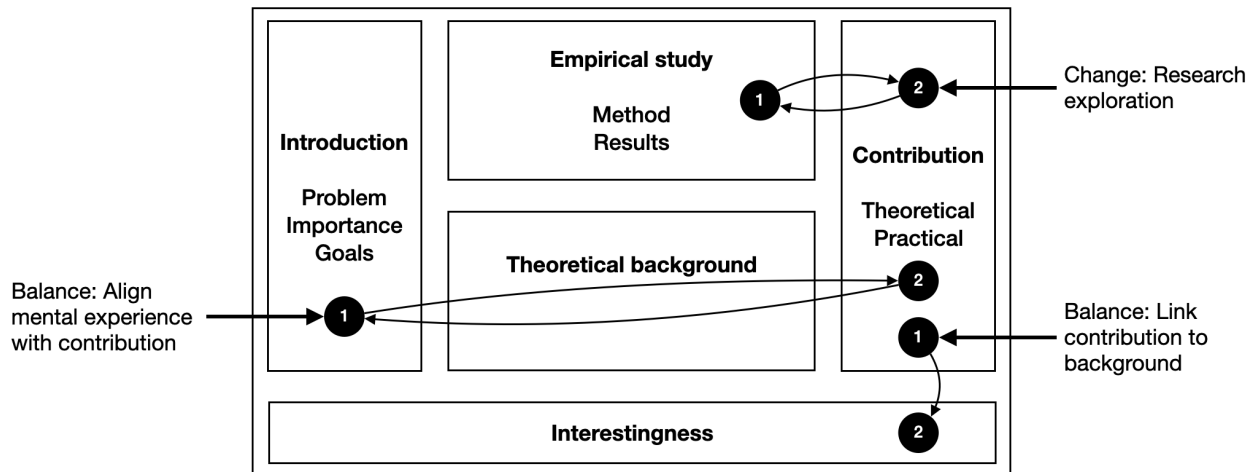


Figure 4. Change and balance in the research contribution canvas design

## 5.5 Case summary

Overall, the research contribution canvas provides an outstanding example of canvas design covering the surface and deep levels of canvas design. The surface level covers the critical components and implicit relationships of research contributions. The deep level covers theorizing, considering the systems theoretical perspective, including static and dynamic views over research contributions. At the deep level, we find assertions that justify fundamental design decisions. Proper integration of assertions at the two levels reinforces the canvas design and its understanding. In fact, Gregor (2017) provides an excellent template for canvas design, which can be used by researchers seeking to design other canvases. Many insights offered in the specific domain where the research contribution canvas has been developed can be translated to other domains, with support from our framework.

## 6 Discussion

Having illustrated how a particular canvas can be analyzed using our framework, we now discuss some implications.

Our framework is flexible in how it supports canvas design. In particular, we detach the canvas from its business model heritage. This contributes to recognize the canvas as a domain-independent artifact, which can be developed in various domains to represent a variety of behaviors and structures using a systems theoretical perspective.

We acknowledge the uniqueness that is implied in the characterization of a new class of artefact, which is represented by the canvas. Our framework provides a simple, yet theoretically sound, characterization of the canvas, which allows researchers to design theoretically grounded and conceptually coherent canvases.

Another relevant aspect of our framework is that, instead of eliminating design complexity through prescription, it embraces and exposes the underlying, intricate design rationale. This is done by separating the canvas design in two levels, surface and deep. At the deep level, the adoption of a systems theoretical perspective, by its own nature, also contributes to characterize complex behaviors and structures, as it brings static and dynamic views to canvas design.

The dynamic view, in combination with the related notions of change and balance, represent a unique aspect of the framework. Dynamics has already been investigated in regard to business models in general and the business model canvas in particular. However, the canvas dynamics has not been analyzed from a domain-independent viewpoint. This research contributes foundational knowledge on how to conceptualize the canvas dynamics, which involves two steps, the first introducing changes and the second balancing the canvas to re-align new and existing logical structures. Elaborating and visualizing different versions or revisions of the canvas has already been recognized as an important dynamic aspect of canvas use (Ojasalo & Ojasalo, 2018; Zolnowski et al., 2014). However, existing approaches lack a conceptual foundation (e.g., Vom Brocke & Maedche, 2019; Zolnowski et al., 2014). Our consideration for change and balance offers

such a foundation. Nevertheless, future research is necessary to express dynamics more explicitly in the canvas.

