

Corporate entrepreneurship as knowledge creation and conversion: the role of entrepreneurial hubs

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Abstract Corporate entrepreneurship (CE) is an important means for inducing innovation, revitalizing organizations, and enhancing productivity. It is also the source of new knowledge that allows companies to create capabilities to enter new markets and achieve growth. This article highlights key findings from a 25-year-long stream of research, conducted in several countries, that shows how CE creates knowledge and the variety of knowledge that emerges from different CE activities. It also explains the role of entrepreneurial hubs in capturing, accumulating, converting and translating, and integrating this knowledge, enabling companies to build new revenue streams. The role of these hubs is pervasive, calling for engaged management and creativity in building linkages within and across the different units of an organization. Knowledge, the foundation of competitive superiority, is clearly one of the most important products of CE in today's dynamic global markets.

Keywords Corporate entrepreneurship · Knowledge creation · Knowledge conversion · Knowledge integration · Entrepreneurial hubs

JEL Classifications L26

Starting my research on corporate entrepreneurship (CE) nearly three decades ago, the literature consisted mostly of case studies, descriptive reports, and testimonials. Most research at the time also focused on mature US companies that struggled for survival in a rapidly and vastly different global market where the Japanese have ascended to worldwide technological preeminence and industry leadership. European companies were in a similar situation to those of US multinationals, failing to understand the magnitude of change occurring in their markets. From the beginning, my research sought to understand how the very technological forces that have so radically changed the fortunes of leading US and European multinationals could be used to build strong positions in the global market and regain technological leadership. Technology and globalization have been deeply embedded in my thinking and writing from the beginning—and they remain so today.

My early work has progressively examined the variety of activities that constitute formal and informal CE activities (Zahra 1991, 1993), their antecedents (Zahra 1991, 1993, 1996; Zahra and Covin 1995;

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Narayanan et al. 2009), and outcomes (Foss et al. 2013; Zahra 1991, 1993, Kelley et al. 2013; Zahra and Covin 1995; Zahra et al. 2000b). Miller (1983) inspired my work that has explored the role of the external environment and industry conditions, organizational structure, corporate culture, managerial incentives, and ownership types as antecedents of CE. It has also examined the financial and non-financial outcomes of CE activities, using predominantly survey data (often supplemented with and validated by secondary data) and cross-sectional designs. This work has canvassed a range of privately held companies, public corporations, family firms (Zahra 2003), and multinationals. Observing how CE activities unfolded in US-based multinational companies, I have come to see the knowledge-creating potential of these initiatives. This realization has led to a change in my research focus, adopting the knowledge and learning perspectives. I have also increased my attention to autonomous or informal initiatives that serve as the core of CE.

Over the past two decades, I have written about knowledge creation in CE (Zahra et al. 1999), knowledge absorption and capacity building (Zahra and George 2002), knowledge conversion (Zahra et al. 2007), and knowledge integration (Zahra et al. 2000a; Zahra and George 2002; van de Ven and Zahra 2015). This work has addressed issues relating to organizational learning (Zahra et al. 2006; Tsang and Zahra 2008; Uotila et al. 2009) and capability development (Sapienza Autio et al. 2006). I have explored these themes conceptually and empirically using data from diverse settings mostly from high technology industries in different countries. As the reach of my field work has expanded around the globe and studied hundreds of multinational companies, subsidiaries, and born global companies, I have become especially interested in the organizational mechanisms that shape the evolution of informal CE activities and then transform them into legitimate formal initiatives, an issue Burgelman (1983) has identified as worthy of analysis. One of these key mechanisms that my work highlights is the “entrepreneurial hubs” that pervade organizations. These hubs are the focus of this paper.

