

THE INFRASTRUCTURE OF ENTREPRENEURIAL LEARNING

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ABSTRACT:

THE INFRASTRUCTURE OF ENTREPRENEURIAL LEARNING

The quantity and quality of entrepreneurial activity in a society are critically influenced by the extent to which people in that society possess knowledge relevant to the practice of entrepreneurship. In most times and places in history, the acquisition of entrepreneurial knowledge has been a relatively slow process, and a person's ability to acquire it has often been restricted by his or her geographic location and social network. Over the past several decades, however, there has emerged a rich set of resources that help people acquire entrepreneurship-related knowledge. These new resources are characterized by 1) the large-scale codification of entrepreneurial knowledge through the development of books, periodicals, blog posts, podcasts, videos and other media that distill portions of what practicing entrepreneurs and others have learned, and 2) the formation of networks, markets and other social structures devoted specifically to the exchange of this knowledge. Although many of these resources are familiar to entrepreneurship scholars, their collective emergence and impact remains theoretically underappreciated. In this essay, I propose a new way of thinking about these resources, and I consider their implications for future research. In particular, I propose that future scholars should pay more careful attention to the content of the knowledge people exchange through these mechanisms and to the potential for these mechanisms to shape the way people think about whether and how to start new ventures. (227 words)

When Steve Jobs died in October 2011, it sent ripples of reflection through many communities of people interested in entrepreneurship. Accordingly, much was written about Jobs' life, his management career, and the evolution of his flagship company, Apple, and its pathbreaking products. Less has been said about how the larger world of entrepreneurship had changed over the course of Jobs' career. But on this front, too, there is much to reflect on. When Jobs founded Apple in 1975, for example, there were comparatively few resources available to help nascent entrepreneurs learn about the process of launching a new venture. Jobs did have the help of some informal networks, such as the "Homebrew Computer Club" that had taken root in the Palo Alto area. But there were relatively few college courses or guidebooks available to help him, and there were no "Startup Weekend" events or "live-tweeted" panel discussions of venture funding alternatives available to inform his efforts. Today, by contrast, aspiring entrepreneurs have access to an extraordinary range of learning resources. Some of these resources address general challenges of entrepreneurship, such as marketing and resource mobilization, while others address more specific issues. For example, there are books and articles written specifically for people who want to open a food truck or an "app"-based business (e.g., Mayyasi, 2013). And there are online communities that enable subgroups of entrepreneurs – such as mothers with young children or military veterans – to exchange knowledge that is especially relevant to their experiences (Feld, 2012).

As part of the larger "entrepreneurial revolution" that has been written about at some length (e.g., Audretsch, 2007; Bornstein, 2007), many of these learning resources are well-recognized in society at large and among entrepreneurship scholars in particular. At the same time, however, scholars have only begun to fully appreciate the cumulative significance of these resources. There are scholarly literatures devoted to the study of specific types of resources, such as entrepreneurial education programs (e.g., Kuratko, 2005). In practice, however, many entrepreneurs access information from multiple resources simultaneously (Ozgen & Baron, 2007). And in the future the set of available learning resources is likely to expand and to exert more pervasive effects on whether and how people engage in entrepreneurial activity. As a consequence, it behooves scholars to understand more fully the evolving array of resources

from which people learn about entrepreneurship and to consider more carefully their implications for entrepreneurial behavior.

My goal in this chapter is to call attention to these learning resources as an important phenomenon worthy of more focused scholarly attention, to help position them in the context of what we know about cognition and entrepreneurship, and to consider their implications for future research. I begin by calling attention to the fact that entrepreneurs need knowledge that enables them to not only recognize opportunities – a process that has attracted the lion’s share of scholarly attention in recent years – but to evaluate and exploit them as well (Markman, 2007; Shane & Venkataraman, 2000). In particular, I observe, entrepreneurs need knowledge relevant to the practical demands of creating a new venture and managing it during its earliest stages. In addition, I draw on Van de Ven’s (1993) concept of a societal-level “entrepreneurial infrastructure” to propose a shift in our research focus away from differences in the knowledge possessed by individual entrepreneurs and towards differences in the knowledge possessed by large groups of people within and across societies. Consistent with this approach, I go on to document the emergence of a rich array of learning resources, and I contend that these learning resources comprise a kind of subsidiary infrastructure – an “infrastructure of entrepreneurial learning” – within the larger infrastructure of entrepreneurship. I conclude by considering some implications of these ideas for the study of entrepreneurial cognition.

