A SYSTEM PERSPECTIVE ON BUSINESS MODELS

by

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This dissertation is dedicated to my family, Jingjing Li, Ping Feng, Shoucheng Liu, and Mirabella

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ABSTRACT

The business model concept was first introduced in the early 1990s alongside the boom of the Internet. Although the Internet bubble has burst, the popularity of the business model concept continues to increase. It is being used more and more often by not just people in business management, but also the general population, as people, for example, talk about a successful start-up. Although it has become part of the vernacular today, the business model concept itself is lacking in theoretical roots. Thus, a gap exists regarding the business model concept. Its usefulness in practice has been proven in numerous business cases, yet academia remains divided on the definition and appropriate means to use the concept. A thorough literature review reveals that the concept of a business model has been framed in various ways, ranging from the strategic logic of a company to the activities a company performs. This misalignment creates barriers for the advancement of this body of knowledge in both research and practice. Researchers have thus called for a clearer and more operational definition of the concept.

With this goal in mind, this qualitative study sought to advance business model understanding by proposing a business model conceptualization that:

1) Is robust in its theoretical roots and informs the critical characteristics of a business model,

2) Highlights potential means to resolve the debate over the definition of a business model through examination of its broad range of conceptualizations and uses, and,

3) Guides business model design through a robust exploration of design options for users interested in business model development.

To achieve this goal, a three-stream study was conducted.

The first stream focused on creating a business model construct that is rooted in advanced system theory and on proposing a related business model framework. This objective was achieved through a combination of scholarship of integration and thematic analysis. A resilient complex adaptive system (RCAS) perspective was taken to proactively construct a business model conceptualization. To fully understand an RCAS, a literature review was carried out on the notion of systems. Theories from general system theory (GST) to an RCAS were examined to form a full understanding of these foundational concepts. The resulting construct was employed as the

underlying structure of a business model framework. To create a set of functions that a business model should include, an extensive literature review was conducted on 150 business model research articles. Thematic analysis was employed to analyze words and phrases used by authors to describe the critical components of a business model, and then aggregate these views into a set of mutually supportive functions that represent the essence of a business model. Eight functions, termed "elemental functions", centered on value were defined. These elemental functions are able to capture all components identified in the studied literature and collectively display required RCAS characteristics. This RCAS business model framework lays the foundation for a unified landscape of business model conceptualization and acts as a potential universal language in this body of knowledge. The developed framework also serves as the basis for the subsequent lines of work detailed below, and grounds both further research and application.

The second stream is based on the RCAS framework and draws on its ability to facilitate abstraction. The work stream focuses on outlining a knowledge space for business models utilizing three variables that are closely tied to abstraction in the business model context, namely: elemental functions, purposes, and levels of abstraction. These variables were identified as critical factors influencing business model variation from both a literature perspective and observations. A thematic analysis was conducted on the same 150 articles as in the first stream to extract the potential states of these variables. Eleven purposes and five levels of abstraction were identified; and these two variables act as the axes of the knowledge space. Elemental functions were incorporated in the knowledge space to illustrate the frequency with which each elemental function is used for specific purposes and specific levels of abstraction. This knowledge space, herein termed the business model knowledge map, can be used to position existing work and identify future opportunities for research. The 150 articles were positioned in this space to outline a grander picture of the business model concept. It highlights that previous authors in the business model area have worked on abstractions of the same concept. This stream is another step towards a universal landscape of business model conceptualization that could help unify previously diverse views of business models.

The last work stream contributes to the design of business models – one of the key purposes for which business model constructs are employed as highlighted in the knowledge map described above. Specifically, this work stream puts forward a system-inspired business model design method. Building directly on the RCAS framework, this stream employs combinatorial design

thinking from engineering and design to create a design method. One of the most critical aspects of this design method is its emphasis on creating a complete, to the extent possible, set of design options for each elemental function that composes a business model. To achieve this, an extensive review of over 200 company annual reports was conducted to generate design options for each elemental function. This design method focuses on raising awareness of one's design options thereby enhancing the potential for business model innovation.

Collectively, this study advances the business model body of knowledge in both research and practice. The study is unique in its proactive employment of the RCAS construct to define a business model, its focus on abstraction to form a theoretically robust and potentially universal landscape for knowledge and research on business models, and its proposition of a structured approach to complete business model design. It is hoped that the developments outlined herein help pave a path to a more unified view of business model concepts that can foster connections between the work of researchers who employ business model constructs and further advance the state of knowledge in this arena.

1. INTRODUCTION

1.1 Importance of the Study of Business Models

"Strategy has been the primary building block of competitiveness over the past three decades, but in the future, the quest for sustainable advantage may well begin with the business model", noted Casadesus-Masanell and Ricart (2011). The phrase "business model" is becoming part of the vernacular well beyond the world of business. It is common for people to refer to the business model of a company when they talk about it. Some business models, such as Dell's direct sale, Xerox's leasing, and Amazon's online market place, have helped companies become titans in their industry and influence other companies. Designs of business models even extend beyond their original industries to others. Classic examples include Gillette's razor model, which can be spotted in coffee makers and even video gaming industries embodied by micro-transactions. It is safe to say, and most scholars would agree, that a strong business model is a necessary foundational element of any successful business. As noted by Chesbrough (2007), "every company has a business model, whether they articulate it or not". Any organization or start-up needs a business model to survive, and as shown in the examples above, a few will flourish with unique business models. It is also interesting and powerful that the business model concept does not only determine the basics of a business's logic, but it also provides avenues for innovation.

Different from product innovation or technological innovation, business model innovation is a way of re-organizing or reconfiguring a company's approach to conducting business to seize new opportunities. There need not be a new product or technology, just a new way to conduct business activities. Xerox is a good example of this type of innovation. The model 914 copier was not a revolutionary machine and was even turned down by many companies including Kodak and GE when Xerox approached them with a marketing partnership proposal. However, with its bold leasing model, it became a huge success and shaped Xerox to be the company it is today. Business model innovations explore new ways of doing business and thus of gaining a competitive advantage.

If a business model is crucial not only to a company's survival but also its success, it is then important to have a clear understanding of the model and its related aspects. With the potential to generate profits and raise a company to a different level than its competitors, a business model

should be a unit of analysis and point of consideration to business leaders. Managers and executives need to have a full grasp of the business model concept before they can successfully apply it to analyze and innovate their own company's business models.

1.2 Challenges to Business Model Studies

The notion of a business model– that is what it is and what it represents–has been a focus of great debate since the concept was first introduced in the 1990s. Many authors have highlighted disagreements and discrepancies in the definition of a business model. Notably, Morris, Schindehutte, and Allen (2005) called out that "no consensus exists regarding the definition, nature, structure, and evolution of business models". In the work of Zott, Amit, and Massa (2011) where a broad and multifaceted literature review was provided, they "reveal that scholars do not agree on what a business model is". Common terminologies used to define a business model include "statement", "description", "representation", "architecture", among others. What might be more surprising is that the review shows that "a business model was often studied without explicitly defining the concept". One third of the articles reviewed did not define the concept. Less than half defined it by enumerating its components, and the remaining publications adopted others' definitions. More recently, Massa, Tucci, and Afuah (2017) reached the same conclusion in their review of business model literature that "there is a lack of agreement among scholars on more operational definitions of a business model". Three interpretations emerged from their review: business models as attributes of real firms, business models as cognitive/linguistic schema, and business models as formal conceptual representations/descriptions. Both literature reviews raised the concern that the lack of definitional clarity represented a source of confusion. It is believed that the discrepancies on business model conceptualizations are products of a more fundamental problem than people simply using different words. They result from the absence of a unifying theoretical construct underlying the idea of a business model. This hinders the progression of research as much effort is spent on debating and hoping to reach a consensus. Subsequent studies are delayed because they rely on the root understanding of the concept. The varied representations also create roadblocks to application since it is difficult for practitioners to adopt the best definition. Therefore, creating an understanding that is both rigorous with theoretical roots and has the ability to pave a unifying landscape of the concept has the potential to be impactful. A clear theoretical foundation offers the potential to unify the language and mental model of the business model

concept. It informs critical characteristics. And it adds rigor and confidence to practice. These needs for overall business model studies lead to the hypotheses and research questions of this research.

1.3 Hypotheses and Research Questions

The challenges in existing literature draw out two overarching research questions: 1) Is there a universal way to define a business model and if there is, what is the definition? And 2) What should a structured business model design approach be like? These questions follow the same chain of logic as the understanding and application of a business model, the understanding and application of any concept actually – what it is, how do we make it, and what do we do with it. Therefore, there is both a conceptual side and a design side of this study. The conceptual understanding will explore the following detailed research questions:

- Is there a unifying theoretical foundation for business models?
- Is there a set of complete business model components?
- What is a more comprehensive way to define a business model?
- Why are there so many differences in business model conceptualizations?
- Is there a way to reconcile between these debates?
- Is there a way to build a universal language for advancement of knowledge on business models?
- How can researchers navigate through business model literature more easily?
- How can researchers better position their work?

In a similar fashion, the design side will try to answer the following:

- What are the procedures to design a business model?
- What are the options for designing each elemental function?
- What exactly is being designed?

To address the research questions presented above, advance the body of knowledge, and create a theoretically rooted understanding of a business model, a general hypothesis is put forward: A conceptualization of a business model based on system theories will provide effective language

and a strong frame to advance the application of the concept. This overarching hypothesis responds to the lack of a unifying theoretical foundation underpinning the debate over business model conceptualization. To help test and support this overarching hypothesis, several more specific hypotheses are proposed:

- A business model constructed as a resilient complex adaptive system (RCAS) will inform a more comprehensive and complete conceptualization.
- The RCAS framework, with its ability to be abstracted, provides resolution to the debate and can create a knowledge space for researchers to position their work and navigate the body of knowledge.
- Elemental functions, levels of abstraction, and purposes are three factors that determine abstraction of a business model.
- A business model design method based on engineering design principles and inspired by system theories will provide a strong guideline to facilitate business model design.

These hypotheses will be explained in detail in the following chapters. In general, the first specific hypothesis responds to what should be the underlying theoretical construct of a business model. The second and third hypotheses address misalignment in business model conceptualizations and offer a potential solution. The last hypothesis responds to the need to add rigor in practice.

1.4 Conceptual Overview of Business Models and Business Model Design

These hypotheses are tested (and ultimately supported) through three streams of studies that are connected with each other. The three streams of studies produce three different results. These three research streams are logically ordered as: first, a conceptual model and understanding of a business model is developed. A system framework of a business model is presented. Then based on the system framework and one of its key characteristics, the second chapter, by thematically analyzing and retrieving relevant variables from previous literature, outlines a grander architecture of the business model concept and its varied studies. This architecture is presented in the form of a “space”, framed by two variables, which is termed a knowledge map in this study. Previous and future research on business models can be positioned onto this map. Third and finally, on the design side, a business model design method is developed based on the proposed system framework and combinatorial design thinking. This design method provides a structured approach

for business model design, and more importantly, generates a pool of design choices for each elemental function.

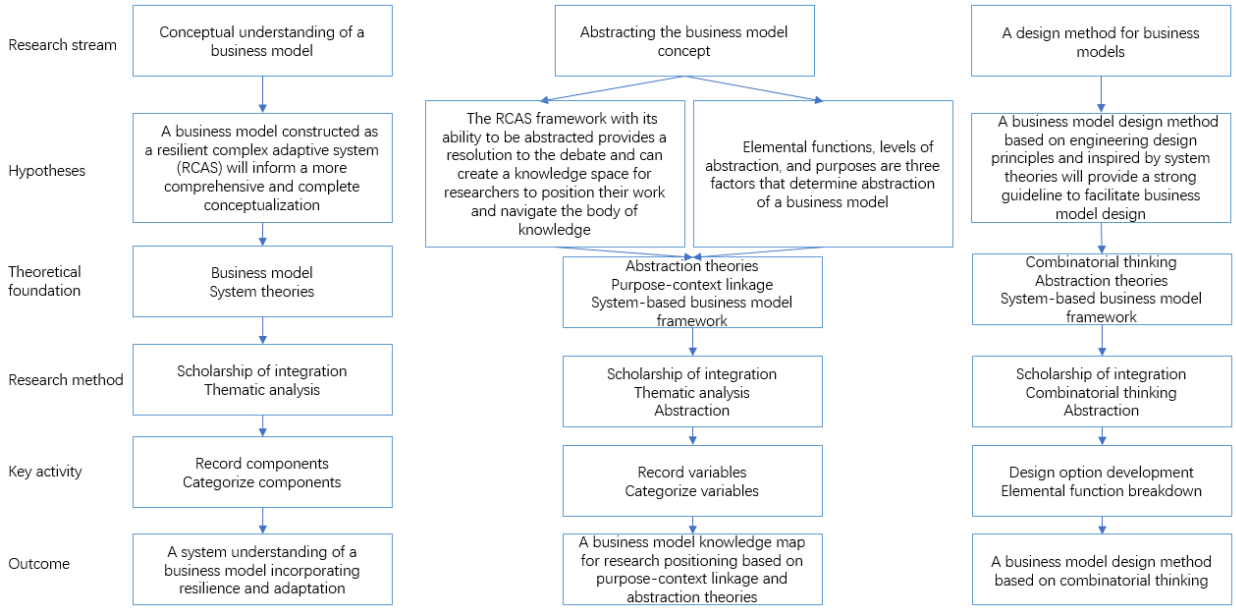


Figure 1.1. Research stream overview.

1.5 Research Methods

The main research methods employed in this study include scholarship of integration, thematic analysis, abstraction, and combinatorial design thinking. The methods are chosen to fulfill the jobs needed and goals intended for each phase of the research. Each research method is discussed in detail below.

1.5.1 Scholarship of Integration

Scholarship of integration is one of the four elements of the academic model proposed by Boyer (1990). It involves “making connections across the disciplines, placing the specialties in large context, illuminating data in a revealing way, often educating non-specialists too”. It seeks to “interpret, draw together, and bring new insight to bear on original research”. It also intends to interpret and fit one’s own research into larger intellectual patterns. It engages in identifying new insight when analyzing a collection of knowledge together rather than individually. As noted by Boyer, “those engaged in integration ask, ‘What do the findings mean? Is it possible to interpret

what's been discovered in ways that provide a larger, more comprehensive understanding?'" There are two primary foci of scholarship of integration: 1) cross-discipline cooperation; and 2) drawing insight by viewing knowledge collectively. These two foci fit with the nature of this study. Firstly, this study itself is an inter-disciplinary endeavor. Essentially, it is using system theories as tools to address a business problem guided by an engineering mindset. Secondly, with the nature of the business model concept, much of the research is qualitative, and literature review and case studies are the main sources of data and theory. Some of the main contributions of this study are built directly on extensive examination of literature and new insights derived in the process.

1.5.2 Thematic Analysis

Thematic analysis is one of the most common forms of analysis for qualitative research (Guest, 2012) and some have argued that it should be seen as a foundational method (Braun and Clarke, 2006). Simply put, thematic analysis is a method for "identifying, analyzing, and reporting patterns (themes) within a data set" (Braun and Clarke, 2006). It "moves beyond counting explicit words or phrases, as might be done in traditional text analysis, and focuses on identifying and describing both implicit and explicit ideas within the data, that is themes", often represented by codes (Guest et al., 2011). Therefore, some regard thematic analysis as a process for encoding qualitative information (Boyatzis, 1998). What is critical about thematic analysis is that it focuses not just on the words themselves, but the relations and meaning of words. By interpreting words in the data set, meanings of words are extracted, and their relations established by the selection of themes. There is no one definition of theme. For some, "themes are patterns of shared meaning across data items, underpinned by a central concept, that are important to the understanding of a phenomenon and are associated with a specific research question" (Daly et al., 1997). For others, themes are just simple summaries of information related to a particular topic. A theme is a pattern that at minimum describes and organizes the possible observations and at maximum interprets aspects of the phenomenon. Themes may be "generated both inductively from raw information or deductively from theory and prior research" (Boyatzis, 1998). With themes clearly defined according to related research question(s), construct validity can be achieved through careful examination and categorization of data using thematic analysis.

Thematic analysis, employed herein, adopts a manual approach instead of relying upon other automated data mining tools. We believe the manual approach is appropriate for this study

for several reasons. Firstly, there are limitations to current data mining tools regarding contextual nuances within a data set. Current automated data mining tools are not competent enough to interpret and take into account contexts surrounding the use of key words, which influences the categorization of elemental functions, purposes, and levels of abstraction examined in this study. As we explain in the discussion of coding tables later in the document, specifically regarding coding key words, the presence of certain key words does not automatically categorize a component into an elemental function. Having those key words only increases the probability this will happen. The correct interpretation needs to take into account the whole sentence and how words are used. As will be shown in later chapters, a business model can be deemed to include the function Manage Value. This is not easy to interpret directly. In one case, one component proposed by Bohnsack et al. (2014) is termed "purpose". When taken out of context, it can be interpreted in different ways. One may think it refers to the purpose of a firm, as in a firm's core strategy or vision, thus one may categorize it into Manage Value. However, in Bohnsack's work, "purpose" is used in a target market context and refers to the job a product/service may fulfill. It then should be categorized into Identify Value, another value function we will discuss later. Therefore, although the authors of the 150 papers all employed relatively direct language, a certain level of interpretation is still required. A manual approach ensures that context is taken into consideration. Secondly, there are broad fields of use encompassed in the literature corpus. This wide range of varied vocabulary is employed in literature. A significant number of general words are also employed in the literature, such as technology, resources, activities, processes, among others. This variety makes it difficult to readily interpret the literature autonomously using current data mining tools. Lastly, the sample size of 150 articles is not overwhelming. It is not beyond the capability of manual interpretation and thematic analysis. Combined with the two points raised above, a manual approach is pursued herein.

1.5.3 Abstraction

Abstraction (and subsequent level of abstraction) refers to a stream of theory and a research method. On the method side, abstraction is largely related to information reduction and is generally defined as a process of identifying a set of invariant central characteristics of a "thing" (Rosch et al., 1976; Schul, 1983; Vallacher & Wegner, 1987; Semin & Fiedler, 1991; Shapira et al., 2012; Burgoon et al., 2013). It is an objective-based information selection process. The notion of level

comes in as it determines how much and what type of information is selected. It reinforces the idea that abstraction operates on a continuum. Usually, levels of abstraction are ordered (totally or partially) through an abstraction-relation, i.e., one level is called more abstract than another level. "Lower levels of abstraction capture more detailed, specific, vivid, and imageable thoughts (Strack et al., 1985), while higher levels of abstraction include fewer readily observable characteristics". A more abstract level is characterized through a reduced level of detail in the representation. The process of deciding the levels of abstraction required is dependent upon the research objective as well since it governs the details that are needed. There are methodological abstractions that are based on connections of means to end, ontological abstractions which highlight varying subsystems that comprise systems, epistemological abstractions which focus on observation, or some combinations of the above. The levels of abstractions are often defined by creating a hierarchy from a high level of conceptual, functional understanding of a system, through to a medium level of logical structure, down to a lower level of actions and links that make up the system and allow it to pursue its purposes (e.g., Rasmussen, 1986; Bisantz and Vicente, 1994; Lind, 1999; Timpf, 1999; Braun and Rappl, 2002). A strong system model should facilitate levels of abstraction of the object being modeled.

1.5.4 Combinatorial Thinking

Combinatorial thinking is a mentality that is based on mathematic education and engineering design. It is considered an important skill by Levin (1998), Rezaie and Gooya (2011), Lockwood (2013), Syahputra (2016) among others and can be powerful in dealing with complex design objects where multiple interrelated components are present. It is described as a process to find alternative solutions to discrete problems and can be considered higher-order thinking that requires critical and creative thinking ability (Syahputra, 2016). A complex object often has interrelated parts that need to be designed. Combinatorial thinking first breaks down the design object into manageable small components and designs accordingly, and then re-combines these components to a complete object. The main emphasis of combinatorial design thinking is the generation of choices and the importance of knowing them during design. It was found by Sinfield et al. (2012) that despite common belief, with the right structure, the choices for designing a component in most contexts are not infinite. Possible design alternatives are generated for designers so that they are aware of their choices, thus raising the likelihood of making the best design.

The research methods outlined above will be referenced throughout the remainder of the dissertation where they are respectively applied.

1.6 Contributions of this Study of Business Models

There are three main contributions to the body of knowledge on business models resulting from this study linked to the above outlined streams of research. The first contribution is that it employs system theories, specifically a resilient complex adaptive system construct, to provide a foundational theory for a business model. Based on this theoretical foundation, an RCAS framework of a business model is presented. This framework contributes to business model conceptualization in the following ways: 1) It presents RCAS as the underlying construct which addresses the problem of the lack of a unifying theoretical foundation for business models as explained earlier; 2) By proactively employing the RCAS as the theoretical foundation of a business model, it informs overlooked properties of a business model such as resilience and the ability to facilitate abstraction of the model for different purposes of applications; 3) Based on the RCAS characteristics and an extensive literature review, the RCAS framework presents a set of elemental functions that achieves a level of completeness that has not been achieved in previous frameworks.

The second contribution of this study, which builds directly on the RCAS business model construct, is a business model knowledge map that links the purpose of using business model constructs, typical levels of abstraction employed in their description, and elemental functions utilized in respective model representations. This knowledge map provides a unified landscape for researchers to position existing research and identify potential future research opportunities. It highlights that, historically, researchers have largely been examining a fraction of the whole while defining narrow views of business models for their own work. This contributes to the potential reconciliation between the debate over business model conceptualization outlined in the earlier section. This also creates a common language for researchers thus making it easier to position their work and advance this body of knowledge.

The third contribution is to the design of business models. Despite the importance of a business model, design schemes and methods are far from robust. Existing methods are not complete enough to support systematic and structured design. In the design method proposed in this study, a business model is composed of different design options for each major elemental

function that composes the model. It contributes to the body of knowledge by both raising awareness of the need to understand possible design options and by providing them for each elemental function.

1.7 Points of Departure

There are mainly five points of departure that distinguishes this study from previous research on the topic studied. The first is that this research adopts an interdisciplinary approach and combines three distinct areas of knowledge. The main focus of this research is a business problem in nature. However, it is approached and tackled from an engineering mindset. Theories and concepts from system studies, especially the concept of an RCAS, are used as tools to address the focal challenge. In other words, this research adopts an engineering mindset and philosophy and utilizes system theories to approach a business problem. This interdisciplinary approach is valuable in that the engineering school of thought contributes a theoretical foundation in system thinking where one was previously lacking. Further, the RCAS construct is a more advanced system that informs more critical characteristics than simple system concepts, specifically General System Theory (GST) which has been pursued in the past. By adopting RCAS construct and actively building a business model as one, it ensures completeness.

The second point of departure pertains to the newly proposed business model framework. By adopting a more comprehensive RCAS construct, this research identifies key properties that have been overlooked in previous frameworks. By defining and developing a business model as an RCAS, a business model should exhibit all RCAS characteristics, which include resilience and adaptation. Then building on an extensive literature review and an RCAS-guided thematic analysis, this research identifies a set of elemental functions which not only capture all traditional business model components, but also comply to all RCAS requirements.

The third point of departure is and the focus of this work on application of the concept of abstraction. Abstraction is the hallmark of a system construct and is present in many areas including psychology, software engineering, and general problem solving. Building on abstraction and the RCAS framework that facilitates abstraction of the business model concept, this research puts forward a possible solution a long and heated debate on business model conceptualization. It argues that the historical differences and disagreements between business model conceptualizations result from the varying abstractions of the business model concept researchers

are examining rather than from more foundational misalignment. The individual conceptualizations are not wrong necessarily; they are just results from the varying abstractions they employ. And since abstractions can be subjectively chosen and thus vary, the resulting business model conceptualizations vary as well. To support this argument, a business model knowledge map is created using the three most common variables in the business model literature: purposes, levels of abstraction, and elemental functions. These three variables influence how researchers interpret a business model and the proposed map shows that existing work on business models indeed operates on different levels, answering the question as to why there are so many different definitions of the business model. More importantly, the map is an attempt to unify a debated concept and it provides a platform for scholars to communicate and position their work. If a universal understanding is reached, less effort will be spent on arguing about definitions and more can be dedicated to advance the concept.

The fourth point of departure pertains to the development of a proactive design method based on the proposed RCAS system construct for a business model. Design options for each of the elemental functions in the model are developed from in-depth review of the 10-K reports of 200 companies, yielding a relatively complete set of design options to guide business model innovators.

These options, in fact, represent the last point of departure in this work, as previous studies on business model design rarely provide design options for readers. These design options give potential users the flexibility that exists in business model design and are crucial to making the optimal design. It also supports the mentality that with a robust structure, it is possible to develop a finite number of options for a particular design element.

1.8 Organization of the Dissertation

This dissertation is organized according to the flow and logic of the three research streams. The second chapter will develop and explain the RCAS-based business model framework, which produces the foundation of the subsequent analyses. It recognizes and attempts to address the gap in current literature and the need for a unifying framework. The third chapter builds on the RCAS framework and creates a business model knowledge map based on abstraction theories and purpose-context linkage. It outlines the grander picture that is a business model and highlights how previous authors are working only on abstractions of a larger whole. The fourth chapter again builds directly on the RCAS framework and adopts combinatorial thinking to create a design

method for business models. It highlights the options that are available to designers manifested in design option matrices for each business model elemental function. The last chapter summarizes each phase and its respective contributions and impact. It also describes limitations of this study and potential future research opportunities highlighted through this work. A graphic is presented below to illustrate the organization of this study.

Figure 1.2. Organization of the dissertation.

2. A SYSTEM FRAMEWORK OF A BUSINESS MODEL

2.1 Introduction

The concept of a "business model" took root in the mid-1990's and has continued to draw increasing interest among scholars and practitioners alike ever since. Multiple scholarly reviews of related works have revealed broad and varying characterizations of the business model concept (See for example, Hedman and Kalling, 2003; Zott et al., 2010; Amit and Massa, 2011; George and Bock, 2011; Lambert and Davidson, 2013; Bocken et al. 2014; Gassman et al. 2016; Foss and Saebi, 2017; and Massa et al., 2017). Most journal papers on the subject now contain lengthy overviews of the historical development of business model literature, often to conclude that the literature is complicated or that there is noted disagreement on the definition or use of the construct. Other papers that utilize the business model construct often state that "there is no agreed upon definition of a business model". Zott et al. (2011) called out that business scholars "…have yet to develop a common and widely accepted language that would allow researchers who examine the business model construct through different lenses to draw effectively on the work of others". Several scholars tried to define how business models have been explored. Some examples include Tucci and Massa (2013), where they examined the role of level of abstraction played in business model conceptualization, calling out differences between activity systems, meta-models, specified graphical frameworks, ontologies, archetypes, and narratives. More recently, Gassmann (2016) categorized different conceptualizations of business models from approximately 50 theories into seven schools of thought to highlight the varying theoretical roots of the concept. Despite these endeavors, the existing body of knowledge remains scattered and difficult to build upon.

It is posited that the fundamental reason for such misalignment is associated with knowledge management. The business model as a concept can add to the vocabulary of business management and create new opportunities for exploration and clarity for existing problems. However, it is difficult to position advances by author(s) without an all-encompassing framework. There exists a need to organize knowledge and highlight links between problems, methods, and insights. This challenge is present in every developed field of knowledge and is tied to two fields which focus on organizing knowledge for problem solving: systems and design. System thinking facilitates abstraction of a problem to other levels if the model of the problem is defined appropriately. Design,

on the other hand, is a goal-oriented activity (Klein et al., 2006) and studies the linkage between purpose and context when solving problems, thus facilitating abstraction even more. Together, a systems-derived view of the business model that encompasses considerations of problem-solving — that is design — has the potential to be abstraction tolerant and thus be employed to address problems of varying nature by altering the sophistication of the model, but not its basic form.

In this phase of the research, an effort is made to provide a resilient complex adaptive system view of a business model with the intent of framing the knowledge space holistically. This endeavor starts by understanding system theories from literature, from general system theory to more advanced resilient complex adaptive systems (RCAS), and outlines the required characteristics of an RCAS. Business model literature is then reviewed and thematically analyzed to develop an understanding of business model components, which represent a critical aspect of a complete system view. An RCAS-based framework is finally presented to represent a more comprehensive view of a business model.

The system understanding of a business model is constructed by combining established management theories of a business with theories from engineering systems. Theories and properties of a system shape the outline and fundamental characteristics of the framework. Components of varying business model constructs from the business school of thought are then used to contextualize the framework to a business.

Figure 2.1. Conceptual constituents of the system framework.

2.2 Research Questions and Hypothesis

In this chapter, an effort is made to address the problem of the lack of a unified understanding of business models due to the absence of a unifying theoretical foundation. The work presented below addresses three main research questions related to the problem under analysis: 1) Is there a unifying theoretical foundation for business models? 2) Is there a set of complete business model components? and 3) What is a more comprehensive way to define a business model? To answer these research questions, a hypothesis is proposed: *a business model constructed as a resilient*

complex adaptive system will inform a more comprehensive and complete conceptualization. The reasoning behind this is that system theories stem from strong theoretical roots and are well defined. A system, when elevated to the concept of an RCAS, provides a strong theoretical construct and structural guidance to the creation of a business model. A system construct represents a business well as demonstrated in later sections of this document. It also informs a level of completeness to address the problem of varied and misaligned business model components and highlights important properties that have been overlooked historically.

2.3 Theoretical Background and Methodology

The work presented in this chapter utilizes two primary streams of theory and two research methods. The first stream of theory comes from established school of management, including both the value-centric view of a business and seven schools of thought of business models by Gassmann's work (2016), which will be discussed later in the chapter. The value-centric view, with its focus on value, provides a unit of analysis to ground our framework in established management literature. The seven schools of thought of business models represent the current understandings and simultaneously the confusions regarding the business model concept. These diverse views of business models are the origins of a long-time debate among researchers, which revolves around what a business model is and what it entails. This diversity of views also opens up the opportunities to explore and establish a universal foundation for business model research.

The second stream of theory is from systems and engineering systems. Previous attempts to construct a business model as a system have been pursued. But those were built on general system theory (GST). In this study, an extension is made from general system theory to the notion of an RCAS. Definitions of systems and the evolution of which put forward by various authors, such as Meadow and Wright (2008), Blanchard and Fabrycky (1990), Holland (1992), Gell-Mann (1994) are reviewed and documented. From examined literature, we are able to highlight defining characteristics of an RCAS. The hallmark of a robust system-based model is the ability to capture both partial, and complete views of said model.

The main research methods employed in this chapter include thematic analysis and scholarship of integration. Thematic analysis, as explained in the previous chapter, is employed in this chapter to classify business model components proposed by previous researchers into

elemental functions. Scholarship of integration is applied to draw insights from a collective examination of business model literature.

2.4 The Concept of a System

A system is generally defined as a set of elements or parts that is coherently organized and interconnected in a pattern or structure that produces a characteristic set of behaviors, often classified as its "functions" or "purposes" with resilience and self-preservation (Meadow, 2008; Blanchard & Fabrycky, 1990; Gibson et al., 2007; Rechtin & Maier, 1997). At its core lies two fundamental properties: interconnectedness, which refers to the fact that elements traditionally considered independent are in fact influenced by each other, and holism, which means that the collective effects of all the components are more than just the sum. A system is also a goal-oriented entity (Rechtin & Maier, 1997; Gibson et al., 2007), and exhibits a structure of flow and feedback (Meadow & Wright, 2008). A system should have a set of components, or agents, within its boundaries that have influences on and from each other (Holland, 1992; Gell-Mann, 1994).

This set of characteristics is derived from system thinking. System thinking is an analytic mentality that starts by recognizing that the concept under study is a system. It defines the system's boundaries and goals, then identifies the functional elements of that system, which establishes the structure and feedback loop, and finally studies the relationships between the functional elements, which establishes internal dynamics and rules. The feedback loop is a critical aspect of a system because it allows improvement and sustainability in the long run. To achieve the structure, a system needs to have input and output. The output of the system is transmitted to the intended recipient and feedback is obtained as additional input for the next process cycle, continuously improving the system and its dynamics.

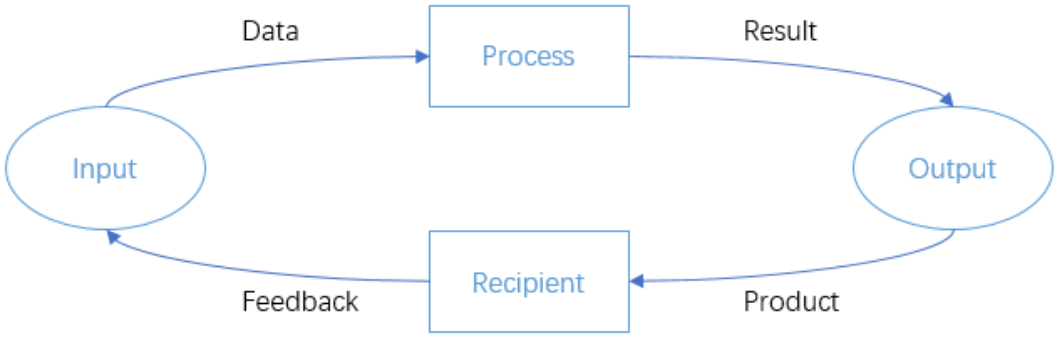


Figure 2.2. Feedback loop of a system.

As technology and problems encountered become more sophisticated and complex, the traditional and simple concept of a system is not robust enough to characterize them. A simple system does not have complex interactions between its constituent elements, and thus cannot accurately describe an entity that is complex in nature. This is also true for business models. In order to achieve the goal of characterizing a complex problem or entity, the system utilized should be able to represent and model the complexity and intricate interactions as accurately as possible. This is where the concept of complex adaptive systems becomes relevant. The word complex in the name indicates the inability to predict an outcome even with a perfect understanding of inputs. The cause and effect relationship within the system becomes understandable in retrospect but not repeatable. Emergent behavior is evident. The adaptive nature comes from the feedback structure of the system that allows self-preservation and evolution. It enables the system to accommodate changes in the environment with the intent of maintaining the goal of the system. Building on the traditional system definition, a complex adaptive system (CAS) exhibits "adaptive, dynamic, goal-seeking, self-preserving, and sometimes evolutionary behavior". (Holland, 1992; Gell-Mann, 1994; Levin, 1998; Dodder & Dare, 2000; Chan, 2001; Janssen & Kuk, 2006; Brownlee, 2007; Meadow & Wright, 2008). Many problem spaces, from complex engineering endeavors to government policies, have adopted this concept as a means to address these respective challenges (Buckley, 1968; Steels, 2000; McCarthy et al., 2006; Janssen & Kuk, 2006). Additionally, with the need to understand infrastructure-human interactions and related long-term sustainability, as well as cyber systems, the notion of resilience, termed homeostasis by some, was introduced to CAS to reinforce the idea of long-term viability and utility (Meadow, 2008; Sheridan, 2008; Haimes, 2009; Youn, Hu, & Wang, 2011). Resilience enables a system to protect itself from external shock. It maintains a system's structure, both physical and operational, and recover from damage. Collectively, a resilient complex adaptive system, or an RCAS, is thus considered to be a strong conceptualization and foundation for system development that intends to model complex entities' intent on longevity. It has strong theoretical roots in system theories and has a form that is compatible with changing and more complex problems and goals. This evolution of the concept of a system provides insight into the key descriptors to define a system that is organized to pursue a goal, over the long-term, in an environment requiring adaptation to change.

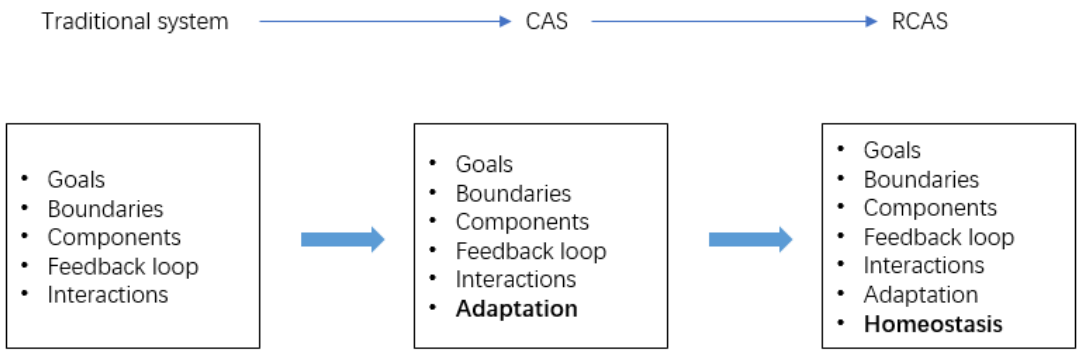


Figure 2.3. Evolution of characteristics from a traditional system to an RCAS .

In summary, an RCAS should exhibit the following traits:

- Goal: The underlying purpose of the system which establishes its functional goals
- Boundaries: The delimiting characteristic(s) that define what is captured in the system, and what is not
- Feedback Loop: The driving cycle of interactions among/between elements and the external environment that facilitates self-correction and action in relation to the broader environment
- Structure: The organization of the composite elements and related rules that drive its functionality and supports its goal
- Elemental functions: The interrelated and interdependent elements that compose the system
- Homeostasis: The aspects of the system that establish resilience toward external disturbance, helping to maintain the ability to fulfill its purpose
- Adaptation: The aspects of the system that facilitate/enable internal change needed to accommodate or counter externalities (protect) and preserve the ability to achieve its purpose

These traits are important in later sections because they inform required business model characteristics when an RCAS construct is proactively applied to define a business model. The following section examines the business model concept from the perspective of business literature and establishes a linkage between a business model and an RCAS.

2.5 The Business Model Concept

Business models and business model innovations have been a significant focus of research in management in recent years (Speith et al., 2014; Zott et al., 2011). The emergence of this concept can be attributed to factors that have drawn significant attention in the business area such as the Internet, eCommerce, the knowledge economy, and outsourcing of business activities. Business model constructs have been recognized as useful in multiple areas such as organizational design, resource-based views of a firm, narrative and sense making, understanding the nature of innovation, transactive structure, and opportunity facilitation (George & Bock, 2011). Despite its usefulness and prevalence, the definition of a business model has never been agreed upon by scholars or practitioners. It has been varyingly viewed as a series of activities within the value chain (Chesbrough, 2007), an interrelated set of decision variables (Morris, et al., 2005), a resource-based theory (Barney, 2001), an architecture of an offering (Timmers, 1998), a reflection of a firm's realized strategy (Casadesus-Masanell & Ricart, 2010), a story that answers Peter Drucker's questions of customer, value, revenue, and economic logic (Magretta, 2002), a "manipulable device between technology and economic value creation" (Chesbrough & Rosenbloom, 2002), a representation of the ''business logic'' (Casadesus-Masanell & Ricart, 2010), a combination of "who", ``what", ``when", ``where", ``why", ``how", and ``how much" an organization uses to offer its products or services and to develop resources to continue its efforts (Mitchell & Bruckner Coles, 2004), and a ''theory of the business'' (Drucker, 1992). A business model has been referred to as "a statement of how a firm will make money" (Stewart & Zhao, 2000), a company's logic for making money (Linder & Cantrell, 2001), an abstraction of a business (Betz, 2002), a description (Applegate, 2000; Weill & Vitale, 2001; Amit, Massa, & Zott, 2011); a representation (Morris, Schindehutte, & Allen, 2005; Shafer et al., 2005); an architecture (Dubosson-Torbay et al., 2002; Teece, 2010; Timmers, 1998; Anthony, et al., 2008); a dimensional tool (George & Bock, 2011); conceptual tool or model (Osterwalder, 2004; Osterwalder et al., 2005; Teece, 2010); a design of content, structure and governance (Amit & Zott, 2001), a method (Afuah & Tucci, 2001; Amit, et al., 2011); a framework (Afuah, 2004; Amit, et al., 2011); a pattern (Brousseau & Penard, 2007), and a set of capabilities (Seelos & Mair, 2007). Teece (2010) defines a business model as the way a company generates value and how it captures some of this value as profit. Pitelis (2009) sees value creation and value capture as two key tasks set forth by a business model. Mahadevan (2000)

defines a business model as a unique blend of the value stream, revenue stream and the logistical stream (Foss & Saebi, 2015). Tikkanen, Lamberg, Parvinen and Kallunki (2005) believe that "a business model is a system manifested in the components and related material and cognitive antecedents" of business model design and innovation (Foss & Saebi, 2015; Tikkanen et al., 2005). Bocken, Rana, and Short (2015) believe that a business model framework might provide a structured way to foster sustainable business thinking by "mapping the purpose, opportunities for value creation across the network, and value capture in companies". Nielsen and Lund (2014) believe a business model is the platform which connects resources, processes and the supply of a service which result in the fact that the company is profitable in the long run. Roome and Louche (2016) think "business models refer to the way firms do business". Some scholars defined business models as cognitive/linguistic schemes, including business models as models (Baden-Fuller & Morgan, 2010), heuristic logic (Chesbrough & Rosenbloom, 2002), structured and interdependent operational relationships (Doz & Kosonen, 2010), or designed systems of activities (Martins et al., 2015).

Faced with this rather scattered body of knowledge, attempts have been made to provide a framework to sort it. Gassmann (2016) summarized different theories regarding the business model concept and synthesized seven schools of thought. The first school is the activity system school strongly advocated by Zott and Amit (2008, 2010). In this school, a business model is defined as the structure, content, and governance of transactions. They also believed that the activity system can be described both by design elements, which include content, structure, and governance, and by design themes, including novelty, lock-in, efficiency, and complementarities. The process school is the second school and it defines a business model as a dynamic process of balancing revenue, costs, organization, and value. Demil and Lecocq (2010) contributed to business model research by proposing that the relationships between components are the source of dynamics and a business model is constantly changing. The process school combined the static and dynamic view of a business model and proposed the resources, competencies, organization, and value proposition for business models. Changes to the components and between the components of a business model are the research focus of this school. A business model is a "model" or the "logic" of how firms do business according to the cognitive school supported by Baden-Fuller and colleagues. They drew insights from other disciplines such as biology. Baden-Fuller and Morgan (2010) considered business models as tangible frameworks and tools and were the first to interpret

business models as both abstract ideal business types and story-telling constructs. At the center of this school is detecting typologies and taxonomies. Entrepreneurs and entrepreneurial pathways of designing a business model are at the core of their considerations. The technology-driven school considers a business model as a way to commercialize novel technology. Both Chesbrough and Teece were interested in this area but approached it in different ways. The former focused more on spin-off strategies (Chesbrough & Rosenbloom, 2002; Chesbrough, 2009) while the latter focused on an innovation framework and the role of dynamic capabilities in designing business models (Teece, 2001). The research group around Casadesus-Masanell tried to build connections between business models and existing management knowledge. In the strategic choice school, a business model is regarded as a result of strategic choices. Once a business model is employed, a firm may choose tactics that follow the rules of that business model. In this school, a business model is also a blueprint and is subject to imitation. The recombination school is strongly supported by Gassmann and colleagues, who regard a business model as "a recombination of patterns for answering the who-what-how-why questions of a business". They believed that most business models are reorganizations and competitive patterns. They also applied network theory to open business models (Frankenberger, et al., 2013). The last school is the duality school which mainly focuses on managing multiple business models within a firm. Researchers in this area contributed to the overall body of knowledge in first recognizing that business model innovation is theoretically demarcated from radical product and technology innovation. In addition, they tackled the topic of managing dual businesses. Thirdly, they highlighted that business models are interlinked with the balance between exploitation and exploration.

Table 2.1. Seven schools of thought for business models by Gassmann

Schools	**Research focus**
Activity system	structure, content, and governance of transactions
Process	dynamic process of balancing revenue, costs, organization, and value
Cognitive	"model" or the "logic" of how firms do business
Technology-driven	a way to commercialize novel technology
Strategic choices	a result of strategic choices
Recombination	a recombination of patterns for answering the who-what-how-why questions of a business
Duality	managing dual businesses and organizational ambidexterity

As demonstrated, there is significant disagreement and misalignment on the exact definition of a business model. Literature reviews keep getting longer and longer with new definitions and understandings with the same conclusion. The continuous disagreement has posed many challenges to the advancement of this body of knowledge. It is difficult to put related works in context. It is also hard for them to effectively communicate contributions from their perspectives. As a result, practitioners and researchers find it hard to locate relevant information to help with their work. It was called out by Zott (2011) that business scholars "have yet to develop a common and widely accepted language that would allow researchers who examine the business model construct through different lenses to draw effectively on the work of others". This debate on the definition of a business model may have led to a deviation from the importance of certain core elements of a business model and consensus on its concept.

2.6 Why Systems for Business Models

The relevance of systems to business characterization is not new. System thinking, in the form of GST has been employed in this space. The statement of Afuah and Tucci (2000) was among the earliest, which conceptualized a business model as a "system that is made up of components, linkages between the components, and dynamics." Anderssen et al. (2009) regarded business models in terms of agents, activities, and resource exchanges. Gassmann (2016) believed that business models and systems bear the same characteristics. Itami and Nishino (2010) believed that a business model is composed of two elements: a business system and a profit model, with the former being a "'system of works' (the production/delivery system) that a firm designs — within and beyond its boundaries — to deliver its products or services to its target customers." More recently, Baden-Fuller and Haefliger (2013) defined the business model as a system involving cause-effect relationships that "solves the problem of identifying who is the customer, engaging with their needs, delivering satisfaction, and monetizing the value". Gassmann (2016) indicates that "A business model is believed to have multiple components and these components have inter-relationships with each other. It is shown … that systems bear the same characteristics." Abdelkafi and Täuscher (2016) utilized principles of systems dynamics to describe a business model for sustainability as a "reinforcing feedback loop between the value created for customers, the value captured by the firm, and the value to the natural environment". Velu (2017) also shed light on the

business model concept as a system, adopting a system lens as a theoretical frame in order to articulate how business model evolution takes place. These efforts are contrasted against proactive utilization of system theories to define a business model. Zott and Amit (2010) highlighted interdependencies among organizational activities centered on the firm and placed emphasis on the importance of system level and purposeful design. Halecker and Hartmann (2013) adopted the construct of Pfeiffer (1971) to declare that when viewed from a system lens, a business model is constituted of functions, structure, process, and steering. Here it is proposed to extend the linkage between business models and systems to more comprehensively characterize a business model as a resilient complex adaptive system (RCAS), as the business model is a representation of an entity that in nearly all circumstances operates in an ever-changing environment with the intent of remaining a going concern. This requires not only performance of the traditional activities to manage a value cycle among stakeholders, but also to pursue decision making and actions associated with resilience and adaptation (i.e., financial viability and commercial relevance) over the long term. The work discussed in this chapter can somewhat be viewed as a continuation from Zott and Amit's work in that it is also trying to apply a system lens to define and conceptualize a business model. What is novel here is that while previous efforts adopted general systems perspectives based on general system theory, this study expands on existing literature by intentionally selecting a more recent perspective of RCAS with the intent of instilling resilience and adaptation in the model.

When defined as an RCAS, a business model can be represented as complete as no previous constructs can. The requirements of an RCAS, while captures established theories of business models, highlights and bridges gaps in existing literature regarding business model conceptualization, namely resilience and adaptation. Resilience and adaptation are believed to be crucial because as noted by several researchers such as Velu (2017), Kennerly and Neely (2003), Todnem By (2005) among others, the business environment is rapidly changing. Resilience and adaptation are directly and closely associated with how firms deal with change. Their relevance to change is also strongly supported by management literature.

Business resilience is a crucial topic in business management literature, and it is largely discussed in supply chain management (Sheffi, 2005). The origin of the concept can be traced back to Staw et al. (1981) and Meyer (1982). They contributed to the literature by observing that the "way in which organizations respond to external threats triggers organizational processes which

can lead to either successful or unsuccessful response". It is largely related to what firms can do when faced with an unanticipated disruption, such as a natural disaster. Resilience is often studied as internal reliability (Perrow, 1984). The notion of resilience gained attention as "companies increasingly face various types of disruptions that could take place individually or simultaneously" (Sahebjamnia et al., 2015). Horne and Orr (1997) believe resilience to be the "fundamental quality to respond productively to significant change that disrupts the expected pattern of events". Resilience enables an organization to absorb an external shock and bounce back (Wildavsky, 1988) through various means such as building flexibility, redundancies (Christopher & Peck, 2004; Kleindorfer & Saad, 2005; Klibi et al., 2010) and managing employee capabilities (Coutu, 2002).

In terms of adaptation, it deals directly with change and enables sustainability in firms to adapt to changing business environments. Firms need to constantly change, or they will no longer be able to compete and exist. The work of Teece (1994) defined dynamic capabilities which are widely accepted and recognized as critical tools for firms to achieve sustainability through adaptation. Business model adaptation gained interest after 9/11 as "researchers started to focus on how companies adjust, adapt and reinvent their business models in an ever-changing environment (ideally before they are forced to do so)" (Linnenluecke, 2017). Saebi et al. (2017) believed business model adaptation is a critical part of business model change, beside business model innovation. They also suggest that business model adaptation refers to the changes occurring in existing business models over time, often in response to an external trigger. Management actively tries to align business models to a changing environment. Saebi et al. (2017) also brought attention to the dynamic nature of a business model, which is supported by scholars such as Demil and Lecocq (2007). Business model adaptation is one form of dynamics that enables business model evolution and learning. This notion is aligned with the definition of an RCAS, as one of the characteristics of CAS is the self-preserving and evolution nature. In summary, the addition of resilience and adaptation provides a more accurate description of a business model and a business, which is a dynamic entity that is constantly interacting with a rapidly changing environment.

Collectively, the RCAS construct provides a guiding principle in business model conceptualization. Combining with the established value-centric view, the RCAS construct puts forward a comprehensive definition of a business model that describes the true nature of a business and a business model more accurately.

2.7 A Business Model as an RCAS

Now that introductions have been made to RCAS and business models as well as how they are compatible with each other, this section proactively constructs a system understanding of a business model. The process starts by understanding the goal of a business model, setting the boundary of a business model, and establishing the feedback structure underlying the system. These fundamental characteristics then indicate elemental functions within the system and the interactions between them to in turn strengthen the system. The process displays a structure similar to the "system – components – interaction" as explained in the discussion earlier. It has already been demonstrated that a business bears the traits of an RCAS, and now a similar effort will be made on the concept of a business model.

2.7.1 RCAS Goal

The process first looks at the goal of a business model. Scholars and practitioners have some consensus on the goal of a business model (Hienerth et al., 2011; Teece, 2010; Bocken et al., 2015; Upward & Jones, 2015; Abdelkafi & Tauscher, 2016). Basically, a business model exists to create and manage the exchange of value. Value then becomes an essential part of the construct. In management, more specifically value-based strategy, value is defined as the difference between willingness to pay and cost (Brandenburger & Stuart, 1996; Oxley et al., 2009), a definition that provides powerful tools to assess and analyze the competitiveness of a business. Value is created when there is willingness to pay from potential customers and cost, borne by companies which make the offering. Value is then captured both by customers and companies and is defined with willingness to pay, price, and cost. The difference between willingness to pay and price is the value captured by customers, and the difference between price and cost is the value captured by companies. As indicated by the goal of a business model, value exchange is the central theme of the RCAS view of a business model.

2.7.2 RCAS Boundary

Following this central theme, the boundary of the RCAS framework can be described as the functions, decisions, and activities that enable and drive an organization's ability to exchange value over the long term in a changing environment, which is the same to the locus classically defined as the "firm".

2.7.3 RCAS Feedback Loop

The word "exchange" naturally indicates the loop structure underlying a business and a business model, as there is feedback from customers that also act as a source of input into the business activities carried out by companies. A simple illustrate is presented below to show the loop structure underlying a business.

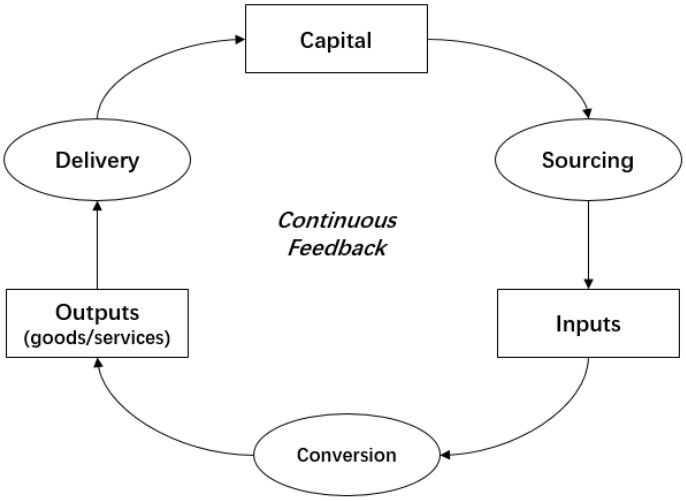


Figure 2.4. Business feedback loop.

Capital is firstly gathered to procure resources and equipment to carry out business activities. Inputs, both tangible and intangible, are acquired, which are then converted to offerings by production. These offerings, or output, are then delivered to customers in exchange for profit, which then goes back to the company's source of capital. Feedback embodies many forms during this process, including profit, sales, market share, customer engagement, and others. This illustration is made intentionally simple to show that there exists a feedback loop for even the simplest business. A more comprehensive view will be presented later. In summary, a business can be characterized as an RCAS as shown in the table below"

2.7.4 RCAS Structure

After the feedback loop is identified, the structure required by the RCAS construct can be defined. The structure can be described as a collection of interconnected elemental functions in a feedback loop with the emphasis on value exchange. A figure depicting the structure of the framework will be presented later.

2.7.5 RCAS Elemental Functions: Data Gathering

After establishing the goal, boundary, and feedback, appropriate and necessary functions can be developed. These elemental functions should enable the pursuit of goals and help achieve RCAS characteristics. These elemental functions have been a focal point of debate among business model scholars and many functions have been put forward, typically cast in the literature as "components". To address these debates, efforts have been made by scholars to provide overviews of these alternatives (Hedman & Kalling, 2003; Demil & Lecocq, 2010; Lambert & Davidson, 2013; Bocken et al., 2014; Wirtz et al., 2015; and Massa et al., 2017). The seven schools of thought by Gassmann also implied rationale for the different selections of components. This categorization, while useful, displays a bias among scholars, which is that they select a particular set of components to serve the purpose for which they intend to use the business model construct, as pointed out by Sinfield et al. (2012). Therefore, the question remains. What is the proper set of elemental functions that are both complete and exhibit RCAS characteristics? To answer this question, one must first have a good understanding of what components are out there. From a traditional business model point of view, components serve different purposes in the business process. In system language, they correspond to elemental functions that perform required jobs in a system collectively to achieve the intended system goal. Therefore, understanding components from the business model school of thought helps us understand necessary elemental functions of the RCAS framework. To achieve this, a two-part analysis is conducted. First, an extensive literature review was carried out on 150 research papers from both scholars and practitioners. Each article was reviewed with a focus on understanding components put forward. Components proposed in these works were recorded. These components are the source to create the set of elemental functions that satisfy the requirements of an RCAS. However, there are too many components to be considered as a possible set. Besides, there are overlaps in functions between

components as well. Therefore, to create a feasible set of elemental functions, thematic analysis is employed to analyze these components, identify shared functions, and code them accordingly. The results of the review are synthesized into a histogram with axes denoting the name of the component and the frequency of its appearance in the examined literature.

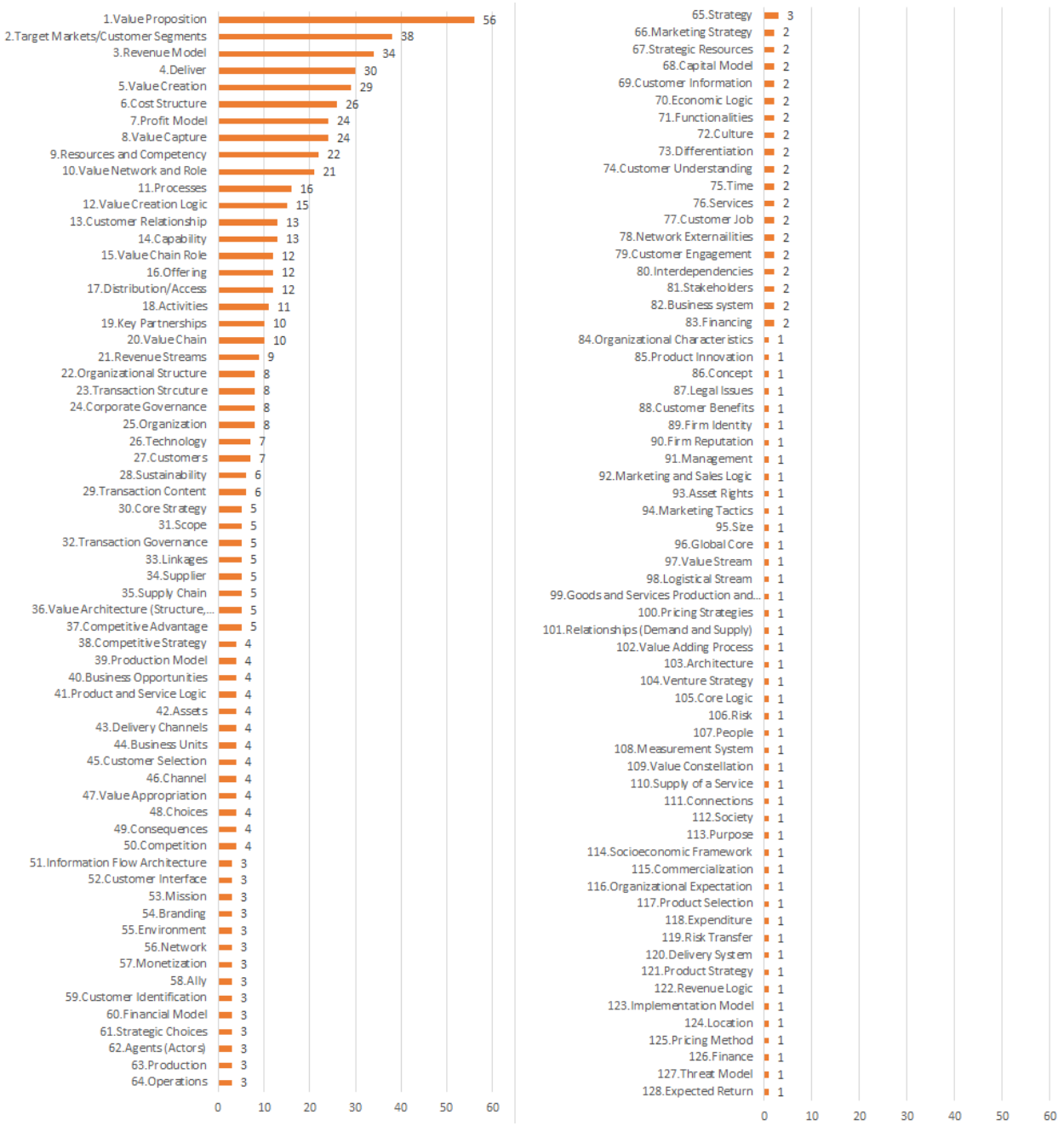


Figure 2.5. Business model components present in reviewed literature.

