

THE BUSINESS MODEL PATTERN DATABASE — A TOOL FOR SYSTEMATIC BUSINESS MODEL INNOVATION

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Companies are more frequently seen shifting their focus from technological innovation towards business model innovation. One efficient option for business model innovation is to learn from existing solutions, i.e., business model patterns. However, the various understandings of the business model pattern concept are often confusing and contradictory, with the available collections incomplete, overlapping, and inconsistently structured. Therefore, the rich body of literature on business model patterns has not yet reached its full potential for both practical application as well as theoretic advancement. To help remedy this, we conduct an exhaustive review, filter for duplicates, and structure the patterns along several dimensions by applying a rigorous taxonomy-building approach. The resulting business model pattern database allows for navigation to the relevant set of patterns for a specific impact on a company's business model. It can be used for systematic business model innovation, which we illustrate via a simplified case study.

Keywords: Business models; business model innovation; business model patterns; taxonomy development.

Introduction

In advanced economies, innovative capacity is the strongest deterrent for nations and companies gaining competitive advantage (Porter, 1990; Porter and Stern, 2001). Therefore, companies often heavily invest in technological innovations by developing new resources, plants, and even business units (Amit and Zott, 2012).

However, due to the increasing environmental turbulence in more and more industries and markets (El Sawy et al., 2010), this approach not only tends to be very expensive but also exhibits uncertain returns on investments (Amit and Zott, 2012). Furthermore, technological innovations are of little value without appropriate business models (Chesbrough, 2010) — in fact, a good business model can even make an inferior technology more successful than a superior one (Chesbrough, 2007). Hence, the design and implementation of new business models has the potential to be more efficient than technological innovation (Teece, 2010).

Research on the innovation of business models is spread across a variety of fields, including information systems, strategic management, and technology and innovation management (Abdelkafi et al., 2013; Schneider and Spieth, 2013; Zott et al., 2011). In contrast to other research streams such as product innovation, business model innovation is still at the beginning of its academic elaboration (Bucherer et al., 2012). This is somehow surprising due to the increasing importance of business model innovation for management practice, which requires conceptual toolkits for business model design (Zott and Amit, 2010). Therefore, research on this matter should contribute to a better understanding by providing firms with specific means, i.e., tools and methods, for business model innovation (Schneider and Spieth, 2013).

One such tool are business model patterns, which describe proven solutions to recurring problems during business model design (Abdelkafi et al., 2013). The importance of the concept is underlined by the finding that 90% of all business model innovations are a recombination of existing business model patterns (Gassmann et al., 2014). Therefore, by drawing upon aspects that have already been proven to be successful for other companies and industries, the use of business model patterns provides an efficient way to undertake business model innovation (Abdelkafi et al., 2013). However, business model patterns must not be misunderstood; they do not focus on imitating, but rather address efficiency, spur creativity, and help to overcome cognitive barriers in the business model innovation process, which is of special importance in times of transformative change (Chesbrough, 2010).

An illustrative example and often cited instance of business model patterns is *razors/blades* (e.g., Gassmann et al., 2014; Johnson, 2010; Linder and Cantrell, 2000). The pattern describes companies offering a cheap basic product (“razors”) with complements that must frequently be replaced (“blades”). These complements are overpriced, thereby subsidizing the basic product. The pattern name was derived from Gillette’s marketing efforts at the beginning of the twentieth century, when the company gave away razors in order to sell more blades (Gassmann et al., 2014). Since then, several companies have innovated their

business models by adopting the *razors/blades* pattern. For instance, Nespresso, a sub-brand of the Nestlé Corporation, introduced a new espresso maker that is sold for less than comparable machines of competitors are (Amit and Zott, 2012). The espresso maker, however, can only be used in combination with Nespresso-produced coffee capsules. In contrast to traditional producers of coffee machines, Nespresso does not depend on gaining value from selling the machines because the company uses the machines to open up an even larger and continuous value pool by selling the highly profitable capsules (Matzler *et al.*, 2013).

Because business model patterns can be such a powerful tool for business model innovation, several researchers assembled collections of business model patterns (e.g., Applegate, 2001; Gassmann *et al.*, 2014; Johnson, 2010; Rappa, 2001; Weill *et al.*, 2005). Most researchers, however, have slightly different understandings of the business model pattern concept. For instance, some collections discuss prototypical patterns describing holistic business models (e.g., Weill *et al.*, 2005), while others discuss solution patterns that are specific building blocks of business models (e.g., Johnson, 2010) and yet others mix both types of patterns (e.g., Gassmann *et al.*, 2014). Furthermore, the patterns among the various collections strongly overlap, with many patterns occurring in multiple different sources. However, no collection is exhaustive; even when applying the most comprehensive collection with 55 business model patterns from Gassmann *et al.* (2014), one misses more than the two-thirds of the available patterns. This diversity in research is of particular value, as business reality is not uniform and demands different solutions for different settings. Nevertheless, what is missing is a meta-perspective that describes which business model patterns are suitable for which purpose.

With this research we aim to make the valuable existing collections of business model patterns more usable for both future business model pattern research as well as practice applications. The goal of our work is to provide the respective audiences with a tool guiding them to the patterns most suitable for their individual situations. Thus, we aim to bridge the gap between general business model patterns described in prior literature and specific business model innovation endeavours in research and business practice. To do so, we conduct an exhaustive review and integrate all patterns into one database. We filter for duplicates and structure the patterns along several dimensions by applying a rigorous taxonomy-building approach. The database reveals the relevant set of patterns for a specific impact on a company's business model. Finally, we describe how to apply the database for systematic business model innovation, which we illustrate using a simplified case study. The database thus increases the efficiency and effectiveness of business model innovations in practice by deriving contingency factors for the targeted deployment of business model patterns. Furthermore, by filtering,

structuring and categorizing business model patterns, the database provides a common ground for the advancement of business model research, which for instance can be used to describe transformative effects stemming from technological or societal developments across industries.

Background

Before developing and presenting the business model pattern database, we briefly define the concepts on which we later build: the business model, business model innovation, and business model patterns.

The business model

The business model is a useful lens for understanding a company's underlying logic because it describes what value is provided, how this value is created and delivered, and how profits can be generated therefrom (Magretta, 2002). Thus, the business model concept helps to look "at the forest, not the trees" (Amit and Zott, 2012, p. 49). The concept has a variety of uses, such as capturing value from technological innovations (Chesbrough and Rosenbloom, 2002), defining the boundaries of a firm (Zott and Amit, 2010), and creating a direct connection between business strategy and business processes (Al-Debei and Avison, 2010).

To achieve a common understanding of the business model concept, several authors have identified elements belonging to a business model (e.g., Gordijn *et al.*, 2005; Hedman and Kalling, 2003; Johnson, 2010; Osterwalder and Pigneur, 2010). Probably the most popular example (Spieth *et al.*, 2014) is the business model canvas by Osterwalder and Pigneur (2010), shown in slightly adapted form in Table 1.

Business model innovation

Defining business models and describing their constituent elements has received much interest in academia and belongs to a static view on the concept. However, due to heightening environmental turbulence and transformative developments, recent research has shifted to a more dynamic view on business models (Wirtz *et al.*, 2015). Business model innovation, i.e., "designing a new, or modifying the firm's extant activity system" (Amit and Zott, 2010, p. 2), is important for startups wanting to gain significantly in size as well as for incumbents looking to identify new growth opportunities (Günzel and Holm, 2013). Business model innovations often result in additional yet unused sources of value generation

Table 1. Elements of a business model.

Meta-component	Business model building block	Description
Value proposition	Value propositions	Gives an overall view of a company's bundle of products and services.
Value delivery	Customer segments	An organization serves one or several customer segments.
	Channels	Value propositions are delivered to customers through communication, distribution, and sales channels.
	Customer relationships	Customer relationships are established and maintained with each customer segment.
Value creation	Key resources	Key resources are the assets required to offer and deliver the previously described elements.
	Key activities	Number of key activities performed by key resources.
	Key partnerships	Some activities are outsourced and some resources are acquired outside the enterprise.
Value capture	Revenue streams	Revenue streams result from value propositions successfully offered to customers.
	Cost structure	The business model elements result in the cost structure.

Source: Osterwalder and Pigneur (2010); meta-components renamed according to Günzel and Holm (2013).

(Amit and Zott, 2012). Compared to product innovation, innovations regarding the business model are often harder to replicate (Amit and Zott, 2012) and can therefore be a very strong competitive advantage (Magretta, 2002). At the same time, however, business model innovations of competitors from within and outside the industry can be a major threat to firms who fail to advance their business model in accordance with external changes (Amit and Zott, 2012). For instance, the new business model of no-frills airlines such as Ryanair has changed the rules of competition for the whole airline industry (Demil *et al.*, 2015).

A business model innovation happens when a company modifies or improves one or several elements of its business model (Abdelkafi *et al.*, 2013). Several authors describe the phases of business model innovation. For instance, Frankenberger *et al.* (2013) distinguish among initiation, ideation, integration, and implementation. Schneider and Spieth (2013) mention exploration, exploitation,

and effects, while Osterwalder and Pigneur (2010) discuss the five phases mobilize, understand, design, implement, and manage.

Business model innovation is one of the greatest challenges for today's managers (Chesbrough, 2006). Christensen and Overdorf (2000) demonstrate how established firms fail in disruptive innovation due to conflicts with existing technologies and business models. Chesbrough (2010) argues that it is not only conflict but also confusion that holds managers back from business model innovation, as they fail to recognize proper business models. Bohnsack et al. (2014) point out that path dependency cognitively constrains managers in the sense that they stay close to what they already know when it comes to the design of new business models. These challenges also render the generic phases for business model innovation – independently of their concrete naming and order — of little value if not supplemented by concrete tools and methods. For instance, the identification of new business model ideas will probably not happen by following advice to do so, but rather by applying tools that facilitate creativity. Furthermore, tools are needed to enable experimentation and overcome cognitive biases such as path dependence in decision making (Spieth et al., 2014), as business model innovations have been described as being depended on trial-and-error-learning (Sosna et al., 2010) or discovery-driven approaches (McGrath, 2010). This especially holds true as business environments become more complex and dynamic (El Sawy et al., 2010).

The importance of tools is underlined by several researchers suggesting that tools are at least as important as the people applying them (Garfield et al., 2001). Paradigm-changing ideas in particular — i.e., the more disruptive ones — can be facilitated significantly by the use of creativity tools (Garfield et al., 2001). Furthermore, tools have been proven to be particularly suitable for facilitating group interaction and idea generation during business model innovation (Eppler et al., 2011). There are several tools that can be applied to support one or several phases during business model innovation. For instance, Pynnönen et al. (2012) use the customer value model, the business mapping framework, and group decision-support systems. De Reuver et al. (2013) propose business model road-mapping, which can be used to identify the ideal transition path once the desired business model changes are identified. However, the most popular tools for business model innovation are the business model canvas and business model patterns. Through an experimental study on the effectiveness of the business model canvas for idea generation and group interaction, Eppler et al. (2011) find that it significantly increases collaboration while significantly decreasing creativity. In contrast, business model patterns not only facilitate group interaction (Gassmann et al., 2014) but also promote creativity by thinking in analogies (Johnson, 2010).

Business model patterns

When defining business model patterns, researchers often refer to Christopher Alexander, a famous architect who is considered to be the father of patterns (e.g., Abdelkafi *et al.*, 2013; Amshoff *et al.*, 2015; Osterwalder and Pigneur, 2010). He made several publications on the use of patterns in architecture — most famously, “A Pattern Language” (Alexander *et al.*, 1977), in which he proposes 253 patterns that can be used to design even highly complex architecture. Alexander asserts the following definition: “Each pattern describes a problem which occurs over and over again in our environment, and then describes the core of the solution to that problem, in such a way that you can use this solution a million times over, without ever doing it the same way twice” (Alexander *et al.*, 1977, p. x).

