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Pick and choose: A venture's cognitive toolbox to business model innovation

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Abstract

There is a consensus that cognition impacts how ventures innovate their business models. However, little is known about which cognitive capabilities facilitate the venture's business model innovation (BMI). To investigate this phenomenon, this article reviews current concepts and literature on BMI and dynamic capabilities from a cognitive perspective. It derives the following conceptualizations: 1) Cognitive activities underpin BMI-related sensing, seizing, and reconfiguring. Thus, BMI can become a cognitive venture capability. 2) The business model as a mental model changes through sensemaking, new heuristics, and routines and beliefs. Those mental operations facilitate the systematic definition and adaptation of the business model, and its continuous innovation. 3) The maturing venture benefits from the routines and beliefs implicit in BMI, which ensures its competitive advantage

Keywords

Business models; business model innovation; cognition; new ventures; cognitive capability

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1. Introduction

Many great CEOs have vitally impacted how their firms act and innovate. Apple's products like the iPhone or iTunes are unthinkable without Steve Jobs. The question is whether Apple's business model would have been as disruptive to many industries if it had not been for Jobs.

Teece (2012) suggests that entrepreneurial, dynamic capabilities are vital to shape how the entire firm senses, seizes, and reconfigures opportunities. He particularly emphasizes that entrepreneurs like Jobs and their mental models drive how ventures define their first value proposition and creation. Yet, scholars have not explored the capabilities that underlie the development of a functioning business model for maturing ventures.

We understand business models in two ways: First, in accordance with Baden-Fuller & Mangematin, (2013) we define business models as mental models and cognitive schemas that help entrepreneurs and managers to configure their business model. Second, we consider business models as activity-based systems characterized by interrelated activities, which help to propose, create, and capture value (Clauss, 2016; Zott, Amit, & Massa, 2011).

However, configuring a functioning business model can become a challenge for ventures and their entrepreneurs, entrepreneurial teams, and growing workforce (Cavalcante, Kesting, & Ulhøi, 2011; Zott & Amit, 2008). Their mental models or schemas, which are shaped by mental structures and cognitive maps (Baron & Hannan, 2002; Martins, Rindova, & Greenbaum, 2015), can serve as starting points for the business model journey of the venture (Teece, 2012). But these journeys usually involve dynamics such as trial-and-error, iteration, exploration, and exploitation (Wirtz, Pistoia, Ullrich, & Göttel, 2016).

To manage those dynamics, individuals — managers, entrepreneurs, or employees — often remain attached to known schemas (Dewald & Bowen, 2010; Doz & Kosonen, 2010). Meanwhile, they reject schemas unknown to them (Baden-Fuller & Mangematin, 2013; Chesbrough, 2010). Those inertial tendencies can also limit or even impede innovation (Baden-Fuller & Mangematin, 2013; Osiyevskyy & Dewald, 2015). With this in mind, we define business model innovation as the innovation of an existing business model, or the development of a business model new to the firm and/or industry (Chesbrough & Rosen-

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bloom, 2002; Chesbrough, 2010). Finding a new and functioning business model is particularly vital for ventures (Blank & Dorf, 2012; Kesting & Günzel-Jensen, 2015).

Notably, recent literature has attempted to explain how business models as mental models support business model innovation (Martins et al., 2015; Osiyevskyy & Dewald, 2015). Additionally, first scholars have shown how the mental models of founders impact their ventures' business models (Malmström & Johansson, 2015). However, academia lacks a thorough understanding of the mental operations of entrepreneurs, entrepreneurial teams, and employees and how these operations impact venture business model innovation. Therefore, this article intends to understand which particular mental activities underpin, shape, and facilitate how the venture intends to propose, create, and capture value through the business model.

Achtenhagen, Melin, and Naldi (2013) emphasize that different activities or micro-practices are captured in capabilities. They draw on the dynamic capabilities view (DCV) to explain that capabilities allow the firm to strategically adapt the business model to changes in the external environment like markets or customer needs. At the same time, dynamic capabilities drive the leveraging and building of the internal organization through considerate resource allocations (Achtenhagen et al., 2013; George & Bock, 2011; Morris, Schindehutte, & Allen, 2005). Mezger (2014) applies the DCV to assess the business model innovation of ventures. Drawing on the microfoundations of dynamic capabilities, namely, sensing, seizing, and reconfiguring (Teece, 2007), Mezger argues that business model innovation can be conceptualized as a dynamic capability that helps entrepreneurs to strategically consider their business model opportunities. It appears that the DCV is a useful way of framing research on venture business model innovation.

Originally, Teece, Pisano, and Shuen (1997) established the DCV as a strategic response to the firm's constant need for change. Since its inception, this view has repeatedly been applied and refined as theoretical lens in strategic management, entrepreneurship, and business model literature (Barreto, 2010; Wilden, Devinney, & Dowling, 2016). Mezger (2014) applies the microfoundations of dynamic capabilities to frame business model innovation as a dynamic capability. Helfat and Peteraf (2015) identify cognitive capabilities that underline the managerial capabilities for sensing, seizing, and reconfiguring. They

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related these cognitive to managers and entrepreneurs. Meanwhile, they define cognitive capabilities as dynamic managerial capabilities that help to build, reconfigure, and reposition organizational resources and capabilities (Adner & Helfat, 2003; Helfat & Martin, 2014; Helfat & Peteraf, 2015). These capabilities depend on managerial social capital, human capital, and managerial cognition (Colombo & Grilli, 2005; Eggers & Kaplan, 2013; Helfat & Peteraf, 2015). In this, Helfat and Martin (2015) build on Teece (2012), who holds that the individual entrepreneur is crucial to implement particular dynamic capabilities. As the venture matures, it should develop and incorporate internal routines that are likely to be adopted by the entire firm.

We see that current literature to DCV increasingly approaches DCV from a cognitive viewpoint. Barreto (2010) and Wilden et al. (2016) particularly call for research on the cognitive underpinnings of the DCV. The many articles published in leading management journals (e.g., Academic Management Journal, Journal of Management, Strategic Management Journal) indicate that there is substantial academic interest in furthering the debate to dynamic capabilities.

In addition, business model scholars have employed the microfoundations of the DCV to frame research on business model innovation and ventures (e.g., Mezger, 2014). What remains to be investigated are the cognitive processes and conditions that facilitate the definition, adaptation, and innovation of the venture's business model. Spieth, Schneckenberg, and Matzler (2016) explicitly point to that gap when they call for research on systematized business model innovation on modes of firm-level and intra-firm level so that business model innovation can become an organizational capability.

This article intends to respond to those calls for research and to close important theoretical gaps at the intersection of business model innovation and the DCV. It will therefore investigate the microfoundations of cognitive capabilities with a focus on managerial cognition and business model innovation. To do so, it will disaggregate sensing, seizing, and reconfiguring into the cognitive activities necessary to define, adapt, and innovate the business model. Thus, this article will tackle the following question: What cognitive capabilities facilitate a venture's business model innovation?

Through gathering, assessing, and conceptualizing existing theoretical constructs and definitions on the DCV and business model innovation through a

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cognitive lens, this paper contributes to the understanding of literature in many ways.

First, this paper suggests that business model innovation of ventures builds on cognitive capabilities. In this, mental activities and micro-activities underpin BMI-related sensing, seizing, and reconfiguring. Second, the business model as a mental model changes through sensemaking, new heuristics, and evolving routines and beliefs. Those mental operations facilitate the systematic definition and adaptation of the business model as well as its continuous innovation. Third, the maturing venture profits from such a routine and belief of business model innovation, which, in turn, ensures its competitive advantage in the long run.

2. Theoretical background

To frame our line of reasoning, we will first look at the business model defined as a system of activities that proposes, creates, and captures value (Clauss, 2016; Saebi, 2015; Zott & Amit, 2009). This system requires decisions about elements and design by the entrepreneur in order to achieve a competitive advantage (Zott & Amit, 2015). Additionally, scholars consider the business model as a dynamic construct that is adapted as the venture develops (Cavalcante et al., 2011; Demil & Lecocq, 2010; Morris et al., 2005). Scholars have referred to the underlying cognitive capabilities of the entrepreneur as an important driver behind the development of the business model (Baden-Fuller & Mangematin, 2013; Martins et al., 2015).