128 components have been identified in the literature review. Interestingly, attention to resilience, adaptation, and protection is limited, reinforcing the need and benefit of employing the RCAS framework as foundational construct for business models. Competitive strategy and sustainability do exist in these components, but they are clearly in the minority. Besides, they are not used or viewed in the sense of supporting resilience and self-preservation. It is interesting to notice that these components seem to come from different schools of management, such as marketing, supply chain management, and strategic management. The notion that the construct of a business model transcends and links differing schools of thought is not new. Consider Amit and Zott (2001), who approached the business model as a unifying unit of analysis that captures value creation arising from multiple sources and argued for a cross-theoretical perspective. Morris et al. (2005) argued that the business model construct builds upon an array of ideas including value chain concepts, competitive strategy, resource-based theory, and network theory. Gassmann's (2016) seven schools of thought also serve as prime examples of how business models are connected to other management areas. Arguably, it is exactly this cross-management use of the business model construct that makes it so valuable. Unfortunately, it is also because of this broad use that there is great inconsistency in its conceptualization. There is thus great promise in the RCAS construct, as a theoretically grounded and complete representation of a system, to connect these varied bodies of literature. It also shows that authors have already utilized the notion of abstraction, largely unintentionally. While there are 128 distinct business model components in the literature review, no single article included all of them. Therefore, some kinds of selection among these components had to have happened. This chapter of the research, on the other hand, intends to create a complete set of elemental functions that can capture all the components that have been proposed in the studied works. Using this literature review as a database, this is pursued using an appropriate categorization method.

2.7.6 RCAS Elemental Functions: Thematic Analysis

Thematic analysis is utilized to analyze the 128 components recorded. As applied in this phase of the research, the process starts with deciding the themes that are relevant to the research objective under analysis. Here, that is to identify a set of elemental functions for the RCAS framework among the recorded components. The key word is "function". This key word and objective to create elemental functions informs the themes required. In other words, thematic

analysis studies the meaning of each component and interprets its function. Then components with the same or similar functions are aggregated together under a shared code.

2.7.7 Elemental Functions

Themes may be generated inductively from raw information or deductively from theory and prior research (noted in the research method section, Boyatzis, 1998). As applied herein, an iterative cycle between these two approaches was employed. Using a value-centric feedback loop from the RCAS conceptualization as a starting point, an initial set of potential theme codes were defined around Creating Value, Delivering Value, and Capturing Value. These themes were explored and readily supported quite directly by components quoted in the literature as shown in Appendix B. These themes, however, did not include means to facilitate homeostasis (coded as Protect Value) and adaptation (coded as Sustain Value) as called for by the RCAS construct. Grouping literature derived components into this expanded set of functions still left multiple components unaccounted for. Iterating through the remaining components revealed that several authors delved more deeply into the value exchange loop, placing emphasis on customer segmentation and targeting (coded as Identify Value), and marketing (coded as Convey Value). Other authors called out components that describe the organizational aspect of a business model, such as organizational structure and corporate governance, as well as components related to resource distribution. These themes were aggregated into the code "Manage Value", and sorted into sub-themes in Appendix B to facilitate higher resolution analyses if desired.

To illustrate the process of thematic analysis, "Create Value" is used as an example. The definition of the elemental function "Create Value" is the means or acts by which a firm decides to address identified needs and benefits for its target customers. The coding rule for this elemental function is the activities and structures that operate to produce offerings, develop value propositions, and materialize the identified value. Therefore, if any proposed components perform the function stated in the coding rule, they are considered to fit in the elemental function. With the rules for interpretation and categorization understood, the process goes on to examine components. For example, the work of Lambert (2008) proposed that customer, value proposition, supplier, value adding process, ally, channel, and value in return are the components of a business model. According to his definition, value proposition refers to "product, service, information or combination of these". The words "product" and "service", along with the sentence used indicate

that “value proposition” is about creating an offering that is being sold to customers, follow the definition and coding rule of “Create Value”. Therefore, “value proposition” is thematically categorized into “Create Value”. This interpretation and categorization process is applied to all components such as supplier, customer, channel, and others. They are interpreted and thematically categorized accordingly. It is important to note that interpretation and categorization should not be based on the wording itself. It means that just because an author uses the word “value proposition”, it is not automatically a part of “Create Value”. It is indeed more likely, but it is not definitive. The context and explanation of the term should be considered holistically to interpret its function. Thematic codes, their definitions, and related coding rules that guided the above outlined analysis are summarized in the table below.

Table 2.2. Elemental function definitions and coding rules

Elemental Functions	**Definition**	**Coding Rule**
Manage Value	the structures (e.g., legal, organizational), rules, decisions, and evaluative metrics set forth and/or employed by a firm as well as choices and means tied to financing the act of creating value	Activities and structures that support financing, organizational design, strategic decision-making, and value distribution and investment
Identify Value	mechanisms for exploring and identifying needs, and/or defining benefits that are likely to be expressed/sought by potential consumers, so that a potential willingness to pay is identified and the rest of the business cycle can commence	Activities and structures that function to explore and discover customers, markets, and general business opportunities
Create Value	means or acts by which a firm decides to address identified needs and benefits for its target customers	Activities and structures that operate to produce offerings, develop value propositions, and materialize the identified value
Convey Value	means or acts that communicate created value to potential customers and convince them of its worth	Activities and structures that operate to reach out to customers to advertise and promote offerings, and to establish and maintain customer relationship
Deliver Value	means or acts that provide access to the firm’s offering, and when relevant, facilitating physical acquisition of the firm’s good or service	Activities and structures that provide and facilitate access to offerings for customers
Capture Value	revenue streams, profit model, economic logic, and other related mechanisms that yield a return to the firm	Activities and structures that describe and design cost structure, revenue model, and generally how a firm captures profit
Protect Value	mechanisms that prevent disturbance of the value creation, delivery, and capture mechanism of a firm, limiting loss or damage, and maintaining a stable structure	Activities and structures that help defend against disturbance, market changes, and competition and also help the firm recover

Table 2.2 continued

Sustain Value	mechanisms that facilitate adaptation to shifts in the market, in customers' demands, and other external or internal changes	Activities and structures that operate to sustain the business in the long-term and evolve based with changing business environment

A summary mapping of the business model components observed in the literature to the thematic analysis derived elemental functions is presented in Appendix A. The complete set of thematic codes, mapping to business model components, and related direct quotations from the literature are provided in Appendix A and Appendix B.

In summary, the descriptors of different business model components presented in the literature have been examined through thematic analysis to link and aggregate terms and draw out elemental functions. In concert, these functions have been compared to the requirements of an RCAS to look for and fill gaps in the representation of a business model. This analysis calls attention to eight primary elemental functions – identify, create, convey, deliver, capture, manage, protect, and sustain value – which inform a robust view of the business cycle of value exchange briefly introduced above. These elemental functions capture all previously documented business model components presented in Figure 2.5., illustrating that the value centric perspective efficiently organizes the work of previous scholars, while highlighting the limited focus that has been given to date to functions that protect and sustain the business as called for in an RCAS.

Employing thematic analysis, it is possible to see that each component is in some way linked with a business's ability to manage value. Expanding upon the coding rules outlined above, each elemental function involved in the value centric view of the business model is defined as follows, drawing on views of value management in the literature.

Manage Value

As noted earlier, businesses drive a feedback loop centered on value. As described by Morris et al. (2005), a business model "…builds upon the value chain concept (Porter, 1985) and the extended notions of value systems and strategic positioning (Porter, 1996). Because the business model encompasses competitive strategy, it also draws on resource-based theory (Barney et al., 2001). In terms of the firm's fit within the larger value creation network, the model relates to strategic network theory (Jarillo, 1995) and cooperative strategies (Dyer & Singh, 1998). As the

decision-making locus of the proposed model, the elemental function of managing value thus deals with the structures (e.g., legal, organizational), rules, decisions, and evaluative metrics set forth and/or employed by a firm as materialized in strategy, governance, organizational structure, resource allocation, the distribution of captured value to involved stakeholders, and investment of captured value back into the business, as well as choices and means tied to financing the act of creating value. Since it is the decision-making locus and command center of a business model, Manage Value is an overarching function that is interacting with every other elemental function. It involves specific tasks a firm does on a day-to-day basis. Such tasks include financing, capital distribution, human resource coordination, among others, similar to the support activities discussed in value chain analysis (Porter, pp 11-15, 1985). This function is thus inherently linked with capture value, as a firm's resources are not infinite, and efficient management of constrained resources is core to the success of a firm.

Identify Value

As highlighted earlier in the definition of value, value can only exist when there is a willingness to pay. Generally, willingness to pay appears when there are needs expressed by consumers or benefits consumers may desire. Much of the research on product development suggests that one of the most critical factors in new product development is understanding user needs and incorporating them into new product design (Cooper, 1979; Cooper & Kleinschimdt, 1987; Rothwell et al., 1974; Zirger & Maidique, 1990). For service providers, customer involvement is often seen as even more important. Alam and Perry (2002) stated "…services tend to involve a longer commitment and therefore a more intimate relationship with customers (Alam, 2000; Harris et al., 1999; Martin et al., 1999; Sundbo, 1997). Thus, customer orientation plays a more important role in service firms than in tangible product firms (Kelley, 1992; Hartline et al., 2000)." Customers may proactively communicate these needs to a firm, communicate among themselves, or simply not realize they have certain needs (e.g., as in the case of compensating behaviors). Firms may also systematically explore a market/population to find opportunity, developing constructs like segmentation schema or market analyses. Vargo et al. (2017) also suggested taking a system thinking perspective to analyze markets in a rapidly changing environment. Identification of these needs based on expressed or observed customer input serves as the starting point of value creation between companies and the customer. This business model

elemental function encompasses the acts of exploring and identifying needs, and/or defining benefits that are likely to be expressed/sought by potential consumers, so that a potential willingness to pay is identified and the rest of the business cycle can commence. The ability to identify value is often housed in consumer analysis roles of a business and can provide distinct advantage when new methods or insights are used to define target markets.

Create Value

When companies have produced, on their own, or in collaboration with partners or customers (e.g., service dominant logic), a product/service that responds to a need for which consumers are willing to pay, value is created. Three focal points for value creation are identified by Lepak (2007), who highlight value at the individual level, organizational level, and societal level. Weill (2004) attempted to define the range of possible value creation strategies, which can address each of the aforementioned levels, by suggesting that a business creates value by being a creator, distributor, landlord, or broker of a good or service. As can be inferred from these value creation frameworks, multiple value creation activities and processes, such as innovation, invention, R&D, purchasing, sourcing, conversion, and partnerships are possible, and have been proposed by researchers (i.e., Lee et al., 2007). It is also possible to incorporate customers into the value creation process, for example through the exchange of knowledge or skills, in acts of collaboration or co-creation with a firm, as suggested in service dominant logic. Vargo and Lusch (2006), for example, strongly advocated for the notion of customer involvement and stated that "the customer is always a co-creator". Thus, this elemental function of the business model encompasses how a firm decides, on its own, or through collaboration, to address identified needs and benefits for its target customers.

Convey Value

After value is created, the next step is to communicate such created value to potential customers. In "Identify Value", consumer needs are identified, but not all consumers are aware of certain needs (even their own), and they may not be aware of the options/alternatives to satisfy those needs. Firms help consumers realize these needs and available solutions via various mechanisms that are often encapsulated in the marketing unit of an organization. This is the act of

"Conveying Value". This elemental function includes one of the primary activities in Porter's value chain analysis – marketing. Marketing has generally been oriented towards how to acquire customers (Storbacka et al., 1994). Much of marketing theory revolves around "attracting, retaining, and sustaining a customer base (Anderson et al., 2004; Gruca & Rego, 2005; Rego et al., 2009), not just for (re)purchase purposes, but also beyond the transaction" (van Doorn et al., 2010). With markets becoming more and more complex (e.g., Vargo, 2017; Neu and Brown, 2006), researchers have started using system perspectives to examine markets. Vargo (2017), for example, proposed system thinking-based perspective changes to better understand this complexity. Firms need to convince potential customers that the value is worth their money, thus securing a willingness to pay, and to attract customers. Customer engagement is an important part of customer attainment. Customer relationship management then deals more with customer retainment and sustainability. Customer engagement also helps in the value creation process (Vargo & Lusche, 2006) as suggested by the S-D logic and customer relationship management is long-term (Storbacka et al., 1994). Convey Value is thus tied to Create Value and Sustain Value as well. Effective mechanisms to convey value are important because potential customers' perceptions of value may differ from that of the firm.

Deliver Value

If consumers decide that the value created is worth purchasing, they need a means or a channel to access such value. Just as Convey Value corresponds to the marketing activity in Porter's value chain analysis, Deliver Value corresponds to sales and outbound logistics. This can be viewed to encompass three processes as proposed by Van Weele (2002): the ordering process, which is the selection of an offering by customers; the contracting process, which is the purchase commitment for the offering; and the expediting process, which is the delivery of the offering. These activities may happen at essentially the same time, for example when a physical good is purchased at a brick-and-mortar store, or these activities may happen in series, such as when a good is chosen and purchased on-line, and subsequently delivered. At the broader level of serving a customer population, distribution provides access for customers by "making the right quantities of the right product or service available at the right place" (Pitt et al., 1999). This element deals with all of these activities, as firms must decide how their created value can be functional and how it can be obtained. At this point, value is captured by customers.

Capture Value

As discussed in earlier sections, value created at the primary level of a firm's operations is distributed between the company creating it and its customers. This is where the exchange of value is completed in that the company-created value is exchanged for money from customers and the firm captures those funds. Capturing value from conjectured value creating advantages, assets, and actions is arguably the main objective of firms (Brandenburger and Nalebuff, 1995; Teece, 1986; Teece et al., 1997; Pitelis and Teece, 2009). As suggested by value-based management, a firm "can capture less, equal, or more value than that created through their activities" (Brandenburger & Nalebuff, 1995). And a firm's ability to capture value is largely based on its bargaining power, both to customers and to suppliers (Pitelis, 2009). In this functional element, firms need to think about their revenue streams, profit model, economic logic, and other related decisions. Capturing the most value, which is one form of making value for shareholders, is any manager's top priority.

Protect Value

For this functional element, the focus is protecting a firm's ability to manage and exchange value, at its most fundamental level. The essence of "Protect Value" is to prevent disturbance of the value creation, delivery, and capture mechanism of a firm, limiting loss or damage, and maintaining a stable management structure. It also protects a firm's static resources and capabilities. In general, there are tangible resources and intangible resources. Tangible resources include physical assets such as plants, equipment, and materials. Hall (1993) posited that intangible resources include people dependent assets such as reputation and know-how, as well as people independent assets such as data bases. Hall then established connections between intangible resources and sustainable competitive advantage. Fernández et al. (1999) categorized intangible resources into "human capital, organizational capital, technological capital, and relational capital". The importance of company resources is even more significant in the resource-based view of the firm (RBV) (Barney, 1991). In RBV, a firm is considered a combination of different resources and those firms with rare and valuable resources are said to have competitive advantages. Following this logic, protection of such resources is of paramount importance. This element then serves as a static foundation of competitive advantage under current market paradigms. It thus provides the resilience in the RCAS construct, establishing a firm's ability to endure and recover from shocks.

Porter (1985) stated that the maintaining a firm's strategy requires that a firm possesses some barriers that make imitation difficult. "Just as product and process innovations are hard to protect, business model innovations can be imitated as well" (Casadesus-Masanell & Zhu, 2013). Establishing barriers, such as trade secrets or intellectual property, is one of the primary aims of the "Protect Value" elemental function, but the function also includes strategic moves like long-term supplier contracts, or vertical integration, which in some cases could protect a business' core approach to market.

Sustain Value

Just as "Protect Value" acts as the static component of a firm's competitive advantage, "Sustain Value" acts as the dynamic component and provides the adaptive nature of the foundational RCAS behind this business model framework. It is noted by Vargo (2017) that the market and business environments are becoming more complex and dynamic, necessitating business tolerance to change and evolution. Adaptation is understood as the actions or activities a firm undertakes to cope with a changing environment over time to achieve long-term success (Chakravarthy, 1982; Tushman & Romaneli, 1985; Linnenlueke & Griffiths, 2010), and encompasses the ideas of business model evolution, learning, and lifecycles (Saebi et al., 2017). It is also associated with dynamic capabilities (Teece et al., 1997)) – that is capabilities that focus on adaptation to a rapidly changing environment. Different from ordinary capabilities, dynamic capabilities integrate, build, and reconfigure a firm's resources to evolve (Eisenhardt and Martin, 2000; Teece et al., 1997), and thus support the fundamental idea of Sustain Value. Through the value-centric lens of the proposed model, sustain value utilizes the feedback nature of the construct to adapt to shifts in the market, in customers' demands, and other external or internal changes. Value creation is dependent upon firm strategy and the balance between target customer needs and the cost to meet them, all of which are subject to change. Thus, "Sustain Value" encompasses the mechanism employed by a firm to constantly adapt to its changing environment.

Collectively, these elemental functions, centered on the value locus of a business, provide an RCAS view of the business model that can be illustrated as shown in the figure below.

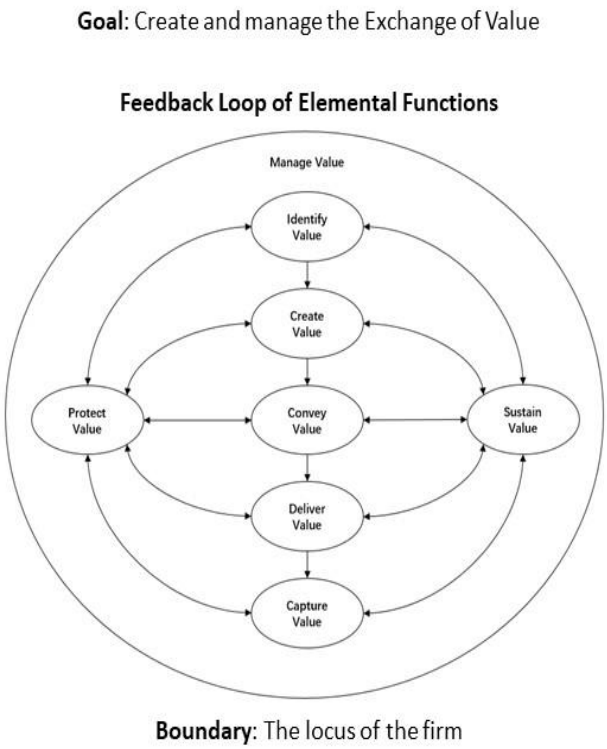


Figure 2.6. The RCAS framework of a business model.

It can be seen that the figure depicts a business model as a set of elemental functions in the form of a value feedback loop. Consumers are studied and understood, to identify what they may value. In response, a firm develops its value proposition and implements that value proposition as corresponding artifacts to create value for the consumer. This potential value is conveyed to the target consumer and hopefully sought after. If so, the consumer becomes a customer, providing payment representative of perceived value in exchange for the delivered offering, facilitating the value exchange goal of the enterprise. The firm captures a share of that value and feedback is gathered throughout the cycle, so that the value exchange and distribution can be managed. Captured value is distributed to the firm's stakeholders and/or reinvested in the business, fueling means to protect and sustain the business so that it can adapt and continue over time as market conditions change.

The arrows in the figure are conceptually indicative of the flow in the business model to develop and realize value. As mentioned before, Manage Value is an overarching function and the "command center" of the framework. It is presented as such in the figure. The value feedback loop is then portrayed in one direction as a process from Identify, to Create, to Convey, to Deliver, and

on to Capture Value. While this process is of course not always linear in reality, the chain of elements represents a typical input-to-output cycle. The two-way arrows between Capture Value and Protect and Sustain Value are constructed to illustrate that Capture Value yields important feedback for the RCAS. Captured value is used to resource all elemental functions through the Manage Value function, including those that Protect and Sustain Value. On the other hand, Protect and Sustain Value have arrows pointing towards all other value functions because they ensure that all of those functions persist in the face of challenge or change. Every elemental function can also be a source of value protection and/or sustainability. Overall, the framework defines a business model as an RCAS with 8 interacting elemental functions in a value exchange feedback loop to purse a goal of creating and managing the exchange of value. This figure depicts the structure and highest-level interactions of the elemental functions of the proposed RCAS business model construct.

2.8 Summary

In this chapter, an attempt is made to propose a more complete understanding of a business model than available in present literature. It addresses the lack of foundational theory behind a business model conceptualization and misalignment in the business model community regarding business model components. To address the former, this chapter draws on theories from system literature. A resilient complex adaptive system, with its origins and properties, is chosen as a foundational construct to business model building. Linkages and compatibility between these two concepts are established. This RCAS underlying construct informs critical characteristics of a business model that have been overlooked in the past, namely resilience, adaptation, and the ability to facilitate abstraction. The benefit of having an RCAS as a theoretical foundation is that by building a business model as an RCAS, the business model has to exhibit RCAS characteristics, which then requires users to incorporate properties they might not previously consider. To address the second issue, this work first performed a literature review on 150 scholarly reviewed articles on business models. Respective components proposed were recorded. The result showed 128 distinct components. Thematic analysis was then employed to examine these 128 components and identify 8 elemental functions. An RCAS-based business model framework including these elemental functions was constructed that also exhibits RCAS structure and feedback. These 8 elemental functions effectively capture all the components that have been proposed in the reviewed

literature and satisfy the requirements set by RCAS theory. More importantly, the thematic analysis shows that no single article employed the whole set of elemental functions. Instead, each previous model only utilized a fraction of the elemental functions – essentially representing parts of the grander whole that is the RCAS construct. The RCAS model's ability to "encompass" studied prior works highlights its flexibility for abstraction; and this ability opens up more opportunities to provide clarity to the business model concept as observed in the following chapter.

3. A KNOWLEDGE ORGANIZATION MAP FOR BUSINESS MODEL RESEARCH

3.1 Introduction

This chapter is aimed at providing a potential resolution to the long debate over business model conceptualization. As noted by various scholars and synthesized schools of thought, consensus regarding the definition, understanding, and components of the business model concept has never been reached (Gassmann, 2016; Hedman and Kalling, 2003; Zott et al., 2010; Amit and Massa, 2011; George and Bock, 2011; Lambert and Davidson, 2013; Bocken et al. 2014; Gassman et al. 2016; Foss and Saebi, 2017; and Massa et al., 2017). While proposed conceptualizations and frameworks have been effective for their respective research applications, as shown in the literature review of the previous chapter for business model components, 128 components emerged from the 150 articles with limited overlap. This variance indicates that some components are proposed by certain scholars while ignored by others, and indicates that in fact no framework to date captures all elemental functions. Another finding in the components examined is that there is lack of consistency in the level of abstraction they entail. It is evident in the synthesized components that some authors characterize a business model using upper management concepts such as transaction governance, some authors mention strategic components such as marketing strategy, while still others argue for detailed activities such as distribution. The inconsistency in the levels of abstraction is also shown from the different definitions identified for a business model provided. Notably, even efforts to synthesize perspectives such as Gassmann's (2016) work on the seven schools of thought include strategic choice school and activity system school, directly displaying differing levels.

This chapter builds on the system framework of a business model and its RCAS properties, to exploit its ability to facilitate abstraction, and proposes a means to reconcile the debates described above. By proposing three parameters: purpose of using a business model, levels of abstraction, and elemental functions, and constructing a knowledge organization scheme and map, this chapter argues that the seemingly different definitions and understandings of a business model are in fact abstractions of the same concept. Authors with different perspectives are not wrong, they are just looking at different portions of the whole. This chapter paints the whole with the intent of facilitating greater alignment in future research.

3.2 Research Questions and Hypothesis

This chapter addresses the questions regarding the inconsistent perspectives about business models. It tackles the question, "Why are there so many different conceptualizations about a single topic?" and "Is there a way to reconcile between these debates?" It is believed that the problem is largely related to knowledge organization. The current literature on business models is scattered, partly because of its varying theoretical roots. It is also thus hard for researchers to navigate the body of knowledge. We ask then, is there a means to help with the situation? Can we provide a way for authors to work on the same landscape and more easily navigate it? Two hypotheses are proposed in this phase: 1) Authors/researchers choose parts of the whole RCAS construct, most unintentionally, depending upon what they focus upon with their work; and 2) Elemental functions, levels of abstraction, and purposes are three factors that form common abstraction of a business model. The reasoning is that the RCAS framework facilitates the abstraction.

3.3 Foundational Theories and Methodology

This chapter is built mainly on three streams of theory and the primary research methods are thematic analysis and scholarship of integration. The first two streams of theory are based on the RCAS business model framework and its properties. The first is the understanding of business model elemental functions from the last chapter, which is drawn largely from management theory. The second stream is the theory of abstraction and comes from the abstractable nature of the RCAS construct: that is its ability to be examined and abstracted along various levels of focus while maintaining the conceptualization as a whole. Selective examination and focus are achieved while the grander concept remains unchanged. This property lays a solid foundation for our proposition. The third foundational theory employed herein relates to the purpose-context linkage: how purpose influences the selective use of a certain concept, as raised by Sinfield et al., (2012).

The research questions and related hypotheses described above will be again explored using thematic analysis. Thematic analysis will be performed on the same 150 articles studied in the last chapter. This time, the purposes for which authors use the business model concept and level of abstraction of their analysis will be recorded. These three variables will become the building blocks of the proposed knowledge organization map.

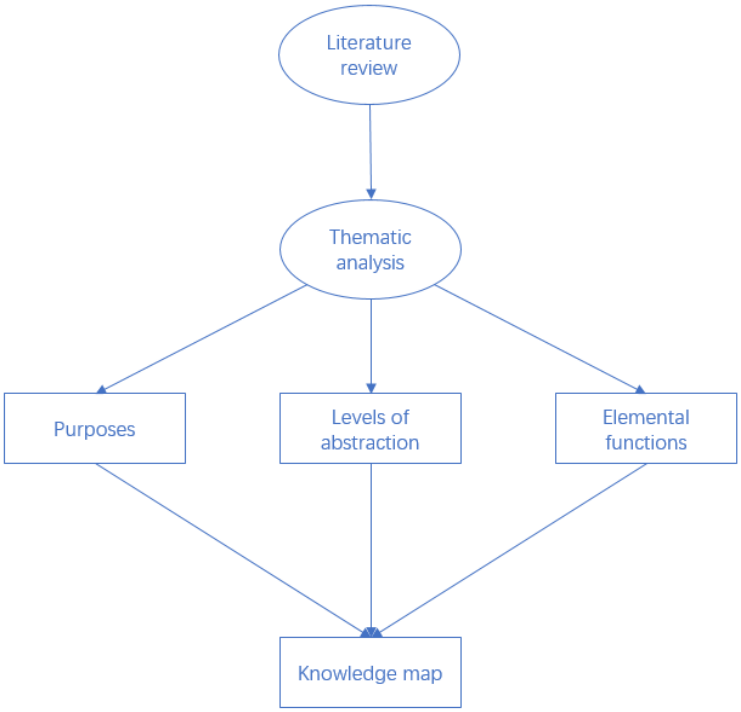


Figure 3.1. Research flow.

3.4 Business Model Elemental Functions

Traditional business model components were studied in chapter one and re-aggregated into eight elemental functions that are complete and theoretically grounded, as described earlier. There are two implications from this previous analysis. The first is that these eight elemental functions encapsulate all components in the studied literature. The second implication is that the thematic analysis supports the statement that different authors are looking at only a portion of the business model concept. Every author is using only a portion of the complete function set. It is then evident that the components (functions) in any given business model representation are thus a byproduct of an author's chosen level of abstraction. These elemental functions will be revisited later when the knowledge map is being constructed.

3.5 Purposes of Using a Business Model

Purpose is defined as "the reason for which something is done or created or for which something exists" by the Oxford dictionary. It is the objective of an effort, a goal to be achieved, or a job to be performed. It is not uncommon for the purpose of using a certain concept to have an

influence on the focus of research and to result in abstraction of the concept. Take construction engineering for example, construction is a series of activities and any construction process is a complex project. However, when someone is trying to examine the economic aspects, such as the cost efficiency, they would only look at data regarding cost of procurement, cost of equipment, time of construction, and related aspects and would not look at the detailed methods of surveying or what the profit is. Krantz and Kunreuther (2007) have examined how goals influence decision making. They used fire and theft insurance purchase as an example to illustrate a goal-based model for choices. In their research they listed several jobs or aspects that purchasing insurance can satisfy for the buyer, including reducing the chances of a catastrophic loss, and reducing anxiety about risks of fire and theft, among others. The importance of these jobs varies with individual buyers, but they are also affected by contextual variables. They then raised an example when a buyer is considering paying monthly bills, he/she may think chiefly about satisfying the requirements of the bank that holds the mortgage loans and minimize the cost of insurance. The full list of purposes provides a holistic representation of the insurance concept (like a business model). The contextual variable in the insurance example allows buyers to consider only two of the whole set of jobs that insurance can provide because the rest is of less importance given that purpose. Language is another example of purpose-context as illustrated by Douglas and Sutton (2003). It was posited that communication goals affect language abstraction. Schmid et al. (1996) demonstrated this idea by using an example of lawyers in court. Typically, prosecution lawyers use high level language to describe defendants' actions, implying dispositionality and personal responsibility, while defense lawyers use more concrete language, implying that situational factors were the cause. This is another great example of purpose's influence on selective usage of a concept. It is also evident in business management as well. Sinfield et al. (2012) have pointed out that researchers and practitioners have chosen the elements to include in their particular view of a business model based on the purpose for which they plan to use the business model construct, and concluded that a business model, as a construct, is composed of a set of choices that may vary by circumstance of application. Effectively, different elements have been varyingly assembled to address different questions. A scholar studying supply chain is unlikely to pay too much attention to marketing. Focusing on the aspects that best fulfill the purpose(s) of the research will largely increase efficiency and accuracy. This process is an abstraction process that extracts a portion out of the whole based on the purpose of the research.

3.6 Levels of Abstraction

Abstraction was initially a prominent topic in the early years of cognitive and developmental psychology, and much attention was given to understanding how people store, retrieve, and integrate knowledge (Brown, 1958; Kay, 1971; Rosch, 1975; Rosch et al., 1976; Schank & Abelson, 1977). The earliest mention of abstraction dated back to Aristotle (2013/350 B.C.E.) when he believed that people's ability to think at a higher level of abstraction can influence the very fabric of human interactions. Abstraction is largely related to information reduction and is generally defined as a process of identifying a set of invariant central characteristics of a "thing" (Rosch et al., 1976; Schul, 1983; Vallacher & Wegner, 1987; Semin & Fiedler, 1991; Shapira et al., 2012; Burgoon et al., 2013). The notion of levels of abstraction reflects the idea that people must operate at some level of abstraction when thinking about "things" (Burgoon et al., 2013). It reinforces the idea that abstraction operates on a continuum. Usually, levels of abstraction are ordered (totally or partially) through an abstraction-relation, i.e., one level is called more abstract than another level. Lower levels of abstraction capture more detailed, specific, vivid, and imageable thoughts (Strack et al., 1985) while higher levels of abstraction include fewer readily observable characteristics. A more abstract level is characterized through a reduced level of detail in the representation. Moreover, abstract levels model the world in a less precise way, but still capture certain, important properties (Bergmann & Wilke, 1996). In the software industry, where object-oriented coding has evolved to employ abstraction with intention, programmers reduce complexity by selectively choosing what information to convey about an object. Similarly, in engineering contexts, it is commonplace to selectively include first, second, and higher order effects, allowing focus on primary variables, without declaring that other variables don't exist; they are simply negligible for some classes of problems. A similar idea has essentially been employed in the business model arena as varying "partial views" of a business model have been utilized to address different questions. The notion that business models have been employed for different purposes at varying levels of abstraction has been highlighted by several scholars. Notably, Massa and Tucci (2014) delved into the various conceptualizations of business models and argue that "these could be structured into several levels of decomposition with varying depth and complexity depending on the degree to which they abstract from the reality they aim to describe" (pp. 431). Specifically, Massa and Tucci (2013) indicate several forms of abstraction: activity systems, meta-models, specified graphical frameworks, archetypes, and narratives. In

addition, Wirtz et al. (2016) took another perspective, calling out product level (detailed), business unit, company level, and industry level variations of business model conceptualizations. It is posited here that the variance in chosen levels of analysis and focus will yield differences in abstraction. In other words, if authors are using the business model concept or examining the concept on different levels, their conclusions or results will be different as well. If examined on a higher level, there are likely to be fewer concrete details about a business model compared to examination on a lower level.

3.7 Why These Three Variables

Before diving into the analysis of these three variables, it is important to understand why these three variables are chosen to describe abstractions of business model conceptualizations. According to abstraction theory explained above, abstraction is largely linked to information selection. Information selection can vary in both depth and scope. Depth indicates how detailed the selected information is, and scope indicates how comprehensive it is. In the context of business model studies, depth and scope are represented by elemental functions, purposes, and levels of abstraction. These three variables come primarily from observations generated through literature reviews. Elemental functions have already been shown to be factors of abstraction in Chapter 2. Thematic analysis presented earlier demonstrates that past papers were only employing a fraction of the 8 elemental functions that encompass variables in the literature, indicating abstraction indeed happened. It is observed that purpose is a contributing factor towards abstraction in the section above from a literature standpoint. This phenomenon is also evident in the 150 papers studied in chapter one. For example, the work of Markides (2013) aims to "guide research on the challenge of managing two business models simultaneously and identify several insights". Since "managing" is a key component of this work, his proposed elemental functions include Manage Value. Whereas in the work of Pauwels and Weiss (2008) which examines the source of long-term revenue loss, Capture Value is the main focus. Another example is Room and Louche's work (2016) to understand business models for sustainability. Sustain Value is a key function under discussion. These signs suggest that purpose(s) play a role in the abstraction of business model conceptualizations observed. Collectively, elemental functions and purposes represent the scope of abstracted information. The notion of level of abstraction (level of analysis), which is the depth of abstracted information, is most discernible in Gassmann's schools of thought. It is mostly

brought up unknowingly since it is a concept rooted in other fields of study. It can be observed that the schools of thought vary quite significantly. The activity system school focuses on firm activities and falls on a lower level of abstraction. The process school goes up a level and interprets a business model as a dynamic process, which doesn't focus on specific activity but the interactions between business activities. The strategic choice school and cognitive school go even higher on the spectrum of levels of abstraction. Authors working on different levels have different interpretations and understanding of a business model. The presence of varying levels is also evident in other reviews such as the difference between "business operations" and "conceptual representations". Collectively, these three most commonly used notions in business model conceptualization, functions, purposes, and abstraction levels, provide a robust and effective set of variables with which to characterize different works. Therefore, they are chosen to construct the knowledge map described below.

3.8 Literature Review and Data Gathering

With the three variables understood, this section presents a thematic analysis of the literature to retrieve related data and construct the knowledge map with these three variables. The same 150 peer-reviewed articles from the last chapter are used as the subjects of the analysis. Elemental functions from these 150 articles have already been recorded and will be used directly. In the following section, each article's purpose(s) and abstraction level(s) are carefully identified and recorded. Each paper was read carefully and words or phrases that either explicitly or implicitly express each paper's purpose(s) and level(s) are located.

3.8.1 Purposes

The purposes gathered here are not the purposes of the businesses being modeled or the purposes of the papers, but instead the purposes for which the business models were employed in the studied works. The gathering of purposes is performed with the intent to develop a set of themes – generalized purposes – similar to what is done in the last chapter regarding elemental functions. Purpose(s) for each article are first identified. Thematic analysis is then applied to interpret these purposes, analyze their nature, and aggregate them based on shared nature. A coding table is presented below to illustrate the criteria used for categorization of purposes and supporting quotes that enabled related decisions. It is important to notice that a paper using the key words does not

necessarily mean it is pursuing the corresponding purpose. It depends on the context of the paper. On the other hand, a paper not using certain key words can also pursue the corresponding purpose. Each was thus examined to determine the purpose. But generally speaking, papers using key words in the coding table tend to pursue the corresponding purposes. The process of thematic analysis starts with purposes that are easily observable such as “Theorize”, “Characterize”, and “Change” since many papers use business model constructs to form conceptualizations and to achieve innovation. Each paper is then reviewed to determine if it can be categorized into these themes based on the definitions. For example, the work of Abdelkafi and Tauscher (2016) is trying to “advance the current understanding of the basic functioning of business model for sustainability”. From the words “functioning” and “advance … understanding”, it can be interpreted that it is proposing a conceptualization of a business model. Therefore, it fits the definition of “Theorize” and is categorized there. However, upon reading the paper, it also describes value creation and value capture as essential functions of a business model, which also fits the definition of “Characterize” and thus is placed in that theme as well. The process was continued and some papers were found to synthesize business models into typologies or ontologies such as the work of Afuah (2004). This purpose does not fit with any of the three starting themes. A new one was thus created for it and coded “Categorize” to reflect the purpose of “synthesize into typologies”. As this process continued, more and more purposes were identified that went beyond existing themes. New themes were created to satisfy those purposes. This iterative process is continued until every paper could be categorized into one or more purpose themes.

Table 3.1. Coding table for purposes.

Code	Label	Definition	Example coding key words	Example supporting quote	Author	Year
Theorize	a	to form theories, conceptualize, and create understanding of a concept	Understanding, theory, insight, definition, foundation	"advances the current understanding of the basic functioning of business model for sustainability"	Abdelkafi & Tauscher	2016
Characterize	b	to describe what a business model is, including its components, characteristics, and company examples	Framework, components, function, structure, characteristics,	"to propose a theoretical e-business model framework, a multidimensional classification-scheme, and to define critical success factors"	Dubosson-Torbay et al.	2002
Categorize	c	to categorize different types of business models or classify companies based on business models	Synthesize, ontology, type,	"offer concepts and tools to analyze and synthesize business models"	Afuah	2004
Compare	d	to compare between business models, companies, and other aspects regarding business models and companies	Between/and/vs, comparing, distinguish, relationship.	"investigate the business model configurations associated with high and low firm performance"	Aversa et al.	2015
Model/predict	e	to model or simulate a business model and predict outcome or result	Implication, relationship, effect on, link, determinants	"to examine the financial performance implications of strategic emphases with respect to business model innovation vs replication"	Aspara et al.	2010
Organize	f	to organize business models or companies	Organize	"investigates how an established firm organizes for an emerging business model"	Khanagha et al.	2014
Strategize	g	to formulate strategy or make strategic decisions with business models, as well as study strategic influences	Competitive advantage, strategy, use business model to, determine, create value	"explores the concepts, tools, and techniques that enable organizations to gain and/or maintain a competitive advantage"	Afuah	2014
Design	h	to design business models, businesses, or activities	Design, create, develop, build, execution, formulate	"present an approach that utilizes goal and business models as the foundation for designing e-services"	Andersson et al.	2009
Assess	i	to measure the effect and successfulness of a business model or aspects regarding a business model	Analyze, examine	"offer concepts and tools to analyze and synthesize business models"	Afuah	2001
Optimize	j	to optimize a business model, business, or performance	Advantage, improve, best, success, excellence, better,	"explores the concepts, tools, and techniques that enable organizations to gain and/or maintain a competitive advantage"	Afuah	2014
Change	k	to change business model understandings, a company's business model, a business, or parts of a company	Transformation, innovation, different, new, evolution, adapt, dynamize, improve, renewal, alter	"provide new insights into how executives′ cognitive processes can influence corporate business model transformation decisions"	Aspara et al.	2013

Eleven primary purposes (labeled from a to k) were defined using thematic analysis, as shown in Table 3.2. Purposes vary along a spectrum from theorizing about businesses and the way they operate, through to constructs to inform applied decision making, optimize performance, and manage change. The quotes that reflect each article's purpose are presented in appendix B.

Table 3.2. Purposes from thematic analysis.

a. Theorize	g. Strategize
b. Characterize	h. Design
c. Categorize	i. Assess
d. Compare	j. Optimize
e. Model	k. Change
f. Organize	

In retrospect, these purposes are widely used in the business model area. Using business model constructs for theory building represents a significant application in the literature. One of the most fundamental uses of business model constructs, on the other hand, encompasses simply characterizing, conceptualizing, or describing a business and how it functions. It is also common that researchers utilize the concept to form theories. This can be done via narratives, symbolic diagrams, or even graphical frameworks. Examples of such purposes are reflected by phrases used by authors such as "to conceptualize", "to provide a theory", "to understand the characteristics", and others. Once businesses are characterized in such a way, some researchers attempt to group similar businesses, or business models, by categorizing them, for example into ontologies or as archetypes. This purpose is reflected by phrases such as "to classify between", "to group business models", among others. Further, when a given construct is decided upon, authors or researchers sometimes employ that construct to assess a business or compare it with others at a strategic or tactical level. This may be done on an absolute or relative basis (i.e., setting standard measures, or simply comparing models), can be used for internal evaluation (e.g., over time), or in comparison to external entities like competitors, or may be carried out under current/static conditions or be viewed more dynamically. Albeit typically at a richer level of detail, business model constructs may also be utilized to literally model or simulate a business, its operations, or broader industry dynamics. Authors typically try to predict certain outcomes or verify certain frameworks in this purpose. Ultimately, if a model is robust, it has the potential to be employed in scenario analyses and/or to predict or forecast business performance and options. This can sometimes lead to use of

the business model construct to explore organizational challenges and opportunities within an enterprise, or to formulate strategy. Oftentimes, in efforts to realize a strategy practically, the fundamental functions of a business model are used to facilitate business model design exercises, again at varying levels of depth. With a robust perspective on intent, business model constructs, particularly at higher levels of abstraction, may also be employed to facilitate communication and understanding of how a business works or competes. Views of business models may further be used to help assess and manage an enterprise and inform decision-making. In this regard, the business model construct may also be used to help optimize the operation of a business by monitoring and adjusting different functions or developing an understanding of cause-effect linkages in the business system, or to explore means to proactively or reactively change the business by transforming the enterprise or deriving new, innovative ways to compete (a process often referred to as business model innovation).

Across the 150 works analyzed, the purposes outlined above have varying frequency as illustrated in Figure 3.2. below. A great deal of work, 91 of the 150 papers, focused on theorizing the value and/or nature of business model constructs. A significant number of authors also employ the business model construct to conceptualize or characterize the way a business model works, or to define an individual category of business (e.g., e-services, internet businesses, or networked models) (84 of the articles). Fewer authors have attempted to develop broadly applicable ontologies that categorize different forms of businesses (14 of 150). Select business model constructs are quite frequently used to compare businesses (25) or model industry dynamics (19). Strategy development (38), inclusive of scenario analyses, and exploration of situations that may necessitate change through transformation or innovation (57), are also a common focal areas for application of business model concepts. The documentation of each paper's purpose(s) is presented in Appendix B.

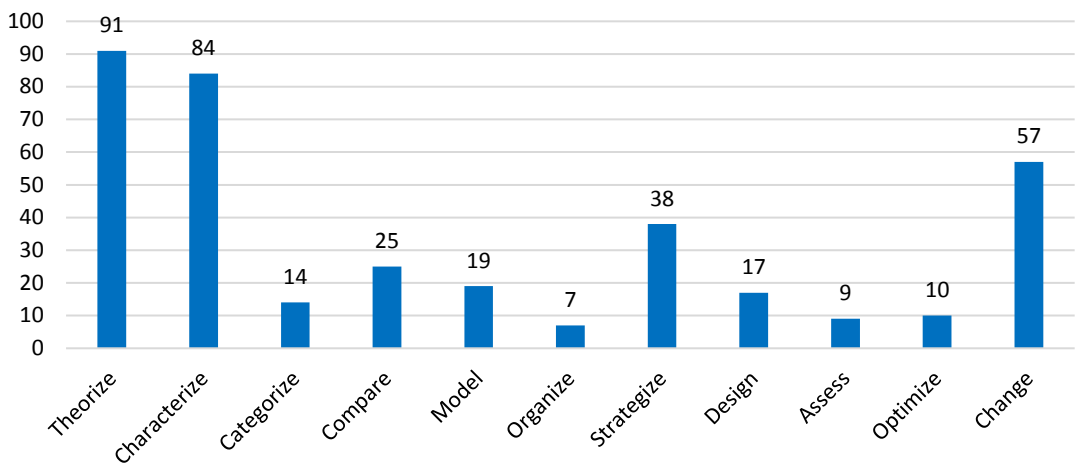


Figure 3.2. Histogram of purposes for which business models are used.

It is also noticed that a few papers employed multiple purposes in their pursuit. A pie chart is presented below to show the number of papers with multiple purposes.

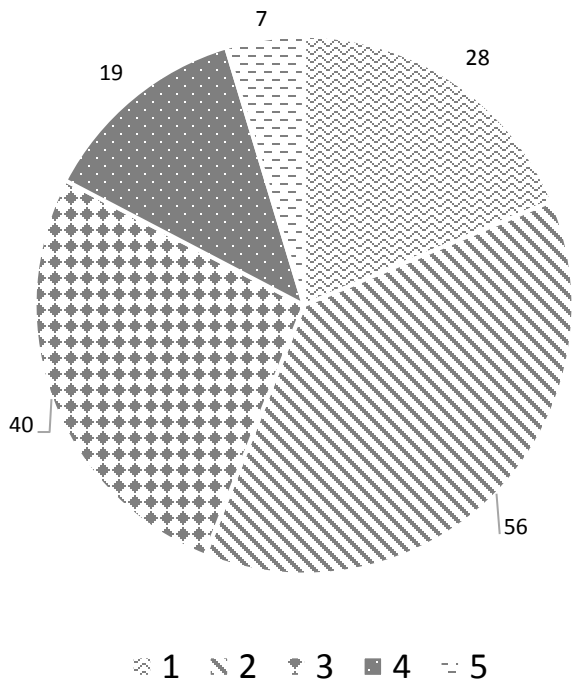


Figure 3.3. Number of papers with multiple purposes.

It can be seen that most papers actually pursued two purposes. As many as five purposes have been employed at the same time. It is intuitively reasonable for authors to pursue different purposes as many of the purposes "ladder" in complexity and thus build on each other. Authors often present a theory or an understanding of a business model and then characterize it in terms of structure and components. Some then use it to compare it to existing frameworks and assess its strength. This simple yet illustrative example shows that it is indeed natural for authors to pursue multiple purposes. It is also common for researchers to develop theories based on a business model construct and then propose strategic moves and suggestions based on the theories. Strategy and management of change (innovation, transformation) are also closely linked. To show these interrelations between purposes, a matrix is developed. The size of each bubble in the graph denotes the number of papers sharing the intersecting purpose. The result shows how closely and often two purposes are linked. For example, Theorize and Characterize are often studied together.

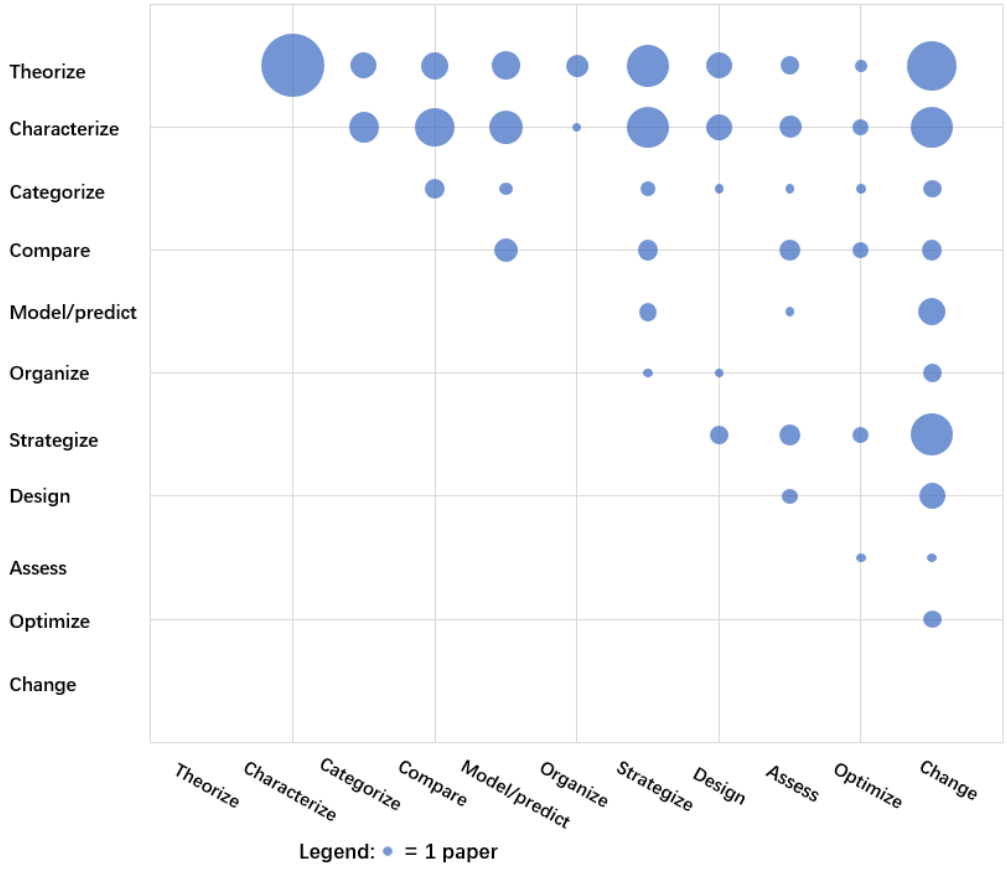


Figure 3.4. Purposes correlation matrix.

3.8.2 Levels of Abstraction

Collectively, these purposes capture all of the efforts employing business model constructs described in the 150 works explored in this study. However, importantly, it is clear that different researchers fulfill these purposes using business model constructs at substantively different levels of abstraction. With this in mind, effort was also invested to develop a robust and, to the extent possible, complete view of the levels of abstraction that are encountered throughout the business model literature. As explained in the earlier section, abstraction is about information selection. It is intentionally including or excluding details of the object under analysis. Levels of abstraction define the amount of detail selected. As a research method, abstraction facilitates focused analysis based on predetermined goals. Take aircraft for example. One can envision aircraft conceptually as, for example, a flying wing, blended wing, or wing plus fuselage configuration; be more specific about the design and functional implications of these configurations, or get into great detail about the attributes of the aircraft system components themselves, as one might examine in an investigation of the underlying mechanics and inter-relationships of components. Any given level of abstraction is thus a model with enough detail to achieve the intended purpose of the representation. This is a concept that transfers equally well to business models.

With this in mind, building on the literature of abstraction, herein five distinct levels (each assigned a Roman numeral) of abstraction have been defined to encompass the broad body of work to date that has involved some form of business model construct, at outlined in the table below. The development process of abstraction levels differs from the process of defining purposes. The main reason is that the level a paper is on is less explicit. Therefore, the starting point – initial themes – of the thematic analysis comes from abstraction theory. From that point on, thematic analysis improves on the existing themes and completes the set using reviewed papers as sources. Recall from the discussion on levels of abstraction earlier, abstraction operates along a continuum between a high, more abstract level, and a low, more detailed level. Applied herein, the higher level is represented by the conceptual understanding of a business model as suggested by some of the high-level descriptions of elemental functions offered by previous authors, in relations to functions of value creation and value capture. On the other end of the spectrum, the lower level is represented by the detailed activities or concepts suggested by elemental functions and the details within them such as logistics and financing. When reviewing these 150 papers, more levels were identified that operate between the highest level and lowest level. For example, Aspera et al. (2010)

examined the financial performance implications of strategic emphasis on business model innovation vs. replication. There is a logical connection that is being studied. It is not high enough to be considered conceptual and is not detailed enough to fit the activity level definition. Therefore, a new level is created and coded "logical level" that describes internal rules and interactions.

Table 3.3. Levels of abstraction

i. Conceptual	This level provides a cognitive impression of the business model, yielding a generalized understanding of its primary functions, purposes, and basis of advantage
i. Logical	This level describes the rules that establish the ways in which the functions of the business model interact
ii. Functional	This level yields insight into the specific functional states of the business model (i.e., the specific choices made to fulfill the functions that achieve its purpose)
iii. Architectural	This level defines the hierarchical relationships between functions and related actors, establishing organizational structure, resource relationships and constraints
iv. Activity	This level provides a detailed view of the actions of functions and their exchanges (e.g., funds, resources, capabilities, influence)

By carefully reading and reviewing each article in the literature review, it is possible to determine each article's level of abstraction. The above five levels were tested and altered as necessary in the review process. Once all the papers reviewed could be categorized into one or more levels and no additional undefined levels were needed, it was determined that these levels were all the levels necessary to capture work presented in the studied papers. The result of such categorization will be presented in a master table in Appendix B.

3.9 Knowledge Organization Map

With the herein yielded purposes and the five levels of abstraction developed, it is possible to define a space in which one can map all examined previous studies involving business model concepts, as shown in Figure 3.5. Elemental functions are incorporated in this space in the form of ovals in the cells within this space building on the RCAS model design developed earlier. With the purpose(s) and level(s) of abstraction of each paper known, it is possible to position each paper in one or more cells inside the created space like a coordinate. We can then highlight the ovals corresponding to the correct functions that were used in each work building on the analysis presented in Chapter 2. This way, the three variables are incorporated in the same knowledge map.

Going deeper into this analysis, it can also be seen that different subsets of the functions encompassed in the RCAS business model construct are typically employed at different levels of abstraction and to fulfill specific purposes. From this perspective, greater consistency is apparent in the literature than might be expected when simply viewing all work on business model constructs as a collective whole. There are, effectively, units of analysis drawn from the business model construct that are relevant to specific problems. A more detailed analysis of each article is provided in the master table in the Appendix C. The table includes purpose(s) and levels of abstraction used for each article.

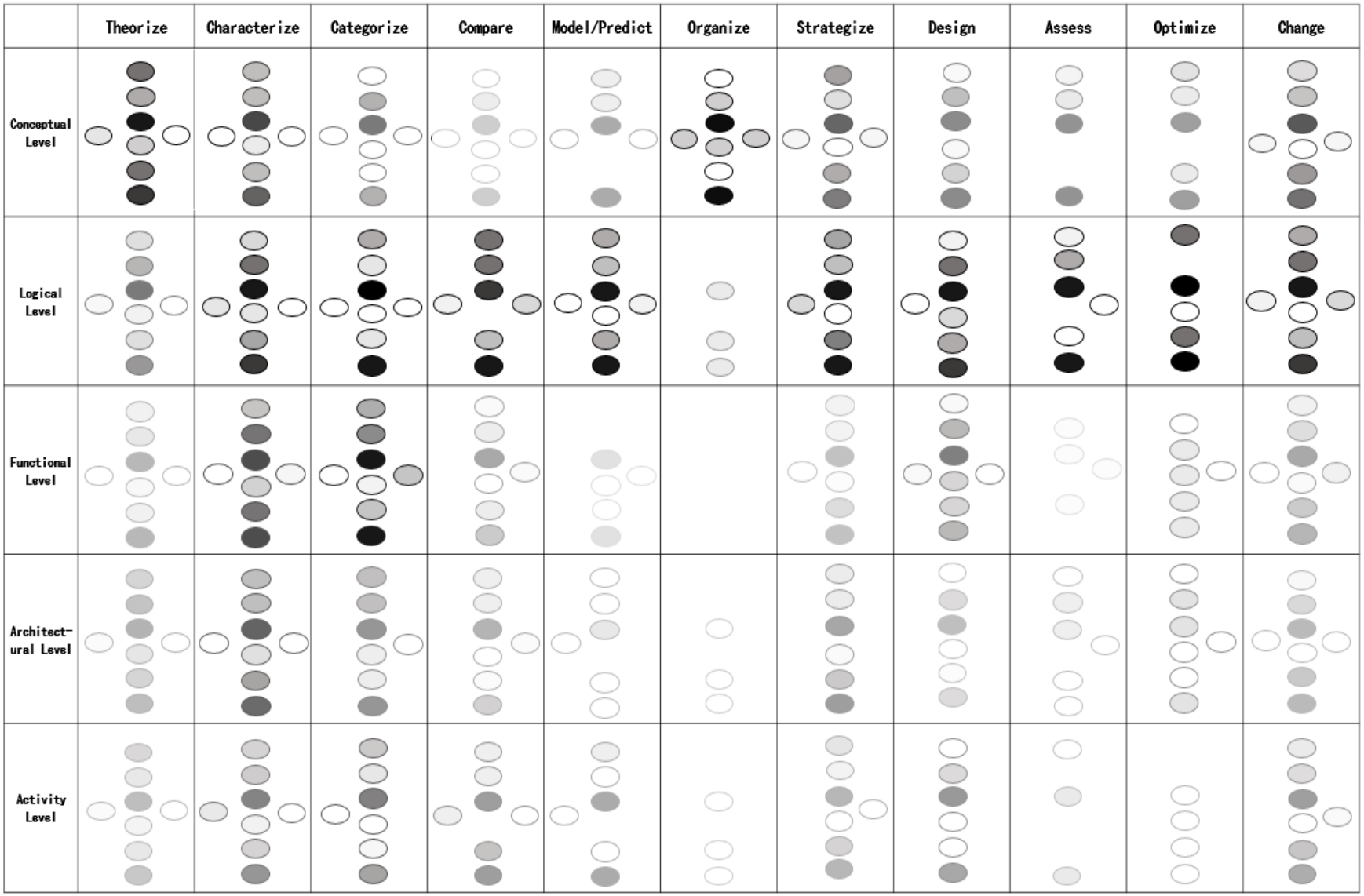
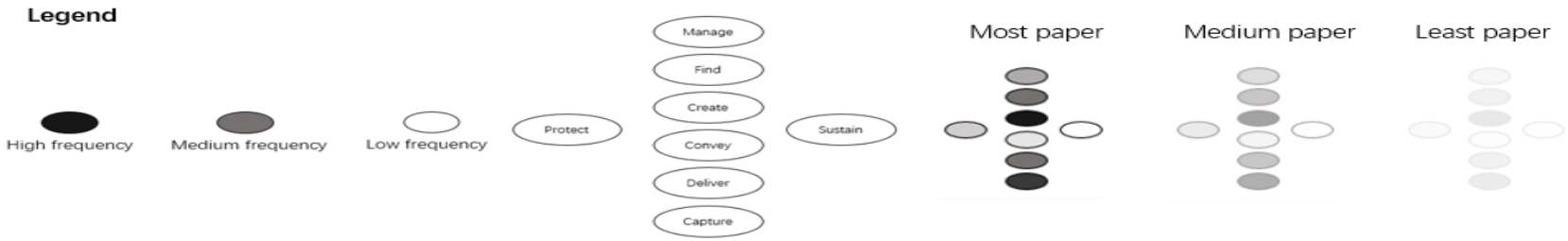


Figure 3.5. Business Model knowledge map.

