9. The artifacts of entrepreneurial practice

Henrik Berglund and Vern L. Glaser

INTRODUCTION

Historically, most explanations of venture development tend to focus on character traits or cognitive heuristics of individual entrepreneurs (Alvarez, Barney, & Anderson, 2012; Gartner, 1988; Sarasvathy, 2001), aspects of the environment that help shape the process (Ramoglou & Tsang, 2016; Venkataraman, 1997), or sequences of events and activities that mark venture development progress (Gartner, Shaver, Carter, & Reynolds, 2004). In recent years, practice-oriented scholars have instead sought to combine accounts of individuals, contexts, and activities by moving closer – both empirically and conceptually – to "the real-time doings and sayings of practitioners involved in entrepreneurship" (Champenois, Lefebvre, & Ronteau, 2020, p. 281). By doing so, the ambition is to develop more descriptively accurate and prescriptively useful entrepreneurship theories.

However, despite the practice tradition's commitment to sociomateriality and entrepreneurial practices as materially mediated (e.g., Thompson & Byrne, 2020), the central artifacts of entrepreneurial practice – such as pitches, business plans, business model diagrams, financial models, prototypes, minimum viable products, etc. – have received surprisingly little attention from not only mainstream entrepreneurship scholars, but also from scholars explicitly concerned with entrepreneurship-as-practice. This is surprising for several reasons. First, artifacts in the form of business model canvases (Osterwalder, 2013), minimum viable products (Blank, 2013; Ries, 2011), and prototypes (Savoia, 2019) are absolutely central in the thriving practitioner literature. In contrast, the neglect of entrepreneurial artifacts in the academic literature is striking. As a result, many entrepreneurship scholars grudgingly admit to teaching the Lean Startup methodology (Ries, 2011) or incorporating the Business Owner's Manual (Blank & Dorf, 2012) into their courses, because students are most interested in learning how to design products and businesses.

Second, entrepreneurship, when viewed as a management practice (as opposed to self-employment, an economic function, or the running of a small business), is essentially concerned with the design of new businesses in the face of uncertainty (Klein, 2008). From a design perspective (Berglund, Dimov, & Wennberg, 2018; Rindova & Martins, 2021; Wegener & Glaser, 2021), a focus on central entrepreneurial artifacts such as prototypes, business plans, and pitches is arguably quite natural and will likely improve our understanding of entrepreneurship. Analogous illustrations include how examinations of the constraints and affordances of Microsoft Excel helped explain the practice of financial evaluation (Spee, Jarzabkowski, & Smets, 2016), how investigating the use of whiteboards (Sapsed & Salter, 2004) and PowerPoint (Kaplan, 2011) helped develop theory about how collaborative work is enabled and constrained, and how studying algorithms and information systems has helped us understand the formation of organizational routines (Glaser, Valadao, & Hannigan, 2021).

Despite the obvious potential for practical utility as well as theoretical understanding, entrepreneurship research has so far been conducted without much attention paid to its central

artifacts. Echoing Schumpeter (1942) and Baumol (1968), it is as if the Prince of Denmark had again been expunged from discussions of Hamlet. Only this time, it is not entrepreneurs who are missing from economic theories or textbooks, but artifacts that are missing from accounts of entrepreneurial practice. To rectify this situation, we first define entrepreneurial artifacts and describe them in terms of three broad categories: abstract, material, and narrative. Then, we discuss themes that we believe should be addressed to advance our conceptual understanding of entrepreneurial artifacts. We conclude the chapter by exploring the implications of our conceptual framework for the practice (and practice theory) of entrepreneurship.

ENTREPRENEURIAL ARTIFACTS

The value of considering artifacts in accounts of development and change has long been stressed by practice-oriented social theorists (e.g., Knorr Cetina, 2001; Latour, 1987; Schatzki, Knorr Cetina, & Savigny, 2001) as well as by organizational scholars from an increasingly broad set of perspectives (e.g., Carlile, 2002; D'Adderio, 2011; Glaser, 2017; Simon, 1996; Suchman, 2007; Whittington, 2003). In addition to making research more practically useful, there is much to be gained conceptually by making artifacts central to how we understand entrepreneurship as a practice, where such artifacts function as evolving boundary objects of sorts that relate individuals and environments as part of design-oriented practices (e.g., Bechky, 2003; Berglund, Bousfiha, & Mansoori, 2020; Knorr Cetina, 2001; Kostis & Ritala, 2020; Orlikowski & Lacono, 2001; Randhawa, West, Skellern, & Josserand, 2021; Rindova & Martins, 2021). In this spirit, we build on the work of Berglund et al. (2020, p. 828) and conceptualize the entrepreneurship concept of "opportunity" as the most abstract entrepreneurial artifact.[1] The abstract opportunity-as-artifact is then iteratively developed in an entrepreneurial design process that revolves around more concrete entrepreneurial artifacts – such as business models, prototypes, landing pages, pitches etc. – which serve connect and gradually stabilize the relationship between the organized individuals of the entrepreneurial venture and their external environment.

In our treatment, we define any artifact that serves to instantiate an abstract opportunity in a way that supports its further development as entrepreneurial (Berglund et al. 2020). While emphasizing the individual entrepreneur, Dimov's (2011, pp. 62–63) description resonates with ours:

> An opportunity epitomizes the symbolic aspect of the interaction between entrepreneurs and their environments. It can be regarded as an evolving blueprint for action, synthesizing the entrepreneur's sense of, expectations about, and aspirations for the future, and can help us understand what the entrepreneur does at every step of the way from within the worldview that the entrepreneur holds.

To further elucidate and make operable our understanding of entrepreneurial artifacts, we highlight three sub-categories: abstract artifacts, material artifacts, and narrative artifacts. While internally heterogeneous and partly overlapping, these broad types clarify our discussion and provide a stepping stone for entrepreneurship-as-practice scholars to better understand the entrepreneurial process. We illustrate each type of artifact using examples from academic and practitioner writings about entrepreneurship, and summarize this typology of entrepreneurial artifacts in Table 9.1.

Table 9.1 A typology of entrepreneurial artifacts

Entrepreneurial artifact	Definition	Examples
Abstract	Conceptual devices that help entrepreneurs develop theories of their ventures which in turn help them develop their organizations, create products and services, and communicate with external stakeholders	Business model Entrepreneurial identity
Material	"Things" whose corporeity and material substance are central to their function in the entrepreneurial process	Physical prototypes Digital prototypes
Narrative	Sensemaking devices that are not defined by their materiality, but rather by their ability to relate individuals, objects, and events in meaningful accounts	Business plans Rhetorical tropes: – Analogy, metaphor, synecdoche – Anomaly, paradox, and irony