2.1 The business model — a means to propose, create, and capture value

The business model proposes, creates, and captures value (Clauss, 2016; Demil, Lecocq, Ricart, & Zott, 2015; Wirtz, Pistoia, Ullrich, & Göttel, 2016; Zott & Amit, 2010). Value proposition describes the products or services offered to a specific target group and the ways through which that value is delivered (Morris et al., 2005; Wirtz et al., 2016). Value creation defines how and by what means a company creates value along its value chain (Achtenhagen et al., 2013; Amit & Zott, 2001). A purposeful use of available resources and capabilities is of particular importance in this process (Clauss, 2016; Spieth et al., 2016). Value capture

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refers to the revenue model of the firm, that is, how value propositions are converted into profits (Clauss, 2016; Teece, 2010; Zott & Amit, 2010). Thus, the firm ensures sustainability and performance (Baden-Fuller & Haefliger, 2013; Johnson, Christensen, & Kagermann, 2008). Those three dimensions essentially constitute the firm's business model (Clauss, 2016).

Meanwhile, there are a variety of activities that underlie these dimensions (Zott & Amit, 2009). Their interrelations also play an important role in the various conceptualizations of the business model (Zott et al., 2011). In this, activities are defined by the offer the firm makes to specific customers and how it delivers and prices this offer (Johnson et al., 2008; Saebi, 2015; Zott & Amit, 2009). "Relations specify the organizational units performing those activities and the ways in which these units are linked and governed, thus determining "how" the firm creates, delivers and captures value." (Saebi, 2015, p. 6).

With regards to the venture, the entrepreneur must purposefully select, link, and perform activities that constitute the particular business model dimensions (Morris et al., 2005; Zott & Amit, 2010). Hence, a functioning business model is a result of how those dimensions dynamically evolve and interlink (Afuah & Tucci, 2001; Amit & Zott, 2015). We will employ this view of the business model to understand a venture's procedure of business model innovation.

Scholars agree that in order to become and remain competitive firms must continuously develop and adapt their business models through business model innovation (Saebi, 2015; Spieth et al., 2016; Wirtz et al., 2016). Hence, business model innovation refers to innovating an existing business model as much as to developing a business model that is new to the firm and/or industry (Chesbrough, 2010; Spieth, Lundberg, & Matzler, 2014). Finding a new business model that will be functioning and scalable is crucial for ventures as it helps them to propose, create, and capture value within a given market (Kesting & Günzel-Jensen, 2015; Malmström & Johansson, 2015). Business models have proven to be a useful unit of analysis to investigate the creation of new business ideas (Trimi & Berbegal-Mirabent, 2012), the pioneering of new markets and first mover advantages (Markides & Sosa, 2013), and the competitive advantages of ventures (Colombo, Mohammadi, & Lamastra Rossi, 2015).

To describe venture business model innovation as a construct requires the understanding of the changes of the three primary dimensions of the business model (Clauss, 2016) as well as their underlying activities and relations (Co-

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lombo, Mohammadi, & Lamastra Rossi, 2015; Zott, Amit, & Massa, 2010). In this respect, many authors referred to experimentation (Osiyevskyy & Dewald, 2015; Zott & Amit, 2015), iteration (Amit & Zott, 2015; Saebi, 2015), trial-and-error (McGrath, 2010), or imitation (Casadesus-Masanell & Ricart, 2007; Casadesus-Masanell & Zhu, 2013; Frankenberger, 2013).

A prevalent discussion in business model literature revolves around the evolution of a functioning business model as well as the later adaptation and innovation of the business model (Clauss, 2016; Spieth et al., 2014). This discussion also questions which activities and relations are required to inform (Achtenhagen et al., 2013) and drive those changes (Doz & Kosonen, 2010; Spieth et al., 2014). While Achtenhagen et al. (2013) qualitatively analyze on ventures and small and medium sized firms, other scholars consider established firms from a conceptual perspective. They argue that activities and relations are embedded in the firm's routines and beliefs (Leih, Linden, & Teece, 2015; Wirtz et al., 2016). As opposed to Achtenhagen et al. (2013) who emphasize that different activities or micro-practices are captured in capabilities. Capabilities allow the venture to strategically adapt the business model to changes in the external environment like markets or customer needs. At the same time, capabilities drive the leveraging and building of the internal organization through considerate allocation of resource like personnel (Achtenhagen et al., 2013; George & Bock, 2011; Morris et al., 2005). Mezger (2014) applies capabilities to explain the business model innovation of ventures. He argues that business model innovation can be conceptualized as strategic dynamic capability, which helps entrepreneurs to strategically consider their business model opportunities (Mezger, 2014).

In essence, the business model concept integrates static and dynamic notions. It has also served as a beneficial informant at the interface of strategy and entrepreneurship research. Meanwhile, important scholars in the field call for more research as to how business model innovation can become a capability of the firm (Spieth et al., 2014). In addition, the business model has proven as useful unit of analysis to reflect on how ventures can realize their value proposition, creation, and capture (Chesbrough & Rosenbloom, 2002; Clauss, 2016; Colombo et al., 2015). To our knowledge, however, the business model has not been employed as unit of analysis in capability research to investigate how cognition impacts the venture's business model. Research could additionally bene-

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fit from investigating how cognitive activities shape venture business model innovation.

To investigate this phenomenon and based on existing literature, we aim at conceptualizing business model innovation as a dynamic cognitive capability of the venture that is shaped by various activities and micro-activities.

2.2 Using dynamic capabilities view to frame business model innovation

The dynamic capabilities view (DCV) has been applied as a theoretical lens in strategic management and entrepreneurship to understand phenomena of change (Barreto, 2010). "Capability is a set of activities a firm performs that enables products and services to be made and delivered, and profits to be generated. Dynamic capabilities refer to the higher-level capabilities that allow firms to build and reconfigure internal and external resources." (Teece, Peteraf, & Leih, 2016, p. 6). Thus, recent special issues like that of the California Management Review (2016) (e.g., Teece et al., 2016) deepen the understanding of DCV with regards to how uncertainty and risk affect strategy. As they put it, DVC is about doing the right thing and, hence, making the right decision about needed activities. While Teece and Leih (2016) and Teece et al. (2016) provide an answer to manage uncertainty and risk — both of which are highly relevant to entrepreneurial ventures —Dong, Garbuio, & Lovallo (2016) also hint at the cognitive processes underlying dynamic capabilities.

In his seminal papers, Teece (2007) distinguishes dynamic capabilities by their microfoundations, namely, sensing, seizing, and reconfiguring. Microfoundations are essentially bundles of higher-level activities to explain how strategic change facilitated. Mezger (2014) applies the microfoundations as means to conceptualize business model innovation as dynamic capability. Sensing is thus defined by identifying opportunities for new business models; seizing is described by designing and implementing the business model through suitable processes, and reconfiguring is the dynamic adaptation of the business model and its processes (Mezger, 2014; Teece, 2012).

Scholars also shed light on business model innovation as entrepreneurial dynamic capability (Achtenhagen et al., 2013; Helfat & Peteraf, 2015; Leih et al., 2015; Saebi, 2015). While Saebi (2015) identifies particular dynamic capabilities

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that inform business model dynamics, namely, evolution, adaptation, and innovation, Helfat and Peteraf (2015) categorize microfoundations at the cognitive level of the manager and/or entrepreneur. They define cognitive capabilities as capabilities to perform mental activities. Similarly, Leih et al. (2015) establish that the cognitive underpinnings of dynamic capabilities are essential to business model innovation. Although they do not consider ventures, they highlight that entrepreneurial managers are responsible for sensing, seizing, and reconfiguring business models opportunities. While some authors talk about entrepreneurial managers (Helfat & Peteraf, 2015; Teece, 2010) and/or how to innovate established business models (Leih et al., 2015; Saebi, 2015), none of them explain how ventures can employ dynamic capabilities to develop new business models.

