OPPORTUNITIES AND NEW BUSINESS MODELS: TRANSACTION COST AND PROPERTY RIGHTS PERSPECTIVES ON ENTREPRENEURSHIP

Nils Stieglitz
Strategic Organization Design Unit
Southern Denmark University
Campusvej 55; 5230 Odense; Denmark
nst@sam.sdu.dk

Nicolai J Foss
Department of Strategy and Management
Norwegian School of Economics and Business Administration;
Breiviksveien 40; N-5045 Bergen; Norway

Njf.smg@cbs.dk

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INTRODUCTION

Entrepreneurs in a competitive economy face three fundamental problems. They need to search for and discover a business opportunity (Kirzner, 1973), evaluate it (Knight, 1921), and then seize the opportunity to reap entrepreneurial profits (Schumpeter, 1911) (Langlois, 2007). The problem that we address is how the ability to exploit business opportunities is influenced by entrepreneurial search and the economic organization of entrepreneurship (Arrow, 1962; Lippman & Rumelt, 2003; Aghion et al., 2005; Foss et al., 2007). In many cases, the discovery for a new business opportunity needs to be motivated by expected gains, since the search and evaluation of business opportunities is a costly, resource-consuming process (Denrell, Fang & Winter, 2003; Nickerson & Zenger, 2004; Foss & Klein, 2005; Teece, 2007; Foss & Foss, 2008).[1] We show the critical role of expectations for understanding of the economic organization of entrepreneurship, and argue that transaction cost economics, with its insistence on bounded rationality, but far-sighted contracting offers useful insights and presents rich opportunities for further theoretical and empirical research (cf. also Furubotn, 2002).

Prior research on entrepreneurship has evolved around three core research questions, namely why, when, and how 1) entrepreneurial opportunities arise, 2) certain individuals and firms and not others discover and exploit opportunities, and 3) different modes of action are used to exploit these opportunities (Shane & Venkataram, 2000). Hence, many scholars in the entrepreneurship field have argued that entrepreneurship studies should embrace the discovery of opportunities as the main construct and unit of analysis of entrepreneurship research (Shane, 2000; Shane & Venkatarmaran, 2000; McMullen & Sheperd, 2006; McMullen, Plummer & Acs, 2007). However, the discovery of an opportunity is only one step in the entrepreneurial process (Companys & McMullen, 2007).

Entrepreneurship can be more thoroughly grounded by adopting the understanding of entrepreneurship as *judgment* (Foss & Klein, 2005; Klein, 2008), drawing on a long history in economic thought (Cantillon, 1755; Knight, 1921; Mises, 1949). This understanding of entrepreneurship goes beyond opportunity discovery by including the evaluation and exploitation of opportunities into the analysis, and focusing on investments and asset ownership as key to realizing opportunities (Klein, 2008). It therefore provides a natural link to the theory of the firm that is not provided by the notion of opportunity discovery (Foss & Klein, 2005). Specifically, the unit of analysis is not so much the opportunity, but the rather the investment into and assembly of resources in the present in anticipation of uncertain receipts in the future. That conceptualization of the firm also ties into in the resource-based view of strategy that sees the firm as a legal shell holding a

[1] Even Kirzner (1973) who denies that there are opportunity costs to entrepreneurship argues that profits alert entrepreneurs to the hitherto undiscovered profit opportunities.

bundle or coalition of resources (Alchian, 1984; Lippman & Rumelt, 2003a: 909). The economic organization of entrepreneurship is therefore fundamentally concerned with how resources interact to create and to appropriate value (Lippman & Rumelt, 2003b; Foss & Foss, 2005, 2008; Alvarez & Barney, 2004).

One way to capture the economic organization of entrepreneurship is by means of the notion of a business model. We are not the first to suggest this possibility. Zott and Amit (2008: 2) explicitly link business opportunity, value creation, and business models: "A business model depicts the design of transaction content, structure, and governance so as to create value through the exploitation of business opportunities." Business models have attracted substantial attention in the practitioner literature, but much less in academic research (cf. Amit & Zott, 2001; Chesborough & Rosenbloom, 2003; Zott & Amit, 2008; Teece, 2007 for notable exceptions). A business model may be seen as a set of instructions to address how an entrepreneur creates and appropriates value in combination with other resource owners under uncertainty. In terms of the judgment perspective, entrepreneurs are individuals who decide on, implement, and adapt business models to discover and exploit business opportunities. This entails managing a coalition of resources to create value and to stake out a bargaining position that allows for the appropriation of value (Lippman & Rumelt, 2003b; Ryall & MacDonald, 2004). The entrepreneurial process is inherently uncertain, since the value of a business opportunity becomes only apparent after it has been implemented. It also implies that we adopt a functional view of entrepreneurship (Klein, 2008): An entrepreneur is simply defined as an (any) individual who discovers and exploits an uncertain and novel business opportunity and bears the business risk of exercising her judgment.[2]