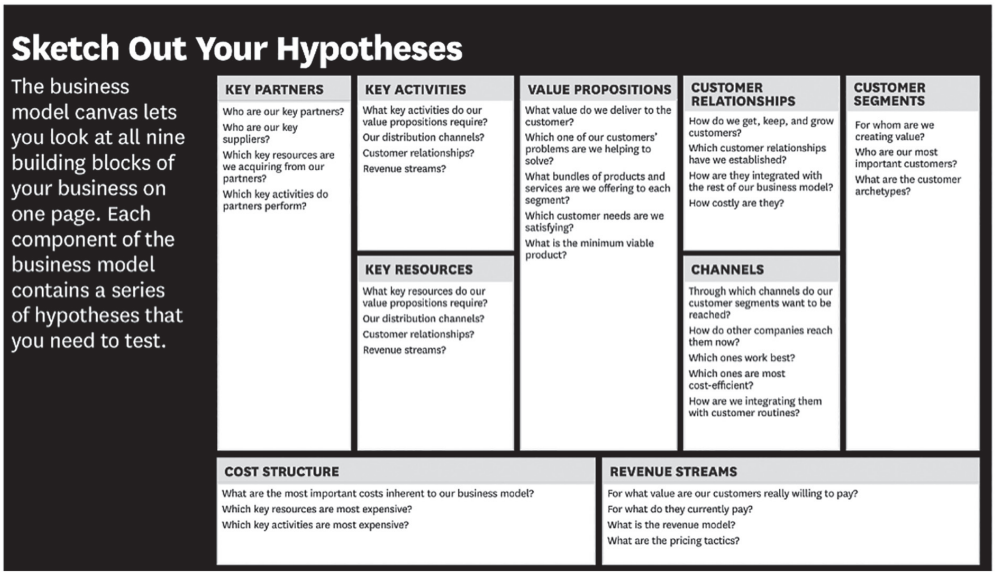
Abstract Artifacts

Abstract entrepreneurial artifacts are conceptual devices that help entrepreneurs articulate theories of their ventures which in turn help them develop their organizations, create products and services, and communicate with external stakeholders. At the core of the entrepreneurial process is thus the development of "blueprints" (Dimov, 2011) or "theories" that "shape entrepreneurial action and strategy" (Felin & Zenger, 2009, p. 135). Specifically, to comprehend and describe entrepreneurial opportunities, entrepreneurs need to develop theories and models that make them concrete: "Entrepreneurs and managers originate theories and hypotheses about which activities they should engage in, which assets they might buy, and how they will create value" (Felin & Zenger, 2017, p. 258). Examples of abstract artifacts that instantiate an entrepreneurial theory are a *business model* and an *entrepreneurial identity*.

Academics and practitioners alike have used the concept of a *business model*, "the rationale of how an organization creates, delivers, and captures value" (Osterwalder & Pigneur, 2010, p. 14), to describe the theory of how a venture operates (for a more detailed history of the concept of business model, see DaSilva & Trkman, 2014). Academic understandings of business models suggest that they can be used to classify organizations, function as sources for analogical inspiration for strategic changes, or provide recipes for how to organize business processes and activities (Baden-Fuller & Morgan, 2010). Business models are used by entrepreneurs as market devices that facilitate the connections entrepreneurs make with other actors (Doganova & Eyquem-Renault, 2009), and recent research has begun to theorize the process of designing business models in nascent markets (McDonald & Eisenhardt, 2020). Academics thus have used business models to analyze and assess organizational performance.

Recently, business models have become increasingly central to the practices of entrepreneurship – specifically through the introduction of the business model canvas (Blank, 2013; Osterwalder & Pigneur, 2010). The business model canvas is an artifactual tool used to stimulate entrepreneurial articulation of the theory of the venture, asking questions about key partners, activities, and resources, value propositions, customer relationships, channels, customer segments, cost structures, and revenue streams that can be rapidly tested and evaluated (Blank, 2013). The business model canvas, when integrated with entrepreneurial practices intended to help would-be entrepreneurs recognize patterns, design novel business models,

and re-interpret existing strategies through a business model lens, becomes a central means through which entrepreneurial practice is enacted (Osterwalder & Pigneur, 2010). The entrepreneurial artifact of the business model canvas (see Figure 9.1) thus has become a central part of entrepreneurship in practice, considering that the inventor of the canvas, Alex Osterwalder claimed that over 5,000,000 practitioners had downloaded it from the "strategyzer" website (Amarsy, 2015).



Source: Blank (2013).

Figure 9.1 The business model canvas

Another abstract artifact that can be associated with the theory of the entrepreneurial venture is *entrepreneurial identity* (Navis & Glynn, 2011). Entrepreneurs, when promoting novel innovations, need to concurrently promote the general legitimacy of their innovations while also maintaining their distinctiveness relative to other innovators (Navis & Glynn, 2010). Identity work is central to how entrepreneurs accomplish this, and existing research highlights its significance. Grimes (2018) showed that when engaging in the practice of entrepreneurship, founders often need to overcome the challenge of maintaining their distinctiveness while demonstrating their responsiveness to external feedback (see also McDonald & Gao, 2019; Snihur & Zott, 2020). Specifically, entrepreneurs use the abstract artifact of identity to enact practices of idea work (i.e., defending, repairing, and re-engineering) and identity work (i.e., transcending, decoupling, and professionalizing) in order to balance their needs to both differentiate and assimilate (Grimes, 2018, p. 1703). Collectively, the abstract entrepreneurial artifacts of business models and entrepreneurial identity provide an important framework from which to explore our understanding of entrepreneurship as practice.

Future research in this vein might explore how historical and contemporary analogs and antilogs (Mullins & Komisar, 2009) influence the design and use of abstract artifacts, includ-

ing, but not limited to, popular business models (e.g., Chen, 2019) and founder identities (e.g., Carreyrou, 2020). Similarly, studies of cultural entrepreneurship exploring entrepreneurial possibilities (Lounsbury & Glynn, 2019) and optimal distinctiveness (Zhao, Fisher, Lounsbury, & Miller, 2017) might both enrich, and be enriched by, accounts of the influence and use of abstract artifacts.

Material Artifacts

Material entrepreneurial artifacts are those "things" whose corporeity and material substance are central to their function in the entrepreneurial process. In the strategy-as-practice literature (e.g., Vaara & Whittington, 2012; Whittington, 2003), scholars have long described how the materiality of PowerPoint presentations (Kaplan, 2011), spreadsheets (Spee et al., 2016), whiteboards (Hodgkinson & Wright, 2002), and other tools shape strategy work. Such artifacts can, of course, be relevant to entrepreneurial practice as well. However, to be properly considered as entrepreneurial artifacts in our framework, they must also be used to instantiate the opportunities being pursued. Key examples of material artifacts are *physical prototypes* and *digital prototypes*.

Physical prototypes are very common in the practitioner literature on entrepreneurship (e.g., Blank & Dorf, 2012; Kromer, 2019; Mansoori & Lackeus, 2020; Savoia, 2019) where they are usually designed to be distinct and unambiguous representations of the envisioned value proposition with a special emphasis on what are believed to be its most critical elements (Eisenmann, Ries, & Dillard, 2011; Savoia, 2019). Typically, the central focus is the envisioned product or user experience, and through their own or others' engagement with prototypes, entrepreneurs are able to evaluate assumptions, identify limitations, and surface opportunities for further development that otherwise would be easy to miss. An illustrative example is the wood and paper mockup of the Palm Pilot used by cofounder Jeff Hawkins during its early development (Jackson, 1998; Savoia, 2019) (see Figure 9.2).

Importantly, while material prototypes often represent the envisioned product in physical or digital form, their potential for generating insights during interactions with potential customers, users, partners, investors, and other external stakeholders goes beyond the product per se. In such situations, the entrepreneur can use the material artifact and descriptions of its intended functionality as a jumping-off point before segueing into more general discussions of the business as a whole. Enabling potential customers to vividly envision what it would be like to have a Palm Pilot and quite literally appreciate the difference it would make in their lives sets the stage for very concrete discussions of relevance to the entrepreneurial design process writ large, such as: typical use cases, preferred revenue models, complementary products and services, potential competitors, relevant marketing channels and key opinion leaders, product categorization and positioning, relevant trends in markets, technology, or regulations, etc. (Blank & Dorf, 2012; Moore, 2014).