Merely Teece (2012) considers the entrepreneur's set of abilities and beliefs as initial driver of a ventures dynamic capabilities. Although Teece does not explicitly talk about cognitive capabilities, he suggests that every entrepreneur holds a particular mental model that serves as a starting point to develop a venture. In his view, the entire venture needs to adopt those capabilities in order to grow and profit in the long term. In other words, insights into the microfoundations of cognitive capabilities with regards to business model innovation might be beneficial to ventures that are struggling to find a functioning business model (Leih et al., 2015; Malmström & Johansson, 2015).

Hence, this article will analyze the microfoundations sensing, seizing, and reconfiguring with a particular dedication to their underlying cognitive activities. To do so, it will conceptualize existing theory at the intersection of business model innovation and dynamic capabilities. It thus responds to scholarship asking for more research on the cognitive underpinnings of the DCV (Barreto, 2010; Wilden et al., 2016).

Meanwhile, recent special issues like that of the Strategic Entrepreneurship Journal focusing on business model innovation and cognition (e.g., Martins et al., 2015; Osiyevskyy & Dewald, 2015) prove the academic interest in this matter. Yet, especially the cognitive activities that shape and drive venture business model innovation have not been addressed yet.

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To close those important gaps with respect to business model innovation and the DCV, this article will tackle the following question: What cognitive capabilities facilitate a venture's business model innovation? (See also Figure 1.)

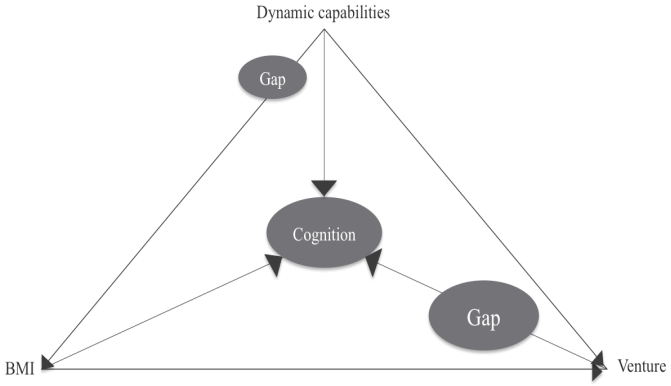


Fig. 1: Research framing

3. Cognition: A starting point for identifying the cognitive microfoundations of venture business model innovation

Cognitive psychologists and management scholars have defined cognition as (1) "the mental activities involved in acquiring and processing information," and (2) "an item of knowledge or belief." (Helfat & Peteraf, 2015; 834; see also: Colman, 2006). Mental activities include particular actions that are directed by structures and representations acquired by the individual over time (Prahalad & Bettis, 1986). These mental representations are simultaneously referred to as schemas (Wisniewski, 1997), mental models (Baden-Fuller & Mangematin, 2013; Gentner, 1983; Martins et al., 2015), or "cognitive structures that represent knowledge about a concept or type of stimulus, including its attributes and the relations among attributes" (Fiske & Taylor, 2013, p. 98).

Since schemas can range from simple to abstract representations, they essentially simplify and filter information (Porac & Tschang, 2013). Additionally, they organize knowledge at different levels of abstraction (Wisniewski, 1997). Hence, a schema can be changed by systematically reorganizing the structures of attributes and their relations (Ocasio, 1997; Ocasio, 2011; Porac & Tschang, 2013). Scholarship has pointed to the simultaneous attentional processes in-

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volved in the dynamism of schema change (e.g., Ocasio, 2011; Ocasio & Joseph, 2008). According to Ocasio (2011), schemas provide answers to particular issues. Consequently, they direct the attention of managers to solving some issues, while neglecting others. In other words, so-called selective attention stabilizes a known schema by reinforcing a particular set of activities. By contrast, executive attention facilitates a change of schemas through the directed allocation of cognitive resources (Ocasio, 2011; Ocasio & Joseph, 2008).

To this end, we emphasize that schemas, or mental models, include representations that direct individual attention and trigger particular activities.

3.1 Business models as mental model

This idea is consistent with a growing stream of literature that debates business models as schemas or mental models (Baden-Fuller & Morgan, 2010; Tripsas & Gavetti, 2000). It explains that business model schemas consist of attributes and relations that organize managerial understandings regarding business model design (Baden-Fuller & Mangematin, 2013; Martins et al., 2015). As such, business model schemas impact the design and interlinking of activities that reflect value proposition, creation, and capture (Baden-Fuller & Haefliger, 2013). In line with prior research, we conceive of the business model as a designed system of activities that reflects the choices of the entrepreneur, his entrepreneurial team, and the entire venture (Tikkanen, Lamberg, & Parvinen, 2005).

Value proposition is based on business model schemas known to the entrepreneur

Business models as mental models provide frames for choices on design logics (Baden-Fuller & Morgan, 2010; Zott & Amit, 2010) and assist the entrepreneur to assess new business opportunities (Baron & Hannan, 2002; Baron, 2007; Dewald & Bowen, 2010). Cavalcante et al. (2011) consider the entrepreneur as an initial business model designer. They argue that the entrepreneur holds the initial business idea. Similarly, Colombo & Grilli (2005) hold that the entrepreneur's prior experience vitally impact their ventures' designs and growth (see also: Baron, 2007). Put differently, entrepreneurs and their mental

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models are the driving forces behind how value is proposed through the initial business model (e.g., Cavalcante et al., 2011).

Hence, the design of the business model depends on both individual cognition and the specific characteristics and necessities of a venture (Malmström & Johansson, 2015). Taken together, the business model schemas known to the entrepreneur usually guide the first structuring of activities and transactions when designing the initial business model (Amit & Zott, 2015; Ricart & Casadesus-Masanell, 2011).

Value creation processes and structures rely on cognition of the growing entrepreneurial team

Activities and relations inform processes (Doz & Kosonen, 2010; Saebi, 2015) and thus expand the initial business model of the venture (Sosna, Trevinyo-Rodríguez, & Velamuri, 2010). In this, activities are characterized as improvements with regard to how the venture deals with internal and external stakeholders like employees and customers (Amit & Zott, 2002; Leih et al., 2015). As a consequence, operational efficiency increases (Leih et al., 2015) and the stability of the business model itself becomes enforced (Amit & Zott, 2002).

Those processes define how and by what means a firm creates value along the value chain using the available capabilities to meet and exploit the identified business opportunities (Achtenhagen et al., 2013; Clauss, 2016). To implement and execute the activities necessary for those processes, a venture no longer relies on the mental models of its entrepreneur alone (Wasserman, 2012), but also on those of its growing entrepreneurial team (Aspara, Lamberg, Laukia, & Tikkanen, 2011; Aspara, Lamberg, Laukia, & Tikkanen, 2011; Colombo & Grilli, 2013). In fact, entrepreneurs can become victim of bias and tap into various pitfalls like misjudging market opportunities (Wassermann (2012). A working entrepreneurial team can become a counterbalance to this (Ambos & Birkinshaw, 2010).

Value capture is a joint endeavor through routines and beliefs

Once the venture has established the manner in which it proposes and creates value, its way of capturing value and converting it into profits becomes more important (Clauss, 2016; Johnson et al., 2008; Teece, 2010). This implies that activities and processes need to be translated into repeatable sets of rou-

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tines and beliefs (Aspara et al., 2011; Sonsa, Trevinyo-Rodríguez, & Velamuri, 2013). Entrepreneurs and the entrepreneurial team vitally impact the evolution of those routines and beliefs when it comes to a venture's business model (Sosna et al., 2010). According to Baden-Fuller & Mangematin (2013) the business model as mental model is a set of cognitive configurations. Put differently, while the initial business model idea mostly depends on the cognition of the individual entrepreneur, the maturing business model framework needs to become an integrative cognitive configuration (Baden-Fuller & Mangematin, 2013; Teece, 2012). According to Teece (2012) the venture needs to take a step to establish a dynamic adaptation of processes within the business model as core belief and routine. In other words, the mental model of the venture should optimally include a constant, dynamic, and strategic reconfiguration of value proposition, creation, and capture, if need be.