From Alexander’s definition, we can learn three important aspects that also hold true for business model patterns. First, patterns describe a “solution” to a recurring “problem” that needs to be solved, which also accounts to business model patterns (Abdelkafi *et al.*, 2013). For instance, a business model must capture value and therefore requires a pricing strategy for which the pattern *razors/blades* (Johnson, 2010) can be a solution. Second, Alexander notes that a pattern describes “the core of the solution,” which means that a business model pattern often describes a solution for only a certain part of a company’s business model (Weill and Vitale, 2001). Hence, complete business models of companies are often a combination of several patterns (Osterwalder and Pigneur, 2010). Third, a pattern should be usable “a million times over” and therefore requires a certain level of generalization (Amshoff *et al.*, 2015; Timmers, 1998). Accordingly, business model pattern researchers integrate one or several of these three aspects into their definitions (Table 2).

The majority of literature on business model patterns comprises lists of patterns. However, when practitioners and researchers attempt to use these collections in their current form, they face three major challenges: incompleteness, overlap, and inconsistent structure. First, incompleteness means that no single collection of patterns is even close to exhaustive. The most comprehensive collection of business model patterns, from Gassmann *et al.* (2014), contains 55 patterns. But in other collections, more than 100 additional patterns can be found. Therefore, innovators applying patterns from just one source can be sure to miss the majority of business model patterns. Second, existing collections have a significant amount of overlap. For instance, the business model pattern *virtual community* involves creating and facilitating an online community of people by enabling interaction and service provision (Weill and Vitale, 2001). However, several patterns from other collections describe a very similar idea, including *selling experience*, *create user communities*, *user communities*, *community model*, *social networking*

Table 2. Definitions of business model patterns.

Author	Definition
Abdelkafi et al. (2013, p. 14)	“The relationship between a certain context or environment, a recurring problem and the core of its solution”
Amshoff et al. (2015, p. 4)	“Reusing solutions that are documented generally and abstractly in order to make them accessible and applicable to others”
Gassmann et al. (2014, p. 22)	“A specific configuration of the [...] business model dimensions [...] that has proven to be successful”
Osterwalder and Pigneur (2010, p. 55)	“Business models with similar characteristics, similar arrangements of business model Building Blocks, or similar behaviours”
Timmers (1998, p. 4)	“Generalisations of specific business models”
Weill and Vitale (2001, p. 21)	“The essence of a different way to conduct business”

services, community building, and virtual communities (Clemons, 2009; Johnson, 2009, 2010; Rappa, 2001; Strauss and Frost, 2014; Timmers, 1998). Hence, applying several collections simultaneously leads to significant redundancies. Third, the patterns are not structured in a consistent manner. Whereas Eisenmann (2001) presents the patterns without an underlying structure, Linder and Cantrell (2000) group their patterns in eight categories and Timmers (1998) arranges the patterns according to two dimensions. Due to this lack of consistent structure, it is very challenging to navigate through the different collections when attempting to apply them for business model innovation. In particular, this limits the possibility of filtering for business model patterns that address the situation of a specific business model innovation endeavour, which would substantially increase the efficiency and effectiveness of the patterns' usage.

The three issues of existing business model pattern collections — incompleteness, overlap, and inconsistent structure — can, in general, be mitigated by a review. A review summarizes existing literature and thereby “creates a firm foundation for advancing knowledge” (Webster and Watson, 2002, p. xii). However, existing reviews of business model patterns have insufficiently addressed the issues related to existing literature. Most importantly, no review is exhaustive, but even the most comprehensive review (Bonakdar et al., 2013) misses more than two-thirds of the patterns available. Furthermore, the majority of reviews list different patterns but do not systematically analyze the individual patterns by, e.g., highlighting commonalities and differences. This is because existing reviews deal with business models in general or their application to a specific case. Thus, the authors of prior reviews aimed merely to provide a rough overview.

Methodology

Drawing on existing knowledge in the field of business model patterns and the associated gaps in research outlined above, we argue that a meta-perspective serving as a navigator through the business model pattern landscape represents an important contribution but remains missing. The objective of this research was to create such a meta-perspective. Therefore, we proceeded in three major phases, which are further detailed in Table 3. The objective of Phase 1 was to mitigate the incompleteness by systematically identifying and reviewing existing collections, while Phase 2 aimed to remedy the overlap by filtering for duplicates and Phase 3 focused on creating a consistent structure among all patterns.

Table 3. Research design overview.

	Phase 1: Review business model pattern literature	Phase 2: Extract and integrate business model patterns	Phase 3: Structure patterns by impact on business model elements
Objective	Exhaustive overview of business model pattern literature	Integrated list of patterns that is free of duplicates	Consistent structure for navigation through the patterns
Steps	<ul style="list-style-type: none"> ● Search scientific databases (e.g., EBSCO) for articles on business model patterns ● Search for additional articles via forward and backward referencing (Webster and Watson, 2002) ● Systematically analyze original and review articles 	<ul style="list-style-type: none"> ● Extract patterns, descriptions, and examples from original sources into one common database ● Filter for useless patterns ● Filter for duplicates by searching for <ul style="list-style-type: none"> – Identical/similar name – Similar description – Overlapping examples ● For each potential duplicate decide on aggregation by at least two researchers 	<ul style="list-style-type: none"> ● Apply a taxonomy-building methodology to create a consistent structure. (Nickerson <i>et al.</i>, 2013) ● Define a meta-characteristics of the taxonomy ● Run through several iterations until all patterns are classified
Result	22 original and 6 review articles identified	356 business model patterns identified, 182 after filtering	182 patterns classified by affected business model elements

Phase 1: Review business model pattern literature

We searched for relevant literature on business model patterns in several common databases, including EBSCO, Web of Science, and Google Scholar. Because not all authors dealing with the topic use the name “business model patterns,” we also had to search for other terms, including “atomic business models” (Weill and Vitale, 2001, p. 21), “business model analogies” (Johnson, 2010, p. 131), “business models” (Rappa, 2001, p. 1), “operating business models” (Linder and Cantrell, 2000, p. 7), and “profit models” (Tuff and Wunker, 2010, p. 5). The initial sources were supplemented by searching for forward and backward referencing (Webster and Watson, 2002). Literature from academia and practice was likewise included in the search. The scope was on business model pattern collections dealing with generic patterns as well as e-business model patterns. Collections focusing on a single industry were not included in this review (e.g., mobile platform providers (Becker et al., 2012; Ghezzi, 2012), the textile industry (Hodge and Cagle, 2004), project-based firms (Kujala et al., 2010), Spanish industry (Camisón and Villar-López, 2010)). As a result, we identified 22 original collections of business model patterns (see Table 4 in results section) as well as six reviews (see Table 5 in results section), each summarizing several original collections. As we also studied all original collections mentioned in the review articles, we are confident that our sample represents a fairly complete picture of business model patterns mentioned in the existing literature.

Phase 2: Extract and integrate business model patterns

Next, we extracted all 356 patterns mentioned in the 22 collections of business model patterns that were identified in Phase 1 and loaded them into a database. As our data stems from multiple sources, we had to harmonize the format and properly filter the instances (Bauer and Günzel, 2013).

We shortened the description of each pattern to one sentence and ensured that at least one example was provided. If an example was lacking, we manually searched for a company that applied the pattern. We next filtered for useless and duplicate instances. Two patterns — *human creator*, i.e., creating and selling human assets, and *human distributor*, i.e., buying and selling human assets (Weill et al., 2005) — were found to be impossible because they are illegal. Therefore, we removed them from the database. Furthermore, we identified potential duplicate patterns by comparing names, sample companies, and descriptions. For instance, the pattern name *mass customization* occurs in the collection of Gassmann et al. (2014) as well as Strauss and Frost (2014). According to Gassmann et al. (2014, p. 352), the pattern means that “individual customer needs can be met under mass production conditions and at competitive prices.” Strauss and Frost (2014, p. 58) maintain that

mass customization allows one to “customize products and communication on an individual basis for a large number of people.” After two researchers were unable to identify any significant differences between the two descriptions, the two patterns were merged to one instance within the database. Furthermore, we found that Gassmann *et al.* (2014) mention Dell as an example of a company that implemented the pattern. Because Dell is also provided as example for the pattern *mass-customized commodity* from Linder and Cantrell (2000), we considered this pattern to also be a potential duplicate. Linder and Cantrell (2000, p. 7) describe the pattern as one that “offer[s] ‘have it your way’ model options on top of competitive prices, convenient buying, and fast delivery to win in commodity markets.” We agreed to also consolidate this pattern with the other two, thus condensing all three instances to the pattern *mass customization* within the database. However, the original sources (i.e., Gassmann *et al.*, 2014; Linder and Cantrell, 2000; Strauss and Frost, 2014) and alternative names (i.e., *mass-customized commodity*) are still directly linked to the pattern. Using the same approach, we summarized a total of 172 duplicate business model patterns, resulting in a final list of 182 patterns (see Appendix A).

Phase 3: Structure patterns by impact on business model elements

The objective of the third phase was to develop a consistent structure for better navigation through existing business model patterns. To do so, we classified patterns with similar characteristics into common groups, i.e., we developed a taxonomy (Nickerson *et al.*, 2013). Thereby, the homogeneity of objects (i.e., business model patterns) within a group had to be maximized while the heterogeneity between groups had to be minimized (Bailey, 1994). As taxonomy research often lacks a profound methodology (Nickerson *et al.*, 2013), we applied the taxonomy-building approach from Nickerson *et al.* (2013). Their approach has been proven by its successful application (e.g., Geiger *et al.*, 2012; Haas *et al.*, 2014; Nakatsu *et al.*, 2014), its rigor in clearly defining all necessary steps and the ending conditions, and its flexibility in comparison to most other approaches because it integrates empirical and conceptual research into one methodology. Hence, “readers of papers that present taxonomies developed using [the] method can also be reasonably confident that the taxonomy presented was developed in an established way” (Nickerson *et al.*, 2013, p. 354).

The taxonomy development method from Nickerson *et al.* (2013) contains seven steps, which typically include several iterations (Fig. 1). The first step is to define a meta-characteristic directly addressing the purpose of the taxonomy. The meta-characteristic must reflect the interests of the users of the taxonomy. All characteristics defined later must be logical consequences of the meta-characteristic.

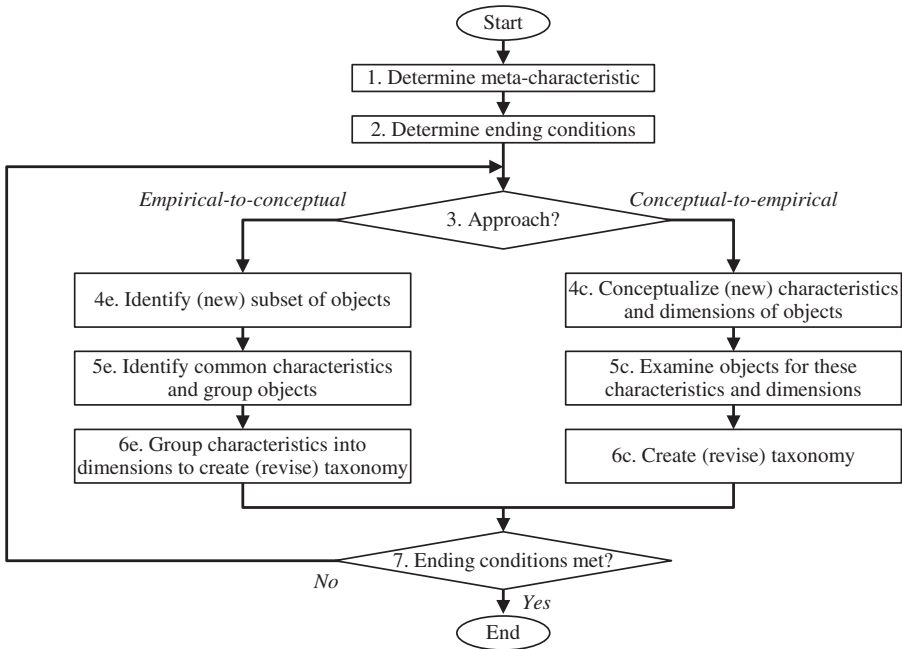


Fig. 1. Taxonomy development method (Nickerson et al., 2013, p. 345).