Figure 3.5. Continued.



In this collective analysis, the purposes of the business model construct employed, the level of abstraction, and the elemental functions utilized were explored. The analysis shows the linkages between these three variables and produces insight into their inter relationships. Inside each cell, it was mentioned that the ovals represent the elemental functions of the RCAS employed by the authors of each work. The darkness of the ovals represents the frequency of that elemental function among papers modeled in the cell. The darker an elemental function, the higher its prevalence in that cellblock. For example, in the "theorize-conceptual level" cell, the oval denoting "Create Value" is the darkest. It means that this elemental function is used the most in articles pursuing the "theorize" purpose on a conceptual level. It is also noticeable in the figure that some of the cells have higher visibility than others. The shading of the cells indicates the number of papers located in that cell. Take the column "Theorize" for example, the conceptual level block is most visible, which means that the majority of the articles pursuing the purpose of theorizing are conducted at a conceptual level. Similar signs can be observed elsewhere in the table, such as the purpose "Characterize" which has quite consistent shading at all levels, because a business model or a business can be characterized at all five levels of abstraction. For purposes such as "model/predict" and "strategize", the logic level is the most visible. One of the reasons may be that in order to model or strategize, there needs to be understanding of the logic connections and implications between the elemental functions. Using this map, it is possible to position every piece of studied research in terms of three included variables. Not only is it a tool to organize previous studies, it can also act as an indicator of possible future research and application areas. All the cells that are either blank or not clearly visible may be due to the fact that there are very few studies done regarding those spaces and there are thus opportunities for research. Another possible reason is that certain levels of abstraction are of little value for certain kinds of problems. This link between problem frame and variant of solution (business model) form, is the foundation of yet another school of thought termed "design". Design is a goal-oriented problem-solving activity (Crismond & Adams, 2012; Solis & Sinfield, 2016), in which it is broadly recognized that design choices and constraints change as the end goal changes (Chi and Hausmann 2003; Grant and Berry 2011; Dorst 2015).

In summary, once the purpose of employing a business model construct for any research is decided, there are likely a key set of elemental functions and an appropriate level of abstraction that scholars need to consider. This is the core insight into the linkages of purpose, level of

abstraction, and elemental functions illustrated in the map above. What is even more important is that when viewed this way, the underlying system does not change with varying purposes or levels of abstraction. One system – the RCAS business model system – represents all. This then supports the proposition that this chapter is making, which is that different authors with distinct conceptualizations of business models are not wrong, they are just examining different abstractions of the same concept. It reinforces further the universal value of a system model of the business model. The differences amongst the business model community arise because researchers are looking at the same concept with different purposes, levels of abstraction, and elemental functions, likely without realizing it. This is supported by the fact that all 150 research articles examined can be successfully described using the RCAS model and be placed into the map. This organization map outlines the grander whole of the business model concept.

3.10 Summary

This chapter of the dissertation tackles the long debate on business model conceptualization. The proposed resolution provides a possible common ground among scholars to discuss their findings and organize existing and future knowledge. It also clears some of the confusion and provides a possible resolution to the debate about business model conceptualizations. By introducing purposes and levels of abstraction, this chapter intends to provide a knowledge space and tool that is as objective and inclusive as possible. These solutions are achieved through an extensive thematic analysis of the literature, which provides historical support. A knowledge map is developed that can cover the entire business model research space that has been pursued to date and supports extrapolation to new spaces where a business model construct could be valuable. Through the literature review, this chapter draws existing concepts and components from previous studies and combines them with new but critical ideas from engineering systems to fill the gaps within the business model realm. It addresses the knowledge management gap stated at the beginning of this study and provides a theoretical foundation for future business model studies. It is believed that the RCAS framework can serve as a language between scholars and practitioners to advance the study of business models across levels of abstraction and purposes.

4. A COMBINATORIAL DESIGN METHOD FOR BUSINESS MODELS

4.1 Introduction

This chapter explains the last work stream of this study, which is a system-inspired design method for business models. This chapter is built directly from the business model framework constructed in the second chapter. It adopts the system framework and a combinatorial design mentality, each of which will be explained in detail in this chapter. Collectively, a manual-like design method and guide are developed.

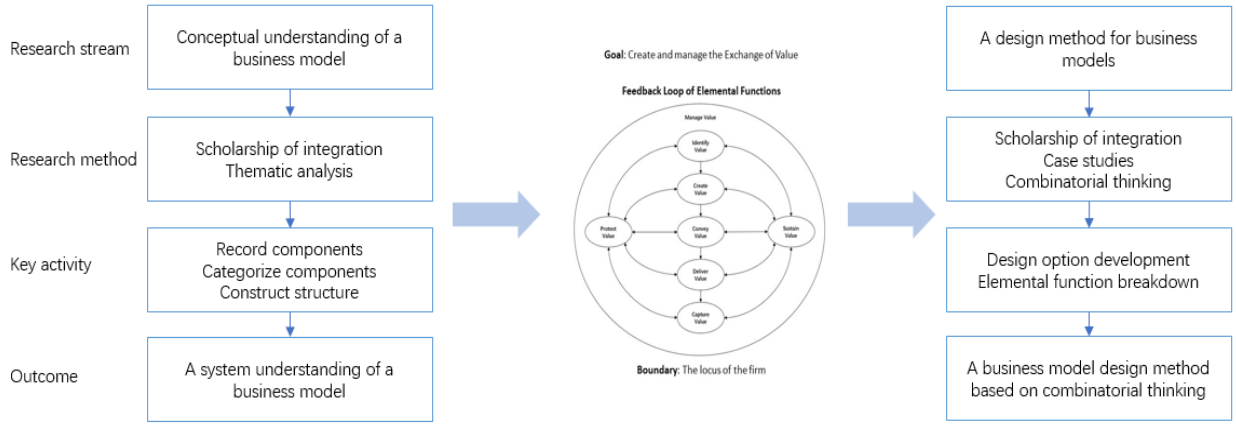


Figure 4.1. Research overview of chapter 4.

4.2 Research Questions and Hypothesis

This chapter of the research builds on the lack of design methods for business models as called out by other researchers (Zott & Amit, 2010; Keen & Qureshi, 2006). There are very few guidelines for users to follow and design options to choose from. These problems are partially related to the lack of a thorough understanding of a business model. If the design object itself is not clear, it is rather difficult to develop a design method accordingly. This problem has been addressed in chapter two of this research. Another problem is that most previous attempts at a design method were conceptual and provide few detailed options. There is potential to take a step further and be more impactful to practice. To address these problems, we ask what the procedures and design options are to design a business model. A hypothesis is proposed, which is that a business model design method based on engineering design principles and inspired by system theories will provide a strong guideline to facilitate business model design. The reasoning is that

design has been a crucial part of engineering for centuries and engineers have developed well-studied design principles and procedures. These insights can be transferred into business models. Like the RCAS framework, design is system-based and focuses on relationships between components. It is the interactions between components to achieve a goal, and design facilitates that by selecting the best components that can functionally relate most ideally with others to yield an optimal result.

4.3 Design and Business Model Design

In modern times, design has been a crucial part of people's lives. Our computer, cellphone, shoes, the beds we sleep on, the house we live in, and the road we walk on all come to reality because there are designs behind them. It has affected all parts of our lives, influencing our purchase preferences, forming our habits in life, and influencing our quality of life as well. A good design induces positive emotions within us, such as seeing a really pretty dress, driving a well-engineered and decorated car, and even small things like sitting on a comfortable chair. A good design enables the end product to do its intended job better, while providing comfort for people influenced by it. Sometimes design is so prevalent, and we are so used to it, that we take it for granted, thinking that some product is just like that, without realizing the complexity and science in its design process. People may also think that design is not that difficult and should be very intuitive. On the contrary, design is a complicated process that involves carefully contemplated decisions and trade-offs. Take an office chair for example, some people may believe that designing a chair is simple. However, there is more engineering to it than one may think. Designers must consider the curvature of the back to provide comfort for the people sitting in the chair, height of the armrest, optimal numbers of legs to hold the whole chair, materials used to ensure durability and comfort, and many other aspects that require specific expertise. Design is not just present in engineering or product development. It exists in many areas such as strategic management, website development, and architecture. One area that can benefit from more involvement of structured design is the business model realm.

When it comes to business models, design has also been a part of the concept. Chesbrough stated that "every company has a business model, whether they articulate it or not", hinting that design can be intentional or unintentional. Business model design is also one of the eleven purposes for which scholars adopt the business model concept in their work as noted in the last chapter. The

importance of the business model concept itself is a strong implication of the importance of designing one. It goes beyond the business model concept and extends to business model innovation as well. Massa and Tucci (2013, page 424) stated that business model innovation refers to "1) the design of novel business models for newly formed organizations or 2) the reconfiguration of existing business models". They also consider the first phenomenon as business model design entirely. From their definition, business model design is the foundation of business model innovation, which is becoming another stream of innovation beyond product, services, and technology (Chesbrough, 2007; 2010; Lindgardt et al., 2009).

However, literature and research on business model design are not as prevalent as they should be. Given the vital importance of the business model for entrepreneurial firms and general managers, it is surprising that academic research (with a few exceptions) has so far devoted little attention to this topic stated by Zott and Amit (2010). They also called for a conceptual toolkit that enables entrepreneurial managers to design their future business models, as well as to help managers analyze and improve their current designs to make them fit for the future, similar to the concept of business model innovation mentioned earlier. Keen and Qureshi (2006) also pointed out the fact that there are very few guidelines in the research literature on business models as to the principles for designing one. Also, in the last chapter, out of 150 peer-reviewed works on business models, only 17 pursued the purpose of design. Some of the reasons for the lack of business model design research include the fact that the concept of a business model itself is still under debate. This stagnancy strongly hinders the advancement of research on this front. Researchers are still debating about what components there are, what structure a business model is built upon, and what the characteristics of a business model should be. Without crucial information and conceptualization like this, creating a design scheme has been extremely difficult and subjective.

Despite its rarity, there is research that has tried to create design principles or methods for business models. Zott and Amit (2007) first proposed two streams of principles to design a business model, namely a novelty-based business model and an efficiency-based business model. The former focused on the conceptualization and adoption of new ways of conducting economic exchanges, while the latter focused on the measures firms can take to achieve transaction efficiency through their business models. They later improved on this principle and combined design elements and design themes. Following their definition of a business model as an activity system,

they identified content, structure, and governance as the design elements. Design themes were an extension from novelty and efficiency to NICE: novelty, lock-in, complementarities, and efficiency. Grassl (2012) employed this method to try to design business models of social enterprise. Casadesus and Ricart (2011) used Ryanair as an example to demonstrate their Choices – Consequence model. Sinfield et al. (2012) presented a business model design method as a combination of choices, which users can select to yield different final results. Practitioners often adopt different business model "design guides", such as business model canvas, to facilitate design. However, these guides are often incomplete. First, they are often not complete representations of a business model. Second, they don't offer design options for users. Without design options, users, especially those who are not experts in the field, don't have a baseline to work with and to iterate upon. Even with these efforts on business model design, there is still potential for a more complete and intuitive design methodology, especially with the more complete understanding of a business model constructed in the last chapter.

4.4 Gaps and Needs for a Business Model Design Method

A few gaps are noticed in the business model design literature. The first gap pertains to the lack of a consistent structure underlying a business model. Most business model design literature follows a similar pattern in content. It first presents an understanding or definition of a business model and its components. Then it suggests readers to design for each component. This process is intuitive and not wrong in principle, but it's not enough. The first assumption for this process to work accurately is that the understanding of a business model and its components are complete enough to encapsulate what a business model really is in its entirety. Just as a civil engineer designing a project while not knowing whether it's a commercial building or residential building will be deemed irresponsible, a manager designing a business model without understanding what a business model truly is will also be ridiculed. However, among the current literature on business models, there is a clear lack of consensus on its definition and components, rendering existing design proposals accurate in their own realms of study but not applicable universally. This is evident in that nearly all previous research efforts on business model design methods use a different set of components. The second gap is the fact that most research on business model design employs an analytic and retrospective approach. This can be seen from works of Chesbrough and Rosenbloom (2002), Casadesus-Masanell and Ricart (2011). A well-known business is often used

as a case study to show how their respective design approach can be applied to the case. While this method is legitimate and important in its strength to explain and break down a successful business in a simple and understandable way, there is potential to adopt a more proactive approach. Just as a vehicle designer can first envision the appearance of a car and design the details gradually and systematically, a robust business model design method can also facilitate managers to adopt a more impactful approach. The third gap is the lack of a structured procedure to designing a business model. As seen in the literature, most works lay out their perceived business model components and explain why they are important, and why users should design them well. It is rarely the case that users get orderly guidance on business model design. Those who are not well-informed on business models may not fully grasp how to design for certain components, what choices they have, or the implications of their choices.

These gaps inform a need for a more structured design method for business models. This chapter, essentially, fills the three gaps and tackles the challenge of developing a business model design method by combining the combinatorial thinking of design and the business model framework developed in the second chapter. Later sections expand on the combinatorial design thinking from Sinfield et al. (2012) and the business model framework and explain how they work together to create a design method. Later sections also explain design, especially engineering design, and combinatorial thinking accordingly. A complete, manual-like design method with design options extracted from a database of actual companies will be presented and explained.

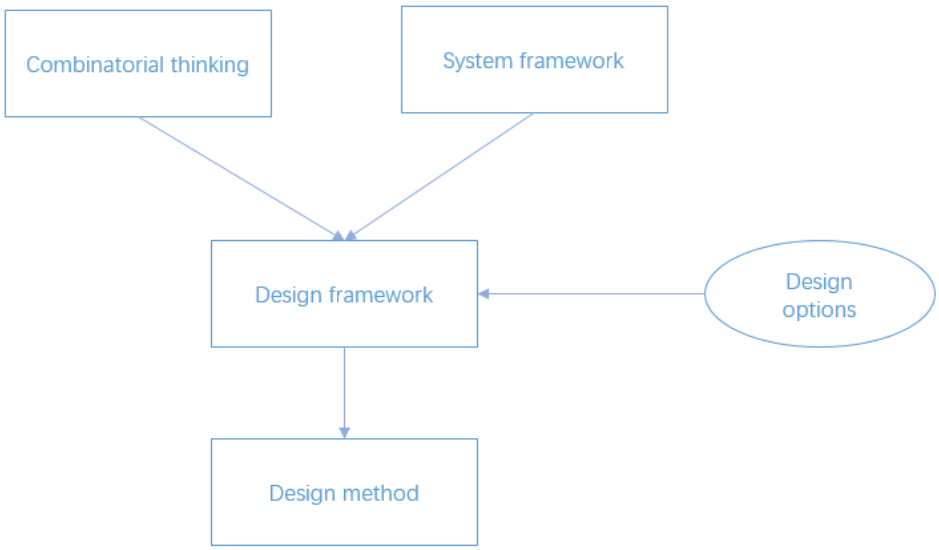


Figure 4.2. Research overview of chapter 4.

4.5 Design and Design Procedures

Unlike random brainstorming, design is deemed a goal-directed problem-solving activity (Archer, 1965; Crismond & Adams, 2012; Solis & Sinfield, 2016). Design involves optimizing parameters (Matchett, 1968) and balancing trade-offs to meet targeted user needs (Gregory, 1966). Design is also promoted as a thoughtful process that depends on the systematic, intelligent generation of design concepts and the specifications that make it possible to realize these concepts. "While creativity is important, and may even be teachable, design is not invention as caricatured by the shouting of 'Eureka' and the flashing of a light bulb" as noted by Dym et al. (2005). It is broadly recognized that choices and constraints change as the end goal changes (Chi & Hausmann 2003; Grant & Berry 2011; McCaffrey 2012; Dorst 2015). Design initiates "changes in human-made things" (Jones, 1992). Ranging from large scale infrastructure projects to small but precise objects, almost all projects and products need some level of design, and there are a large number of schools and disciplines teaching this skill. Design and design thinking are not limited to the engineering discipline. The business area has adopted design in multiple areas. Cooper, Junginger, and Lockwood (2009) believe that "design thinking applied to business strategy and business transformation involves the visualization of concepts and the actual delivery of new products and services", and "the concept of design thinking is now taking hold in management and is paving the way for design to address new problems in the organization". It is increasingly being viewed as a vital and important strategic resource (Dell'Era et al., 2010). Despite its wide recognition in importance and usefulness, designing a business model is not a simple task. Faber et al. (2003) pointed out that designing business models is a "complex undertaking because of the interrelatedness – a concept that will be revisited in later sections – of the different requirements, including technical, financial, and organizational". These different requirements need to be "accommodated and balanced". Design choices in one domain may affect those of another domain. Zott and Amit (2010) also emphasized this interrelatedness by pointing out how one choice made to one component of a business model can have influence on another component. Essentially, "each of these choices involve a fundamentally different business model, that is, implies a different set of activities, as well as the resources and capabilities to perform them" (Zott & Amit, 2010). This complexity, and sensitivity to large changes, strengthens the need for a structured design method. Engineering design principles are employed to try to provide insights and advancement to the solution of this complex problem.

Given its importance, how design is conducted bears a rather large significance. To understand it, we first turn to engineering. Design has been a major part of engineering for a long time and many have synthesized and developed procedures and rules of engineering design. In the work by Rusin (2015), the author proposed that a design process involves four steps, including defining the problem, creation and consideration of options, refining the solutions, and final decision of solutions. The book by Haik and Shahin (2010) divides design process into identifying customer needs, market analysis, defining goals, establishing functions, task specifications, conceptualization, evaluating alternatives, embodiment design, analysis and optimization. Pahl and Beitz (2007) believe that engineering design includes four major steps, including planning and clarifying the task, conceptual design, embodiment design, and detail design. Cross (2008) supports this breakdown of engineering design. In Cross's book, the design process begins with the analysis of the problem. Conceptual design, by analyzing the problem, generates broad solutions in forms of schemes. In embodiment design, those schemes are worked up in greater details. Finally, in detail design, the solution is refined carefully for implementation. In these proposed design processes, one of the important steps is to generate options, alternatives, or solutions for the task problem. Tayal (2013) divides engineering design process into "define the problem, do background research, specify requirements, create alternative solutions, choose the best solution, do development work, build a prototype, and test and redesign". Atman et al. (2007) propose that a design process includes problem scoping and information gathering, project realization, and considering alternative solutions. There is a significant amount of consistency among the design procedures by various scholars. Solis and Sinfield (2018) synthesized views in a design process to include stages of envisioning, defining problems, gathering information, generating alternatives, modeling and analyzing, evaluating and selecting. More importantly, they noted that the process is non-linear and transitions between stages iteratively and opportunistically, with changes in the way each stage may be approached depending upon the goal of the design exercise. At a higher level, primarily four steps can be identified: understanding the goal of the design, conceptual design, generating alternatives, and iterate to a final design. Other steps can be added but these four are prevalent in every design method proposed.

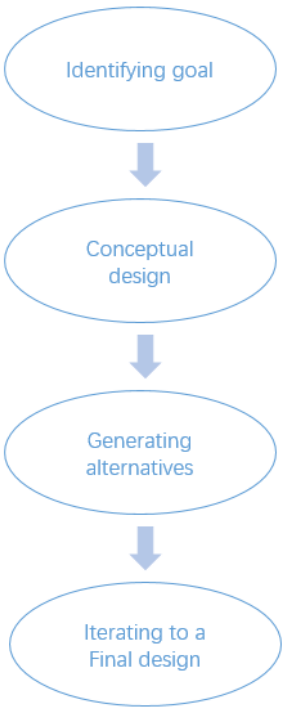


Figure 4.3. Design process at a high level.

This process is applied in virtually all areas that require design. Whether in civil engineering, mechanical engineering, or web design, these four key steps are present, and it is not difficult to imagine why. Identifying a goal is the first step of many tasks, not just design. It is impossible to design anything if the design object is not understood or designers don't know what exactly to design. Then a conceptual design is developed as a prototype to illustrate design ideas and examine if they fit expectations. If an initial design does not fit expectations or main ideas of the end product, there is no point in going on with the design. Alternatives are options that are available for certain aspects of the design. Often times for each design aspect, there are multiple choices that designers or clients have available. What kinds of steel to use, what color to use for a website, or what type of body shape to use for a car, are all examples of choices. After making choices on each design aspect that requires it, the final design is decided. This core process is very similar to the combinatorial thinking used in this phase of the research and what Sinfield et al. (2012) advocated in their work.

4.6 Combinatorial Thinking in Business Models

In this particular study, the proposed design method does not guarantee an end result based on a goal but rather places emphasis on creating options. But once a designer does have a goal in mind, the process of the proposed combinatorial business model design is similar to traditional engineering design, containing primarily four steps: understanding the goal of design, breaking down a design object into elemental functions, developing design alternatives (options) for each elemental function, and making choices. This method is, again, based largely on the idea of systems. In recent years, products and objects are becoming increasingly complex and they are essentially systems themselves with interacting components. By treating the design process the same way, it allows designers to create a pool of choices and lay out a structured approach to tackle the complexity. Another important aspect of this method is the ability to not only use it as a design approach, but also use it as an identification tool. If users change one option previously chosen for a certain component, the end product may become vastly different than the original, depending on the change and the significance of the component being changed. Then users of such thinking can change the choices and experiment with different possibilities in a relatively simple and iterative manner. Lastly, this method, while guiding design, concurrently constructs a database of choices. This is because what Sinfield et al. (2012) found was that the choices for each component, despite common belief, are not infinite. With the correct model and framework, it is indeed possible to generate all the alternatives, or at least a structure that can capture all the alternatives, for each component. Therefore, after designing one version of an object, there is a way to design multiple versions of this same object with different features and properties using this palette of choices. Sinfield et al. (2012) described the process as pulling different levers to yield different results.

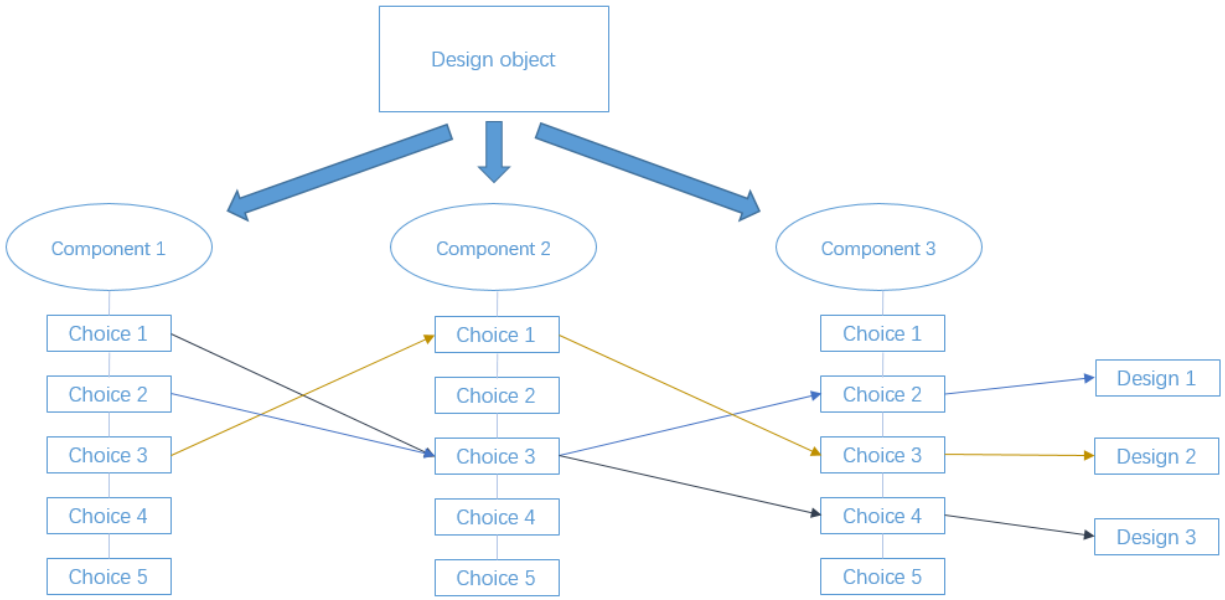


Figure 4.4. Combinatorial design process.

Sinfield et al. (2012) applied this thinking to the design and generation of new business models, a process they called "business model experimentation". This phase of the study is an extension and improvement on their business model experimentation based on combinatorial thinking. Business model experimentation was intended for users to quickly and methodically identify and examine multiple business model alternatives. It, contrary to many previous researchers, treats a business model as a combination of variables rather than a static item. They broke a business model down into six illustrative basic questions and noted that many more were possible: who is the target customer; what need is met for the customer; what offering will we provide to address that need; how does the customer gain access to that offering; what role will our business play in providing the offering; how will our business earn a profit. Notice that these are all questions, instead of determined components in a traditional sense, displaying the dynamic nature of this line of thinking as the answers to each question are by design and vary from scenario to scenario. The process starts by creating a template to examine possible alternative answers to each question. Then this template becomes a pool of choices that users can select to experiment with different combinations to yield the best outcome. This combinatorial and experimentation mentality presents another potential, which is that it is possible to yield business models that are not common in the target industry but are common in others. After creating the alternative choices

for each question, the next step is to narrow the choices. It is evident that not all combinations are feasible or compatible enough for successful execution. Just as a bulldozer cannot have plastic material for is shovel, a business is not likely to sell airplanes in a retail store. It is also possible to deliberately align business model choices with corporate goals by "locking in" specific choices before starting the process, which is another strong sign of design itself. The final step is then to make the final decision and refinements of the choices made. During this process, one thing to keep in mind is that one should always consider the effect of system interactions. As mentioned in the previous section, one change made to a single elemental function may have significant effect on the end result.

After understanding the basics of combinatorial thinking, it is important to assess why it is feasible in terms of business models. Several reasons encouraged the adoption of combinatorial thinking into business model design in this study. Firstly, as mentioned before, both combinatorial thinking and the business model concept receive significant influence from systems and engineering systems. They share some of the key characteristics including the presence of multiple components, internal interactions, and a goal. These characteristics, among others, enable great synergies between these two concepts. As noted in the earlier section, combinatorial design thinking requires users to break down the design subject into pieces. The system framework does exactly this. The system framework presents a construct where a business model is broken down into eight elemental functions, on which the combinatorial thinking procedures can be easily applied. The second reason is the framework's ability to generate alternative options for each elemental function, which is also a step of combinatorial thinking. Each of the elemental functions is generated from proposed components that companies use in their practices, which establishes the foundation of its applicability and relevance. Also, as noted by Sinfield et al. (2012), although ways to perform each business model function vary, they are not infinite, particularly when remaining consistent with an organization's goals and values. It is possible to come up with a rather complete set of choices for each elemental function, either from actual company policies or academic research. The third reason is the framework's interrelatedness and connectivity. The relationships between elemental functions will limit the choices users make for each elemental function, acting as constraints and check points for validity. A choice made on one elemental function has influence and is influenced by related elemental functions, which is exactly the principle of a system and in line with the statement that choices made on a component will have

an impact on another component by Zott and Amit (2010). In conclusion, the combination of the combinatorial design thinking and the system framework provides a process where potential choices are generated for each elemental function and then users select from this pool of options. Then the end-product will be an eight-part business model system with a set of choices. The following sections will focus on generating the choices of each elemental function.

This design method addresses two of the gaps mentioned in the previous section. This method proactively seeks out different business models through thought experimentation and combinations of different choices to achieve the purpose of design. It also provides a skeleton for a manual-like guide for users. However, just as mentioned before, in order for the design method to be effective, the design object should be as clear and complete as possible. An architect cannot design a successful building if the clients don't give him/her enough information on how they want the building to be, no matter how talented the architect is. What's more, without a good representation and framework of the design object, there is no way to construct a structured approach to its design. If the design method is the skeleton of the whole process, the design object is the flesh and blood that enriches the body. Therefore, a strong framework for business models is needed. And in this phase of the study, the system framework from the first chapter acts as the design object to represent a business model. The RCAS framework, with its eight elemental functions, ability for abstraction, and linkage between purposes and context, provides a complete representation of a business model that informs its key characteristics. It is also dynamic and provides focus on resilience and sustainability. The fact that combinatorial thinking requires a bottom-up mentality and procedure naturally fits with the construct of the system framework, as the framework is already a disaggregation of a business model with 8 elemental functions. Essentially, the first step of combinatorial thinking has already been performed by the nature and structure of the system framework. It is also seen that the dynamic nature of the two fit very well. While combinatorial thinking treats each component as a question with varying answers, the system framework describes each component as a function, waiting to be fulfilled in varying ways, strengthening the notion of human-made design. The following sections will explain the design method accordingly.

4.7 Combinatorial Design Process

This section will go through each step of the design accordingly to explain the whole design method. It starts by understanding the goal of the design, then identifies the design object. Alternatives are generated for the disaggregated design object. Finally, and most importantly, the section will explain the process of generating a pool of design choices for each elemental function.

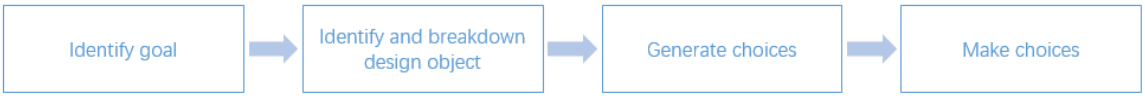


Figure 4.5. Combinatorial business model design process.

4.7.1 Identifying the Goal and Design Object

The first step is to understand what is it that designers are designing for. As mentioned before, the system framework developed in the last chapter will be used as the intended design object. The goal, however, is slightly different from the goal of a business model. As established before, the goal of a business model is to manage the exchange of value. The goal of designing a business model is to enable and facilitate such management. It is also unlikely that a company will just make one deal and then dissolve. Most companies desire long-term success, which is also what a business model should facilitate according to the RCAS framework. Therefore, to put it generally, the goal of designing a business model is to select the best options for each of the elemental functions and construct a business that can successfully manage the exchange of value in the long term and withstand competition. Notice that the word "generally" is used to frame the goal of designing a business model. The reason is that when context and market are applied, the design of a business model should vary case by case. It depends largely on the perception and expectation of managers and entrepreneurs. A car manufacturer's goal will be different from a gaming company's goal. A large corporation's goal to design a new business model may differ from a small start-up's. The goal framed earlier is a general baseline required for every design of a business model and it's not a complete representation of the goal of individual businesses. Normally, before designing a business model, managers or entrepreneurs will or should have a vision in mind about their expected business, and that vision should set the goal.

The RCAS framework is used as the design object, and as mentioned before, one of the strengths is that the disaggregation of the design object has already been performed due to the

structure of the framework. The eight elemental functions act as components of the design object. They are also the complete set of functions of a strong business model so that when combined, they should inform a complete business model with all the characteristics and requirements met.

4.7.2 Generating Choices for Elemental Functions

The next step is to generate choices for these eight elemental functions. This process follows a top-down approach for each elemental function. It takes an elemental function and tries to break it down into different levels of choices based on certain guiding principles. The notion of level here represents a hierarchy of composition. Just as a company is structured as a hierarchy, from higher management at the C-suit to general staff, each elemental function is constructed the same way to approach the design options structurally. For example, Deliver Value is first broken down into the act of purchasing and the act of obtaining. However, the act of purchasing and the act of obtaining are still too abstract and high level. They are further broken down. The act of purchasing is divided into the ways people can access offerings, such as direct high engagement and indirect high engagement. But there is still potential to provide even more detailed options. There are several ways to provide direct high touch access. Examples include physical stores with assistance, sales personnel, telephone sales, among others. There exists a continuum from the high level notion of Deliver Value to the detail-level activity of sales personnel, thus the notion of level is crucial to the option development process. There also exists a guiding principle or criterion in the process. The first division of Deliver Value comes from the definition of Deliver Value, which is to provide access to and facilitate acquisition of offerings (including the transaction and act of obtaining). Access and acquisition are the primary parts of this elemental function, thus the first division of act of purchase and the act of obtaining. Only after a customer accesses, purchases, and physically obtains the offering is the function of Deliver Value complete. Then one naturally considers what are the ways customers can access, purchase, and obtain offerings, which are the guiding principle for the next dividing process. Design options for all elemental functions are presented this way. Note that while users can have their own criteria and dividing principles, what the work herein does is provide one possibility from the authors' perspective. These options are derived from various company annual 10-K reports and studies of companies in the S&P 500 list. What is important is that the criteria should be inclusive enough to cover all the possible choices. Choices are continuously being broken down into the lowest level choices possible. The alternative

choices, or option trees, for each elemental function will be explained respectively in the following sections.

Thematic analysis takes on a large role in this part of the analysis because it is the method used to categorize design options into different levels and branches. It extracts information from the dataset and groups them based on chosen themes. 10-K reports are chosen to be the database for a couple of reasons. More than 200 companies are chosen from the S&P 500 list as the database. The companies are chosen randomly to ensure diversity since this chapter is trying to develop design options that can be applied across companies and industrial context needs to be stripped off. These reports were explored as a data source primarily because they contain robust information and are very easy to access. One can easily download a company's annual 10-K reports on its website for free. Secondly, 10-K reports are also very comprehensive at describing a company's business. They contain information regarding each business segment, financial statements, and varying degree of details regarding the operation, including information on distribution, marketing, and sales, of a company. Although these reports may not have everything that the RCAS framework requires with respect to each individual company, the number of companies chosen and varying difference in details make up for the incompleteness in any individual report. For example, some companies, such as Abbott Laboratory, do not state what type of pricing method they are using in the reports. Therefore, they do not provide insight into pricing method from the thematic analysis perspective. However, other companies do state their pricing methods in their reports and do provide insight on how companies price their offerings. Collectively, although some companies do not provide contributions to the design options for certain elemental functions, the sheer number of companies ensures the completeness in the overall design option set. This is shown in the analysis in that each proposed design option is supported by at least one company, which means that at least one company uses this option and states it in its annual report.

One challenge in this analysis is that information in the report may not be named and structured in the same way as the business model framework developed herein. However, this is to be expected. A business model, as mentioned, is indeed a topic under debate and at the time of this study no universal framework exists with which everyone agrees. It is of course unlikely that a 10-K report will describe a business using the framework developed here. Therefore, information needs to be gathered and structured to fit this framework. A certain level of coding and abstraction is also needed in order to create a list of design options. The reason is that each report describes

the respective company, which operates in one or more industries. As a result, their descriptions are very industry-specific. But in this case, we are trying to develop a set that can be applied to all cases. This means that an abstraction of the design options, or de-contextualization, needs to be done as well. As noted by Maglio et al. (2009), abstraction allows seemingly different things to be compared, and allows one phenomenon to be explained in terms of another better understood or simpler phenomenon. Take gravity for example, this abstraction can explain both the falling of an apple and the movement of stars. Just as explained in earlier chapters, through abstraction, it is possible to find an appropriate level of detail to strip industrial context off the design options, yielding those that can be applied to all scenarios. Here in this chapter, abstraction will focus on the action of each design option rather than its locus, meaning that the detail left will focus on what to do rather than in what industry or business to do it. On the other hand, each elemental function, with its definition, informs the place and key phrases to look for in each report. For example, financing is a portion of Manage Value. Then it can be inferred that there is likely useful information in the "Capital requirements and liquidity" section of the reports. The coding rule in this phase of the research is actually the same as that in the first phase when the 8 elemental functions were developed. However, there are differences in the process. In the second chapter, the goal was to look for business model components and find similarities and shared functions between them. Then based on these similarities and shared functions, these business model components were categorized into groups, which yielded the 8 elemental functions.

In this chapter, the 8 elemental functions are already decided, and we are actively looking for activities and operations that fit into each elemental function. The logic of the process is reversed. However, after all the activities and operations are identified, the logic of the first chapter is applied. Activities with same or similar functions are grouped together into sub-groups, resulting in multiple levels of detail. Just as in the second chapter, for which the thematic analysis had a starting point of only Create, Deliver, and Capture Value, the design options for each elemental function in this chapter all have starting points. These starting points produce a fundamental structure on which the thematic analysis can commence and iterate. The starting structure of each elemental function is from varying literature sources or observation and it provides a set of sub-groups to begin to work with. If an activity/choice can be placed in any existing sub-group, it is put there, and the process moves on to another activity/choice. If an activity does not belong to any sub-group, a new one is created for it. Take the Pricing part of Capture Value for example, the

starting pricing methods, obtained from observation of existing companies, include cost-based pricing, competition-based pricing, and value-based pricing. When going through companies, Allstate states in its report that it uses a model for its insurance termed premium pricing. It does not fit into the existing three design options. A new one is created for it and coded as "Model-based" pricing to cover any pricing that is based on models or algorithms. Another example will be for "Create Value". The starting themes for Create Value follow the work of Weill (2005) where he defined four roles for companies: creator, distributor, landlord, and broker. However, when reviewing companies, Ebay stood out as being none of them. A new theme is created for it and coded as "Connector" to emphasize its primary offering to connect buyers and sellers. The notion of abstraction comes into play again here. While in Chapter 2, the business model components identified have varying levels of abstraction, from high level conceptual description to low level activities. In this chapter, we are only looking for low level and detailed activities. For example, for Convey Value, a business model component may represent this by words like marketing or customer relationship. This type of representation is too vague for the goal of this chapter. In this chapter, we are looking for words and phrases like "online advertising" and "promotional deals".

4.7.3 Designing Options for Elemental Functions

Manage Value

The first component is Manage Value. This function primarily deals with the structures, rules, decisions, and evaluative metrics within a company. It is the strategy, governance, resource allocation, distribution of captured value (e.g. dividends, reinvest, cost), and financing of a company's operations. It supports the underlying business feedback loop and guides a company's operations. This elemental function is composed of two design choice matrices – one connected to a firm's structure and governance and one related to a firm's ability to acquire resources. The first design matrix incorporates a firm's legal structure and its' organizational structure to reflect governance and structure. This design matrix is designed as a checklist, as only one combination of legal structure and organizational structure is chosen. It is created as a checklist due to the fact that it is extremely rare for a firm to have more than one legal structure and organizational structure combination at the same time. The design matrix is presented below.

Table 4.1. Organization structure matrix.

Unitary	**Centralized**	**Decentralized**	**Functional**	**Divisional**	**Matrix**	**Virtual network**	**Organiza-tional / Legal**
							Proprietorship
							Partnership
							C Corporation
							S Corporation
							LLC

The axes are from observations of companies in the market and 10-K reports. Legal structure is largely related to the ownership structure of a company. This aspect has a significant influence over the decision-making process of any company. Whereas a proprietor-run company can make decisions quickly by one person, a large corporation may need a longer process to reach a consensus on a major issue. It also affects the administrative side of management since there are different laws for different legal structures. It is a crucial part of corporate governance, which can be defined as the "collection of mechanisms, processes and relations by which corporations are controlled and operated" (Shailer, 2004), as it partially determines the ownership structure and stakeholders involved. Organizational structure, or operational structure, is more associated with company operations. It is also a part of corporate governance because it decides the power relationship between employees and stakeholders. It, unlike legal structure, leans more towards daily operations, while also being a contributor to decision-making processes. Organizational structure determines how a company is structured for the best management practices, which vary from company to company partially due to the difference in talent and styles.

The second design matrix for this elemental function is related to resource acquisition. The logic behind this matrix supports actions associated with "acquiring resource A by doing X". The design matrix is presented below.

Table 4.2. Resource acquisition matrix.

	Talent	**Supply**	**Equipment**	**Facilities**	**Capital**	**Intellectual property**
Buy	Hire from trade schools, sourcing, recruit	Purchase from Supplier	Purchase from OEM	Real estate agent, REIT, building owner	Stock, venture funding	Acquire
Build	Training, experience, knowledge sharing, organizational learning	Vertical integration	Self-manufacture	Construct, develop, redevelop	Cash on hand, revenue from sales	Research and development
Borrow	Partnership, Consultant	NA	Lease	Lease	Credit facilities, debt, credit agreement	Lease License

Resources are divided into Talent, Supply, Equipment, Facilities, Capital, and Intellectual Property. They are obtained from observations of 10-K reports and capture most resources that are vital to any firm. Acquisition method is divided into Buy, Build, and Borrow. Buy describes obtaining resources by buying them from other companies or institutions. Build means that firms make or create resources on their own, while Borrow means leasing or temporarily accessing from others. The very first round of financing is very important as it enables the start and continuation of a business. A company needs that first funding to build up its infrastructure, produce the first order, and acquire other resources. These methods vary in manifestations with respect to the resources that are being obtained. Exemplary methods are presented in the cells in the matrix for each combination of resources and methods. For this matrix, users can select multiple methods to obtain resources.

Identify Value

As defined in the first chapter, Identify Value is concerned with exploring business opportunities represented by consumer benefits and needs. It is the process of deciding what type of characteristics, attributes, and benefits a company identifies that can be the basis of an offering. It is similar to a value proposition as in they both explore and decide the essence of what a business is really selling to its customers. This elemental function is represented by one design option matrix. The idea behind it describes “Identify value X for customer group A”. This matrix is constructed as a checklist where users select the involvement level of a certain type of value. One of the reasons

for this decision is that it is rarely the case that an offering only has one type of value. For example, when considering buying a pair of basketball shoes, a person is likely to consider both their functional strength as well as their aesthetics. Another common consideration for purchase is getting a functional product with low price. Therefore, the X-axis of this matrix is composed of the involvement of different values. It is composed of five types of values, namely functional, emotional, economic, social, and experiential value. These value types are largely based on the work of Rintamaki et al. (2007) where they identified economic value, functional value, emotional value, and symbolic value. This value categorization is also supported by other researchers such as Sheth et al. (1991), Park et al. (1986), and Wang et al. (2004). Functional value refers to the performance of the offering and what the function is for the intended job. Some of the examples include treating a disease, transporting customers from place to place, and solving customer problems. It is the most common value implemented in any offering because almost always customers need these offerings to get their jobs done and they cannot do it without the help of those offerings. Emotional value focuses on arousing or resonating certain emotions in consumers. These offerings elicit emotions in customers by creating stimulus that can resonate with customers in terms of goals, which are things customers want to see happen, standards, which are beliefs, norms, or conventions, and attitudes, which are dispositional liking or disliking (Ortony et al., 1988). These emotions are sometimes additional drivers for purchase and sometimes they are the main reason. For example, a lot of people buy anime or cartoon statues or figures not because they need to perform a job with them, but simply because they look great and they are a real representation of what these people enjoy in life. Some of the common emotional value characteristics includes appealing appearance, nostalgia, and excitement. Economical value pays more attention to the price of the offering, such as affordable or more affordable than other offerings. It is targeted to customers that are price sensitive. It is also very common in company offerings. Walmart is a common example of utilizing such value as an additional driving force for customer purchase. Social value is for consumers who value social status and how they appear to others socially. It helps to shape how others perceive them. It is similar to emotion-oriented value but different in that unlike emotion-oriented value that elicits emotions in the buyers, social-oriented value also elicits emotions in others towards the buyer. It can be represented by luxury, trending products. Experiential value is added to account for values that give customers a good feeling and a good experience, such as good service in a hotel and overall experience of going to

a movie. The Y-axis is then composed of customer groups based on the logic of this matrix. It is divided into demographical group, psychographic group, need group, and job group. This categorization is also largely supported by customer and market segmentation literature (Wells, 1974; Lunn, 1978; Kotler, 1984; Tynan & Drayton, 1987; Beane & Ennis,1987; Yankelovic & Meer, 2006). Combining the two axes, the design option matrix is presented below.

Table 4.3. Identify value matrix.

	Functional value involvement		**Emotional value involvement**		**Economic value involvement**		**Social value involvement**		**Experiential value involvement**	
	High	**Low**	**High**	**Low**	**High**	**Low**	**High**	**Low**	**High**	**Low**
Demographical group										
Psychographic group										
Need group										
Job group										

Create Value

Create Value is the process of "making" the actual products/services that a company is selling. The end product of this elemental function is different than the one of Identify Value as the created value will be the offerings that customers purchase. And these offerings are the commercial representation of the value chosen in Identify Value. Value creation is largely associated with the role a company is playing. What companies are planning to create in some way decides what type of roles companies are playing, and the roles companies are playing also limit the end products that are being offered. A consulting firm is not able and not normally intended to manufacture machines. On the other hand, a company that wants to create machines will not normally be organized and managed like a consulting firm. Due to this connection between role and creation, the design options for Create Value are developed based on the role companies can play in the market. These roles are largely influenced by Weill's framework of business model archetypes (Weill et al., 2005) which has been modified to support this work. In their work they proposed four business model archetypes: creator, distributor, landlord, and broker. In this study the roles are increased to 8, including Manufacturer, Designer, Distributor, Lender, Adder, Broker, Connector, and Aggregator. A Manufacturer manufactures but does not design offerings. A Designer designs offerings but does not manufacture. A Distributor is a business that distributes

products. They can perform this job in mainly two ways. They can buy products from manufacturers and sell them to customers with additional mark-up, or provide distribution as a service. The difference is manifested in the wording in the report. When a company is selling products to distributors, the former scenario applies. When a company is selling through distributors, the latter applies. A Lender is similar to landlord who sells the right for customers to use their assets under a certain agreement. An Adder adds value to offerings that are being offered to customers, such as a value-adding reseller. A Broker acts as a customer's agent and buys various merchandise for them and earn commissions. A stockbroker is a common example. A Connector connects buyers and sellers without participating in the transactions. The offerings between companies vary based on the role they are taking in the value chain and what they do in that role. A Connector connects potential customers and potential offering providers. Ebay is a good example of this role. An Aggregator aggregates a set of offerings that a customer is buying and sells them in a bundle. A construction contractor who gathers sub-contractors is a prime example of such role.

Another key component of Weill's model is assets that are involved. These assets are utilized differently based on the roles a company is playing. Weill defined four assets: physical assets, intangible assets, human assets, and financial assets. In this study, assets are modified as well to account for new asset types. 8 types of assets are incorporated as well, including Physical assets, Financial assets, Talent, Intangible assets, Service, Outcome, Relationship, and Knowledge/content/data. Design choices are then combinations of these two axes. For example, a physical asset manufacturer includes manufacturers of physical products such as machines, food, and clothing. A content aggregator includes social network and online catalogs. For this elemental function, users can select one or more roles and asset types to best describe their intended vision of businesses. The design matrix is presented below.

Table 4.4. Create value matrix.

	Manufacturer	**Designer**	**Distributor**	**Lender**	**Adder**	**Broker**	**Connector**	**Aggregator**
Physical asset	Food producer, supplies producer, clothing manufacturer	product designer, Service designer	general retailer, dealer, house supplies retailer	equipment lender, space renter	dealers, value-adding retailer	Realtor,	online marketplace	online product catalog
Financial asset	Consumer bank	consumer bank	consumer bank	investment bank	Mortgage purchaser?	Financial broker	stock trading floor	mortgage aggregator
Talent	Coach	trade schools	NA	consulting firm	NA	Agent	job-hunting platform	job ads aggregator, agency
Intangible asset	Computer software developer, operating system creator, power plant	software developer, app developer, technology developer	movie theaters, utility provider	software developer, IP creator, Cloud	medical therapies		app connector, code-sharing platform	App stores, video game platform
Service	personal service provider, brand management, product distributor, financial service	personal service, professional service, financial service		NA	airline, delivery service provider, advisory service provider		online booking, service platform	contractor, transportation provider
Outcome	performance result provider, fund manager, insurance provider	performance result, financial return, insurance provider		NA	food delivery	insurance broker		search engine
Relationship								
Knowledge/content/ data	online article writer, video content creator	online article director, video content designer	TV networks, entertainment provider	content creator, TV/movie maker, data warehouse	data analyst, data scientist		search engine? Online encyclopedia	online publisher, online catalog, social network

Convey Value

Convey Value is a function that informs customers about a company's offerings and convinces them that an offering is better than others. Advertising and promotions are the main methods used to communicate. The x-axis of this matrix is primarily composed of Promotion and Advertisement, each of which is then divided into Push tactics and Pull tactics. Each push and pull aspect are then divided into Direct channel and Indirect channel. The y-axis is constructed according to the widely recognized four stages of marketing: awareness, consideration, conversion, and retention similar to the marketing funnel commonly used in marketing. Design options are then created based on these criteria. Exemplary design options are obtained from examinations of 10-K reports. This is commonly described in "marketing" or "distribution" section of the reports. Common options include trade shows, sponsorship, various forms of advertising, loyalty programs, among others. The design matrix is presented below.

Table 4.5. Convey value matrix.

	Promotion				**Advertisement**			
	Push		**Pull**		**Push**		**Pull**	
	Direct	**Indirect**	**Direct**	**Indirect**	**Direct**	**Indirect**	**Direct**	**Indirect**
Awareness	Telephone, door-to-door, social media promotion, content distribution, catalog	Celebrity endorsement, catalog-retailer	Brand campaign, event sponsorship, referral	Trade promotion, referral, advocacy	Direct email, advertising campaign, direct-to-customer advertising, television advertising	Trade advertising, television advertising, movie advertising	Direct email, social media advertising, advertising campaign, direct-to-customer advertising	Search advertising, social media advertising, movie advertising, radio advertising
Consideration	door-to-door, targeted email promotion, catalog	Celebrity endorsement, free trials, catalog-retailer	Event sponsorship, advocacy, case study, free trials	Internet search promotion, trade promotion, case study, referral, advocacy	Direct (e)mail, advertising campaign, direct-to-customer advertising	trade advertising, television advertising	advertising campaign, public relation, ratings and reviews, free samples	free samples, search advertising
Conversion	door-to-door, personalized email, telephone promotion, social media promotion, coupons, catalog	celebrity endorsement, referral, recommendations, catalog-retailer	event sponsorship, advocacy, coupons, ratings and reviews, recommendation	internet search promotion, ratings and reviews, recommendation	direct (e)mail, advertising campaign, direct-to-customer advertising	radio advertising, trade advertising	advertising campaign, public relation, ratings and reviews, free samples	ratings and reviews, search advertising, social media advertising
Retention	Loyalty offer, exclusive offer		Loyalty program	Loyalty program			Customized advertising	Customized advertising

Deliver Value

Once an offering is created and conveyed, it should be delivered to its intended customers. Delivery here is divided into the act of purchase and the act of obtaining. A channel of distribution is a pathway for products or services to go to market, involving the producing suppliers at one end of the channel, resellers such as distributors or dealers in the middle, and end-customer accounts at the other end (Magrath & Hardy, 1987). The first consideration is the sales channel. It is how customers get access to your offerings. Do I use sales personnel to do door-to-door sales or do I use a sales center? Do I put my offerings in a store or do I sell them online? The answers to these questions are partially dependent upon the nature of the offering and partially by design, especially with the advancement of technology and shift of people's buying habit. This aspect is often explained in the "Sales" section of reports. Sales force, online stores, physical stores are some of the common methods. Then the physical delivery comes into the picture. If a company has physical stores, customers can just walk in and leave with the product. But with online purchase, the company should then consider if it should outsource its delivery to a delivery company or perform delivery itself. As customers desire "just in time" delivery more and more, it is crucial to have a strong delivery model. Some examples of successful delivery model innovation include Netflix. The Delivery channel is also an element of marketing, as it fulfills the distribution element of marketing. As mentioned, Deliver Value is divided into the act of purchase and the act of obtaining, hence the categorization in the design options. There are multiple sales channels, divided here by the direct/indirect and then high/low engagement method. Direct refers to that customers purchase directly from the producer of the product, often at an official store or website, while indirect means customers purchase from dealers or distributors such as via Walmart. High touch refers to high engagement from the sellers and low touch refers to the opposite.

Delivery channel is simpler. Customers can either obtain the offering in the store or have it delivered to a place of their choosing. Companies often have delivery contracts with large carriers to deliver their products. These two channels make up the two axes of this design option matrix. Exemplary options are in each cell and users can select multiple options that suit their business visions. Common options include official store, official website, retail store, among others. If customers decide to pick up their orders, they can either do it in an affiliated facility, such as stores, or in a non-affiliated facility, like in a warehouse. If customers decide to have their orders delivered, the structure becomes a little different. This part of the matrix is structured on a

composition basis. There are four criteria identified: speed, accuracy, security, comfort. A firm needs to decide what criterion it values the most and prepare its delivery option accordingly. It is common for customers to desire a fast delivery and that their package arrive at the right address. It is encouraged that companies meet more than one criterion.

Table 4.6. Deliver value matrix.

Delivery Channel \ Access Channel			Direct		Indirect	
			High engagement	**Low engagement**	**High engagement**	**Low engagement**
Pick up at point of sale		**Affiliated facility**	stores-with assistant, office, phone order, contract	official website, stores	retail store, wholesale store, phone orders from retailers, phone orders from wholesalers	retail store, wholesale store, retail website, wholesale website, vending machines
		Non-affiliated facility	phone order, sales force, delivery center	sales branch, delivery facility	retail store, wholesale store, phone orders from retailers, phone orders from wholesalers	retail store, wholesale store, retail website, wholesale website, vending machines
Deliver to designated places	**Speed level**	**High**	stores-with assistant, office, phone order, contract, sales force	official website, unstaffed stores	phone order retail	retail website, wholesale website
		Low	service agent, stores-with assistant, office, phone order, contract	official website, unstaffed stores	retail store, wholesale store, retails sales force	retail website, wholesale website
	Security level	**High**	stores-with assistant, office, phone order, contract, sales force	official website, unstaffed stores	retail store, wholesale store	retail website, wholesale website
		Low	stores-with assistant, office, phone order, contract, sales force	official website, unstaffed stores	retail store, wholesale store	retail website, wholesale website
	Accuracy Level	**High**	stores-with assistant, office, phone order, contract, sales force	official website, unstaffed stores	phone order retail	retail website, wholesale website
		Low	service agent, stores-with assistant, office, phone order, contract	official website, unstaffed stores	retail store, wholesale store, retails sales force	retail website, wholesale website
	Comfort level	**High**	stores-with staff, office, phone order, contract, sales force	official website, unstaffed stores	retail store, wholesale store	retail website, wholesale website
		Low	stores-with assistant, office, phone order, kiosks, sales force	official website, unstaffed stores	retail store, wholesale store	retail website, wholesale website

Capture Value

This elemental function is mainly connected to the financial and economic aspect of the business model, as a core element of the firm's business model is its economic model (Linder and Cantrell, 2000). Johnson et al. (2008) believed that the profit formula is the "blueprint that defines how the company creates value for itself while providing value to the customers" and consists of revenue model, cost structure, margin model, and resource velocity. Designing how a company captures value is essential to its success in multiple aspects. It is the primary source of profit, which contributes to a business's capital. It has been established in Manage Value that capital is the fuel for a business's operations and activities, thus the importance of Capture Value. Capture Value can also be a source of a business's competitiveness reflected in pricing among other activities. Intuitively, profit is associated with both price and cost, hence the importance of pricing and cost structure. Balancing cost and price will attract customers and increase competitiveness among competitors, as many companies do, and it is one of the generic competitive strategies by Porter (1985). Another key aspect is payment method. For example, if a supermarket does not allow credit card payment, fewer people will be willing to shop there. Following the definition of Capture Value and value itself, it is not difficult to divide it into the receiving money from customers, bearing cost to produce offerings, and the transaction process in the middle as the means of exchange. Therefore, the options are developed revolving around methods to decide price, cost structure, and payment mechanism. Options for all matrices are obtained from observations of.

Two design matrices are developed. The first one contains "Payment mechanism" and "Pricing" as axes. Notice that "Pricing" here is the process of deciding the price of an offering, not pricing strategy where company uses pricing as a strategic tool to penetrate market or gain shares. Pricing is divided into "Companies decide", which includes Cost-based, Model-based, and Value-based, and "Others decide", which includes Market-based, and Competition-based. "Companies decide" means that the price is mostly decided by the companies providing the offerings. "Others decide", on the other hand, means that other parties such as the market or customers have more influence on the price. Cost-based is one of the most common ways companies decide prices. Price is usually decided by adding a profit margin on the cost of producing. Some companies use more complicated ways to set their prices such as using a certain algorithm or model and it is named Model-based pricing herein. Insurance companies are a prime example of companies using this pricing method. Insurance premiums are often calculated based on several factors of individual

customers. Value-based pricing is gradually becoming the best pricing method according to scholars and practitioners in terms of profit maximization (Cannon & Morgan, 1990; Monroe, 2002; Docters et al., 2004). In this pricing mechanism, price is often set according to the value that is offered to customers and how a company wishes to position itself in the market. Market-based pricing is often utilized in mining industries like gold, which have a set market price. It also applies to markets that are heavily regulated that prices are carefully monitored and decided with government interference such as utilities. Competition-based pricing is to set prices based on competitors' prices. This is also a common tactic to gain market share and fend off new competitors early on, since incumbents normally have more resources and capital to do so.

The payment mechanism describes how an offering is paid for. It is divided into Subscription, Single payment, and Continuous payment. Subscription is further divided into subscription based on volume and subscription based on time. Subscription based on volume means that customers pay regularly and companies deliver a pre-agreed volume of offerings. Subscription based on time means that companies deliver offerings on a pre-agreed time basis. Single payment is a common payment mechanism where customers simply pay for what they want, like buying supplies in grocery stores. Payment can be delivered instantly or delayed. Continuous payment is similar to subscription except that for subscription, the price and volume are predetermined and can usually be canceled with ease. Some examples of Continuous payment include paying for utilities and interest payment. The Pricing/payment matrix is presented below. Exemplary design options are presented in each cell.

Table 4.7. Payment and pricing matrix.

			Payment					
			Subscription		**Single payment**		**Continuous payment**	
			Time	**Volume**	**Instant**	**Delayed**	**Installments**	**Usage**
Pricing	**Companies decide**	**Cost-based**	cost-plus	cost-plus and discount	cost-plus, break-even	cost-plus, break-even	target return	cost-plus
		Model-based	multi-factor, demand	algorithm, demand	algorithm	algorithm, multi-factor	risk, multifactor, algorithm	demand
		Value-based	freemium, differential	freemium, differential, performance, bundle	perceived value, volume, bundle	perceived value	freemium, differential	performance, freemium
		Outcome-based		Performance-guaranteed	Performance-guaranteed			
	Others decide	**Market-based**	market price, regulated	market price, regulated	regulated, market based, auction	regulated, market based, auction	regulated	regulated, market price
		Competition-based	competitor, going rate	competitor, going rate	competitor	competitor	going-rate, sealed-bid	going-rate, competitor

The second matrix pertains to Cost structure, and is developed as an independent checklist. One of the reasons is that as the name "cost structure" suggests, this aspect is more of a structure than an option. Companies are likely to incur all types of cost. Depending on the types of business a company is doing, the ratio of different costs varies. Companies need to balance their various costs. Therefore, this matrix is developed as below.