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Business Model Dimension	References	Summary	Cognitive allocation	Key Insights
Value proposition	Baron & Hannan (2002)	Entrepreneurs draw on various mental models (blueprints) when designing a new venture and its organizational structure.	Entrepreneur	"Business models are mental models of the entrepreneur"
	Chesbrough (2010)	Business model innovation within an established firm requires a change in attitude and the commitment of management / internal leaders.		
	Amit & Zott (2010)	A key task for entrepreneurs is the active design and construction of the business model as an activity system. Using a business model perspective helps entrepreneurs structure internal and external activities in order to drive innovation.		
	Baden-Fuller & Morgan (2010)	Business models serve as recipes for managers to facilitate strategic change and innovation within an organization.		
	Cassadesus-Masanell & Ricart (2010)	A business model depends on policy choices (the actions an organization takes across all its operations), asset choices (the tangible resources a company deploys) and governance (the decision-making rights over the other two).		
	Cavalcante et al. (2011)	The entrepreneur bears the initial business idea in mind and iterates this idea multiple times before creating an actual business model. Subsequently, change to this business model happens in four stages (1) creation, (2) extension, (3) revision and (4) termination.		
	Porac & Tschang (2013)	The managerial mind shapes the way it perceives its environment and makes decisions within this environment. Dealing with complexity and imagination are key acts of managers to stimulate innovation.		
	Malmström & Johnson (2014)	Entrepreneurs cognition influences weather a business model is high-profit or low-profit. The cognitive processes to develop a high-profit business model are clearer and more sorted, leading to focused actions.		
	Martins et al. (2015)	Business models as schemas shape a managers understanding of value creating activities and their interdependencies. Consciously changing those schemas unlocks innovation potential and novel ways of value creation.		
	Zott & Amit (2015)	To design a business model, entrepreneurs observe and synthesize information, generate and refine potential solutions and finally implement their design choice.		
Value creation	Johnson et al. (2008)	The managers understanding of the value proposition's key elements is key to ensure it is fulfilled in a profitable way engaging available resources and processes.	Entrepreneurial team	"Processes and structures define how the venture creates value"
	Sosna et al (2010)	A business model ensures value creation and capture for a firm. Organizational learning on all levels plays an important part in designing, developing, scaling and sustaining a business model.		
	Cavalcante et al. (2011)	The entrepreneur bears the initial business idea in mind and iterates this idea multiple times before creating an actual business model. Subsequently, changing this business model happens in four stages (1) creation, (2) extension, (3) revision and (4) termination.		
	Achtenhagen et al. (2013)	Value creation is shaped by three key capabilities – the experimentation and exploitation of new opportunities, the balanced use of resources and the coherence between leader-		

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		ship, culture and employee commitment. These capabilities are expressed through activities.		
	Saebi (2015)	The ability to change a business model is expressed through evolution, adaptation and innovation. Organizational agility is key to adapt the business model and driven by change capabilities (particularly on the manager level).		
	Clauss (2016)	Value proposition innovation, value creation innovation, and value capture innovation drive business model innovation. In order to exploit business opportunities, resources and capabilities have to be configured to create value.		
	Doz & Kosonen (2010)	Meta-capabilities like strategic sensitivity, leadership unity, and resource fluidity and the corresponding leadership actions enable a firm to change the business model.	Entrepreneurial team	"The cognition of the entrepreneurial team shapes how activities and processes are implemented"
	Aspara et al. (2011)	The systematic belief systems about the business model are drivers for decision-making and action. Inter-organizational cognition shapes business model innovation processes.		
Value capture	Johnson et al. (2008)	To fulfill a value proposition in a profitable way, managers need to understand its key elements and employ the necessary processes and resources.	Venture	"Value creation processes deliver profits"
	Cavalcante et al (2011)	The entrepreneur bears the initial business idea in mind and iterates this idea multiple times before creating an actual business model. Subsequently, changing this business model happens in four stages (1) creation, (2) extension, (3) revision and (4) termination.		
	Baden-Fuller & Mangematin (2013)	Business models serve as cognitive configurations of managers that are subject to change and aid managers to understand the world faster and better.		
	Baden-Fuller & Häflinger (2013)	The choice of business model influences how products are monetized and thus in turn the profitability of the firm. It also frames how managers, entrepreneurs and developers address innovation.		
	Clauss (2016)	Value proposition innovation, value creation innovation, and value capture innovation drive business model innovation. To capture value, all value-creating activities need to be converted into profits.		
	Tikkannen et al. (2005)	The cognitive belief system of the firm strongly influences business model configurations. Cognition defines how actors within the organization perceive a future, functioning business model.	Venture	"Business model innovation becomes a cognitive configuration of the entire venture"

Table 1: Cognitive underpinnings to business model innovation

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3.2 Assessing higher level capabilities through the lens of cognition

We will concentrate on cognitive capabilities from a DCV perspective in order to investigate how venture business model innovation comes about (Adner & Helfat, 2003; Eggers & Kaplan, 2013; Helfat & Martin, 2014). Managerial cognitive capabilities have been informed by dynamic managerial capabilities that help to build, reconfigure, and reposition organizational resources and capabilities (e.g., Eggers & Kaplan, 2013). They depend on managerial social capital, human capital, and managerial cognition (e.g., Helfat & Martin, 2014). Yet, their cognitive underpinnings and the related cognitive activities remain to be fully understood (Helfat & Peteraf, 2015). In addition, Teece (2007) holds that cognition plays an important role for the microfoundations sensing, seizing, and reconfiguring. In order to advance our understanding of cognitive capabilities in the context of business model innovation, we focus on the underpinnings to managerial cognition. We specifically debate how entrepreneurs, entrepreneurial teams, and entire venture workforces orchestrate activities while innovating the business model.

Sensing opportunities and threats is a key cognitive capability of the entrepreneur

Teece (2007) defines sensing as "capacity to sense and shape opportunities and threats" (p.1319). He argues that sensing depends on a person's knowledge about users, customers, markets, and his/her capability to deal with information; that is, how to gather, interpret, and filter it.

Helfat & Peteraf (2015) highlight the importance of the entrepreneur's cognition to sense opportunities before they materialize. They particularly look at the mental activities of perception and attention, which happens at this point. Perception is hence characterized by the detection of patterns that emerge in the environment of the firm (Baron, 2007) and the correct interpretation of data (Ericsson, 2006). In accordance with this, Wirtz, Schilke, and Ullrich (2010) suggest a framework for the strategic assessment of opportunities. This helps to come up with novel ways to create and capture value through the business model. Meanwhile, such a framework facilitates the recognition and creation of opportunities (Gavetti, 2012). Attention is the ability to notice relevant stimuli

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(Kosslyn & Rosenberg, 2006). This alertness enables the detection and creation of new opportunities (Helfat & Peteraf, 2015). It is also an orienting capacity to turn attention into information (Posner & Fernadez-Duque, 1999). Additionally, attention can be improved through practice over time (Rueda, Posner, & Rothbart, 2005).

In sum, sensing is the cognitive capability of the entrepreneur to perceive and create business opportunities (Teece, 2012) that are subsequently translated into activities (Zahra, Sapienza, & Davidsson, 2006).