Second, the ending conditions must be defined. The methodology then runs through several iterations. These iterations can either be empirical-to-conceptual, in which case common characteristics for selected objects are identified and grouped into dimensions with corresponding characteristics, or conceptual-to-empirical, which means that dimensions and characteristics are derived from theory and evaluated by objects that fulfil these characteristics. During these iterations, it is important to understand that the characteristics must be mutually exclusive and collectively exhaustive, meaning that each object can be assigned to exactly one characteristic for each dimension. As we will later see, this rule sometimes makes it necessary to split one existing dimension into two or more new dimensions because otherwise some objects (i.e., patterns in our case) would have more than one characteristic for the same dimension. The iterations end when the previously defined ending conditions are met.

We applied the taxonomy development method to our data sample of 182 business model patterns that we identified and integrated in the Phases 1 and 2. We first defined the meta-characteristic as the impact of the pattern on a business model’s elements (e.g., the value proposition). Second, we adopted the eight objective ending conditions and five subjective ending conditions proposed by Nickerson et al. (2013) (Appendix B). Afterwards we ran through five iterations, which we have summarized in Fig. 2.

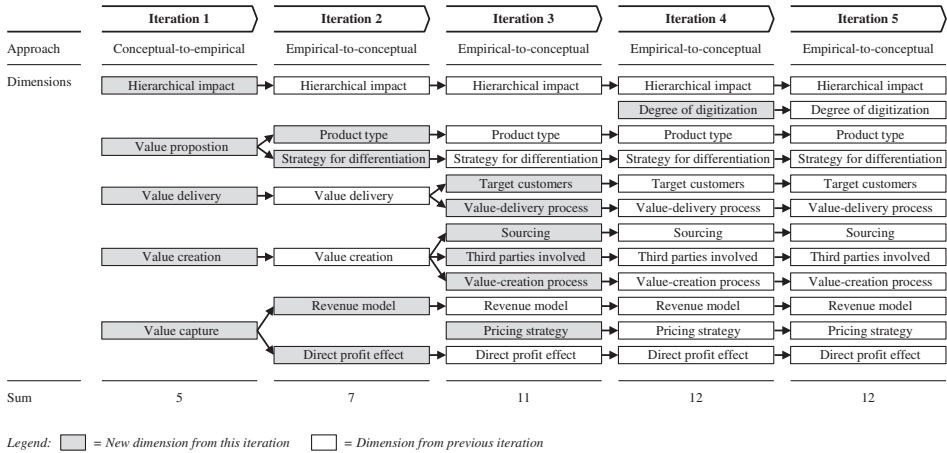


Fig. 2. Development of dimensions for the business model pattern taxonomy.

We first decided on a conceptual-to-empirical iteration and defined five new dimensions. Based on Amshoff *et al.* (2015) and Strauss and Frost (2014), who found that business model patterns affect different hierarchical levels, we defined the first dimension as a hierarchical level of impact, which can either be the holistic business model, i.e., prototypical business model patterns, or business model building blocks, i.e., solution patterns. Furthermore, the meta-characteristic required us to determine which business model elements were affected by the application of a pattern. Therefore, we added four additional dimensions reflecting the four business model components from Table 1: value proposition, value delivery, value creation, and value capture. Afterwards, we examined patterns from our sample that addressed these dimensions. The pattern *solution provider* is a prototypical pattern addressing the whole business model, whereas the pattern *razors/blades* is a prototypical pattern that addresses only certain elements. Furthermore, the pattern *razors/blades* affects the value proposition dimension (by offering cheap prices) and the value capture dimension (as it describes a pricing strategy). In addition to these two patterns, we found that the pattern *disintermediation* addresses the value delivery dimension (as it defines a new sales model) while the pattern *from push-to-pull* impacts the value creation dimension (as it involves a new manufacturing methodology).

As the second iteration, we chose an empirical-to-conceptual cycle and added all patterns from the three sources containing general, prototypical patterns (Andrew and Sirkin, 2006; Chatterjee, 2013; Weill *et al.*, 2005). To adequately classify these instances and at the same time assure mutual exclusiveness and collective exhaustiveness, we had to split the dimension value proposition. For instance, some patterns describe different product types offered (e.g., *physical*

landlord and *financial landlord*), whereas other patterns describe different strategies for differentiation (e.g., *perceived value-based* and *brokerage*). Therefore, we split the dimension value proposition into two new dimensions: product type (adopted from Weill *et al.*, 2005) and strategy for differentiation. For the same reason, we also split the value capture dimension by type of revenue model and impact on the profit.

In the third iteration, we again ran through an empirical-to-conceptual cycle and classified all the remaining sources with general patterns (Gassmann *et al.*, 2014; Johnson, 2009, 2010; Linder and Cantrell, 2000; Osterwalder and Pigneur, 2010; Tuff and Wunker, 2010). To adequately classify these patterns, we split the dimension value delivery into target customers and value-delivery process; the dimension value creation was divided into sourcing, third-party involvement, and value-creation process. Furthermore, we added the dimension pricing strategy.

During the fourth empirical-to-conceptual iteration, we added those e-business patterns whose initial version stems from the internet boom that occurred around the 2000s (Applegate, 2001; Bienstock *et al.*, 2002; Eisenmann, 2001; Hanson, 2000; Hartman *et al.*, 2000; Rappa, 2001; Strauss and Frost, 2014; Tapscott *et al.*, 2000; Timmers, 1998; Weill and Vitale, 2001). To better distinguish these patterns from the previous ones, we included the dimension degree of digitization.

Finally, we added the remaining sources that contain e-business patterns from recent years (Clemons, 2009; Fleisch *et al.*, 2014; Wirtz *et al.*, 2010). At this point, we did not have to add any new dimensions or characteristics and had fulfilled all objective and subjective ending conditions; hence, we conducted no further iterations.

Further details on each step are provided in Appendix C, with the iterations shown in the first column. The final taxonomy contains 12 dimensions, each having between two and seven characteristics, which are further elaborated upon in the results.

Results

In this section, we successively present and explain the results of the three steps of our methodological approach: an overview of business model pattern literature, an integrated list of existing business model patterns, and a taxonomy structuring the patterns by their impact on a business model.

Overview of business model pattern literature

As described above, we identified 22 original articles as well as six reviews on business model patterns. Original sources of business model patterns identify new

patterns and typically provide a description and one or several examples for each pattern. The 22 original sources contain more than 300 business model patterns (Table 4). Roughly two-thirds of the patterns relate to general businesses, while one-third specifically addresses electronic (e-)businesses. The patterns differ by their granularity, as they can either be prototypes of a company's business model or solution patterns addressing very specific aspects of a business model (Amshoff *et al.*, 2015). While not all authors provide further details on the applied research methodology, those who do either apply conceptual research, e.g., identify patterns along the value chain, or empirical analyses of real-world business models. Within their articles, the authors supply different approaches to structure the patterns. The first group – mostly those presenting fewer than 10 patterns – arranges the patterns in random order. The second group arranges the patterns alphabetically, and the third group clusters the patterns according to several categories without providing further details on the underlying criteria for clustering. The fourth group comprises authors who explicitly use one or several dimensions to structure the patterns. For instance, Timmers (1998) arranges the patterns by degree of functional integration and degree of innovation, whereas Weill *et al.* (2005) use the rights to be sold (i.e., creator, distributor, landlord, broker) and the type of asset involved (i.e., financial, physical, intangible, human). This group also includes Gassmann *et al.* (2014), who supplement their alphabetical list with a mapping of each pattern on the affected business model components.

In addition, we identified six reviews of business model patterns, each summarizing the patterns of several original sources (Table 5). The most exhaustive review, from Bonakdar *et al.* (2013), includes 13 original sources and 94 patterns. In contrast to the other reviews, this review also includes industry-specific patterns. Three of the six review articles filter for duplicate patterns (Abdelkafi *et al.*, 2013; Afuah and Tucci, 2000; Lam and Harrison-Walker, 2003), whereas the others present all patterns that are mentioned in the original sources under investigation. Most reviews structure the patterns by author of the original source. An exception are Lam and Harrison-Walker (2003) arranging the patterns by their relational objectives (i.e., direct access, network development, corporate communications) and their value-based objectives (i.e., financial improvement, product/channel enrichment) as well as Abdelkafi *et al.* (2013) mapping each pattern with the affected business model dimensions.

As we are also conducting a review with this research, we added it to Table 5 (last row). Our review covers all 356 patterns mentioned in the 22 original sources from Table 4. Thus, to the best of our knowledge, our review is significantly more comprehensive than any other review to date has been. Furthermore, the patterns were filtered for duplicates and organized along multiple dimensions. We elaborate on both aspects below.

Table 4. Original sources of business model patterns.

Source	Number of patterns	Industry focus	Pattern granularity	Research methodology	Patterns structured by
Andrew and Sirkim (2006)	3	General	Prototypical patterns	n.a.	n.a.
Applegate (2001)	24	E-business	Prototypical patterns	Conceptual, along the value chain	6 categories
Bienstock et al. (2002)	11	E-business	Mixed	Empirical, taxonomy through analysis of 400 websites	6 dimensions: number of buyers, number of sellers, type of seller, price mechanism, nature of product, frequency of offering
Chatterjee (2013)	4	General	Prototypical patterns	Conceptual, Porter's generic strategies	2 dimensions: efficiency vs. perceived value, individual firm vs. network
Clemons (2009)	9	E-business	Mixed	n.a.	2 categories
Eisenmann (2001)	8	E-business	Prototypical patterns	n.a.	n.a.
Fleisch et al. (2014)	8	E-business	Solution patterns	Conceptual, transfer of existing patterns to the Internet of Things	2 categories (which are included here as patterns themselves)
Gassmann et al. (2014)	55	General	Mixed	Empirical, recurring patterns of success at 237 business model innovations	Alphabetical order, supplemented by mapping on affected business model dimension
Hanson (2000)	18	E-business	Mixed	n.a.	5 categories
Hartman et al. (2000)	5	E-business	Prototypical patterns	n.a.	n.a.
Johnson (2009)	20	General	Solution patterns	n.a.	Alphabetical order
Johnson (2010)	19	General	Solution patterns	n.a.	Alphabetical order
Linder and Cantrell (2000)	34	General	Mixed	n.a.	8 categories
Osterwalder and Pigneur (2010)	5	General	Mixed	n.a.	n.a.

Table 4. (Continued)

Source	Number of patterns	Industry focus	Pattern granularity	Research methodology	Patterns structured by
Rappa (2001)	50	E-business	Mixed	n.a.	9 categories (which are included here as patterns themselves)
Strauss and Frost (2014)	20	E-business	Mixed	n.a.	1 dimensions: level of business impact
Tapscott <i>et al.</i> (2000)	5	E-business	Prototypical patterns	Empirical, analysis of more than 200 case studies	2 dimensions: economic control, value integration
Timmers (1998)	10	E-business	Mixed	Conceptual, along the value chain	2 dimensions: functional integration, degree of innovation
Tuff and Wunker (2010)	20	General	Mixed	Empirical, recurring patterns of success in sample of more than 5,000 innovations	Alphabetical order
Weill and Vitale (2001)	8	E-business	Mixed	Empirical, from consulting work	Alphabetical order
Weill <i>et al.</i> (2005)	16	General	Prototypical patterns	Conceptual, possible combinations along two dimensions	2 dimensions: rights being sold, type of asset involved
Wirtz <i>et al.</i> (2010)	4	E-business	Prototypical patterns	n.a.	n.a.
Sum	356				

Table 5. Reviews of business model pattern literature.