Knowledge and learning in new ventures

The idea that organizations acquire and use knowledge to enhance their effectiveness has a long history in the management literature (Argote & Ingram, 2000, Easterby-Smith & Lyles, 2011). The acquisition of knowledge that is useful or potentially useful to an organization, moreover, has been characterized as “organizational learning” (Huber, 1991). Much of what organizations learn is derived from their own experience as they perform their tasks (Argote & Miron-Spektor, 2011), but they can also learn from sources outside their own boundaries, a process that has been characterized as “knowledge transfer” (Argote & Ingram, 2000). Much of what has been written about organizational learning and

knowledge transfer has focused on relatively established firms. In a notable exception, however, Huber (1991) described a process of knowledge transfer that occurs during the creation of a new venture, which he called “congenital learning”. He explained the process this way:

Organizations do not begin their lives with clean slates. The individuals or organizations that create new organizations have *knowledge about the new organization's initial environment and about the processes the organization can use to carry out its creator's intentions, and they make this knowledge available to the new organization's members.* [italics added] ... There invariably exists a time interval between when an organization is first conceived of and the rather arbitrarily defined birth event ... During this interval the organization's founders employ vicarious learning, grafting, or searching to learn on behalf of the organization-to-be. Thus an organization's *congenital knowledge* is a combination of the knowledge inherited at its conception and the additional knowledge acquired prior to its birth. (p. 91)

Thus, Huber calls attention to the knowledge that informs the way founders create their ventures as well as the fact that they impart knowledge to their ventures.

Entrepreneurship scholars, for their part, have also discussed knowledge and learning in connection with new venture creation (Harrison & Leitch, 2005; Markman, 2007). Unlike Huber, however, they have tended to focus primarily on those elements of knowledge that enable a person to recognize an entrepreneurial opportunity (e.g., Corbett, 2007; Dimov, 2007; Shepherd & DeTienne, 2005). For example, Shane (2000) called attention to the extent to which an individual's capacity to recognize an entrepreneurial opportunity is a function of his or her “idiosyncratic prior knowledge”. Relatedly, it is common for entrepreneurship scholars to speak of startup formation as a process through which people seek to “commercialize knowledge” (e.g., Mueller, 2006). In these cases, the link to opportunity recognition may or may not be made explicit, but the knowledge referred to generally serves as a source of entrepreneurial opportunity (Audretsch & Keilbach, 2007).

Without disputing the critical role knowledge plays in opportunity recognition, I wish to focus here on elements of knowledge that enable people to act more effectively during other stages of the entrepreneurial process as well, including knowledge that enables people to more effectively evaluate and exploit opportunities (Markman, 2007). In particular, I am interested in the knowledge that enables

people to create a new independent firm and manage it during its earliest stages (Baron & Shane, 2008). This kind of knowledge may still include some knowledge relevant to opportunity recognition, but it extends well beyond that and overlaps more fully with the kinds of practical knowledge implied in Huber's reference to "the processes the organization can use to carry out its creator's intentions". For the sake of simplicity, the range of knowledge I refer to encompasses the set of topics that are commonly covered in a standard introductory entrepreneurship textbook.¹ This includes such topics as market research, venture financing and attracting and managing human capital (e.g., Allen, 2006; Baron & Shane, 2007). Knowledge of these topics often takes the form of tacit knowledge possessed by people having direct or indirect experience with venture creation (Davidsson & Honig, 2003; Minniti & Bygrave, 2001). However, as I explain in subsequent sections, knowledge about various aspects of new firm creation and management is increasingly being codified – i.e., transmitted in formal, symbolic language (Edmondson et al., 2003). And it is being transferred in a wider variety of ways and to a wider range of people than has traditionally been the case.

Past research on knowledge in entrepreneurship has also tended to focus on individual differences in knowledge and on the implications of those differences (e.g., Baum et al., 2007; Alvarez & Busenitz, 2001). My focus here, however, is on knowledge differences as they are manifested across large groups of people, such as those that may exist between groups of people within or across societies, or within a society over time. It is important to consider what large groups of people know about entrepreneurship, because the knowledge they collectively possess is likely to influence both the quantity and the quality of the new ventures launched in a society (Busenitz et al., 2000; Levie & Autio, 2008). Consider, for example, the choices made by the potential entrepreneurs in a society about whether to start a new venture. Sarasvathy (2004) observes that in any society there is likely to be a subset of people in any society "who want to become entrepreneurs but do not", owing to one or more barriers that may exist (p.

¹ This is not to say that entrepreneurial knowledge is satisfactorily *contained* in such a book. The depth of knowledge relevant to any particular venture will generally exceed the contents of any textbook, but the range of topics these textbooks cover provides a useful starting point for mapping the range of knowledge relevant to entrepreneurial activity.

707). Among the barriers that inhibit people from creating a new venture is a lack of knowledge about how to evaluate and exploit an entrepreneurial opportunity.