Digital entrepreneurial artifacts have often been discussed in the context of experimentally testing explicit hypotheses, e.g., through landing pages or online ads for A/B testing, or more elaborate concierge or wizard of Oz MVPs (see Camuffo, Cordova, Gambardella, & Spina, 2020; Eisenmann et al., 2011; Kromer, 2019). However, due to their distributed nature and the relative ease by which software can be altered, digital artifacts can also be used to harness the transformational potential of collective creativity. Examples of such transformation-inducing digital artifacts include free and open-source software systems such as Linux and Wikipedia

Source: Jackson (1998).

Figure 9.2 Physical prototype of the Palm Pilot

Source: TechCrunch Blog (2011).

Figure 9.3 Digital prototype of the Dropbox video

(Garud, Jain, & Tuertscher, 2008; Nambisan, 2017) as well as more delimited and focused artifacts such as software development kits (Franke & Piller, 2004; von Hippel & Katz, 2002) and digital probes (Jarvenpaa & Standaert, 2018) that entrepreneurs can use to explicitly invite others into the development process. An illustrative example of experimentation through digital artifacts is the video detailing the planned feature set and user experience of Dropbox (Figure 9.3), created by cofounder Drew Houston (Berglund et al., 2020; TechCrunch Blog, 2011). Being digital, the early Dropbox prototypes were shared and diffused to hundreds of thousands of potential users overnight, leading to validation of several critical business hypotheses. This example illustrates one of the advantages of digital over physical artifacts – namely, the speed and ease with which they can be distributed and transformed (Nambisan, 2017; Zittrain, 2006). With growing resources and userbases, startups often take full advantage of these affordances by running large numbers of simultaneous experiments (Thomke, 2001).

Future research in this vein might empirically explore how, for what purposes, and with what consequences physical and digital artifacts are used, thus probing deeper into the question of how the affordances and constraints of materiality artifacts makes them more or less suitable for various entrepreneurial design tasks. Based on such insights, scholars may also

develop a typology with which to classify material artifacts and their affordances in the context of entrepreneurship (Berglund et al., 2020). Such efforts have been undertaken in many design oriented fields. In information systems, the affordances of technologies that can enable informal network change across interdependent organizations have been categorized as individualized, collective, and shared (Leonardi, 2013), and the broad challenges of knowledge exchange, knowledge deliberation, and knowledge collaboration in large-scale collaborative efforts have similarly been matched with the affordances of knowledge collaging, purposeful deliberating, and knowledge interlacing (cf. Malhotra, Majchrzak, & Lyytinen, 2021).

Narrative Artifacts

By narrative entrepreneurial artifacts, we mean sensemaking devices that are not defined by their materiality, but rather by their ability to relate individuals, objects, and events in meaningful accounts. Depending on the purpose for which they are used, the function of narrative artifacts is to represent the opportunity with appropriate clarity, coherence, and stability (Ashforth & Humphrey, 1997). Due to their immaterial character, narratives can be recrafted very easily in principle, in the sense that the entrepreneur simply must tell a different story. In practice, however, the fact that narrative artifacts tend to be instantiated in physical documents or digital files – and are constrained by broader material and discursive circumstances that influence what can be meaningfully said – makes them more or less inert. Still, the material substrate is a contingent feature of any narrative artifact whose essence is captured in the account itself. In entrepreneurship, the archetypical narrative can be thought of as the business plan, and the narrative it uses employs a variety of literary devices to communicate a message or stimulate the generation of new insights (Garud, Gehman, & Giuliani, 2014).

The business plan tells a story that connects aspects of the past with present conditions in order to chart a plausible path toward the future. Echoing longstanding fault lines in the strategy field, business plans are often described as rational instruments that reflect the strategic intent of the firm and its founders, or as institutionally conditioned artifacts designed in response to external norms and pressures in order to appear legitimate to important stakeholders such as investors or partners (Honig & Karlsson, 2004). In discussions with such stakeholders, entrepreneurs are often advised to aim for optimal distinctiveness in the sense of constructing a narrative that balances the value of standing out as innovative and different with the value of being feasible and legitimate (Lounsbury & Glynn, 2001). Consequently, a business plan typically must cover a series of events and concepts that expand beyond and/or flesh out the entrepreneurial identity, as illustrated in "how-to" manuals prevalent in the practitioner literature (for an example, see Shelton, 2017), or in "the pitches" that entrepreneurs make to solicit investor fundings (e.g., Garud, Gehman, & Tharchen, 2018; Soublière & Gehman, 2020; van Werven, Bouwmeester, & Cornelissen, 2019).

Many consider a business plan to be a formal document containing five key elements (see Figure 9.4):

1. Business goals;
2. Reasons why these goals are attainable;
3. A plan for reaching these goals;
4. Data backing the uniqueness of the products and services to be sold; and
5. Supporting information about the organization and team attempting to reach these goals.

Source: Shelton (2017, p. 27).

Figure 9.4 Example of a "how-to" business plan

To make novel or vague business ideas intelligible, entrepreneurs can develop narrative artifacts that make use of tropes such as analogies, metaphors, metonymies, or synecdoches that emphasize similarity with situations and concepts that are already understood (Gioia, 1986), thereby facilitating communication and development despite great uncertainty and ambiguity (Cornelissen & Clarke, 2010). To illustrate, analogies accomplish this through literal references to startups, such as an entrepreneur describing what they do as "X for Y," e.g., Uber for dogs or Airbnb for food (Chen, 2019) or by describing the applicability of concepts from one domain such as finance to another domain such as online advertising (Glaser, Fiss, & Kennedy, 2016). Metaphors instead rely on more figurative references by drawing parallels to less obviously related domains such as warfare, sports, or parenting when describing the products or services being developed, the organizations and overall ambitions of the entrepreneurs, and, not least, their "entrepreneurial journeys" (Bruni, Bonesso, & Gerli, 2019; Cardon, Zietsma, Saparito, Matherne, & Davis, 2005; Clarke & Holt, 2010; Santos & Eisenhardt, 2009).

In contrast, if the ambition is not to explicate or clarify a given idea, but to expand ideas and generate new insights, entrepreneurs may instead leave the "cognitive comfort zone" of similarity (Oswick, Keenoy, & Grant, 2002, p. 294) in favor of tropes such as anomaly, paradox, and irony. Executive taglines such as "impossible is nothing" (Nike) or "enjoy better" (Time Warner) are often used for marketing purposes by established companies, but can also be used by entrepreneurs to stimulate imagination and creative engagement (Berglund et al., 2020; Garud et al., 2008). Relatedly, instead of describing "what they do" using the idiom of the classical venture "pitch" – expecting some clarifying questions followed by either a yes or a no – entrepreneurs can use the idiom of "an ask" that explicitly invites the other person

to "help shape the venture in return for their commitment to become involved in some way" (Dew, Ramesh, Read, & Sarasvathy, 2018, p. 400). To use the metaphor of dating, it is not hard to imagine the question "What would it take for you to go out with me?" opening doors to potential fruitful conversations that otherwise would remain firmly closed if one stuck to the traditional "Will you go out with me?"

Future research in this vein might explore how, for what purposes, and with what consequences narrative artifacts and linguistic strategies are developed and used in entrepreneurial processes. For instance, in a recent study of microlevel rhetoric in entrepreneurial pitches, van Werven et al. (2019) applied theories of argumentation (e.g., Brockriede & Ehninger, 1960; Perelman, 1982; Toulmin, 1958) to better understand of how types of arguments (e.g., analogy, classification, generalization, cause, sign, and authority) relate to the promotion of entrepreneurial ventures of differing degrees of novelty. Given the uncertainty and ambiguity of entrepreneurship (Berglund, 2015), it may be especially relevant to acknowledge how multiple narratives – e.g., as held and promoted by founders, employees, and investors – may coexist, compete, combine or otherwise relate to one and other. In addressing such questions, scholars may benefit from research on the role of narratives in organizational stability and change (Vaara, Sonenshein, & Boje, 2016) and on communication as constitutive or organizations (Cooren, Kuhn, Cornelissen, & Clark, 2011).