The surface and deep levels of the canvas highlight the multifaceted nature of canvas design. The canvas not only provides a relevant representation, but it also theorizes about selected behaviors or structures. Furthermore, the two domains are interrelated. When designing a canvas, the creator, besides considering what should be represented, should also consider how it should be theorized in terms of abstract principles and abstractions. As the canvas provides a scaled-down representation, theorization also requires significant visual thinking from the canvas users. For that reason, canvas uses are emergent and action oriented.

The set of concepts identified by the framework should not be considered closed. The framework is expected to embrace new emergent properties of canvases, as they are identified by researchers; or alternatively can help identify and discuss significant contradictions and opposite views.

Instead of prescribing how to design canvases for various domains, we provide a frame of reference that facilitates the communication of canvas designs. Researchers can use the framework to align language and concepts, and to theorize about their canvas designs. We also note that multiple canvases could easily be compared to justify new additions to the knowledge base.

The main contributions of the framework include explicating a set of domain-independent concepts involved in canvas design. These explanations sensitize the researchers to discuss the underlying strategies and rationales supporting their canvas designs. No less relevant is that researchers can also use the framework to analyze if something is missing, equivocal or redundant in their canvas designs. In particular, the framework allows researchers to check the coherence of their canvases at a deep level of detail, which considers the systems theoretical perspective.

Regarding current limitations, we recognize that the systems perspective, which essentially characterizes the canvas using static and dynamic views, could be further elaborated. For instance, a relevant aspect of the systems perspective concerns the “good decomposition” of components and associated properties (Recker et al., 2019), which we do not discuss. Another aspect concerns the dependencies and interactions between system components, which we discuss in regard to change and balance, but do not consider in relation to causality (Weber, 2020). Future work could rely on the systems perspective to elaborate guidelines regarding decomposition and causality in the canvas.

We also recognize that our framework, by focusing on representation and theorizing, does not address the socio-technical aspect of the canvas. From a socio-technical perspective, the canvas is made up of representation and theorizing, plus the intellectual contributions and understandings of the canvas users. Future work could extend the framework with the socio-technical viewpoint, which would allow the canvas designers to consider the user’s experience with the canvas.

## **7 Conclusion**

In this research, we propose a framework for understanding the canvas as a domain-independent artifact. The proposed framework separates the representation and theorizing domains of the canvas. Regarding theorizing, the framework is fundamentally drawn from the systems theoretical perspective. This perspective brings a distinctive frame of understanding to the table, which concerns the conceptualization of selected behaviors or structures using static and dynamic views, where the dynamic view highlights change and balance. These distinctions foster a variety of descriptions and explanations about the canvas. We also emphasize the important role of the canvas in theorizing about selected behaviors or structures at an intermediate level of abstraction, focused on abstract principles, and requiring visual thinking, which combines tacit knowledge with abstract principles to make plausible interpretations.

By combining a variety of aspects involved in canvas design and considering the associated concepts and properties, we contribute a unique framework of understanding of the canvas. Paraphrasing Burton-Jones et al. (2015), we hope this framework will provide researchers with a new way to think about the canvas, and to design new canvases in a variety of domains.

We suggest that the framework can be used to support various activities related to canvas design, in particular theorizing, communicating, and inspecting. In that regard, the framework contributes to define language and concepts, and to establish the logical coherence of the canvas.