Clearly, knowledge is but one of many factors that influence entrepreneurial activity in a society. In an effort to enumerate these factors, Van de Ven (1993) proposed the concept of an “infrastructure for entrepreneurship”. The infrastructure he referred to encompassed the set of actors and entities within a given society that both enabled and constrained entrepreneurial activity. “Popular folklore notwithstanding, the process of entrepreneurship is a collective achievement” (p. 211), he wrote, which depended not only on the efforts of individual entrepreneurs but on “many other public- and private-sector actors who perform critical functions to develop and commercialize a new technology” (p. 214). As he characterized it, the infrastructure for entrepreneurship was comprised of three key components: 1) “proprietary functions”; 2) “resource endowments”; and 3) “institutional arrangements”. Proprietary functions refers to the firms directly involved in commercializing an innovation as well as their immediate buyers and suppliers – in short, those actors that fall within a traditional strategic definition of an industry environment (Hitt et al., 2010). Resource endowments refers to the set of actors and entities that provide resources critical to the development of an innovation. Institutional arrangements refers to the authorities and structures that govern and legitimize collective action. In subsequent formulations, he added “market consumption” as a fourth component, distinguishing consumer demand and the cultural norms affecting it from other proprietary functions. Figure 1 provides a graphical representation of the infrastructure.

*** Insert Figure 1 here ***

Within this framework, the availability of knowledge relevant to the creation and management of new ventures can be regarded as a “resource endowment” that exists at the level of societies, not firms or individuals. For example, Van de Ven called attention to the extent to which people in a society are generally educated as well as the extent to which they possess “specific skills related to [a particular]

innovation” (p. 216). In societies with richer endowments along these dimensions, he contended, actors would be more likely to collectively construct the environmental niches that give rise to the emergence of new organizational populations and, relatedly, to instances of organizational founding and technological innovation (pp. 212-214).

The infrastructure framework provides a useful tool for understanding the learning resources that have emerged over the last several decades, because it prompts us to regard those resources not as discrete fragments of activity but rather as part of a coherent set of societal endowments that shape entrepreneurial activity. Taken together, these learning resources comprise a kind of subsidiary infrastructure within the larger infrastructure of entrepreneurship Van de Ven identified: an “infrastructure of entrepreneurial learning”. More specifically, this learning infrastructure represents a subset of what Van de Ven characterized as the “resource endowments” component of the larger entrepreneurial infrastructure insofar as it affects the competence of the human resources available in a society. But because these elements of infrastructure are today considerably deeper and more elaborate than they were when this framework was introduced, they merit more explicit and detailed consideration than they were given at that time. In the sections that follow, I elaborate some key elements of the contemporary infrastructure of entrepreneurial learning, and I consider their implications for entrepreneurial activity. But first, in order to underscore the distinctiveness of these new knowledge resources, I offer a more general discussion of how entrepreneurs acquire new knowledge.

How do people acquire entrepreneurial knowledge?

In most times and places in history, people have acquired entrepreneurial knowledge in two main ways: directly, by engaging in entrepreneurial activity themselves, or indirectly, by closely associating with others who are so engaged. The direct acquisition of entrepreneurial knowledge is best illustrated by the case of serial entrepreneurs (e.g., Westhead et al., 2005). Minniti and Bygrave (2001) propose that people who repeatedly engage in entrepreneurship acquire a “stock of knowledge accumulated on the basis of past experiences” (p. 5) and that this knowledge informs their subsequent entrepreneurial efforts.

Often – although not always – this knowledge improves the effectiveness with which they carry out specific venture creation activities, and this in turn accounts for the performance advantages that some studies have found to accrue to serial entrepreneurs (e.g., Ucbasaran, 2008; Parker, 2013). Indirect knowledge acquisition, on the other hand, has been documented by the literatures on role modeling and family or early-life influences on entrepreneurial activity (e.g., Carroll & Mosakowski, 1997; Van Auken et al., 2006). These literatures have shown that people can acquire entrepreneurial knowledge by communicating with and closely observing the behaviors of people engaged in entrepreneurship. Having a social relationship with an entrepreneur may affect a person’s entrepreneurship-related choices in a variety of ways. For example, the experience of having an entrepreneur as a parent may affect the values or emotions a person associates with entrepreneurial activity. But such a relationship often involves a transfer of knowledge as well (Shaver & Scott, 1991), as parents (or other associates) are likely to explain and model various elements of the entrepreneurial activities they are engaged in.