1 Focus and objective

This paper examines the importance of entrepreneurial hubs in established companies, focusing on their role

in knowledge creation and conversion. Knowledge creation centers on the development of new knowledge either through discovery or through creative recombination (Zahra et al. 1999). Conversion is the process by which knowledge is translated and transformed from abstract concepts to more concrete objects that are easier to understand and experience and thus facilitate the development of ideas and prototypes of products, businesses, and other applications (Zahra et al. 2007). The paper advances that entrepreneurial hubs are important for defining the types of knowledge being developed and how it is converted later to more concrete concepts and objects, stimulating the definition of opportunities for formal and informal entrepreneurial initiatives in established companies.

The paper begins by explaining the importance of a knowledge perspective for the study of CE. It then defines entrepreneurial hubs and their relevance for CE. The paper then discusses mechanisms for knowledge creation within formal and informal CE. Once this is accomplished, the discussion shifts to knowledge conversion outlining its meaning, role, and attendant processes. The paper highlights the contribution of the knowledge perspective on CE for future study, identifying several promising research avenues.

2 CE as a knowledge creation and conversion process

CE activities often unfold over time, across organizational levels. In each step, participants in CE share their ideas, add refinements, introduce concepts, test their assumptions, and so on. These activities extend what these participants know and even create new knowledge (Narayanan et al. 2009; Zahra et al. 1999). In creating this knowledge, participants also convert this knowledge to idea sets that serve as the basis for introducing novelty and variety into the repertoire of their companies. This gives us a reason to study CE as knowledge of creation and conversion.

Viewing CE as “knowledge” draws attention to some of the key non-financial benefits of CE which come into existence as a consequence of informal processes (Zahra 1991; Zahra and Flatotchev 2004). Knowledge, in particular, is an important asset in today’s global economy; it is the fuel of innovation and discovery that renews companies and their

operations. Considering knowledge in the context of CE also provides an important opportunity to observe how CE activities contribute to the development of diverse organization capabilities that enable firms to compete, conceive new strategies, remake themselves, and undertake transformational activities that redefine their industries. Considering CE as a key source of knowledge can also help us address the basic question: Why are some companies intelligent and do great things that create new industries, business categories, and revenue streams? Fundamentally, having knowledge is only the beginning in a long process that enhances strategic variety. The use of knowledge is the primary source of value creation, and this use requires the patient management of several processes. Fortunately, managers do not have to assume total responsibility for these processes. Members of a company's entrepreneurial hubs play key roles that determine the fate of the knowledge created and shared within the firm's operations.

3 Corporate entrepreneurial hubs

My recognition of entrepreneurial hubs began when I started to study multinational companies and their dispersed subsidiaries around the globe. I found that internationalization spurs CE activities that generate different types of knowledge that promote and stimulate further international expansion that in turn produces new knowledge, as displayed in Fig. 1. I was struck by the dispersion of CE activities, especially those conducted informally, away from the center of the organization. My firsthand observation of these activities led to realize that they took a form that resembled "organized chaos."

These "hubs" were important intellectual meeting places for ideas of change; their members were the proponents of fundamental changes in the way firms functioned, organized, and competed. Given that many of the CE activities are initiated by employees and middle managers, proposals for innovative ideas often traverse the informal organizational structure where different coalitions of interested people take part in the process, often at different times. These hubs, which are typically dispersed throughout a firm, are arenas where people share their ideas, assumptions, and "theories" about the future things to come. Hubs differ greatly in their occupants—who they are,