## 8 References

- Achtenhagen, L., Melin, L., & Naldi, L. (2013). Dynamics of business models—strategizing, critical capabilities and activities for sustained value creation. *Long Range Planning*, 46(6), 427–442.
- Amit, R., & Zott, C. (2015). Crafting business architecture: The antecedents of business model design. *Strategic Entrepreneurship Journal*, 9(4), 331–350.
- Baden-Fuller, C., & Morgan, M. (2010). Business models as models. *Long Range Planning*, 43(2–3), 156–171.
- Berends, H., Smits, A., Reymen, I., & Podoynitsyna, K. (2016). Learning while (re) configuring: Business model innovation processes in established firms. *Strategic Organization*, 14(3), 181–219.
- Beynon-Davies, P. (2018). What’s in a face? Making sense of tangible information systems in terms of Peircean semiotics. *European Journal of Information Systems*, 27(3), 295–314.
- Burkhart, T., Krumeich, J., Werth, D., & Loos, P. (2011). Analyzing the business model concept—A comprehensive classification of literature. *Thirty Second International Conference on Information Systems*.
- Burton-Jones, A., McLean, E., & Monod, E. (2015). Theoretical perspectives in IS research: From variance and process to conceptual latitude and conceptual fit. *European Journal of Information Systems*, 24(6), 664–679.
- Caetano, A., Antunes, G., Pombinho, J., Bakhshandeh, M., Granjo, J., Borbinha, J., & Da Silva, M. (2017). Representation and analysis of enterprise models with semantic techniques: An application to ArchiMate, e3value and business model canvas. *Knowledge and Information Systems*, 50(1), 315–346.
- Carter, M., & Carter, C. (2020). The Creative Business Model Canvas. *Social Enterprise Journal*, 16(2), 141–158.
- Cavalcante, S. (2014). Designing business model change. *International Journal of Innovation Management*, 18(02), 1450018.
- Cavalcante, S., Kesting, P., & Ulhøi, J. (2011). Business model dynamics and innovation:(re) establishing the missing linkages. *Management Decision*, 49(8).
- Chatterjee, S., Sarker, S., Lee, M., Xiao, X., & Elbanna, A. (2020). A possible conceptualization of the information systems (IS) artifact: A general systems theory perspective. *Information Systems Journal*. <https://doi.org/10.1111/isj.12320>
- Ching, H., & Fauvel, C. (2013). Criticisms, Variations And Experiences With Business Model Canvas. *European Journal of Agriculture and Forestry Research*, 1(2), 26–37.
- Cosenz, F. (2017). Supporting start-up business model design through system dynamics modelling. *Management Decision*, 55(1), 57–80. <https://doi.org/10.1108/MD-06-2016-0395>
- Cosenz, F., & Noto, G. (2018). A dynamic business modelling approach to design and experiment new business venture strategies. *Long Range Planning*, 51(1), 127–140.
- Daou, A., Mallat, C., Chammas, G., Cerantola, N., Kayed, S., & Saliba, N. (2020). The Ecocanvas as a business model canvas for a circular economy. *Journal of Cleaner Production*, 258, 120938.
- Demil, B., & Lecocq, X. (2010). Business model evolution: In search of dynamic consistency. *Long Range Planning*, 43(2–3), 227–246.
- Demil, B., & Lecocq, X. (2015). Crafting an innovative business model in an established company: The role of artifacts. In *Business models and modelling* (Vol. 33, pp. 31–58). Emerald Group Publishing Limited.
- Eisape, D. (2019). The Platform Business Model Canvas a Proposition in a Design Science Approach. *American Journal of Management Science and Engineering*, 4(6), 91–107.
- Fielt, E. (2013). Conceptualising business models: Definitions, frameworks and classifications. *Journal of Business Models*, 1(1), 85–105.

- Fritscher, B., & Pigneur, Y. (2014). Visualizing business model evolution with the business model canvas: Concept and tool. *2014 IEEE 16th Conference on Business Informatics, 1*, 151–158.
- Fritscher, B., & Pigneur, Y. (2015). Extending the business model canvas: A dynamic perspective. *Proceedings of the Fifth International Symposium on Business Modeling and Software Design*, 86–96.
- George, G., & Bock, A. (2011). The business model in practice and its implications for entrepreneurship research. *Entrepreneurship Theory and Practice*, 35(1), 83–111.
- Green, T., Blandford, A., Church, L., Roast, C., & Clarke, S. (2006). Cognitive dimensions: Achievements, new directions, and open questions. *Journal of Visual Languages & Computing*, 17(4), 328–365.
- Gregor, S. (2017). On Theory. In *The Routledge companion to management information systems*. Routledge.
- Gregor, S., & Jones, D. (2007). The Anatomy of a Design Theory. *Journal of the Association of Information Systems*, 8(5), 312–335.
- Hassan, N., Mathiassen, L., & Lowry, P. (2019). The process of information systems theorizing as a discursive practice. *Journal of Information Technology*, 34(3), 198–220.
- Hevner, A., March, S., Park, J., & Ram, S. (2004). Design Science in Information Systems Research. *MIS Quarterly*, 28(1), 75–105.
- Jarzabkowski, P., & Kaplan, S. (2015). Strategy tools-in-use: A framework for understanding “technologies of rationality” in practice. *Strategic Management Journal*, 36(4), 537–558.
- John, P., Gregor, S., & Sun, R. (2016). A Research Engagement Canvas to facilitate University-Industry Collaboration. *ISPIM Conference Proceedings*, 1.
- John, T., & Szopinski, D. (2018). Towards explaining the popularity of the business model canvas: A dual coding approach. *Multikonferenz Wirtschaftsinformatik 2018*, 1509–1515.
- Lauff, C., Menold, J., & Wood, K. (2019). Prototyping canvas: Design tool for planning purposeful prototypes. *Proceedings of the Design Society: International Conference on Engineering Design, 1*, 1563–1572.
- Martins, L., Rindova, V., & Greenbaum, B. (2015). Unlocking the hidden value of concepts: A cognitive approach to business model innovation. *Strategic Entrepreneurship Journal*, 9(1), 99–117.
- Massa, L., Tucci, C., & Afuah, A. (2017). A critical assessment of business model research. *Academy of Management Annals*, 11(1), 73–104.
- Niederman, F. (2021). Process Theory: Background, Opportunity, and Challenges. *Foundations and Trends in Information Systems*, 5(1–2), 1–230. <https://doi.org/10.1561/29000000017>
- Ojasalo, J., & Ojasalo, K. (2018). Service logic business model canvas. *Journal of Research in Marketing and Entrepreneurship*, 20(1), 70–98. <https://doi.org/10.1108/JRME-06-2016-0015>
- Osterwalder, A. (2004). *The business model ontology a proposition in a design science approach* [PhD Thesis]. Université de Lausanne, Faculté des hautes études commerciales.
- Osterwalder, A., & Pigneur, Y. (2010). *Business model generation: A handbook for visionaries, game changers, and challengers*. John Wiley & Sons.
- Osterwalder, A., Pigneur, Y., & Tucci, C. (2005). Clarifying business models: Origins, present, and future of the concept. *Communications of the Association for Information Systems*, 16(1), 1.
- Pianesi, A. (2019). Design Thinking plus Adaptive Leadership: Leading Organizational Change with the Change Canvas. *Organization Development Journal*, 37(3), 45–58.
- Popper, K. (1972). *Objective knowledge* (Vol. 360). Oxford University Press.
- Popper, K. (1980). *The Logic of Scientific Discovery*. Unwin Hyman.