OPPORTUNITIES FOR ADVANCING OUR UNDERSTANDING OF ENTREPRENEURIAL ARTIFACTS

By conceptualizing entrepreneurship as artifact-centered design, we align ourselves with other profession-oriented fields such as engineering (Vincenti, 1990), medicine, architecture, human–computer interaction (Suchman, 2007), and information systems (March & Smith, 1995), which have long regarded as a central task: "to teach about artificial things: how to make artifacts that have desired properties and how to design" (Simon, 1996, p. 111). As for practitioners in these fields, the ultimate goal of practicing entrepreneurs is to design new artifacts, which typically involves employing a range of more or less concrete intermediate artifacts to guide the process. This pragmatic and instrumental attitude towards the object of inquiry highlights the conceptual difference between sciences of man-made design and of naturally existing things (Niiniluoto, 1993; Schön, 1984; Simon, 1996). To illustrate the difference, physicists *qua* natural scientists might be interested in describing and explaining the constituents and interactions of atomic nuclei, whereas physicists *qua* nuclear engineers combine such insights with human desires to develop principles and tools that guide the design of artifacts as different as nuclear power plants and hydrogen bombs.

Similarly, entrepreneurship research conducted as a "natural science" seeks to better understand how various things relate to one and other, so as to produce accurate descriptions and causal explanations of processes and outcomes. To illustrate, entrepreneurial opportunities are often treated as naturally existing, with the implication that researchers "need to know the magnitude of the force exerted by the opportunities themselves to accurately estimate the effect of the individual motivations on entrepreneurial decisions" (Shane, Locke, & Collins, 2003, p. 269; see also Berglund & Korsgaard, 2017; Ramoglou & Tsang, 2016; Shane & Venkataraman, 2000). In contrast, design-oriented entrepreneurship scholars gladly use insights from descriptive and explanatory research, but do so with an eye to developing prag-

matically useful design theory. For example, the business model canvas is based on descriptive research that was used to develop, test, and refine a tool to enable effective communication, structure business assumptions, and guide entrepreneurial design work (Romme & Reymen, 2018). Similarly, Porter's (1979) five forces framework used explanatory research from industrial organization economics to develop a tool for assessing industry attractiveness and guide strategy development.

While a relatively recent perspective in the entrepreneurship field (see Berglund et al., 2020, 2018; Dimov, 2016; Rindova & Martins, 2021; Romme & Reymen, 2018), the focus on design-artifacts rather than natural things is quite common in other profession-oriented disciplines such as engineering, architecture, information systems, and medicine, where scholars are not primarily concerned with the world as it is, but as it ought to be – in terms of better cars, buildings, databases, or medical treatments (Niiniluoto, 1993; Simon, 1996). In what follows, we discuss how this perspective might be extended by studying the use of artifacts through experimentation and transformation, exploring the nature of artifacts as epistemic object, and the embeddedness of entrepreneurial artifacts in assemblages.

The Design of Artifacts through Experimentation and Transformation

By describing in some detail how entrepreneurial artifacts can be conceptualized, we hope to provide entrepreneurship scholars who are interested in entrepreneurial action and practice with an alternative to the currently dominant concept of opportunity, which – stemming from its roots in economic theory (Dimov, 2011; Korsgaard, Berglund, Thrane, & Blenker, 2016) – has proven both conceptually and pragmatically problematic. Specifically, we hope that our elaboration of "entrepreneurial artifacts" proves to be both analytically and empirically productive for scholars who are interested in unpacking what might be called strategic entrepreneurship or venture development: entrepreneurial practices that revolve around artifacts that instantiate and develop the abstract "opportunity" pursued (Berglund et al., 2020).

Following design theorists and practice scholars, we see artifacts as interfaces that connect inner and outer systems in productive ways (Schön, 1984; Simon, 1996). In the specific context of entrepreneurship, this means that entrepreneurial artifacts relate the ideas and visions of the organized individuals comprising the emerging venture (inner system) to the customers, users, partners, regulators, institutions, technologies (outer system) comprising the context in which these artifacts are embedded and within which they must fit.

Clearly, entrepreneurial artifacts are intimately intertwined with entrepreneurial practice. Following Berglund et al. (2020), we find it useful to speak of such practices in terms of experimentation and transformation as broad categories or types of entrepreneurial design:

> Design principles in experimentation are analogous to those of scientists who gradually adapt and refine their tentative theories by articulating and iteratively testing the underlying assumptions on which they are based against empirical reality … On the contrary, transformation thrives on heterogeneity of both knowledge and perspectives … with the overarching aim of design principles being "to keep multiple evaluative principles in play and to exploit the resulting friction of their interplay" (Stark, 2009: 15). (Berglund et al., 2020, p. 833)

It often makes sense to design entrepreneurial artifacts that lend themselves especially well to either experimentation or transformation. Experimentation requires distinct and interpretively unambiguous artifacts that enable unbiased information gathering from, and adaptation of the

artifact to, the external environment. In contrast, transformation relies on constructive negotiations among artifacts that are "underspecified, left incomplete, and retain tension" (Weick, 1979, p. 43).

However, actual practices of entrepreneurial design are not always as clear cut as these ideal types suggest. Specifically, abstract, material, and narrative artifacts can be productively combined in different ways as part of experimental and transformational processes. To illustrate, the exact same entrepreneurial artifact (e.g., a physical product prototype) can be used to conduct a comprehension test or a usability test for purely evaluative purposes, or be used as a starting point for a creative conversation to the extent that it is narratively framed as part of a co-design and development process. Similarly, a business plan used to support a definitive vision and point of view in the context of pitching investors is very different from the same business plan framed as an initial stab where nothing is set in stone, and is used as a stimulus to engage investors in generative conversation.

The Nature of Artifacts as Epistemic Objects

As previously discussed, natural things are characterized by their essential qualities. Design artifacts lack such essential qualities and are instead contingently defined and developed in relation to human purposes and situations. To help us further develop the notion of an entrepreneurial artifact, we need a vocabulary and an ontology that resonates with these purposive and contingent qualities. Here we believe that the notion of epistemic objects, as developed by Rheinberger (1997) and Knorr Cetina (2001) provides a good starting point.

Used to characterize the artifacts at the center of non-routine and novelty-generating activities – scientific research being the paradigmatic example – epistemic objects are characterized by an "unfolding ontology" in the sense that they are in the process of being defined, and as such, only exist in terms of various contingent instantiations that are, by definition, incomplete, thereby generating questions that drive further inquiry (Knorr Cetina, 2001; Rheinberger, 1997). In the words of Miettinen and Virkkunen (2005, p. 438):

> These objects are not things with fixed qualities but rather are open-ended projections oriented to something that does not yet exist, or to what we do not yet know for sure. For this reason, they are also generators of new conceptions and solutions and can be regarded as a central source of innovation and reorientation in societal practices.

To develop her argument, Knorr Cetina (2001) described the ontological status of epistemic objects as *unfolding*, *dispersed*, and *question-generating*. First and foremost, they are unfolding in the sense that they are essentially characterized by their lack of stability and incompleteness of being: they are not fixed, but in the process of being defined. One can think here of a "minimum viable product," a prototype, or some similar intermediate entrepreneurial artifact whose function is to elicit feedback and engagement that serves to gradually refine it (Berglund et al., 2020).