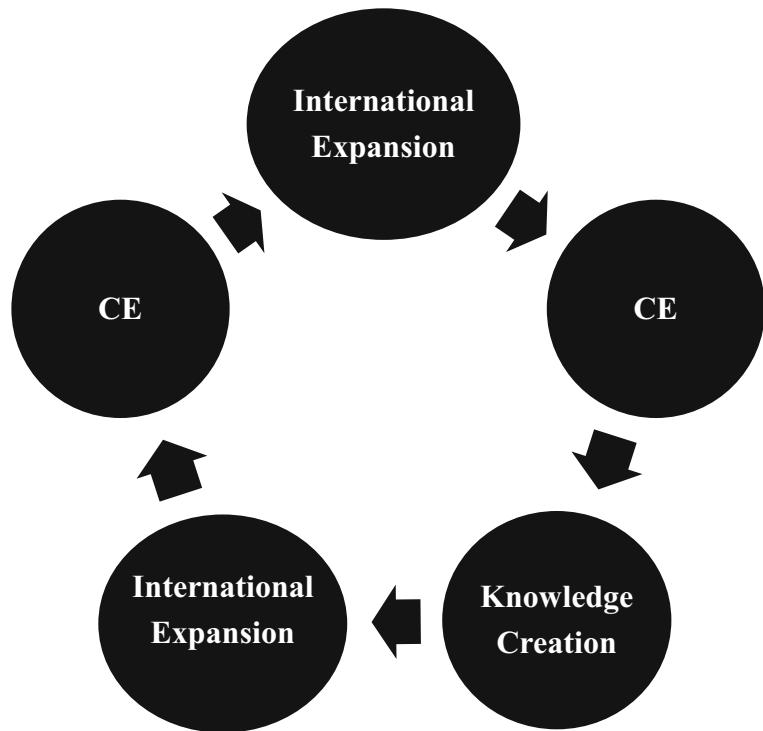
their organizational status and role, experience, interests, and connections. This variety accentuates the role that some hubs play in capturing knowledge within CE activities. Members appreciate the fact that CE can be a source of technical, market and competitive, organizing, and entrepreneurial knowledge. These different knowledge types serve very different strategic purposes.

Different CE activities generate different types of knowledge "bundles" that combine various types of knowledge. For example, an acquisition brings in a set of knowledge types that differ from that gained from investments made in corporate venture capital. Members of an entrepreneurial hub are usually sensitive to the issues that arise with such different bundles of knowledge in terms of their content, complexity, ownership, and potential usefulness. Informal discussions within these hubs set the stage for reorganizing different types of knowledge, where they might fit into the organization and their potential relevance (usefulness). This is important to note because the variety of knowledge traversing entrepreneurial hubs varies greatly, contributing differently to replenishing and expanding the firm's knowledge base.

Some hubs are more active and useful than others, reflecting their history, location, and composition. Their ability to influence knowledge creation and use of processes are, consequently, different which impacts the fate of the CE proposal. Perhaps this is the reason Burgelman (1983) highlights the importance of the "organization" and the "strategic" contexts. The problem is that a serious knowledge gap seems to exist where senior, and often middle, managers are unaware of what hub members might know. Further, if managers are aware of that knowledge, they might not appreciate its value. A key source of discrepancy is the raw nature of knowledge itself and its fragmentation (for a detailed discussion and theory, see Mahnke et al. 2007). This asymmetry of knowledge could influence who values, champions, and supports CE (Mahnke et al. 2007). Hubs provide the initial testing grounds that allow a more thoughtful and careful determination of which CE initiatives deserve recognition and support.

Knowledge creation in hubs occurs through multiple mechanisms that include the following: knowledge sharing and exchange of ideas, knowledge recombination and integration, analysis of successes, study of intelligent failures, and transactive memory where

Fig. 1 Internationalization, CE, and knowledge creation




team members learn from one CE initiative and take (or apply) their learning to a new project. Hub members also bring new knowledge from their industry and professional connections, communities of practice, and investments that their company has made in other firms—as happens when established companies invest in young start-ups (Maula et al. 2013).