These traditional modes of entrepreneurial knowledge acquisition are powerful, and they remain important modes of knowledge transfer today. But to the extent we are interested in understanding how entrepreneurial knowledge might disseminate within large groups of people, it is clear that these modes of knowledge transfer have some significant limitations. For example, the direct acquisition of experience requires people to actually engage in entrepreneurial activity and to bear the associated risks and costs. And the indirect mode of learning from others has traditionally depended on the formation of relationships between people who are geographically proximate (e.g., between parents and children, or between entrepreneurs and their employees). In many cases, too, the formation of these relational ties are further dependent on pure chance – as in the case of a child being born to entrepreneurial parents – or on an individual’s social status (Ruef et al., 2003). Finally, much of the knowledge acquired in these ways is tacit, rather than explicit, a feature that tends to slow its dissemination. “Because tacit knowledge is bound to the senses, personal experience and bodily movement”, Von Krogh and colleagues (2000) observe, its transfer “requires close physical proximity while the work is being done” (p. 83).

Over the last several decades, these traditional modes of entrepreneurial knowledge acquisition have been supplemented by new learning resources. These new resources are characterized by 1) the large-scale codification of entrepreneurial knowledge through the development of books, periodicals, blog posts, podcasts, videos and other media that distill portions of what practicing entrepreneurs and others have learned through their direct and indirect experiences with entrepreneurial activity, and 2) the deliberate formation of networks, markets and other social structures devoted specifically to the exchange of this knowledge. Table 1 presents some examples of these kinds of learning resources.

*** Insert Table 1 here ***

The emergence of new learning resources

The resources shown in Table 1 did not exist on anything approaching their current scale when Van de Ven (1993) offered his original formulation of the “resource endowments” component of an entrepreneurial infrastructure some twenty years ago. Accordingly, Van de Ven confined his attention to people’s levels of general education and to their possession of knowledge related to particular innovations. As he put it, “new technologies mean that new competencies are required to perform essential tasks, be they related to research, manufacturing or marketing” (p. 216). This characterization of the relevant human resource endowments was appropriate to the learning resources that were generally available at that time, and it reflected the fact that for much of the Twentieth Century, the set of knowledge relevant to innovative activity was understood to include a mix of general knowledge, business-related knowledge and technical knowledge specific to the domains of activity being undertaken. Thus, Van de Ven identified some specific mechanisms through which those kinds of knowledge could be transferred, including educational training programs at colleges and universities, corporate recruitment and training processes, and knowledge sharing via conferences and trade publications. Today, on the other hand, the elements of knowledge available to potential and existing entrepreneurs are much more specifically targeted and much more widely available. For example, an entrepreneur today can find

guidance related to identifying and evaluating new business opportunities (Mullins, 2010), developing and refining various elements of a startup business model (Mullins & Komisar, 2006), soliciting startup funding (DeClercq et al., 2007), and cultivating a regional startup community (Feld, 2012).

Universities have played a critical role in the codification and exchange of entrepreneurial knowledge by fostering the development of scholarly research and formal educational programs devoted to the study of entrepreneurship. Scholarly research on entrepreneurship has grown dramatically over the last three decades, for example, during which time scholars have established entrepreneurship as an academic field (Aldrich, 2012). Key developments in that process have included the publication of books and new scholarly journals, the development of academic conferences and the establishment of doctoral programs, all of which foster the generation and exchange of new knowledge (Katz, 2003). Although much academic research does not produce knowledge that is immediately applicable to the practice of entrepreneurship, academic research often informs the development of formal educational programs in entrepreneurship and the textbooks used in those programs (Baron & Shane, 2008; pp. 22-28). In addition, it generates frameworks and insights that are sometimes directly adapted and translated for broader audiences. Examples of this translation process include Noam Wasserman's (2012) book *The Founder's Dilemma*, which condenses for a popular audience Wasserman's own academic research on the tradeoffs associated with the pursuit of alternative entrepreneurial goals. Formal educational programs in entrepreneurship, moreover, have themselves increased in number and sophistication. Some of the oldest programs have targeted students in elementary and secondary schools, including Junior Achievement and NFTE-sponsored programs, but the greatest growth in recent decades has been in undergraduate- and masters-level programs (Katz, 2003; Kuratko, 2005). Today, as a result, students in many countries around the world can study entrepreneurship at every level of schooling. Entrepreneurial education is also increasingly integrated into the higher-level study of subjects traditionally taught outside of business schools, such as design and engineering (Thorp & Goldstein, 2010).

Beyond universities too, there have emerged a variety of networks, markets and other social structures through which people exchange knowledge about the practice of entrepreneurship. These

activities are more diffuse and less comprehensively documented than university-based activities, but they involve many more people than university-based activities. Among these activities are the publication of books and periodicals by for-profit publishers. For example, *The Lean Startup*, a book written by entrepreneur Eric Ries and published by a subsidiary of Random House, offers to entrepreneurs a set of techniques for managing the product development process in a new venture. Similarly, periodicals like *Fast Company* (launched in 1995) and *Inc.* (launched in 1979) convey entrepreneurial knowledge codified by journalists, former entrepreneurs and others to hundreds of thousands of readers.