Seizing is about the entrepreneurial team's capability of make opportunities real

According to Teece (2007), seizing is about utilizing opportunities through new products, processes, or structures. Not surprisingly, this requires multiple investments in development and commercialization (Eisenhardt & Martin, 2000; Teece, 2007). Those are usually decided upon by strategic management under conditions of uncertainty and complexity (Teece & Leih, 2016). Besides financial funds, seizing also requires substantial organizational effort (Teece et al., 2016). In other words, both the strategic management team and the growing entrepreneurial team of the venture (Cavalcante et al., 2011; Colombo & Grilli, 2013) need to build on the cognitive capabilities of problem solving and reasoning to seize opportunities. Problem solving involves directional thinking. It thus tackles an initial problem — the seized opportunity — through mental operations to achieve a particular goal — the sensing of the opportunity (Gazzaniga, Heatherton, & Halpern, 2010). Thereafter, reasoning is "directed at finding solutions to problems by applying formal rules of logic or some other rational procedure" (Helfat & Peteraf, 2015: 840, based on Colman, 2006). Hence the evolution as well as a functioning business model is built on managerial cognition and respective actions (Tikkanen et al., 2005).

In essence, seizing is the cognitive capability of the entrepreneurial team to reason and solve problems in order to translate initial activities into structures and processes.

Reconfiguring supports routines and beliefs of change within the venture

Ultimately, reconfiguring includes the recombination and reconfiguration of assets and organizational structures as the venture grows. In the meantime, it

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is a means of maintaining the venture's evolutionary fitness through meeting changing markets and environments (Teece, 2012; 2007).

Subsequently, reconfiguration is about how the entrepreneurial team orchestrates and integrates routines and beliefs about change into the core of the venture (Zollo & Winter, 2002). To achieve this, cognitive capabilities of language and communication, and social cognition gain importance (Helfat & Peteraf, 2015). Language and communication refers to the ability to tell stories in order to achieve strategic change through "(1) oral language (listening and speaking); (2) written and printed language (reading and writing); and (3) language reception and language production (speaking and writing)" (Carroll, 1993, pp. 146–147). All of this largely depends on how management adopts those means, and combines and aligns them with non-verbal communication (DePaulo, 1992).

Social cognition defines how an individual interacts with people in a social setting (Moskowitz, 2005) and how the individual influences their relationships (Pennington, 2000). This refers to mental activities such as attention, memory, and emotion (Fiske & Taylor, 2013).

Taken together, reconfiguring is the cognitive capability of the entrepreneurial team to establish routines and beliefs and overcome potential resistance to change within the workforce. In the long-term, a venture might thus even be able to achieve the core belief and routine to react to changes strategically.

Summary

As literature has shown, entrepreneurs, the entrepreneurial team, and the growing workforce is impacted by and, in turn, affects the maturing business model. In order to find a functioning business model, various activities are needed. At this point, cognition plays an especially vital part: While it is mainly the entrepreneur's cognition that shapes how value is proposed in order to sense a certain business opportunity, it is the entrepreneurial team's cognition that increasingly affects value creation through seizing chosen opportunities. Lastly, the processes and structures needed to capture value are shaped and reconfigured by the entire venture workforce (Ambos & Birkinshaw, 2010; Wilden et al., 2016).

One stream of DCV literature has been concerned with explaining the mental activities that help to achieve strategic change (Adner & Helfat, 2003; Helfat & Martin, 2014). The cognitive capabilities introduced in this work can be

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mapped onto the microfoundations of sensing, seizing, and reconfiguring (Helfat & Peteraf, 2015) (Helfat & Peteraf, 2015). We will rely on this work to derive those activities that go into sensing, seizing, and reconfiguring of a venture business model.

In addition, scholars have increasingly applied the DCV to assess business model innovation (Saebi, 2015; Leih et al., 2015; Mezger, 2014). They hold that business model innovation, while separate from strategy, should become increasingly strategic (Leih et al., 2015). (Table 2 puts the DCV in context and Table 3 summarizes the outlined cognitive underpinnings to capabilities.)

In order to better understand the activities that go into proposing, creating, and capturing value, this work will subsequently conceptualize the cognitive underpinnings to business model innovation.

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Microfoundations	References	Summary	Cognitive allocation	Key Insights
Sensing	Tripsas & Gavetti, (2000)	An organization's strategic beliefs are rooted in executive cognition. They require adaptation in times of environmental change.	Entrepreneur	"Sensing opportunities and threats is a cognitive capability of the entrepreneur"
	Adner & Helfat, (2003)	Dynamic managerial capabilities guide how managers build, integrate, and reconfigure resources and competences within an organization in response to changes in the environment. Managerial human capital, managerial social capital and managerial cognition underpin these capabilities. Managerial cognition is based on beliefs and mental models that guide managerial decision-making.		
	Zahra et al. (2006)	The creation and implementation of dynamic capabilities rely on the perception of opportunities, the willingness to drive change and the ability to implement changes. In that, managerial vision and integration skills are essential		
	Teece (2007)	Entrepreneurial managers play an important role in sensing, seizing and reconfiguring new opportunities. The three microfoundations are driven by various underlying activities at the management and enterprise level. Sensing new opportunities involves scanning, learning and interpretive opportunities.		
	Eggers & Kaplan (2013)	Managerial cognition guides CEO attention and thus impacts strategic renewal. Managerial cognition in that sense is a dynamic managerial capability that helps to sense, seize and reconfigure organizational capabilities in times of environmental change.		
	Gavetti, Greve, Levinthal, & Ocasio, (2012)	Superior opportunities are cognitively distant to the manager and require mental associations and processes that combine different contexts in novel ways.		
	Eggers & Kaplan (2013)	Cognition plays a key role in capability development and deployment through (1) the construction of routines, (2) the assembly of routines into capabilities, and (3) the matching of capabilities to opportunities.		
	Helfat & Peteraf (2015)	Managerial cognitive capabilities highlight that capabilities hold the ability to perform not only physical but also mental activities. Cognitive capabilities such as perception and attention underpin the microfoundations of sensing.		
	Leih at al. (2015)	Dynamic capabilities reply on both the skills of top management and the learning mechanisms and culture of an organization. In that, top management is responsible for recognizing and implementing business model change as well as imbedding the skills to do so within the organizational culture.		
Seizing	Teece, 2007	Entrepreneurial managers play an important role in sensing, seizing and reconfiguring new opportunities. The three microfoundations are driven by underlying activities at the management and enterprise level. Seizing relates to the ability to make unbiased decisions under uncertainty to allocate resources.	Entrepreneurial team	"Seizing transforms opportunities into action"

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	Helfat & Martin (2014)	Empirical evidence suggests that dynamic managerial capabilities are essential to drive strategic change. They draw on (1) managerial cognition, (2) managerial social capital and (3) managerial human capital. Those in turn guide a manager's decision-making and action. Knowledge structures (influence decisions on strategic change through existing mental models and beliefs), mental processes (guide managerial attention, perception, interpretation and reasoning) and emotions (causes differences in opportunity seizing) shape managerial cognition.		
	Helfat & Peteraf (2015)	Managerial cognitive capabilities highlight that capabilities hold the ability to perform not only physical but also mental activities. Cognitive capabilities underpin the microfoundations of seizing (problem-solving and reasoning).		
	Teece 2012	Dynamic capabilities rely on the skills of individual (top) managers. To sustain performance, the entrepreneurial manager must transfer these capabilities to the wider organization.		"Seizing is a cognitive capability of the entire entrepreneurial team"
	Teece, 2007	Entrepreneurial managers play an important role in sensing, seizing and reconfiguring new opportunities. The three microfoundations are driven by various underlying activities at the management and enterprise level.		
		Reconfiguring is the ability to ensure a continuous renewal of routines within the organization.		"Reconfiguring supports the establishment of routines and beliefs"
	Helfat et al. (2007)	Asset orchestration is a key task for executives to select, configure, align and modify tangible and intangible assets. Strategic change in turn requires a recombination of assets.		
	Helfat & Peteraf (2015)	Managerial cognitive capabilities highlight that capabilities hold the ability to perform not only physical but also mental activities. Cognitive capabilities underpin the microfoundations of reconfiguring (language/communication and social cognition).		
	Zollo & Winter (2002)	Dynamic capabilities are stable patterns of activity within an organization. The development of dynamic capabilities is driven by three distinct learning mechanisms (1) experience accumulation, (2) knowledge articulation, and (3) knowledge codification.		
Reconfiguring	Mezger (2014)	BMI is conceptualized as a distinct dynamic capability, consisting of the capacity to sense opportunities, seize them through a unique business model and reconfigure competences and resources. Organizational routines and processes shape these capacities.	Venture	
	Leih at al. (2015)	Dynamic capabilities reply on both the skills of top management and the learning mechanisms and culture of an organization. In that, top management is responsible for recognizing and implementing business model change as well as imbedding the skills to do so within the organizational culture.		"Reconfiguring happens that the core of the entire venture"
	Wilden et al (2016)	A framework is proposed to conceptualize DC in general, (1) emphasizing the micro foundations of DCs; (2) accounting for the multilevel nature of DCs; (3) addressing the confusion about DC definitions; and (4) providing methodological alternatives to modeling. In that, cognition emerges as an important research stream to understand managerial behavior as key micro foundation of DC. In particular, cognitive models shape routines and structures within the firm on individual, team and firm-level		