Author	Original sources in scope	Number of patterns	Industry focus	Filtered for duplicates	Patterns structured by
Abdelkafi et al. (2013)	Andrew and Sirkin (2006) Johnson (2009) Johnson (2010) Osterwalder and Pigneur (2010) Weill et al. (2005)	49	General	Yes	Author, supplement-ed by mapping on affected business model dimension
Afiah and Tucci (2000)	Rappa (2001) Timmers (1998)	9	E-Business	Yes	n.a.
Bonakdar et al. (2013)	Becker et al. (2012) Bienstock et al. (2002) Camisón and Villar-López (2010) Chatterjee (2013) Ghezzi (2012) Hodge and Cagle (2004) Kujala et al. (2010) Linder and Cantrell (2000) Rappa (2001) Tapscott et al. (2000) Timmers (1998) Weill and Vitale (2001) Weill et al. (2005)	94	General, e-business, mobile platforms, textile industry, project-based firms, and the Spanish industry	No	Author
Hedman and Kalling (2003)	Applegate (2001) Rappa (2001) Timmers (1998)	43	E-Business	No	Author

Table 5. (Continued)

Author	Original sources in scope	Number of patterns	Industry focus	Filtered for duplicates	Patterns structured by
Lam and Harrison-Walker (2003)	Afuah and Tucci (2000) Eisenmann (2001) Hanson (2000) Rappa (2001) Strauss and Frost (2014)	33	E-Business	Yes	2 dimensions: relational objectives, value-based objectives
Zott <i>et al.</i> (2010)	Applegate (2001) Rappa (2001) Tapscott <i>et al.</i> (2000) Timmers (1998) Weill and Vitale (2001)	37	E-Business	No	Author
This research	All 22 sources from Table 4	356 (182 after filtering)	General and e-business	Yes	Multiple dimensions that describe the impact of pattern application

Integrated list of business model patterns

The result of our second research phase is a database with 182 business model patterns. The database contains all generic and e-business-specific business model patterns that were identified through a comprehensive literature review. Each pattern in the database is described with further details. For instance, the database contains the following information for the pattern *razors/blades*:

- Pattern name: *Razors/blades*
- Alternative pattern names: *Cellphone, razor and blade*
- Description: Offer a cheap or free basic product (“razor”) together with complements (“blades”) that are overpriced and thereby subsidize the basic product
- Examples: Gillette, Nespresso, Amazon Kindle
- Sources: Gassmann et al. (2014), Johnson (2009), Johnson (2010), Linder and Cantrell (2000)

The full list can be found in [Appendix A](#). Although the database already solves two important shortcomings of the existing literature — it is exhaustive and free of duplicates — its practical application would still be difficult as the simultaneous application of 182 patterns for business model innovation is likely to be overwhelming unless the relevant subset of patterns for a specific endeavour can be identified. In the next part we explain the taxonomy remedying this issue.

Taxonomy of business model patterns

The patterns in the database are classified along the 12 dimensions of the taxonomy. Each pattern is assigned to exactly one characteristic for each of the 12 dimensions. [Figure 3](#) visualizes the 12 dimensions and possible characteristics as a multidimensional matrix, which can also be referred to as a morphological box (Zwicky, 1967). The dimensions (D) are grouped by those that are overarching (D1–D2) and those affecting a specific business model component, i.e., value proposition (D3–D4), value delivery (D5–D6), value creation (D7–D9), and value capture (D10–D12), all of which are elaborated upon below.

The overarching dimensions describe aspects affecting several business model components simultaneously. The first dimension, hierarchical impact (D1), distinguishes whether a business model pattern describes a prototypical business model (e.g., *financial trader*) or a solution pattern (e.g., *channel maximization*). Prototypical patterns describe the general set-up of a company’s business model, whereas solution patterns imply actions to change only sub-aspects of it. Furthermore, the patterns differ by their degree of digitization (D2). For instance, *online brokers*, such as Airbnb, employ purely digital business models in which

	Dimension (D)	Characteristics per dimension (number of patterns per characteristic)									
Overarching	D1: Hierarchical impact	Prototypical pattern (87)					Solution pattern (95)				
	D2: Degree of digitization	Purely digital (55)			Digitally enabled (35)			Not necessarily digital (92)			
Value proposition	D3: Product type	Physical (12)	Financial (7)	Human (5)	Intellectual property (36)	Hybrid (10)	Product type not specified (112)				
	D4: Strategy for differentiation	Quality (9)	Customization (8)	Combination (13)	Access/convenience (6)	Price (22)	Network effects (11)	No impact on differentiation (113)			
Value delivery	D5: Target customers	Specific new customer segment (10)		Lock-in existing customers (9)		Other companies (B2B) (7)		No impact on target customers (156)			
	D6: Value-delivery process	Brand and marketing (7)	Sales channel (20)		Sales model (9)		Customer relationship management (3)		No impact on delivery process (143)		
Value creation	D7: Sourcing	Make (17)			Buy (11)			No impact on sourcing (154)			
	D8: Third parties involved	Suppliers (9)	Customers (12)		Competitors (3)		Multiple parties (18)		No impact on third parties involved (140)		
	D9: Value-creation process	Research and design (7)	Supply (5)		Production (8)		Multiple steps (11)		No impact on creation process (151)		
Value capture	D10: Revenue model	Sell (15)	Lend (20)		Intermediate (18)		Advertising (12)		No impact on revenue model (117)		
	D11: Pricing strategy	Premium (11)	Cheap (9)		Dynamic (12)		Non-transparent (8)		No impact on pricing strategy (142)		
	D12: Direct profit effect	Increase revenue (42)		Reduce cost (15)		Multiple effects (11)			No direct profit impact (114)		

Fig. 3. Dimensions, characteristics, and number of business model patterns per characteristic.

the operator is not required to own major physical assets. *E-retailers*, such as Amazon, buy large amounts of physical products and thus do not employ purely digital business models. However, as they sell everything online, they still depend on digital technologies and are thus digitally enabled. In contrast, the basic business model of *physical manufacturers*, such as Pepsi, does not necessarily depend on digital technologies.

Patterns affect the value proposition in terms of either the type of product offered (D3) or the strategy for differentiation (D4). Product types can be physical (e.g., *physical manufacturer*), financial (e.g., *financial broker*), human (e.g., *advisors*), intellectual property (e.g., *information collection*), or hybrid (e.g., *physical freemium*). Differentiation is then possible by quality (e.g., *quality selling*), customization (e.g., *mass customization*), combined offering (e.g., *bundle elements together*), convenience (e.g., *one-stop convenient shopping*), price (e.g., *low-touch approach*), or network effects (e.g., *multi-sided platforms*).

Value delivery is affected by either the target customers in focus (D5) or the process of value delivery (D6). Some patterns propose focusing on a specific new customer segment (e.g., *own the undesirable*), while others suggest locking in existing customers (e.g., *digital lock-in*) or focusing exclusively on business-to-business (B2B) customers (e.g., *value chain service provider*). The value-delivery process may be affected regarding brand and marketing (e.g., *cool brands*), sales channels (e.g., *bricks + clicks*), sales model (e.g., *disintermediation*), or customer relationship management (e.g., *customer loyalty*).

Patterns affect value creation in terms of sourcing (D7), third-party involvement (D8), and the process of value creation (D9). Some patterns explicitly require internal production, i.e., make (e.g., *entrepreneur*), whereas others propose purchasing the products or services externally (e.g., *physical wholesaler*). Some patterns depend on third-party involvement, such as suppliers (e.g., *from push to pull*), customers (e.g., *user designed*), competitors (e.g., *forced scarcity*), or multiple parties (e.g., *collaboration platforms*). The value-creation process can be affected in terms of innovation (e.g., *open business models*), supply (e.g., *e-procurement*), production (e.g., *self-service*), or multiple steps (e.g., *orchestrator*).

The fourth business model component, value capture, is addressed by patterns regarding the revenue model (D10), pricing strategy (D11), or profit (D12). The proposed revenue models can be summarized as selling (e.g., *product sales*), lending (e.g., *rent instead of buy*), intermediation (e.g., *broker model*), or advertising (e.g., *free*), while the proposed pricing strategies are premium (e.g., *experience destination*), cheap (e.g., *one-stop, low price shopping*), dynamic (e.g., *auction*), or non-transparent (e.g., *razors/blades*). Patterns may directly impact profit either by aiming to increase revenues (e.g., *channel maximization*) or reduce costs (e.g., *self-service*) or by multiple effects (e.g., *user designed*).

Application of the Database for Business Model Innovation

In business model innovation endeavours, the simultaneous application of all 182 identified patterns would be rather overwhelming. Even lists from single authors such as Gassmann et al. (2014) with 55 patterns, Rappa (2001) with 50 patterns, or Linder and Cantrell (2000) with 34 patterns can lead to a quite complex and unfocused process. The business model pattern database reduces this complexity significantly, as it helps to identify the relevant set of patterns for a specific purpose depending on the specific situation of the innovating firm. For instance, the database can be used to identify relevant patterns for the integration of a rough business idea or technological innovation into a complete business model. In contrast, prior business model pattern literature has mainly applied patterns during

the first phases of the business model innovation process, i.e., to analyze existing business models (e.g., Weill *et al.*, 2005) or for the generation of new business ideas (e.g., Gassmann *et al.*, 2014).

To demonstrate the different uses of the database, we refer to the business model innovation phases explained by Frankenberger *et al.* (2013), spanning across initiation, ideation, integration, and implementation. During initiation, the database aids in better understanding existing business models by guiding the identification of patterns currently employed. In the next step, ideation, the database allows for systematic generation of ideas through transferring patterns to the focal company. During integration, the database enables the development of complete business models by revealing patterns that can be combined with the initial ideas. Finally, during implementation, the database serves as a glossary, linking to additional information for the successful execution of each pattern. Table 6 summarizes the objective of each phase, the role of the business model pattern database, and the results from its application.

In the following we outline generic instructions on how to use the business model pattern database during each phase. For simplicity, we present the phases sequentially, even though iterations between phases (Frankenberger *et al.*, 2013) and parallelization of phases (Osterwalder and Pigneur, 2010) are necessary. Furthermore, business model innovation itself is not a one-time project, but an iterative process that must be anchored within every sustainable organization (Osterwalder and Pigneur, 2010).

Initiation

The objective of the initiation phase is to better understand the innovating firm's own business model as well as the surrounding ecosystem (Frankenberger *et al.*, 2013). Furthermore, emerging technological, social, environmental, and organizational trends that might require business model change must be understood (Demil and Lecocq, 2010). During this phase, business model patterns can be used to make the underlying business logics of the company, its partners, and its competitors more transparent (Tuff and Wunker, 2010).

Using the taxonomy structure of the database, one can identify the patterns implemented in the focal company's business model. To guide this process, the following questions (amongst others) may be useful: What is the current strategy for differentiation (D4)? Which third parties are directly involved in value creation (D8)? How are revenues generated (D10)? Once the patterns implemented in the current business model have been identified, they can be used to gain further insights: Have competitors implemented identical or different patterns? Which companies from other industries have implemented similar patterns? What can be

Table 6. Usage of the pattern database during the business model innovation process.