The knowledge created in CE is heterogeneous, reflecting the content and complexity of the knowledge itself, the processes by which it is created and the context in which it is conceived and developed—including, of course, the managerial processes employed throughout these activities. Heterogeneity emerges also from the different skills, knowledge, and cognitions of those involved in creating knowledge. Regardless of its source, heterogeneity of knowledge is the basis of variety in companies' operations and strategic initiatives. Strategy—whether domestic or global—centers on creating and exploiting this heterogeneity to create distinctive products, innovative business models, and well-protected and lucrative market spaces. My field work further shows that different CE activities produce different types of

knowledge that allow the firm to develop, reinforce, and sustain this heterogeneity by building novelty while delaying or preventing imitation. The different activities that occur in entrepreneurial hubs accentuate knowledge heterogeneity.

Table 1 presents an overview of the different contributions of an entrepreneurial hub. It shows that within each activity/stage, multiple players are involved, undertaking a variety of roles. The interaction of these different players not only refines ideas but also creates additional knowledge that serves as an input into the next stage. Flashes of insights, revisions, and interpretations enrich this process of knowledge addition. It also progressively overcomes the problem of knowledge fragmentation noted earlier. People attempt to make sense of and integrate different pieces of knowledge, giving them organizational and business meaning that others can use to conceive applications of that knowledge. As Table 1 makes clear, members of a hub play a key role in identifying emerging CE initiatives, clarifying their scope, testing and refining these ideas and orchestrating organizational support for them, and positioning them for management recognition, evaluation, and approval.

Table 1 Roles hubs play in knowledge creation and conversion within CE

Phase	Focus on	Remarks
Identification	What Who Why	Throughout these processes, different actors—with different skills and interests—play different roles in championing ideas and seeing them to fruition
Reorientation/ clarification	Strategic impact (potential) Financial impact (potential) Organizational impact (potential) Political realities Conversion and translation Integration	
Orchestration	Testing and feedback Refining Integration Coalition Building	
Positioning and championing	Integration (higher-order into idea bundles) Sequencing Prototyping Presentation	

Each of these stages requires hub members to address several issues to affirm the potential contribution of the knowledge at hand.

The multiplicity of internal and external sources of ideas and knowledge for CE initiatives requires companies to possess a well-developed absorptive capacity, the ability to acquire, assimilate, transform (convert), and exploit knowledge (Zahra and George 2002). Absorptive capacity can significantly affect multiple organizational outcomes including the financial performance of a company's international CE activities (Zahra and Hayton 2008). This capacity could be found at the individual, team, initiative, unit (division), or firm levels. Individual capacities could be honed to develop team and CE initiative-level capacity useful in the process of knowledge creation, conversion, and commercial exploitation. In a similar fashion, entrepreneurial hubs develop absorptive capacity that serves as magnets of particular types of knowledge, absorbing it and using it for organizational purposes. The depth of this capacity is determined by the diversity of the skills of participants and the quality of their expertise and experiences.

It is useful to separate potential from realized absorptive capacity. Potential capacity refers to those activities related to acquisition and assimilation of knowledge. Realized capacity refers to transforming and exploiting this knowledge. Many companies (and CE activities) have high potential capacity that often remains un-realized. It is often easier to gather information than to make sense or use it for strategic advantage. Building on the expertise of their members, entrepreneurial hubs serve a major purpose in this regard by reducing the gap between potential and realized absorptive capacity, making knowledge accessible and useful. In this way, hubs stretch the firm's imagination, opening new paths for strategic reorientation and change.

New directions for strategic change become evident as hubs create a "transaction space" (Gibbons 2008) or trading zones where experts and non-experts interact, negotiate, and trade—without compromising their own interests. Actors in these hubs rely on two important skills. The first is their *interactive expertise* which refers to the ability to communicate and understand specialized language or profession without

practicing it. The second is their *transactive memory* which refers to learning from one group and using this learning with other groups. These two skills allow hub members to exchange ideas and share knowledge and negotiate their interpretations of what that knowledge means, facilitating individual, team, and organizational learning.