The largest category of non-university activity, however, involves the development and maintenance of online communities, social media networks and offline communities. These communities and networks are comprised of people who create, co-create and exchange knowledge about entrepreneurship, often through patterns of interaction that resemble those of “open source” innovation communities (Von Hippel & Von Krogh, 2003). Accordingly, these social structures tend to evolve informally through the accumulated efforts of many individual participants. However more formal elements of network structure are sometimes established by enterprising individuals (such as Steve Blank, who operates an elaborate and influential website at <http://steveblank.com>), nonprofit organizations (such as the Kauffman Foundation) or firms (such as Meetup.com, an online networking site).

Sometimes such networks are affiliated with schools and universities (as in the case of the MIT Enterprise Forum, for example), but many others have no such affiliation and are rooted instead in social networks defined by geography, ethnicity or subjects of interest. For example, a search of the Meetup.com site based on the terms “Chicago entrepreneurs” reveals over 50 groups that feature labels such as: “Startup Evanston,” the “Founding Moms Exchange”, the “Boostrappers Breakfast Group” and the “Chicagoland Conscious Capitalists”. Each of these groups includes between 100 and 800 members. Groups and networks can leverage in-person mechanisms of knowledge exchange, as in the case of Meetup groups or the “Startup Weekend” series of venture launch workshops (<http://startupweekend.org>), as well as virtual mechanisms, such as Internet blogs and social media technologies like Twitter. Twitter, for example, enables networked individuals to exchange short, ready-access linkages to websites, blog

postings, articles and other content that contain elements of entrepreneurial knowledge. For example, a search of Twitter in March 2014 for the term “entrepreneurship” surfaced a link offered by the Kauffman Foundation to a blog post authored by Zen Chu, an entrepreneur in residence at MIT (Chu, 2014). The post provided information on “meaningful metrics” appropriate for measuring return on investment in healthcare startups and contained several links to additional sites with supporting information.

To some extent these modes expand the reach of traditional modes of knowledge transfer, for example by enabling larger numbers of people to more easily acquire direct and indirect experience of entrepreneurial activity. But they go beyond traditional modes of knowledge transfer insofar as they represent the large-scale codification of knowledge and insofar as they enable people to rapidly form relationships with large numbers of others from whom they might learn. These developments, in turn, are likely to significantly expand the ability of existing and potential entrepreneurs to acquire knowledge relevant to the decisions they face. Figure 2 illustrates this point while also highlighting the role that existing and former entrepreneurs play in feeding knowledge back to the infrastructure of entrepreneurial learning.

*** Insert Figure 2 here ***

In characterizing activities like those shown in Table 1 as modes of knowledge transfer, I hasten to add several important caveats. First, I do not mean to suggest that all – or even most – of the knowledge entrepreneurs learn from experience can be readily codified and disseminated. As in any complex domain, much important knowledge cannot be effectively codified, and not all knowledge that can be codified is readily exchanged (Nonaka & von Krogh, 2011). Accordingly, there are important limits to what entrepreneurs can effectively learn from these resources. Second, the knowledge needs of entrepreneurs vary considerably across contexts, and they are liable to change and expand over time as organizations and their environments evolve (Aldrich & Ruef, 2006). Thus, the fact that knowledge is available does not mean it will continue to be relevant indefinitely or that it will be interpreted and

applied with due regard to its contextual limitations. Third, we cannot assume that the members of a society will have equal access to the infrastructure of entrepreneurial learning. Rather, access is likely to vary significantly across groups within a society. Finally, the validity of the knowledge offered through these learning resources varies widely. (I return to these last two points shortly.) For all of these reasons, there will inevitably remain significant gaps between the codified knowledge available through the mechanisms identified here and the demands of entrepreneurial activity. At the same time, the collective emergence of these mechanisms represents a clear “sea change” in the extent to which knowledge about the creation and management of new ventures is available within societies. Accordingly, it behooves us to ask how the availability of this knowledge is affecting the way entrepreneurs think and make decisions.