	1. Initiation	2. Ideation	3. Integration	4. Implementation
Objective of the phase	Understand own business model and its surrounding ecosystem	Identify new ideas for business model innovation	Integrate ideas into a complete business model	Pilot and commercialize the designed business model
Role of the business model pattern database	Identification of currently implemented patterns in the focal firm's ecosystem	Iterative cycle of structure (select dimension for innovation) and creativity (transfer patterns to own business model)	Systematic generation of opportunities to specify the missing business model dimensions through additional patterns	Glossary for relevant background information and cases for implementation of involved patterns
Results from application of the database	Overview of patterns employed in own business model and differences compared to competitors	List of several business model ideas (i.e., patterns and a description of how to transfer them)	Specified business model by combining several patterns	Success factors from prior implementations of the pattern

Source: Phases adapted from [Frankenberger et al. \(2013\)](#).

learned from these companies? Thus, by using the database, an analysis can be conducted along the different dimensions, which is structured and systematic but also flexible enough to account for the specific situation of the respective firm.

Ideation

The ideation phase aims to identify ideas for new business models (Frankenberger *et al.*, 2013). From an analysis of 14 innovation cases, Frankenberger *et al.* (2013) found three recurring challenges hindering the generation of new ideas: resistance in overcoming the existing business logic, not thinking in terms of business models, and the absence of creativity tools supporting this process. Business model patterns mitigate all three challenges. They aid in breaking with the current business logic (Tuff and Wunker, 2010), already reflect the most critical elements of a business model (Weill and Vitale, 2001), and boost creativity by thinking in analogies with other industries (Johnson, 2010).

The database allows for the identification of the relevant subset of patterns for an effective idea generation process. To do so, the results from the prior initiation phase can be used. For instance, do the technological, social, environmental, or organizational trends have a particularly strong impact on any business model component? Which dimension of the firm's own business model has been identified as the weakest? On which dimensions have competitors innovated their business models? Is a new strategy for differentiation required (D4)? Does the current business model generate sufficient profits (D12)? As these questions already indicate, the ideation phase typically requires several iterations. It has therefore proven most efficient to alternate between two steps. First, one should select of a subset of patterns from the database by filtering for the corresponding dimensions and characteristics that these should address. Second, one should try to transfer each pattern to the focal company during a brainstorming phase. After each iteration, the best patterns and descriptions of how to transfer them are logged into a continuously growing list of options for business model innovation.

Integration

Business model patterns only describe the configuration of specific elements of a business model (Abdelkafi *et al.*, 2013). Therefore, during integration, the most promising ideas collected in the previous phase must be further developed into complete business models (Frankenberger *et al.*, 2013), which requires the specification of all business model dimensions (Gassmann *et al.*, 2014).

The dimensions (D3–D12) of the database taxonomy serve as a checklist to assure that value proposition, value delivery, value creation, and value capture

were sufficiently specified. As the patterns on the idea list from the previous phase are already mapped on these dimensions, the missing pieces for each idea become transparent. They can now be specified by searching the database for additional patterns that address these missing dimensions. Of course, the missing dimensions could also be specified manually, but the search for additional patterns and the combination of these patterns with the initial idea results in more sophisticated innovations.

Implementation

The former three phases – initiation, ideation, and integration — all target the design of a new business model, while the objective of the implementation phase is to commercialize this new business model (Frankenberger *et al.*, 2013). Therefore, projects must be initiated, milestones defined, a new organizational structure set up, budget allocated, and so on (Osterwalder and Pigneur, 2010). To reduce implementation risks, one can use experimentation, trial-and-error learning, and pilots (Sosna *et al.*, 2010).

The translation of business model designs into concrete activities can be better performed by using further tools, such as De Reuver *et al.* (2013) business model roadmapping approach. Nonetheless, the business model pattern database provides valuable information as input for this process, as patterns are derived from successful implementations that can provide insights on success factors. In this phase, guiding questions might include the following: How are the patterns typically implemented? Which steps have other companies taken to implement them? What were the critical factors for their successful implementation? For each pattern the database directly refers to several sample companies that have implemented the pattern as well as to the authors that have identified the pattern, who often provide further useful information and sources.

Illustrative Case Study

To further clarify the instructions on using the pattern database during the business model innovation process, we found it useful to provide a simplified, anonymized case study. Automotive Aftermarket Inc., which is a division of a multinational company, produces spare parts and primarily sells them to car repair shops. The rather broad product portfolio of Automotive Aftermarket Inc. includes more traditional spare parts, such as windscreen wipers or headlights, but also electronics, such as sensors or actuators, and connectivity appliances, such as Bluetooth connectors for cars.

The company was facing increasing pressure from new competitors for several of its products. Furthermore, market research revealed that technological and social trends will reduce car use and car ownership in future, leading to a threatening decline of the overall market. Therefore, Automotive Aftermarket Inc. has initiated a business model innovation project with the objective of identifying new business models better addressing the assumed changes in future consumer preferences. The company assumed its competencies in electronics and connectivity appliances an important facilitator for this, even though it was not mandatory for the new business models to be directly related to them.

Initiation

The initial business model of Automotive Aftermarket Inc. was to sell high quality spare parts. Surveying the database for such patterns (D4: strategy for differentiation = quality) revealed that the company has implemented the *premium* pattern, gaining higher margins than its competitors. These high prices were enabled from having implemented the pattern *ingredient branding*, i.e. consequently branding the spare parts to make customers aware of brand and quality (D6: value delivery process = brand and marketing). In contrast, most competitors – often from Asia – focused on *cost leadership* for well-delimited product segments (D4: strategy for differentiation = price).

Ideation

The innovation process targeted the identification of completely new business models. Due to the increasing importance of digital technologies for the automotive sector, Automotive Aftermarket Inc.'s wanted to further strengthen its digital capabilities. Therefore, the first database query was used to identify generic business models (D1: hierarchical impact = prototypical pattern) that were purely digital or digitally enabled (D2: degree of digitization = purely digital OR digitally enabled). One idea then was to adopt the pattern *multi-sided platform* by creating an integrated mobility platform for urban mobility, allowing customers to compare and book different transport modes by integrating multiple transportation service providers. Ideas from other iterations included the adoption of the *marketplace exchange* pattern for intermediating between spare parts manufacturers and repair shops, the *financial landlord* pattern to offer car insurance by using car connectivity sticks that the company was already selling, the *sensor as a service* pattern for the collection and sale of data from the sensors that the company was producing for cars, and the *peer-to-peer* pattern for building a new peer-to-peer car sharing service.

Integration

Automotive Aftermarket Inc. decided to further specify the integrated mobility portal business model, which was identified by adopting the pattern *multi-sided platform*. *Multi-sided platform* is a prototypical pattern (D1) that is typically purely digital (D2). It uses network effects as a differentiation strategy (D4), i.e., more customers will make the platform more attractive for transportation service providers and vice versa. To specify the other business model dimensions, further patterns from the database were identified and integrated in a more complete business model: The pattern *long tail* meant that the platform should primarily address customers who plan non-recurring trips – not, for instance, daily commuters. The pattern *customer loyalty* led to the idea of combining the platform with a reward program, while *white label* resulted in the plan to allow the local authorities to co-brand the platform. The pattern *brokerage* was adapted to define the revenue model via intermediation fees, which should be supplemented by *contextual mobile advertising*, for which the target location of each customer could be used. As a pricing strategy, it was decided to also offer *flat-rates* with different travel volumes. Finally, the business model dimensions that were still insufficiently defined (e.g., D3: the precise products and services to be offered) were specified manually.

Implementation

In the case of Automotive Aftermarket Inc., the integrated mobility portal was piloted in one city in a joint effort with the local authority. The database had revealed some valuable information for the implementation of this pilot. For instance, [Osterwalder and Pigneur \(2010\)](#) explain that the implementation of the pattern *multi-sided platform* often involves a chicken-and-egg problem and therefore may require the subsidization of a customer segment. One sample company that successfully implemented the *multi-sided platform* pattern is Metro Newspaper: The free newspaper attracted a large readership immediately after its launch, which made it very attractive for advertisers and led to rapid profitability ([Osterwalder and Pigneur, 2010](#)). This example strengthened the idea of offering the portal to travellers for free but charging fees from advertisers and, in a second stage, from transportation service providers.

Limitations of the Research

Our research is subject to limitations. First, taxonomies — in our case, the classification of business model patterns — cannot be universally perfect, but in the

best scenario are a useful solution to a specific problem (Nickerson *et al.*, 2013). We argue that our taxonomy is useful for the specific challenges of business model innovators when attempting to apply business model patterns, because the taxonomy classifies the patterns by their impacts on the business model (which we chose as meta-characteristic of the taxonomy). Furthermore, a comparison of our taxonomy with research on business model components (e.g., Abdelkafi *et al.*, 2013; Gordijn *et al.*, 2005; Osterwalder and Pigneur, 2010; Teece, 2010) shows that most of our dimensions and characteristics can be found in these sources. However, we did not merely copy or combine existing business model concepts but rather derived the dimensions and characteristics from analyzing hundreds of successfully executed examples of business model innovation, i.e., business model patterns. Therefore, our taxonomy is not only useful for classifying business model patterns but also a business model concept describing the most important dimensions and characteristics for configuring a business model. Second, we summarized more than 100 instances of business model patterns as duplicates. However, even when two patterns possess similar names, their original descriptions might differ slightly. We could have easily avoided this issue by not filtering for duplicates, but we are convinced that the benefit of not having to review identical or very similar patterns multiple times outweighs this disadvantage. Third, the mapping of each pattern on the taxonomy dimensions might be biased due to the subjective interpretations of the researchers. To avoid such bias, two researchers discussed each rating. Furthermore, we conducted several cross-checks by, for instance, comparing all patterns that were assigned to the same characteristic of each dimension. Fourth, we do not consider our database to be an algorithm for business model innovation but rather a heuristic tool to support a systematic process. Hence, the database is not an automatic decision support system that determines which pattern is the best; instead, it reveals potential solutions for a specific situation. The selection of the best patterns for a company's specific situation, however, requires the expertise of managers who also must consider other factors, such as the company's business strategy or the competitive landscape (Amshoff *et al.*, 2015). In addition to expertise, the business model innovation process also requires significant amounts of creativity and experimentation. Some potentially effective patterns might not immediately appear attractive, while some patterns initially appearing attractive might fail to deliver the desired outcomes. Finally, although we have demonstrated the usefulness of the tool developed in all four generic phases of the business model innovation process (Frankenberger *et al.*, 2013), we also want to stress that business model patterns primarily serve as tools for designing the front-end of a business model, i.e., defining the necessary changes. The translation of these changes into concrete activities and a transition path is no less important and can be better supported by

other tools, such as De Reuver et al.'s (2013) business model roadmapping. Therefore, our approach must be regarded not as a substitute but rather a complement to these existing tools.

Future Research Opportunities

We see two important future research opportunities arising directly from this research. First, only one original source of business model patterns (Fleisch et al., 2014) comes from within the last three years. However, we are facing a new wave of digital transformation due to recent advances in digital technologies (Porter and Heppelmann, 2014). Hence, the identification of new digital business model patterns evolving from this transformation can make an important contribution for theory and practice. Our business model pattern database provides a good structure for systematically integrating these new patterns with existing research. Second, the database presents a solid foundation for applying business model patterns to a specific industry and identifying potential future business models. For instance, Abdelkafi et al. (2013) transfer business model patterns to e-mobility and identify several cutting-edge opportunities for new business models. In the future, the database of business model patterns could be transferred to other industries that are also undergoing fundamental changes, such as automotive, transportation, health, energy, buildings, or machinery.

Conclusion

The objective of this research was to make the valuable existing knowledge of business model patterns more accessible for both practical application as well as theoretic enhancements of the concept. We addressed several shortcomings of the existing literature. Our review sheds light on the often confusing and contradictory use of the business model pattern concept. It is the first of its kind, because it does not limit its scope to a subset of authors or disciplines. The review integrates concepts from theory with those from practitioners while advancing existing knowledge by systematically structuring the business model pattern landscape. Furthermore, the business model pattern database developed is a ready-to-use tool for business model innovators. The database clearly describes 182 patterns and immediately reveals the relevant set of patterns for a specific effect on the business model. In addition, the database can be integrated into the business model innovation process. Hence, we hope for the innovation of many future business models through the application of the business model pattern database as well as the identification of further patterns that could be added to the database in future.