Table 2: The DCV in context

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4. Findings

BMI-related sensing as cognitive capability

Sensing refers to the identification of new opportunities for business models before they materialize (Mezger, 2014; Teece, 2007) and the way in which value is proposed based on these opportunities (Clauss, 2016; Johnson et al., 2008). To do so, entrepreneurs rely on two cognitive activities, namely perception and attention (Helfat & Peteraf, 2015).

Perception

The entrepreneur's mental model is fundamental to conceive the first business model idea (Helfat & Peteraf, 2015; Martins et al., 2015). Initially, entrepreneurs rely on the business models they already know, for instance, industries or markets (Casadesus-Masanell & Ricart, 2007). These known models help them scan their environments in order to identify opportunities (Baron & Ward, 2004; Mezger, 2014). As the mental model consists of relations and attributes (Fiske & Taylor, 1991), it assists the entrepreneur in perceiving emerging patterns (Malmström & Johansson, 2015). It also provides frames and logics that help entrepreneurs to interpret the information gathered from the environment (Baden-Fuller & Haefliger, 2013; Zott et al., 2011).

Attention

The stimuli received from the interpretation of patterns in the environment direct the entrepreneur's attention and trigger selective attention (Parasuraman, 2000; Ocasio, 2011). As a consequence, entrepreneurs direct their awareness towards creating business model ideas (Helfat & Peteraf, 2015). Thus, structured approaches to idea development like brainstorming (Amit & Zott, 2015; Cavalcante et al., 2011), improvisation (Helfat & Martin, 2015; Amit & Zott, 2015), conversing, and sketching (Cavalcante et al., 2011) are important tools for the entrepreneurs to draft an initial offering (Helfat & Martin, 2015).

Executive attention enhances planning, problem solving, and decision making, and relates to diverse, often non-consistent schemas derived from novel insights into the market, competitors, and customers (Fernandez-Duque et al., 2000; Ocasio, 2011). A subsequent market assessment deepens the understanding about customer

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and their needs, markets and possible competitors, and targeted offerings. By perceiving opportunities and subsequently directing attention in order to synthesize insights, entrepreneurs ultimately achieve an initial value proposition (Clauss, 2016). Based on this initial value proposition, value creation processes are designed.

4.1 BMI-related seizing as a cognitive capability

Seizing is utilizing opportunities through new products, processes, or structures (Teece, 2007). It also assists the venture in the definition of its value creation (Mezger, 2014). To translate activities into processes, the entrepreneurs and their growing entrepreneurial team rely on problem-solving and reasoning (Helfat & Peteraf, 2015).

Problem-solving

In order to solve problems, individuals tend to rely on their mental models. Working with the mental models known and close to the entrepreneur enables him or her to make fast decisions through simplification and abstraction (Helfat & Peteraf, 2015; Colman, 2006; Prahalad & Bettis, 1986). In addition, new knowledge from market assessments and employees joining the venture directs rational thinking. This way, rational thinking enables a recombination of schemas through adding new attributes and relations (Wisniewski, 1997; ref). In other words, while the entrepreneurs and their growing entrepreneurial team reorganize and advance their preeminent mental models, they transform insights into business model structures and processes (Mezger, 2014).

Reasoning

Essentially, the entrepreneurs and their growing entrepreneurial team increase their ability to reason without sticking too much to previously learned knowledge (Kosslyn & Rosenberg, 2006; Stanovich, 2009). A reorganization of insights becomes possible (Ocasio, 2011; Porac & Tschang, 2013) and helps them to systematically advance the evolving business model structures and processes (Mezger, 2014). These structures and processes define how the venture intends to create value through particular, interconnected activities within the business model (Clauss, 2016; Zott & Amit, 2010). In the meantime, the systematic advancement of new knowledge from evolving mental models triggers investment decisions regarding, for instance, necessary technologies or partnerships (Wirtz et al., 2010). Ultimately, the joint decisions

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that are made about value creating activities advance the venture's business model heuristics (Wilden et al., 2016). Thus, they provide frameworks for future action and decision making under conditions of uncertainty and complexity (Helfat & Peteraf, 2015).

Taken together, through moving from problem-solving to reasoning the venture clarifies how it intends to create value with its initial value proposition. To maintain a functioning business model, the venture now needs to ensure sustainable value capture mechanisms.

4.2 BMI-related reconfiguring as cognitive capability

Reconfiguring includes the recombination and reconfiguration of assets and organizational structures (Teece, 2007). Fundamentally, it is about translating structures and processes into routines and beliefs in order to capture value through the venture business model (Mezger, 2014; Teece, 2010; Johnson et al., 2010). The microactivities around language and social cognition gain importance (Helfat & Peteraf, 2015).

Language

To achieve a shared mental model, the entrepreneurs and their entrepreneurial team create stories. Those stories are told top-down so that they reach the entire venture workforce (Helfat & Peteraf, 2015; Carroll, 1993; Teece, 2012). Stories are defined as controlled mental processing that aim to derive issues and collective answers (Bialystok & Ryan, 1985). They are communicated through communicative sounds and symbols (Colman, 2006). Yet, language is not merely a verbal but also a nonverbal expression of confusion, opinion, values, motivation, or agreement (Helfat & Peteraf, 2015).

Asset reconfiguration depends critically on management and how it wraps its intentions into language, verbal and nonverbal. This way, they can set examples and inspire the entire workforce (Baum, Locke, and Kirkpatrick, 1998; Wesley and Mintzberg, 1989). For instance, by setting common goals and living them, entrepreneurs and their teams can facilitate strategic change (Hill & Levenhagen, 1995; Teece, 2012; Metzger, 2014; Barreto, 2010).

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Social cognition

One central common goal is to capture value from the business model to gain profits (Teece, 2010; Johnson et al., 2008). The agreed-on configuration of business model assets drives the alignment of activities, structures, and processes. As a consequence, a shared understanding of how to capture value through a particular business model evolves (Clauss, 2016). That alignment also supports and enforces the establishment of relationships and human interaction (Fiske & Taylor, 1991; Pennington, 2000).

The social cognition that forms in this way enhances the processing of "socially relevant information" regarding the internal and external surrounding. In addition, it leads to automatic and controlled mental processing (Pennington, 2000: 62). Controlled mental processing is directed by an intention. It guides human attention based on conscious awareness of human action. Put differently, the actor — any member of the firm — is aware of his/her actions and the processes controlled by these actions. Hence, controlled mental processing is vital for setting goals and for self-monitoring of processes towards attaining these goals (Moskowitz, 2005). Once an actor practices a particular action long enough it becomes automatic. Automatic processing thus refers to learned actions that occur without giving it much thought (Kolb & Whishaw, 2009).

In essence, social cognition underpins the establishment of the cognitive business model schema for the entire venture. It clarifies common goals with respect to how value is proposed, created, and captured through agreed on sets of activities and interdependencies.

Ultimately, social cognition appears to be vital for overcoming resistance within the organization. In this, language and social cognition drive the routines and beliefs embedded in the venture. They sustain a particular cognitive configuration of the business model (Baden-Fuller & Morgan, 2010; Baden-Fuller & Mangematin, 2013) while supporting a culture of strategic and dynamic change (Teece, 2012).