Implications for the study of entrepreneurial cognition

Research on entrepreneurial cognition has traditionally focused on understanding relatively general differences in how people process information and in how those differences affect people’s entrepreneurial capacities. For example, scholars have explored the extent to which people rely on biases and heuristics in making decisions, or the extent to which they rely on effectual or causal reasoning processes (Gregoire et al., 2011). These lines of inquiry can help explain larger patterns of behavior on the part of individual entrepreneurs and their firms, but they are less well suited to explaining differences in entrepreneurial behavior across societies. To answer such questions, we need to pay more attention to the societal-level resources that shape people’s entrepreneurial abilities. The availability of knowledge resources specific to the practice of entrepreneurship is likely to enhance the quality and quantity of entrepreneurship in a society by enabling the members of that society to make better decisions about whether, when and how to launch new ventures. This, in turn, opens up several important opportunities for scholars interested in entrepreneurial cognition.

At the most basic level, it would be useful for scholars to begin to characterize more clearly and comprehensively the various *kinds* of entrepreneurially-relevant knowledge being exchanged in societies. Some categories of knowledge encompassed by the infrastructure of entrepreneurial learning are

relatively well-developed in a theoretical sense, such as ideas pertaining to opportunity recognition. But the infrastructure also codifies and disseminates knowledge about a variety of context-specific problems entrepreneurs encounter in the course of building and managing new ventures. For example, if an entrepreneur wants to know how to assemble a board of directors, or how to negotiate a term sheet with a venture capitalist, there are articles and books specifically devoted to those issues. This kind of knowledge is not well characterized in the existing literature on entrepreneurial cognition. In other words, as scholars we lack a robust set of terms and frameworks for describing and discussing some of the more applied forms of knowledge that entrepreneurs work with.

In developing such tools, it may help to turn to theories of socially situated cognition, which emphasize the physical and social environments in which knowledge is used as well as the technologies with which knowledge is accessed. For example, Smith and Semin (2007) contend that “theory should reflect the way that cognition is socially enabled and distributed through communication”, observing that “cognitive processes draw not only on resources in the social environment but also on technical equipment (monitors, readouts, maps) into which considerable knowledge is downloaded” (p. 134). Thus, studies of entrepreneurial cognition should be expanded beyond their traditional focus on how entrepreneurs think: Going forward, we need to know more about *what* entrepreneurs think about and about how they label, access and exchange knowledge in their communications with others.

Second, scholars should begin to critically examine the quality and validity of the knowledge resources that comprise the infrastructure of entrepreneurial learning. Although some of the knowledge made available is based on the insights of past research, much of it is not. Rather, the knowledge offered is often based on the accumulated experiences of individuals. To some extent, the highly distributed and grounded nature of this knowledge is part of its strength; in aggregate, it represents a form of knowledge that differs from scholarly knowledge but which is also valid and appropriate to the purposes it serves (Van de Ven & Johnson, 2006). But not all of it is valid, of course, and some of the knowledge available is in fact contradictory. For example, in his book *The Lean Startup*, Eric Ries advocates an approach to product development centered on the concept of a “minimum viable product” (MVP). But in a recent

blog post, former entrepreneur Bill Aulet warns of “our dangerous obsession with the MVP” (Aulet, 2014). This raises the question, “Which view is correct?” Or might it depend on the context – and if so then how?

Scholars can help answer questions like these by leveraging their distinctive skills to help clarify which knowledge claims are more and less valid. Scholars can also help identify patterns of cognitive bias in knowledge exchange. For example, past research has shown that there are times when practitioners’ own articulations of what they know differ considerably from the intuitions they tend to employ in practice (e.g., Zacharakis & Meyer, 1998). Such discrepancies – between articulated and actual knowledge – suggest that knowledge resources based entirely on practitioners’ own articulations of what they know may be misleading to actual and aspiring entrepreneurs. Scholars can call attention to such discrepancies, therefore, and look for ways to more accurately distill and articulate key elements of entrepreneurial expertise (Baron & Ensley, 2006).

Finally, there is a need for scholars to help determine how and to what extent these resources shape entrepreneurial activity within societies. For example, can variations in entrepreneurial activity be traced to differences in the extent to which specific groups of people (across societies or within a given society) have access to the infrastructure of entrepreneurial learning? Alternatively, do people interpret or utilize that learning infrastructure differently based on differences in their institutional/cultural contexts (Elsbach et al., 2005; Mitchell et al., 2000). Studies have begun to examine the effectiveness of formal entrepreneurship education in connection with questions like these, but more work is needed, especially with regard to the implications of the less-formal knowledge-diffusion mechanisms outlined above. Social cognitive theory provides a basis for theorizing about how people can learn about entrepreneurship from less-formal knowledge resources insofar as it has sought to explain how mass communication technologies facilitate vicarious learning and verbal persuasion (Bandura, 2002).