Appendix A. Integrated List of Business Model Patterns

Pattern name (other names) [manually added description]	Description	Selected example(s)	Source(s)
Add-on	Offer a basic product at a competitive price and charge for several extras	Ryanair, SAP, Sega	Gassmann <i>et al.</i> (2014)
Advertising model (ad-supported, content sponsorship, hidden revenues)	Provide a product or service and mix it with advertising messages	Google, Zattoo, Spotify	Gassmann <i>et al.</i> (2014), Hanson (2000), Rappa (2001), Tuff and Wunker (2010)
Advisors	Provide consulting and advice	Accenture, IBM	Applegate (2001)
Affiliation (prospect fees)	Refer customers to a third party and receive a commission for a specific transaction completed (e.g., click, give information, buy product)	Pinterest, Barnes & Noble, Amazon.com	Gassmann <i>et al.</i> (2014), Hanson (2000), Rappa (2001)
Affinity clubs	Partner with membership associations and other affinity groups to offer a product exclusively to its members	MBNA	Johnson (2010)
Agent models (sales commissions)	Represent the buyer or the seller and earn commissions for successful facilitation of transactions	Expedia.com, estate agents	Hanson (2000), Strauss and Frost (2014)
Aggregation (aggregator, distributor, multi-party market aggregation)	Build a specific form of broker preselecting products/services and target audience – hence, key process is matching of needs	Amazon, Homeadvisor	Applegate (2001), Bienstock <i>et al.</i> (2002), Linder and Cantrell (2000), Rappa (2001), Tapscott <i>et al.</i> (2000)

(Continued)

Pattern name (other names) [manually added description]	Description	Selected example(s)	Source(s)
Agora (exchange)	Build a specific form of broker allowing buyer and seller to freely negotiate and assign value to goods – hence, key process is price discovery	eBay, Priceline, NASDAQ	Applegate (2001), Bienstock et al. (2002), Tapscott et al. (2000)
Aikido	Offer products to the customer that are the opposite of what the competitors are offering, thereby making competitor's strengths a weakness	Cirque du Soleil, Nintendo Wii	Gassmann et al. (2014)
Application service providers (vertical infrastructure portals)	Allow customers to use software that is hosted on remote servers for continuous service fee	Oracle Business online, DoubeTwist	Applegate (2001), Eisenmann (2001)
Auction (auction broker, e-auction, exchange, product bids)	Make customers name the maximum price they are willing to pay; the highest price wins the product or service	Sotheby's, eBay, Google	Applegate (2001), Bienstock et al. (2002), Gassmann et al. (2014), Hanson (2000), Johnson (2009), Rappa (2001), Timmers (1998), Tuff and Wunker (2010)
Audience measurement services	Conduct market research on online audience as agency for other customers	Nielsen/Netratings	Rappa (2001)
Banner advertising (infomercials, ultramedials, advertising networks, banner exchange, pay-per-click)	Place advertising banners on websites	TechWeb, Lycos	Hanson (2000), Rappa (2001)

(Continued)

Pattern name (other names) [manually added description]	Description	Selected example(s)	Source(s)
Barter	Allow customers to trade a non-monetary compensation in exchange for a product or service	Pepsi, Pay with a Tweet	Bienstock <i>et al.</i> (2002), Gassmann <i>et al.</i> (2014)
Brand integrated content	As manufacturer of other products create content for the sole basis of product placement	Red Bull	Rappa (2001)
Breakthrough markets	Invest in opening new markets to gain at least a temporary monopoly	AIG Insurance	Linder and Cantrell (2000)
Bricks + clicks (click and mortar)	Integrate both an online (clicks) and an offline (bricks) presence to browse, order, and pick up products	Home Depot, Tesco, REI	Johnson (2009), Rappa (2001)
Brokerage (switchboard, network efficiency, open market-making)	Bring together and facilitate transactions between buyers and sellers, charging a fee for each successful transaction	NASDAQ, Century 21	Chatterjee (2013), Linder and Cantrell (2000), Johnson (2010), Tuff and Wunker (2010)
Bundle elements together (bundled pricing, bundling sales)	Make purchasing simple and more complete by packaging related products together	iPod and iTunes, fast food value meals	Hanson (2000), Johnson (2009), Johnson (2010), Tuff and Wunker (2010)
Business intelligence	Gather secondary and primary information about competitors, markets, customers, and other entities to predict important information	Oil companies for gas prices, traders	Strauss and Frost (2014)

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Pattern name (other names) [manually added description]	Description	Selected example(s)	Source(s)
Buy/sell fulfilment	Take customer orders to buy or sell a product or service, including terms like price and delivery	CarsDirect, Respond.com	Rappa (2001)
Buying club	Round up buyers with attractive prices and use purchase volume to gain discounts	Letsbuyit.com, mobilcom-debitel	Linder and Cantrell (2000)
Channel maximization	Leverage as many channels as possible to maximize revenues	AOL, Time Warner	Linder and Cantrell (2000)
Classifieds	List items for sale or things of interest and charge listing or membership fees in exchange	Monster.com, Craigslist	Rappa (2001)
Collaboration platforms	Provide a set of tools and an information environment for collaboration between enterprises	Deutsche Telekom/Globana's ICS, ESPRIT GENIAL	Timmers (1998)
Connection (internet access provider, horizontal infrastructure portals, internet services providers)	Provide physical and/or virtual network infrastructure to gain (internet) access	AOL, Sprint, AT&T	Eisenmann (2001), Applegate (2001), Rappa (2001), Wirtz et al. (2010)
Content provider (information and service providers, selling content, online content providers, content publisher, content, content services)	Provide content such as information, digital products, and services	Reuters, Wall Street Journal online, IEEE Journals	Applegate (2001), Clemons (2009), Eisenmann (2001), Rappa (2001), Strauss and Frost (2014), Weill and Vitale (2001), Wirtz et al. (2010)
Content-targeted advertising	Identify the meaning of a web page and then automatically deliver relevant ads when a user visits that page.	Google	Rappa (2001)

(Continued)

Pattern name (other names) [manually added description]	Description	Selected example(s)	Source(s)
Context	Sort and/or aggregate available online information	Google	Wirtz <i>et al.</i> (2010)
Contextual mobile advertising	Tailor advertising to the context, e.g., location, preferences, or status	Google AdSense, CommuteStream	Clemons (2009)
Contractor	Sell services provided primarily by people, such as consulting, construction, education, personal care, package delivery, live entertainment, or healthcare	Accenture, Federal Express	Weill <i>et al.</i> (2005)
Cool brands (branded reliable commodity, brand building)	Earn premium prices with competitive products through expert brand marketing	Goodyear, Nike	Hanson (2000), Linder and Cantrell (2000)
Cost leadership	Keep variable costs low and sell high volumes at low prices	Ikea	Tuff and Wunker (2010)
Cost reduction [through the internet]	Use the Internet to reduce costs and thus increase efficiency	Cisco	Hanson (2000)
Cross selling	Offer complementary products in addition to the standard offering	Shell, Tchibo, Aldi	Gassmann <i>et al.</i> (2014)
Crowdfunding	Finance a product, project, or company by a group of private investors often including a non-monetary compensation in exchange	Marillion, Pebble Technology, Braintool	Gassmann <i>et al.</i> (2014)
Crowdsourcing	Solve a problem by outsourcing it to the crowd (e.g., an internet community)	Cisco, Procter & Gamble, InnoCentive	Gassmann <i>et al.</i> (2014), Johnson (2010)
Custom suppliers	Design, produce, and distribute customized products and services	Boeing, McGraw-Hill	Applegate (2001)

(Continued)

Pattern name (other names) [manually added description]	Description	Selected example(s)	Source(s)
Custom suppliers of hardware	Produce and customize IT equipment or components	Dell, MicroAge	Applegate (2001)
Custom suppliers of software	Create and customize software and license/sell it	Andersen Consulting, Sapient, Viant	Applegate (2001)
Customer loyalty (incentive marketing)	Increase customer loyalty through reward programs	American Airlines, Safeway Club Card, Payback	Gassmann et al. (2014), Rappa (2001)
Customer relationship management [through digital technologies]	Retain and grow business and individual customers through strategies that ensure their satisfaction with the company and its products, e.g., by collecting and integrating all information on each customer touch point	Companies applying salesforce.com	Strauss and Frost (2014)
Database marketing	Collect, analyse, and disseminate electronic information about customers, prospects, and products to increase profits	GM Card, Blockbuster Inc.	Strauss and Frost (2014)
De facto standard	Develop and use proprietary component technology to provide high product functionality, but also license it broadly throughout the industry to establish it as the dominant design	Sharp in flat panel displays	Linder and Cantrell (2000)
Dealer support [through the internet]	Use the internet to indirectly support sales partners	GM	Hanson (2000)

(Continued)

Pattern name (other names) [manually added description]	Description	Selected example(s)	Source(s)
Demand collection system	Let prospective buyers make a final (binding) bid for a specified good or service and arrange fulfillment	Priceline.com	Rappa (2001)
Dial down features	Target less-demanding consumers with products or services that may not be superior but are adequate and perhaps more convenient, simple, etc.	Motofone	Johnson (2009)
Digital add-on	A physical asset is sold at a small margin; over time, the customer can purchase or activate any number of digital services with a higher margin	Navigation systems	Fleisch et al. (2014)
Digital lock-in	Use digital technologies to limit the compatibility of physical products and thus lock customers to your ecosystem	Apple's iPhone	Fleisch et al. (2014)
[Digital] infrastructure retailers ((digital) infrastructure marketplaces, [digital] infrastructure exchanges)	Take control of inventory and sell digital infrastructure	CompUSA.com, Staples.com	Applegate (2001)
[Digital] service provider	Produce and deliver a wide range of services online	American Express, Citigroup	Applegate (2001)
Digitally-charged products	Charge classic physical products with a bundle of new sensor-based digital services and position them with new value propositions	Smart washing machine, smart home	Fleisch et al. (2014)

(Continued)

Pattern name (other names) [manually added description]	Description	Selected example(s)	Source(s)
Digitization	Offer a traditionally physical product as a digital version	Wikipedia, Netflix, Dropbox	Gassmann et al. (2014)
Disaggregated pricing	Allow customers to buy exactly – and only – what they want	Free Mobile	Tuff and Wunker (2010)
Disintermediation (manufacturer direct model, direct selling, multi-level marketing, direct to customer)	Deliver a product or service that has traditionally gone through an intermediary directly to the customer	Dell, Nespresso, WebMD	Gassmann et al. (2014), Johnson (2009), Johnson (2010), Rappa (2001), Strauss and Frost (2014), Weill and Vitale (2001)
Distributive network	Provide infrastructure to connect other actors of the economy such as logistics, energy, mobility, or communication	Enron, UPS, AT&T	Tapscott et al. (2000)
Do more to address the job	Look beyond your typical offering and address other jobs your customers are trying to get done	UPS	Johnson (2009)
Educators	Create and deliver educational offerings, often online	Harvard Business School	Applegate (2001)
Efficiency-based	Use human or capital resources efficiently to produce commonalities in a competitive market	Airlines, mining, hospitals	Chatterjee (2013)
E-mail	Communicate with stakeholders via e-mails rather than print and mail	Online mailings of companies, digital annual reports	Strauss and Frost (2014)