Second, entrepreneurial artifacts, as epistemic objects, are also dispersed in that they typically have multiple instantiations such as visions, business plans, pitches, simulations, prototypes, minimum viable products, etc. Such instantiations are always partial in the sense of not comprising the opportunity as a whole. However – and this is critical – these various instantiations are all there is. There is no more "real thing" that one may find by reaching beyond such

manifestations. It is the epistemic object itself that unfolds through the various developments made possible by engaging with the more or less abstract representations comprising it.

Finally, epistemic objects are question-generating in that their very incompleteness, in more or less subtle ways, indicates what is lacking and suggests what ought to be done next. To illustrate, launching a minimum viable product to a set of users will quickly identify situations where it works to some extent, thereby revealing which activities ought to be undertaken, whether in terms of developing additional features, redefining the user segment, rethinking the revenue model, or something else (e.g., Comi & Whyte, 2018). These ontological commitments fit very well into our framework for entrepreneurial artifacts. They not only go beyond the popular (and simplistic) dualisms of discovery-creation and subjective-objective, but also are compatible with the view of entrepreneurship that is artifact-mediated and concrete, a practice that moves from something vague and simple to something gradually more concrete and intricate. Or, in the words of Knorr Cetina: "Objects of knowledge are characteristically open, question-generating, and complex. They are processes and projections rather than definitive things. Observation and inquiry reveals them by increasing rather than reducing their complexity" (Knorr Cetina, 2001, p. 181).

The Embeddedness of Artifacts in Assemblages

Another theoretical perspective that may be useful to extend the utility of our construct of entrepreneurial artifacts is assemblage theory (DeLanda, 2016; Deleuze & Guattari, 1987), which highlights that artifacts are always embedded in broader assemblages of actors, artifacts, theories, and practices (D'Adderio & Pollock, 2014; Glaser, 2017). For example, the aforementioned innovation of the Palm Pilot can be conceptualized as residing in a broader context that includes computers and phones, philosophies of planning (e.g., the Franklin planner), and different types of users. Whereas some research in entrepreneurship highlights the active power of the entrepreneur as an agent to influence outcomes and achieve goals through different types of thinking such as causation or effectuation (e.g., Sarasvathy, 2001), and other research highlights the affordances and material potential of the innovative product or service (e.g., Baker & Nelson, 2005), an assemblage perspective highlights that agency resides in the interaction of these components and is not reducible to the singular intention of particular actors or artifacts. To illustrate with our Palm Pilot analogy, an assemblage perspective would not overestimate either the rhetorical power of the "pitch" or the inherent affordances of the Palm Pilot: instead, it would focus on the embeddedness of the entrepreneurial artifacts within a broader sociomaterial context.

An example of the rich potential of taking an assemblage perspective on entrepreneurial innovation can be seen in Akrich, Callon, and Latour's (2002a, 2002b) analysis of the "key" to success in entrepreneurial innovation. They first showed how, in contrast with mainstream accounts that focus on the properties or characteristics of an innovation, a central component of success is the ability of entrepreneurs to enlist allies (Akrich et al., 2002a). Understanding the process of developing this broader network requires a theoretical conceptualization of entrepreneurial artifacts to understand how different types of abstract, material, and narrative artifacts are used in the process of developing a collaborative ecosystem. Additionally, they show how entrepreneurs must continually adapt their products to market demands (Akrich et al., 2002b). As highlighted earlier, these adaptation activities inherently require material prototypes, and consequently, entrepreneurial artifacts are central to understanding the phenomenon

of entrepreneurial adaptation of an innovative assemblage. For instance, when deploying innovative products, Apple combines material prototypes (Garud et al., 2014) with media coverage of rumors (Hannigan, Seidel, & Yakis-Douglas, 2018; Seidel, Hannigan, & Phillips, 2018) and physical presentations (Wenzel & Koch, 2018).

Combining the concept of entrepreneurial artifacts with the assemblage concept offers promising potential to examine critical, transformative moments in entrepreneurship (D'Adderio, Glaser, & Pollock, 2019). For instance, Glaser, Pollock, and D'Adderio (2021) suggested that assemblages can be productively examined in terms of different "biographical moments" that highlight situations in which programs of action are layered into an assemblage; performative struggles are addressed and resolved; and assemblages "travel" to other locations. These moments are likely to be of particular import in the entrepreneurial process, and understanding the role of entrepreneurial artifacts could help scholars explain phenomena of interest.

CONCLUSION

As per our brief review, many entrepreneurship scholars appear to conceptualize entrepreneurship as an artifact-centered design practice, some more explicitly than others. However, what we largely lack is the vocabulary and conceptual tools to theorize the role of artifacts in entrepreneurial practice. In this chapter, we have defined entrepreneurial artifacts and developed a typology scholars can employ to address this gap. A natural next step is to build on this preliminary account of entrepreneurial artifacts through empirical and conceptual elaboration of their use in context. To this end, we suggested questions for future research related to abstract, material, and narrative artifacts. To better ground such efforts, we also discussed three opportunities for future conceptual development. Finally, we encourage the development and evaluation of pragmatic frameworks and process-models. Being explicitly prescriptive, these should relate artifacts and entrepreneurial practice in ways that support entrepreneurial design processes. Here, existing contributions (Berglund et al., 2020; Dimov, 2016; Romme & Reymen, 2018) can draw inspiration from practitioner models (Blank & Dorf, 2012; Ries, 2011) as well as examples from other design fields, such as Shneiderman's simple mantra for graphical user-interface design: "Overview first, zoom and filter, then details on demand" (Shneiderman, 2003, p. 365) or Eekels and Roozenburg's (1991) basic design cycle of analysis, synthesis, simulation, evaluation, and decision. In conclusion, we believe that understanding the nature and role of artifacts may be especially important to entrepreneurship compared to many other management activities, since entrepreneurial artifacts – i.e. those artifacts that serve to instantiate an abstract opportunity in a way that supports its further development – are integral to the constitution of the opportunity/venture/startup/business being designed. We hope this chapter can encourage and orient future research in this vein.

ACKNOWLEDGMENTS

We thank the editors Neil Thompson and Anna Jenkins for their insightful comments, which have contributed to this chapter. The authors would also like to acknowledge that this research has been supported in part by funding from the University of Alberta's Centre for Entrepreneurship and Family Enterprise.

NOTE

1. Using the opportunity concept to define entrepreneurial artifacts is a matter of convention; opportunity is the most common shorthand for describing the artifact being designed as abstractly as possible (Berglund et al., 2020; Stevenson & Jarillo, 1990). Alternatives might be "the venture" as preferred by many scholars, "the nosiness" or "the startup" common among practitioners, or "the It," which is Alberto Savoia's charming term for the unknown thing entrepreneurs design (Savoia, 2011, 2019), as well as Karin Knorr Cetina's description of the detection equipment assemblage involved in high-energy physics experiments (Knorr Cetina, 2001, p. 182).

REFERENCES

Akrich, M., Callon, M., & Latour, B. (2002a). The key to success in innovation part I: The art of interessement (Trans. A. Monaghan). *International Journal of Innovation Management*, *6*(2), 187–206.

Akrich, M., Callon, M., & Latour, B. (2002b). The key to success in innovation part II: The art of choosing good spokespersons (Trans. A. Monaghan). *International Journal of Innovation Management*, *6*(2), 207–225.

Alvarez, S. A., Barney, J. B., & Anderson, P. (2012). Forming and exploiting opportunities: The implications of discovery and creation processes for entrepreneurial and organizational research. *Organization Science*, *24*(1), 301–317.