- Recker, J., Indulska, M., Green, P., Burton-Jones, A., & Weber, R. (2019). Information Systems as Representations: A Review of the Theory and Evidence. *Journal of the Association for Information Systems*, 20(6), 5.
- Recker, J., Indulska, M., Rosemann, M., & Green, P. (2010). The ontological deficiencies of process modeling in practice. *European Journal of Information Systems*, 19, 501–525.
- Remane, G., Nickerson, R., Hanelt, A., Tesch, J., & Kolbe, L. (2016). *A taxonomy of carsharing business models*. Thirty Seventh International Conference on Information Systems, Dublin.
- Shepherd, D., & Suddaby, R. (2017). Theory building: A review and integration. *Journal of Management*, 43(1), 59–86.
- Sparviero, S. (2019). The case for a socially oriented business model canvas: The social enterprise model canvas. *Journal of Social Entrepreneurship*, 10(2), 232–251.
- Strulak-Wójcikiewicz, R., Wagner, N., Lapko, A., & Hącia, E. (2020). Applying the Business Model Canvas to Design the E-platform for Sailing Tourism. *Procedia Computer Science*, 176, 1643–1651.
- Täuscher, K., & Abdelkafi, N. (2017). Visual tools for business model innovation: Recommendations from a cognitive perspective. *Creativity and Innovation Management*, 26(2), 160–174.
- Van Waes, A., Farla, J., Frenken, K., de Jong, J., & Raven, R. (2018). Business model innovation and socio-technical transitions. A new prospective framework with an application to bike sharing. *Journal of Cleaner Production*, 195, 1300–1312.
- Vom Brocke, J., & Maedche, A. (2019). The DSR grid: Six core dimensions for effectively planning and communicating design science research projects. *Electronic Markets*, 29(3), 379–385.
- Wand, Y., & Weber, R. (1990). Toward a theory of the deep structure of information systems. *International Conference on Information Systems*, 3.
- Weber, R. (2020). Taking the ontological and materialist turns: Agential realism, representation theory, and accounting information systems. *International Journal of Accounting Information Systems*, 39, 100485.
- Weick, K. (1989). Theory construction as disciplined imagination. *Academy of Management Review*, 14(4), 516–531.
- Weick, K. (1995). What theory is not, theorizing is. *Administrative Science Quarterly*, 40(3), 385–390.
- Wirtz, B., Pistoia, A., Ullrich, S., & Göttel, V. (2016). Business models: Origin, development and future research perspectives. *Long Range Planning*, 49(1), 36–54.
- Zolnowski, A., Weiß, C., & Böhmman, T. (2014). *Representing service business models with the service business model canvas—the case of a mobile payment service in the retail industry*. 718–727.