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Pattern name (other names) [manually added description]	Description	Selected example(s)	Source(s)
E-mail (virtual marketplace)	Build a platform for a collection of e-shops, usually enhanced by a common umbrella, for example, of a well-known brand	Electronic Mall Bodensee, Merchant Services at Amazon.com	Rappa (2001), Timmers (1998)
Enterprise resource planning	Use an integrated back office system to optimize business processes and thereby reduce cost	Companies using SAP	Strauss and Frost (2014)
Entrepreneur	Create and sell financial assets, often creating and selling firms	Kleiner, Perkins, Caufield & Byers	Weill <i>et al.</i> (2005)
E-procurement (online purchasing)	Conduct tendering and procurement electronically	Japan Airlines, Wal-Mart	Strauss and Frost (2014), Timmers (1998)
E-retailer (commerce, catalog merchant, virtual merchant)	Assume control of inventory, set a non-negotiable price, and sell physical products online	Amazon.com, LandsEnd.com, Walmart.com	Applegate (2001), Eisenmann (2001), Rappa (2001), Wirtz <i>et al.</i> (2010)
E-shop (e-commerce, order processing)	Build a web shop to sell products or services online	Fleurop, Travelocity, Flyeralarm	Gassmann <i>et al.</i> (2014), Strauss and Frost (2014), Timmers (1998)
Exclusive market-making	Bring together specific, highly targeted, qualified audiences for trading	Edu.com, Orderzone.com	Linder and Cantrell (2000)
Experience destination (experience selling)	Use a carefully designed environment to attract customers who pay premium prices	Disney theme parks, Nike Town Stores, Nestlé Nespresso	Gassmann <i>et al.</i> (2014), Linder and Cantrell (2000)

(Continued)

Pattern name (other names) [manually added description]	Description	Selected example(s)	Source(s)
Experience selling	Allow the client to experience the product, often via a sales force and a pyramid commission structure; traditionally applied for cosmetic products	Mary Kay Cosmetics, Amway	Linder and Cantrell (2000)
Financial broker	Match buyers and sellers of financial assets	e*Trade, Schwab	Weill et al. (2005)
Financial landlord (financing, instant gratification)	Let others use cash (or other financial assets) under certain (often time-limited) conditions	Bank of America, Fannie Mae, Aetna	Linder and Cantrell (2000), Tuff and Wunker (2010), Weill et al. (2005)
Financial trader	Buy and sell financial assets without significantly transforming (or designing) them	Merrill Lynch	Weill et al. (2005)
Flat-rate	Charge a fixed price and allow the customer unlimited access in exchange	Buckaroo Buffet, Sandals Resorts, Netflix	Gassmann et al. (2014)
Flexible pricing (dynamic pricing strategies online)	Vary prices for an offering based on demand	American Airlines	Strauss and Frost (2014), Tuff and Wunker (2010)
Forced scarcity	Limit the supply of offerings available to drive up demand and prices	OPEC, Rue La La	Tuff and Wunker (2010)
Fractional ownership	A good is purchased together by a group of customers, each buying a certain share of the usage right, often a time period	Time-sharing condos, Net Jets, écurie25	Gassmann et al. (2014), Johnson (2010)

(Continued)

Pattern name (other names) [manually added description]	Description	Selected example(s)	Source(s)
Franchising	Allow franchisees to use a business concept, including brand and products, in compensation for financial compensation	Starbucks, Subway, McDonald's	Gassmann <i>et al.</i> (2014)
Free (free for advertising)	Provide customer with a free-of-charge offer and use other sources such as advertising to generate revenues	Metro (free paper), private TV stations, Google	Linder and Cantrell (2000), Osterwalder and Pigneur (2010)
Freemium (free trial)	Offer basic services for free, while charging a premium for advanced or special features	Skype, Dropbox, Linked In	Gassmann <i>et al.</i> (2014), Hanson (2000), Johnson (2009), Johnson (2010), Tuff and Wunker (2010)
From push-to-pull	Make production more flexible in order to ideally produce a product just when it is ordered and not upfront as stock article	Toyota, Zara, Dell	Gassmann <i>et al.</i> (2014)
Haggle	Allow the buyers to negotiate over the price	www.hagglezone.com	Bienstock <i>et al.</i> (2002)
Horizontal portals (portals, portal)	Create a portal that provides a gateway to Internet's content and offerings, such as search engine, e-mail, news etc.	Yahoo!, Microsoft's MSN	Applegate (2001), Eisenmann (2001), Rappa (2001), Strauss and Frost (2014)
HR broker	Match buyers and sellers of human services	Robert Half, EDS	Weill <i>et al.</i> (2005)

(Continued)

Pattern name (other names) [manually added description]	Description	Selected example(s)	Source(s)
Incomparable products (incomparable service)	Use deep R&D skills to develop and exploit proprietary technology to offer unique products that command high margins	Polaroid, DuPont	Linder and Cantrell (2000)
Infomediary (information brokers, IP broker)	Match buyers and sellers of information or other intangible assets	Internet Securities, Individual.com, Valassis	Applegate (2001), Hartman et al. (2000), Rappa (2001), Timmers (1998), Weill et al. (2005)
Information collection	Collect and commercialize information gathered from the Internet	DoubleClick, Google	Hanson (2000)
Infrastructure services firms (e-business enabler)	Produce and deliver complementary services for the Internet	DoubleClick, Federal Express, Webvan	Applegate (2001), Hartman et al. (2000)
Ingredient branding (category-building)	Build a brand of a product component that is part of an end product	Intel, Carl Zeiss, Bosch	Gassmann et al. (2014)
Integrator	Cover most parts of the value chain in-house in order to keep control of innovations, efficiency etc.	Carnegie Steel, Ford, Exxon Mobil	Gassmann et al. (2014), Andrew and Sirkin (2006)
Inventor	Create and then sell intangible assets, such as patents and copyrights	Lucent's Bell Labs	Weill et al. (2005)
IP trader (bit vendor)	Buy and sell intangible assets	NTL Inc., Apple iTunes Music Store	Rappa (2001), Weill et al. (2005)
[IT] equipment/component manufacturers	Produce IT equipment and components	IBM, Compaq, Cisco	Applegate (2001)
Knowledge management [through use of digital technologies]	Transform and store a company's data into useful information and knowledge	Companies using an internal Wiki	Strauss and Frost (2014)

(Continued)

Pattern name (other names) [manually added description]	Description	Selected example(s)	Source(s)
Leverage customer data (selling information gathered from online experience, user registration)	Collect customer data and use them commercially, e.g., for targeted advertising	Twitter, 23 and Me, Facebook	Gassmann <i>et al.</i> (2014), Clemons (2009), Rappa (2001)
Leverage new influencers	Win over influencers who support the sales process	Hindustan, Unilever	Johnson (2009)
Licensing (the licensor, IP landlord, license)	License or otherwise get paid for limited use of intangible assets	Microsoft	Andrew and Sirkin (2006), Gassmann <i>et al.</i> (2014), Rappa (2001), Tuff and Wunker (2010), Weill <i>et al.</i> (2005)
Lock-in	Lock the customers to your ecosystem by strongly increasing the switching costs through high hurdles	Lego, Hewlett-Packard, Nestlé BabyNes	Fleisch <i>et al.</i> (2014), Gassmann <i>et al.</i> (2014)
Low-touch approach (no frills, low-price reliable commodity, standardization)	Offer standardized, low-price version of a product or service that is traditionally customized and higher priced	Southwest airlines, Xiameter	Gassmann <i>et al.</i> (2014), Linder and Cantrell (2000), Johnson (2009), Johnson (2010)
Make more of it	Offer internal know-how and other resources also as external service to other companies	Porsche Consulting, Festo Didactic, Amazon Web Services	Gassmann <i>et al.</i> (2014)
Marketplace exchange	Build a specific form of broker also offering a full range of services covering the transaction process, from market assessment to negotiation and fulfilment for an industry consortium	Orbitz, ChemConnect	Rappa (2001)

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Pattern name (other names) [manually added description]	Description	Selected example(s)	Source(s)
Mass customization (mass-customized commodity)	Customize a commodity product to the customers' specific preferences	Dell, mymuesli	Gassmann et al. (2014), Linder and Cantrell (2000), Strauss and Frost (2014)
Membership	Charge a time-based payment to allow access to locations, offerings, or services that non-members do not have	Costco, Metro	Tuff and Wunker (2010)
Merchant model (sales)	Act as wholesalers/retailer of goods and services	Wal*Mart, Mediamarkt	Bienstock et al. (2002), Rappa (2001)
Micro transactions	Sell many items for as little as a dollar – or even only one cent – to drive impulse purchases	Kartrider	Tuff and Wunker (2010)
Misdirection	Send customers to locations different from what they initially searched for if the searched company did not pay sufficient listing fees to the search engine	Google, Yahoo	Clemons (2009)
Multi-sided platforms (two-sided market)	Bring together two or more distinct but interdependent groups of customers, where the presence of each group creates value for the other groups	Visa, Microsoft Windows, Metro Newspaper	Gassmann et al. (2014), Osterwalder and Pigneur (2010)
Negative operating cycle (alter the usual formula, float, cash machine)	Generate high profits by maintaining low inventory and having the customer pay up front	Amazon, Next Restaurant, Groupon	Gassmann et al. (2014), Johnson (2009), Johnson (2010), Tuff and Wunker (2010)

(Continued)

Pattern name (other names) [manually added description]	Description	Selected example(s)	Source(s)
Network value	Provide a platform that leads to repeated purchases by a core group of loyal customers	Microsoft, Netflix, Playstation	Chatterjee (2013)
Networked utility providers	Create and distribute downloadable software programs that facilitate communication	ICQ, Acrobat Reader	Eisenmann (2001)
Object self service	Provide physical products with the ability to independently place orders on the Internet	Smart heating systems, Internet refrigerator	Fleisch <i>et al.</i> (2014)
One-stop convenient shopping	Use broad selection and ubiquitous access to attract busy buyers who will pay a premium for convenience	WW Grainger	Linder and Cantrell (2000)
One-stop low-price shopping	Use low price and the convenience of broad selection to attract buyers, then convert volume into purchase discounts	Walmart, SupplyGenie.com	Linder and Cantrell (2000)
Online advertising and public relations	Buy advertising on products or services of another companies	Product advertising in radio, TV, or Internet	Strauss and Frost (2014)
Online brokers (brokerage model, third-party marketplace, marketplace, intermediary, broker, metamediary, e-business storefront)	Use the internet to facilitate a transaction between a buyer and a seller	ebay, Airbnb	Bienstock <i>et al.</i> (2002), Hartman <i>et al.</i> (2000), Rappa (2001), Strauss and Frost (2014), Timmers (1998), Weill and Vitale (2001)
Online sales promotions	Use the internet to send free product samples or discount coupons to customers	Companies selling via Groupon	Strauss and Frost (2014)

(Continued)

Pattern name (other names) [manually added description]	Description	Selected example(s)	Source(s)
Open business models	Create innovations by systematically integrating partners into the company's R&D process	Procter & Gamble, Innocentive	Gassmann et al. (2014), Osterwalder and Pigneur (2010)
Open content (public broadcasting)	Develop openly accessible content collaboratively by a global community of contributors who work voluntarily	Wikipedia, The Classical Station	Rappa (2001)
Open source (alliance)	Develop a product not by a company, but by a public community with all information being available publicly	Mozilla, Linux, Wikipedia	Gassmann et al. (2014), Rappa (2001), Tapscott et al. (2000)
Orchestrator (value chain)	Focus on core competencies and outsource/coordinate all other activities along the value chain	Procter & Gamble, Nike, Li & Fung	Andrew and Sirkin (2006), Gassmann et al. (2014), Timmers (1998)
Own the undesirable	Seek to serve segments of the market that might not appear immediately attractive	AllLife	Johnson (2009)
Pay per use (metered use, metered subscriptions, pay-as-you-go, utility model)	Charge for each use of a product or service	Metered ISPs, Google, Zipcar	Gassmann et al. (2014), Hanson (2000), Johnson (2010), Rappa (2001), Tuff and Wunker (2010)
Pay what you want (user-defined)	Invite customers to set the price they wish to pay	Radiohead, One World	Gassmann et al. (2014), Tuff and Wunker (2010)
Peer-to-peer (Person-to-person networking services)	Facilitates a transaction among peers, i.e., two or more consumers, through provision of a platform	Everybody, Humble Bundle, ebay, Napster, Airbnb	Gassmann et al. (2014), Rappa (2001)