Table 4.8. Cost structure matrix.

	Cost type		**Intensity**		**Ownership**	
	Fixed	**Variable**	**Light**	**Heavy**	**In-house**	**Outsource**
Procurement						
Production						
Distribution						
Inventory						
Marketing						
Sales						
Asset						
Overhead						
R&D						
Capital						
Infrastructure						
Wages and Benefits						

The Y axis lists the kinds of cost a company is normally faced with. Common costs include supply procurement, marketing, and cost of capital. Some functions are linked to prior matrices such as production and marketing. The X axis describes the characteristics of these costs. Are they fixed or variable costs? How intense a cost is to a company? By checking this checklist, users can arrive at different combinations of cost structure for their businesses.

Protect Value

There is limited literature that explicitly studies protecting value. Protect Value is defined as to prevent both value created and value captured from loss or damage, while maintaining a stable organizational structure. In the context of business management, protecting value is largely associated with protecting a firm's resources and capabilities. The resource-based view of a firm states that a firm is a collection of resources and capabilities. Those with rare and valuable resources are likely to have a competitive advantage. Therefore, protecting via legal and

organizational means is crucial to a firm's success. It is largely related to resilience as demonstrated in the second chapter. Organizational resilience is becoming increasingly recognized and important in business management, especially in supply chain management. It is defined as an organization's ability to overcome an internal or external shock and to return to a stable state (Meyer, 1982; Weick, 1993; Weick et al., 1999; Hamel & Välikangas, 2003; Hollnagel et al., 2006; Boin & McConnel, 2007). The concept of resilience makes up one axis of this design option matrix. This axis describes what a company can do regarding disturbance in different stages of disturbance. It is also heavily influenced by the work of Kahan et al. (2009). They studied resilience in the context of homeland security and identified four missions to achieve resilience, namely prevent, protect, respond, and recover. Because resilience, by definition, is largely associated with shock/disturbance, then to achieve resilience is to establish mechanisms to overcome shocks. The Y axis of this design option matrix builds on the similar idea as in it describes how to deal with disturbance. It is divided chronologically into before, during, and after a shock happens. Four stages, or tasks, have been identified: anticipate disturbance, prevent disturbance, absorb disturbance, and recover from disturbance. The first task is to anticipate disturbance. It builds on the idea that unanticipated situations will arise, and it will be helpful to prepare for it in advance. This takes place before disturbance happens and focuses on identifying potential risks that may have influence on businesses. Potential risks and disturbances are likely to differ between businesses and managers need to examine their unique situation to identify possible disturbances. The second task follows anticipating disturbance and actively makes attempts to prevent disturbance from happening. For example, if a company anticipates that there is a high chance of natural disaster in the area of its primary supplier, making it unable to deliver, it will be helpful for them to order more in advance or negotiate a contract with a new supplier to prevent shortage of supplies when disaster does strike. Ways to prevent disturbance vary depending on the nature of the disturbance and company strategies and culture. The point is that companies should have mechanisms and strategies in place to prepare for disturbances. Of course, it is not possible to anticipate and prevent every disturbance and sometimes accidents indeed happen. In that case, companies need to absorb the disturbance and minimize its impact. The final task is after the disturbance is over and companies need mechanisms to recover from it. Factories need to be rebuilt after an earthquake and new employees need to be hired and trained after talent loss, just to name

a few examples. These tasks are all heavily dependent upon the nature of disturbances, and disturbances can be physical or intangible.

The X axis of this design option matrix is associated with company assets, since they are the central focus of protection in business management. Four asset types are identified: physical assets, intangible assets, financial assets, and human assets. Means to protect these assets vary based on both the stage of disturbance and the nature of the assets. Companies have both legal means and organizational means to protect their assets. The design option matrix is presented below.

Table 4.9. Protect value matrix.

	Physical assets		**Intangible assets**		**Financial assets**		**Talent**	
	Legal means	**Organizational means**	**Legal means**	**Organizational means**	**Legal means**	**Organizational means**	**Legal means**	**Organizational means**
Anticipate disturbance	Law research	Regular maintenance, partnership, news monitoring, computer modeling		Technological innovation, research, connections with research institutes, computer modeling		market studies, economic environment studies, computer modeling		special personnel
Prevent disturbance	law enforcement	Strong facilities, security system, partnership, redundancy, service contract	patents, trademarks, legislation, code-setting	NDA, cyber security, IT infrastructure, know-how, service contract, partnership, trade secret		diversification, redundancy, cost monitoring	contract agreement	stock options, talent contract, NDA, knowledge sharing
Absorb disturbance	lawsuit	Repair, insurance, redundancy	Lawsuit	Upgrade, security network, redundancy, multiple business models	legal bond	cash redundancy, bond/surety	lawsuit	fast recruitment, knowledge sharing
Recover from disturbance	lawsuit compensation	Purchase, compensation, rebuild	lawsuit	Upgrade, research and development, innovation		credit facilities, investment facilities		hiring, training

Sustain Value

Sustain Value is to achieve long-term success, competitive advantage, and superior profit, just as the definition of competitive advantage according to Grant (2010). Porter (1985) also believed that "competitive strategy aims to establish a profitable and sustainable position against the forces that determine industry competition" and "a generic strategy does not lead to above-average performance unless it is sustainable". Therefore, the design options for Sustain Value are largely influenced by a company's competitive strategy. Nine main aspects that companies usually compete on are identified and used to create the X axis of this design option matrix. Companies can compete on one or more aspects. However, it is also important to remember not to go with too many paths since it may cause inability to manage and/or to lose focus and fit with other strategic decisions. Stability refers to how stable a company is in terms of organization, production, and general existence. To increase stability is to mitigate errors, to more carefully manage risk, and to generally reduce uncertainty during daily activities of a business. Efficiency means a company should increase its efficiency in its operations. It includes both efficiency in overall management and production, as well as economic efficiency. Efficient cost control enables a firm to achieve pricing advantage. Differentiation focuses on being different from other offerings or companies, in product/services or other aspects. It is one of the two competitive directions suggested by Porter (1985). Quality refers to how good a company's offering is. Does an engine a company is selling have great quality? Does a financial service yield good results for its customers? This is probably the most common advantage companies are trying to pursue. Experience is an aspect that primarily addresses customers' feelings. Good customer service, the appealing quality of the product, and how customers feel when using the product can all influence customers' overall perception of the product and the company. Hotels often pursue this competitive advantage to retain guests by offering great service and experience. Agility is a concept that is becoming popular. It is commonly defined as the characteristic or ability to be ready for change and to respond rapidly in terms of market and customer feedback (Goldman et al., 1995; Christopher, 2000; Van Hoek, et al., 2001). Staying agile to change and feedback allows a business to build up its competitive advantage. Reach includes both geographical reach and awareness. Geographical reach refers to companies that have a large geographical presence. Prime examples include McDonald's, which have branches in almost every town in the U.S. and in larger cities in the whole world. Having more regional and local offices and facilities will reach more customers generally. Awareness is closely

linked to awareness channel and is about making potential customers know about your offerings rather than competitors. It is commonly adopted in advertisement and marketing tactics. Innovation describes companies that focus on innovating their products, processes, and other business aspects. They compete on new products, research efforts, and new ways of doing business. Imitation means that companies don't necessarily innovate themselves, rather they learn and follow other companies.

In the Sustain Value matrix, the Y axis describes the role a company is playing in the context of competition and adaptation. This axis adopts the strategic typology developed by Miles et al. (1978) where they identified four types of strategic adaptation roles, namely Defender, Prospector, Analyzer, and Reactor. A defender chooses a narrow product-market domain and strives to maintain stability. It acts aggressively to prevent competitors from entering its "turf" via means of competitive pricing, product quality, and organizational stability. It tends to ignore developments and trends outside its domain. A prospector acts almost the opposite of a defender. While a defender focuses on stability and efficiency, a prospector focuses on innovation and exploiting new products and market opportunities. An analyzer situates somewhere in the middle between a defender and a prospector. It focuses on minimizing risk and combines the strengths of a defender and a prospector. An analyzer only adopts certain products and technology when their worth has been proved. It selectively adopts innovation types and product developments. A reactor lacks mechanisms to cope with change and users are encouraged not to be this strategic type. It is listed here for the purpose of completeness. Common options for Sustain Value are listed in the cells and are obtained from observation.

Table 4.10. Sustain value matrix

	Stability	**Efficiency**	**Differentiation**	**Quality**	**Experience**	**Agility**	**Reach**	**Innovation**	**Imitation**
Defender	M&A, increase scale, long-term contracts, customer loyalty, customer relationship, financial strength	M&A, cost control, pricing, operating efficiency, supply chain efficiency	NA	product quality, service quality	customer service, customer relationship	fast fulfillment	brand awareness, customer base, geographical coverage, promotional activities	process innovation	NA
Prospector	patent position, exclusivity	program launch support, technical expertise, product design capability	product differentiation, new applications, original programming, functionality, product type	product quality, service quality	attractiveness, ease of use, customizable	product innovation speed, speed to market, technology changes	product awareness	M&A, product innovation	NA
Analyzer	patent position	high quality asset, product design capability	selective differentiation, scope of service, product features, original programming, product selection	product quality, service quality	customizable, aesthetic appeal, selective locations	market study, adapt to technology changes	store location	selective innovation	M&A, product imitation
Reactor	NA	NA	NA	NA	NA	NA	NA	NA	NA

4.7.4 Making Choices

Now that all the design options are presented, the final step is to make choices based on the end goal and the relationships between choices. The end goal is probably the most important aspect in this step, and even in the whole design process. While choices can vary by standards and design, the end goal should be determined before the design starts and be kept consistent. Despite its importance, the requirement for the end goal is not that complex. Since the design process is an iterative process, as long as the vision for the end result remains consistent, the details of design can be refined. Normally speaking, the users only need to consider which industry or business they would like to be in for startups. They would also have an understanding of their own strengths, including the resources and capabilities they have. For companies that are trying to innovate or diversify into other industries, managers just need to think about which industry they want to diversify into. All the other aspects about the business are described and will be designed in the framework as one proceeds. An illustration of this process is shown later in this section. You can even start with any elemental function, but it is recommended to start with "Identify Value". Users select one or more choices that they think are a good fit with their end goal of a business. As mentioned, you should always consider the relationships and dynamics between choices when making selections. Most of the limitations between choices are obvious, but some require more thinking. For instance, it would be impossible to manufacture products by yourself if you don't have enough capital and manufacturing capabilities or knowledge. An online venture cannot be successful without competent IT infrastructure and security system. You also cannot perform high touch sales without a sufficient number of sales employees. It is not to say that one cannot choose these options if they don't have the corresponding resources or capabilities at the beginning. It is to suggest that one needs to get those resources and capabilities somehow in order to implement those options. It is also a display of the system nature of a business model, as the components within a system have influence over each other. Another thing to notice is that the process described above is very linear and straightforward. However, it is important to understand that it is actually an iterative process with feedback and possible evolutionary behavior. The first "design" stage is iterative because it is "design". Then the overall model can and should be iterated because of market feedback. This trait comes from the business model framework's underlying RCAS system construct, as it is a system containing 8 elemental functions built on a feedback loop

structure, whose goal is to manage and exchange value. The feedback feature comes primarily from the Capture Value elemental function. Profit, market share, and customer feedback are all common indicators of how a business is performing in a market. Owners can always use these pieces of information to improve their business models. As a matter of fact, it is encouraged that managers don't think of business model design as a one-time task, but rather an evolutionary and dynamic process to constantly consider in order to stay competitive and achieve sustainable success.

4.7.5 Design Manual

The use of the above design method follows a very simple yet intuitive pattern. One starts with examining their vision of their end business and their resources and capabilities at hand. Often times, when someone is planning to start a new business and a business model, or someone is planning to transfer from one type of business to another, they already have some sort of vision in mind of what the end businesses are. They should also have a set of resources and capabilities at their disposal, which enables them to compare resources available and resources needed. These two assumptions are the most fundamental when using this method. Because if they don't know these pieces of information, it's likely they have a larger problem at hand. Now that they understand their end vision and resources, they can start the process. It is suggested to start with Identify Value, because by identifying the value that fits your end vision, it initiates the unit of study of this framework, which is value. Once the intended value is identified, one can simply follow the value exchange loop. The next step will be to create that value, and that process is largely related to the resources you need. The way you create value and the role your intended business is playing largely depend upon the resources and capabilities you will need, including capital, technology, connections, among others. For example, if someone does not have enough capital or does not have connection with a manufacturer, it will be hard for that person to become a manufacturer. It is not saying that he/she definitely cannot be, it is that they need to acquire that capability in some way. After Create Value is designed, users need to consider how to convey the created value to potential customers. Then how customers can access the created value needs to be designed. With this, you'll need a sales channel, or form of transaction, and price the offering appropriately to provide economic viability. Pricing is often largely related to cost, thus this is a good time to consider your cost structure. After Capture Value is designed, the main value

exchange loop is complete. Protect Value and Sustain Value are according to how do you want to protect your assets and capabilities, as well as how you want to compete, using the provided matrices. Finally, based on your options, you need to evaluate the difference between the required resources for the design and the resources at disposal. For example, the designed business model may require more capital than what you have. This evaluation helps you design for the "Resource Acquisition" design option matrix because you'll need to close the gap in some way. Finally, you'll need to design the legal structure and organizational structure of the business, as they establish corporate governance and how information and resources flow within the firm. This is also an iterative as after evaluating the resource difference, you can go back to the design and change those that are not necessarily available. For example, maybe after the first design, you think that there is no way to get the manufacturing capability that is required, you can change that aspect of design and related aspects. The design process is presented in a flow chart below.

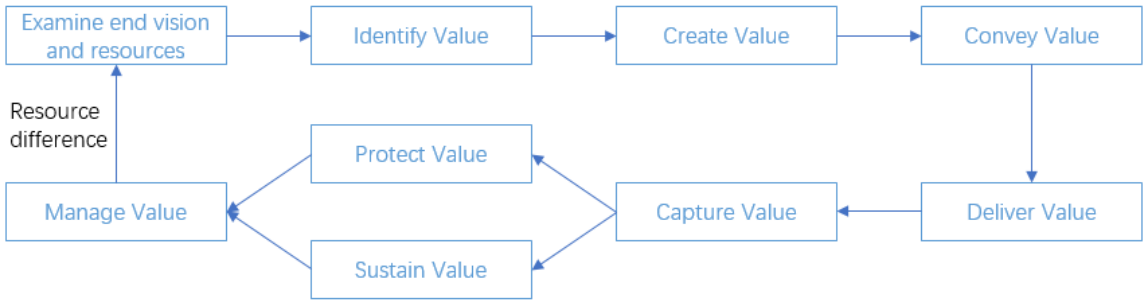


Figure 4.6. Design process flow chart.

4.7.6 A Thought Illustration

To give readers a clearer idea about the process, an imaginary scene will be set, and an exemplary design process will be conducted. Let's imagine that I'm the CEO of a new start-up and I want to be in the apparel business. I want to establish my own brand and appeal to young generations, people between 18 and 30. I have some personal connections with a manufacturing plant in China and my partner is a student in art design. The design process starts with us identifying the value we want to sell to the customers. We are going with clothing that is appealing and trendy with young generations since they place a significant amount of attention on personalities and how clothes look. We are largely influenced by the street culture, stuff like skateboarding, rock bands, and fun pictures and texts that show personalities. We then decide to be designers and manufacturers of tangible products because we want majority control of design

and manufacturing of our products and we want to ensure quality by ourselves. Since I have a connection with manufacturing facilities, we have the capability to be a manufacturer ourselves by leasing their facilities. We are conveying our products to our customers through social media advertisement and promotion, which is a good fit for our target customers. We also invited some of the celebrities on social media and gave them free clothes to wear and asked them to post pictures, for which we will need to pay them. But since they are not movie or sports superstars necessarily, the price is acceptable. Since we don't have significant capital, we are starting the business in online stores. We created our own website and sell a portion of our products on the website. We also work with local skateboard stores to recruit them to be our distributors, since those are places where our target customers hang out a lot. It is also relatively cheap compared to larger distributors and retailers like malls. Our products will be sold on a pay per purchase basis; and we are planning to launch a time-dependent subscription service where with a subscription fee, we send out a box of clothes that are designed to fit customers' styles based on their purchase preferences. Our cost will mainly be our manufacturing cost, including material and labor. Our procurement and production costs are mainly variable costs. We will be asset light since we rent most of our infrastructure. We are currently not a big company so there are not many employees and we do a lot of the work ourselves. Overhead is mainly attributed to our website maintenance and order handling. We will set prices based on the product. For some of the essential clothing or regularly designed products, we will use cost-based pricing to make it affordable to teens who don't have a huge budget. For some of the products with more of a trendy design, we will be charging more on a value basis. The best resources we have to protect our business include the connection with manufacturing capabilities, our design capabilities, and our brand image. With these, we can ensure we have an appealing product line with reasonable manufacturing price to maintain profit. Building our own brand will increase exposure and reputation in the long term. It also helps us identify with customers as we want our clothes to be able to express who our customers are as a person. We decide to sustain our success by increasing our agility in design innovation, customer feedback, and market understanding to stay on or even ahead of the trend. Increasing reach is another crucial aspect to grow our customer base and brand exposure. We pair these two with increasing our efficiency in both manufacturing and handling for the best customer satisfaction and increasing differentiation to satisfy customers with different styles and taste. In terms of managing our value, we are currently a partnership business and operate on a functional

basis. We will set up our design, manufacturing, sales, financial, and administrative departments. We will be borrowing our manufacturing capabilities and will build our own sales capabilities. The initial financing will be largely based on bank loans and our own personal funds. Continuous funding and capital will be from our profit and potential investors.

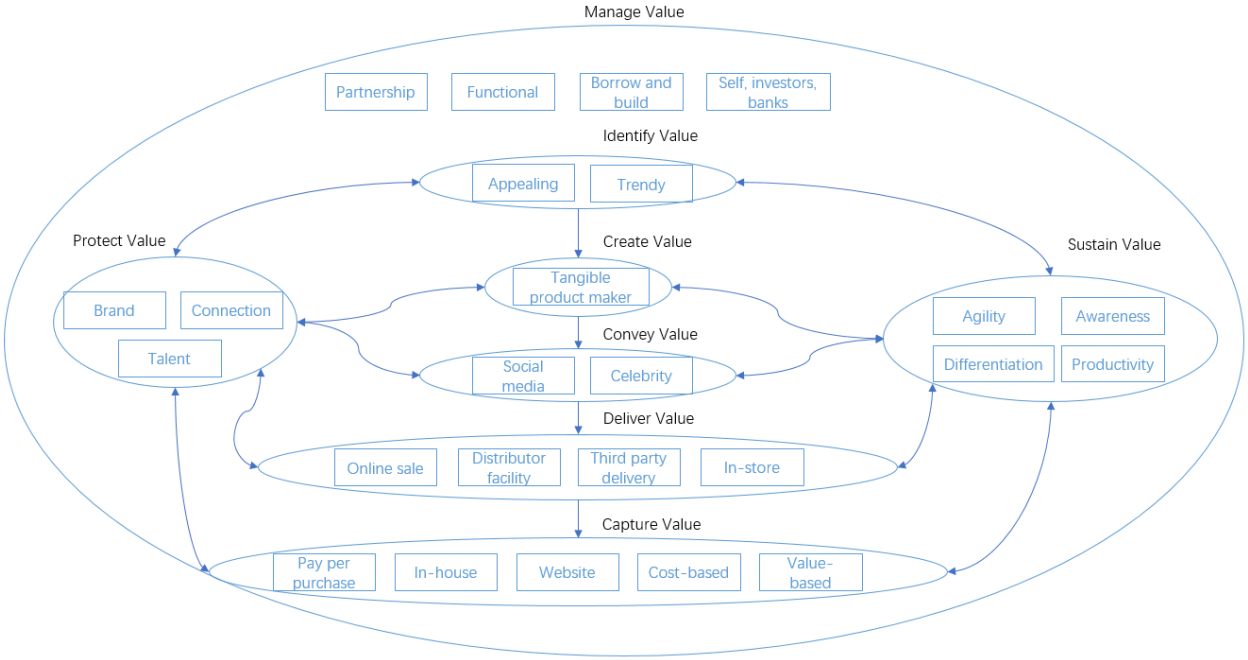


Figure 4.7. Example business model design.

This imaginary example, or thought experiment, illustrates the simplicity of this combinatorial design method in designing a business model. There is still room for modification and business model innovation after the initial design is complete. What if we choose not to build our own website and sell on online shopping platforms such as Amazon or TaoBao? What if instead of increasing reach, we choose to increase effectiveness and product quality and let our products speak for themselves and rely on word of mouth? The beauty of having all the design options shows here as there are sets of options that can suit your own style and vision.

4.8 Summary

This phase of the study, by combining combinatorial thinking in design and a system framework of a business model, proposed a new design method for business models, which was largely missing in the business model community. By examining carefully the concept of design

and particularly engineering design, we were able to apply the concept to an area outside of engineering, an area where there are fewer structured design approaches and limited theoretical background. An intuitive, structured, and guided design framework and method was developed on an object that is represented holistically by a conceptualization framework. Then by following the combinatorial thinking process, design alternatives and choices are derived from practical sources to ensure feasibility. A complete set of design options is developed for the eight elemental functions for a business model. When finished, this set of design options can act as database for future application, whether it is new business model design or existing business model innovation. The database can also be enriched with more options when they emerge. What is important is that this framework shows a rigorous design approach and how it is applied to a complete design object. This study acts as a bridge between the engineering and business model communities and is an example of cross-disciplinary application. It is believed that by collaborating between these two areas, a great deal can be learned for both sides. While the business community can have access to more structured approaches and methodologies, the engineering area can understand how to commercialize and market technologies. This phase of the study leans more towards the practical side of business model research. Its simplicity and intuitive flow and process are also strong indicators of the value of a complete and rigorous framework developed in the first phase of the research.

5. SYNTHESIS OF FINDINGS AND IMPLICATIONS

5.1 Synthesis of Findings

This research aimed to address several problems and questions identified in the business model community, specifically the lack of a unifying theoretical construct, the misalignment in business model conceptualization, and a lack of a rigorous business model design method. It offered contributions and applications both from an academic and a practice perspective. These applications and contributions were built on theoretical foundations from the well-studied areas of system theory and engineering design. Three main findings were obtained in this research

1) An RCAS-based business model construct effectively accommodates the complexity and dynamism of the business model environment. This framework provides a comprehensive characterization of business at a point in time while accounting for dimensions of resilience and adaptation over time.
2) The RCAS model's inherent abstracability provides a robust means to organize all studied work on business model concepts. By creating a knowledge map that differentiates studies on the basis of purpose, abstraction level, and elemental functions, previous studies can be organized and navigated more easily. It also outlines the grander whole of the business model concept.
3) The complete, yet readily disaggregated RCAS model, facilitates a systematic method to design business models. Combined with combinatorial thinking, the system-inspired design method also draws attention to all key variables.

5.1.1 Synthesis of Insights from the RCAS Framework

By adopting a foundational theory from the system school of thought, the proposed RCAS framework is anchored in strong literature. New insights were generated from such a framework:

- Using system theory as a theoretical foundation provided a language that is relatively universal. The notion of a system is a concept that is omnipresent, and though a system may come in different forms, its core characteristics remain consistent and do not vary by interpretations or the area of application. This universality acts as a **unifying language** to advance the body of knowledge.

- By proactively building a business model conceptualization as an RCAS, the resulting framework **captures previously overlooked yet critical properties of business models** by virtue of being an RCAS. Two of the most significant characteristics brought forward with the RCAS model are resilience and adaptation. Instead of treating a business model as a static blueprint of a business, this framework defines a business model as a system that needs to both defend itself competitively and adapt in an ever-changing environment with the goal of managing value exchange. This definition brings a layer of dynamism and longevity into the concept that needs to be reinforced.
- This framework also **reinforces the dynamic nature** of a business by building a business model on a feedback loop. It emphasizes the goal of a business model to manage the exchange of value. The feedback loop facilitates such exchange and acts as source of improvement and subsequent longevity.
- Business model components have always been a focal point of debate among scholars. The literature review revealed 128 different components across 150 articles. A set of elemental functions was put forward that captures all identified components. Using an established method – thematic analysis – these different components were categorized into functions. This method stripped "wording" away and focused on the inherent meaning relative to the research problems for which each studied construct was used. **Eight distinct elemental functions are able to capture all components** in the examined literature and display RCAS characteristics.
- The **level of completeness of the RCAS construct exceeds that of previously developed frameworks** and theoretical foundations. This completeness provides users with a checklist when they study or apply the business model concept. Just like a plane should have every component in order to fly, a business model needs to have every elemental function to work.

5.1.2 Synthesis of Insights from the Business Model Knowledge Map

The knowledge map developed in the study provides a tool for scholars to navigate through the business model body of knowledge and addresses the debate over business model conceptualization. It outlines the grander image that is a business model and depicts different

spaces authors might have been operating in, resulting in the different conceptualizations observed and debated in extant literature.

- The **RCAS construct of a business model provides the basis for this knowledge map**, as it can be abstracted along different levels of analysis. This flexibility is encapsulated in the elemental functions. The functions are coded in a general way to allow interpretations along levels of analysis. With an abstraction-tolerant framework, the concept being modeled remains unchanged when details under study are being manipulated. This is the foundation of abstraction analysis as this allows researchers to examine required parts of a concept without jeopardizing the validity of the whole. This property is the core reasoning behind the argument raised in the third chapter regarding business model conceptualizations. This key characteristic supports the proposition that **previous conceptualizations were abstractions of a broader business model concept**. The developed **RCAS framework outlines the grander picture of a business model** and its abstractability enables the creation of the knowledge map to position previous work on different levels with different purposes and select elemental functions.
- Abstraction is largely related to information reduction and facilitates the storage, retrieval and integration of knowledge. It is widely applied in engineering and computer software development. In the case of the work herein, **three variables are identified that influence abstraction in the context of business models, which are purpose, level of abstraction, and elemental functions**.
- Purpose influences abstraction as discussed in Chapter 3. To solve a particular problem, the purpose of research actually, researchers need to examine the right part of the concept to be more efficient. It would be futile to work on parts that are not relevant or can be ignored. This is a significant contributor to the abstraction of business models as shown in the literature review and resulting knowledge map. **Purposes influence the level of abstraction a study is focusing on and the elemental functions utilized**.
- Level of abstraction indicates how much information is left out and how much is retained for a certain analysis. It provides mental ordering of the included ideas. People usually define a hierarchy for level of abstraction from a high-level conceptual understanding with few concrete details to low level activity or agents with detailed

and vivid descriptions. The notion of abstraction level depicts the level of detail in business model studies.

- Components of a business model put forward by different authors already show signs of abstraction as demonstrated. **Previous authors are using only parts of the eight elemental functions** and no prior researchers have covered every elemental function of the newly developed model. The knowledge map also creates **a unifying landscape for authors**. With understanding of the larger picture, it is easier for people to communicate what level of abstraction they are working on and how and to what degree they can collaborate. The knowledge map is thus a tool for authors in this field to advance as a whole and provides a scientific way to sort all the literature, yielding a knowledge organization mechanism for the whole community.

5.1.3 Synthesis of Insights from the System-inspired Design Method

To contribute to the practical use of business model constructs, a system-inspired design method is proposed. It builds upon principles from engineering design to structure the design method, as well as design options from business practices. This research phase highlighted function-specific options to implement the RCAS model and highlighted the importance of understanding one's options while designing a business model:

- Both engineering design and business models are considered to be influenced greatly by system theories, as they both value the interactions between functional elements in a complex system. Therefore, **applying engineering design methods to business model design is appropriate**.
- **Combinatorial thinking divides the design object into finite pieces and then creates a set of design options for each component**. It does not guarantee outcomes; however, the focus here is the creation and consideration of a complete set of options. Combined with the notion of level of abstraction, it is possible to define a level of design options for the elemental functions **that can capture a nearly complete array of possible design choices**.
- A set of design options for each elemental function, termed an option matrix, was put forward based on literature and observation. Each option matrix captured numerous design choices that could be generated in that function. The main insight here is the

strength of a structured approach over random brainstorming. It has already been stated in literature that design is a goal-oriented and thoughtful process, unlike brainstorming. With a structured approach, one is more likely to generate extensive results in a more efficient manner.

In summary, this research presents an interconnected research contribution regarding the business model concept. Academic and practical contributions are built on a strong theoretical foundation, which address several of the main challenges limiting research progress in the target area. Literature and empirical data are utilized to give this research rigor and foundation. A few implications can be derived from the insights gained.

5.1.4 Connections between Phases

At the core of this study is a system model. This system model facilitates completeness, enables abstraction, and provides the foundation for combinatorial design. With the RCAS construct, we are able to better characterize a business model and a business. The requirements set by the RCAS construct facilitate the development of a complete business model framework and a business model is defined as an RCAS in the first phase. With this characterization, we are able to utilize the abstractability of the RCAS framework to construct the knowledge map. Similarly, since a business model is defined as an RCAS, we are able to argue that the RCAS framework synergizes with combinatorial design. Additionally, the abstractable nature of the RCAS framework also enables us to create the design option matrices presented in this study. As established in the first phase, the elemental functions are termed general intentionally to not confine them to certain abstraction levels. They can be easily abstracted along the continuum. This property enables us to do the same for the axes of our design option matrices. One can even argue that the creation process of the design option matrices is a type of abstraction. In turn, the findings of the business model knowledge map explain why there were different conceptualizations of a business model in the first place. It provides an all-encompassing framework that was previously lacking to put the 150 papers examined into context. Differences can be potentially resolved using this map. One author is able to both describe his/her and others' work using the map. By doing this, comparison is made, and gaps and misalignments are highlighted. Then knowledge and insight can be communicated accordingly, and advancement can be made with more clarity.

5.2 Implications of this Work for Related Research

This research demonstrates the value of employing a robust theoretical foundation – in the form of RCAS theory – to define the business model construct. Implications of the approach and related findings are described as follows: 1) implications for business model conceptualization; 2) implications for business model design and innovation; 3) implications for interdisciplinary research.

5.2.1 Implications for Business Model Conceptualization

The overarching goal of this research is to advance the body of knowledge on the concept of a business model towards a more unified view. A business model should be a consistent concept at the most foundational level. The historic lack of unity on this front has been inherent in the body of knowledge for decades and very few attempts have been made to address it. The RCAS framework developed herein, with its deep connections to system theories, provides a potentially fundamental understanding of a business model. By proactively constructing a business model as an RCAS, we obtained a conceptualization that displays critical system characteristics by virtue.

The RCAS framework, while providing a language to unify business model conceptualizations, also creates a unifying landscape for studies in this body of knowledge. As shown in the third chapter, scholars adopt this concept for different purposes, and they are often studied on different levels of analysis. The abstraction-tolerant nature of the RCAS allows the business model concept to be abstracted on different levels. Combined with purposes and functions as variables, a map of a knowledge space is created. This map space is the field of business model studies. It shows that all existing studies have been operating in one or more areas in this space, thus becoming a unifying landscape for research. This map can be utilized among scholars to share insight and collaborate. One can describe the work that is being performed to another by simply describing the variables in this map. It is easy and more accurate to position a piece of research as "using a business model to pursue change on an architectural level with Create Value, Deliver Value, and Protect Value" than just saying "business model innovation" or going into intricate details about the research. The abstractable nature of the RCAS framework also potentially resolves the debate over business model understandings. No author's conceptualization of a business model is wrong per se. They are just different abstractions of the same object. With the debate settled, more effort can be spent on advancing theories within this space. This map

facilitates this process as well. Spaces where there are fewer papers are all potential research opportunities. Even the axes themselves can indicate future research directions. The language used to frame the landscape is also easy to use and can help define which directions to pursue. By simply selecting the desired purpose(s), level(s) of abstraction, and element function(s), authors can pinpoint the exact research space they want.

5.2.2 Implications for Business Model Design and Innovation

The main implications of the research herein in this space come from the system-inspired design process and the sets of design options proposed. Designing a business model is a complex endeavor and requires careful contemplation and a well-guided process. The proposed approach comes from structured engineering design principles and is influenced by system theories which emphasize interactions. The design procedure fits naturally with the business model concept, especially with the RCAS framework that is also largely influenced by systems. The structured approach provides more rigor than simple brainstorming and the overall design method addresses the absence of one in the business model community as called out by Zott and Amit (2011). This underlying notion of addressing a problem in parts is valuable to tackle complex challenges as it divides a rather large problem into smaller and more manageable pieces and addresses each accordingly, without losing sight of their interconnectivity.

The other implication is the creation of design options. With the correct level of abstraction, it is indeed possible to generate a set of options that is all-encompassing. This then raises the importance of understanding one's choices fully before designing. It would be hard to come up with the best design if one does not fully understand what can be selected. This mentality goes with the understanding of the design object as well. Previous business model constructs are lacking in their nature, thus rendering the final design incomplete. The RCAS framework elevates the business model concept to a more comprehensive level. Designers are able to check if they have carefully examined major choices for critical business model elemental functions without having to worry if they missed anything. This then raises the importance to design for resilience and adaptation that is often lost in current literature as business environment becomes more complex and rapidly changing.

Similar insights apply to business model innovation as well. Business model innovation can be considered a reconfiguration of existing business models (Massa & Tucci, 2013). Then,

business model design is the foundation of business model innovation, and business model innovation is another business model design process with additional intent to change. The same mentality carries over that one should have a complete understanding of the options and object that is being innovated. Without a full idea of the options, it is possible that what is thought to be an innovative option may actually be under the same umbrella as a previous one. Although it is indeed possible and common to innovate only parts of a business model, one must always be careful of the overall effect induced by the interconnectedness of the system nature of business models. Thus, understanding every elemental function of a business model is crucial, even if only parts of it are being innovated.

5.2.3 Implications for Interdisciplinary Research

This research is largely interdisciplinary in nature. It employs system theories as tools to address a business problem with engineering principles and mentality. It is shown here that interdisciplinary research thinking provides new tools for problem solving and yields new insights. One should not be confined in a supposed "research area" and should always think about and pursue the best tool for a problem, even outside one's specialty area. It is especially useful when there are very few available tools and theories in one's specialty area for a certain problem. Business model conceptualization has always been a significant barrier to further advance the body of knowledge in the business area, and there have been no universal theories. Even less information can be found on business model design and individual elemental functions. Maybe because of its emergence from practice, scholars have tended to disregard it as a stream of theory. It is also partly due to the fact that there is no anchoring theory behind the concept. With this problem at hand, outside help is needed. System theory with its well-established theoretical foundation provides a strong framework and guidance for conceptualization. When stripped of their names, business models and systems are both describing constituent elemental functions interconnected to pursue a goal. This piece of research is essentially bridging the gap between engineering and business management.

5.3 Implications for Practice

A business model is indeed a practical concept that both emerged from and thrived in practice. Every business has a business model, even if unintentional. A few implications can be identified through this research:

- A business model is a dynamic system that needs to consider resilience and longevity. It is very rare that a business is developed to conduct one business activity and then dissolve. Most businesses aim for long-term success and scale-up. Similarly, a business model should also enable long-term success. One must think about how to defend against competition and how to cope with an ever-changing environment, both the natural and business environment.
- The system nature of the business model concept requires careful consideration of the internal relationships between elemental functions. With its complex nature as an RCAS, emergent behavior is likely to occur at some point with a business model. It is also possible that the outcome of a business model may differ from what was originally envisioned. Therefore, it is important to always examine the overall effect before making even the smallest changes. Because of the loop structure of a business model, one should also incorporate feedback from the market into their business model management and innovation.
- Following on the point above, firms that do intend to change their business models or parts of their business models should realize that changing only the intended parts is likely not enough. The reason is the interconnectedness of an RCAS. As established previously, interactions between agents to pursue objectives are the most fundamental characteristics of any system. Viewing a business model as an RCAS highlights that it is crucial to pay extra attention to the interactions between elemental functions. If a company is trying to change from a product manufacturer to a consulting and customer service firm, just changing the product being sold is not enough. Human resources need to be altered, new employees with consulting capabilities need to be hired, different cost structure needs to be established, just to name a few. Therefore, any change to a business model is not a “small” change and emergent behavior should not be ignored.

- In design and innovation processes, one should always consider all the options for each elemental function and select the one most suited. Understanding one's choices is crucial not just for being successful, but also for surviving in the first place.
- Utilizing combinatorial thinking and experimenting with different combinations of choices provided, it is possible to create business models that are not common in one industry but common in another. This is a way to innovate business models that may be novel because they have not been seen before in the focal sector, thus competitors may take some time to cope, giving the business model innovator an advantage.

5.4 Limitations of Research and Opportunities for Future Work

As all research, the results of this study should be interpreted with awareness of its limitations and recognition of the resulting opportunities for future research in this subject area. The first limitation is that is that this study only presents a framework to describe a business model. It's not an agent-based simulation model or system dynamic model. It does not actually simulate or study the exact interactions between functions. For example, how Create Value influences Capture Value precisely is not studied here. This limitation presents an opportunity for future researchers to study and model the framework to a more exact level of detail. Studies can be done to understand more intricate interactions between functions and the consequences of related decisions. Just like modelling other complex entities, there is potential to create a similar model for the RCAS framework that can better simulate a business based on inputs to each elemental function.

Second, our RCAS framework and elemental functions are coded generally on purpose. More specific topics may not be readily visible as a result. Unlike previous conceptualizations and frameworks, this framework, along with the knowledge map, outlines the grander picture of a business model. It does not pertain to a specific level of abstraction or a certain space in the knowledge map. Previous frameworks and understandings, on the other hand, are shown to be operating in certain abstractions, which means that they are likely to provide more detailed examinations of certain aspects of a business model.

Another limitation is that when employing the findings of the work described herein. The successful use of the RCAS framework requires a clear and defined level of abstraction of the problem under analysis by the users. Employing the RCAS framework on a conceptual level won't

be very helpful if users are trying to model businesses on an architectural level. It is crucial for users of this framework to know that when faced with a specific problem, whose level of abstraction is clearly defined, they need to take advantage of the abstractable nature of the framework to move to the level that is compatible with the problem. Greater resolution/disaggregation may be required to break down corresponding elemental functions to a compatible state.

What's more, this study, specifically the RCAS framework, places focus on individual business models and how to describe them. It does not study how one business model influences another. However, larger companies often have several businesses and it would be safe to assume significantly different businesses will have different business models. This study does not provide insight into how to manage or create business models for different businesses under the same company structure. It is a practical problem that needs to be addressed. In fact, the RCAS framework could act as a foundation of this stream of research. To manage multiple business models, individual business models need to be created first. Then research can be conducted to study their interactions and overall influence on the company.

Another limitation of this research is that there may be new purposes of utilizing a business model construct not included here. The main contribution of the knowledge map is to outline the phenomenon of abstraction and provide an organization scheme. The eleven purposes found in literature may not represent all possible uses for a business model. One example is to communicate. Either between scholars or practitioners, a business model can be a tool to communicate findings and insights. However, no paper has utilized this purpose. There may be new ways to add to the existing axis to further expand the knowledge map and make it more inclusive and complete. This comes from the limitation that this study does not include every single paper regarding business models, especially studies in practice domain.

This limitation also carries over to the design method. The method proposed here is focused on understanding one's choices and conducting design as a structured procedure. It does not guarantee outcome. In other words, this study does not make any claim that if you choose certain choices you will definitely get certain results. In fact, it will be extremely difficult for anyone to make that definitive claim because the complex nature of the business model is associated with emergent behavior. However, there is potential to establish the linkage between goal and choices to make predictions to some level of confidence of probability. This is built on understanding the

interactions between elemental functions in the RCAS framework. It is also possible to create archetypes from the RCAS framework and the design method.

Following on the notion of design, there are limitations on the design options generated in this study. As explained in the corresponding chapter, each design option matrix is governed by a guiding principle, either from established theories or observation from existing companies. Also as explained, the guiding principles chosen herein are from the author's perspective. It is entirely possible that there are other theories that describe a certain elemental function better and can generate a more complete and encompassing set of design options.

Lastly, it is mentioned earlier that the thematic analysis employed herein adopted a manual approach. There is an opportunity to improve current data mining tools and expand the literature database incorporated. By updating these tools to interpret context, we will have the opportunity to examine an even larger body of literature to draw out more insight. A constantly renewing database can even be made to document the evolution of the body of knowledge with this type of capability.

5.5 Summary and Conclusion

This research attempts to address several problems with business model studies. It addresses the problem of the absence of a unifying theoretical foundation and subsequent misalignment between definitions, components, and applications in the literature. Two main research methods are employed, namely scholarship of integration and thematic analysis. Scholarship of integration was used to generate insights through literature review to add to the body of knowledge. Thematic analysis was largely employed to create the content and results of the research. This research also builds on the notion of systems and engineering design, two fields that are largely related to knowledge organization with the intent of problem solving, and applies these theories in combination with management theory to reframe the notion of a business model.

Three main contributions are made in this research. An RCAS framework of a business model is created by combining system theories and management theories. An RCAS construct is studied and adopted as the structure and theoretical foundation of a business model and provides the skeleton of the framework. Literature review on business model components is conducted to provide a full understanding of business model components. Thematic analysis is utilized to create a set of elemental functions that can capture all components, which act as the flesh of the

framework. An eight-elemental-function framework built on a value centric feedback loop is presented. This RCAS framework provides a more complete characterization of business models than current frameworks. Then building on the abstraction-tolerant nature of the framework, a knowledge map is created using three metrics that affect abstraction: purposes, levels of abstraction, and elemental functions. This knowledge map organizes existing literature and identifies future opportunities on a unifying landscape. It also provides a potential resolution to the business model debate. Finally, building on the RCAS framework and adopting combinatorial design thinking, a system-inspired design method is developed with a set of finite design options for each elemental function. It raises awareness of the importance of knowing one's options to inform design and innovation. Overall, this research advances the business model body of knowledge and promotes robust theory making using rigorous and established theories from an interdisciplinary standpoint.

In summary, the term business model has always been confusing and driving division among scholars. Given its importance in practice, this confusion makes it hard for practitioners to adopt it confidently. It also stagnates academic research. However, a business model is crucial to a company's success and given its complex nature, more thought should be given to its understanding, design, and innovation. This research advances the concept and clarifies much of this confusion regarding the concept. It makes contributions to both the academic and practical world. It is advocated here that researchers and practitioners work on this concept towards an even more unifying landscape and advance the concept collectively. Understanding more thoroughly the interactions, dynamics, and choice-goal correlations of a business model will increase its usefulness in practice to facilitate company success. Researchers and practitioners alike should work towards building a robust system of knowledge of a business model like they would for other subjects.

APPENDIX A. BUSINESS MODEL DATABASE

Business Model Components

Author	Year	Components
Abdelkafi & Tauscher	2016	Value Capture, Value Creation
Afuah	2014	Value Capture, Value Creation
Afuah	2001	Value Proposition, Profit Model, Revenue Model, Scope, Capability, Sustainability, Deliver, Processes
Afuah	2004	Value Creation
Afuah & Tucci	2002	Target Markets/Customer Segments, Revenue Model, Offering, Scope, Sustainability
Al-Debei et al.	2008	Value Proposition, Value Network and Role, Financial Model, Value Architecture (Structure, Configuration)
Al-Debei et al.	2008	N/A
Alt & Zimmermann	2001	Revenue Model, Organizational Structure, Technology, Mission, Processes, Legal Issues
Amit	2001	Value Creation
Amit & Zott	2015	N/A
Ammar	2006	Value Network and role, Value Creation Logic, Value Capture
Andersson et al.	2009	Resources and Competency, Activities, Agents (Actors)
Applegate & Collura	2000	Core Strategy, Capability, Concept, Value Creation Logic
Arend	2013	Value Creation
Aspara et al.	2013	Environment, Value Creation Logic, Organization, Business Units
Aspara et al.	2010	Target Markets/Customer Segments, Revenue Model, Value Creation Logic, Business Units, Business System
Aversa et al.	2015	Value Proposition, Corporate Governance, Linkages, Value Capture, Monetization, Value Chain, Customer Identification, Architecture
Baden-Fuller & Haefliger	2013	Value Proposition, Deliver, Linkages, Customer Engagement, Monetization, Customer Identification
Baden-Fuller & Mangematin	2013	Corporate Governance, Linkages, Customer Engagement, Monetization, Value Chain
Baden-Fuller & Morgan	2010	N/A
Barquet et al.	2011	Value Proposition, Target Markets/Customer Segments, Cost Structure, Customer Relationship, Deliver, Revenue Streams, Key Partnerships, Resources and Competency, Channel, Activities

Benson-Rea et al.	2013	Deliver, Value Capture, Value Creation
Berglund and Sandstrom	2013	Value Proposition, Target Markets/Customer Segments, Deliver, Value Creation, Value Appropriation
Berman	2007	Revenue Model, Key Partnerships, Value Chain
Betz	2002	Profit Model, Product and Service Logic, Operations
Bigliardi et al.	2005	Production, Commercialization
Birkinshaw & Goddard	2009	N/A
Björkdahl	2009	Value Creation Logic, Linkages, Value Appropriation
Bock et al.	2012	Revenue Model, Transaction Structure, Value Creation, Organizational Expectation
Bocken et al.	2014	Value Proposition, Deliver, Delivery Channels, Value Capture, Value Creation
Bocken et al.	2015	Business Opportunities, Environment, Value Creation Logic, Value Capture, Network, Society, Stakeholders, Purpose
Bohnsack et al.	2014	Value Proposition, Value Network and Role, Cost Structure, Revenue Model
Bonaccorsi et al.	2006	Network Externalities
Boons & Ltiese-Freund	2013	Value Proposition, Customer Interface, Supply Chain, Financial Model
Brea-Solis et al.	2015	Management, Value Capture, Value Creation, Product Selection, Choices, Consequences
Brousseau & Penard	2006	Cost Structure, Sustainability, Revenue Streams, Network Externalities, Goods and Services Production and Exchange, Pricing Strategies, Relationships (Demand and Supply)
Bucherer et al.	2012	N/A
Calia et al.	2007	Value Proposition, Target Markets/Customer Segments, Profit Model, Competitive Strategy, Scope, Time, Size
Casadesus-Masanell & Ricart	2010	Choices, Consequences
Casadesus-Masanell & Ricart	2010	Choices, Consequences
Casadesus-Masanell & Ricart	2007	Choices, Consequences
Cavalcante et al.	2011	N/A
Chesbrough	2007	Value Proposition, Target Markets/Customer Segments, Value Network and Role, Value Chain Role, Cost Structure, Competitive Strategy, Revenue Model, Value Capture

Chesbrough	2010	Value Proposition, Target Markets/Customer Segments, Value Network and Role, Value Chain Role, Cost Structure, Revenue Model, Distribution/Access, Key Partnerships, Resources and Competency, Activities
Chesbrough & Rosenbloom	2002	Value Proposition, Target Markets/Customer Segments, Value Network and Role, Value Chain Role, Cost Structure, Profit Model, Competitive Strategy
Dahan et al.	2010	Value Proposition, Value Network and Role, Cost Structure, Revenue Model, Organizational Structure, Environment, Key Partnerships, Corporate Governance, Value Chain, Value Creation
De Reuver & Haaker	2009	Value Proposition, Target Markets/Customer Segments, Value Network and Role, Revenue Model, Technology, Functionalities
Dedrick et al.	2000	Target Markets/Customer Segments, Customer Relationship, Distribution/Access, Supplier, Production
Demil & Lecocq	2010	Value Proposition, Organizational Structure, Deliver, Resources and Competency
Demil et al.	2015	N/A
Doganova & Eyquem-Renault	2009	Value Proposition, Target Markets/Customer Segments, Revenue Model, Deliver, Value Chain
Dohrmann et al.	2015	Value Proposition, Target Markets/Customer Segments, Customer Relationship, Distribution/Access, Revenue Streams, Expenditure
Donath	1999	Customer Understanding, Marketing Tactics, Corporate Governance
Doz & Kosonen	2010	Organizational Structure, Corporate Governance, Value Creation
Dubosson-Torbay et al.	2002	Value Proposition, Target Markets/Customer Segments, Value Network and Role, Value Chain Role, Cost Structure, Profit Model, Revenue Model, Customer Relationship, Offering, Product Innovation, Capability, Deliver, Processes, Customer Information, Branding
Eriksson et al.	2008	Offering, Organization, Customers, Resources and Competency, Competition
Fiet & Patel	2008	Profit Model, Risk transfer
Foss & Saebi	2015	Organizational Structure, Deliver, Transaction Content, Transaction Structure, Transaction Governance, Corporate Governance, Value Capture, Value Creation
Frankenberger et al.,	2013	Value Proposition, Target Markets/Customer Segments, Value Chain Role, Revenue Model, Processes, Activities
Froud et al.	2009	Cost Structure., Revenue Model

Gambardella & McGahan	2010	Cost Structure, Revenue Model, Value Creation Logic, Value Capture
Gassmann et al.,	2014	Value Proposition, Target Markets/Customer Segments, Revenue Model, Value Chain
Gauthier & Gilomen	2016	Value Proposition, Customer Interface, Supply Chain, Financial Model
George & Bock	2011	N/A
Giesen et al.	2007	N/A
Govindarajan & Trimble	2005	N/A
Hamel	2001	Value Network and Role, Customer Relationship, Customer Interface, Strategic Resources, Core Strategy, Capability, Mission, Processes, Competitive Advantage
Hedman & Kalling	2003	Value Chain Role, Offering, Capability, Processes, Organization, Resources and Competency, Supply Chain, Activities, Competition
Hienerth et al.	2011	Value Proposition, Profit Model, Deliver, Processes, Value Creation Logic, Resources and Competency
Hoque	2000	Target Markets/Customer Segments, Customer Relationship, Distribution/Access, Firm Identity, Firm Reputation, Product and Service Logic
Horowitz	1996	Profit Model, Offering, Distribution/Access, Organizational Characteristics, Technology
Hurt	2008	N/A
Itami & Nishino	2010	Profit Model, Production, Business System, Delivery System
Johnson	2010	Value Proposition, Profit Model, Deliver, Processes, Resources and Competency
Johnson et al.	2008	Value Proposition, Profit Model, Deliver, Processes, Customer Job, Resources and Competency
Khanagha et al.	2014	Value Proposition, Profit Model, Processes, Resources and Competency
Kim & Min	2015	N/A
Klang et al.	2014	N/A
Konde	2009	Value Proposition, Revenue Model, Value Chain
Lambert	2008	Value Proposition, Target Markets/Customer Segments, Revenue Model, Value Capture, Customers, Channel, Value Adding Process, Supplier, Ally
Lambert & Davidson	2013	N/A
Linder et al.	2001	Value Proposition, Profit Model, Revenue Streams, Organization

Lindgardt et al.	2009	Target Markets/Customer Segments, Cost Structure, Revenue Model, Offering, Deliver, Organization, Value Chain, Competitive Advantage
Lalue Chain, Competit	2016	Value Proposition, Deliver, Key Partnerships, Value Capture, Resources and Competency, Value Creation
Magretta	2002	Value Proposition, Target Markets/Customer Segments, Cost Structure, Profit Model, Deliver, Economic Logic
Mahadevan	2000	Value Proposition, Revenue Streams, Value Stream, Logistical Stream
Markides	2013	Transaction Content, Transaction Structure, Transaction Governance, Customer Selection, Value Creation
Markides & Charitou	2004	N/A
Markides & Oyon	2010	Culture
Markides & Sosa	2013	Target Markets/Customer Segments, Cost Structure, Distribution/Access, Branding, Customer Selection, Ally, Value Creation, Competitive Advantage
Martins et al.	2015	N/A
Mason & Spring	2011	Offering, Technology, Capability, Deliver, Network, Activities
Massa & Tucci	2013	Value Network and Role, Distribution/Access, Capability, Sustainability, Deliver, Value Capture, Value Creation
Matzler et al.,	2013	Product and Service Logic, Value Creation Logic, Marketing and Sales Logic, Value Capture
McGrath	2010	Processes, Business Units
Michelini & Fiorentino	2012	Value Proposition, Target Markets/Customer Segments, Value Network and Role, Value Chain Role, Cost Structure, Profit Model, Competitive Strategy
Mitchell & Bruckner Coles	2004	Value Proposition, Target Markets/Customer Segments, Profit Model, Deliver
Mitchell & Coles	2003	Value Proposition, Target Markets/Customer Segments, Profit Model, Deliver
Morris et al.	2005	Value Proposition, Target Markets/Customer Segments, Value Chain Role, Profit Model, Revenue Model, Offering, Capability, Organization, Resources and Competency, Supply Chain, Venture Strategy, Competitive Advantage
Nielsen & Lund	2014	Value Proposition, Sustainability, Deliver, Processes, Value Creation Logic, Resources and Competency, Strategic Choices, Supply of a Service, Connections, Value Creation

Ojala & Tyrväinene	2006	Distribution/access, Services, Product Strategy, Revenue Logic, Implementation Model
Onetti et al.	2012	Value proposition, Organization, Location
Osiyevskyy & Dewald	2015	Value Proposition, Deliver, Transaction Structure, Resources and Competency, Value Architecture (structure, configuration), Operations
Osterwalder	2004	Value Proposition, Target Market/Customer Segments, Cost Structure, Revenue Model, Customer Relationship, Offering, Processes, Delivery Channel, Key Partnership, Resources and Competency
Osterwalder et al.	2005	Value Proposition, Target Market/Customer Segments, Cost Structure, Revenue Model, Customer Relationship, Delivery Channel, Key Partnership
Panagiotopoulos et al.	2012	Value Proposition, Target Market/Customer Segments, Value Network and Role, Cost Structure, Revenue Model, Organizational Structure, Value Architecture (structure, configuration), Pricing Method
Pauwels & Weiss	2008	Revenue Model
Perkmann & Spicer	2010	N/A
Petrovic et al.	2001	Target Market/Customer Segments, Value Network and Role, Value Chain Role, Cost Structure, Revenue Model, Production Model, Distribution/Access, Marketing Strategy, Strategic Resources, Capital model, Product and Service Logic
Pousttchi et al.	2009	Value Proposition, Target Market/Customer Segments, Cost Structure, Revenue Model, Customer Relationship, Distribution/Access, Capability, Value Architecture (Structure, Configuration), Financing, Threat Model
Provance et al.	2011	Deliver, Transaction Content, Transaction Structure, Corporate Governance, Value Creation
Rappa	2001	Value Chain Role, Revenue Model, Sustainability
Rask et al.	2009	Customer Identification, Value Creation, Value Appropriation
Reim et al.	2015	Deliver, Value Creation Logic, Value Capture
Richardson	2008	Value Proposition, Target Market/Customer Segments, Value Network and Role, Core Strategy, Capability, Deliver, Economic Logic, Value Creation Logic, Revenue Stream, Organization, Value Capture, Resources and competency, Value Chain, Activities, Competitive Advantage
Roman et al.	2011	Customers, Value Creation

Roome and Louche	2016	Value Proposition, Value Network and Role, Cost Structure, Technology, Deliver, Delivery Channel, Revenue Stream, Value Capture, Resources and competency, Activities, Value Creation
Sabatier et al.	2010	Core Strategy, Time, Core Logic, Risk, Interdependencies, Expected Return
Santos et al.	2009	Target Market/Customer Segments, Deliver, Activities, Value Creation
Schaltegger	2012	Value Proposition, Target Market/Customer Segments, Cost Structure, Revenue Model, Customer Relationship, Key Partnership, Value Creation,
Schaltegger et al.	2016	Value Proposition, Deliver, Value Capture, Value Creation
Schneider & Spieth	2013	N/A
Seelos & Mair	2007	Capability
Shafer et al.	2005	Value Proposition, Target Market/Customer Segments, Value Network and Role, Cost Structure, Profit Model, Customer Relationship, Offering, Distribution/Access, Information Flow Architecture, Core Strategy, Scope, Capability, Mission, Processes, Customer Information, Branding, Customer Benefits, Value Creation Logic, Differentiation, Assets, Resources and Competency, Supplier, Strategic Choices, Activities, Competition
Sinfield et al.	2012	Target Market/Customer Segments, Value Chain Role, Profit Model, Offering, Distribution/Access, Customer Job
Slywotzky	1999	Profit Model, Customer Selection, Value Creation
Smith et al.	2010	Value Proposition, Target Market/Customer Segments, Organizational Structure, Processes, Culture, Value Capture, Customers, Resources and competency, Strategic Choices, People, Measurement System, Value Creation
Sorescu et al.	2011	Organizational Structure, Value Creation Logic, Value Capture, Activities, Interdependencies, Value Appropriation
Sosna et al.	2010	Key Partnership, Value Capture, Customers, Supplier, Value Creation
Spieth et al.	2014	N/A
Stwert & Zhao	2000	Value Chain Role, Scope, Differentiation, Customer Selection, Value Capture
Teece	2010	Value Proposition, Cost Structure, Revenue Model, Deliver, Customers
Thompson & MacMillan	2010	N/A

Tikkanen et al.	2005	Customer Relationship, Customer Understanding, Network, Finance, Operations, Strategy
Timmers	1998	Value Network and Role, Profit Model, Marketing Strategy, Information Flow Architecture, Revenue Stream, Value Chain, Agents (Actors)
Upward & Jones	2016	Value Proposition, Target Market/Customer Segments, Cost Structure, Revenue Model, Capability, Key Partnership, Resources and Competency, Channel, Value Architecture (Structure, Configuration), Agents (Actors), Stakeholders,
Van der Vorst et al.	2002	Value Proposition, Value Network and Role, Processes, Functionalities
Viscio	1996	Corporate Governance, Global Core, Business Units, Linkages, Services
von den Eichen et al.	2015	N/A
Weill & Vitale	2013	Information Flow Architecture, Customers, Supplier, Ally
Weill et al.	2011	Revenue Model, Assets, Asset Rights
Wells	2016	Value Proposition, Value Network and Role, Profit Model, Technology, Assets, Value Capture, Supply Chain, Socio-economic Framework, Value Creation
Wells	2016	Value Proposition, Production Model, Technology, Resources and competency
Wirtz et al.	2010	Value Proposition, Revenue Model, Production Model, Offering, Resources and Competency
Wirtz et al.	2016	Target Market/Customer Segments, Value Network and Role, Cost Structure, Customer Relationship, Production Model, Capital Model, Concept, Value Creation Logic, Assets, Revenue Stream, Channel, Competition, Financing, Strategy
Yunus et al.	2010	Value Proposition, Target Market/Customer Segments, Cost Structure, Profit Model, Revenue Model, Deliver, Value Constellation
Zott & Amit (2007)	2007	Transaction Content, Transaction Structure, Transaction Governance
Zott & Amit (2008)	2008	Transaction Content, Transaction Structure, Transaction Governance
Zott & Amit (2010)	2010	Transaction Content, Transaction Structure, Transaction Governance
Zott et al.	2011	N/A