5. Discussion

While literature on business models has repeatedly highlighted trial-and error and experimentations as core components of the cognitive black box to business model innovation (Doz & Kosonen, 2010; Saebi, 2015), our insights show that there is more to it: We agree that venture business model innovation is initially impacted by the

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cognition of the entrepreneurs (Dewald & Bowen, 2010; Osiyevskyy & Dewald, 2015). But as the venture matures, the growing entrepreneurial team and workforce gains increasing importance for the venture's business model innovation (Ambos & Birkinshaw, 2010; Aspara et al., 2011).

However tacit the mental operations may be that drive the journey of value proposition, creation and capture (Clauss, 2016; Martins et al., 2015), they can be subsumed under the cognitive capabilities sensing, seizing, and reconfiguring (Mezger, 2014) (see Figure 2).

5.1 Sensemaking drives BMI-related sensing

First, in accordance with Helfat and Peteraf (2015) sensing is defined by the activities perception and attention. We expand prior research by establishing that they are characterized by the following micro-activities (Helfat & Martin, 2014): With respect to perception, the mental model of the entrepreneur serves as starting point for scanning the environment for emerging patterns (Cavalcante et al., 2011; Malmström & Johansson, 2015). Those patterns direct the first sensing of opportunities with regards to business model components such as market, customer, and offering (Clauss, 2015; Morris et al., 2005; Wirtz et al., 2016). Although entrepreneurs might initially stick to known business models, and subsequently deny opportunities that are not compatible with those models (Baden-Fuller & Mangematin, 2013; Baron & Hannan, 2002; Doz & Kosonen, 2010; Martins et al., 2015; Osiyevskyy & Dewald, 2015), they expand those models with increasingly strategic assessments (Dong et al., 2016). For instance, Wirtz et al. (2010) suggest a framework to strategically assess the new modes of business possible through the Internet. This directs their attention and leads to first and new ideas of markets, customers, or possible offerings (Ocasio & Joseph, 2008). A set of activities evolves that shapes the conception of the initial business model through the mind (Cavalcante et al., 2011; George & Bock, 2011). Ultimately, this sensemaking of opportunities guides first conceptualizations of value proposition (Clauss, 2016; Colombo & Grilli, 2005; Saebi, 2015; Shafer, Smith, & Linder, 2005). Put differently, the cognitive capability of sensing facilitates initial strategic steps towards designing a venture business model (Achtenhagen et al., 2013).

We establish that BMI-related sensing is the cognitive capability of the entrepreneur(s) that allows him/her to develop a value proposition for their venture through sensemaking.

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Although schemas function as a theoretical glimpse of how the entrepreneur(s) start their journey to designing a business model, the cognitive processes that go into that journey still remain to be fully understood. Entrepreneurial cognition in relation to venture or firm performance has been approached through opportunity confidence (Dimov, 2010), understanding of tasks (Mitchell, Shepherd, & Sharfman, 2011), and perception of strategic issues (Thomas, Clark, & Gioia, 1993), or new technologies (Gerstner, König, Enders, & Hambrick, 2013; Tongur & Engwall, 2014). However, the micro-activities that underpin the cognitive capability of BMI-related sensing remain to be assessed empirically. Future research at the intersection of business model innovation and the DCV could therefore look at heterogeneous groups of entrepreneurs in a similar venture development stage and analyze step-by-step what happens while they perceive and direct their attention to particular business model opportunities. Some research questions might include: How do perception and attention interact while the entrepreneur(s) define their initial value proposition? Does BMI-related sensing differ amongst homogenous and heterogeneous groups of entrepreneurs?

5.2 Heuristics facilitate BMI-related seizing

Second, seizing involves the activities problem-solving and reasoning. Scholarship has often pointed to the inertia involved in business model evolution and change (Doz & Kosonen, 2010). Others have explained how to address schema change through applying close and adjacent business model schemas (Martins et al., 2015). We expand this work by identifying micro-activities that help to address and overcome bias, and to create novel knowledge. The subsequent systematic advancement of the business model as schemas or mental models digs deeper into processes and structures (Afuah & Tucci, 2001). Cavalcante et al. (2011) emphasize the emergence of general, joint efforts without detailing them further. Tikkanen et al. (2005) hold that business model definition relies on both individual and organizational level cognitive processes, both of which induce the evolution of novel representations of complex systems or heuristics.

We enhance their notion and suggest that entrepreneurs and their growing entrepreneurial teams jointly make investment decisions, e.g., about hiring or sales. Like this they increasingly clarify how they want to create value through the business model. The arising heuristic of how to propose and create value provides a cognitive pathway for the venture to condense and meet opportunities at present and in the

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future. Unlike Wilden et al. (2016), who categorize heuristics primarily as an individual cognitive activity, we argue that heuristics direct the activities of the entrepreneurs and their entrepreneurial teams.

We establish that BMI-related seizing is the cognitive capability of the entrepreneur(s) and their entrepreneurial teams that allows them to develop the value creation for the venture through emerging heuristics.

Tapping into problem-solving and reasoning conceptually has been enlightening to expand the idea of business model iterations (Amit & Zott, 2015). Interesting avenues for future research open: For instance, scholarship could look at how entrepreneurs and their teams allocate attention while they execute micro-activities to define how value will be created (Ocasio, 2011).

In addition, we provide a theoretical conceptualization of the mental activities underlying dynamic capabilities in business model innovation (Helfat & Martin, 2014; Wilden et al., 2016). Future research could empirically validate those conceptual findings through the following research questions: What conditions foster problem-solving and reasoning? Are diverse entrepreneurial teams beneficial contributors to the strategic iterations involved in BMI-related seizing?

5.3 Routines and beliefs are core to BMI-related reconfiguring

Finally, reconfiguring addresses language and social cognition. Language refers to the way resistance in the organization is overcome through the on-going advancement of the ventures' notion of its business model.

Gavetti (2012) explains that some managers have the capability to transfer knowledge structures from one particular market setting to another. We enhance this notion by arguing that the advancement of an existing schema helps to clarify how value is captured through the business model (Clauss, 2016; Teece, 2010). The impact of storytelling — both verbally and nonverbally — cannot be denied at this point. In fact, language becomes essential to drive the interaction within the entire venture. It also underlines how agreements are achieved, and opportunities are being met. A shared set of routines and beliefs with regards to agreed-on activities and interconnections within the venture business model arises. The social cognition thus shaped directs controlled and automatic mental processing (Kolb & Whishaw, 2007; Moskowitz, 2005). Gary, Wood, and Pillinger (2012) emphasize that after managers have experienced change within a particular setting, they develop a sustainable capacity to

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transfer knowledge to different contexts. Put differently, controlled mental processing is the process of communicating and enforcing shared goals. As soon as those shared goals have been learned and integrated into the entire venture's routines and beliefs, automatic mental processing and action towards common goals like capturing value occurs.

We establish that BMI-related reconfiguring is the cognitive capability of the venture to create, establish, and reinforce routines and beliefs. Those routines and beliefs also refer to how value is captured through agreed on sets of interrelated business model activities. This is particularly vital as environments change constantly and keep presenting new and changing opportunities.

Language and social cognition underpin BMI-related reconfiguring. Once the venture has defined its very own language and social cognition, this cognitive capability becomes a means of meeting conditions of change. Those can include technological shifts which need to be responded to through business model innovation (Kesting & Günzel-Jensen, 2015; Tongur & Engwall, 2014). Prior research confirms that firms differ with respect to their cognitive capabilities and that these differences are a vital competitive advantage to meet conditions of change (Peteraf & Reed, 2007; Sirmon & Hitt, 2009). Scholarship on managerial capabilities also states that managerial cognition, managerial social capital, and managerial human capital jointly drive strategic change of venture sales and profitability (Davidsson & Honig, 2003). What scholars have not yet addressed is the following: How do language and social cognition shape the reactions of the entire venture workforce to conditions of change? Could the BMI-related cognitive capability of reconfiguring increase foresight, risk assessment, and long-term competitive advantage and thus prevent fast and nonstrategic pivots?