Amarsy, N. (2015). Why and how organizations around the world apply the business model canvas. *Strategyzer*. https://www.strategyzer.com/blog/posts/2015/2/9/why-and-how-organizations-around-the-world-apply-the-business-model-canvas.

Ashforth, B. E., & Humphrey, R. H. (1997). The ubiquity and potency of labeling in organizations. *Organization Science*, *8*(1), 43–58.

Baden-Fuller, C., & Morgan, M. S. (2010). Business models as models. *Long Range Planning*, *43*(2), 156–171.

Baker, T., & Nelson, R. E. (2005). Creating something from nothing: Resource construction through entrepreneurial bricolage. *Administrative Science Quarterly*, *50*(3), 329–366.

Baumol, W. J. (1968). Entrepreneurship in economic theory. *The American Economic Review*, *58*(2), 64–71.

Bechky, B. A. (2003). Object lessons: Workplace artifacts as representations of occupational jurisdiction. *The American Journal of Sociology*, *109*(3), 720–752.

Berglund, H. (2015). Between cognition and discourse: Phenomenology and the study of entrepreneurship. *International Journal of Entrepreneurial Behavior & Research*, *21*(3), 472–488.

Berglund, H., Bousfiha, M., & Mansoori, Y. (2020). Opportunities as artifacts and entrepreneurship as design. *Academy of Management Review*, *45*(4), 825–846.

Berglund, H., Dimov, D., & Wennberg, K. (2018). Beyond bridging rigor and relevance: The three-body problem in entrepreneurship. *Journal of Business Venturing Insights*, *9*, 87–91.

Berglund, H., & Korsgaard, S. (2017). Opportunities, time, and mechanisms in entrepreneurship: On the practical irrelevance of propensities. *Academy of Management Review*, *42*(4), 731–734.

Blank, S. (2013). Why the lean start-up changes everything. *Harvard Business Review*, May 1. https://hbr.org/2013/05/why-the-lean-start-up-changes-everything.

Blank, S., & Dorf, B. (2012). *The Startup Owner's Manual: The Step-by-Step Guide for Building a Great Company*. Hoboken, NJ: John Wiley & Sons.

Brockriede, W., & Ehninger, D. (1960). Toulmin on argument: An interpretation and application. *Quarterly Journal of Speech*, *46*(1), 44–53.

Bruni, E., Bonesso, S., & Gerli, F. (2019). Coping with different types of innovation: What do metaphors reveal about how entrepreneurs describe the innovation process? *Creativity and Innovation Management*, *28*(2), 175–190.

Camuffo, A., Cordova, A., Gambardella, A., & Spina, C. (2020). A scientific approach to entrepreneurial decision making: Evidence from a randomized control trial. *Management Science*, *66*(2), 564–586.

Cardon, M. S., Zietsma, C., Saparito, P., Matherne, B. P., & Davis, C. (2005). A tale of passion: New insights into entrepreneurship from a parenthood metaphor. *Journal of Business Venturing*, *20*(1), 23–45.

Carlile, P. (2002). A pragmatic view of knowledge and boundaries: Boundary objects in new product development. *Organization Science*, *13*(4), 355–457.

Carreyrou, J. (2020). *Bad Blood: Secrets and Lies in a Silicon Valley Startup*. New York: Picador.

Champenois, C., Lefebvre, V., & Ronteau, S. (2020). Entrepreneurship as practice: Systematic literature review of a nascent field. *Entrepreneurship & Regional Development*, *32*(3–4), 281–312.

Chen, A. (2019). "Is your startup idea taken?" – And why we love X for Y startups. *Andrewchen*. https://andrewchen.co/x-for-y-startup-ideas/.

Clarke, J., & Holt, R. (2010). The mature entrepreneur: A narrative approach to entrepreneurial goals. *Journal of Management Inquiry*, *19*(1), 69–83.

Comi, A., & Whyte, J. (2018). Future making and visual artefacts: An ethnographic study of a design project. *Organization Studies*, *39*(8), 1055–1083.

Cooren, F., Kuhn, T., Cornelissen, J. P., & Clark, T. (2011). Communication, organizing and organization: An overview and introduction to the special issue. *Organization Studies*, *32*(9), 1149–1170.

Cornelissen, J. P., & Clarke, J. S. (2010). Imagining and rationalizing opportunities: Inductive reasoning and the creation and justification of new ventures. *Academy of Management Review*, *35*(4), 539–557.

D'Adderio, L. (2011). Artifacts at the centre of routines: Performing the material turn in routines theory. *Journal of Institutional Economics*, *7* (Special Issue), 197–230.

D'Adderio, L., Glaser, V., & Pollock, N. (2019). Performing theories, transforming organizations: A reply to Marti and Gond. *Academy of Management Review*, *44*(3), 676–679.

D'Adderio, L., & Pollock, N. (2014). Performing modularity: Competing rules, performative struggles and the effect of organizational theories on the organization. *Organization Studies*, *35*(12), 1813–1843.

DaSilva, C. M., & Trkman, P. (2014). Business model: What it is and what it is not. *Long Range Planning*, *47*(6), 379–389.

DeLanda, M. (2016). *Assemblage Theory*. Edinburgh: Edinburgh University Press.

Deleuze, G., & Guattari, F. (1987). *A Thousand Plateaus: Capitalism and Schizophrenia* (Trans. B. Massumi) (2nd edition). Minneapolis: University of Minnesota Press.

Dew, N., Ramesh, A., Read, S., & Sarasvathy, S. D. (2018). Toward deliberate practice in the development of entrepreneurial expertise: The anatomy of the effectual ask. In K. A. Ericsson, R. R. Hoffman, A. Kozbelt, & A. M. Williams (Eds.), *The Cambridge Handbook of Expertise and Expert Performance* (2nd edition) (pp. 389–412). New York: Cambridge University Press.

Dimov, D. (2011). Grappling with the unbearable elusiveness of entrepreneurial opportunities. *Entrepreneurship Theory and Practice*, *35*(1), 57–81.

Dimov, D. (2016). Toward a design science of entrepreneurship. *Advances in Entrepreneurship, Firm Emergence and Growth*, *18*, 1–31.

Doganova, L., & Eyquem-Renault, M. (2009). What do business models do? Innovation devices in technology entrepreneurship. *Research Policy*, *38*(10), 1559–1570.

Eekels, J., & Roozenburg, N. F. (1991). A methodological comparison of the structures of scientific research and engineering design: Their similarities and differences. *Design Studies*, *12*(4), 197–203.

Eisenmann, T., Ries, E., & Dillard, S. (2011). *Hypothesis-Driven Entrepreneurship: The Lean Startup*. Boston, MA: Harvard Business School.

Felin, T., & Zenger, T. R. (2009). Entrepreneurs as theorists: On the origins of collective beliefs and novel strategies. *Strategic Entrepreneurship Journal*, *3*(2), 127–146.

Felin, T., & Zenger, T. (2017). The theory-based view: Economic actors as theorists. *Strategy Science*, *2*(4), 258–271.

Franke, N., & Piller, F. (2004). Value creation by toolkits for user innovation and design: The case of the watch market. *Journal of Product Innovation Management*, *21*(6), 401–415.

Gartner, W. B. (1988). Who is an entrepreneur? Is the wrong question. *American Journal of Small Business*, *12*(4), 11–32.

Gartner, W., Shaver, K., Carter, N., & Reynolds, P. (Eds.) (2004). *Handbook of Entrepreneurial Dynamics: The Process of Business Creation*. Thousand Oaks, CA: Sage Publications.