Result of Thematic Analysis

	Manage Value	Identify Value	Create Value	Convey Value	Deliver Value	Capture Value	Protect Value	Sustain Value
Value Proposition			●					
Target Markets/Customer Segments		●						
Revenue Model						●		
Deliver					●			
Value creation			●					
Cost Structure						●		
Profit Model						●		
Value Capture						●		
Resources and competency			●		●		●	●
Value Network and role			●					
Processes	●		●	●	●	●	●	
Value creation logic			●					
Customer Relationship		●		●				●
Capability			●				●	
Value Chain Role	●		●					
Offering			●					
Distribution/Access					●			
Activities		●	●		●			
Key partnerships	●		●				●	
Value Chain	●		●		●			
Revenue Streams						●		
Organizational Structure	●							
Transaction Structure	●							
Corporate Governance	●							
Organization	●						●	
Technology			●					
Customers		●						
Sustainability								●
Transaction content			●			●		

Core Strategy	●							
Scope	●							
Transaction governance	●							
Linkages	●				●			
Supplier			●					
Supply chain			●					
Value Architecture (structure, configuration)	●							
Competitive advantage							●	●
Competitive Strategy							●	●
Production Model			●					
Business opportunities		●						
Product and service logic			●					
Assets	●		●					
Delivery Channels					●			
Business units			●			●		
Customer Selection		●						
Channel					●			
Value appropriation	●					●		
Choices	●							
Consequences	●							
Competition							●	
Information flow architecture			●					
Customer Interface				●				
Mission	●		●					
Branding				●				
Environment		●	●					
Network	●		●					
Monetization						●		
Ally	●		●					
Customer Identification		●						

Financial model	●					●		
Strategic choices	●	●	●			●		
Agents (actors)	●							
Production			●					
Operations	●		●		●			
Strategy	●							
Marketing Strategy				●				
Strategic Resources							●	●
Capital Model	●					●		
Customer information		●						
Economic Logic						●		
Functionalities			●					
Culture	●							
Differentiation						●	●	●
Customer understanding		●						
Time					●			
Services			●					
Customer Job		●						
Network Externalities			●					
Customer engagement				●				
Interdependen cies	●		●					
Stakeholders	●		●			●		
Business system	●							
Financing	●							
Organizational Characteristics	●							
Product Innovation		●	●					●
Concept			●					
Legal issues	●							
Customer benefits		●						
Firm identity	●							
Firm reputation				●				
Management	●							

Marketing and sales logic				●				
Asset rights			●					
Marketing Tactics				●				
Size	●							
Global core	●							
Value Stream		●						
Logistical Stream			●					
Goods and services production and exchange			●					
Pricing strategies						●		
Relationships (demand and supply)			●					
Value Adding process			●					
Architecture	●							
Venture strategy	●							
Core logic			●			●		
Risk	●							
People	●							
Measurement system	●							
Value constellation					●	●		
Supply of a service			●					
Connections			●					
Society			●					
Purpose		●	●					
Socioeconomic framework	●							
Commercialization			●			●		
Organizational expectation	●							
Product selection		●						
Expenditure						●		
Risk transfer							●	
Delivery system					●			

Product strategy			•					
Revenue logic						•		
Implementation model			•					
Location		•						
Pricing method						•		
Finance	•							
Threat model						•		
Expected return						•		

Business Model Purposes and Levels of Abstraction

Author	Year	Purpose/abstraction
Abdelkafi & Tauscher	2016	a, b/i
Afuah	2001	a, b/i; c, d, i/ii
Afuah	2004	g/ii; b/v
Afuah	2014	k/i; g, h, i/ii; k/v
Afuah & Tucci	2002	d, h, i/ii; b/iii; b/iv
Al-Debei et al.	2008	a, b/i
Al-Debei et al.	2008	a, b/i
Alt & Zimmerman	2001	a, b/iv
Amit & Zott	2001	a/i; d/v
Amit & Zott	2015	a, b/i
Ammar	2006	a, b, g, k/i
Andersson et al.	2009	a, g, h/ii
Applegate & Collura	2000	a/i, i/ii, h/v
Arend	2013	a/i
Aspara et al.	2010	d, e, g, i/ii
Aspara et al.	2013	a, k/i
Aversa et al.	2015	d/iv
Baden-Fuller & Haefliger	2013	a, e, k/ii
Baden-Fuller & Mangematin	2013	a/i
Baden-Fuller & Morgan	2010	a/i
Barquet et al.	2011	b/iv; e/v
Benson-Rea et al.	2013	a, g/i; b/iv
Berglund and Sandstrom	2013	k/i, ii, iii
Betz	2002	c/ii, iii, iv, v
Bigliardi et al.	2005	b, c, d/ii, iii, iv, v
Birkinshaw and Goddard	2009	a/ii, b/iv
Björkdahl	2009	b, d, e/ii
Bock et al.	2012	g, k/ii
Bocken et al.	2014	a, b/i
Bocken et al.	2015	a, b/i; b, e/iii
Bohnsack et al.	2014	a, b, e, k/ii
Bonaccorsi et al.	2006	a, b, e, g, k/ii
Boons & Ludeke-Freund	2013	a, b/i
Brea-Solis et al.	2015	d, e, g/ii
Brousseau & Penard	2007	b, d/iv
Bucherer et al.	2012	j, k/i, ii
Calia et al.	2007	b, g, k/ii
Casadesus-Masanell & Ricart	2007	a, b/I; a, e/v
Casadesus-Masanel & Ricart	2010	a, g/i; a/iv
Casadesus-Masanell & Ricart	2010	a, d, e, k/ii
Cavalcante et al.	2011	a/i; k/iv
Chesbrough	2007	a, b/i; k/ii
Chesbrough	2010	a, k/i

Chesbrough & Rosenbloom	2002	a/I; b/iii
Dahan et al.	2010	a, b/i; e/v
De Reuver & Haaker	2009	a/i; h, k/ii, v
Dedrick et al.	2000	b, d/ii, v
Demil et al.	2015	a/i
Demil & Lecocq	2010	a, k/i
Doganova & Eyquem-Renault	2009	a/I; k/ii
Dohrmann et al.	2015	b, d/ii, iii
Donath	1999	a/i, iii
Doz & Kosonen	2010	k/v
Dubosson - Torbay et al.	2002	a, b, c, j, d/iii; b, c/iv
Eriksson et al.	2008	a, e, k/ii
Fiet & Patel	2008	a/i; b/iii; b/v
Foss & Saebi	2015	a, b, g, k/i, iii, iv
Froud et al.	2009	b, g/ii, iii, v
Gambardella & McGahan	2010	b/i, ii, iii, iv, v
Gassmann et al.	2014	h, k/ii, v
Gauthie & Gilomen	2016	a/v
George & Bock	2011	a/i
Giesen et al.	2007	a, j/i
Govindarajan & Trimble	2005	j/ii, iii, iv, v
Hamel	2001	g, k/iii
Hedman & Kalling	2003	a/i, iv
Hienerth et al.	2011	b, j/ii, iii, v
Hoque	2000	b, h/ii, iii, iv
Horowitz	1996	b/i
Hurt	2008	a, b/i; b, g, i/ii
Itami & Nishino	2010	a/i; b/v
Johnson	2010	g, k/ii; b/iii
Johnson et al.	2008	b/iv; g, k/ii
Karolin Frankenberger et al.	2013	k/i, iii, iv, v
Khanagha et al.	2014	f/i; g, h/ii; f, g, h/iv, v
Kim & Min	2015	d, g, j, k/ii
Klang et al.	2014	a/i
Konde	2009	b/ii, iii, iv, v
Lambert	2008	a, b/i, ii; b/iii, iv, v
Lambert & Davidson	2013	a, b/i
Linder & Cantrell	2001	g, j, k/ii
Lindgardt et al.	2009	k/i
Lüdeke-Freund et al.	2016	a, g, k/i; c, g, k/ii; c/v; b, k/iv
Magretta	2002	a/i, iii
Mahadevan	2000	a/i; b/ii, iii, iv; h/ii
Markides & Charitou	2004	a, g, k/i, ii
Markides & Sosa	2013	a, g/ii
Markides	2013	a, g, k/i, ii
Markides & Oyon	2010	a, b, g, k/ii

Martins et al.	2015	a, h, k/ii
Mason & Spring (2011)	2011	a/i
Massa & Tucci	2013	a, b, f, k/i
Matzler et al.	2013	a, k/i; h/v
McGrath	2010	a, g, k/i
Michelini & Fiorentino	2012	b, d/i, ii, v
Mitchell & Coles	2003	g/ii, k/i
Mitchell & Coles	2004	k/i, ii, iii, v
Morris et al.	2005	a, b/ii, iii, iv, v
Nielson and Lund	2014	a, g, k/i; k/v
Ojala & Tyrväinen	2006	a, b, g, d/ii, v
Onetti et al.	2012	a/i, v; g/ii
Osiyevskyy & Dewald	2015	a, b/i; c, g/ii
Osterwalder	2004	a, b, c/i, iv
Osterwalder et al.	2005	a, b/i, iv; b/ii;
Panagiotopoulos et al.	2012	b/i, iv; g, i, j/i
Pauwels & Weiss	2008	a, b, d, i/ii
Perkmann & Spicer	2010	a/i
Petrovic et al.	2001	b/ii, iv; h/ii, iii, iv, v
Pousttchi et al.	2009	a/ii, iii, iv; b/ii, iii, iv, v
Provance et al.	2011	a, b/i; a, e/ii
Rappa	2001	a, c/i; b/iii
Rask et al.	2009	b, c/i, iii, v
Reim et al.	2015	j/i, ii
Richardson	2008	g, h/ii, b/iii
Roman et al.	2011	b, h, k/ii; c/ii, iv; h, k/v
Roome and Louche	2016	b/ii, iii; e/ii; k/ii
Schneider & Spieth	2013	a, f, k/i
Sabatier et al.	2010	a, g/i
Santos et al.	2009	a/i
Berman et al.	2007	a, e, c/ii, v; d, k/ii
Schaltegger et al.	2012	b, e, k/i, ii
Schaltegger et al.	2016	a/i
Seelos & Mair	2007	a, b, k/i, iv; e/ii, iv
Shafer et al.	2005	a/i
Sinfield et al.	2012	g, k/ii; b, g, k/iii, v; b/iv
Slywotzky	1999	h, k/i, ii
Smith et al.	2010	b, c, g/iii, iv, v; g/ii
Sorescu et al.	2011	b, k/i, ii, v
Sosna et al.	2010	b, k/ii
Spieth et al.	2014	a, k/i; c/iii; k/ii
Friedrich von den Eichen	2015	k/i, ii, iii, iv, v
Stewart & Zhao	2000	b/ii, iii, v
Teece	2010	a/i; g, k/ii
Thompson & MacMillan	2010	b/ii, iii; h/ii
Tikkanen et al.	2005	a/i, ii, iv; b/iii, v
Timmers	1998	a, b/i; c/iii

Upward & Jones	2016	a/i, iv; b/ii, iv
Van der Vorst et al.	2002	a, b/i; b/iii, iv, v
Viscio & Pasternack	1996	a/i
Weill et al.	2011	b/v; d, e/ii; k/ii, v
Weil & Vitale	2013	d, j, k/ii
Wells	2016	b/iii, iv; d/iii, v
Wells	2018	b/ii, iii, iv; k/ii
Wirtz et al.	2016	a, f/i
Wirtz et al.	2010	b, c, d, e/ii
Yunus et al.	2010	a, b, g, k/i; b/iv
Zott & Amit	2007	a, b, d/ii
Zott & Amit	2008	b, d, g, h/ii
Zott & Amit	2010	a, b/i
Zott et al.	2011	a/i; f/iii

APPENDIX B. SUPPORTING QUOTES FOR THEMATIC ANALYSIS

Supporting Quotes for Elemental Functions

Elemental Function	Sub-theme	Components	Exemplary quotation from source	Author	Year
Manage Value	Organization / Architecture	Organizational structure	*From the perspective of a firm's business model, the effects of strategies, processes and the environment on the **organizational structure**s are vital in order to find the link with organizational performance*	Tikkanen et al.,	2005
		Organizational characteristics	*the main components of a business model are price, product, distribution, **organizational characteristics** and technology*	Horowitz	1996
		Organization	*the **organization** you put in place to make good on your promises and to make use of what you get in return*	Linder & Cantrell	2001
		Firm Identity	*term used without explanation*	Hoque	2001
		Scope	*An integrated business model must capture the entrepreneur use of **scope**, and size ambitions or what might be termed the firm 'investment model.'*	Morris et al.	2005
		Legal issues	***Legal issues** have to be considered with all dimensions of business models*	Alt & Zimmermann	2001
		Size	*An integrated business model must capture the entrepreneur's time, scope, and **size** ambitions or what might be termed the firm's 'investment model.'*	Morris et al.	2005
		Organizational expectation	*Business models have been equated to revenue models (Afuah, 2003), boundary-spanning transactive structures (Amit and Zott, 2001), value creation systems (Osterwalder et al., 2005), **organizational expectations** (Downing, 2005), and narratives of success (Magretta, 2002).*	Bock et al.	2012
		Architecture	***Architecture** refers to the original structure of the business in terms of vertical integration, supply chain and value creation and capture as found in the mainstream literature on business models*	Wells	2016
		Transaction structure	*how value-creating economic **transactions** are **structure**d*	Zott & Amit	2007
		Linkages	*value chain and **linkages** (governance typically concerning the firm internally)*	Baden-Fuller & Mangematin	2013
		Value chain	***value chain** and linkages (governance typically concerning the firm internally)*	Baden-Fuller & Mangematin	2013

		Value chain role	*Define the structure of the **value chain** required by the firm to create and distribute the offering, and determine the complementary assets needed to support the firm und **position** in this chain*	Chesbrough	2007
		Value architecture	*The **value architecture** is a broad plan that specifies all necessary core technological and organizational arrangements in terms of resources and their configurations, as well as competencies that an organization is equipped with*	Panagiotopoulos et al.	2012
		Actors	*including a description of the various business **actors** and their roles*	Timmers	1998
		Stakeholders	*It includes the value proposition you work out with all your important **stakeholders***	Linder & Cantrell	2001
		Socio-economic framework	*how value is situated within the wider **socio-economic framework***	Wells	2016
		Business systems	*A **business system** is the 'system of works' (the production/delivery system) that a firm designs - within and beyond its boundaries - to deliver its products or services to its target customers.*	Itami & Nishino	2010
	Strategy	Core strategy	***Core strategy**. How does your firm choose to compete*	Hamel	2001
		Global core	*The **global core** has five key missions that meet the burden-of-proof test: identity, strategic leadership, capabilities, capital and control*	Viscio & Pasternack	1996
		Mission	***Mission**. One of the most critical elements of the business model is developing a high-level understanding of the overall vision, strategic goals and the value proposition including the basic product or service features*	Alt & Zimmermann	2001
		Network	*the **network** model has the highest value as a strategic component.*	Wirtz et al.	2016
		Venture strategy	*A business model is a concise representation of how an interrelated set of decision variables in the areas of **venture strategy a***	Morris et al.	2005
		Strategic choices	*A business model describes the coherence in the **strategic choices** which facilitates the handling of processes and relations which create value on both the operational, tactical, and strategic levels in the organization*	Nielson & Lund	2014
		Risk	***Risks** also affect the firm's business logic, and have both technological and financial dimensions*	Sabatier et al.	2010
		Strategy	*The function of the **strategy** is to give a meaning and direction for the development of the company's business model is to give a meaning and direction*	Tikkanen et al.,	2005

			for the development of the company's business model		
	Financials	Capital model	***Capital Model—****Describes the logic of how financial sourcing occurs to create a debt and equity structure, and how that money is utilized with respect to assets and liabilities, over time*	Petrovic et al.	2001
		Financial model	***Financial model****: costs and benefits from 1), 2) and 3) and their distribution across business model stakeholders.*	Boons & Ludeke-Freund	2013
		Value appropriation	*business model is defined as the logic and the activities that create and* ***appropriate economic value****, and the link between them*	Björkdahl	2009
		Financing	*The* ***financing*** *building block addresses the capital structure of the m-payment service provider*	Pousttchi et al.,	2009
	Operations	Process	*The transformation of input resources into output products/services is performed by the* ***process*** *and operations of the business*	Betz	2002
		Management	*the concrete choices made by* ***management*** *on how the organization must operate*	Casadesus-Masanel & Ricart	2010
		Interdependencies	***Interdependencies*** *with other organisations are related to the levels of specificity of the firm activities*	Sabatier et al.	2010
		Choices	*business models are composed of two different sets of elements: (a) the concrete* ***choices*** *made by management on how the organization must operate*	Casadesus-Masanel & Ricart	2010
		Consequences	*business models are composed of two different sets of elements: (a) the concrete choices made by management on how the organization must operate, and (b) the* ***consequences*** *of the choices*	Casadesus-Masanel & Ricart	2010
		Operations	*The transformation of input resources into output products/services is performed by the process and* ***operations*** *of the business*	Betz	2002
		Measurement system	*uses a particular organizational architecture - of people, competencies, processes, culture and* ***measurement systems*** *-in order to create and capture this value*	Smith et al.	2010
	Resources	Assets	*resource model: core competencies & competencies, core assets &* ***assets***	Wirtz et al.	2016
		Key partnership	*Media incumbents must aggressively experiment with the revenue model, the industry value chain and the enterprise model, including the use of* ***partnership****s and acquisitions*	Berman et al.	2007

		People	*How do we deploy and develop our **people** to sustain and enhance our competitive advantage*	Lindgardt et al.	2009
		Ally	*roles and relationships among a firm's customers, **allies**, and suppliers*	Weill & Vitale	2013
	Governance	Governance	*value chain linkages concern the **governance** architecture of value creation and capture, defining the degrees of integration in a firm's relation-ships with its suppliers and other stakeholders*	Aversa et al.	2015
		Culture	*the **culture** of the company, which includes its norms, values and unquestioned assumptions*	Markides & Oyon	2010
		Transaction governance	*transaction cost theory is concerned with explaining the choice of the most efficient **governance** form given a transaction that is embedded in a specific economic context.*	Zott & Amit	2007
Identify Value	Customer	Target market/ customer segment	***Customer Segment**s (distinct segments with common needs, common behaviors, or other attributes): defines the different groups of people or organizations an enterprise aims to reach and serve*	Barquet et al.	2011
		Customer information	*all **customer information** and knowledge a company can gather and exploit in order to discover new and profitable business opportunities*	Dubosson - Torbay et al.	2002
		Customer relationship	*customer model: **customer relationships**/target groups*	Wirtz et al.	2016
		Customer identificatio n	***CUSTOMER IDENTIFICATION** Are users paying and if not, who are the other customers?*	Baden-Fuller & Haefliger	2013
		Customer selection	***customer selection**, that is, from whom the firm makes money*	Stewart & Zhao	2000
		Customer benefits	*listed without explanation*	Shafer et al.	2005
		Customer understandin g	*listed without explanation*	Donath	1999
		Customer job	*Customer value proposition. The model helps customers perform a specific "**job**" that alternative offerings don't address*	Johnson et al. 2008	
		Customers	*it includes notions about the identity of **customers** and strategic posture in the industry architecture towards competitors and collaborators*	Rask et al.	2009
		Strategic choices	*By business model, we mean the design by which an organization converts a given set of **strategic choices** - about markets, customers, value propositions*	Smith et al.	2010
	Offering	Product innovation	***Product innovation**: The product component of the eBusiness Model framework describes the value a firm wants to offer its customers.*	Dubosson - Torbay et al.	2002

		Purpose	*target segment: luxury vs. economic, single-**purpose** vs. multi-purpose*	Bohnsack et al.	2014
		Product selection	***Product selection**. Discount retailers must choose the mix of goods they sell*	Brea-Solis et al.	2015
	New opportunities	Business opportunities	*" we formally define the business model as depicting 'the content, structure, and governance of transactions designed so as to create value through the exploitation of **business opportunities**.'"*	Zott & Amit	2007
		Environment	*Market Model—Describes the logic of choosing a relevant **environment** in which the business operates*	Petrovic et al.	2001
		Value stream	*The **value stream** identifies the value proposition for the buyers, sellers, and the market makers and portals in an Internet context*	Mahadevan	2000
		Activities	*A business model is a configuration of **activities** and of the organizational units that perform those activities both within and outside the firm designed to create value in the production (and delivery) of a specific product/market set*	Santos et al.	2009
		Location	*the ''locus'' of the business, i.e. the **location** or locations across which the firms' resources and/or value adding activities are spread*	Onetti et al.	2012
Create Value	Value creation logic	Value proposition	*The element **VALUE PROPOSITION** is an overall view of one of the firm's bundles of products and services that together represent value for a specific CUSTOMER SEGMENT*	Osterwalder	2004
		Mission	***Mission**. One of the most critical elements of the business model is developing a high-level understanding of the overall vision, strategic goals and the value proposition including the basic product or service features*	Alt & Zimmermann	2001
		Concept	*The idea of combined product service systems emerged as a business **concept***	Wells	2016
		Product innovation	***Product innovation**: The product component of the eBusiness Model framework describes the value a firm wants to offer its customers.*	Dubosson - Torbay et al.	2002
		Value creation logic	*The **value creation logic** refers to how the company shapes its activities and processes, to market the product or service.*	Matzler et al.	2013
		Core logic	*we define a business model as a representation of a firm's underlying **core logic** and strategic choices for creating and capturing value within a value network*	Shafer et al.	2005

		Interdependencies	*which together with their **interdependencies** define a retailer's organizing logic for value creation and appropriation.*	Sorescu et al.	2011
		Strategic choices	*By business model, we mean the design by which an organization converts a given set of **strategic choices** - about markets, customers, value propositions - into value*	Smith et al.	2010
		Environment	*A business model defines how an organization interacts with its **environment** to define a unique strategy, attract the resources to build the capabilities required to execute the strategy, and create value for all stakeholders*	Applegate & Collura	2000
		Connections	*the core of a business model description is the **connections** (between resources, processes, and the supply of a service) that create value*	Nielson & Lund	2014
		Purpose	*the **purpose** of the business*	Bocken et al.	2015
		Value creation	*How will the firm **create** value*	Calia et al.	2007
		Commercialization	*companies whose major areas of business are industrial development, production and **commercialization***	Bigliardi et al.	2005
		Product strategy	*The framework (Rajala et al., 2003a, 2003b, 2004) divides a business model into **product strategy**, revenue logic, distribution model, and service and implementation model*	Ojala & Tyrväinene	2006
	Production	Production model	*A **business system** is the 'system of works' (the production/delivery system) that a firm designs*	Itami & Nishino	2010
		Business unit	*we view the **business unit**-level business model as the business unit managers' perceived logic of how the unit in question functions and creates value*	Aspara et al.	2013
		Functionalities	***Functionalities** that support these processes as given (marketing and sales, quality control, procurement, supply chain planning)*	Van der Vorst et al.	2002
		Process	***Processes** provide a more detailed view on the mission and the structure of the business model. It shows the elements of the value creation process*	Osterwalder	2004
		Value adding process	***Value Adding Process**: This element ties together the resources, activities, and capabilities of the entity to create the Value Proposition*	Lambert	2008
		Activities	*In this paper the business model is defined as the logic and the **activities** that create and appropriate economic value*	Björkdahl	2009

		Supply of a service	*The business model is therefore a platform which connect resources, processes, and **the supply of a service** which results in the fact that the company is profitable in long-term*	Nielson & Lund	2014
		Production	*A business system is the 'system of works' (the **production**/delivery system) that a firm designs*	Itami & Nishino	2010
		Implementation model	*The framework (Rajala et al., 2003a, 2003b, 2004) divides a business model into product strategy, revenue logic, distribution model, and service and **implementation model***	Ojala & Tyrväinene	2006
		Operation	*A value activity is an **operation** that can be carried out in an economically profitable way for at least one actor*	Andersson et al.	2009
	Resources	Assets	*Resources/**Assets**. In order to create value, a firm needs resources*	Dubosson - Torbay et al.	2002
		Asset rights	*Our business model framework is based on defining the types of assets a company sells and the **rights** it grants customers to use those assets*	Weill et al.	2011
		Key partnership	***PARTNERSHIPS** are developed to provide a VALUE PROPOSITION*	Osterwalder	2004
		Capability	*The **capability** building block outlines the assets or resources necessary to provide them-payment procedure*	Pousttchi et al.,	2009
		Logistical stream	***logistical stream** (addresses various issues related to the design of the supply chain for the business)*	Mahadevan	2000
		Network	*Partner **Network** Portrays the network of cooperative agreements with other companies necessary to efficiently offer and commercialize value*	Osterwalder et al.	2005
		Relationships (demand and supply)	*With the passing of time, it is easier to identify the commonalities among the new business models that exploded with the growth of the Internet, although some had existed before. We believe they combine new and innovative ways of organizing the relationship between **demand and supply***	Brousseau & Penard	2007
		Resources and competencies	*we assume that a BM can be described with three core components: its **resources and competences**, its organizational structure and its propositions for value delivery*	Demil & Lecocq	2010
		Supplier	*The business model perspective is unique in one crucial respect: it embraces system wide changes that include both value creation and value exploitation, so requiring that the focal firm create value for all stakeholder groups - customers, **suppliers**, employees, and partners (such*	Sosna et al.	2010

			as franchisees in our case) - and capture value for itself		
		Ally	***Ally**: This term describes other entities in the value domain that assist the entity in providing the Value Proposition to the customer*	Lambert	2008
		Supply chain	***supply chain** management*	Morris et al.	2005
		Technology	*the underlying theory of the **technology** element of business models suggests four distinct dimensions to technology: product, process, core, and infrastructure technology*	Mason & Spring	2011
	Offering	Service	*Value proposition: product-content, **service** content*	Bohnsack et al.	2014
		Offering	*Product or Service **Offering**. What are we offering the customers to satisfy their needs?*	Lindgardt et al.	2009
		Product and service logic	***Product and service logic**. Which products and product features are necessary to become indispensable and strengthen our positioning*	Matzler et al.	2013
		Transaction content	*the structure, **content**, and governance of transactions between the focal firm and its exchange partner*	Zott & Amit	2007
		Goods and services production and exchange	*we define a business model as a pattern of organizing exchanges and allocating various costs and revenue streams so that the **production and exchange of goods or services** becomes viable*	Brousseau & Penard	2007
	Value structure	Value network and role	*the **value network** component represents the external arrangements which revolve around the communication and collaboration a CNTO needs and conducts with other businesses in its value network in order to be able to offer its products and/or services*	Al-Debei et al.	2008
		Value chain role	*Define the structure of the **value chain** required by the firm to create and distribute the offering, and determine the complementary assets needed to support the firm und **position** in this chain*	Chesbrough	2007
		Value chain	*The first two elements of the business model - the value proposition and the **value chain** - depict the firm as a producer of value for its customers*	Doganova & Eyquem-Renault	2009
		Society	*Sustainable business models consider a wider group of stakeholders than just customers and shareholders and explicitly consider **society** and environment as stakeholders*	Bocken et al.	2015
		Information flow	*An architecture for the product, service and **information flows***	Timmers	1998

		Stakeholders	*It includes the value proposition you work out with all your important **stakeholders** and the organization you put in place to make good on your promises and to make use of what you get in return*	Linder & Cantrell	2001
		Network externalities	***network externalities** in software demand shape the strategies of firms that entered the OSS field.*	Bonccorsi et al.	2006
Convey Value	Customer relationship	Customer relationship	*addressing all aspects of identifying customers, creating customer knowledge, building **customer relationships** and shaping their perceptions of the organization and its offerings*	Tikkanen et al.,	2005
		Customer interface	***Customer interface**: how are downstream relationships with customers structured and managed*	Boons & Ludeke-Freund	2013
		customer engagement	*Here we suggest the typology that considers four elements: Identifying the customers (the number of separate customer groups); **customer engagement** (or the customer proposition); monetization; and value chain and linkages (governance typically concerning the firm internally)*	Baden-Fuller & Mangematin	2013
	Marketing	Marketing strategy	*We need to know the **marketing strategy** of the company in order to assess the commercial viability*	Timmers	1998
		Process	*key **processes** (new product development, marketing, etc.)*	Hienerth et al.	2011
		Branding	*Reduce customer risk through **branding** and communication*	Markides & Sosa	2013
		Firm reputation	*listed without explanation*	Hoque	2000
		Marketing and sales logic	***The sales and marketing logic** defines how to attract and retain customers*	Matzler et al.	2013
		Marketing tactics	*listed without explanation*	Donath	1999
Deliver Value	Distribution/ Access	Distribution/ access	*which are the main **distribution** channel*	Dohrmann et al.	2015
		Channel	***Channel**: The channel describes how the value exchanges take place*	Lambert	2008
		Deliver	*how it creates and **delivers** this value proposition*	Lüdeke-Freund et al.	2016
		Delivery system	*A business system is the 'system of works' (the production/**delivery system**) that a firm designs*	Itami & Nishino	2010

		Delivery channel	*value creation and **delivery** in reference to the key activities, resources, **channels**, technology and patterns that create value and the way value is then (re)distributed*	Roome & Louche	2016
		Time	***Time** to market characterises how and when a product or service reaches the market*	Sabatier et al.	2010
		Linkages	*These **linkages** sometimes are described as value delivery*	Baden-Fuller & Mangematin	2013
		Value constellation	*a **value constellation**, that is, the answer to the question: How do we deliver this offer to our customers*	Yunus et al.	2010
	Network	Value network	*description of the structure of the multi-actor **value network** required to create and distribute the service offering and to describe the focal firm typically concerning the firm inter*	De Reuver & Haaker	2009
		Value chain	***Value Chain**. How are we configured to deliver on customer demand?*	Lindgardt et al.	2009
	Support	Process	*key **processes** and key resources are the means by which the company delivers the value to the customer and itself*	Johnson	2010
		Resources and competencies	*key processes and key **resources** are the means by which the company delivers the value to the customer and itself*	Johnson	2010
		Activities	*To build and distribute the value proposition, a firm has to master several processes and **activities***	Frankenberger et al.	2013
		Operations	*defines the way **operations** are organized to utilize available resources towards delivering value to stakeholders, including customers, partners, and owners*	Osiyevskyy & Dewald	2015
Capture Value	Value capture logic	Cost structure	***Cost Structure**: describes all costs incurred to operate a business model*	Barquet et al.	2011
		Revenue model	***Revenue Model**—Describes the logic of what, when why, and how the company receives compensation in return for the products.*	Petrovic et al.	2001
		Profit model	*A **profit model** is a pattern of the firm's intention about how it will make a profit in its given business*	Itami & Nishino	2010
		Capital model	*financial model: financing model, **capital model**, cost structure model*	Wirtz et al.	2016
		Transaction content	*the structure, **content**, and governance of transactions between the focal firm and its exchange partner*	Zott & Amit	2008
		Economic logic	*revenue sources, **economics** of the business*	Richardson	2008

		Revenue stream	*"**Revenue Streams**: result from value propositions successfully offered to customers, this element represents the cash a company generates from each Customer Segment*	Barquet et al.	2011
		Financial model	***Financial model**: costs and benefits from 1), 2) and 3) and their distribution across business model stakeholders*	Boons & Ludeke-Freund	2013
		Core logic	*we define a business model as a representation of a firm's underlying **core logic** and strategic choices for creating and capturing value within a value network*	Shafer et al.	2005
		Strategic choices	*A business model is a representation of the underlining core logic and **strategic choices** for creating and capturing value within a value network*	Shafer et al.	2005
		Expenditure	*Which are the most important **expenditures***	Dohrmann et al.	2015
		Revenue logic	*The framework (Rajala et al., 2003a, 2003b, 2004) divides a business model into product strategy, **revenue logic**, distribution model, and service and implementation model*	Ojala & Tyrväinene	2006
		Pricing method	*the value finance is a description of the arrangements related to economic viability. Total cost of ownership, **pricing methods**, and revenue structure are the main three concepts from this perspective*	Panagiotopoulos et al.	2012
		Expected return	***Expected Return**s are the anticipated level of value generated by the activity, and the promises made by the firm to its shareholders in terms of the return they can expect on their investments*	Sabatier et al.	2010
	Activities/ processes	Value capture	***value capture**, that is, how the firm makes money*	Stewart & Zhao	2000
		Process	*"The business model is therefore a platform which connect resources, **processes**, and the supply of a service which results in the fact that the company is profitable in long-term*	Nielson & Lund	2014
		Differentiation	*revenue model: revenue streams, revenue **differentiation***	Wirtz et al.	2016
		Pricing strategies	*With the passing of time, it is easier to identify the commonalities among the new business models that exploded with the growth of the Internet, although some had existed before. We believe they combine new and innovative ways of organizing the relationship between demand and supply, with **pricing strategies** that take into account network externalities,*	Brousseau & Penard	2007

		Monetization	***Monetization*** *addresses how firms capture portions of the value that they create, encompassing pricing and the mechanisms by which customers can be convinced to pay for the products or services that they consume*	Aversa et al.	2015
		Value appropriation	*a high-level description of how a firm (or part of a firm) creates, delivers and* ***appropriates*** *value*	Berglund & Sandstrom	2013
		Commercialization	*companies whose major areas of business are industrial development, production and* ***commercialization***	Bigliardi et al.	2005
	Entities	Business units	*to produce revenues and/or costs to the corporation or to other* ***business units***	Aspara et al.	2010
		Value network	*description of the way a* ***value network*** *intends to generate revenues from a particular service offering and of the way risks, investments and revenues are divided among the various actors in a value network*	De Reuver & Haaker	2009
		Value constellation	*how costs are structured and capital employed in the* ***value constellation***	Yunus et al.	2010
		Stakeholders	*the financial requirement of cost recovery is accompanied by a need to respond to the demands and expectations of key external* ***stakeholders***	Froud et al.	2009
Protect Value	Competitive strategies	Competitive strategy	*Formulate the* ***competitive strategy*** *by which the innovating firm will gain and hold advantage over rivals*	Chesbrough	2007
		Advantage	*What is the firm's internal source of* ***advantage***	Calia et al.	2007
		Competition	*To be sustainable a business must be profitable, or in other words able to survive sufficiently against entrenched and emergent* ***competition***	Wells	2016
		Threat model	*The* ***threat model*** *points out the potential and profound threats to the economic success of an m-payment business model*	Pousttchi et al.,	2009
	Activities/ processes	Process	*The second are* ***process*** *or operational advantages, which yield performance benefits when more adroit deployment of resources leads a firm to enjoy superior efficiency or effectiveness on the key variables that influence its profitability*	McGrath	2010
		Differentiation	***differentiation*** *and strategic control, that is, how the firm protects its profit stream over time*	Stewart & Zhao	2000

		Risk transfer	*The **risk transfers** may consist of such offsets as (1) longer credit periods from suppliers, which would decrease the risk of late payment; or (2) requiring that buyers finance the manufacture of a product, which would reduce the risk of nonpayment.*	Fiet & Patel	2008
	Resources	Partnership	*Key **Partnerships**: describes the network of suppliers and partners that make the business model work*	Barquet et al.	2011
		strategic resources	***Strategic resources**. Every significant competitive advantage rests on resources specific to the company in question*	Hamel	2001
		Capability	*The term 'core competency' is used to capture an internal **capability** or skill set that the firm performs relatively better than others*	Morris et al.	2005
Sustain Value	Sustainability mechanisms	Sustainability	*we define a business model as a pattern of organizing exchanges and allocating various costs and revenue streams so that the production and exchange of goods or services becomes viable, in the sense of being self-**sustainable** on the basis of the income it generates*	Brousseau & Penard	2007
		Differentiation	***differentiation** and strategic control, that is, how the firm protects its profit stream over time*	Stewart & Zhao	2000
		Competitive strategy	*Formulate the **competitive strategy** by which the innovating firm will gain and hold advantage over rivals*	Chesbrough	2007
		Product innovation	*In this virtuous circle products and **product innovation** can be improved which, in return, attracts new customers*	Dubosson - Torbay et al.	2002
		Advantage	*what a firm must do to sustain any **advantage**s it has*	Afuah	2001
	Resources	Strategic resources	***Strategic resources**. Every significant competitive advantage rests on resources specific to the company in question*	Hamel	2001
		Customer relationship	*to exploit existing **customer relationships** by getting a feel for the customer's desires, serving him and developing an enduring relationship with him*	Dubosson - Torbay et al.	2002
		Organization	***Organization**. How do we deploy and develop our people to sustain and enhance our competitive advantage*	Lindgardt et al.	2009

Supporting Quotes for Purposes and Levels of Abstraction

Author	Year	Purpose	Key words	Supporting quote	Level of abstraction	Key words	Supporting quote
Abdelkafi & Tauscher	2016	Theorize	"current understanding"	"advances the current understanding of the basic functioning of BMfS"	Conceptual	"understanding"	"advances the current understanding of the basic functioning of BMfS"
		Characterize	"partial model"	"propose partial models for the firm, natural environment, entrepreneur/manager, and customer"	Conceptual	"conceptualization"	"introduce a conceptualization of BMfS as a causal model related to four subsystems"
Afuah	2001	Theorize	"concept"	"offer concepts and tools that students of management need to analyze and synthesize business models"	Conceptual	"conceptualize"	"A business model can be conceptualized as a system that is made up of components, linkages between the components, and dynamics."
		Characterize	"framework"	"to develop an integrative framework that allows readers…"	Conceptual	"components"	"A business model can be conceptualized as a system that is made up of components, linkages between the components, and dynamics."
		Compare	"which"	"to know which of the many competitors that use these business models will succeed"	Logic	"variables"	"by how they are described by four variables or dimensions"
		Categorize	"synthesize"	"continue our exploration of business models by enumerating a taxonomy of business models"	Logic	"variables"	"by how they are described by four variables or dimensions"
		Assess	"analyze"	"need to analyze the components to know which of the many competitors..."	Logic	"variables"	"by how they are described by four variables or dimensions"
Afuah	2004	Model/predict	"link"	"provides the link between resources, product-market positions and profits—how	Logic	"link"	"provides the link between resources, product-market positions and profits—how resources and product-

				resources and product-market positions are translated into profits"			market positions are translated into profits"
		Characterize	“framework"	"offers an integrated framework for understanding the relationship between the set of activities that a firm chooses to perform"	Architectural	"framework"	"offers an integrated framework for understanding the relationship”
Afuah	2014	Change	"innovation"	"gets into the application of some of the business model innovation concepts to globalization and growth"	Conceptual	"concepts"	"gets into the application of some of the business model innovation concepts to globalization and growth"
					Activity	"activities"	"how the activities and resources of Chapter 8 are used to create and capture value"
		Strategize	"execute"	"explores the strengths and weaknesses of the firms that must conceive of, generate, and execute business models in the face of the opportunities and threats"	Logic	"explores"	"explores the strengths and weaknesses of the firms that must conceive of, generate, and execute business models in the face of the opportunities and threats"
		Design	"paint a portrait"	"chapter also explores four types of business model innovations and suggests how a firm can paint a portrait of a business model"	Logic	"explores"	"explores the strengths and weaknesses of the firms that must conceive of, generate, and execute business models in the face of the opportunities and threats"
		Assess	"assess"	"dedicated to assessing the profitability potential of a business model in its various forms"	Logic	"profitability potential"	"dedicated to assessing the profitability potential of a business model in its various forms"
Afuah & Tucci	2002	Compare	"compares"	"it is important to be able to understand how one business	Logic	NA	"we can measure how good a business model is at three levels: measures of profitability,

				model compares with another"			profitability prediction, and business model component attributes"
		Assess	"measure"	"we can measure how good a business model is at three levels"	Logic	NA	"we can measure how good a business model is at three levels: measures of profitability, profitability prediction, and business model component attributes"
		Characterize	"components"	"will then examine the components of a business model"	Functional	NA	"business model should include answers to a number of questions: The profit site to enter, what value to offer customers, which customers to provide the value to, how to price the value, who to charge for it, what strategies to undertake in providing the value, how to provide that value"
			"components"	"will then examine the components of a business model"	Architectural	NA	a visual architectural framework
Al-Debei et al.	2008	Theorize	"definition"	"propose guidelines as a basis on which to develop a more comprehensive definition"	Conceptual	"definition"	"propose guidelines as a basis on which to develop a more comprehensive definition"
		Characterize	"model"	"a generic model (V4 Model) is proposed for the BM of these companies based on value proposition, value architecture, value network and value finance"	Conceptual	"generic"	"a generic model (V4 Model) is proposed for the BM of these companies based on value proposition, value architecture, value network and value finance"
Al-Debei et al.	2008	Theorize	"definition"	"propose a new definition for the business model that we argue is more appropriate to this new world."	Conceptual	"definition"	"propose a new definition for the business model that we argue is more appropriate to this new world."

		Characterize	"business model concepts"	"identifying the four main business model concepts and values"	Conceptual	NA	a visual framework
Alt & Zimmerman	2001	Theorize	"definition"	"These definitions will be used to suggest a working definition for business models"	Architectural	"structure"	"To establish some structure and to identify the critical components of business models"
		Characterize	"components"	"To establish some structure and to identify the critical components of business models"	Architectural	"structure"	"To establish some structure and to identify the critical components of business models"
Amit & Zott	2001	Theorize	"theoretical"	"explore the theoretical foundations of value creation"	Conceptual	"theoretical"	"explore the theoretical foundations of value creation"
		Compare	"59 companies"	"examining how 59 American and European e-businesses that have recently become publicly traded corporationscreate value."	Activity	"create value"	"potential sources of valuecreation (e.g., questions included: ‘How importantare complementary products or services?’ and‘Are they part of the transaction offering?')"
Amit & Zott	2015	Theorize	“theoretical development"	"proceed with the theoretical development to link the design antecedents to the design themes of business models"	Conceptual	“theoretical development"	"proceed with the theoretical development to link the design antecedents to the design themes of business models"
		Characterize	"identify"	"identify and analyze the following four design drivers"	Logic	"affect"	"design drivers crucially affect the resulting business model designs in terms of their design themes"
Ammar	2006	Theorize	"conceptualization"	"propose a different conceptualisation of the BM"	Conceptual	"conceptualization"	"propose a different conceptualisation of the BM"
		Characterize	"dimensions"	"comprising three major dimensions: the value proposition in reference to the specificity of the firm’s offer to its customers, the value design entailing the value network as an	Conceptual	"dimensions"	"comprising three major dimensions: the value proposition in reference to the specificity of the firm’s offer to its customers, the value design entailing the value network as an external value chain, the firm’s activities as

				external value chain, the firm's activities as an internal value chain and the portfolio of resources and capabilities"			an internal value chain and the portfolio of resources and capabilities"
		Strategize	"strategy"	"developed an exhaustive definition of the BM as being a part of the strategy discipline rather than a 'challenger' of strategy and have proposed instead to compare it with similar managerial concepts."	Conceptual	"definition"	"developed an exhaustive definition of the BM as being a part of the strategy discipline rather than a 'challenger' of strategy and have proposed instead to compare it with similar managerial concepts."
		Change	"different"	"propose a different conceptualisation of the BM"	Conceptual	"conceptualization"	"propose a different conceptualisation of the BM"
Anderson et al.	2009	Theorize	"presents"	"present an approach that utilizes goal and business models as the foundation for designing e-services"	Logic	"modelling"	"how this kind of modelling can be used in a method for identifying services of an enterprise where some of these can be realized as e-service"
		Strategize	"strategic"	"it offers a structured way to identify services that are aligned with the strategic goals of an enterprise while considering the role that the enterprise has in business collaboration."	Logic	"modelling"	"how this kind of modelling can be used in a method for identifying services of an enterprise where some of these can be realized as e-service"
		Design	"designing"	"present an approach that utilizes goal and business models as the foundation for designing e-services"	Logic	"dependencies"	"a global goal model is made that captures the goals of all actors participating in collaboration and the dependencies that exist between those goals"

Applegate & Collura	2000	Theorize	"definition"	"Before describing an approach for analyzing a business model and identifying opportunities for improvement, it is helpful to begin with a definition"	Conceptual	"definition"	"Before describing an approach for analyzing a business model and identifying opportunities for improvement, it is helpful to begin with a definition"
		Assess	"assess"	"provides the basic frameworks and approaches that executives in established businesses can use to assess their current business models"	Logic	NA	"business model analysis helps executives understand how their current organizations make and lose money and how to identify and evaluate new business opportunities"
		Design	"crafting"	"key steps in crafting a business model are presented below"	Activity	NA	"key steps in crafting a business model are presented below"
Arend	2013	Theorize	"argue"	"argue that the use of the term “business model” as a “description” of how a traditional venture operates is strong on redundancy and weak on theoretical grounding"	Conceptual	"idea"	"address the research question of “when is the business model idea useful?”"
Aspara et al.	2010	Compare	"vs."	" to examine the financial performance implications of a firm’s strategic emphases with respect to business model innovation vs replication."	Logic	"implications"	" to examine the financial performance implications of a firm’s strategic emphases with respect to business model innovation vs replication."
		Model/ predict	"implications"	"presenting an empirical study that examines the financial performance implications of strategic emphasis on business model innovation"	Logic	"implications"	"presenting an empirical study that examines the financial performance implications of strategic emphasis on business model innovation"

		Strategize	"strategic"	"presenting an empirical study that examines the financial performance implications of strategic emphasis on business model innovation"	Logic	"implications"	"presenting an empirical study that examines the financial performance implications of strategic emphasis on business model innovation"
		Assess	"examine"	" to examine the financial performance"	Logic	"implications"	"presenting an empirical study that examines the financial performance implications of strategic emphasis on business model innovation"
Aspara et al.	2013	Theorize	"insight"	"to provide new insights into how executives' cognitive processes can influence corporate business model transformation decisions."	Conceptual	"cognitive"	"to provide new insights into how executives' cognitive processes can influence corporate business model transformation decisions."
		Change	"transformation"	"to provide new insights into how executives' cognitive processes can influence corporate business model transformation decisions."	Conceptual	"cognitive"	"to provide new insights into how executives' cognitive processes can influence corporate business model transformation decisions."
Aversa et al.	2015	Compare	"comparative"	"investigate the business model configurations associated with high and low firm performance by conducting a qualitative comparative analysis of firms competing in Formula One racing."	Architectural	"configuration"	"investigate the business model configurations associated with high and low firm performance by conducting a qualitative comparative analysis of firms competing in Formula One racing."
Baden-Fuller & Haefliger	2013	Theorize	"formulate"	" We formulate the business model relationship with technology in a two-way manner."	Logic	"relationship"	"We formulate the business model relationship with technology in a two-way manner."

		Model/ predict	"cause and effect"	"the framework depicts the business model system as a model containing cause and effect relationships"	Logic	"cause and effect"	"the framework depicts the business model system as a model containing cause and effect relationships"
		Change	"change"	"how innovation links to performance through the business model, and how changes in the business model influence technological innovation."	Logic	"influence"	"how innovation links to performance through the business model, and how changes in the business model influence technological innovation."
Baden-Fuller & Mangematin	2013	Theorize	“can be seen"	"how business models can be seen as a set of cognitive configurations that can be manipulable in the minds of managers"	Conceptual	"cognitive"	"how business models can be seen as a set of cognitive configurations that can be manipulable in the minds of managers"
Baden-Fuller & Morgan	2010	Theorize	"explore the question"	"explore the question ‘Are Business Models useful?’"	Conceptual	"forms"	"We point out that they act as various forms of model"
Barquet et al.	2011	Characterize	"characteristic"	"this paper identifies and classifies the characteristics of the PSS business model"	Architectural	canvas	described PSS characteristics through the canvas model
		Model/ predict	"fits"	"result support companies that aim to implement a PSS to better understand its constraints and to define a business model which fits to its purposes"	Activity	NA	described different PSS business model characteristics yielded by PSS types.
Benson-Rea et al.	2013	Theorize	"theories"	"Our objectives are to link the theory and practice of business models in three ways.”	Conceptual	"conceptualization"	"setting out our conceptualization of business models and the link to strategy selection by firms"

		Strategize	"strategy"	"setting out our conceptualization of business models and the link to strategy selection by firms"	Conceptual	"challenge assumption"	"Our findings challenge assumptions that firms have (or should have) a single business model thus allowing a plurality of approaches within a single firm or industry that shifts the focus from implementing strategy A or B or C, to implementing strategy A and B and/or C.“
		Characterize	“framework"	"Typologies are proposed as frameworks to understand and explain patterns of organizational similarity and difference"	Architectural	NA	presented in a table
Bergl und and Sandstrom	2013	Change	"innovation"	"explore challenges related to BMI by instead drawing on an open systems perspective on organisations."	Conceptual	"perspective"	"To complement existing research, we will explore BMI challenges by drawing on an open systems perspective on organisations."
					Logic	"result in"	"A lower degree of heterogeneity in terms of incentives among the concerned actors will increase the likelihood of successful BMI"
					Functional	"function"	"as long as the innovation project only concerns functions internal to the firm, the task of coordinating and managing activities can, in principle, be delegated to a heavyweight manager with formal authority over all involved actors"
Betz	2002	Categorize	"generic"	"Six different kinds of generic business models that can be used in strategy are summarized"	Logic	"logically"	"a complete set of business models can be generated from the logically distinct combinations of four operational issues"

					Functional	"operational issues"	"a complete set of business models can be generated from the logically distinct combinations of four operational issues"
					Architectural	NA	presented in graphs
					Activity	NA	presented in a graph
Bigliardi et al.	2005	Characterize	NA	"'service companies', 'small research companies' (NBFs), 'Traditional integrated firms', 'Industrialized Integrated firms'"	Logic	"cluster"	"results of the study show the existence of four clusters grouping biotechnological firms"
					Functional	NA	description of each cluster group
					Activity	NA	description of each cluster group
		Categorize	"cluster"	"results of the study show the existence of four clusters grouping biotechnological firms"	Logic	"statistical"	"to study the business models of the Italian biotechnological firms through a statistical analysis"
					Functional	NA	description of each cluster group
					Activity	NA	description of each cluster group
		Compare	"pattern"	"We then analyse the patterns of the development of biotechnological firms in Italy"	Logic	"pattern"	"We then analyse the patterns of the development of biotechnological firms in Italy"
					Functional	NA	description of each cluster group
					Activity	NA	description of each cluster group
Birkinshaw and Goddard	2009	Theorize	"framework"	"provide a framework dividing companies' business models into four possible choices"	Logic	"determine"	"and help leaders determine which management model may be right"
		Characterize	"frameworks"	"provide a framework dividing companies' business models into four possible choices"	Architectural	NA	presented in a graph

Björkdahl	2009	Characterize	"description"	"description of the methods and an investigation of three corporations that diversified the technology bases of their products by integrating ICTs"	Logic	NA	"The study is based on three multi-national corporations, and their integration of information and communication technologies into established mechanical engineering products."
		Compare	"three corporations"	"description of the methods and an investigation of three corporations that diversified the technology bases of their products by integrating ICTs"	Logic	NA	"The study is based on three multi-national corporations, and their integration of information and communication technologies into established mechanical engineering products."
		Model/ predict	"linking"	"contributes to the management literature by linking the input resources with the market output for creating and appropriating value from technology cross-fertilization."	Logic	"linking"	"contributes to the management literature by linking the input resources with the market output for creating and appropriating value from technology cross-fertilization."
Bock et al.	2012	Strategize	"strategic"	"to reveal CEO perceptions of the drivers of strategic flexibility during business model innovation"	Logic	“affect"	"How do culture and structure affect strategic flexibility during business model innovation?"
		Change	"innovation"	"to reveal CEO perceptions of the drivers of strategic flexibility during business model innovation"	Logic	"perception"	"How does business model innovation effort moderate those relationships?"
Bocken et al.	2014	Theorize	"develop"	"to develop a common language that can be used to accelerate the development of sustainable business models in research and practice"	Conceptual	"language"	"to develop a common language that can be used to accelerate the development of sustainable business models in research and practice"

		Characterize	"elements"	"a business model is defined by three main elements: the value proposition, value creation and delivery and value capture"	Conceptual	"elements"	"a business model is defined by three main elements: the value proposition, value creation and delivery and value capture"
Bocken et al.	2015	Theorize	"developed"	" A value mapping tool was developed to assist in the design of sustainable business models"	Conceptual	NA	" A value mapping tool was developed to assist in the design of sustainable business models"
		Characterize	"framework"	"offers a conceptual framework for a sustainable business model"	Conceptual	"conceptual"	"offers a conceptual framework for a sustainable business model"
					Functional	NA	"benefits or product/service offering to customer and society and environment, customer segments and relationships"
		Model/predict	"generation"	"The value mapping tool was developed as an idea generation tool"	Functional	NA	"How might value mapping as a tool and process be used for sustainable business thinking."
Bohnsack et al.	2014	Theorize	"explores"	"explores how incumbent and entrepreneurial firms' path dependencies have affected the evolution of business models for electric vehicles"	Logic	"dependencies"	"explores how incumbent and entrepreneurial firms' path dependencies have affected the evolution of business models for electric vehicles"
		Characterize	"archetypes"	"the paper identifies four business model archetypes and traces their evolution over time"	Logic	"dependencies"	"explores how incumbent and entrepreneurial firms' path dependencies have affected the evolution of business models for electric vehicles"
		Model/predict	"convergence"	"Over time there seems to be some convergence in the business models of incumbents and entrepreneurs in	Logic	"convergence"	"Over time there seems to be some convergence in the business models of incumbents and entrepreneurs in the direction of delivering

				the direction of delivering economy multi-purpose vehicles."			economy multi-purpose vehicles."
		Change	"evolution"	"the paper identifies four business model archetypes and traces their evolution over time"	Logic	"dependencies"	"explores how incumbent and entrepreneurial firms' path dependencies have affected the evolution of business models for electric vehicles"
Bonaccorsi et al.	2006	Theorize	"determinants"	"examines the determinants of the degree of openness toward OS and discusses the stability of hybrid models in the evolution of the industry"	Logic	"determinants"	"examines the determinants of the degree of openness toward OS and discusses the stability of hybrid models in the evolution of the industry"
		Characterize	"describe"	"describes the roots of the entry and the business models of commercial firms in the Open Source arena"	Logic	NA	"Firms that adopt a hybrid business model are likely to be are heterogeneous with respect to the extent to which they mix the two production paradigms"
		Model/ predict	"model"	"present a model of adoption that studies the intra-firm diffusion of the new paradigm"	Logic	"model"	"present a model of adoption that studies the intra-firm diffusion of the new paradigm"
		Strategize	"strategies"	"Explanatory hypotheses are discussed analysing how the characteristics of the Open Source production mode and of network externalities in software demand shape the strategies of firms that entered the OSS field."	Logic	NA	"Explanatory hypotheses are discussed analysing how the characteristics of the Open Source production mode and of network externalities in software demand shape the strategies of firms that entered the OSS field."

		Change	"evolution"	"examines the determinants of the degree of openness toward OS and discusses the stability of hybrid models in the evolution of the industry"	Logic	"determinants"	"examines the determinants of the degree of openness toward OS and discusses the stability of hybrid models in the evolution of the industry"
Boons & Ludeke-Freund	2013	Theorize	"insight"	"we provide insight into the ways in which the sustainable innovation literature currently lacks attention towards aspects that are crucial for successfully marketing innovations."	Conceptual	NA	"we provide insight into the ways in which the sustainable innovation literature currently lacks attention towards aspects that are crucial for successfully marketing innovations."
		Characterize	"elements"	"distinguish the following elements of a generic business model concept"	Conceptual	"generic"	"distinguish the following elements of a generic business model concept"
Brea-Solis et al.	2015	Compare	"evolution"	"apply the method to study the evolution of Walmart after its IPO in 1970, from 1971 to 2008. "	Logic	"effect"	"implement the quantitative model in order to determine the effect of Walmart's choices on its performance"
		Model/predict	"link"	"propose a novel approach to quantify the link between a firm's choices and their consequences"	Logic	"link"	"propose a novel approach to quantify the link between a firm's choices and their consequences"
		Strategize	"choice"	"propose a novel approach to quantify the link between a firm's choices and their consequences"	Logic	"link"	"propose a novel approach to quantify the link between a firm's choices and their consequences"
Brousseau & Penard	2007	Characterize	"framework"	"proposes an analytical framework for comparing different business models for producing information goods and digital services."	Architectural	NA	presented in a graph

		Compare	"compare"	"proposes an analytical framework for comparing different business models for producing information goods and digital services."	Architectural	NA	presented in a graph
					Functional	"assembling"	"The second dimension refers to the economics of assembling per se, and focuses on what we call 'assembling costs'"
Bucher er et al.	2012	Optimize	"best practices"	"assess the potential of transferring insights and best practices"	Conceptual	"understanding"	"intends to contribute to a better understanding of the options that exist for business model innovation"
					Logic	NA	"compare the results with the state of the art in product innovation management to leverage findings and best practices from this discipline."
		Change	"innovation"	"intends to contribute to a better understanding of the options that exist for business model innovation"	Conceptual	"understanding"	"intends to contribute to a better understanding of the options that exist for business model innovation"
					Logic	NA	"derive implications for an improved management of business model innovation based on the cases analysed"
Calia et al.	2007	Characterize	NA	description of the company in case study	Logic	NA	"the MetallurgyCompany creates value by delivering low-cost and high-performance metals tablets to increase resistance and plastic properties of aluminum."