4 Entrepreneurial hubs and knowledge conversion

Acquiring or developing knowledge is one thing, but being able to harvest it for competitive advantage is another. Companies need a capability to convert the knowledge that permeates their CE activities into usable concepts. This conversion process centers on translating incoming knowledge in ways that promote shared understanding of its content, meaning, and potential usefulness. One of the few empirical studies on knowledge conversion suggests that it is a meta-capability that consists of three lower-order capabilities (Zahra et al. 2007). Each of these sub-capabilities has a specific focus. But together, they form an overall coherent capability centered on knowledge conversion. Van de Ven and Zahra (2015) discuss ways this knowledge translation and conversion occur. Their discussion underscores the multiplicity of activities needed to achieve this goal. Hubs play a key role in each of these activities, offering a foundation for building a knowledge conversion capability useful in exploiting knowledge on a given initiative or overall organizational change and renewal.

Knowledge conversion is a creative, not mechanical, one. It requires mastery of domain knowledge, ability to see connections between seemingly unrelated pieces of data, and envisioning uses for knowledge. Raw knowledge often created through a scientific discovery (e.g., basic research findings) has to be translated, retranslated, and reframed multiple types before it has practical or commercial meaning. Translations (hence conversion) could target particular audiences (e.g., research scientists vs. drug makers), highlighting the unique and often idiosyncratic nature of the knowledge. These multiple “translations” allow members of a hub to learn different things about the knowledge being shared. This learning could become the foundation for future knowledge creation. Translations also make it possible to discover and create business opportunities (Zahra

2008), fueling a virtuous cycle where discovery promotes learning that enriches opportunity creation.

Opportunities revealed by knowledge translation, transformation, and conversion vary greatly in their novelty and size, as well as technical and market riskiness. These different opportunities reflect the interaction of knowledge characteristics (e.g., newness and complexity) with the multiplicity of interpretations of hub members. These interpretations reflect hubs’ (and their members’) differential access to information, different degrees of expertise, and organizational experience, as well as individual and group cognitions. These cognitions are of particular importance as they vary across organizational levels and among individuals and groups. If these cognitions and interactions among members are well managed, the variety of cognitions in a hub can lead to a richer variety. Cognitions are important also in seeing connections useful for knowledge integration.

5 Entrepreneurial hubs and knowledge integration

The knowledge developed and even converted in CE activities are often fragmented and widely dispersed throughout the firm. Even within a hub, different actors or groups of actors have differential access to this knowledge. This dispersion reflects the informal existence and processes of CE hubs. This knowledge is of little strategic or economic value unless combined and integrated in meaningful idea sets. This gives rise to the need for organizational integration, the capacity to combine and synthesize different types from knowledge obtained from internal and external sources and envision ways to develop products, processes, and capabilities (Zahra et al. 2000a; Zahra and Nielsen 2002; Zahra et al. 1999; Zahra and Nasimbam 2011). This integration happens routinely and informally in CE hubs. But many companies have become cognizant of the complexity and strategic value of this process and therefore have introduced systems and appointed individuals to undertake this integration with an eye on deploying knowledge for successful commercialization. This integration often occurs across organizational levels, yielding new useful knowledge about opportunities, nature of markets and competitors’ business models, and foundations of new strategic initiatives. As a result,

knowledge integration helps organizational members and leaders to discover multiple opportunities even from the same basic body of knowledge. Further, integration promotes learning within CE hubs as well as the company. Because of the growing understanding of knowledge and related opportunities, integration can accentuate the effect of this learning (e.g., about new technology) on company performance (Zahra et al. 2000a). These potential benefits underscore the need for knowledge integration within informal and formal CE activities, highlighting the need for understanding the processes involved in this integration.

6 Discussion

After three decades of research, it would be natural to ask: What do we learn from this stream of (mostly empirical) studies? I believe five findings are worth noting. First, my early work underscores the complementarity of formal and informal CE activities; though these activities are not always in unison, both are always needed to induce innovation, risk taking, and proactiveness into companies' operations. Both contribute to this goal. However, each requires a varied set of skills to manage, coordinate, and extract value. These skills are also needed to connect formal and informal efforts, perpetuating CE activities in a company.