(Continued)

Pattern name (other names) [manually added description]	Description	Selected example(s)	Source(s)
Perceived value-based	Position company's output as a "want" item and command a price premium — invest in knowledge professionals such as scientists, engineers, programmers, or data experts	Semiconductors, software firms, pharma	Chatterjee (2013)
Performance-based contracting	Determine the fee for usage of a product not by frequency of use but rather by the quality of the result from the use	Rolls-Royce, BASF, Xerox	Fleisch <i>et al.</i> (2014), Gassmann <i>et al.</i> (2014)
Physical broker	Match buyers and sellers of physical assets	eBay, Century 21	Weill <i>et al.</i> (2005)
Physical freemium	A physical asset that is sold together with free digital services while charging a premium for advanced digital services	Android smartphones	Fleisch <i>et al.</i> (2014)
Physical landlord	Sell the right to use a physical asset	Marriott, Hertz	Weill <i>et al.</i> (2005)
[Physical] manufacturer	Create and sell physical assets	Ford, Pepsi, General Motors	Applegate (2001), Weill <i>et al.</i> (2005)
[Physical] wholesaler (retailer) Premium	Buy and sell physical assets Price at a higher margin than competitors for a superior product, offering, experience, service, or brand	Wal*Mart, Amazon Lexus	Rappa (2001), Weill <i>et al.</i> (2005) Tuff and Wunker (2010)
Product as point of sales	Make physical products become sites of digital sales and marketing services that the customer consumes directly	Smartphones, cars	Fleisch <i>et al.</i> (2014)

(Continued)

Pattern name (other names) [manually added description]	Description	Selected example(s)	Source(s)
	at the product or indirectly via another device		
Product sales (purchase)	Sell a product for a fixed price	Dell	Hanson (2000), Rappa (2001)
Quality selling (enhance quality)	Attract customers with high quality and/or hard-to-find products or services for premium prices	Saks Fifth Avenue, Nordstrom	Hanson (2000), Linder and Cantrell (2000)
Query-based paid placement	Sell favourable link positioning or advertising keyed to particular search terms in a user query	Google, Overture	Rappa (2001)
Razors/blades (cellphone)	Offer a cheap or free basic product (“razors”) together with complements (“blades”) that are overpriced and thereby subsidize the basic product	Gillette, Nespresso, Amazon Kindle	Gassmann et al. (2014), Johnson (2009), Johnson (2010), Linder and Cantrell (2000)
Reliable commodity operations (guaranteed availability)	Provide predictable commodity products or services for which customers are willing to pay a small premium, as they are reliable	UPS, AT&T, Hilti	Linder and Cantrell (2000), Gassmann et al. (2014)
Remote usage and condition monitoring	Equip products with digital technologies that allow to detect errors preventatively and monitor usage	Rolls-Royce, Brother	Fleisch et al. (2014)
Rent instead of buy (lease instead of sell, leasing, lease)	Temporarily lend a product to the customer and charge a rent	Xerox, fashionette, United Rentals	Gassmann et al. (2014), Johnson (2009), Johnson (2010), Rappa (2001)

(Continued)

Pattern name (other names) [manually added description]	Description	Selected example(s)	Source(s)
Revenue sharing (retail alliances)	Share the revenues with other companies in order to create a symbiotic relationship	Cdnow, Apple AppStore, Groupon	Gassmann <i>et al.</i> (2014), Hanson (2000), Rappa (2001)
Reverse auction	Set a ceiling price for a product or service and have participants bid the price down	E lance.com, OnForce.com	Bienstock <i>et al.</i> (2002), Johnson (2010)
Reverse engineering	Break down a product of competitors into its components and use this information to build a comparable product	Bayer, Brilliance China Auto, Pelikan	Gassmann <i>et al.</i> (2014)
Reverse innovation	Transfer cheaper products from less developed countries to more developed countries	General Electric, Logitech, Renault	Gassmann <i>et al.</i> (2014)
Reverse razors/blades	Offer an expensive basic product (“razors”) that allows for usage of cheap or even free complements (“blades”)	iPod/iTunes	Johnson (2009), Johnson (2010)
Risk sharing	Waive standard fees or costs if certain metrics are not achieved, but receive outsized gains when they are	Progressive	Tuff and Wunker (2010)
Robin Hood	Charge wealthy customers more than poorer customers for a product or service	Museums, Aravind Eye Care System, TOMS Shoes	Gassmann <i>et al.</i> (2014)
Scaled transactions	Maximize margins by pursuing high-volume, large-scale transactions when unit costs are relatively fixed	Morgan Stanley	Tuff and Wunker (2010)

(Continued)

Pattern name (other names) [manually added description]	Description	Selected example(s)	Source(s)
Search agent	Search out the price and availability for a good or service specified by the buyer	Idealo.de	Rappa (2001)
Self-service	Delegate a part of the value chain to the client	McDonald's, IKEA, BackWerk	Gassmann et al. (2014)
Selling experience	Offer new experiences through participation in a community, often virtually	GameBox, World of Warcraft	Clemons (2009)
Selling online services	Offer to use software services online	E*Trade, Survey Monkey	Clemons (2009)
Selling virtual accessories	Sell accessories that would be difficult to earn in online games	World of Warcraft, Second life	Clemons (2009)
Sensor as a service	Collect, process, and sell sensor data for a fee	Streetline.com, Google Maps	Fleisch et al. (2014)
Service-wrapped commodity	Distinguish commodity products by services that are added	Mindspring, Earthlink	Linder and Cantrell (2000)
Servitization of products (product-to-service)	Sell ongoing services in addition to the product or even sell the service the product performs rather than the product	IBM, Hilti, Zipcar	Johnson (2009), Johnson (2010)
Shared infrastructure	Share a common infrastructure among several competitors	ABACUS	Weill and Vitale (2001)
Shop-in-shop (develop unique partnerships)	Build a store within another store	Tchibo, Deutsche Post, MinuteClinic	Gassmann et al. (2014)
Social search	Tailor search results based on a user's social network	Facebook, Airbnb	Clemons (2009)
Software firms	Create software and license/sell it	Microsoft, Oracle, Siebel	Applegate (2001)

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Pattern name (other names) [manually added description]	Description	Selected example(s)	Source(s)
Solution provider (comprehensive offering, full-service provider)	Provide a full range of services in one domain directly and via allies and attempt to own the primary consumer relationship	Apple iPod/iTunes, Heidelberg Druckmaschinen	Gassmann <i>et al.</i> (2014), Linder and Cantrell (2000), Weill and Vitale (2001)
Subscription (subscription model, subscription club, membership)	Continuously provide customers with products or services and regularly charge upfront fees	Magazines, Blacksocks, Spotify	Gassmann <i>et al.</i> (2014), Hanson (2000), Johnson (2009), Johnson (2010), Rappa (2001), Tuff and Wunker (2010)
Supermarket (cat-daddy selling)	Offer a large variety of products at a low price	Toys"R"Us, The Home Depot, Staples	Gassmann <i>et al.</i> (2014), Linder and Cantrell (2000)
Supplier support [through the internet]	Use the Internet to improve procurement and speed of delivery from suppliers	GE	Hanson (2000)
Supply chain management	Connect suppliers and distribution channels more closely	FedEx	Strauss and Frost (2014)
Target the poor	Focus on the bottom-tier clients of the income pyramid and sell a large number of cheap products with low margin	Wal*Mart, Aldi	Gassmann <i>et al.</i> (2014)
The long tail	Focus on selling a large number of niche products, each of which sells relatively infrequently	Netflix, eBay, YouTube	Gassmann <i>et al.</i> (2014), Osterwalder and Pigneur (2010)
Transaction service and exchange intermediation (infrastructure provider)	Provide integrated portal to coordinate complex transactions among	Celarix, Solbright, PrintConnect	Hartman <i>et al.</i> (2000), Linder and Cantrell (2000)

(Continued)

Pattern name (other names) [manually added description]	Description	Selected example(s)	Source(s)
Trash-to-cash	involved several parties for spot markets	Duales System Deutschland, H&M, cmr	Gassmann et al. (2014)
Trust intermediary (transaction broker)	Reuse already used products	PayPal, Escrow.com, CyberCash	Hartman et al. (2000), Rappa (2001)
Trust services	Provide a third-party payment mechanism for buyers and sellers to settle a transaction	Truste	Rappa (2001)
Trusted product leadership	Establish membership associations that abide by an explicit code of conduct, and in which members pay a subscription fee	Cisco, Intel	Linder and Cantrell (2000)
Ultimate luxury	Develop long-lasting product platform architectures to create a non-disruptive product upgrade path for locked-in customers	Lamborghini, Abbot Downing	Gassmann et al. (2014)
Unbundling	Focus on selling to the top-tier customers of the income pyramid	Mobile telecom industry, private banking industry	Osterwalder and Pigneur (2010)
Under the umbrella pricing	Unbundle three types of businesses/organizational units within one firm as they all have different imperatives: customer relationship, product innovation, and infrastructure	Prime Computer with Digital Equipment in the 1980s, MCI WorldCom with AT&T	Linder and Cantrell (2000)

(Continued)

Pattern name (other names) [manually added description]	Description	Selected example(s)	Source(s)
User designed	follow in product/service development Customers invent products that afterwards are produced by the company	Apple AppStore, Createmytattoo, Lego Factory	Gassmann <i>et al.</i> (2014)
Value chain integrator (value net integrator)	Coordinate activities across the value net by gathering, synthesizing, and distributing information	Seven Eleven, ESPRIT project TRANS2000	Timmers (1998), Weill and Vitale (2001)
Value chain service provider (layer player)	Only support parts of the value chain such as logistics or payments – but for several companies	Banks, FedEx, UPS	Timmers (1998), Gassmann <i>et al.</i> (2014)
Value-added reseller	Sell a comprehensive range of undifferentiated products based on value-added services, e.g., through consultative selling, product availability, service, and promotional pricing	Ingram Entertainment, Pitman Company, Berkshire Computer	Linder and Cantrell (2000)
Vertical portals (affinity portals, validation through community content)	Create a portal that specializes in a particular area and provides very deep content and functionality in this area	Expedia, TripAdvisor, RateBeer	Applegate (2001), Clemons (2009)

Appendix B. Objective and Subjective Ending Conditions for Taxonomy-Development

#	Objective Condition (OC)
OC1	All objects have been examined
OC2	No objects were merged or split in the last iteration
OC3	At least one object is classified under each characteristic
OC4	No new dimensions or characteristics were added in the last iteration
OC5	No dimensions or characteristics were merged or split in the last iteration
OC6	Each dimension is unique
OC7	Each characteristic is unique within its dimension
OC8	Each cell is unique and not repeated

#	Subjective Condition (SC)
SC1	<i>Concise</i> : The taxonomy contains a limited number of dimensions
SC2	<i>Robust</i> : The dimensions and characteristics provide sufficient differentiation among objects to be of interest
SC3	<i>Comprehensive</i> : All objects can be classified and all dimensions of interest are identified
SC4	<i>Extendible</i> : New dimensions and characteristics can easily be added
SC5	<i>Explanatory</i> : The dimensions and characteristics contain useful information about the objects of interest

Source: Nickerson et al. (2013).

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