		Strategize	"strategy"	"the new technology allows the Metallurgy Company to utilize recycled scrap alloys instead of virgin metals as raw materials for the tablets. This strategy enables the Metallurgy Company to decrease costs and gain competitive advantage in the global market."	Logic	"allow"	"the new technology allows the Metallurgy Company to utilize recycled scrap alloys instead of virgin metals as raw materials for the tablets. This strategy enables the Metallurgy Company to decrease costs and gain competitive advantage in the global market."
		Change	"innovation"	"presents an example of how a technological innovation network provides the necessary resources to change the business model"	Logic	"brought by"	"The company established changes and brought product innovations by introducing tablets from steel scraps with aluminum alloys through ‘‘water atomization’’ technology"
Casadesus-Masanell & Ricart	2007	Theorize	"defined"	"a business model is defined as a company’s choice of policies and assets, the governance structure of those policies and assets, and their consequences"	Conceptual	"understanding"	"to facilitate an understanding of the interaction with other business models"
					Activity	NA	"Examples of policies include opposing the emergence of unions, locating plants in rural areas, encouraging employees to fly tourist class, providing high-powered monetary incentives, or flying to secondary airports"
		Characterize	"defined"	"a business model is defined as a company’s choice of policies and assets, the governance structure of those policies and	Conceptual	NA	"a business model is defined as a company’s choice of policies and assets, the governance structure of those policies and assets, and their consequences"

				assets, and their consequences"			
					Architectural	NA	presented in a figure
		Model/ predict	"test"	"develop some tests to evaluate the business model both in isolation as well as in interaction with other business models from different organizations, such as competitors, complementary organizations, suppliers, partners, and others"	Activity	NA	"Increasing the level of comfort would require reducing the number of seats in planes, the additional offer of food, coffee, baggage transfer, and, perhaps, flights to primary airports. "
Casadesus-Masanell & Ricart	2010	Theorize	"present a conceptual framework"	"present a conceptual framework to separate and relate business model and strategy"	Conceptual	"conceptual"	"present a conceptual framework to separate and relate business model and strategy"
					Architectural	NA	presented in a figure
		Characterize	"present a conceptual framework"	"present a conceptual framework to separate and relate business model and strategy"	Conceptual	"conceptual"	"present a conceptual framework to separate and relate business model and strategy"
					Architectural	NA	presented in a figure
		Strategize	"strategy"	"show that the concepts of strategy and business model differ when there are important contingencies upon which a well-designed strategy must be based"	Conceptual	"concepts"	"show that the concepts of strategy and business model differ when there are important contingencies upon which a well-designed strategy must be based"
Casadesus-Masane	2010	Theorize	NA	"show how competitiveness can be achieved	Logic	"achieved"	"show how competitiveness can be achieved through

ll & Ricart				through business model reconfiguration"			business model reconfiguration"
		Compare	"each firm"	" We developed a full case for each firm form management interviews, many carried out directly by the authors with the help of research assistants. Each case was fully analyzed using our business model framework"	Logic	"identify …behind"	"just enough to identify the main value loop behind the firms' ability to create and capture value and highlight the contributions made to those loops by innovation and internationalization."
		Model/ predict	"path…to"	"analyze their business models to illustrate a path to competitiveness where the drive for innovation has originated from the need to compete in international markets."	Logic	"path…to"	"analyze their business models to illustrate a path to competitiveness where the drive for innovation has originated from the need to compete in international markets."
		Change	"adapt"	"to understand the need to adapt business models to changes in the environment"	Logic	"adapt"	"to understand the need to adapt business models to changes in the environment"
Cavalcante et al.	2011	Theorize	"conceptualization"	"to discuss the need to dynamize the existing conceptualization of business model"	Conceptual	"conceptualization"	"to discuss the need to dynamize the existing conceptualization of business model"
		Change	"change"	"proposes a new typology to distinguish different types of business model change."	Architectural	NA	presented in a figure
Chesbrough	2007	Theorize	"understand"	"To innovate the company business model, executives must first understand what it is, and then examine what paths exist for	Conceptual	"what it is"	"To innovate the company business model, executives must first understand what it is, and then examine what paths exist for them to improve on it"

				them to improve on it"			
		Characterize	"framework"	"The Business Model Framework (BMF) is a model that sequences possible business models from very basic (and not very valuable) models to far more advanced (and very valuable) models"	Conceptual	"framework"	"The Business Model Framework (BMF) is a model that sequences possible business models from very basic (and not very valuable) models to far more advanced (and very valuable) models"
		Change	"improve"	"To innovate the company business model, executives must first understand what it is, and then examine what paths exist for them to improve on it"	Logic	"path"	"To innovate the company business model, executives must first understand what it is, and then examine what paths exist for them to improve on it"
Chesbrough	2010	Theorize	"explore"	"explores the barriers to business model innovation, which previous academic research has identified as including conflicts with existing assets and business models, as well as cognition in understanding these barriers."	Conceptual	"understanding"	"explores the barriers to business model innovation, which previous academic research has identified as including conflicts with existing assets and business models, as well as cognition in understanding these barriers."
		Change	"innovation"	"explores the barriers to business model innovation, which previous academic research has identified as including conflicts with existing assets and business models, as well as cognition in understanding these barriers."	Conceptual	"understanding"	"explores the barriers to business model innovation, which previous academic research has identified as including conflicts with existing assets and business models, as well as cognition in understanding these barriers."

Chesbrough & Rosenbloom	2002	Theorize	"explores"	"explores the role of the business model in capturing value from early stage technology"	Conceptual	"role"	"explores the role of the business model in capturing value from early stage technology"
		Characterize	"definition"	"We offer the following,more detailed and operational, definition"	Functional	"function"	"The functions of a business model are to: …"
Dahan et al.	2010	Theorize	"broaden"	"Our conceptualization broadens the business model concept to incorporate cross-sector collaborations, arguing such partnerships can create and deliver both social and economic value, which can be mutually reinforcing"	Conceptual	"conceptualization"	"Our conceptualization broadens the business model concept to incorporate cross-sector collaborations, arguing such partnerships can create and deliver both social and economic value, which can be mutually reinforcing"
		Characterize	"elements"	"most conceptualizations of business models contain common definitional elements which we highlight here."	Conceptual	"definitional"	"most conceptualizations of business models contain common definitional elements which we highlight here."
		Model/ predict	"create and deliver"	"arguing such partnerships can create and deliver both social and economic value, which can be mutually reinforcing"	Activity	NA	"The local NGOs and other organizational partners educate small farmers about new irrigation technology and promote its use"
De Reuver & Haaker	2009	Theorize	"overview"	"provide a well-grounded, holistic overview of design issues that are the most critical in developing viable business models for context-aware services"	Conceptual	"overview"	"provide a well-grounded, holistic overview of design issues that are the most critical in developing viable business models for context-aware services"

		Design	"design"	"provide a well-grounded, holistic overview of design issues that are the most critical in developing viable business models for context-aware services"	Conceptual	"overview"	"provide a well-grounded, holistic overview of design issues that are the most critical in developing viable business models for context-aware services"
					Activity	NA	"Targeting Value-creating elements Branding Customer retention…"
		Change	"adoption"	"apply mobile business model concepts to the domain of context-aware services, identifying the design issues that have to be addressed to increase the adoption of these services and technologies"	Logic	"be addressed"	"apply mobile business model concepts to the domain of context-aware services, identifying the design issues that have to be addressed to increase the adoption of these services and technologies"
					Activity	NA	"Pricing Division of costs and revenues Multiple revenue models…"
Dedrick et al.	2000	Characterize	"shows"	"shows how Dell's strategies of direct sales and build-to-order production have proven successful in minimizing inventory and bringing new products to market quickly, enabling it to increase market share and achieve high returns on investment"	Logic	"proven"	"shows how Dell's strategies of direct sales and build-to-order production have proven successful in minimizing inventory and bringing new products to market quickly, enabling it to increase market share and achieve high returns on investment"
					Activity	"information technology"	"In particular, Dell's use of information technology (IT) has been vital to executing both elements of its business model - direct sales and build-to-order"

		Compare	NA	case study on Dell's business model at different stages	Logic	NA	description of how performance changes after refining business models
					Activity	NA	descriptions of how Dell's activities change after business model refinement
Demil et al.	2015	Theorize	"theory"	"to publish work that develops theory on business models"	Conceptual	"conceptual"	"we briefly review the main conceptual developments of the past two decades"
Demil & Lecocq	2010	Theorize	"address"	"try to reconcile these two approaches to address the question of how a BM evolves, looking particularly at the dynamic created by the interactions between its building blocks"	Conceptual	"view"	"view business model evolution as a fine tuning process involving voluntary and emergent changes in and between permanently linked core components"
		Change	"evolve"	"try to reconcile these two approaches to address the question of how a BM evolves, looking particularly at the dynamic created by the interactions between its building blocks"	Conceptual	"view"	"argued that both the static view, which aims to describe the configurations of elements producing (or not) good performance, and the dynamic view, which tries to grasp the ways in which a BM evolves over time, are useful, but that, simply, they fulfil different functions."
Doganova & Eyquem-Renault	2009	Theorize	"examined"	"investigate the role played by business models in the innovation process"	Conceptual	"intelligent collective device"	"examine business models as intelligent collective devices in a context of uncertainty"
		Change	"innovation"	"investigate the role played by business models in the innovation process"	Logic	"allows"	"business model works as both a calculative and a narrative device. It allows entrepreneurs to explore a market and to bring their innovation"

Dohrmann et al.	2015	Characterize	"entails"	"The business model of a soup kitchen entails the social mission of food supply to recipients who do not have enough money to buy food."	Logic	"relationships"	" The numbered arrows illustrate specific relationships between business model components, where the dashed arrows indicate supplementary relationships, which characterize extended variants of the basic model."
					Functional	NA	"who offer funds and/or donations"
		Compare	"cases"	"Using a gallery of real-life case studies, we illustrate that social business models can be characterized and ordered by the degree to which they monetize social value creation and the level of generated market revenues in excess of expenditures."	Logic	"the degree of which"	"Using a gallery of real-life case studies, we illustrate that social business models can be characterized and ordered by the degree to which they monetize social value creation and the level of generated market revenues in excess of expenditures."
					Functional	NA	"who contribute funds and/or donations"
Donath	1999	Theorize	"define"	"define a business model and its components"	Conceptual	"define"	"define a business model and its components"
					Functional	NA	descriptions of business model components
Doz & Kosonen	2010	Change	"transformation"	"propose a repertoire of concrete leadership actions enabling the meta-capabilities needed to accelerate the renewal and transformation of business models"	Activity	"actions"	"propose a repertoire of concrete leadership actions enabling the meta-capabilities needed to accelerate the renewal and transformation of business models"

Dubosson - Torbay et al.	2002	Theorize	"propose"	"propose a theoretical e-business model framework for doing business"	Functional	NA	"Our eBusiness Model framework is therefore divided into four principal components. (1) The products and services a firm offers, representing a substantial value to a target customer (value proposition), and for which he is willing to pay"
		Characterize	"framework"	"propose a theoretical e-business model framework for doing business"	Functional	NA	"Our eBusiness Model framework is therefore divided into four principal components. (1) The products and services a firm offers, representing a substantial value to a target customer (value proposition), and for which he is willing to pay"
					Architectural	NA	presented in a graph
		Categorize	"classification"	"to propose a multi-dimensional classification-scheme for eBusiness Models"	Functional	"principle roles"	"we identified as principal dimensions for classifying the business models: •The user role: How is the client or the prospect considered by the company?"
					Architectural	NA	presented in a graph
		Optimize	“success factors"	"to define critical success factors"	Functional	NA	presented in a table
		Compare	"compare"	"to use this framework to classify and compare the business models"	Functional	NA	descriptions of different companies
Eriksson et al.	2008	Theorize	"propose"	"propose an integrated e-newspaper business model framework consisting of three models, ubiquitous, local, and prestige"	Logic	"factor analysis"	"The three-factor solution presented in Table 4 gives three consumers views on mobile e-news services."
		Model/ predict	"implications"	"discuss the implications that these consumer views could have	Logic	"implications"	"discuss the implications that these consumer views could

				on developing new business models"			have on developing new business models"
		Change	"new"	"discuss the implications that these consumer views could have on developing new business models"	Logic	"implications"	"discuss the implications that these consumer views could have on developing new business models"
Fiet & Patel	2008	Theorize	"define"	"which we define as ones in which risk is disproportionately borne by others while venture payoffs are shared proportionately by an entrepreneur and/or investors"	Conceptual	"define"	"which we define as ones in which risk is disproportionately borne by others while venture payoffs are shared proportionately by an entrepreneur and/or investors"
		Characterize	"in a FBM"	"In a FBM, a resource provider may be induced to bear a disproportionate amount of risk in return for the same or a reduced level of profitability. In other words, a resource provider accepts risks without being compensated for them—unlike in efficient capital markets."	Functional	"bear risk"	"In a FBM, a resource provider may be induced to bear a disproportionate amount of risk in return for the same or a reduced level of profitability. In other words, a resource provider accepts risks without being compensated for them—unlike in efficient capital markets."
					Activity	"offsets"	"the risk transfers may consist of such offsets as (1) longer credit periods from suppliers, which would decrease the risk of late payment"
Foss & Saebi	2015	Theorize	"propose"	"propose a contingency model of open business models"	Conceptual	"model"	"propose a contingency model of open business models"
					Functional	"content, structure, and governance"	"we argue that pursuing open innovation is likely to affect a company's business model with respect to (1) the content (2) the

						structure and (3) governance"
				Architectural	NA	presented in a graph
	Characterize	"propose"	"propose a contingency model of open business models"	Conceptual	"propose"	"propose a contingency model of open business models"
				Functional	"content, structure, and governance"	"This strategy affects the company's business model content, structure and governance in the following ways."
				Architectural	NA	presented in a graph
	Strategize	"strategies"	"how adopting different types of open innovation strategies affect a company's business model"	Conceptual	"conceptual"	"Drawing on this conceptual framework, we take the focal company's open innovation strategy (at the business-unit level) as the unit of analysis"
				Functional	"acquire"	"Adopting a market-based innovation strategy, the company acquires the "solution" to its innovation problem from a selected knowledge supplier on market basis"
				Architectural	NA	presented in a graph
	Change	"innovation"	"how adopting different types of open innovation strategies affect a company's business model"	Conceptual	"conceptual"	"Drawing on this conceptual framework, we take the focal company's open innovation strategy (at the business-unit level) as the unit of analysis"
				Functional	"reduction in transaction cost"	"Change in business model content. Adopting a market-based innovation strategy, the company can achieve significant reductions in transaction costs"
				Architectural	NA	presented in a graph

Froud et al.	2009	Characterize	"business model"	"The BBC's business model was complicated in 2002 with the collapse of the terrestrial ITV venture OnDigital"	Logic	"came at a cost"	"This opportunity came at a price, as the BBC expanded from a two-channel and regional output producer to a multi-channel digital broadcaster"
					Functional	"functions"	"BBC management must adjust internal labour costs to balance the rising share of external purchases resulting from the outsourcing of 'non-core' business functions plus the cost of independent programme purchases"
					Activity	"sales of business"	"from the sale of businesses like BBC Technology to financial engineering moves such as the outsourcing of property maintenance"
		Strategize	"strategy"	"explain the recent defensive strategy of downsizing at the BBC"	Logic	"explains"	"explain the recent defensive strategy of downsizing at the BBC"
					Functional	"functions"	"BBC management must adjust internal labour costs to balance the rising share of external purchases resulting from the outsourcing of 'non-core' business functions plus the cost of independent programme purchases"
					Activity	"sales of business"	"BBC has already pulled most other strategic levers, from the sale of businesses like BBC Technology"
Gambardella & McGahan	2010	Characterize	"describe"	"describes a business model that is growing in prevalence and that carries novelimplications: the development of general-purpose	Conceptual	NA	"As a result of this vulnerability, many technology-based firms have engaged in business-model in-novation by pursuing strategies in which they invest in technologies with

				technologies for licensing to down-stream specialists"			more general applicability”
					Logic	"as a result"	"As a result of this vulnerability, many technology-based firms have engaged in business-model in-novation by pursuing strategies in which they invest in technologies with more general applicability”
					Functional	"delivers technolog y"	"delivers a general-purpose technology to multiple downstream markets, it is no longer as vulnerable in one-on-one negotiations with potential downstream manufacturers as it would be in a narrow sub-segment"
					Architectur al	NA	presented in a figure
					Activity	“license research tools"	"no longer sold specific compounds for commercialization, but instead licensed research tools such as bio-informatics devices"
Gassma nn et al.	2014	Design	"design"	"present a practical business model innovation design method"	Logic	"logic"	"contains the essential information that is needed to understand the concept behind the pattern: a title, a description of the general logic, and a concrete example of a company implementing the pattern in its business model"
					Activity	"example "	"contains the essential information that is needed to understand the concept behind the pattern: a title, a description of the general logic, and a concrete example of a company implementing the

							pattern in its business model"
		Change	"innovation"	"provides a process for business model innovation structured in three steps"	Logic	"logic"	"contains the essential information that is needed to understand the concept behind the pattern: a title, a description of the general logic, and a concrete example of a company implementing the pattern in its business model"
					Activity	"example"	"contains the essential information that is needed to understand the concept behind the pattern: a title, a description of the general logic, and a concrete example of a company implementing the pattern in its business model"
Gauthie & Gilomen	2016	Theorize	"address"	"This article addresses these issues by exploring changes in business model elements in detail"	Activity	"elements"	"it is worth considering the role played by business model elements (the value proposition and the financial model) that literature does not usually discuss in enabling the management of or transition to business models for sustainability"
George & Bock	2011	Theorize	"theory development"	"findings provide new directions fortheory development and empirical studies in entrepreneurship by linking the business model to entrepreneurial cognition"	Conceptual	"reframe"	"review prior research and reframe the business model with an entrepreneurial lens"
Giesen et al.	2007	Theorize	"find out"	"to find out what exactly the term business model innovation encompasses"	Conceptual	"type"	"identified three main types of business model innovation, which can be used

							alone or in combination"
		Optimize	"best result"	"to find out what exactly the term business model innovation encompasses and what type yields the best results"	Conceptual	NA	"key finding was that each type of business model innovation, with the right strategy and strong execution, can generate success"
Govindarajan & Trimble	2005	Optimize	"excellence"	"a company's emphasis must shift from ideas to execution and from leadership excellence to organizational excellence"	Logic	"what it takes"	"to find out exactly what it takes to get beyond ideas"
					Functional	"forgetting"	"Forgetting, borrowing, and learning are monumental tasks"
					Architectural	"one level above"	"NewCo should report at least one level above CoreCo in order to reduce the pressures"
					Activity	"add contents"	"They experimented with potential revenue sources and added a great deal of content"
Hamel	2001	Design	"design	"identifies the key design criteria for building companies that are activist friendly"	Functional	"develop financial measures"	"harness the imagination of every employee; develop new financial measures that focus on creating new wealth; and create vibrant internal markets for ideas, capital, and talent"
		Change	"revolutionize"	"guidelines for those who may have ideas about new opportunities that can revolutionize the company or the industry"	Functional	"develop financial measures"	"harness the imagination of every employee; develop new financial measures that focus on creating new wealth; and create vibrant internal markets for ideas, capital, and talent"

Hedman & Kalling	2003	Theorize	"outline"	"offers an outline fora conceptual business model, and proposes that it should include customers and competitors, the offering, activities and organisation, resources and factor market interactions."	Conceptual	"conceptual"	"offers an outline fora conceptual business model, and proposes that it should include customers and competitors, the offering, activities and organisation, resources and factor market interactions."
					Architectural	NA	presented in a figure
Hienerth et al.	2011	Characterize	"refers"	"the term “user-centric business models” refers to business models designed to allow and even trigger “interference” from users in activities at all stages of the value chain "	Logic	"logic"	"user-centric business models follow a completely different logic compared to traditional manufacturer-centric models"
					Functional	"resolve high-priority problems "	"The basic idea underlying this initiative was to use the company’s global workforce in order to get inputs to resolve high-priority problems or tasks"
					Activity	"created an online platform"	"IBM created an online platform which allowed employees to exchange information and discuss ideas"
		Optimize	"success"	"explores the success factors for attracting and engaging users in core business processes, "	Logic	"prerequisite"	"enabling users to interact with each other in real time in order to exchange and discuss ideas or to provide feedback and support is a vital prerequisite for fostering creativity"
					Functional	"integrate users"	"established companies that have successfully extended their traditional business models by introducing novel tools, instruments and procedures to systematically and

							continuously integrate users into their core business processes."
					Activity	"signing of NDAs"	"Signing of NDAs and IP rights transfer forms (for developing concrete concepts)"
Hoque	2000	Characterize	NA	"what are your competencies"	Logic	"between"	"You must lay out the flows of products, services, and information between actors who add value by playing specific, defined roles"
					Functional	"functionality"	"business architecture gives an enterprise a distinct shape and defines its high-level functionality"
					Architectural	NA	presented in a figure
		Design	"articulate"	"At this stage, you will also articulate more clearly how your physical stores and sales force…"	Logic	"relate"	"At this stage, you will also articulate more clearly how your physical stores and sales force relate to Net-based sales and service"
					Functional	"functions"	"Some of these processes will seem to be very specific to a particular offering, but many more will prove to be common functions that enable many different offerings"
					Architectural	NA	presented in a figure
Horowitz	1996	Characterize	"discuss"	"Discusses the service-and-support business model propagated by value-added resellers (VAR)"	Conceptual	NA	"Discusses the service-and-support business model propagated by value-added resellers (VAR)"
Hurt	2008	Theorize	"version"	"presents an enhanced version of the business model"	Conceptual	"viewed"	"the business model can be viewed as a total architecture of the firm made up of a set of components and linkages, reflecting the firm's choices"

		Characterize	"version"	"presents an enhanced version of the business model"	Conceptual	"viewed"	"the business model can be viewed as a total architecture of the firm made up of a set of components and linkages, reflecting the firm's choices"
					Logic	"linkages"	"the business model can be viewed as a total architecture of the firm made up of a set of components and linkages, reflecting the firm's choices"
		Design	"formulation"	"that can assist in piloting firm internationalization and replication"	Logic	"evaluate"	"effectively as a scorecard to evaluate and guide firms' strategy formulation and implementation"
		Strategize	"strategy"	"effectively as a scorecard to evaluate and guide firms' strategy formulation and implementation"	Logic	"evaluate"	"effectively as a scorecard to evaluate and guide firms' strategy formulation and implementation"
		Assess	"evaluate"	"effectively as a scorecard to evaluate and guide firms' strategy formulation and implementation"	Logic	"evaluate"	"effectively as a scorecard to evaluate and guide firms' strategy formulation and implementation"
Itami & Nishino	2010	Theorize	"definition"	"the common definition seems to be that a business model is composed of two elements, a business system and a profit model, hence the term business model"	Conceptual	"definition"	"the common definition seems to be that a business model is composed of two elements, a business system and a profit model, hence the term business model"
		Characterize	"elements"	"the common definition seems to be that a business model is composed of two elements, a business system and a profit model, hence the term business model"	Activity	"outsources"	"Toyota's famous (and much-copied) business system is exceptional in all three aspects. Toyota outsources production of many of its auto part…"
Johnson	2010	Characterize	"elements"	"define the elements of a successful business model	Functional	"interrelate"	"define the elements of a successful business model and explain how they interrelate"

				and explain how they interrelate"			
		Strategize	"growth"	"illustrate how companies are using innovative business models to seize their white space and achieve transformational growth"	Logic	"bring"	"chance to seize a piece of white space presents a tantalizing opportunity. Success here can bring the transformational growth that so many business leaders seek"
		Change	"innovation"	"illustrate how companies are using innovative business models to seize their white space and achieve transformational growth"	Logic	"how"	"explore how business model innovation can empower organizations to transform existing markets, create new ones, or recast whole industry"
Johnson et al.	2008	Characterize	"elements"	"A business model, from our point of view, consists of four interlocking elements that, taken together, create and deliver value."	Architectural	NA	presented in a figure
		Strategize	"strategic"	"observed five strategic circumstances that often require business model change"	Logic	"require"	"observed five strategic circumstances that often require business model change"
		Change	"change"	"observed five strategic circumstances that often require business model change"	Logic	"yield"	"These questions will help you evaluate whether the challenge of business model innovation will yield acceptable results."
Karolin Frankenberger et al.	2013	Change	"innovation"	"develop the 4I-framework that structures the business model innovation process and highlights the specific challenges"	Conceptual	"framework"	"develop the 4I-framework that structures the business model innovation process and highlights the specific challenges"
					Functional	"understanding and monitoring"	"The initiation phase in business model innovation processes can be described by activities which focus on the understanding and monitoring of the

							surrounding ecosystem"
					Architectural	NA	presented in a figure
					Activity	"pitching workshop"	"applies more creative brainstorming and pitching workshop formats to arrive at new business model ideas"
Khanagha et al.	2014	Organize	"organize"	"investigates how an established firm organizes for an emerging business model."	Logic	"how"	"investigates how an established firm organizes for an emerging business model."
					Architectural	NA	presented in a figure
					Activity	"activities"	"Aligning the internal activities with external rate and direction of change"
		Strategize	"strategy"	"exploring the interdependence among strategy formulation, structuring, and business model innovation processes."	Logic	"interdependence"	"exploring the interdependence among strategy formulation, structuring, and business model innovation processes."
					Architectural	NA	presented in a figure
					Activity	"activities"	"Aligning the internal activities with external rate and direction of change"
		Change	"innovation"	"exploring the interdependence among strategy formulation, structuring, and business model innovation processes."	Logic	"interdependence"	"exploring the interdependence among strategy formulation, structuring, and business model innovation processes."
					Architectural	NA	presented in a figure
					Activity	"activities"	"Aligning the internal activities with external rate and direction of change"
Kim & Min	2015	Compare	"performance change"	"analyzed the performance change of those physical store-based retailers that added online	Logic	"performance change"	"analyzed the performance change of those physical store-based retailers that added online retailing

				retailing as a new business model."			as a new business model."
		Strategize	"managerial choice"	"choice on the timing of new business model addition helps unlock the potential of complementary assets"	Logic	"helps"	"choice on the timing of new business model addition helps unlock the potential of complementary assets"
		Optimize	"improve"	"incumbent performance after new business model addition improves when the incumbent firm aligns complementary assets with earlier addition of the new business model and conflicting assets with an autonomous business unit for the new business model"	Logic	"when"	"incumbent performance after new business model addition improves when the incumbent firm aligns complementary assets with earlier addition of the new business model and conflicting assets with an autonomous business unit for the new business model"
		Change	"addition"	"choice on the timing of new business model addition helps unlock the potential of complementary assets"	Logic	"helps"	"choice on the organizational configuration of the new business model helps vaccinate against the detriment of conflicting assets"
Klang et al.	2014	Theorize	“insight"	"to provide insight into the antecedents of this paradox and to understand their implications for the future development of the concept."	Conceptual	"development of the concept"	"to provide insight into the antecedents of this paradox and to understand their implications for the future development of the concept."
Konde	2009	Characterize	"discuss"	"discusses the various business models and strategies adopted by the biotechnology companies"	Logic	"directed"	"that directed the growth of the biotechnology industry in the country based on the techno-economic dynamics and the key challenges faced by these firms."

					Functional	"developing products"	"The Product business model was represented by conducting basic and preclinical research, developing products in defined therapeutic areas, venture capital funding through preclinical development,"
					Architectural	NA	presented in a figure
					Activity	"offer genomic testing"	"Many diagnostic laboratories that offer genomic testing follow a service model, which has the advantage of short development time, but is typically slow to scale"
Lambert	2008	Theorize	"propose"	"to propose a conceptual framework for business model research that provides a basis for theory development and debate"	Conceptual	"conceptual"	"to propose a conceptual framework for business model research that provides a basis for theory development and debate"
					Logic	"rules"	"The operational aspects of the business model refer to the rules and conventions that dictate when and how to recognise business model elements"
		Characterize	"framework"	"to propose a conceptual framework for business model research that provides a basis for theory development and debate"	Conceptual	"conceptual"	"a business model conceptual framework (BMCF) can be developed that provides the foundation for business model representations"
					Logic	"ties"	"This element ties together the resources, activities, and capabilities of the entity to create the Value Proposition"
					Functional	"value exchange"	"The channel describes how the value exchanges take place"

					Architectural	"pyramid"	"The bottom pyramid emphasises the hierarchy of conceptual levels stressed by the framework."
					Activity	"rent"	"Value in Return: such as rent, commission, sales revenue, advertising space, future contracts"
Lambert & Davidson	2013	Theorize	"themes"	"Three themes emerge from an analysis of the papers"	Conceptual	"as a research construct"	"to highlight the value of the business model as a research construct and improve the general understanding of the business model concept."
		Characterize	NA	"(1) the business model as the basis for enterprise classification, (2) business models and enterprise performance, and (3) business model innovation"	Conceptual	NA	descriptions of each theme from the empirical study
Linder & Cantrell	2001	Strategize	"strategy"	"If your business model guides day-to-day execution, your strategy should tell how you intend to change your model to take advantage of shifting markets and new opportunities"	Logic	NA	"If your business model guides day-to-day execution, your strategy should tell how you intend to change your model to take advantage of shifting markets and new opportunities"
		Optimize	"successful"	"but the more successful models do share three characteristics"	Logic	"based on"	"successful business models are grounded in reality. They're based on accurate assumptions about how people will behave"
		Change	"change"	"to understand how they were changing business models"	Logic	"understand how"	"to understand how they were changing business models"

Lindgardt et al.	2009	Change	"innovation"	"This chapter analyzes several aspects of business model innovation"	Functional	"break out of intense competition"	"BMI can provide companies a way to break out of intense competition, under which product or process innovations are easily imitated, competitors' strategies have converged, and sustained advantage is elusive"
					Activity	"low fares"	"Virgin Blue, an airline that offered low fares with a "premium coach" experience and a fresh brand"
Lüdeke-Freund et al.	2016	Theorize	"how are"	"How are innovative business models creating shared value?"	Conceptual	"overview"	"to provide an overview of the state of the art of research at the nexus of business models and shared value and related business practice"
		Characterize	"explain"	"the business model attempts to explain how resources, capabilities, and activities are geared to providing a customer value proposition"	Functional	"supporting analyses"	"It adds depth to the Hourglass Model, in the sense of supporting business model analyses at a more detailed level"
					Architectural	NA	presented in a figure
		Categorize	"classified"	"The sustainable business model archetypes (Figure 12) are classified by the dominant innovation orientations"	Logic	"driven by"	"Archetypes with a largely environmental impact, often supporting and driven by technology innovations"
					Activity	"substituting"	"Substituting with renewables and natural processes."
		Strategize	"strategic"	"The Sustainability Strategy Roadmap (SSR) helps managers to identify and prioritize opportunities for corporate sustainability and	Conceptual	NA	"The Sustainability Strategy Roadmap (SSR) helps managers to identify and prioritize opportunities for corporate sustainability and shared value creation."

				shared value creation."			
					Logic	"result"	"Having a clear strategic roadmap results in strategic focus and the ability to efficiently define and communicate goals and priorities within the firm"
		Change	"innovative"	"How are innovative business models creating shared value?"	Conceptual	"view"	"offers a systemic view on business models and business model innovation for sustainability and shared value"
					Logic	"how"	"How are innovative business models creating shared value?"
					Architectural	NA	presented in a figure
Magretta	2002	Theorize	"definition"	"But before managers can apply the concept, they need a simple working definition that clears up the fuzziness associated with the term"	Conceptual	"definition"	"But before managers can apply the concept, they need a simple working definition that clears up the fuzziness associated with the term"
					Functional	"making something"	"Part one includes all the activities associated with making something"
Mahadevan	2000	Theorize	"develops"	"develops a framework that can help practicing managers understand the notion of a business model in the Internet context"	Conceptual	"understanding"	"develops a framework that can help practicing managers understand the notion of a business model in the Internet context"
		Characterize	"framework"	"develops a framework that can help practicing managers understand the notion of a business model in the Internet context"	Functional	"revenue stream"	"A business model is a unique blend of three streams that are critical to the business. These include the value stream for the business partners and the buyers, the revenue stream..."

					Logic	"philosophy"	"The fundamental philosophy behind free services is one of giving up today's revenues in return for assured future revenues"
					Architectural	NA	presented in a figure
		Design	"arriving"	"the process of arriving at an appropriate business model involves choosing the right mix of alternatives"	Logic	"involves"	"the process of arriving at an appropriate business model involves choosing the right mix of alternatives"
Markides & Charitou	2004	Theorize	"offers"	"offers a contingency solution to help companies embrace the new business models without diluting and destroying their existing models"	Conceptual	"perspective"	"This discussion suggests to us that rather than adopting an either/or perspective, we may be better off approaching the issue from a contingency perspective."
					Logic	"influencing"	"existing literature suggests that two key variables influence how a firm should manage two business models simultaneously"
		Strategize	"strategy"	"The bigger the conflicts between the two business models and the lower the possibility that the two models can share any synergies among them, the more appropriate is the separation strategy."	Conceptual	NA	descriptions of four strategies
					Logic	"the more appropriate"	"The bigger the conflicts between the two business models and the lower the possibility that the two models can share any synergies among them, the more appropriate is the separation strategy."

		Change	"new"	"offers a contingency solution to help companies embrace the new business models without diluting and destroying their existing models"	Conceptual	NA	"This is especially the case when, in addition to the absence of conflicts, the two business models serve strategically similar businesses and so stand to gain from exploiting synergies among them."
					Logic	"influenced"	"Viewing the new model as an opportunity influenced the firms' actions in two ways: (a)how they approached it; and (b)what they actually did to take advantage of it"
Markides & Sosa	2013	Theorize	"thesis"	"Our thesis is that the business models that pioneers or late entrants adopt could have a big impact on the usefulness and sustainability of first-mover advantages. "	Logic	"thesis"	"Our thesis is that the business models that pioneers or late entrants adopt could have a big impact on the usefulness and sustainability of first-mover advantages. "
		Strategize	"low cost"	"Achieving low cost and differentiation at the same time is the first way that pioneers can use to respond to their attackers"	Logic	"probability"	"if the pioneer succeeds in developing an innovative business model to counter-attack the late entrants' own innovative business models, the probability that it will protect its FMAs will be higher"
Markides	2013	Theorize	"proposed"	"The primary solution offered to solve this problem is to keep the two business models (and their underlying value chains) physically separate into distinct organizations"	Conceptual	"idea"	"The main idea is that the same unit or company can undertake two seemingly incompatible activities (such as exploitation and exploration) but at different times"

					Logic	"because"	"Running dual business models is challenging because a new business model requires different and often incompatible value-chain activities from the ones the company already has in place"
		Strategize	"strategy"	"temporal separation would mean that a firm could start out by putting the new business model in a separate unit but reintegrate it in the main business overtime (i.e., phased integration strategy)"	Conceptual	NA	"temporal separation would mean that a firm could start out by putting the new business model in a separate unit but reintegrate it in the main business overtime (i.e., phased integration strategy)"
					Logic	"question"	"If temporal separation is as viable a strategy as spatial separation, the natural question for academic researchers to explore is 'when is one preferable to the other?'"
		Change	"innovation"	"guide research on the challenge of managing two business models simultaneously and identify several insights"	Conceptual	"guide research"	"guide research on the challenge of managing two business models simultaneously and identify several insights"
					Logic	"identify"	"guide research on the challenge of managing two business models simultaneously and identify several insights"
Markides & Oyon	2010	Theorize	"identify"	"identified five key questions to consider if they are to improve in competing with dual business models in the same industry“	Logic	“questions"	"identified five key questions to consider if they are to improve in competing with dual business models in the same industry”

		Characterize	NA	descriptions of cases	Logic	"rational"	"the rationale for this approach is straightforward: Managers at the established company who feel that the new business model is growing at their expense would want to constrain or even kill it"
		Strategize	"enter the market"	"Should I enter the market space created by the new business model?"	Logic	"logic"	"The logic for this approach is straightforward. Proponents of running two separate operations point to the benefits of keeping the two business models apart..."
		Change	"new"	"If I develop a new business model, how separate should it be organizationally from the existing business model"	Logic	"logic"	"The logic for this approach is straightforward. Proponents of running two separate operations point to the benefits of keeping the two business models apart..."
Martins et al.	2015	Theorize	"theory"	"advance a theory of how business models can be innovated proactively in the absence of exogenous changes, through processes of generative cognition"	Logic	"through"	"advance a theory of how business models can be innovated proactively in the absence of exogenous changes, through processes of generative cognition"
		Organize	"organize"	"analyzing business models as schemas that organize managerial understandings about the design of firms' value‐creating activities and exchanges"	Functional	"organize"	"analyzing business models as schemas that organize managerial understandings about the design of firms' value‐creating activities and exchanges"

		Design	"design"	"analyzing business models as schemas that organize managerial understandings about the design of firms' value - creating activities and exchanges"	Logic	"how"	"analyzing business models as schemas that organize managerial understandings about the design of firms' value - creating activities and exchanges"
		Change	"innovated"	"advance a theory of how business models can be innovated proactively in the absence of exogenous changes, through processes of generative cognition"	Logic	"through"	"advance a theory of how business models can be innovated proactively in the absence of exogenous changes, through processes of generative cognition"
Mason & Spring	2011	Theorize	"suggest"	"suggest that firms, business networks and markets form embedded systems within which multiple overlapping business models can be considered as constituent parts"	Conceptual	"concepts"	"examines the concept of business models"
Massa & Tucci	2013	Theorize	"introduce"	"introduce the notion of business model innovation"	Conceptual	"notion"	"introduce the notion of business model innovation"
		Characterize	"clarify"	"clarify the origins and notion of the BM"	Conceptual	"notion"	"clarify the origins and notion of the BM"
		Organize	"organize"	"organize the literature on BMI around emerging literature streams"	Conceptual	"streams"	"organize the literature on BMI around emerging literature streams"
		Change	"innovation"	"introduce the notion of business model innovation"	Conceptual	"notion"	"introduce the notion of business model innovation"
Matzler et al.	2013	Theorize	"how…be implemented"	"demonstrate how business model innovation can be implemented successfully"	Conceptual	"concept"	"aims to examine the concept of business model innovation and to discuss the design of the key elements"
		Change	"innovation"	"aims to examine the concept of business model innovation and to	Conceptual	"concept"	"aims to examine the concept of business model innovation and

				discuss the design of the key elements"			to discuss the design of the key elements"
		Design	"design"	"aims to examine the concept of business model innovation and to discuss the design of the key elements"	Logic	"logic"	"Nespresso's revenue logic is built on the razor-blade model"
					Activity	"sold"	"High quality coffee machines in elegant design are sold for an economic price through licensing partners"
McGrath	2010	Theorize	"what constitutes"	"Which brings us to two core components of what constitutes a business model. The first is the basic 'unit of business', which is the building block of any strategy, because it refers to what customers pay for. The second are process or operational advantages"	Conceptual	"operational advantage"	"Which brings us to two core components of what constitutes a business model. The first is the basic 'unit of business', which is the building block of any strategy, because it refers to what customers pay for. The second are process or operational advantages"
		Strategize	"strategy"	"the choice of unit of business is critical to strategy"	Conceptual	"building block"	"which is the building block of any strategy, because it refers to what customers pay for."
		Change	"change"	"The concept of 'the business model' is appealing because it suggests a change to the way that strategies are conceived, created and executed again"	Conceptual	"concept"	"The concept of 'the business model' is appealing because it suggests a change to the way that strategies are conceived, created and executed again"
Michelini & Fiorentino	2012	Characterize	"characteristics"	"to understand which characteristics distinguish social and inclusive business models"	Conceptual	"theoretical"	"to define a theoretical framework characterized by categories and sub-categories which has been useful to develop

							the multiple case study analysis“
					Logic	“characterized by"	"In the social business model, the offer is characterized by features and prices that must serve the needs of the low-income sector"
					Activity	"joint-venture"	"The two models differ in terms of governance systems in that the social business type is tied to the creation of a joint venture with a non-profit organization, while the inclusive business is characterized by internal or external spin-off businesses where the company is the sole promoter"
		Compare	"distinguish"	"to understand which characteristics distinguish social and inclusive business models"	Conceptual	NA	“To identify characteristics distinguishing the social and the inclusive business models, as well as the benefits and risks of each model“
					Logic	"connected"	"what kind of benefits and risks (for companies and for communities) are connected to each model"
					Activity	"joint-venture"	"The two models differ in terms of governance systems in that the social business type is tied to the creation of a joint venture with a non-profit organization, while the inclusive business is characterized by internal or external spin-off businesses where the company is the sole promoter"
Mitchell & Coles	2003	Strategize	"strategies"	"Most companies use one of 4 strategies to outperform the competition"	Logic	NA	"1. lower prices based on cost advantages, 2. more desirable products and services, 3. more choices and information, and 4.

							close personal relationships"
		Change	"changes"	"The CEO must establish an unchanging core vision for serving customers and other stakeholders that includes an expectation of regular business model changes"	Conceptual	"vision"	"The CEO must establish an unchanging core vision for serving customers and other stakeholders that includes an expectation of regular business model changes"
Mitchell & Coles	2004	Change	"innovation"	"to introduce business model innovation breakthroughs in particular companies"	Conceptual	"by…we mean"	"By business model innovation, we mean business model replacements that provide product or service offerings to customers and end users that were not previously available. We also refer to the process of developing these novel replacements as business model innovation"
					Logic	"as a result"	"Most companies that provide these other services to small businesses do not do payroll processing. As a result, Paychex now offers a whole range of record development and recordkeeping services based on its payroll database for each employer"
					Functional	"provide new benefits"	"Business model innovators often find ways to provide these new benefits at lower cost, enhancing circumstances for themselves while providing more for their customers"
					Activity	"improving program"	"It is important to note that Clear Channel provided more customer benefit at the same or lower prices by: * improving programming and

							assembling better audiences for advertisers"
Morris et al.	2005	Theorize	"proposed"	"A six-component framework is proposed for characterizing a business model"	Logic	"how"	"The economic model provides a consistent logic for earning profit"
					Functional	"logic"	"How will the firm create value?"
					Architectural	"levels"	"Foundation level, proprietary level, rules level"
					Activity	"selective hiring"	"Highly selective hiring of employees that fit profile"
		Characterize	"characterizing"	"A six-component framework is proposed for characterizing a business model"	Logic	"how"	"The economic model provides a consistent logic for earning profit"
					Functional	"logic"	"How will the firm create value?"
					Architectural	"levels"	"Foundation level, proprietary level, rules level"
					Activity	"serve only drinks"	"Serve only drinks/snacks"
Nielson and Lund	2014	Theorize	"broaden"	"to broaden our understanding of how business models may change over time and how the role of strategic partners may differ over time too"	Conceptual	"understanding"	"to broaden our understanding of how business models may change over time and how the role of strategic partners may differ over time too"
		Strategize	"strategic patterns"	"to broaden our understanding of how business models may change over time and how the role of strategic partners may differ over time too"	Conceptual	"reflecting"	"this study adds value by reflecting the dynamics created in the interactions between a business model's strategic partners"
		Change	"change"	"to broaden our understanding of how business models may change over time and how the role	Conceptual	"challenge"	"it illustrates how the changes in network configuration over the five depicted phases challenge the existing frameworks for

				of strategic partners may differ over time too”			generating and analyzing business models"
					Activity	"selling control"	"the firm had laid out the groundwork for a two-sided business model, in which one targeted selling control and guidance competences”
Ojala & Tyrväinen	2006	Theorize	"investigate"	"investigates the relation between the business model and the entry mode of eight software firms"	Logic	"relation"	"investigates the relation between the business model and the entry mode of eight software firms"
					Activity	"specific software solutions"	"The product strategy can vary from customer specific software solutions to the development of highly standardized software products"
		Characterize			Logic	"relation"	"investigates the relation between the business model and the entry mode of eight software firms"
					Activity	"virtual design"	"Firm A developed virtual design environments for electronics intensive products"
		Compare	"eight software firms"	"investigates the relation between the business model and the entry mode of eight software firms"	Logic	"relation"	"investigates the relation between the business model and the entry mode of eight software firms"
					Activity	NA	descriptions of cases
		Strategize	"strategy"	"The results imply that the product strategy and the service and implementation model of a software firm are closely connected to the entry mode choice"	Logic	"related"	"The results imply that the product strategy and the service and implementation model of a software firm are closely connected to the entry mode choice"

					Activity	"representatives"	"case firms A and B,which tailored their products in close cooperation with customers, used representatives as the entry mode"
Onetti et al.	2012	Theorize	"make a distinction"	"This contribution makes a clear distinction between the business model and the strategy concepts "	Conceptual	"concepts "	"This contribution makes a clear distinction between the business model and the strategy concepts "
					Activity	"activities "	"the activities which provides the basis of the firm's value proposition"
		Strategize	"strategy "	"This contribution makes a clear distinction between the business model and the strategy concepts "	Logic	"influence"	"business model decisions strongly influence and characterize the way new technology based firms operate and the strategy they put in place"
Osiyevskyy & Dewald	2015	Theorize	"developed"	"develop a typology of incumbent adaptations to emerging disruptive business model innovations, based on two generic strategies"	Conceptual	"typology "	"develop a typology of incumbent adaptations to emerging disruptive business model innovations, based on two generic strategies"
		Characterize	"framework"	"by combining prior research into a definable framework"	Conceptual	"cognitive"	"by combining prior research into a definable framework and by testing the cognitive influences on strategic response"
		Categorize	"typology"	"develop a typology of incumbent adaptations to emerging disruptive business model innovations, based on two generic strategies"	Logic	"based on"	"develop a typology of incumbent adaptations to emerging disruptive business model innovations, based on two generic strategies"
		Strategize	"strategic "	"by testing the cognitive influences on	Logic	"influences"	"by testing the cognitive influences on strategic response"

				strategic response"			
Osterwalder	2004	Theorize	"conceptualization"	"Consolidation of the research in the domain of business models into a specification of a conceptualization resulting in the proposition of a business model ontology"	Conceptual	"conceptualization"	"Consolidation of the research in the domain of business models into a specification of a conceptualization resulting in the proposition of a business model ontology"
					Architectural	NA	presented in figures
		Characterize	"elements"	"the elements, attributes and relationships of the ontology are explained and described in detail"	Conceptual	"definition"	"Gives a precise description of the business model element"
					Logic	"relationships"	"the elements, attributes and relationships of the ontology are explained and described in detail"
					Architectural	NA	presented in figures
Osterwalder et al.	2005	Theorize	"clarify"	"aims to clarify the concept of business models, its usages, and its roles in the Information Systems domain"	Conceptual	"concept"	"aims to clarify the concept of business models, its usages, and its roles in the Information Systems domain"
					Functional	"usage"	"aims to clarify the concept of business models, its usages, and its roles in the Information Systems domain"
					Architectural	NA	presented in figures
		Characterize	"describe"	"identifies the terminology or ontology used to describe a business model"	Conceptual	"terminology"	"identifies the terminology or ontology used to describe a business model"
					Functional	"usage"	"aims to clarify the concept of business models, its usages, and its roles in the

							Information Systems domain"
					Architectural	NA	presented in figures
		Compare	"compares"	"compares this terminology with previous work"	Conceptual	"terminology"	"compares this terminology with previous work"
Panagiotopoulos et al.	2012	Characterize	"explore"	"We explore its main components within the public sector and particularly examine how BM thinking can enhance the use of ICTs in public engagement"	Conceptual	"defined"	"The Business Model (BM) concept can be defined as"
					Architectural	NA	presented in a figure
		Strategize	"strategies"	"the BM concept emphasizes the ways in which strategies and structures enable technological characteristics to become part of functions and operations"	Conceptual	NA	"the BM concept emphasizes the ways in which strategies and structures enable technological characteristics to become part of functions and operations"
		Assess	"analysis"	"develops and applies a business model perspective as an interceding framework for analysis and evaluation"	Conceptual	"can be"	"The study suggests that BM thinking, as a view on technological initiatives can be beneficial to organize and evaluate the impact of digital governance activities"
		Optimize	"improve"	"policy makers can benefit from BMs in order to plan and evaluate manageable institutional mechanisms that will improve the impact of digital governance initiatives"	Conceptual	"improvement points"	"At the second level, the BM analysis allows for the identification of potential improvement points and elements which require more careful considerations"
Pauwels & Weiss	2008	Theorize	"implications"	"Their analysis suggests several managerial implications"	Logic	"implications"	"Their analysis suggests several managerial implications"

		Characterize	"that is"	"how firm performance is affected by moving from free to free & fee — that is, from offering all content for free to charging for at least some of it."	Logic	“affect"	"how firm performance is affected by moving from free to free & fee —that is, from offering all content for free to charging for at least some of it.”
		Compare	"free to fee"	"Moving from free to ‘free & fee’ for any product or service represents a challenge to managers"	Logic	"source"	"examines (1) the sources of long-run revenue loss (through attracting fewer free subscribers"
		Assess	"affect"	"(2) how the firm’s marketing actions affect its revenue gains"	Logic	"affect"	"(2) how the firm’s marketing actions affect its revenue gains"
Perkmann & Spicer	2010	Theorize	"propose"	"propose an alternative conception of business models as performative representations"	Conceptual	"conception"	"propose an alternative conception of business models as performative representations"
Petrovic et al.	2001	Characterize	"sub-models"	"a business model can be divided into seven sub-models"	Logic	"logic"	"Value Model—Describes the logic of what core product(s)/service(s)/experience(s) are delivered to the customer"
					Architectural	NA	presented in a figure
		Design	"developing"	"What is important for developing business models?"	Logic	"logic"	"this logic of the system, the business model, is based upon a complex mental model"
					Functional	"support"	"The methodology should support the structuring and sharing of knowledge"
					Architectural	NA	presented in a figure
					Activity	"explaining"	"explaining and structuring assumptions (via systems models)"
Pousttchi et al.	2009	Theorize	"develop"	"to develop an m-payment business model framework based on the results of a	Logic	"based on"	"to develop an m-payment business model framework based on the results of

				precedent multi case study analysis"			a precedent multi case study analysis"
					Functional	"offers"	"The product pillar covers all aspects of what an m-payment service provider offers its customers"
					Architectural	NA	presented in a figure
		Characterize	"framework"	"to develop an m-payment business model framework based on the results of a precedent multi case study analysis"	Logic	"enable"	"effective segmentation that enables a company to allocate investment resources to target customers that will be most attracted by its m-payment procedure and determines the channels to reach its customers."
					Functional	"offers"	"The product pillar covers all aspects of what an m-payment service provider offers its customers"
					Architectural	NA	presented in a figure
					Activity	"fixed price"	"Users pay a fixed price for their usage of a mobile service"
Provance et al.	2011	Theorize	"proposing"	"proposing a model of institutional conditions under which different business models will emerge "	Conceptual	"model"	"proposing a model of institutional conditions under which different business models will emerge "
					Logic	"based"	"When these factors are introduced into the existing framework for business model choice, the business model based less on firm decision-making and more about variables that exist within national innovation systems and political structure"

		Characterize	"framework"	"propose an expansion of the strategic framework developed by Morris et al. (2006) from Fig. 1 that incorporates political and socio-cognitive institutional factors"	Conceptual	NA	"propose an expansion of the strategic framework developed by Morris et al. (2006) from Fig. 1 that incorporates political and socio-cognitive institutional factors"
		Design	"design"	"to explain the business model design process in more institutionalized context"	Conceptual	NA	"to explain the business model design process in more institutionalized context"
Rappa	2001	Theorize	“present"	"to present a comprehensive and cogent taxonomy of business models observable on the web"	Conceptual	"taxonomy"	"to present a comprehensive and cogent taxonomy of business models observable on the web"
		Characterize	"description"	"Description: Brokerage Model"	Functional	"facilitate transactions""	"Brokers are market-makers: they bring buyers and sellers together and facilitate transactions"
		Categorize	"taxonomy"	"to present a comprehensive and cogent taxonomy of business models observable on the web"	Conceptual	"taxonomy"	"to present a comprehensive and cogent taxonomy of business models observable on the web"
Rask et al.	2009	Characterize	"describe"	"to describe and analyse which emergent business models and corresponding value capturing capabilities can be found in the emerging market for electric cars"	Logic	NA	"Integrated Product specialists in vehicles and batteries that have entered or said they will enter the Danish markets are car manufacturers with integrated battery"
					Functional	"create infrastructure"	"seek an open innovation model to create a complete infrastructure for electric vehicles"
					Activity	"charging station"	"The charging station is a point that supplies electricity for the

							recharging of electric vehicles”
		Categorize	NA	presented in a table	Logic	NA	"The system architects are created by specialists with either a modular product which creates Proprietary Systems”
					Functional	"manufacturers"	"they will enter the Danish market are manufacturers of vehicles"
					Activity	"build charging stations"	"It works with business partners to build charging stations in geographically small areas"
Reim et al.	2015	Optimize	"differentiate"	"to extend insights about the crucial factors that may differentiate successful and unsuccessful PSS companies."	Conceptual	"insights"	"to extend insights about the crucial factors that may differentiate successful and unsuccessful PSS companies."
					Logic	"factors"	"to extend insights about the crucial factors that may differentiate successful and unsuccessful PSS companies."
Richardson	2008	Characterize	"framework"	"have organized and defined the components of the business model framework to reflect current thinking about strategy"	Functional	"deliver"	"what the firm will deliver to its customers"
		Strategize	"strategy"	"How the business model articulates the strategy"	Logic	"how"	"How the business model articulates the strategy"
		Design	"design"	"design of the firm (the allocation of activities) should give it some measure of control, if not ownership of these resources and capabilities"	Logic	"should give"	"design of the firm (the allocation of activities) should give it some measure of control, if not ownership of these resources and capabilities"
Roman et al.	2011	Characterize	"framework"	"a conceptual framework is developed in order to provide the	Logic	"provide basis"	"a conceptual framework is developed in order to provide the basis for

				basis for giving an answer to the previous main issues"			giving an answer to the previous main issues"
		Categorize	"three main charging modes"	"the three main charging modes for charging EVs are presented"	Logic	"degree of sophistication"	"all charging modes are classified and hierarchically separated by the degree of sophistication"
					Architectural	"hierarchy"	"all charging modes are classified and hierarchically separated by the degree of sophistication"
		Design	"formulate"	"elaborates the opportunities to formulate more sophisticated business models for vehicle-to-grid application"	Logic	"more"	"more EV charging modes are presented. These models are based on the three main models described in Section6, albeit including some changes or additional possibilities."
					Activity	"purchases"	"It purchases energy to resell it to EV owners."
		Change	"new"	"In this proposal a new agent called the EV charging manager or the EV charging point manager (CPM) has been introduced"	Logic	"based on"	"more EV charging modes are presented. These models are based on the three main models described in Section6, albeit including some changes or additional possibilities."
					Functional	"are in charge of"	"CPMs are in charge of developing charging infrastructure in privately owned parking areas and charging EVs acting as a final customer in the market"
Roome and Louche	2016	Characterize	"fashioned"	"contributes to understanding how new business models for sustainability are fashioned"	Logic	"through interactions"	"contributes to understanding how new business models for sustainability are fashioned through the interactions between individuals and groups inside and outside companies"

					Functional	NA	"'identifying' which refers to the process by which managers recognise the need to change and learn; 'translating' which describes how the company adapts new concept(s) to the organisation; 'embedding' which focuses on the way the company adopts the new adapted concept(s) and develops new internal routines; and 'sharing' which details how the learning process goes beyond the organisation's boundaries to reach other organisations/actors"
		Model/ predict	"factors"	"provides an overview of the factors that contributed to the transformation and specifically the processes and network structure that played a role in the change process that led to the BMfS"	Logic	"factors"	"provides an overview of the factors that contributed to the transformation and specifically the processes and network structure that played a role in the change process that led to the BMfS"
		Change	"change"	"An inductive approach is used to propose a process model of change for sustainability that leads to a new business model"	Logic	"factors"	"provides an overview of the factors that contributed to the transformation and specifically the processes and network structure that played a role in the change process that led to the BMfS"
Schneider & Spieth	2013	Theorize	"proposed"	"A tentative theoretical framework emphasising the need to distinguish between developing and innovating business models	Conceptual	"theoretical"	"A tentative theoretical framework emphasising the need to distinguish between developing and innovating business models as well as to apply an entrepreneurial perspective for further

				as well as to apply an entrepreneurial perspective for further research on business model innovation is proposed."			research on business model innovation is proposed."
		Organize	"three distinct"	"three distinct research streams addressing prerequisites, process and elements, and effects of business model innovation are identified"	Conceptual	"research streams"	"three distinct research streams addressing prerequisites, processand elements, and effects of business model innovation are identified"
		Change	"innovation"	"provides a systematic review of extant academic literature on business model innovation"	Conceptual	"theoretical"	"A tentative theoretical framework emphasising the need to distinguish between developing and innovating business models as well as to apply an entrepreneurial perspective for further research on business model innovation is proposed."
Sabatier et al.	2010	Theorize	"defined"	"explore their business model portfolios, defined as the range of different ways they deliver value to their customers to ensure both their medium term viability and future development"	Conceptual	"concept"	"builds on the analogy between the business model concept and a recipe to discuss the concept of a business model portfolio"
		Strategize	"strategy"	"it positions the notion of ‘Business model’ as an intermediary concept bridging firms’ core competencies and business strategy”	Conceptual	“concept"	"it positions the notion of ‘Business model’ as an intermediary concept bridging firms’ core competencies and business strategy”
Santos et al.	2009	Theorize	"theory"	"presents a theory of business model innovation (BMI) within incumbent firms"	Conceptual	"theory"	"presents a theory of business model innovation (BMI) within incumbent firms"

		Change	"change"	"The process of business model change is examined, with particular attention to business units in a multi business enterprise"	Conceptual	"theory"	"presents a theory of business model innovation (BMI) within incumbent firms"
Berman et al.	2007	Theorize	"propose s"	"proposes seven industry-specific recommendations for incumbent media companies as they face the immediate threat from new entrants and eventual collisions with traditional partners"	Logic	"will likely"	"Building a new-world experience will likely require new content, a new way of consuming it, and new tools to make the experience easy"
					Activity	"invest in"	"Invest in interactive, measurable advertising services and platforms"
		Model/ predict	"future"	"explore future industry competitive scenarios"	Logic	"influence"	"the consumer's media experience will also be influenced by a media company's relationships with partners, from retailers to distributors to back-end providers"
					Activity	"online subscription"	"moving beyond traditional licensing and console relationships to online subscriptions (such as with the popular Sony Online Entertainment Everquest I and II games)"
		Categorize	"four primary"	"see four primary business models"	Logic	"relies"	"This model relies on branded content created by professionals that is delivered through a "walled," conditional-access environment and dedicated devices"
					Activity	"makes professionally produced content"	"makes professionally produced content available in open channels"

		Compare	"between"	"examine the clash between new and traditional media and explore future industry competitive scenarios"	Logic	"as a result"	"As a result of these competitive struggles, we expect traditional media companies to seek growth in new business models"
		Change	"new"	"As a result of these competitive struggles, we expect traditional media companies to seek growth in new business models"	Logic	"as a result"	"As a result of these competitive struggles, we expect traditional media companies to seek growth in new business models"
Schaltegger et al.	2012	Characterize	"framework"	"A framework for business model innovation is proposed"	Conceptual	"pillars"	"the different business model pillars are differently affected by the business case drivers"
					Logic	"affected"	"the different business model pillars are differently affected by the business case drivers"
		Model/ predict	"create"	"A framework for business model innovation is proposed as a means to strategically create business cases on a regular basis as an inherent, deeply integrated element of business activities."	Conceptual	"means"	"A framework for business model innovation is proposed as a means to strategically create business cases on a regular basis as an inherent, deeply integrated element of business activities."
					Logic	"exerting"	"Accommodative strategies go along with a change and some improvement of the business model, thus exerting some influence on business case drivers by experimenting within the current model"
		Change	"innovation"	"argues that business model innovations may be required to support a systematic, ongoing creation	Conceptual	NA	"Business model innovation covers changes from incremental adjustments to more radical changes"

				of business cases for sustainability”			
					Logic	"required"	"argues that business model innovations may be required to support a systematic, ongoing creation of business cases for sustainability”
Schaltegger et al.	2016	Theorize	"extend and enrich"	"extend and enrich the mainstream business model literature as well as the current sustainability-oriented business model discourse."	Conceptual	"fundamentally"	"offer in many ways fundamentally extended and even completely new perspectives on business models for sustainability"
Seelos & Mair	2007	Theorize	"show"	"show how business models can be structured across partner organizations and how those organizations succeed in creating a symbiosis"	Conceptual	NA	"show how business models can be structured across partner organizations and how those organizations succeed in creating a symbiosis"
					Architectural	NA	presented in a figure
		Characterize	"configured"	"summarizes how resources and capabilities are configured to achieve the strategic goals for each alliance partner and thus for the overall business model"	Conceptual	NA	descriptions of cases
					Architectural	NA	presented in a figure
		Model/ predict	"configured"	"summarizes how resources and capabilities are configured to achieve the strategic goals for each alliance partner and thus for the overall business model"	Logic	"to achieve"	"summarizes how resources and capabilities are configured to achieve the strategic goals for each alliance partner and thus for the overall business model"
					Architectural	NA	presented in a figure

		Strategize	"strategic"	"expands our understanding of how strategic factors can be configured to create value"	Conceptual	"understanding"	"expands our understanding of how strategic factors can be configured to create value"
					Architectural	"configured"	"expands our understanding of how strategic factors can be configured to create value"
Shafer et al.	2005	Theorize	"offered"	"a new definition that integrates and synthesizes the earlier work is offered"	Conceptual	"definition"	"a new definition that integrates and synthesizes the earlier work is offered"
		Organize	"synthesizes"	"a new definition that integrates and synthesizes the earlier work is offered"	Conceptual	"definition"	"a new definition that integrates and synthesizes the earlier work is offered"
Sinfield et al.	2012	Characterize	"what is"	"what is a business model"	Functional	"gain access"	"How does the customer gain access to that offering?"
					Architectural	NA	presented in figures
		Strategize			Logic	"interrelated"	"In working through possible combinations of variables, it becomes clear that some are inherently interrelated"
					Functional	"explores opportunities"	"a tool manufacturer explores opportunities to enter new lines of business spurred by market trends"
					Activity	"through travel agents"	"could include 'Through travel agents' or 'Through online websites' or 'Through self-service kiosks' or 'As part of partnerships'"
		Change	"new"	"identify a fourth method called business model experimentation to quickly and inexpensively examine new business model possibilities"	Logic	"since"	"Since Infineum wished to hold to a strong interpersonal sales model in any initiative it pursued, we locked down the 'How we sell' switch and did not consider alternative sales methods."