The theoretical model in Figure 2 captures our findings. It shows the mental operations that shape the conceptually derived cognitive capabilities. In other words, cognitive capabilities of venture business model innovation are mental operations based on interrelated activities and micro-activities (see Fig. 2).

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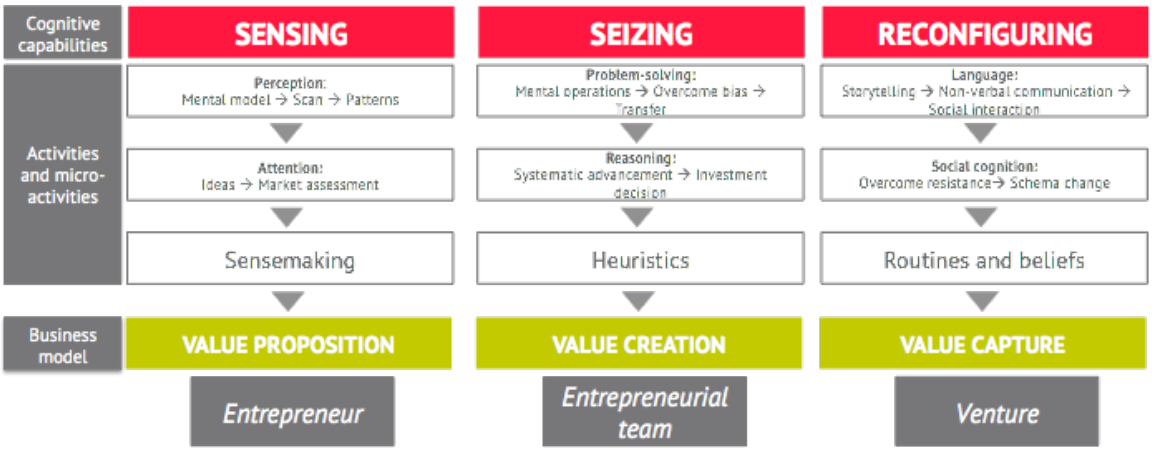


Figure 2: Theoretical model of cognitive capabilities of venture business model innovation

6. Conclusion

6.1 Theoretical contributions

This paper has debated the current state of literature on business model innovation with a particular dedication to cognition. Framed by DCV, it attempted to derive conceptualizations of cognitive capabilities that facilitate the business model innovation of ventures.

Scholars have emphasized the purposeful selection, interlinking, and performance of activities and relations when it comes to innovating the business model (Zott & Amit, 2010). We acknowledge that business model innovation relies on mental operations that are shaped by cognitive activities and relations. Those develop as the actors define, adapt, and innovate the business model (Saebi, 2015; Spieth et al., 2014).

Much has been said about the insights that can be derived for business model innovation from taking the business model as unit of analysis (Zott et al., 2011). Taking the business model as unit of analysis has specifically sharpened the understanding of firm-level and intrafirm-level modes of cognitive actions that the venture performs in order to meet internal and external change drivers. This ties neatly into the DCV — a strategic management framework that has been developed as an answer to manage the need to continuously change and renew the firm through dynamic capabilities (Teece et al., 1997). Late streams of DCV literature have focused on cognitive capabilities as mental activities that the firm performs in order to sense, seize, and reconfigure opportunities (Helfat & Peteraf, 2015). We contribute to previous studies on BMI-related sensing, seizing, and reconfiguring (Mezger, 2014) by showing the

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underlying cognitive micro-activities for these activities. Those emerge from managerial cognition and can be embedded in particular contexts.

Essentially, we advance the literature at the intersection of DCV and business model innovation by suggesting the following: The cognitive capabilities of business model innovation are mental operations based on interrelated mental activities that originate in particular micro-activities. Initially, entrepreneurs and their mental models vitally shape those capabilities through sensemaking with respect to how value will be proposed through the new business model. Jointly, entrepreneurs and their growing teams establish new heuristics of value creation through that business model. Integrating those heuristics into language and social cognition leads to routines and beliefs within the entire firm. Those routines and beliefs are also helpful to enforce how ventures propose, create, and capture value through its business model.

Ultimately, literature to business model innovation has repeatedly highlighted the importance of defining and interlinking the business model dimensions of value proposition, creation, and capturing (Clauss, 2016; Zott et al., 2011). Initially, entrepreneurs and their emerging teams vitally impact the definition of their venture's business model (Cavalcante et al., 2011; Colombo & Grilli, 2005). Put differently, their mental models gain importance (Baden-Fuller & Morgan, 2010; Malmström & Johansson, 2015). In this, business models have been considered as mental models that shape business models (Martins et al., 2015). Our review confirms that the mental models of entrepreneurs, their teams, and the evolving workforce of the venture vitally shape the process of defining, adapting, and innovating the business model. In this, business model definition is about coming up with a functioning business model, adaptation makes it scalable, and the continuous innovation helps to remain competitive in the long term.

We summarize our contributions accordingly. First, our evidence hints at the mental activities and micro-activities that underpin BMI-related sensing, seizing, and reconfiguring. Hence, business model innovation can be considered as a cognitive capability of the venture. Second, we propose that the business model as mental model changes through sensemaking, new heuristics, and evolving routines and beliefs. Those mental operations facilitate the strategic definition and adaptation of the business model as well as its continuous innovation. Third, maturing ventures benefit from the routine and belief of business model innovation. This way, they can ensure their long-term competitive advantage.

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6.2 Managerial implications

Managerial practice can benefit from our insights in many ways: First, by approaching business model innovation as cognitive capability, entrepreneurs can systematically assess, employ, and direct the various mental activities and micro-activities that go into designing, adapting, and innovating the business model.

Second, entrepreneurs and their teams can benefit from this strategic assessment of cognitive capabilities. It can be beneficial to manage and counteract upcoming bias with regards to singular business model dimensions and support a faster alignment of those dimensions. Useful methods to do so could include creative storytelling.

Ultimately, orchestrating those cognitive capabilities of BMI-related sensing, seizing, and reconfiguring can help the entire venture to establish a routine and belief of continuously dealing with internal and external change drivers. Especially, if the management achieves to communicate the idea of continuous business model innovation as part of the venture culture top-down.

6.3 Future research

Our paper also points to many questions that remain without answer. In particular, further research is necessary to fill the gaps at the intersection of business model innovation and cognitive capabilities. An enhanced understanding of the mental operations that go into BMI-related sensing, seizing and reconfiguring could fruitfully enrich the debate. Additionally, it seems promising to further investigate who performs those micro-activities at which point in time as well as how the actors interact.

Our review additionally suggests that more research is needed when it comes to BMI-related reconfiguring. The establishment of routines and beliefs of business model change in a venture has been described as opportunity to meet internal and external change drivers. At the same time, reconfiguring might help established firms to meet those change drivers through continuous business model innovation. Future scholarship could advance research with regards to how both language and social cognition can become facilitators of the strategic innovation of the firm's (venture and established firm) business model.

Ultimately, the article at hand primarily focuses on cognitive capabilities in a venture context. Future research may consider expanding the findings at hand to organizational contexts that are not inherently entrepreneurial, for example, family businesses, small and medium sized firms, or large corporations.

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6.4 Closing

The concept of business model innovation as cognitive capability with its explicit focus on ventures has provided a rich overview of current concepts and debates. With this paper we have gathered, assessed, and conceptualized the mental activities that shape BMI-related sensing, seizing, and reconfiguring. Those conceptualizations open up many opportunities for future research on business model innovation. We therefore hope to encourage scholars in the field to follow up on our suggestions and to deepen insights into the cognition of entrepreneurs, entrepreneurial teams, and the growing venture workforce when it comes to decisions on how to utilize opportunities through proposing, creating, and capturing value with the business model.

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