In exploring these and related questions, moreover, scholars will need to bear in mind the tensions that can exist between the quality and quantity of a society’s entrepreneurial activity. A society in which people make high-quality entrepreneurial decisions, after all, will be one in which many people

make well-considered decisions *not* to start new ventures. This is not to deny the fact that all entrepreneurial activity entails risk, but it is to acknowledge that, as Gilbert and Eyring (2010) have put it, “not all risks are created equal”. Thus, to the extent that newly-available knowledge resources succeed in helping people to make well-informed decisions *not* to become entrepreneurs, it can contribute to the quality of a society’s entrepreneurial activity while simultaneously helping to constrain certain measures of its quantity.

Conclusion

For people in the contemporary world with interests in entrepreneurship, the infrastructure of entrepreneurial learning has become so seemingly ubiquitous and its constituent elements so intimately familiar that it may seem superfluous or unnecessary for scholars to turn their attention to it. But while scholars have actively sought to understand various pieces of this infrastructure, they have yet to develop a robust understanding of how those pieces fit together and how they are collectively shaping the way people engage in entrepreneurial activity in societies around the world.

To some extent, this oversight reflects a general tendency on the part of recent entrepreneurship research to emphasize lower levels of analysis – such as individuals, teams and firms – as opposed to higher levels, such as industries and environments (Busenitz et al., 2003; Forbes & Kirsch, 2011). That tendency, in turn, reflects in part the ascendance of the cognitive perspective in entrepreneurship, which has tended to focus scholars’ attention on psychological processes as they unfold within individuals and groups (Gregoire et al., 2011). Clearly, individual cognition plays a critical role in the launch of new ventures, given the limited organizational infrastructure such firms generally possess. Increasingly, however, entrepreneurs are able to draw upon an extensive set of cognitive resources from their external environments that are specifically geared to their own, context-specific entrepreneurial challenges. These resources codify and transmit the insights of a large, distributed network of peers, experts and advisors. As such, they represent “scaffolds” that entrepreneurs can use to help them scale the cognitive challenges of their work (Semin et al., 2012). As this scaffolding evolves and plays an increasingly important role in

shaping entrepreneurial behavior, it behooves scholars interested in entrepreneurial cognition to pay more direct attention to the knowledge that scaffolding contains and the ways that knowledge is used. In this essay, I have sought to make it easier for scholars to theorize about this emerging scaffolding by linking it to some more established ideas pertaining to the role of knowledge in entrepreneurship. By building on those ideas, scholars can help existing theories of entrepreneurial cognition to adapt to the rapidly evolving world of contemporary entrepreneurial practice.

Finally, scholars can benefit from integrating these ideas with newer ideas, such as theories of socially situated cognition. The approach I take here is broadly consistent with a “situated cognition” perspective on entrepreneurship insofar as it calls attention to the ways in which people’s entrepreneurial behaviors are enabled and constrained by the knowledge-related resource endowments that exist within their societies (Mitchell et al., 2007). As with more traditional approaches to the study of entrepreneurial cognition, this approach still conceives of entrepreneurial activity as a set of behaviors that are critically shaped by the knowledge and beliefs people hold. At the same time, however, it incorporates elements of the institutional and evolutionary perspectives insofar as it seeks to situate discrete instances of entrepreneurial activity within a larger macroenvironmental context that changes over time.

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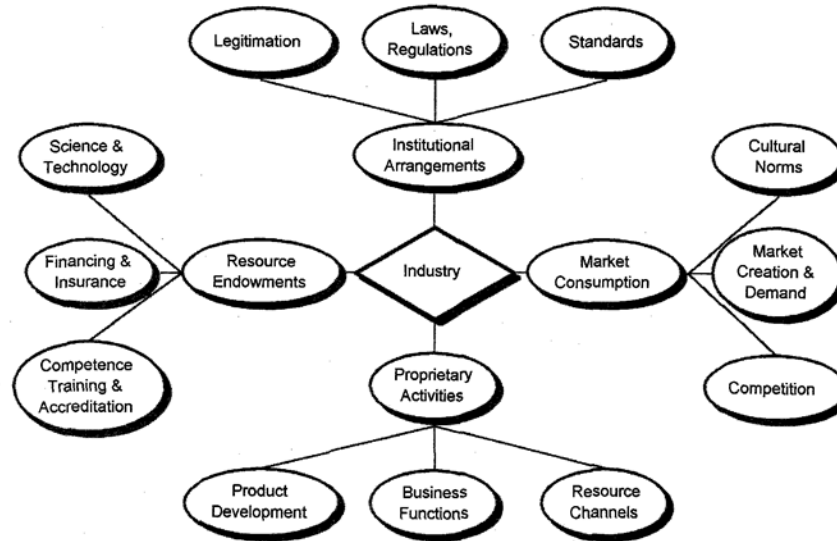
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Figure 1.

A graphical representation of the infrastructure for entrepreneurship.