					Functional	"sales method"	"Since Infineum wished to hold to a strong interpersonal sales model in any initiative it pursued, we locked down the 'How we sell' switch and did not consider alternative sales methods."
					Activity	"selling by the ton"	"so selling the product by the ton, as Infineum usually did, was not appropriate"
Slywotzky	1999	Design	"create"	"address the issue of how to create a business model"	Conceptual	NA	"creating new value, focus on best customers"
					Logic	"how"	"How does profit really happen in our industry, and how do we build a business model that takes advantage of that profitability?"
		Change	"change"	"leaders must determine whether the market they serve is becoming structurally unprofitable and then must either exit that market or change their business model accordingly"	Conceptual	NA	"The shift of market value from one company to another follows one factor above all others—the creation of a better business model"
					Logic	"take full advantage"	"the company has reinvented its business model to take full advantage of the profitability in other parts of its domestic market"
Smith et al.	2010	Characterize			Functional	"hosting"	"Ambidextrous organizations define one type of complex business model, hosting paradoxical strategies through differentiated subunits"
					Architectural	“structures”	"Among the top teams that managed the contradictions between exploration and exploitation

						effectively, we found two team structures"
				Activity	“developing new digital signal processing”	"continue exploiting its market-leading integrated analog semiconductor chips, while at the same time developing new digital signal-processing"
	Categorize	"several types"	"identify several types of complex business models"	Functional	"hosting"	"Ambidextrous organizations define one type of complex business model, hosting paradoxical strategies through differentiated subunits"
				Architectural	“structures"	"Among the top teams that managed the contradictions between exploration and exploitation effectively, we found two team structures"
				Activity	"developing new digital signal processing"	"continue exploiting its market-leading integrated analog semiconductor chips, while at the same time developing new digital signal-processing"
	Strategize	"strategies"	"identify several types of complex business models organizations will need to adopt if they are to host such paradoxical strategies”	Logic	"demand"	"Complex business models demand leaders capable of communicating an overarching vision, building inconsistent organizational designs,,managing ongoing conflict and of long term, integrative thinking"
				Architectural	“structures"	"Among the top teams that managed the contradictions between exploration and exploitation effectively, we found two team structures"
				Activity	"moved engineers"	"frequently moved engineers and sales forces between the

							analog and digital products"
Sorescu et al.	2011	Characterize	"ways"	"propose six major ways in which retailers could innovate their business models"	Conceptual	"refer"	"Retailing activities refer to acquiring, stocking, displaying and exchanging goods and services that fulfill the customer experience"
					Logic	"premise"	"Main premise of the model"
					Activity	"activities"	"Retailing activities refer to acquiring, stocking, displaying and exchanging goods and services that fulfill the customer experience"
		Change	"innovate"	"propose six major ways in which retailers could innovate their business models"	Conceptual	"define"	"define a RBM innovation as a change beyond current practice in one or more elements of a retailing business model (i.e., retailing format, activities, and governance) and their interdependencies, thereby modifying the retailer's organizing logicfor value creation and appropriation. "
					Logic	"refers to"	"effectiveness entails doing the right things"
					Activity	"one-on-one tutorials"	"can also get one-on-one tutorials on a wide range oftechnical issues"
Sosna et al.	2010	Characterize	"case study"	"Our article is based on a single case study desig"	Logic	"led to"	"But the changes in the environment and heightened competitive intensity that followed domestic market liberalization led to Kiluva developing its own captive 'Naturhouse' retail outlet"
		Change	"innovate"	"to study how an established organization innovate its business model,	Logic	"how"	"to study how an established organization innovate its business model, which may not be

				which may not be competitive in the future"			competitive in the future"
Spieth et al.	2014	Theorize	"propose"	"propose in this article a role-based approach to categorize the literature"	Conceptual	"literature"	"propose in this article a role-based approach to categorize the literature"
		Categorize	"categorize	"propose in this article a role-based approach to categorize the literature"	Functional	"roles"	"that the respective roles of explaining the business, running the business, and developing the business can serve as three interrelated perspectives to present an overview of the current business model innovation field"
		Change	"innovation"	"that the respective roles of explaining the business, running the business, and developing the business can serve as three interrelated perspectives to present an overview of the current business model innovation field"	Conceptual	"overview"	"that the respective roles of explaining the business, running the business, and developing the business can serve as three interrelated perspectives to present an overview of the current business model innovation field"
					Logic	"driving force"	"To identify relevant categories, one can use the driving forces behind the interest in business models to distinguish common patterns concerning the authors' interest in the concept"
Friedrich von den Eichen	2015	Change	"innovation"	"discuss the barriers to successful business model innovation and derive implications for management on how to overcome each barrier"	Conceptual	"understanding"	"contribute to an increased understanding of the large potential that BMI holds by analyzing the occurring constraints"

					Logic	"only if"	"Only if companies find ways to capture some of the value they create for their customers through their innovation can they derive returns"
					Functional	"search for"	"To start with where to search for innovation..."
					Architectural	NA	presented in a figure
					Activity	"customer survey"	"Starting with a customer survey that examined whether customers were interested in renting instead of buying construction materials, a totally new BMI emerged with impact on the DOKA portfolio by adding services"
Stewart & Zhao	2000	Characterize	"roles"	"examine the role of the Internet in marketing in the context of business models that are economically viable"	Logic	"viable"	"examine the role of the Internet in marketing in the context of business models that are economically viable"
					Functional	"communicate"	"It is a new way for businesses to communicate with consumers and for consumers to communicate with one another and a new way to sell products and services to consumers"
					Activity	"pay-for - service"	"Internet businesses have employed models that are pay-for-product, such as Dell; pay-for-service, such as AOL; or auction based"
Teece	2010	Theorize	"understand"	"to understand the significance of business models and explore their connections with business strategy, innovation management, and economic theory"	Conceptual	"significance"	"to understand the significance of business models and explore their connections with business strategy, innovation management, and economic theory"

		Strategize	"strategy"	"to understand the significance of business models and explore their connections with business strategy, innovation management, and economic theory"	Logic	"connections"	"to understand the significance of business models and explore their connections with business strategy, innovation management, and economic theory"
		Change	"innovation"	"to understand the significance of business models and explore their connections with business strategy, innovation management, and economic theory"	Logic	"connections"	"to understand the significance of business models and explore their connections with business strategy, innovation management, and economic theory"
Thompson & MacMillan	2010	Characterize	"discuss"	"discuss the preliminary business model development process used"	Logic	"principles"	"provided the foundation that underpins some preliminary principles we feel could be applied to uncovering business models"
					Functional	"create new market"	"argue that many of their problems can be massively ameliorated by developing business models that create new markets"
		Design	"development"	"to have a set of principles to use in a process of deliberate experiment and adaptation designed to develop and unveil an emergent business model"	Logic	"principles"	"provided the foundation that underpins some preliminary principles we feel could be applied to uncovering business models"
Tikkanen et al.	2005	Theorize	"outline"	"outlines a generic framework for the business model and proposes its many linkages to cognition"	Conceptual	"cognition"	"outlines a generic framework for the business model and proposes its many linkages to cognition"
					Logic	"linkages"	"outlines a generic framework for the business model and proposes its many linkages to cognition"
					Architectural	NA	presented in a figure

		Characterize	"framework"	"outlines a generic framework for the business model and proposes its many linkages to cognition"	Functional	"finance and accounting"	"finance and accounting"
					Activity	"acquired"	"capital can be acquired in many forms including debt, equity and mezzanine securities"
Timmers	1998	Theorize	"definition"	"a definition is given of what is meant by a business model"	Conceptual	"definition"	" a definition is given of what is meant by a business model"
		Characterize	"definition"	"a definition is given of what is meant by a business model"	Conceptual	"definition"	"Definition of a business model: ♦An architecture for the product, service and information flows, including a description of the various business actors and their roles"
		Categorize	"eleven"	"Eleven business models currently in use or being experimented with are listed below"	Functional	"to promote"	"this is done to promote the company and its goods or services"
Upward & Jones	2016	Theorize	"introduce"	"introduce an ontology that enables the description of successful strongly sustainable business models"	Architectural	NA	presented in a figure
					Conceptual	"definition"	"We define a business model as a description of how a business defines and achieves success over time"
		Characterize			Architectural	NA	presented in a figure
					Logic	"principles"	"The five critical instrumental principles identified are those that any ontology of strongly sustainable business must fully conceptualize"
Van der Vorst et al.	2002	Theorize	"define and develop"	"defines and develops a typology of e-business models	Conceptual	"define"	"defines and develops a typology of e-business models to elucidate these discussions"

				to elucidate these discussions"			
		Characterize	"typology"	"defines and develops a typology of e-business models to elucidate these discussions"	Conceptual	"define"	"defines and develops a typology of e-business models to elucidate these discussions"
					Functional	"value realization"	"who lead the choreography, value realisation and rule-making activities of the system"
					Architectural	NA	presented in a figure
					Activity	"forward auction"	"Catalogues; Forward auction; Reverse auction; Exchange"
Viscio & Pasternack	1996	Theorize	"answer"	"to answer questions like has the concept of BM outlined its usefulness, what should replace it"	Conceptual	"concept"	"to answer questions like has the concept of BM outlined its usefulness, what should replace it"
Weill et al.	2011	Characterize	NA	descriptions of roles and assets	Activity	"sell"	"sell ownership of products they bought but did not substantially change"
		Compare	"compare"	"Those indices then allowed us to compare total stock market returns"	Logic	"insight"	"The results provide insight into investor treatment of various business models"
		Model/ predict	"analyzing"	"Business models provide a cross-industry lens for analyzing how a company is managed and the resulting stock market total return"	Logic	"how"	"Business models provide a cross-industry lens for analyzing how a company is managed and the resulting stock market total return"
		Change	"shift"	"For example, Disney has dramatically shifted its business model"	Logic	"reliance"	"Disney has reduced revenues from one of the least valued business models, physical landlord, while increasing its reliance on one of the most valued business models, IP landlord"

					Activity	"renting"	"from renting physical assets like theme parks (65% of revenue in 1984 but only 30% in 2009) to licensing intellectual property"
Weil & Vitale	2013	Compare	"traditional"	"the transition from place to space is difficult for traditional businesses"	Logic	"because"	"because they often do not have the appropriate leadership, organizational form, skills, IT infrastructure"
		Optimize	"bolster"	"explains how traditional companies can adapt their bricks-and-mortar legacies to complement and bolster their online ventures"	Logic	"how"	"explains how traditional companies can adapt their bricks-and-mortar legacies to complement and bolster their online ventures"
		Change	"adapt"	"explains how traditional companies can adapt their bricks-and-mortar legacies to complement and bolster their online ventures"	Logic	"how"	"explains how traditional companies can adapt their bricks-and-mortar legacies to complement and bolster their online ventures"
Wells	2016	Characterize	"elements"	"a business model can be defined as having three constituent elements"	Functional	"defines"	"the value proposition that defines how products and/or services are presented"
					Architectural	NA	presented in a figure
		Compare	"comparison"	"a preliminary comparison using the engaged scholarship methodology is made between microbreweries and large multinational brewers"	Functional	"capture environmental benefits"	"Microbrewers have less scope or opportunity to capture the environmental benefits of industrial symbiosis"
					Activity	"own the production process"	"Own the beer production process and retail premises"

Wells	2018	Characterize	"case study"	"This case study paperlinks degrowth, technological innovation, business model innovation and corporate governance"	Logic	"founded"	"The business model at the heart of it all is founded on the characteristics of the underpinning product technologies reinforced and enabled by a 'sale of service' approach in which the business retains ownership of the products as assets"
					Functional	"role"	"The stewards have a role in ensuring that, over the long term, the business remains true to its principles rather than seek to extract some form of monopoly rent and increase charges in the future"
					Architectural	NA	presented in a figure
		Change	"innovation"	"This case study paper links degrowth, technological innovation, business model innovation and corporate governance"	Logic	"achieved"	"shows that radical technology innovations in the vehicle itself are achieved by underlying principles that focus on mass decompounding, powertrain de-coupling, whole system design, and low-volume production systems"
Wirtz et al.	2016	Theorize	"state"	"state a recently converging business model view"	Conceptual	"view"	"state a recently converging business model view"
		Organize	"four"	"identify four essential research foci"	Conceptual	"foci"	"identify four essential research foci"
Wirtz et al.	2010	Characterize	"types"	"illustrate the differential effect of environmental changes on different business model types"	Logic	"focus on"	"that focus on the collection, selection, compilation, distribution, and/or presentation of online content"
		Categorize	"types"	"illustrate the differential effect of environmental changes on different business model types"	Logic	"draw from"	"draws from the '4C' Internet business model typology"

		Compare	NA	descriptions of four types	Logic	"stand from"	"Context oriented businesses primarily stand to benefit from embracing the Web 2.0 social networking and customization/personalization factors"
		Model/ predict	"assess"	"provide an overview assessing the match between each of the four Web 2.0 factors and the four business model types"	Logic	"factors"	"provide an overview assessing the match between each of the four Web 2.0 factors and the four business model types"
Yunus et al.	2010	Theorize	"formulating"	"traces the gradual development of Grameen's expertise in formulating social business models"	Conceptual	"concept"	"We consider this article as a first step in shaping the concept of the social business model"
		Characterize	"framework"	"we can highlight the adjustments needed in switching from a traditional to a social business model framework"	Conceptual	"specification of targeted stakeholders"	"The first change is the specification of targeted stakeholders"
					Architectural	NA	presented in a figure
		Strategize	"strategic"	"This literature suggests that business model innovation is facilitated by three major strategic moves"	Conceptual	"facilitated"	"This literature suggests that business model innovation is facilitated by three major strategic moves"
		Change	"switching"	"we can highlight the adjustments needed in switching from a traditional to a social business model framework"	Conceptual	"definition"	"The second is the definition of desired social profits through a comprehensive eco-system view"
Zott & Amit	2007	Theorize	"theory"	"develop a theory of business model design that explains how value is created at the business model level of analysis and how it is captured at the	Logic	"affect"	"how business model design affects the performance of entrepreneurial firms"

				focal firm level of analysis"			
		Characterize	"centered on"	"We hypothesize that the design of an entrepreneurial firm's business model, which is centered specifically on the themes of novelty and/or efficiency"	Logic	"centered on"	"We hypothesize that the design of an entrepreneurial firm's business model, which is centered specifically on the themes of novelty and/or efficiency"
		Compare	"and"	"propose hypotheses about the impact of efficiency-centered and novelty-centered business model design on the performance of entrepreneurial firms"	Logic	"impact"	"propose hypotheses about the impact of efficiency-centered and novelty-centered business model design on the performance of entrepreneurial firms"
Zott & Amit	2008	Characterize	"refers to"	"Novelty-centered business models refer to new ways of conducting economic exchanges among various participants"	Logic	NA	"Novelty-centered business models refer to new ways of conducting economic exchanges among various participants"
		Compare	"two design themes"	"To evaluate the implications of business model and product market strategy on firm performance, we consider two main business model design themes – novelty-centered and efficiency-centered business models "	Logic	"implications"	"To evaluate the implications of business model and product market strategy on firm performance, we consider two main business model design themes – novelty-centered and efficiency-centered business models "
		Assess	"analyze"	"develop a formal model in order to analyze the contingent effects of product market strategy and	Logic	"effect"	"develop a formal model in order to analyze the contingent effects of product market strategy and business model

				business model choices on firm performance"			choices on firm performance"
		Strategize	"market strategy"	"develop a formalmodel in order to analyze the contingent effects of product market strategy and business model choices on firm performance"	Logic	"effect"	"develop a formalmodel in order to analyze the contingent effects of product market strategy and business model choices on firm performance"
Zott & Amit	2010	Theorize	"conceptualize"	"conceptualize a firm's business model as a system of interdependent activities that transcends the focal firm and spans its boundaries"	Conceptual	"conceptualize"	"conceptualize a firm's business model as a system of interdependent activities that transcends the focal firm and spans its boundaries"
		Characterize	"as"	"conceptualize a firm's business model as a system of interdependent activities that transcends the focal firm and spans its boundaries"	Conceptual	"conceptualize"	"conceptualize a firm's business model as a system of interdependent activities that transcends the focal firm and spans its boundaries"
Zott et al.	2011	Theorize	"reveals"	"review revealsthat scholars do not agree on what a business model is and that the literature is developing largely in silos"	Conceptual	"concept"	"examine the business model concept through multiple subject-matter lenses"
		Organize	"themes"	"found emerging common themes among scholars of business models"	Functional	"unit of analysis"	"the business model is emerging as a new unit of analysis“

APPENDIX C. SUPPORTING QUOTES FOR DESIGN OPTIONS

Value Involvement Matrix

	Functional value involvement		**Emotional value involvement**		**Economic value involvement**		**Social value involvement**		**Experiential value involvement**	
	High	**Low**	**High**	**Low**	**High**	**Low**	**High**	**Low**	**High**	**Low**
Abbott Laboratories	healthcare product									
AbbVie	advanced therapies									
Accenture	professional service					cost effective				
Activision Blizzard	video game consoles, personal computers		entertainment content						entertainment content	
Acuity Brands	lighting and building management				cost efficiency					
Adobe	products to create, publish, and promote content									
Advanced Auto Parts	automotive replacement parts, accessories, batteries and maintenance items									
AES	utility company									
Affiliated Managers Group	equity investment									
Aflac	management company, overseeing the operations of its subsidiaries			supplemental and life insurance						

Agilent technologies	provide applications for the entire laboratory workflow									
Air Products and Chemicals	atmospheric gas, process and specialty gas, equipment, and services									
Akami	solutions for delivering, optimizing and securing content		securing content							
Alaska Air Group	airlines		safety			low fares				providing exceptional customer service
Albemarle	specialty chemicals				low-cost producer					
Alcoa	bauxite, alumina, and aluminum products									
Alexandria Real Estate	develops dynamic urban campuses						AAA innovation cluster locations			
Alexion Pharmaceuticals	therapies, inhibitor									
Align Technologies	global medical device company									
Allegion	provider of security products and solutions		keep people safe							
Allergan	global pharmaceutical leader									
Alliance Data Systems	data-driven marketing and loyalty solutions									

Alliant Energy	utility holding									
Allstate	personal line insurer, information protection		protect people from uncertainty							
Alphabet	advertising, infrastructure, security, data management, analytics, and AI									
Altria		cigarettes, cigars, wine	cigarettes, cigars, wine					cigarettes, cigars, wine	cigarettes, cigars, wine	
Amazon	serve consumers through our online and physical stores, offer programs that enable sellers to grow their businesses, serve developers and enterprises, serve authors and content creators				lowest prices				easy-to-use functionality	
AMD	global semiconductor company									
Ameren	utility holding company									
American Airlines	scheduled air transportation									
American Electric Power	utility holding company									
American Express	payment company									
American International Group	insurance organization									

American Tower	real estate investment trust									
American Water Works	water and waste water utility									
Ameriprise Financials	diversified financial service company									
AmerisourceBergen	sourcing and distribution services			insurance						
Ametek	manufacturer of electronic instruments and electromechanical devices									
Amgen	human therapeutics									
Amphenol	electrical, electronic and fiber optic connectors, interconnected systems, antennas, sensors and sensor-based products									
Anadarko Petroleum	exploration and production company									
Analog Devices	analog technology company									
ANSYS	engineering simulation software and services									
Anthem	health benefits									
AO Smith	water heaters									
Aon	professional services firm that									

	provides advice and solutions to clients									
Apache Corp	energy company									
Apartment Investment and Management Co	real estate investment trust						high level of service, attracting and retaining stable, credit-worthy residents who are also good neighbors		quality apartment homes in a respectful environment	
Apple	mobile communication and media devices and personal computers, related software, services, accessories and third party digital content and applications								best user experience	
Applied Materials	provides manufacturing equipment, services and software									
Aptiv	vehicle component manufacturer			safe, green, and connected						
Archer Daniels Midland	food and beverage ingredients									

Arthur J Gallagher	insurance brokerage, consulting, and third-party property/casualty claims settlement and administrative services									
Assurant	risk management solutions		risk manageme nt solutions							
ATT	provider of telecommunicatio n, media and technology services								entertainm ent group	
AutoDesk	3D design, engineering and entertainment software									
Automatic Data Processing	human capital management solutions									
AutoZone	retailer and distributor of automotive replacement parts			superior service and trustwort hy advice						conveniently located, well-designed stores
AvalonBay Communities	real estate investment trust									
Avery Dennison	production of pressure-sensitive materials									
Baker Hughes	oilfield services									
Ball	supplier of metal packaging									
Bank of America	bank holding and financial holding				bank holding and					

					financial holding					
Bank of New York Mellon	investment service and investment management									
Baxter International	healthcare products			healthcare products						
BB&T	bank									
Becton, Dickinson and Co	medical technology company									
Berkshire Hathaway	insurance business, railroad systems									
Best Buy	solving technical problems			entertainment						
Biogen	biopharmaceutical company									
BlackRock	investment management									
Boeing	aerospace firm									
BorWarner	clean and efficient technology solutions for combustion, hybrid and electric vehicles									
Boston Properties	real estate investment trust						Class A office properties		Class A office properties	
Boston Scientific	medical devices									
Brighthouse Financial	annuity and life insurance									
Bristol-Myers Squibb	biopharmaceutical products									

Broadcom	semiconductor devices									
Brookfield Property	real estate investment trust						clean, secure, and comfortabl e		clean, secure, and comfortab le	
Brown-Forman	alcohol beverages									
Cabot Oil & Gas	oil and gas company									
Cadence Design Systems	enable customers to design electronic systems									
Campbell Soup	high-quality, branded food and beverage			high-quality, branded food and beverage					high-quality, branded food and beverage	
Capital One Financial	financial service holding									
Capri Holdings						fashion and luxury group	fashion and luxury group		fashion and luxury group	
Cardinal Health	healthcare services and products company					cost-effective solutions				
CarMax	used vehicle and product services		modern						customer-friendly	
Carnival	leisure travel company		leisure travel company						leisure travel company	
Caterpillar	construction and mining equipment									
CBOE	exchange holding company									
CBRE	commercial real estate service and investment firm									

CBS	media company		entertainment						entertainment	
Celgene	biopharmaceutical company									
Centene	healthcare enterprise									
CenterPoint Energy	utility holding									
CenturyLink	communication company									
Cerner	supplier of hearth care									
CF Industries	fertilizer and chemical companies									
CH Robinson Worldwide	logistic provider									
Charles Schwab	saving and loan holding									
Carter Communications	cable operator				entertainment				entertainment	
Chesapeake Energy	acquisition, exploration and development of properties to produce oil, natural gas and NGL									
Chevron	crude oil and gas, natural gas									
Chipotle Mexican Grill	restaurant								great guest experience	
Chubb	insurance and reinsurance									
Church & Dwight	consumer household and personal care product									

Cigna	global health service				affordable					
Cimarex Energy	oil and gas exploration and production									
Cincinnati Financial	property casualty insurance									
Cintas	rental and service of uniforms									
Cisco	technologies that have been empowering the internet		secure							
Citigroup	banking									
Citizens Financial Group	retail bank									
Citrix Systems	a general purpose digital work space									
Clorox	consumer and professional product									
CME Group	global benchmark products									
CMS Energy	energy company									
Coca-cola	non-alcohol beverage company						lifestyles			
Cognizant	professional service									
Colgate-Palmolive	consumer product									
Comcast	media and technology								entertainment	
Comerica	financial service company									
Conagra Foods	branded food company									
Concho Resources	oil and natural gas company									

ConocoPhillips	exploration and production company									
Consolidated Edison	electric, gas and steam delivery business									
Constellation Brand	beer, wine and spirit									
Cooper Cos	medical device company									
Corning	innovator in materials science									
Costco Wholesale	membership warehouses									
Coty	beauty company		beauty company					beauty company	beauty company	
Crown Castle	provider of shared communication infrastructure									
CSX	transportation company									
Cummins	diesel engine									
CVS Health	health innovation company				affordabl e				accessible	
Danaher	professional, medical, industrial and commercial products									
Darden Restaurants	full-service restaurants							contemp orary yet casual	contempor ary yet casual	
DeVita Healthcare	healthcare products									
Deere	agriculture and turf operations									
Delta Airlines	major passenger airline									

Dentsply Sirona	dental products and technologies									
Devon	independent energy company									
Digital Realty Trust	global real estate and technology platform									
Discover Financial Service	banking and payment service									
Discovery Communications	global media company									
Dish Network	pay-TV service									
Dollar General	discount retailer				discount retailer					
Dollar Tree	discount variety store				discount variety store					
Dominion Energy	producer and transporter of energy									
Dover	equipment and components, specialty systems, consumable supplies, software and digital solutions and support services									
Dow DuPont	agriculture, material science and specialty products									
DR Horton	home building company									
Dr Pepper Snapple Group	beverage									
DTE Energy	public utility									
Duke Energy	energy company									

Duke Realty	bulk distribution real estate									
DXC Technology	IT service company									
E*Trade Financial	financial service									
Eastman Chemical	material and specialty additives									
Eaton	power management									
Ebay	global commerce leader									
Ecolab	water, hygiene and energy technology and services									
Edison International	public utility									
Edwards Lifesciences	patient-focused medical innovations for structural heart disease and critical care monitoring									
Electronic Arts	digital interactive entertainment		digital interactive entertainment						digital interactive entertainment	
Eli Lily	drug manufacturing business									
Emerson Electric	Automation Solutions , and Climate Technologies and Tools & Home Products									
Entergy	Utility business									

EOG Resources	explores for, develops, produces and markets crude oil and natural gas									
EQT	natural gas production company				low cost					
Equifax	global data, analytics and technology company									
Equinix	nterconnected data center and interconnection platform									
Equity Residential	acquisition, development and management of rental apartment properties									
Essex Property Trust	self-administered and self-managed real estate investment trust									
F5 Networks	multi-cloud application services									
Facebook	build useful and engaging products that enable people to connect and share with friends						Instagram brings people closer to the people and things they love			
Fastenal	industrial and construction supplies									
Federal Realty Investment Trust	equity real estate investment trust									

Fedex	broad portfolio of transportation, ecommerce and business services									
Fidelity National Information Services	FIS is a global leader in financial services technology									
Fifth Third Bancorp	diversified financial services company									
First Energy	transmission, distribution and generation of electricity									
Fiserv	global provider of financial services technology									
FLIR Systems	leader in developing technologies that enhance perception and awareness									
Flowserve	service provider of comprehensive flow control systems									
Fluor	one of the largest professional services firms									
FMC	diversified chemical company									
Foot Locker	global retailer of athletically inspired shoes and apparel									
Ford Motor	full line of Ford cars, trucks, sport									

	utility vehicles (“SUVs”), electrified vehicles, and Lincoln luxury vehicles									
Fortiv	industrial technology growth company									
Fortune Brands Home & Security	home and security products									
Franklin Resources	investment management and related services									
Freeport-McMoRan	international mining company									
Gap	apparel retail company						on-trend, playfully optimistic			
Garmin	Global Positioning System (GPS) navigation and wireless devices and applications									
Gartner	research and advisory company									
General Dynamics	global aerospace and defense company									
General Electric	global high-tech industrial company									
General Mills	branded consumer foods									
General Motors	design, build and sell trucks, crossovers, cars									

	and automobile parts									

Customer Group Matrix

	Demographical group	**Psychographic group**	**Need group**	**Job group**
Abbott Laboratories			Consumers	physicians, doctors
AbbVie			patients, hospitals	physicians
Accenture				professional service
Activision Blizzard		video game		
Acuity Brands			lighting showroom	electrical distributor
Adobe	content creators, web designers, app developers			content creators, web designers, app developers
Advanced Auto Parts		“do-it-yourself”		professional installers
AES	areas of Indianapolis			retail customers
Affiliated Managers Group			boutique management firms	
Aflac				
Agilent technologies				provide applications for the entire laboratory workflow
Air Products and Chemicals				diversified customers in many industries
Akami			media companies, e-retailers, major governments, financial institutions	
Alaska Air Group				airlines
Albemarle				diverse range of end markets
Alcoa				third-party customers who process it into industrial chemical products
Alexandria Real Estate			most brilliant minds and innovative companies	
Alexion Pharmaceuticals	hospitals			distributors, healthcare provider
Align Technologies				dental professionals
Allegion			users	

Allergan				drug wholesalers, retailers and distributors
Alliance Data Systems			consumer-based businesses	
Alliant Energy	customers in the Midwest			
Allstate				
Alphabet			performance advertisers	brand advertisers
Altria			cigarettes, cigars, wine	wholesalers, retailers
Amazon			consumers	sellers
AMD				original equipment manufacturers, direct datacenters
Ameren				
American Airlines			scheduled air transportation	
American Electric Power	cover portions of the states of Arkansas, Indiana, Kentucky…			retail customers
American Express			consumers	mobile and online applications, third-party vendors and business partners
American International Group				
American Tower			wireless service providers, radio and television broadcast companies	
American Water Works	geographically diverse customer base			
Ameriprise Financials			retail clients	individual, institutional and high-net worth investors
AmerisourceBergen				a wide variety of healthcare providers
Ametek				aerospace industry
Amgen				pharmaceutical wholesale distributors
Amphenol				diversified set of end markets
Anadarko Petroleum				
Analog Devices				industrial, automotive, consumer, communications
ANSYS				engineers, designers, researchers and students

Anthem			Large Group, Small Group, Individual, Medicaid and Medicare markets	
AO Smith			residential and commercial end markets	
Aon	all market segments			
Apache Corp				
Apartment Investment and Management Co		stable, credit-worthy residents who are also good neighbors	apartment	
Apple	consumer, small and mid-sized business, education, enterprise and government markets	consumer, small and mid-sized business, education, enterprise and government markets	consumer, small and mid-sized business, education, enterprise and government markets	
Applied Materials				manufacturers of semiconductor chips, liquid crystal and organic light-emitting diode (OLED) displays, and other electronic devices
Aptiv				automotive original equipment manufacturers
Archer Daniels Midland				
Arthur J Gallagher			businesses and organizations of all types	
Assurant			lender	
ATT		businesses and consumers	businesses and consumers	
AutoDesk				architecture, engineering and construction; product design and manufacturing
Automatic Data Processing				businesses of all types and sizes
AutoZone				
AvalonBay Communities				
Avery Dennison				label printers and converters
Baker Hughes				major and super-major oil and natural gas companies
Ball				beverage, personal care and household products companies

Bank of America			consumer	
Bank of New York Mellon				
Baxter International				independent distributors
BB&T				
Becton, Dickinson and Co				
Berkshire Hathaway				
Best Buy			addressing key human needs	
Biogen				wholesale distributors and specialty pharmacy providers
BlackRock			charities, tax-exempt institutions, central banks, wealth funds	
Boeing				commercial airline industry
BorWarner				original equipment manufacturers
Boston Properties			high-quality tenants and command upper-tier rental rates	
Boston Scientific				hospitals, clinics, outpatient facilities and medical offices
Brighthouse Financial				
Bristol-Myers Squibb				
Broadcom				Original equipment manufacturers
Brookfield Property			communities, retailers and consumers	
Brown-Forman				distributors
Cabot Oil & Gas				industrial customers, local distribution companies, gas marketers and power generation facilities
Cadence Design Systems				
Campbell Soup				retail food chains, mass discounters, mass merchandisers
Capital One Financial				
Capri Holdings				

Cardinal Health				retailers, hospitals and other healthcare providers
CarMax				
Carnival		psychographic segmentation		
Caterpillar				
CBOE				investors
CBRE			occupiers	investors
CBS				
Celgene				
Centene				government sponsored and commercial healthcare programs
CenterPoint Energy			commercial and industrial customers and electric and natural gas utilities	commercial and industrial customers and electric and natural gas utilities
CenturyLink			business and residential customers	
Cerner				
CF Industries				cooperatives, independent fertilizer distributors
CH Robinson Worldwide			companies of all sizes, in a wide variety of industries	companies of all sizes, in a wide variety of industries
Charles Schwab			individuals and institutional clients	
Carter Communications			residential and small and medium business customers	
Chesapeake Energy				
Chevron				retailers and marketers
Chipotle Mexican Grill			guest	
Chubb			multinational corporations, mid-size and small businesses, affluent and high net worth individuals	
Church & Dwight				supermarkets, mass merchandisers, wholesale clubs, drugstores, convenience stores, home stores, dollar and other discount stores
Cigna				managed care organizations

Cimarex Energy			other end-users	major energy companies, pipeline companies, local distribution companies
Cincinnati Financial				
Cintas			businesses of all types	
Cisco			businesses of all sizes, public institutions, governments, and service providers	businesses of all sizes, public institutions, governments, and service providers
Citigroup			consumer banking	
Citizens Financial Group			Consumer Banking and Commercial Banking	
Citrix Systems				
Clorox				mass retailers, grocery outlets, warehouse clubs, dollar stores, home hardware centers, military stores and other retail outlets
CME Group				
CMS Energy			individuals and businesses	
Coca-cola				
Cognizant				
Colgate-Palmolive				
Comcast			residential customers	
Comerica				
Conagra Foods				customers who operate in the retail food and foodservice channels
Concho Resources				
ConocoPhillips				
Consolidated Edison				
Constellation Brand				wholesale distributors, retailers and on-premise locations
Cooper Cos				hospitals and surgical centers, obstetricians' and gynecologists' (ob/gyns) medical offices and fertility clinics
Corning			end users	cablers
Costco Wholesale			consumers	

Coty				nail and hair salons, nail and hair professionals and professional stores
Crown Castle				large wireless carriers that operate national networks
CSX				
Cummins				original equipment manufacturers (OEMs), distributors, dealers and other customers worldwide
CVS Health			consumers	
Danaher				
Darden Restaurants	demographics			
DeVita Healthcare				
Deere	geographical customer			
Delta Airlines				
Dentsply Sirona				
Devon				
Digital Realty Trust				
Discover Financial Service				
Discovery Communications		subscribers and viewers		
Dish Network				
Dollar General	discount retailer	discount retailer		
Dollar Tree	discount variety store	discount variety store		
Dominion Energy	customers primarily in the eastern and Rocky Mountain regions			
Dover				
Dow DuPont				
DR Horton				
Dr Pepper Snapple Group				Retailers, Bottlers and Distributors, Partners
DTE Energy				
Duke Energy	Duke Energy Carolinas, Duke Energy Progress, Duke Energy Florida, Duke Energy Indiana and Duke Energy Ohio			
Duke Realty				

DXC Technology			commercial businesses of many sizes	
E*Trade Financial				traders, investors, stock plan administrators and participants
Eastman Chemical				
Eaton				original equipment manufacturers or distributors
Ebay			buyers	sellers
Ecolab				customers in the foodservice, food and beverage processing, hospitality, healthcare, government and education, retail, textile care and commercial facilities management sectors
Edison International			commercial and industrial customers	
Edwards Lifesciences				physicians, nurses, and other clinical personnel
Electronic Arts			players	
Eli Lily				
Emerson Electric			consumer	industrial, commercial
Entergy				
EOG Resources				downstream markets or sold into local markets
EQT			utilities and industrial customers	marketers
Equifax			businesses, governments and consumers	
Equinix				carriers, mobile and other bandwidth providers, cloud and IT services providers, content providers
Equity Residential				
Essex Property Trust				
F5 Networks			mid-to-large enterprise, public sector, and service provider	
Facebook				
Fastenal				manufacturing and nonresidential construction markets

Federal Realty Investment Trust				
Fedex				
Fidelity National Information Services				retail and institutional banking, payments, capital markets, asset management and wealth and retirement markets
Fifth Third Bancorp			commercial, financial, retail, governmental, educational, energy and healthcare sectors	
First Energy				
Fiserv			banks, credit unions, investment management firms, leasing and finance companies, billers, retailers, and merchants	
FLIR Systems			consumer	industrial, original equipment manufacturing
Flowserve				engineering, procurement and construction firms
Fluor				
FMC			agricultural, consumer and industrial markets	agricultural, consumer and industrial markets
Foot Locker				
Ford Motor		customers	customers	dealers
Fortiv				industrial service, installation and maintenance professionals, designers and manufacturers of electronic devices and instruments
Fortune Brands Home & Security				
Franklin Resources		retail, institutional and high net-worth clients in jurisdictions	retail, institutional and high net-worth clients in jurisdictions	
Freeport-McMoRan				
Gap				
Garmin				
Gartner				

General Dynamics				U.S. government
General Electric				
General Mills				foodservice and commercial baking industries
General Motors				

Company Role Matrix

	Manufacturer	**Designer**	**Distributor**	**Lender**	**Adder**	**Broker**	**Connector**	**Aggregator**
Abbott Laboratories	Manufactures	Designs						
AbbVie		develops						
Accenture		develop and execute innovative strategies		consulting				
Activision Blizzard		developer and publisher						
Acuity Brands	operates manufacturing facilities							
Adobe	develop our products internally	develop our products internally						
Advanced Auto Parts			purchased merchandise from over 1,100 vendors					
AES	generation of energy							
Affiliated Managers Group				invest in boutique investment management firms				
Aflac	provide supplemental coverage	provide supplemental coverage			value-added service			

Agilent technologies	manufacturing site, manufacturing support	develop						
Air Products and Chemicals	produces atmospheric gases							
Akami	provide solutions	provide solutions						
Alaska Air Group	airlines	airlines						
Albemarle	manufacturer	developer						
Alcoa	processes bauxite into alumina				value-added portfolio			
Alexandria Real Estate				provides strategic risk capital				
Alexion Pharmaceuticals	internal manufacturing	develop						
Align Technologies	manufacture	design						
Allegion	manufacture our products	develop security products						
Allergan	we manufactured certain of our own finished products	developing						
Alliance Data Systems	provider							
Alliant Energy	provide regulated electric		additional purchases from wholesale energy markets					
Allstate	personal line insurer	insurance provider						
Alphabet	build products	build products						search engine, technology platform
Altria	manufacture, producer			lease portfolio activities				

Amazon	manufacture and sell electronic devices	develop and produce					customers access products on our website	
AMD		develop our products		license portions of our portfolio				
Ameren	electric generation, transmission, and distribution							
American Airlines	air transportation	air transportation						
American Electric Power	generation, provide services							
American Express		designing innovative products		charge cards, credit card, installment lending			network service	
American International Group	provide a wide range of products	provide a wide range of products		investment				
American Tower	tower-related services	tower-related services		leasing of spaces				
American Water Works	water and wastewater utility							
Ameriprise Financials	offer financial planning and advice					brokerage		
AmerisourceBergen	provide drug distribution				value-added service programs			
Ametek	manufacturer	design and manufacture						
Amgen	manufacturing	discovering, developing						
Amphenol	manufacturers	designers						
Anadarko Petroleum	production							

Analog Devices	manufacture	design						
ANSYS	develops	develops						
Anthem	insurance	insurance						
AO Smith	manufacturer							
Aon	provides advice and solutions	provides advice and solutions						
Apache Corp	develops, and produces natural gas, crude oil, and natural gas liquids.	develops, and produces natural gas, crude oil, and natural gas liquids.						
Apartment Investment and Management Co				ownership, management, redevelopment and limited development of quality apartment communities				
Apple	manufactures	designs					Developer Programs	the app store
Applied Materials	manufactures	develops						
Aptiv	manufacturer	design						
Archer Daniels Midland	processing of oilseeds		buy, store, clean, and transport					
Arthur J Gallagher	risk management services					insurance brokerag e		
Assurant	provider							
ATT	wireless services, produces	produce media content						
AutoDesk	software development	software development						
Automatic Data Processing	provides a range of solutions	provides a range of solutions						

AutoZone			retailer	borrow a special tool				
AvalonBay Communities	redevelop and sells	redevelop	redevelop and sells	multifamily communities				
Avery Dennison	manufactures	designs						
Baker Hughes	manufacturing plants							
Ball	manufacturing							
Bank of America	consumer banking	consumer banking		investment banking		brokerage		
Bank of New York Mellon	management service				leasing portfolio	investment service		
Baxter International	provides							
BB&T	insurance	insurance		loan and lease financing		insurance broker		
Becton, Dickinson and Co	manufacture	develop						
Berkshire Hathaway	insurance, manufacturing business	insurance	automotive retail	leasing				
Best Buy			retail stores					
Biogen	developing	discovering and developing		security lending, investment				
BlackRock				investment, security lending				
Boeing	produces	develops		finance lease, equipment under leasing				
BorWarner	manufactures	develops						
Boston Properties	develop	develop		lease				
Boston Scientific	manufacturer	developer						
Brighthouse Financial	annuity and life insurance							
Bristol-Myers Squibb	manufacturing	discovery, development		licensing				

Broadcom	manufacturing operations	develop						
Brookfield Property			retail properties	leases				
Brown-Forman	manufacture							
Cabot Oil & Gas	production of oil	development						
Cadence Design Systems	offer software	offer software, hardware						
Campbell Soup	manufacturer							
Capital One Financial	credit and debit card product	consumer banking		lending products				
Capri Holdings		designer		license				
Cardinal Health	manufactures		distribute branded and generic pharmaceuticals					
CarMax			sells used cars and purchase used cars	auto finance	reconditi on every used vehicle			
Carnival	concessions			independent concessionaires				
Caterpillar	manufacture			financing alternatives, leases				
CBOE							organized marketplac e	
CBRE	providing services			investment activity on behalf of clients				
CBS	developing and scheduling		acquiring entertainment program					
Celgene	development of therapies, manufacture	discovery						

Centene	provide health plan coverage, offering diversified healthcare services	health plan coverage						
CenterPoint Energy	supply natural gas							
CenturyLink	providing a broad array of integrated services	providing a broad array of integrated services						
Cerner	health care information technology solutions	health care information technology solutions						
CF Industries	manufacturing							
CH Robinson Worldwide	third party logistic provider		establishing contractual relationships with qualified transportation providers					
Charles Schwab	provide financial services	provide financial services				brokerag e		
Carter Communicatio ns	providing video, Internet and voice service	providing video, Internet and voice service						
Chesapeake Energy	development, production							
Chevron	production		purchases and sales					
Chipotle Mexican Grill	restaurant	restaurant						
Chubb	insurance and reinsurance			investment				
Church & Dwight	manufacture	develop						
Cigna	insurance, clinical solutions	insurance, clinical solutions		investment				
Cimarex Energy	production							

Cincinnati Financial	insurance	well-designed		investment segment				
Cintas	provide our products and services			uniform rental				
Cisco	provide a broad range of service offerings	designs						
Citigroup	banking	banking		corporate lending, consumer loan				
Citizens Financial Group	Consumer Banking and Commercial Banking	Consumer Banking and Commercial Banking						
Citrix Systems	cloud-enabled app and desktop visualization solution	cloud-enabled app and desktop visualization solution		license				
Clorox	manufacturer							
CME Group	clearing services						centralized market	
CMS Energy	power producer		purchases and sells energy commodities	installment loans				
Coca-cola	manufactures			license				
Cognizant	application development	application development		license software				
Colgate-Palmolive	manufactures							
Comcast	internet, video, voice and security and automation services	internet, video, voice and security and automation services		sell advertising, licensing				
Comerica	sale of annuity product			loans and line of credit		brokerag e		
Conagra Foods	manufacture				adding value for our customer s			

Concho Resources	production							
ConocoPhillips	produce		buys and sells					
Consolidated Edison	provides electric service, delivers gas		buys and sells gas					
Constellation Brand	production		imported beer					
Cooper Cos	manufacturer	develops						
Corning	manufactures	develops						
Costco Wholesale			buy most of our merchandise					
Coty	manufacture	design our products						
Crown Castle	offer certain services			own, operate and lease				
CSX	provides, real estate sales			lease				
Cummins	manufacturer	design						
CVS Health	insurance	insurance	sells prescription drugs and a wide assortment of general merchandise					
Danaher	manufactures							
Darden Restaurants	restaurant	restaurant						
DeVita Healthcare	treatment options							
Deere	manufactures			finance, lease				
Delta Airlines	scheduled air transportation							
Dentsply Sirona	manufacturer	develops, designer			value added dental supplies			
Devon	production of oil, natural gas and NGL							

Digital Realty Trust				data centers			colocation and interconnection solutions	
Discover Financial Service				credit cards, student loans				
Discovery Communications	provides content across multiple distribution platforms	original content	purchased content	advertising				
Dish Network	develop	design						
Dollar General			discount retailer					
Dollar Tree			discount variety store					
Dominion Energy	generates							
Dover	manufacturer	design						
Dow DuPont	production	developing						
DR Horton	construct	home design		mortgage assist				
Dr Pepper Snapple Group	manufacture							
DTE Energy	generation		purchase, storage, transportation, distribution, and sale					
Duke Energy	generation		retail utility					
Duke Realty	development			lease				
DXC Technology	delivers							
E*Trade Financial	provides brokerage and related products and services			investing		brokerage		
Eastman Chemical	manufacture							
Eaton	manufacturing							

Ebay							connect buyers and sellers	
Ecolab	water treatment product, We manufacture, water treatment programs	water treatment product, water treatment programs						
Edison International	providing energy services							
Edwards Lifesciences	manufacturer	design						
Electronic Arts	market, publish and distribute	develop						
Eli Lily	manufacture	discover, develop						
Emerson Electric	various production operations							
Entergy	generation							
EOG Resources	explores for, develops, produces and markets crude oil and natural gas							
EQT	producer							
Equifax	provide	provide information solutions						
Equinix				data centers			interconnection solutions	
Equity Residential				acquisition, development and management of rental apartment properties				
Essex Property Trust				ownership, operation, management, acquisition, development and				

				redevelopment of predominantly apartment communities				
F5 Networks	offers the industry's most comprehensive set of application services							
Facebook	build useful and engaging products							community for sharing photos, videos, and messages
Fastenal			distributor of fasteners and related industrial and construction supplies					
Federal Realty Investment Trust			ownership, management, and redevelopment	ownership, management, and redevelopment				
Fedex	provide							
Fidelity National Information Service	providing							
Fifth Third Bancorp	provide			commercial loans and leases				
First Energy	generation							
Fiserv	provider							
FLIR Systems	develop	design						
Flowserve	manufacture	develop						
Fluor	providing							
FMC	develops	develops						
Foot Locker			global retailer					
Ford Motor	manufactures	designs						
Fortiv	manufacture	design, develop						

Fortune Brands Home & Security	manufactures							
Franklin Resources	provides			investment products				
Freeport-McMoRan	produce							
Gap			omni-channel retailer					
Garmin	manufacturing	designs						
Gartner	provides							Conferences
General Dynamics	manufactures	designs						
General Electric	Manufacturing	development						
General Mills	manufacturer							
General Motors	build	design		automotive financing services				

Asset Option Matrix

	Physical asset	**Financial asset**	**Talent**	**Intangible asset**	**Service**	**Outcome**	**Relationship**	**Knowledge/content/data**
Abbott Laboratories	diagnostic systems, pharmaceutical products			software				
AbbVie	injections, orally administered therapy							
Accenture			consulting	emerging technology	professional services			
Activision Blizzard	games			interactive software				entertainment content
Acuity Brands	lighting				monitoring and controlling light			

Adobe				products, services to create, publish, and promote content	products, services to create, publish, and promote content			
Advanced Auto Parts	automotive replacement parts, accessories, batteries and maintenance items							
AES				energy				
Affiliated Managers Group		invest in boutique investment management firms						
Aflac		provide supplemental coverage			management company, overseeing the operations of its subsidiaries			
Agilent technologies	instruments				a wide range of services			
Air Products and Chemicals	atmospheric gas, process and specialty gas, equipment				services	performance guarantee		
Akami				Cloud Security Solutions				
Alaska Air Group						airlines		
Albemarle	highly engineered specialty chemicals							
Alcoa	bauxite, alumina, and aluminum products							
Alexandria Real Estate	urban cluster campuses	provides strategic risk capital						

Alexion Pharmaceuticals	therapies, inhibitor							
Align Technologies	global medical device company							
Allegion	security products and solutions			door systems	locksmith service			
Allergan	pharmaceutical, device, biologic, surgical and regenerative medicine							
Alliance Data Systems	card				marketing and loyalty solutions			
Alliant Energy				regulated electric and natural gas service				
Allstate		insurer			roadside assistance			
Alphabet				apps, software				search engine
Altria	cigarettes, cigars, wine							
Amazon	electronic devices				Amazon Web Services			media content
AMD	microprocessors							
Ameren				electric				
American Airlines					air transportation			
American Electric Power				utility	accounting, administrative, information systems, engineering, financial, legal, maintenance and other services			
American Express		credit card, charge card		payment programs	expense management service		build and maintain relationships	

American International Group		investment, insurance			financial services			
American Tower	leasing of spaces				tower-related services			
American Water Works	water				water and waste water services			
Ameriprise Financials		investment products, insurance			financial planning and advice			
AmerisourceBergen					sourcing and distribution services			
Ametek	electronic instruments and electromechanical devices							
Amgen	therapeutics							
Amphenol								
Anadarko Petroleum	oil and natural gas							
Analog Devices	integrated circuits (ICs)			algorithms, software, and subsystems				
ANSYS				simulation software and services	simulation software and services			
Anthem		insurance						
AO Smith	water heaters							
Aon					advice and solutions			advice and solutions
Apache Corp	natural gas, crude oil, and natural gas liquid							
Apartment Investment and Management Co	apartment communities							

Apple	Products			Operating Systems	apple care		Developer Programs	
Applied Materials	equipment			software	services			
Aptiv	vehicle component							
Archer Daniels Midland	agricultural commodities				transportation service			
Arthur J Gallagher				insurance brokerage	risk management services			
Assurant		housing insurance						
ATT	equipment			wireless service	advertising services			television shows, feature films and games
AutoDesk				software				
Automatic Data Processing				cloud-based strategic software	Employer Services			
AutoZone	automotive replacement parts							
AvalonBay Communities	multifamily communities							
Avery Dennison	pressure-sensitive materials and a variety of tickets, tags, labels and other converted products							
Baker Hughes	equipment			technology	drilling services			
Ball	metal packaging							
Bank of America		banking			wealth management			
Bank of New York Mellon		banking			investment management			

Baxter International	infusion systems and devices			dialysis therapies				
BB&T		loans		insurance brokerage				
Becton, Dickinson and Co	medical supplies, devices, laboratory equipment and diagnostic products							
Berkshire Hathaway	food distribution, automotive retail	leasing, insurance			food distribution			
Best Buy	computing and mobile phones, Consumer Electronics				Services - consultation, delivery			
Biogen	medicines	security lending		therapeutic programs				
BlackRock		investment, security lending			asset management			
Boeing	equipment under leasing	finance lease			supply chain and logistic management			
BorWarner	turbochargers, eBoosters, timing systems							
Boston Properties	office properties							
Boston Scientific	medical devices							
Brighthouse Financial		insurance						
Bristol-Myers Squibb	biopharmaceutical products							
Broadcom	semiconductor devices							
Brookfield Property	retail properties							
Brown-Forman	alcohol beverages							
Cabot Oil & Gas	Oil and gas							

Cadence Design Systems	hardware			software	services			
Campbell Soup	high-quality, branded food and beverage products							
Capital One Financial		banking			treasury management services			
Capri Holdings	global accessories, footwear and apparel							
Cardinal Health	medical, surgical and laboratory products				supply chain services			
CarMax	used cars	auto financing						
Carnival	ship				leisure travel			
Caterpillar	construction equipment	insurance, financing alternatives						
CBOE		standardized, exchange-traded options						
CBRE					services			
CBS					distribute network programs			media, entertainment
Celgene	oral immunomodulatory drug							
Centene		health plan coverage			pharmacy management			
CenterPoint Energy	natural gas				transmission service			
CenturyLink				VPN and hybrid networking	IP and data services			
Cerner				software	tech-enabled services			
CF Industries	fertilizer and chemical companies							

CH Robinson Worldwide					logistic service			
Charles Schwab		securities, mutual funds			provide financial services			
Carter Communications				video on demand	digital video recorder			video on demand, a package of programming
Chesapeake Energy	oil, natural gas and NGL							
Chevron	crude oil and gas, natural gas				distribution			
Chipotle Mexican Grill	burritos, burrito bowls (a burrito without the tortilla), tacos, and salads							
Chubb								
Church & Dwight	consumer household and personal care products and specialty products							
Cigna	clinical solutions	insurance		clinical solutions	delivery pharmacy			
Cimarex Energy	oil and gas							
Cincinnati Financial		insurance, investment						
Cintas	uniforms				cleaning service			
Cisco				Infrastructure Platforms; Applications; Security and Other Products	service offerings			
Citigroup		banking						
Citizens Financial Group		banking						
Citrix Systems	hardware			cloud-enabled app and desktop	professional services			

				visualization solution				
Clorox	laundry, home care and professional products, charcoal, bags, wraps and containers, cat litter, and digestive health products							
CME Group		trade futures, options, cash and over-the-counter (OTC) markets			clearing services			
CMS Energy								
Coca-cola	non-alcohol beverages							
Cognizant			consulting	software				
Colgate-Palmolive								
Comcast								
Comerica		annuity product, line of credit			foreign exchange management			
Conagra Foods	branded food							
Concho Resources								
ConocoPhillips								
Consolidated Edison	electric, gas, steam							
Constellation Brand								
Cooper Cos								
Corning	mobile consumer electronics, optical fiber			display technology, wireless technologies				

Costco Wholesale	Food and Sundries, Hardlines, Fresh Foods, Softlines, Ancillary							
Coty	color cosmetics, retail hair coloring and styling products, body care and mass fragrances							
Crown Castle				shared communications infrastructure	site development services			
CSX					rail-based freight transportation services			
Cummins	diesel and natural gas engines							
CVS Health	drugs and a wide assortment of general merchandise	insurance			network management			
Danaher	research tools			filtration, separation and purification technologies				
Darden Restaurants	food							
DeVita Healthcare				dialysis and administrative services	dialysis and administrative services			
Deere	agriculture and turf equipment	finance						
Delta Airlines					scheduled air transportation	scheduled air transportation		
Dentsply Sirona	dental supplies and small equipment							
Devon	oil, natural gas and NGL							
Digital Realty Trust	data centers, Colocation			Interconnection and Cloud-				

				Enablement Platform				
Discover Financial Service		student loans, personal loans, housing loans			payment services			
Discovery Communications								media content
Dish Network					pay-TV service			
Dollar General	consumable items, seasonal items, home products and apparel							
Dollar Tree	consumable merchandise, which includes candy and food, health and beauty care, and everyday consumables							
Dominion Energy	natural gas			electricity	related services			
Dover	innovative equipment and components, consumable supplies			software and digital solutions	support services			
Dow DuPont	hybrid corn seed and soybean seed varieties, Acrylic binders							
DR Horton	homes	mortgage						
Dr Pepper Snapple Group	beverage							
DTE Energy	gas			electricity				
Duke Energy	gas			electricity				
Duke Realty	real estate							
DXC Technology				Enterprise and Cloud Applications	IT services			

E*Trade Financial		brokerage, investment			advisory service, corporate service			
Eastman Chemical	Additives and Solvents, Alkylamine derivatives							
Eaton								
Ebay	e-commerce							
Ecolab	water treatment products			water technologies programs				
Edison International				electricity				
Edwards Lifesciences	heart valve replacement, hemodynamic monitoring systems							
Electronic Arts					services			games, content
Eli Lily	Cardiovascular products, Endocrinology products							
Emerson Electric	Measurement & Analytical Instrumentation, Industrial Solutions							
Entergy				electric power, nuclear power				
EOG Resources	crude oil and natural gas							
EQT	natural gas							
Equifax				decisioning technology solutions	fraud and identity management services			
Equinix				data centers				
Equity Residential	rental apartment properties							
Essex Property Trust	apartment communities							