It is useful to reiterate the empirical finding that informal CE activities had positive associations with future company performance (Zahra 1991; Zahra et al. 2013). I do not know of a study that has refuted this simple finding. While one study cannot possibly provide compelling evidence, the results underscore the importance of informal CE activities and the need for their careful management. Relatedly, understanding and cultivating the roles of CE hubs become a worthwhile managerial challenge. In particular, managers' organizational roles should also include attention to entrepreneurial activities.

Second, there is a need to reframe our conversation and the study of CE around knowledge. CE is a more than a set of programs, activities, and decisions—it is a process of creativity, intelligence, learning, and reframing as well as seeing things anew. If this is the case, we need to recognize CE as a knowledge creation and conversion process that induces renewal, variety,

novelty, and intelligence into the organization. It touches the hardware as well the mental and emotional software of the organization to bring about changes in cognition, knowledge, behaviors, systems and structures, and outcomes. This is probably the reason why some small and simple CE initiatives can have profound organizational impacts.

Third, research and practice need to go beyond knowledge access and absorption in analyzing CE and also examine and study knowledge conversion and integration. These are fast becoming crucial mechanisms to transforming knowledge into business, mapping strategic moves, and creating new market spaces. Conversion and integration are essential for learning and therefore can lead to the discovery and creation of opportunities (Zahra et al. 2007; Zahra 2008). Integration gives the firm the opportunity to exploit knowledge created at the intersection (boundary) to identify and pursue radically novel opportunities (Zahra and Yavuz 2008). We can also better understand how companies move from knowledge “destruction” to knowledge “construction” as they package bundles of knowledge into opportunities and make them amenable for exploitation.

Fourth, hubs are crucial within the study and practice of CE—both formal and informal. They connect individuals across levels and across organizational boundaries, and they capitalize on the skills and talents of the members of internal and external network. They grow champions who make initiatives happen or position them for management's recognition and support (Table 1). This suggests we need to study these hubs more closely to understand the political realities that permeate them, their changing composition and structures, and how (and indeed) why they select (or not select) particular initiatives. Understanding the ecology of these hubs is crucial to explaining their contribution and evolution.

Fifth, CE is an important source of new venture creation. The role of established companies in training and nurturing entrepreneurial talent is being increasingly recognized. However, the role of CE and its hubs in this regard is less appreciated and studied. Individuals active in CE care deeply about the fate of their companies and jobs. Thus, CE could be an important motivational tool. But CE activities and hubs are also crucial training grounds that allow interested individuals to hone their skills and practice their craft; they develop useful contacts; and they understand where

and how to assemble resources, among other lessons to be learned. These activities position CE hub members well to strike out on their own and create their own companies, exploiting their experience and learning. The exit of these talented and motivated people could be a loss to the established companies. Yet, newly formed ventures often develop symbiotic relationships with those incumbent companies where their founders work. Further, some incumbents recruit these entrepreneurs back to stimulate innovation within their organizations. Others have bought companies formed by their former employees, hoping to capitalize on their achievements and knowledge. The implications of these symbiotic relationships between incumbents and new ventures for knowledge creation and firm formation could be fruitful and impactful research that informs public policy makers.

7 Conclusion

Formal and informal CE activities are important for organizational strategic renewal, growth, and successful financial performance. Established companies have to recreate themselves to exploit the opportunities opened by technological, social, demographic, and political changes occurring in an increasingly connected global economy. My research has aspired others to understand the entrepreneurial activities that position companies well to succeed in global markets, focusing on the high technology and science-based industries. Entrepreneurship offers companies opportunities to build strong, enduring, and profitable market positions. Moreover, my research makes clear that entrepreneurship has become the ticket for entry into these global markets in the first place, transforming how companies compete and how managers must develop and use an entrepreneurial mindset.

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