Garud, R., Gehman, J., & Giuliani, A. P. (2014). Contextualizing entrepreneurial innovation: A narrative perspective. *Research Policy*, *43*(7), 1177–1188.

Garud, R., Gehman, J., & Tharchen, T. (2018). Performativity as ongoing journeys: Implications for strategy, entrepreneurship, and innovation. *Long Range Planning*, *51*(3), 500–509.
Garud, R., Jain, S., & Tuertscher, P. (2008). Incomplete by design and designing for incompleteness. *Organization Studies*, *29*(3), 351–371.
Gioia, D. A. (1986). Symbols, scripts, and sensemaking: Creating meaning in the organizational experience. In H. Sims & D. Gioia (Eds.), *The Thinking Organization* (pp. 49–74). San Francisco, CA: Jossey-Bass.
Glaser, V. L. (2017). Design performances: How organizations inscribe artifacts to change routines. *Academy of Management Journal*, *60*(6), 2126–2154.
Glaser, V. L., Fiss, P. C., & Kennedy, M. T. (2016). Making snowflakes like stocks: Stretching, bending, and positioning to make financial market analogies work in online advertising. *Organization Science*, *27*(4), 1029–1048.
Glaser, V. L., Pollock, N., & D'Adderio, L. (2021). The biography of an algorithm: Performing algorithmic technologies in organizations. *Organization Theory*, *2*(2), 1–27.
Glaser, V. L., Valadao, R., & Hannigan, T. R. (2021). Algorithms and routine dynamics. In M. S. Feldman, B. T. Pentland, L. D'Adderio, K. Dittrich, C. Rerup, & D. Seidl (Eds.), *Cambridge Handbook of Routine Dynamics* (pp. 315–328). Cambridge: Cambridge University Press.
Grimes, M. G. (2018). The pivot: How founders respond to feedback through idea and identity work. *Academy of Management Journal*, *61*(5), 1692–1717.
Hannigan, T. R., Seidel, V. P., & Yakis-Douglas, B. (2018). Product innovation rumors as forms of open innovation. *Research Policy*, *47*(5), 953–964.
Hodgkinson, G. P., & Wright, G. (2002). Confronting strategic inertia in a top management team: Learning from failure. *Organization Studies*, *23*(6), 949–977.
Honig, B., & Karlsson, T. (2004). Institutional forces and the written business plan. *Journal of Management*, *30*(1), 29–48.
Jackson, D. S. (1998). Palm-to-palm combat. *TIME*, *151*(10), 42–44.
Jarvenpaa, S., & Standaert, W. (2018). Digital probes as opening possibilities of generativity. *Journal of the Association for Information Systems*, *19*(10). https://aisel.aisnet.org/jais/vol19/iss10/3.
Kaplan, S. (2011). Strategy and PowerPoint: An inquiry into the epistemic culture and machinery of strategy making. *Organization Science*, *22*(2), 320–346.
Klein, P. G. (2008). Opportunity discovery, entrepreneurial action, and economic organization. *Strategic Entrepreneurship Journal*, *2*(3), 175–190.
Knorr Cetina, K. (2001). Objectual practice. In T. R. Schatzki, K. Knorr Cetina, & E. von Savigny (Eds.), *The Practice Turn in Contemporary Theory* (pp. 175–188). London: Routledge.
Korsgaard, S., Berglund, H., Thrane, C., & Blenker, P. (2016). A tale of two Kirzners: Time, uncertainty, and the "nature" of opportunities. *Entrepreneurship Theory and Practice*, *40*(4), 867–889.
Kostis, A., & Ritala, P. (2020). Digital artifacts in industrial co-creation: How to use VR technology to bridge the provider-customer boundary. *California Management Review*, *62*(4), 125–147.
Kromer, T. (2019). The question index for real startups. *Journal of Business Venturing Insights*, *11*, e00116.
Latour, B. (1987). *Science in Action: How to Follow Scientists and Engineers through Society*. Cambridge, MA: Harvard University Press.
Leonardi, P. M. (2013). When does technology use enable network change in organizations? A comparative study of feature use and shared affordances. *MIS Quarterly*, *37*(3), 749–775.
Lounsbury, M., & Glynn, M. A. (2001). Cultural entrepreneurship: Stories, legitimacy, and the acquisition of resources. *Strategic Management Journal*, *22*(6–7), 545–564.
Lounsbury, M., & Glynn, M. A. (2019). *Cultural Entrepreneurship: A New Agenda for the Study of Entrepreneurial Processes and Possibilities*. Cambridge: Cambridge University Press.
Malhotra, A., Majchrzak, A., & Lyytinen, K. (2021). Socio-technical affordances for large-scale collaborations: Introduction to a virtual special issue. *Organization Science*, *32*(5), 1371–1390.
Mansoori, Y., & Lackeus, M. (2020). Comparing effectuation to discovery-driven planning, prescriptive entrepreneurship, business planning, lean startup, and design thinking. *Small Business Economics*, *54*, 791–818.
March, S. T., & Smith, G. F. (1995). Design and natural science research on information technology. *Decision Support Systems*, *15*(4), 251–266.

McDonald, R., & Eisenhardt, K. (2020). Parallel play: Startups, nascent markets, and the effective design of a business model. *Administrative Science Quarterly*, *65*(2), 483–523.
McDonald, R., & Gao, C. (2019). Pivoting isn't enough? Managing strategic reorientation in new ventures. *Organization Science*, *30*(6), 1289–1318.
Miettinen, R., & Virkkunen, J. (2005). Epistemic objects, artefacts and organizational change. *Organization*, *12*(3), 437–456.
Moore, G. A. (2014). *Crossing the Chasm*. New York: Harper Business.
Mullins, J., & Komisar, R. (2009). *Getting to Plan B: Breaking Through to a Better Business Model*. Boston, MA: Harvard Business Review Press.
Nambisan, S. (2017). Digital entrepreneurship: Toward a digital technology perspective of entrepreneurship. *Entrepreneurship Theory and Practice*, *41*(6), 1029–1055.
Navis, C., & Glynn, M. A. (2010). How new market categories emerge: Temporal dynamics of legitimacy, identity, and entrepreneurship in satellite radio, 1990–2005. *Administrative Science Quarterly*, *55*(3), 439–471.
Navis, C., & Glynn, M. A. (2011). Legitimate distinctiveness and the entrepreneurial identity: Influence on investor judgments of new venture plausibility. *Academy of Management Review*, *36*(3), 477–499.
Niiniluoto, I. (1993). The aim and structure of applied research. *Erkenntnis*, *38*(1), 1–21.
Orlikowski, W. J., & Lacono, C. S. (2001). Research commentary: Desperately seeking the "IT" in IT research – a call to theorizing the IT artifact. *Information Systems Research*, *12*(2), 121–134.
Osterwalder, A. (2013). A better way to think about your business model. *Harvard Business Review*, *91*(5).
Osterwalder, A., & Pigneur, Y. (2010). *Business Model Generation: A Handbook for Visionaries, Game Changers, and Challengers*. Hoboken, NJ: John Wiley & Sons.
Oswick, C., Keenoy, T., & Grant, D. (2002). Metaphor and analogical reasoning in organization theory: Beyond orthodoxy. *Academy of Management Review*, *27*(2), 294–303.
Perelman, C. (1982). *The Realm of Rhetoric*. Notre Dame, IN: University of Notre Dame Press.
Porter, M. E. (1979). How competitive forces shape strategy. *Harvard Business Review*, *57*(2), 137–145.
Ramoglou, S., & Tsang, E. W. (2016). A realist perspective of entrepreneurship: Opportunities as propensities. *Academy of Management Review*, *41*(3), 410–434.
Randhawa, K., West, J., Skellern, K., & Josserand, E. (2021). Evolving a value chain to an open innovation ecosystem: Cognitive engagement of stakeholders in customizing medical implants. *California Management Review*, *63*(2), 101–134.
Rheinberger, H.-J. (1997). *Toward a History of Epistemic Things: Synthesizing Proteins in the Test Tube*. Stanford, CA: Stanford University Press.
Ries, E. (2011). *The Lean Startup: How Today's Entrepreneurs Use Continuous Innovation to Create Radically Successful Businesses*. New York: Crown Business.
Rindova, V., & Martins, L. L. (2021). Shaping possibilities: A design science approach to developing novel strategies. *Academy of Management Review*, *46*(4). https://doi.org/10.5465/amr.2019.0289.
Romme, A. G. L., & Reymen, I. M. (2018). Entrepreneurship at the interface of design and science: Toward an inclusive framework. *Journal of Business Venturing Insights*, *10*, e00094.
Santos, F. M., & Eisenhardt, K. M. (2009). Constructing markets and shaping boundaries: Entrepreneurial power in nascent fields. *Academy of Management Journal*, *52*(4), 643–671.
Sapsed, J., & Salter, A. (2004). Postcards from the edge: Local communities, global programs and boundary objects. *Organization Studies*, *25*(9), 1515–1534.
Sarasvathy, S. D. (2001). Causation and effectuation: Toward a theoretical shift from economic inevitability to entrepreneurial contingency. *Academy of Management Review*, *26*(2), 243–263.
Savoia, A. (2011). *Pretotype it*. https://www.pretotyping.org/uploads/1/4/0/9/14099067/pretotype_it_2nd_pretotype_edition-2.pdf.
Savoia, A. (2019). *The Right It: Why So Many Ideas Fail and How to Make Sure Yours Succeed*. New York: HarperCollins.
Schatzki, T. R., Knorr Cetina, K., & von Savigny, E. (Eds.) (2001). *The Practice Turn in Contemporary Theory*. London: Routledge.
Schön, D. A. (1984). Design: A process of enquiry, experimentation and research. *Design Studies*, *5*(3), 130–131.
Schumpeter, J. A. (1942). *Socialism, Capitalism and Democracy*. New York: Harper & Row.