F5 Networks	purpose-built hardware products			Operating System and Service Module Software				photos, videos, and messages
Facebook	Oculus			messaging application				
Fastenal	fasteners and related industrial and construction supplies			digital solutions				
Federal Realty Investment Trust	retail and mixed-use properties							
Fedex					transportation service	transportation service		
Fidelity National Information Service				solutions	services			
Fifth Third Bancorp		checking, savings and money market accounts, payments and commerce solutions						
First Energy				electricity				
Fiserv				process electronic payment transactions	credit and debit processing services			
FLIR Systems	solutions that detect people, objects and substances			solutions that detect people, objects and substances				
Flowserve	pumps, valves, seals			power generation				
Fluor					service			

FMC	insecticides, herbicides and fungicides							
Foot Locker	shoes and apparel							
Ford Motor	Ford cars, trucks, sport utility vehicles (“SUVs”), electrified vehicles, and Lincoln luxury vehicles				financial services			
Fortiv	engineered products			software	services			
Fortune Brands Home & Security	Cabinets, plumbing, doors and security							
Franklin Resources		funds		broad range of strategies	Investment Management Services			
Freeport-McMoRan	copper, gold, molybdenum							
Gap	apparel, accessories, and personal care products							
Garmin	GPS - enabled products							
Gartner			business professionals					objective insights and advice
General Dynamics	Aircraft			Combat Systems	maintenance, logistics support and sustainment services			
General Electric	aircraft engines			Oil & Gas	services			
General Mills	branded consumer foods							
General Motors	trucks, crossovers, cars and automobile parts	financing						

Convey Value Matrix

	Promotion				Advertisement			
	Push		Pull		Push		Pull	
	Direct	**Indirect**	**Direct**	**Indirect**	**Direct**	**Indirect**	**Direct**	**Indirect**
Abbott Laboratories	directly towards consumers			doctor recommendations			Consumer advertising	
AbbVie	securing prescriptions, directly to consumers			opinion leaders				
Accenture				client references				
Activision Blizzard	public relation activities	in-store, industry promotions		in-game messaging			customized advertising	online social network
Acuity Brands	direct customer contact	trade shows					print and digital advertising	
Adobe								
Advanced Auto part			store events, loyalty programs					
AES								
Affiliated Managers Group								
Aflac								
Agilent Technologies	direct sales force			electronic commerce				
Air products and chemicals	public relation campaign	channel partners	trade shows				print advertisement, online advertisement	
Akami								
Alaska Air Group			frequent flyer program					media advertisement
Albemarle				post-sale service				
Alcoa								

Alexandria Real Estate Equity								
Alexion Pharmaceuticals			marketing partners					
Align Technology	professional marketing		trade shows					
Allegion			digital marketing	retail promotion			trade-specific advertising	
Allergan	sales professional promotion		direct-to-customer advertising					
Alliance Data Systems								
Alliant Energy								
Allstate							media advertising	
Alphabet		bundle					media advertising	
Altria			promotional activities				advertising	
Amazon								
AMD	marketing programs						cooperative advertising	
Ameren								
American Airlines			loyalty program, marketing programs				Advertisement	
American Electric Power								
American Express	direct mail		promotional campaigns					
American International Group								
American Tower								
American Water Works							advertising	
Ameriprise Financial			branding					
AmerisourceBergen								

Ametek	marketing activities		marketing activities		marketing activities		marketing activities	
Amgen								print, television, and online media
Amphenol								
Anadarko Petroleum								
Analog Devices	promotional programs		promotional programs					paid advertisement
ANSYS	partnership programs						advertising efforts	
Anthem								
AO Smith							advertising	
Aon								
Apache Corp								
Apartment Investment and Management Co								
Apple							advertising	
Applied Materials								
Aptiv								
Archer Daniels Midland								
Arthur J Gallagher							advertising	
Assurant	promotional programs	mortgage lenders						
ATT							advertising	
AutoDesk							advertising	
Automatic Data Processing								
AutoZone	sales force		loyalty program				targeted advertising	
AvalonBay Communities								
Avery Dennison								
Baker Hughes								

Ball								
Bank of America	direct mail		promotional programs				advertising	
Bank of New York Mellon								
Baxter International								
BB&T								
Becton, Dickinson and Co	promotion			promotion				
Berkshire Hathaway							advertising	
Best Buy	promotions	promotions					advertising	
Biogen	promote worldwide, own sales forces	marketing groups					advertisement	
BlackRock								
Boeing								
BorgWarner								
Boston Properties								
Boston Scientific								
Brighthouse Financial								
Bristol-Myers Squibb	promotion						digital advertising	
Broadcom	promotion						advertising	
Brookfield Property								
Brown-Forman			promotion	celebrity endorsement			advertising, social media	
Cabot Oil & Gas								
Cadence Design Systems	trade shows		trade shows				advertising	
Campbell Soup	promotions		promotions				advertising	
Capital One Financial	promotions	promotions	promotions				mail advertising	
Capri Holdings							advertising	
Cardinal Health	promotions	promotions					advertising	advertising
CarMax	sophisticated search engines						media advertising	
Carnival	promotions		promotions				media advertising	

Caterpillar							advertising	
CBOE	special event	special event					advertising	
CBRE	promotion						advertising	
CBS	promotion		promotion				advertising	
Celgene	market access professionals		direct-to-consumer print				television advertising	
Centene								
CenterPoint Energy								
CenturyLink	website promotions	sponsorship	website promotions	digital marketing firms			direct mail, television advertising	newspaper
Cerner	trade shows						advertising	
CF Industries								
CH Robinson Worldwide								
Charles Schwab							advertising	
Carter Communications							mass market advertising	
Chesapeake Energy								
Chevron								
Chipotle Mexican Grill	brand campaign		brand campaign				media advertising	
Chubb							global advertising	
Church & Dwight	promotions						advertising	
Cigna								
Cimarex Energy							advertising campaign	
Cincinnati Financial								
Cintas								
Cisco							advertising	
Citigroup	direct mail						advertising	
Citizens Financial Group	promotion	promotion					advertising	
Citrix Systems	promotional trade-up		promotional trade-up				advertising	
Clorox	trade-promotion						nationally advertised	

CME Group	product promotion		product promotion				advertising	
CMS Energy								
Coca-cola	promotional activities						advertising	
Cognizant	promotion	promotion					advertising	
Colgate-Palmolive								
Comcast	direct mail						advertising	
Comerica								
Conagra Foods								
Concho Resources								
ConocoPhillips								
Consolidated Edison								
Constellation Brand	event sponsors		price promotions				trade advertising	
Cooper Cos	promotional activities	promotional activities					advertising activities	
Corning							social media	journal advertisement
Costco Wholesale								
Coty	collaborations	in-store and in-salon displays		in-store and in-salon displays				editorial coverage
Crown Castle							increase tenant satisfaction	
CSX								
Cummins								
CVS Health			promotions				advertising	
Danaher								
Darden Restaurants			periodic promotions				television advertising	
DeVita Healthcare								
Deere	sales promotion							
Delta Airlines	promotion		loyalty programs				advertising	
Dentsply Sirona								
Devon								
Digital Realty Trust								

Discover Financial Service	direct mail		cashback bonus				media advertising	
Discovery Communications			promotion				advertising	
Dish Network								
Dollar General								
Dollar Tree			promotional merchandise				advertising	
Dominion Energy								
Dover								
Dow DuPont								
DR Horton							advertisement	
Dr Pepper Snapple Group	promotional activities		promotional activities				advertising	
DTE Energy								
Duke Energy								
Duke Realty								
DXC Technology								
E*Trade Financial	customer promotions						advertisement	
Eastman Chemical								
Eaton								
Ebay							advertising	
Ecolab								
Edison International								
Edwards Lifesciences	educational symposia							
Electronic Arts								
Eli Lily	call upon physicians	exhibited in medical meetings		medical journal			website	
Emerson Electric								
Entergy								
EOG Resources								
EQT								
Equifax								
Equinix	active public relations	sponsored events		online media outlet			advertising	

Equity Residential								
Essex Property Trust								
F5 Networks	joint event shows	online community site, trade shows			targeted advertising		digital outreach	
Facebook		people inviting						
Fastenal	in-market selling personnel, direct mail							digital and media advertising
Federal Realty Investment Trust								
Fedex		sponsors						
Fidelity National Information Services	thought leadership	trade shows						web content creation
Fifth Third Bancorp								
First Energy								
Fiserv								
FLIR Systems	trade shows	partner sponsorship					online advertising	
Flowserve								
Fluor								
FMC								
Foot Locker	events						advertising	
Ford Motor							advertising	
Fortiv								
Fortune Brands Home & Security								
Franklin Resources		sponsorship			paid search		television advertisement	financial publications
Freeport-McMoRan								
Gap							advertisement	
Garmin								
Gartner								
General Dynamics								
General Electric								

General Mills								
General Motors								

Sales Channel Matrix

	Sales Channel			
	Direct		Indirect	
	High engagement	**Low engagement**	**High engagement**	**Low engagement**
Abbott Laboratories	marketed directly to customers, doctors, hospitals			third party distributors
AbbVie	sold directly to			independent wholesale distributors
Accenture	contractual			
Activision Blizzard	sold on a direct basis	purchase and download		third party distribution, licensing
Acuity Brands	sales force		independent sales agency	
Adobe	sales force	own website		distributor, retailers
Advanced Auto part	4380 stores	4380 stores, e-commerce site		
AES		directly to end-users	retail distribution platforms	
Affiliated Managers Group	direct sales force		retail distribution platforms	
Aflac	affiliated corporate agencies		independent contractors, independent associates	
Agilent Technologies	direct sales force	electronic commerce	distributors, resellers	
Air products and chemicals				
Akami	direct sales and service organization		channel partners	channel partners
Alaska Air Group	call center	alaskaair.com		online travel agencies
Albemarle	regional sales personnel		commissioned sales representatives	
Alcoa				
Alexandria Real Estate Equity				
Alexion Pharmaceuticals	direct sales force			
Align Technology	direct sales		distribution partners	

Allegion	sales professionals	e-commerce platform	home builder	retail channel
Allergan	sales professional			
Alliance Data Systems				
Alliant Energy				
Allstate	Allstate agents	online	Allstate dealers	independent online agencies
Alphabet		Google store, website		
Altria	sales contract			
Amazon	our stores	our stores, website, app		
AMD	direct sales force		independent distributors, sales representatives	
Ameren		website		
American Airlines	representative centers	website	conventional travel agents	third party distribution channels, online travel agents
American Electric Power				
American Express	direct mail, telephone, in-house sales	mobile and online applications	third party vendors	
American International Group	multi-channel distribution	multi-channel distribution	multi-channel distribution	multi-channel distribution
American Tower				
American Water Works		website		
Ameriprise Financial	advisors, owned broker		third party financial institutions	
AmerisourceBergen	distribution service centers, sales force			
Ametek	sales representatives, direct sales force		distributors	
Amgen	sales force		third party sales force	
Amphenol	global sales force		independent representatives	
Anadarko Petroleum				
Analog Devices	direct sales force	website	third party distributor	
ANSYS	direct sales office		independent channel partners	
Anthem	in-house sales force	website	federally- or government-facilitated platforms	
AO Smith		e-commerce		on-line retailers
Aon	advisors			
Apache Corp				

Apartment Investment and Management Co		website		
Apple	stores, direct sales force	online stores	indirect distribution channel	cellular network carrier
Applied Materials	direct sales force			
Aptiv	direct sales force			
Archer Daniels Midland				
Arthur J Gallagher	sales and service offices			
Assurant		website	independent specialty agent	
ATT	stores, agents	website		third-party retail stores
AutoDesk		online branded store, download	distributor	
Automatic Data Processing	direct sales force	website	indirect sales channel	indirect sales channel
AutoZone	stores	stores		
AvalonBay Communities	real estate sales			
Avery Dennison				
Baker Hughes	direct sales force		indirect channels	
Ball	sales contract			
Bank of America	bank	online applications		
Bank of New York Mellon				
Baxter International	direct sales force	electronic purchasing systems	independent distributors	
BB&T	1879 offices	digital platform		
Becton, Dickinson and Co	directly by BD		independent sales representatives	
Berkshire Hathaway	sales force	online application	independent dealer	
Best Buy	stores	online		
Biogen	sales representatives		wholesale distribution	
BlackRock	directly		third-party fund sponsors	
Boeing				
BorgWarner	direct contact			
Boston Properties	property sales			
Boston Scientific	direct sales organization			
Brighthouse Financial			independent distribution channels	
Bristol-Myers Squibb	field sales organizations			
Broadcom	directly			
Brookfield Property				
Brown-Forman				

Cabot Oil & Gas	sales contract			
Cadence Design Systems	direct sales force		third party distributor	
Campbell Soup	own sales force		third party brokers	
Capital One Financial	banks	digital platform		
Capri Holdings	stores	website		
Cardinal Health			agents	
CarMax	stores, sales consultant	website		
Carnival		online	travel agents	travel agents
Caterpillar	sales force			
CBOE	trading floor			
CBRE	advisory		independent affiliate	
CBS	advertising	news channel		tv
Celgene	market access professionals, sales organizations		third party distributors	
Centene	locally based staff			
CenterPoint Energy		website		
CenturyLink	local offices	website	third parties	
Cerner	sales force			
CF Industries	internal marketing sales force			
CH Robinson Worldwide	teams, communicate needs			
Charles Schwab	telephone, branch capabilities	website		
Carter Communications	domestic call center	online		
Chesapeake Energy				
Chevron	gas stations, contractual agreement	gas stations		
Chipotle Mexican Grill	dine-in	online order		online food order applications
Chubb			independent agents	
Church & Dwight	sales force			
Cigna	sales representative		brokers	
Cimarex Energy				
Cincinnati Financial			independent insurance agencies	
Cintas	distribution network			
Cisco	sales representatives, directly to end users		channel partners	channel partners
Citigroup	bank branches	online applications		
Citizens Financial Group	branches	online and mobile platforms		

Citrix Systems		directly over the web	channel partners	
Clorox	direct sales force		network of brokers	
CME Group	auction market in Chicago	electronic trading platform	privately negotiated transactions	
CMS Energy				
Coca-cola	agreement with bottlers			
Cognizant	delivery centers, direct salesperson			
Colgate-Palmolive	direct sales force		brokers, distributors	
Comcast	call centers, retail stores	online	third party outlets	
Comerica				
Conagra Foods				
Concho Resources			third party purchasers	
ConocoPhillips	contracts			
Consolidated Edison	contracts			
Constellation Brand	full-time in-house sales functions			
Cooper Cos	sales representatives	e-commerce		
Corning	sold directly			
Costco Wholesale	warehouses	e-commerce		
Coty	sales force	online	pretige retailers, department stores	
Crown Castle	sales team			
CSX	contract			
Cummins				
CVS Health	stores	online		
Danaher	sales personnel	e-commerce	independent distributors	
Darden Restaurants	full-service restaurant	online		
DeVita Healthcare				
Deere	sales and administration offices	online		
Delta Airlines	telephone reservations	official website	travel agents	third party platforms
Dentsply Sirona	sales staff		distributors	
Devon				
Digital Realty Trust				
Discover Financial Service		digital channels		
Discovery Communications	license agreement			
Dish Network	sales channel		independent third parties	

Dollar General	stores	website		
Dollar Tree	store			
Dominion Energy	sold directly		network of distributors	
Dover			network of distributors	
Dow DuPont	network of distribution networks			
DR Horton	commissioned employees			
Dr Pepper Snapple Group	sold directly		third-party bottlers	
DTE Energy				
Duke Energy	call	website		
Duke Realty				
DXC Technology	direct sales force			
E*Trade Financial	financial centers	web, mobile		
Eastman Chemical	global marketing and sales organization		independent channels	
Eaton				
Ebay		website, mobile apps		
Ecolab	field employees		dealers and independent third-party distributors	
Edison International				
Edwards Lifesciences	sales and field clinical specialist personnel			
Electronic Arts	direct sales	digital distribution channel	third-party store fronts	retail channel
Eli Lily			wholesalers	
Emerson Electric	direct sales force		independent distribution network	
Entergy				
EOG Resources				
EQT				
Equifax	own direct sales force	internet, direct mail	alliance partners	
Equinix	direct sales force		content providers	
Equity Residential		web-based portal		
Essex Property Trust				
F5 Networks	F5 sales teams		distributors, value-added resellers	
Facebook	global sales force	self-service ad platform		

Fastenal	branch, selling personnel	digital platform		
Federal Realty Investment Trust				
Fedex	retail location		retailers	
Fidelity National Information Services	sales personnel		indirect field sales	
Fifth Third Bancorp	banking centers	internet and mobile apps		
First Energy				
Fiserv				
FLIR Systems	direct sales		third-party representatives	system integrators
Flowserve	direct sales by employees		distributors and sales representatives	
Fluor				
FMC	sell directly		national and regional distributors	
Foot Locker	stores	online		
Ford Motor	sales team		dealers	
Fortiv				
Fortune Brands Home & Security			kitchen and bath dealers	“do-it-yourself” remodeling-oriented home centers
Franklin Resources			third-party distribution	
Freeport-McMoRan				
Gap	in stores	in stores, online		
Garmin			independent dealers and distributors	
Gartner				
General Dynamics				
General Electric				
General Mills	direct sales force		broker and distribution arrangements	
General Motors			dealers, distributors	

Payment Option Matrix

	Payment					
	Subscription		**Single payment**		**Continuous payment**	
	Time	**Volume**	**Instant**	**Delayed**	**Installments**	**Usage**
Abbott Laboratories			directly to consumers			
AbbVie			directly to consumers			
Accenture				contract…span		
Activision Blizzard	subscription		purchase and download, micro-transactions			
Acuity Brands						
Adobe	software subscription model for a period of time		license perpetual versions			
Advanced Auto part			"4380 stores"			
AES			medium or long-term contract	medium or long-term contract		utility
Affiliated Managers Group				recognize revenue ratably overtime		
Aflac	insurance coverage				insurance coverage	
Agilent Technologies						
Air products and chemicals				three to five-year contract		
Akami						
Alaska Air Group			airline ticket			
Albemarle						
Alcoa			spot purchase	long-term contract		
Alexandria Real Estate Equity					tenant	
Alexion Pharmaceuticals			contract value			
Align Technology						
Allegion			retail			
Allergan						

Alliance Data Systems					allocated to separate performance obligations	
Alliant Energy						reading of meters
Allstate	insurance premium					
Alphabet			purchase our made by Google hardware devices			pay us when user engages in their ads
Altria						
Amazon			access offerings in our stores or on our website			
AMD			purchase orders, sales order acknowledgement			
Ameren						utility
American Airlines			air ticket			
American Electric Power						reading of meters
American Express			contract agreement			credit card, interest income
American International Group	insurance premium		fees			investment returns
American Tower	rent					
American Water Works						metered
Ameriprise Financial	premiums		fees based on managed asset balance			fund revenue
AmerisourceBergen						
Ametek						
Amgen						
Amphenol			purchase orders			
Anadarko Petroleum			contracts			
Analog Devices			contracts, website			
ANSYS	time-based licenses		perpetual license			
Anthem	premium		administrative fee			
AO Smith			retail channel			
Aon	premium		commission			

Apache Corp			minimum sales volume commitments, long-term commitment			
Apartment Investment and Management Co					lease	
Apple			sales of hardware			
Applied Materials						
Aptiv			purchase orders			
Archer Daniels Midland						
Arthur J Gallagher			commission			
Assurant	premium					
ATT	subscription		film box office			internet usage
AutoDesk	subscription					
Automatic Data Processing			long-term contract	long installment process		
AutoZone			retail store			
AvalonBay Communities			real estate sales		lease	
Avery Dennison						
Baker Hughes			turnkey contract, fixed fee contract			
Ball			multi-year supply contract			
Bank of America			service fees			interests
Bank of New York Mellon			fees, transaction			
Baxter International			sales contract	sales contract		
BB&T			insurance fee		service charges on deposit	
Becton, Dickinson and Co						
Berkshire Hathaway	premium		retail			based on usage
Best Buy			retail, service fees			
Biogen						
BlackRock			benchmark fee			
Boeing			sales contract			

BorgWarner		long-term supply	contract			
Boston Properties			property sales		lease	
Boston Scientific						
Brighthouse Financial	premium					
Bristol-Myers Squibb						
Broadcom			purchase orders			
Brookfield Property					lease	
Brown-Forman						
Cabot Oil & Gas			long term and short-term contract	long term and short-term contract		
Cadence Design Systems			perpetual licenses			over the license period
Campbell Soup			orders			
Capital One Financial			service fees	service fees		interest
Capri Holdings	license fee		stores			
Cardinal Health			vendor contract, a percentage of the wholesale acquisition cost			
CarMax			purchase used cars		interest	
Carnival			ticket	percentage of their revenues		
Caterpillar	license fee					
CBOE	monthly access fees		transactional fees			
CBRE	monthly management fee		commissions		multi-year portfolio	
CBS	license		publishing			advertising fees
Celgene						
Centene	premium					
CenterPoint Energy			contract			
CenturyLink						internet usage
Cerner	subscription					
CF Industries						contracts on a continual basis

CH Robinson Worldwide			order-to-order basis			
Charles Schwab			commission, advisory fees			interest revenue
Carter Communications	subscription		pay per view			
Chesapeake Energy			spot price contracts		percentage-of-proceeds contracts	
Chevron			fixed and determinable quantities			
Chipotle Mexican Grill			restaurant			
Chubb	premium		bond			
Church & Dwight			long-term contracts, individual sales orders			
Cigna	premiums		pharmacy sales		investment income	
Cimarex Energy				short-term arrangements		
Cincinnati Financial	premiums				investment income	
Cintas			rental revenue, service fees			
Cisco						interest
Citigroup						interest
Citizens Financial Group						
Citrix Systems	subscription		perpetual license			
Clorox						
CME Group						transaction fees
CMS Energy						utility
Coca-cola			bottler's agreement			
Cognizant			contracts			
Colgate-Palmolive						
Comcast	subscription		theme parks, movie tickets			
Comerica			annuity products			interest
Conagra Foods				percentage of proceeds		
Concho Resources						
ConocoPhillips			fixed and determinable quantities			
Consolidated Edison						

Constellation Brand			time and duration agreement	time and duration agreement		
Cooper Cos	monthly subscriptions					
Corning				over time	over time	
Costco Wholesale	membership fees		retailer			
Coty			online			
Crown Castle	monthly rental payment, lease		long-term contract			
CSX						rate per car load
Cummins			long term agreements			
CVS Health	premium		retail stores			
Danaher			e-commerce			
Darden Restaurants			restaurant			
DeVita Healthcare						
Deere						interest
Delta Airlines			airline tickets			cargo spaces
Dentsply Sirona						
Devon			fixed quantities			
Digital Realty Trust	lease arrangement					
Discover Financial Service						interest
Discovery Communications	subscription, license					
Dish Network	subscriber					usage-based
Dollar General			discount retailer			
Dollar Tree			discount variety store			
Dominion Energy				long-term contracted	long-term contracted	
Dover			short-term contracts			
Dow DuPont						
DR Horton					sales contract	
Dr Pepper Snapple Group			perpetual license		multi-year manufacturing agreements	
DTE Energy					long-term revenue contracts	utility
Duke Energy						utility
Duke Realty	rental		contractor fees, property sales			

DXC Technology						
E*Trade Financial	premium					interest
Eastman Chemical						
Eaton						
Ebay	store subscription		promoting list fees			net transaction fees
Ecolab	lease			multi-year contract	multi-year contract	
Edison International			power purchase agreement			
Edwards Lifesciences						
Electronic Arts	subscription		video game sales			
Eli Lily			product sales	milestone payments		royalties
Emerson Electric			sale of manufactured products			
Entergy						
EOG Resources						
EQT						
Equifax	subscription					
Equinix	license, rental					
Equity Residential	rent					
Essex Property Trust	rent		property sales			
F5 Networks						
Facebook						
Fastenal			distributor			
Federal Realty Investment Trust	rent					
Fedex			mailing fee			
Fidelity National Information Services						
Fifth Third Bancorp						interest
First Energy						meter reading
Fiserv	software license		card production sales			transaction-based fee
FLIR Systems			off-the-shelf products			
Flowserve			at a point in time	recognize revenue either over time		

Fluor				over time		
FMC						
Foot Locker			retailer			
Ford Motor			wholesales			
Fortiv			sale of products			
Fortune Brands Home & Security						
Franklin Resources			sale of classes			commission
Freeport-McMoRan					annual contracts	
Gap			apparel retail			
Garmin						
Gartner	subscription		fixed fees	deferred revenue		
General Dynamics			fixed price contract			
General Electric					long-term service agreements	utilization of the asset
General Mills						
General Motors			automotive sales			interest

Pricing Option Matrix

	Pricing				
	Company decide			**Others decide**	
	Cost-based	**Model-based**	**Value-based**	**Market-based**	**Competition-based**
Abbott Laboratories				regulated	
AbbVie				regulated	
Accenture	cost-plus				
Activision Blizzard					
Acuity Brands					
Adobe					
Advanced Auto part					
AES				regulated	
Affiliated Managers Group			value-based fee, asset-based fee		
Aflac					
Agilent Technologies					

Air products and chemicals					
Akami					
Alaska Air Group	cost structure			demand-based	
Albemarle	pricing of key constituent materials				competitors' pricing
Alcoa			negotiated price premium	published LME price	
Alexandria Real Estate Equity					
Alexion Pharmaceuticals				government program	
Align Technology					
Allegion				market price	
Allergan					
Alliance Data Systems		risk-based			
Alliant Energy					
Allstate		algorithms		local market place pricing	evaluation of competitors
Alphabet					
Altria					
Amazon					
AMD					
Ameren				governed by government entities	
American Airlines				governmental regulation	pricing decisions are affected, in large part, by the need to meet competition
American Electric Power					
American Express					
American International Group	expense levels	evaluation of insurance risks			rate actions taken by competitors
American Tower					
American Water Works				regulated	
Ameriprise Financial			fees based on managed asset balance		

AmerisourceBergen					
Ametek					
Amgen					
Amphenol					
Anadarko Petroleum				prices based on relevant market indices	
Analog Devices					
ANSYS					
Anthem	healthcare claim cost				
AO Smith	pricing actions related to higher steel cost				
Aon			commission		
Apache Corp				market-priced contracts	
Apartment Investment and Management Co					
Apple					
Applied Materials					
Aptiv					pricing pressure by competitors
Archer Daniels Midland					
Arthur J Gallagher	cost plus		percentage premium, level of service		
Assurant					
ATT			multiple pricing plans to meet customer needs		
AutoDesk					
Automatic Data Processing					
AutoZone			multi-value price		
AvalonBay Communities					
Avery Dennison	raw materials used				
Baker Hughes					
Ball	ingot based				
Bank of America		pricing model		market price	

Bank of New York Mellon				market value	
Baxter International					
BB&T		quantitative models			
Becton, Dickinson and Co	low-cost manufacturers				
Berkshire Hathaway				regulated	
Best Buy					monitor price by other retailers
Biogen				regulated	
BlackRock					
Boeing		modified by formula			
BorgWarner					
Boston Properties					
Boston Scientific					
Brighthouse Financial		pricing model			lower pricing than competitors
Bristol-Myers Squibb	cost		value of scientific innovation	government regulation	
Broadcom					
Brookfield Property					
Brown-Forman					
Cabot Oil & Gas				market sensitive price	
Cadence Design Systems					
Campbell Soup					
Capital One Financial		models may be used			
Capri Holdings					
Cardinal Health					
CarMax		algorithms			
Carnival		pricing model	multiple pricing levels		
Caterpillar				transactional pricing in the marketplace	
CBOE		pricing model			
CBRE					
CBS					
Celgene					

Centene					
CenterPoint Energy				market price	
CenturyLink					
Cerner					
CF Industries					
CH Robinson Worldwide		pricing algorithms			
Charles Schwab					in relation to competitors
Carter Communications			value-based set		
Chesapeake Energy				spot price	
Chevron				index price	
Chipotle Mexican Grill					
Chubb		modeling			
Church & Dwight					
Cigna	unit cost				
Cimarex Energy				market responsive price	
Cincinnati Financial					
Cintas					
Cisco					
Citigroup					
Citizens Financial Group					
Citrix Systems					
Clorox					
CME Group					
CMS Energy					
Coca-cola				competitive market conditions	
Cognizant					
Colgate-Palmolive					
Comcast			level of service		
Comerica	cost of funds				
Conagra Foods				evaluate market options	
Concho Resources					
ConocoPhillips				market value at sale	
Consolidated Edison					

Constellation Brand					
Cooper Cos					
Corning					
Costco Wholesale					
Coty					
Crown Castle					
CSX					
Cummins					
CVS Health				regulated	
Danaher					
Darden Restaurants					
DeVita Healthcare				by federal Medicare and state Medicaid policy	
Deere					
Delta Airlines					price competition
Dentsply Sirona	related cost				
Devon				market-sensitive price	
Digital Realty Trust					
Discover Financial Service				special market arrangement	competitive pricing level
Discovery Communications					
Dish Network			usage-based pricing		
Dollar General					
Dollar Tree					competitive pricing
Dominion Energy				regulated	
Dover					
Dow DuPont					
DR Horton					
Dr Pepper Snapple Group					
DTE Energy					
Duke Energy				market pricing	
Duke Realty					
DXC Technology					
E*Trade Financial					
Eastman Chemical					

Eaton					
Ebay					
Ecolab					
Edison International					
Edwards Lifesciences					
Electronic Arts					
Eli Lily					
Emerson Electric					
Entergy					
EOG Resources				market price	
EQT					
Equifax			tier pricing		
Equinix					
Equity Residential					
Essex Property Trust					
F5 Networks					
Facebook					
Fastenal					
Federal Realty Investment Trust					
Fedex			service selected	indexed fuel surcharge	
Fidelity National Information Services					
Fifth Third Bancorp					
First Energy					
Fiserv					
FLIR Systems					
Flowserve					
Fluor					
FMC					
Foot Locker					
Ford Motor	Costs of components and raw materials			Market factors	
Fortiv					
Fortune Brands Home & Security					
Franklin Resources			tiered pricing		

Freeport-McMoRan				average London price	
Gap					
Garmin					
Gartner					
General Dynamics					
General Electric					
General Mills					
General Motors					

Protect Value Option Matrix

	Physical assets		Intangible assets		Financial assets		Talent	
	Legal means	**Organizational means**	**Legal means**	**Organizational means**	**Legal means**	**Organizational means**	**Legal means**	**Organizational means**
Abbott Laboratories			patent, trademarks					
AbbVie			patent protection					
Accenture			patent	trade secret				development of people
Activision Blizzard			copyrighted software code	trade secret				
Acuity Brands			licenses, trademarks	internal processes and controls				
Adobe			patents, copyrights	acquisition, trade secret				
Advanced Auto part		store support center	trademarks					
AES		construction management, platform expansion				invest in new projects, long-term contract before construction		
Affiliated Managers Group				long-term relationship		share revenue without regard to expense		
Aflac								

Agilent Technologies			patents	research and development, technical competencies				
Air products and chemicals			patents	research and development, know-how				
Akami			patents, copyrights, trademarks	trade secret			contractual restrictions	ability to attract, retain and motivate highly qualified technical, managerial and other personnel
Alaska Air Group								
Albemarle			patents, trade names	research and development, product improvement				
Alcoa			trademarks	trade secret, research and development				
Alexandria Real Estate Equity		selective project developments, redevelopment				preleasing		
Alexion Pharmaceuticals			patents, regulatory protections	strategic alliances				
Align Technology		single supply relationship	patents	research and development				
Allegion			patents, copyrights, trademarks	know-how, research and development, technology innovation				

Allergan			patents, confidentiality agreement	trade secret, know-how, research and development			confidentiality agreement	
Alliance Data Systems			copyrights, contractual provisions	trade secret			confidentiality procedures	
Alliant Energy								
Allstate								
Alphabet			trademarks, confidentiality provisions, copyrights				confidentiality provisions	hiring talented employees, provide competitive compensation
Altria		contract growing program, sufficient material supply	patents					
Amazon			trademarks, copyrights, patent law	trade-secret			confidentiality agreements, license agreement	
AMD			copyrights, patent applications, trademarks	contract, cross-license agreement				
Ameren		diverse fuel portfolio						
American Airlines		fleet renewal, purchase, spare engines						
American Electric Power	long-term contract							
American Express								

American International Group								
American Tower	long-term lease agreement	high lease renewal rate				low maintenance capital expenditure, high operating margins		
American Water Works		renewal program, property insurance						
Ameriprise Financial			proprietary technology, contract agreements, copyrights, trademarks					attract and retain advisors
Amerisource Bergen			trademarks, patents, proprietary products					
Ametek			patents	research and development				
Amgen			patents					
Amphenol		vertically integrated, global presence	patents, trademarks	research and development, decrease exposure to standard products, know-how				
Anadarko Petroleum								
Analog Devices		third party sub-contractor	proprietary rights, patents, copyrights	trade secret				
ANSYS			patents	strategic alliances, trade secret				
Anthem								

AO Smith			trademarks, trade names, patents	research and development				
Aon						long-term delivery commitments		
Apache Corp								
Apartment Investment and Management Co		redevelopment, sell annually, maintain property quality				controlling expenses, centralized revenue management system		
Apple			intellectual property rights	product innovation				
Applied Materials			patents	research and development				
Aptiv								
Archer Daniels Midland			patents, trademarks	research and development				
Arthur J Gallagher								
Assurant						exclusive agreements		
ATT				research and development, create new services				
AutoDesk			patent, copyrights, trademarks, contractual provisions				contractual provisions	training
Automatic Data Processing				upgrades, enhances, and expands its solutions and services				
AutoZone		alternative sources of supply	patent and trademarks			projected profitability		performance-based bonuses

						before construction		
AvalonBay Communities		direct involvement in construction			Options and long-term conditional contracts	sell assets that no longer meet our long-term strategy, maintain a capital structure that provides financial flexibility		
Avery Dennison		expand production capacity, insured		research and development, new product and operating techniques				
Baker Hughes			patent, trademarks	research and development				
Ball				research and development				
Bank of America								
Bank of New York Mellon			patents, trademarks, copyright	know-how, research and development			confidentiality agreement	
Baxter International								
BB&T								
Becton, Dickinson and Co			patents, patent applications	research and development, technology, know-how				
Berkshire Hathaway								
Best Buy		carefully monitor and manage inventory	trademarks, trade names					
Biogen			patents	research and development,				

				business relationships with other companies, universities and medical research institute				
BlackRock								
Boeing	long-term lease		patents	unpatented research, development and engineering skills				
BorgWarner			patents, patent applications	research and development				
Boston Properties		strategic suppliers		research and development				attract and retain skilled personnel
Boston Scientific								
Brighthouse Financial								
Bristol-Myers Squibb			patents	research and development				
Broadcom			IP rights, patents	research and development				
Brookfield Property		increasing the permanent occupancy of our regional mall				actively recycling capital through the disposition of assets and investing in whole or partial interests		
Brown-Forman			trademarks, copyrights, proprietary packaging	know-how				
Cabot Oil & Gas						use derivative financial instruments to		

						manage price risk		
Cadence Design Systems			patents, copyrights, trademarks	research and development				
Campbell Soup				research and development				
Capital One Financial			copyrights, trademarks, patents					
Capri Holdings		allocate product manufacturing	trademarks applications	mutually satisfactory relationships with these third parties				
Cardinal Health			patent, copyrights, trademark laws					
CarMax			trademarks					additional commissions
Carnival		insurance	proprietary technology					
Caterpillar			patents					
CBOE			proprietary products	long-term strategic relationship				
CBRE			trademarks and trade names					
CBS			trade names, trademarks					
Celgene		back-up manufacturing sites	patents					
Centene								
CenterPoint Energy								
CenturyLink			patents, trade names, trademarks, copyrights					

Cerner			copyrights	security and risk management programs				
CF Industries								
CH Robinson Worldwide			trademarks, copyrights, trade secrets			long-term relationship with customers		
Charles Schwab								
Carter Communications								
Chesapeake Energy					long-term gathering, processing, and transportation contracts			
Chevron				research and technology				
Chipotle Mexican Grill		technological innovation other innovation, carefully evaluate each potential restaurant location						
Chubb			trademarks and trade names					
Church & Dwight			trademarks					
Cigna				technological innovation				
Cimarex Energy								
Cincinnati Financial								
Cintas								

Cisco			patents, copyrights, trademarks, trade names	research and development				
Citigroup								
Citizens Financial Group			trademarks, service marks, trade names					
Citrix Systems			confidentiality agreements	technology relationship, trade secrets				
Clorox			trademarks	research and development				
CME Group			trademarks, service marks, domain names					
CMS Energy						insurance		
Coca-cola			trademarks					
Cognizant			confidentiality procedures	proprietary innovation			confidentiality procedures	
Colgate-Palmolive			trademarks					
Comcast			copyrights, trademarks, patent, trade secret					
Comerica						minimum capital conservation		
Conagra Foods			trademarks	research and development				
Concho Resources								
ConocoPhillips						manage credit-risk exposure		
Consolidated Edison								
Constellation Brand			trademarks					

Cooper Cos			patents, trademarks	research and development				
Corning			patents, trademarks					
Costco Wholesale			trademarks, trade names, copyrights					
Coty			trademarks, license	innovation				programs designed to ensure operating safety
Crown Castle						high renewal rate		
CSX		long-term leased						
Cummins		long-term relationship with suppliers	patents, trademarks	research and development				
CVS Health		store development programs	trademarks, service marks, domain names					
Danaher			patents, trademarks, copyrights, trade secrets and licenses	research and development				
Darden Restaurants		devote significant effort to the site selection process		robust system of data protection and cyber security resources, technology and processes				attracting, retaining, engaging and developing a workforce
DeVita Healthcare								
Deere		facilities are well maintained, in good operating condition and suitable for their present purposes	patents, trade secrets, licenses and trademarks					

Delta Airlines		entered into use agreements which provide for the non-exclusive use of runways, taxiways and other improvements and facilities						
Dentsply Sirona				innovate and product development, complex material technology				
Devon								
Digital Realty Trust								
Discover Financial Service						credit risk management		
Discovery Communications			copyrights in content, trademarks in brands, names and logos, websites, and licenses of intellectual property					
Dish Network								
Dollar General		focused merchandise offering within a broad range of categories	trademarks			limited maintenance capital		
Dollar Tree			owners of several federal service mark registrations			a disciplined, cost-sensitive approach to store site		

						selection in order to minimize the initial capital investment		
Dominion Energy								
Dover			patents, trademarks, licenses and other forms of intellectual property	research and development				
Dow DuPont			owns or licenses a substantial number of trademarks					
DR Horton	enter into land/lot option contracts					Greater access to and lower cost of capital		
Dr Pepper Snapple Group			possess a variety of intellectual property rights					
DTE Energy		long-term purchase contracts						
Duke Energy								
Duke Realty								
DXC Technology			trade secrets, patents, copyrights, and trademarks				contractual protections	
E*Trade Financial						deposit accounts insured		
Eastman Chemical			patents, trademarks, copyrights, and trade secrets	research and development				
Eaton								

Ebay			proprietary technologies, trademarks, copyright, patent, domain names					
Ecolab			patents, trademarks and other intellectual property	research and development				
Edison International		implement additional wildfire safety measures						
Edwards Lifesciences		mitigate risk and seek continuity of supply	Patents, trademarks, and other proprietary rights	research and development				
Electronic Arts			copyrights, trademarks, patents, patent applications, trade secrets	know-how			confidentiality provisions	
Eli Lily			a large number of patents					
Emerson Electric		equipment, machinery and tooling used in these processes are of modern design and well maintained	patents, trademarks and licenses					
Entergy								
EOG Resources								
EQT								
Equifax			applicable trademark laws or by prosecution of patent applications					

Equinix								
Equity Residential						tight cost control		on-line training courses
Essex Property Trust		property insurance						
F5 Networks			patent, copyright, trademark and trade secret laws and restrictions on disclosure					
Facebook			patents, trademarks, copyrights, trade secrets, including know-how, license	investing in protecting the security and integrity of our platform			confidentiality procedures, non-disclosure agreements	
Fastenal			trademarks and service marks					
Federal Realty Investment Trust		monitoring the physical appearance of our properties and the construction quality				maintaining an available line of credit, utilizing the most advantageous long-term source of capital		
Fedex			trademark, service mark and trade name	build technology solutions				
Fidelity National Information Services			trademarks, trade names, copyrights and patents	research and development				
Fifth Third Bancorp								
First Energy				research and development	nuclear insurance			
Fiserv			patent, copyright, trademark and	continually develop, maintain				

			trade secret laws, internal security practices	and enhance our products and systems				
FLIR Systems		vertical integration	patent, trademark, copyright, and trade secret rights				confidentiality agreements	
Flowserve			trademarks and patents					
Fluor								
FMC			patents, trademarks, trade secrets and other intellectual property	research and development				
Foot Locker								
Ford Motor			patents, copyrights, and trademarks					
Fortiv			patents, trademarks, copyrights and trade secrets and licenses					
Fortune Brands Home & Security			trademarks, patent protection					
Franklin Resources			trademarks, service marks and trade names					
Freeport-McMoRan								
Gap			trademarks and service marks					
Garmin		vertically integrated		research and development				
Gartner			patent, copyright, trademark, trade secret					

General Dynamics	long-term agreements	achieve economies of scale	patent, license or other intellectual property right	research and development		negotiating flexible pricing terms		
General Electric				research and development, maintenance of protective systems and contingency plans				employee training, monitoring and testing
General Mills			trademarks	research and development				
General Motors				research and development				

Competition Role Checklist

	Defender	Prospector	Analyzer
Abbott Laboratories	●	●	
AbbVie	●	●	
Accenture	●	●	
Activision Blizzard	●		
Acuity Brands	●		
Adobe	●	●	●
Advanced Auto part	●		
AES	●		●
Affiliated Managers Group	●		
Aflac	●		
Agilent Technologies	●		
Air products and chemicals	●		
Akami	●	●	
Alaska Air Group	●		
Albemarle	●	●	
Alcoa	●		
Alexandria Real Estate Equity			●
Alexion Pharmaceuticals		●	
Align Technology	●		
Allegion		●	

Allergan	●	●	
Alliance Data Systems	●		
Alliant Energy	●		
Allstate	●		
Alphabet		●	
Altria		●	
Amazon	●	●	
AMD	●		
Ameren			
American Airlines	●		
American Electric Power	●		
American Express		●	
American International Group	●		
American Tower	●		
American Water Works			
Ameriprise Financial	●		
AmerisourceBergen	●		
Ametek	●	●	
Amgen		●	
Amphenol		●	
Anadarko Petroleum			
Analog Devices	●	●	
ANSYS	●	●	
Anthem	●		
AO Smith	●		
Aon	●		
Apache Corp			
Apartment Investment and Management Co	●		
Apple		●	
Applied Materials	●		
Aptiv	●	●	
Archer Daniels Midland	●		
Arthur J Gallagher	●		
Assurant	●	●	
ATT			
AutoDesk		●	
Automatic Data Processing	●	●	

AutoZone	●		
AvalonBay Communities	●		
Avery Dennison	●		
Baker Hughes	●		
Ball		●	
Bank of America	●		
Bank of New York Mellon			
Baxter International		●	
BB&T			
Becton, Dickinson and Co		●	
Berkshire Hathaway	●		
Best Buy	●		
Biogen	●		
BlackRock	●		
Boeing	●		
BorgWarner		●	
Boston Properties	●		
Boston Scientific	●		
Brighthouse Financial	●		
Bristol-Myers Squibb	●	●	
Broadcom	●		
Brookfield Property	●		
Brown-Forman	●		
Cabot Oil & Gas	●		
Cadence Design Systems			
Campbell Soup		●	
Capital One Financial	●		
Capri Holdings	●		
Cardinal Health	●		
CarMax	●		
Carnival		●	
Caterpillar	●		
CBOE		●	
CBRE			
CBS	●		
Celgene	●		
Centene	●	●	

CenterPoint Energy			
CenturyLink	●		
Cerner		●	
CF Industries	●		
CH Robinson Worldwide	●		
Charles Schwab	●		
Carter Communications	●		
Chesapeake Energy	●		
Chevron			
Chipotle Mexican Grill		●	
Chubb	●		
Church & Dwight		●	
Cigna		●	
Cimarex Energy			
Cincinnati Financial			
Cintas	●		
Cisco	●	●	
Citigroup			
Citizens Financial Group		●	
Citrix Systems	●		
Clorox		●	
CME Group	●		
CMS Energy	●		
Coca-cola	●	●	
Cognizant	●		
Colgate-Palmolive		●	
Comcast			
Comerica	●		
Conagra Foods			
Concho Resources			
ConocoPhillips	●		
Consolidated Edison			
Constellation Brand	●		
Cooper Cos			
Corning	●		
Costco Wholesale	●		
Coty		●	

Crown Castle	●		
CSX	●		
Cummins			
CVS Health	●		
Danaher	●		
Darden Restaurants	●		
DeVita Healthcare	●		
Deere		●	
Delta Airlines	●		
Dentsply Sirona		●	
Devon			
Digital Realty Trust			
Discover Financial Service	●		
Discovery Communications			
Dish Network			
Dollar General	●		
Dollar Tree	●		
Dominion Energy			
Dover			
Dow DuPont	●		
DR Horton	●		
Dr Pepper Snapple Group	●		
DTE Energy			
Duke Energy	●		
Duke Realty			
DXC Technology	●		
E*Trade Financial	●		
Eastman Chemical		●	
Eaton	●		
Ebay	●		
Ecolab	●		
Edison International			
Edwards Lifesciences		●	
Electronic Arts	●	●	
Eli Lily	●	●	
Emerson Electric	●		
Entergy	●		

EOG Resources			
EQT	●		
Equifax	●	●	
Equinix			
Equity Residential			
Essex Property Trust			
F5 Networks	●		
Facebook			
Fastenal	●		
Federal Realty Investment Trust			
Fedex	●	●	
Fidelity National Information Services	●		
Fifth Third Bancorp			
First Energy			
Fiserv	●		
FLIR Systems	●	●	
Flowserve	●		
Fluor	●		
FMC	●		
Foot Locker			
Ford Motor			
Fortiv	●	●	
Fortune Brands Home & Security	●	●	
Franklin Resources		●	
Freeport-McMoRan	●		
Gap		●	
Garmin	●		
Gartner	●		
General Dynamics	●	●	
General Electric			
General Mills		●	
General Motors	●		

Competition Basis Matrix

	Stability	Efficiency	Differentiation	Quality	Experience	Agility	Reach	Innovation	Imitation
Abbott Laboratories	long-term supply contract	laboratory efficiency		product performance	convenient of use		"consumer advertisement", "packaging"	product innovation	
AbbVie		price						technological innovation	
Accenture	deliver reliably	competitive pricing	scope of service	quality, technical expertise			reputation, global reach and scale	innovative services	
Activision Blizzard	compatibility		product features	game quality	deep customer engagement		brand name recognition		
Acuity Brands		energy efficiency	features and benefits	product quality	customer relationship		brand recognition		
Adobe	business model	cost-effective basis		effective delivery methods	building customer confidence	meet changing customer needs		new applications	acquire developed technology
Advanced Auto part	availability	price	product offering	quality	customer service		store location		
AES	reliability of service	price				adapt to technology changes			
Affiliated Managers Group	stable model	purchase price		performance of our Affiliates			reputation		
Aflac		premium rates	value-added services	policies					
Agilent Technologies	reliability	price		product performance			global channel coverage		
Air products and chemicals	reliability, performance guarantee	price	industrial gas application	technological performance	service				

Akami	security	price	functionalities	performance	reduced complexity			product and service innovations	
Alaska Air Group	safety	low fares	routes served		customer service		customer proximity		
Albemarle	reliability		product diversity	product quality				innovative chemicals and technology	
Alcoa	reliability of supply	price	value-added product portfolio	quality					
Alexandria Real Estate Equity	maintain strategic relationship		real estate niche						
Alexion Pharmaceuticals								product innovation	
Align Technology		price	software features	effectiveness of treatment	aesthetic appeal, customer support		brand recognition		
Allegion		delivery capacity	product breadth	quality			brand reputation	technology innovation	
Allergan		price		product quality	service		reputation	product development	
Alliance Data Systems	capture detailed transaction data		differentiate	effective delivery					
Alliant Energy		cost-effective					new customers		
Allstate	financial strength	price	product offering		customer experience		brand recognition		
Alphabet							attract users, advertisers, content creators	innovative products	
Altria		price		quality, taste			brand recognition	product innovation	

Amazon	reliable fulfillment	price	selection	quality	convenience	fast fulfillment		innovation	
AMD		business practices	product mix				marketing and advertising		
Ameren									
American Airlines		scheduling	price	on-time performance	amenities, cabin configuration		number of markets		
American Electric Power	reliability of service	price							
American Express			features	attractiveness of value proposition, quality of product and service	security of cardholder and merchant information	speed of innovation	reputation and brand recognition		
American International Group	Capital and growth		balance and diversification of products						
American Tower		price		site capacity, quality		speed of service			
American Water Works									
Ameriprise Financial	heading capacity	fee structure	product offering	technology and service capacity	services		attract and retain advisors, brand recognition		
AmerisourceBergen		price	product offering		service and delivery				
Ametek	experienced management team	efficient	technological and development capabilities				market share	new and improved products	
Amgen								product innovation	

Amphenol		price		product quality	customer service	delivery time		technology innovation	
Anadarko Petroleum									
Analog Devices	reliability	delivery capabilities		product performance			strength of brand	technological innovation	
ANSYS	financial viability	price	breadth and depth of functionality	quality	ease of use	flexibility		innovation	
Anthem	financial stability	price		quality of service		flexibility of products and benefits	brand recognition		
AO Smith				high efficiency products					
Aon			diversification of clients						
Apache Corp									
Apartment Investment and Management Co		rental price	breadth	quality of service	attractiveness				
Apple	reliability	price	product and service feature	quality			reputation	product innovation	
Applied Materials		productivity							
Aptiv	reliability	product design capability		product quality	customer service	timely delivery		new product innovation	
Archer Daniels Midland		price	alternative product	quality			global supply		
Arthur J Gallagher		overall cost		quality of services	personalized attention		reputation		
Assurant	financial strength	value chain integration						product innovation	

ATT									
AutoDesk	reliability	price			ease of use		reputation	new products	
Automatic Data Processing		price	breadth of offerings	product and service quality	ease of use		reputation		
AutoZone		price		product availability	customer service		name recognition		
AvalonBay Communities		pricing		quality	amenities				
Avery Dennison	size and scale	technical expertise	broad line of products				distribution capability		
Baker Hughes	reliability and availability	efficiency		product and service quality		on-time delivery			
Ball		price		quality				innovation	
Bank of America		price		quality of products	customer service		reputation		
Bank of New York Mellon					level of service			technological innovation	
Baxter International		cost-effectiveness		product performance	service			technological innovation	
BB&T									
Becton, Dickinson and Co		price		quality	service		reputation	innovation	
Berkshire Hathaway		competitive pricing	product features	quality	level of customer service		reputation		
Best Buy		efficiency	product assortment		customer service				
Biogen	patent position	price		product efficacy	convenience	efficient delivery	brand recognition		
BlackRock	investment discipline	price	investment style	performance record	client service	efficient delivery	brand reputation		
Boeing		cost reduction	greater value product						

BorgWarner		delivery and program launch support		quality				technological innovation	
Boston Properties			leasing terms	quality of properties	attractiveness		reputation		
Boston Scientific	obtain patents	cost-effectively	differentiated	enhance quality					
Brighthouse Financial	financial strength	annuity fees	product features		ease of doing business	speed to market	distribution channel		
Bristol-Myers Squibb		price		product efficacy	safety and ease of use		marketing effectiveness	R&D of new products	
Broadcom	engineering expertise	price	product features	quality		responsiveness of customers			
Brookfield Property			new concepts	quality	clean, secure				
Brown-Forman		price	flavor profile	quality of product			brand recognition		
Cabot Oil & Gas		distribution efficiency, price		quality of service					
Cadence Design Systems									
Campbell Soup				nutritional value, taste	customer service		brand recognition, shelf space	innovation	
Capital One Financial		price	range of products	quality					
Capri Holdings	management team, strong relationship with customers		accessories categories	style	customer service		brand prestige and recognition		
Cardinal Health		price	service offerings	product quality	support services				

CarMax		price	breadth of selections	quality of vehicles	no-haggle	meet customer changing needs	location of our stores		
Carnival			destinations		overall experience			innovation	
Caterpillar		price		product performance	customer service				
CBOE	strategic relationship				ease of use	speed of trade transactions	leading market and brand	innovative products and services	
CBRE									
CBS				program interests					
Celgene	reliability, patent and non-patent exclusivity	price		product efficacy	safety, convenience	speed	availability		
Centene	expertise			quality			localized approach	innovation	
CenterPoint Energy									
CenturyLink	reliability	price	scope of integrated offering		customer service		reach		
Cerner	client relationship						brand recognition	breakthrough innovation	
CF Industries		delivered price		product quality	customer service				
CH Robinson Worldwide	relationship	price	scope of service				network		
Charles Schwab	scale and size	competitive pricing	various products			quick	brand reputation		
Carter Communications		competitive price		high quality product	outstanding service				

Chesapeake Energy	expertise	production capabilities							
Chevron									
Chipotle Mexican Grill				food quality	taste, service		location	technological and other innovation	
Chubb	stability	operating efficiency	product differentiation			flexibility			
Church & Dwight		price		performance			brand recognition	product innovation	
Cigna		cost-effectiveness		quality			marketing and sales	innovation	
Cimarex Energy									
Cincinnati Financial									
Cintas		price		quality	design				
Cisco		price	broad range	product performance			market presence	innovation	
Citigroup									
Citizens Financial Group		price		quality of customer service and execution			reputation	innovative financial solutions	
Citrix Systems		price					market presence		
Clorox		price		performance			brand recognition	product innovation	
CME Group	secure	efficient	diversity of products		customer experience		brand reputation		
CMS Energy		controlling cost	renewable energy options						
Coca-cola	brand and trademark protection	increased efficiency			in-store display			product and ingredient innovation	
Cognizant	financial stability	competitive pricing		quality of service		responsiveness to customers	delivery model		

Colgate-Palmolive		pricing		product quality			promotional activities	new product innovation	
Comcast									
Comerica		pricing		products					
Conagra Foods									
Concho Resources									
ConocoPhillips	experience and expertise	economic analysis							
Consolidated Edison									
Constellation Brand		price		quality			brand recognition		
Cooper Cos									
Corning		supply chain efficiency	broad product line	product quality			global distribution		
Costco Wholesale		price	selection	quality	convenience		location		
Coty		pricing		product efficacy			promotional activities	innovation	
Crown Castle	expertise	price		quality of service		deployment speed	location		
CSX	reliability	price			service				
Cummins									
CVS Health			product selection and variety	quality	excellence in delivering service		store location		
Danaher	reliability		service coverage	product performance	ease of maintenance	speed			
Darden Restaurants	scale	price		quality of food	service, attractiveness of facilities, online ordering capabilities		restaurant location		
DeVita Healthcare	stability	efficiency					reputation		

Deere		price		product performance	customer service		distribution	innovation	
Delta Airlines		fares	routes		services		loyalty programs		
Dentsply Sirona		price		product performance , quality	safety and ease of use			innovation	
Devon									
Digital Realty Trust									
Discover Financial Service		pricing	product and service offerings		customer service		brand reputation		
Discovery Communications	secure distribution agreement		same genre and audience				distribution of our content		
Dish Network									
Dollar General	in-store consistency	pricing		merchandise quality	assortment and presentation		store location		
Dollar Tree		price		merchandise quality	customer service		store location		
Dominion Energy									
Dover									
Dow DuPont	technology and trait leadership	cost competitiveness		quality					
DR Horton		price		quality			locations		
Dr Pepper Snapple Group		price	selection	taste, quality	convenience		brand recognition		
DTE Energy									
Duke Energy	reliability	price							
Duke Realty									

DXC Technology	reliability, expertise	pricing		performance, quality of solutions		responsiveness	reputation		
E*Trade Financial					easy to use				
Eastman Chemical								innovation	
Eaton	design engineering capabilities	price		performance		timely delivery	geographic coverage		
Ebay		price	product selection		services				
Ecolab	technical expertise		chemical formulations	product quality	strong customer service		effective global supply chain		
Edison International									
Edwards Lifesciences	reliability			product performance				innovative features	
Electronic Arts	reliability	price		game quality	ease of use, customer service		brand recognition	innovation	
Eli Lily		cost-effectiveness		effectiveness, safety	ease of use		marketing effectiveness	research and development of new products	
Emerson Electric		price		product performance	service		branding		
Entergy	securing of services		development of reserves						
EOG Resources									
EQT	securing of services		development of reserves						
Equifax	adaptability	price	depth, coverage	quality, technical performance	ease of use	quickness of response,	marketing efforts	new product innovation	

						flexibility			
Equinix									
Equity Residential									
Essex Property Trust									
F5 Networks		pricing	broad functionality	performance	customer support		brand recognition		
Facebook			to attract and retain developers				attract, engage, and retain people		
Fastenal					better service	frequent deliveries	physical presence		
Federal Realty Investment Trust									
Fedex	reliability	price		capacity of scheduled service	ability to track	speed of service	geographic coverage	innovative service	
Fidelity National Information Services	expertise		multiple applications		services				
Fifth Third Bancorp									
First Energy									
Fiserv	security		features	product quality		timely introduction			
FLIR Systems	reliability	price	multi-function capabilities	product quality			agency relationship	technical innovation	
Flowserve	project management	price		quality		timelines of delivery	reputation		

Fluor	project management expertise	cost-effectiveness	diversity	excellence in execution			reputation		
FMC	reliability	cost-efficient			quality customer and technical service			advanced technology	
Foot Locker									
Ford Motor									
Fortiv		price	breadth of products	quality	service and support	delivery speed	distribution channel	technology and innovation	
Fortune Brands Home & Security	stable demand			product quality			established brands	innovation	
Franklin Resources			product mix and offering	investment performance			business reputation	innovation	
Freeport-McMoRan	size	manage cost		quality					
Gap		competitive pricing				quickly respondi ng	attracting customers	innovative products	
Garmin	reliability	price	functionality	quality		time-to-market	brand		
Gartner	experienced management team			superior research content			brand name		
General Dynamics	reliability			technical excellence	customer relationship	on-time delivery	global footprint	innovate	
General Electric									
General Mills		price		product quality	convenient ordering and delivery		brand recognition	product innovation	
General Motors	reliability	price, fuel economy	available options	quality			market leadership		

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