Adapted from A. H. Van de Ven and R. Garud, "A Framework for Understanding the Emergence of New Industries," *Research on Technological Innovation Management and Policy*, 4: 295-325..

Figure 2.

The infrastructure of entrepreneurial learning and its implications.

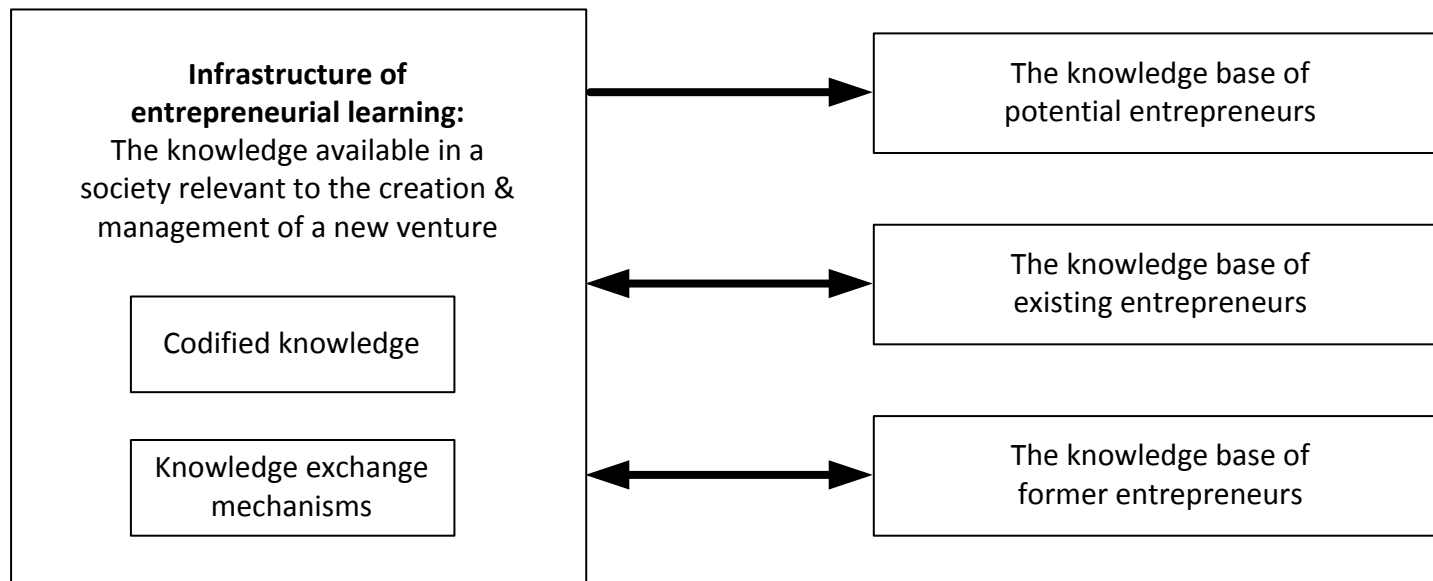


Table 1.

Examples of entrepreneurial learning resources that have emerged or grown significantly since 1980.

Type	Description	Examples
Formal educational offerings	These include degree programs and courses available through colleges and universities.	<ul style="list-style-type: none">• Undergraduate & graduate business degrees reflecting an emphasis or concentration on entrepreneurship.• Entrepreneurship-focused courses within business degree programs.• Coursework in non-business disciplines (e.g., design, engineering) that incorporates significant entrepreneurial content
Periodicals	These include periodicals that include entrepreneurship-related content, either entirely or frequently.	<ul style="list-style-type: none">• <i>Harvard Business Review</i>• <i>Stanford Social Innovation Review</i>• <i>Inc.</i> magazine• <i>Fast Company</i> magazine
Books	These include books that transmit entrepreneurial knowledge.	<ul style="list-style-type: none">• <i>Startup Owner's Manual</i> by Steve Blank & Bob Dorf• <i>How to Change the World</i> by David Bornstein• <i>Launching New Ventures</i>, by Kathleen Allen• <i>Business Model Generation</i>, by Alex Osterwalder & Yves Pigneur

Online resources	These include sites that provide original content, such as blogs, and those that serve as portals to other content.	<ul style="list-style-type: none"> • Steve Blank (steveblank.com) • Stanford Entrepreneurship Corner (ecorner.stanford.edu) • Fred Wilson (www.avc.com)
Social media communities	Groups that exchange knowledge virtually using social media technologies	<ul style="list-style-type: none"> • Twitter • LinkedIn groups
Offline communities	Groups that meet in person and provide networking, training and support.	<ul style="list-style-type: none"> • Startup Weekend • Meetup.com groups • MIT Enterprise Forum