Seidel, V. P., Hannigan, T. R., & Phillips, N. (2018). Rumor communities, social media, and forthcoming innovations: The shaping of technological frames in product market evolution. *Academy of Management Review*, *45*(2), 304–324.

Shane, S., Locke, E. A., & Collins, C. J. (2003). Entrepreneurial motivation. *Human Resource Management Review*, *13*(2), 257–279.

Shane, S., & Venkataraman, S. (2000). The promise of entrepreneurship as a field of research. *Academy of Management Review*, *25*(1), 217–226.

Shelton, H. (2017). *The Secrets to Writing a Successful Business Plan: A Pro Shares a Step-by-Step Guide to Creating a Plan That Gets Results* (2nd edition). N.p.: Summit Valley Press.

Shneiderman, B. (2003). The eyes have it: A task by data type taxonomy for information visualizations. In B. Bederson & B. Shneiderman (Eds.), *The Craft of Information Visualization: Readings and Reflections*. https://learning.oreilly.com/library/view/the-craft-of/9781558609150/xhtml/B9781558609150500469.htm.

Simon, H. A. (1996). *The Sciences of the Artificial* (3rd edition). Cambridge, MA: MIT Press.

Snihur, Y., & Zott, C. (2020). The genesis and metamorphosis of novelty imprints: How business model innovation emerges in young ventures. *Academy of Management Journal*, *63*(2), 554–583.

Soublière, J.-F., & Gehman, J. (2020). The legitimacy threshold revisited: How prior successes and failures spill over to other endeavors on Kickstarter. *Academy of Management Journal*, *63*(2), 472–502.

Spee, P., Jarzabkowski, P., & Smets, M. (2016). The influence of routine interdependence and skillful accomplishment on the coordination of standardizing and customizing. *Organization Science*, *27*(3), 759–781.

Stark, D. (2009). *The Sense of Dissonance: Accounts of Worth in Economic Life*. Princeton, NJ: Princeton University Press.

Stevenson, H. H., & Jarillo, J. C. (1990). A paradigm of entrepreneurship: Entrepreneurial management. *Strategic Management Journal*, *11*, 17–27.

Suchman, L. (2007). *Human–Machine Reconfigurations: Plans and Situated Actions* (2nd edition). New York: Cambridge University Press.

TechCrunch Blog (2011). How DropBox started as a minimal viable product. *TechCrunch*. https://techcrunch.com/2011/10/19/dropbox-minimal-viable-product/.

Thomke, S. (2001). Enlightened experimentation: The new imperative for innovation. *Harvard Business Review*, February 1. https://hbr.org/2001/02/enlightened-experimentation-the-new-imperative-for-innovation.

Thompson, N. A., & Byrne, O. (2020). Advancing entrepreneurship as practice: Previous developments and future possibilities. In W. B. Gartner & B. T. Teague (Eds.), *Research Handbook on Entrepreneurial Behavior, Practice and Process* (pp. 30–55). Cheltenham, UK and Northampton, MA, USA: Edward Elgar Publishing.

Toulmin, S. E. (1958). *The Uses of Argument*. Cambridge: Cambridge University Press.

Vaara, E., Sonenshein, S., & Boje, D. (2016). Narratives as sources of stability and change in organizations: Approaches and directions for future research. *Academy of Management Annals*, *10*(1), 495–560.

Vaara, E., & Whittington, R. (2012). Strategy-as-practice: Taking social practices seriously. *Academy of Management Annals*, *6*(1), 285–336.

van Werven, R., Bouwmeester, O., & Cornelissen, J. P. (2019). Pitching a business idea to investors: How new venture founders use micro-level rhetoric to achieve narrative plausibility and resonance. *International Small Business Journal*, *37*(3), 193–214.

Venkataraman, S. (1997). The distinctive domain of entrepreneurship research. *Advances in Entrepreneurship, Firm Emergence and Growth*, *3*(1), 119–138.

Vincenti, W. G. (1990). *What Engineers Know and How They Know It: Analytical Studies from Aeronautical History* (Johns Hopkins Studies in the History of Technology). Baltimore, MD: Johns Hopkins University Press.

von Hippel, E., & Katz, R. (2002). Shifting innovation to users via toolkits. *Management Science*, *48*(7), 821–833.

Wegener, F., & Glaser, V. L. (2021). Design and routine dynamics. In M. S. Feldman, B. T. Pentland, L. D'Adderio, K. Dittrich, C. Rerup, & D. Seidl (Eds.), *Cambridge Handbook of Routine Dynamics* (pp. 301–314). Cambridge: Cambridge University Press.

Weick, K. E. (1979). *The Social Psychology of Organizing*. New York: McGraw-Hill.
Wenzel, M., & Koch, J. (2018). Strategy as staged performance: A critical discursive perspective on keynote speeches as a genre of strategic communication. *Strategic Management Journal*, *39*(3), 639–663.
Whittington, R. (2003). The work of strategizing and organizing: For a practice perspective. *Strategic Organization*, *1*(1), 117–125.
Zhao, E. Y., Fisher, G., Lounsbury, M., & Miller, D. (2017). Optimal distinctiveness: Broadening the interface between institutional theory and strategic management. *Strategic Management Journal*, *38*(1), 93–113.
Zittrain, J. (2006). The generative internet. *Harvard Law Review*, *119*, 1974–2040.