Following the landmark work of Schumpeter (1934), a business opportunity can usefully be defined as a profitable recombination of resources in novel ways. The potential for combing resources is enormous and non-computable (Rivkin, 2000; Denrell, Fang & Winter, 2003; Becker, Knudsen & March, 2006). Entrepreneurs operate in an environment with a vast set of possible resource combinations. Apart from luck, probing this opportunity set requires some form of pre-selection and guided search (Cattani, Dorsch & Winter, 2007). Guidance may be provided by expectations about the abilities to appropriate a business opportunity (Arrow, 1962; Denrell, Fang & Winter, 2003; Foss & Foss, 2008). Lippman and Rumelt (2003a: 924) argue that "entrepreneurial energy and innovation are starkly biased towards the creation of those surpluses which can be appropriated by the innovator." However, precious little is known about how exactly expectations

[2] In contrast, the occupational perspective on entrepreneurship defines entrepreneurship as self-employment (e.g. Parker, 2004), while the structural approaches take the start-up company as the main unit of analysis (e.g. Aldrich, 1990) (cf. Klein, 2008)

about value appropriation drive entrepreneurial search and the design of business models. Transaction cost economies, possibly combined with insights from property rights theory and organizational economics in general, might provide a useful analytical lens to analyze this relationship. Transaction cost economics has a long tradition of highlighting the role of contractual safeguards to protect a contracting party from expropriation and for its willingness to make specific investments (Williamson, 1985). Likewise, the new property rights approach's paradigmatic problem is how the *ex post* bargaining position of a party influences the ex ante incentives to invest into an asset or activity (Hart, 1995). The same basic analytical structure may be found in recent contributions to organizational economics (Rajan & Zingales, 2001).

What unites these three approaches is that the expected ability to appropriate value fundamentally influences the incentives to engage in value-creating activities. Despite the similarity, there are also sharp differences, primarily in the basic behavioral assumptions made. Transaction cost economics embraces bounded rationality, uncertainty, and adaptation, while the new property rights approach and organizational economics highlight rational expectations, optimization, and strategic interactions. Still, we show that these approaches all have the potential to further our understanding of the search for and discovery of opportunities, and the organization of this process. Indeed, the main purpose of the following is to suggest avenues for research in intersection between entrepreneurship and the economics of the firm (and economic organization in general), rather than to derive distinct propositions. The big challenge here seems to be building, modeling, and testing suitable behavioral foundations. Advancing our understanding of entrepreneurship and its economic organization calls for a sustained probing of the murky ground between purely adaptive and fully rational expectations of human agents.

TRANSACTION COST ECONOMICS: SAFEGUARDING AGAINST OPPORTUNISM

Transaction Cost Economics and Entrepreneurial Decision-making

An entrepreneur needs to transact with other resource owners to realize a perceived business opportunity. In principle, the transacting process can be organized by multiple contractual institutions. Transaction cost economics therefore seems to be well-positioned to shed light on the economic organization of entrepreneurship, even though it has been criticized for not being able to adequately account for entrepreneurial uncertainty (e.g. Furubotn, 2002; Alvarez & Barney, 2007). This line of attack is, however, somewhat problematic as Williamson in particular has emphasized "genuine" uncertainty (Foss, 1993), and since transaction cost economics has always highlighted the role of bounded rationality as well as of opportunism for explaining economic organization (Williamson, 1975; Williamson, 1985). Bounded rationality makes comprehensive contracting

infeasible, since an entrepreneur is unable to fully predict how to exploit a prospective business opportunity – the business idea – and how to react to unforeseen disturbance. The adaptive capacity of governance modes becomes important (Williamson, 1991). The hierarchy facilitates continuous adaptation by sequential decision-making when disturbances and realignments require coordinated responses (Williamson, 1991; Furubotn, 2006). All these insights surely seem relevant for an understanding of how entrepreneurs cope with uncertainty.

If what critics such as Furubotn (2002) and Alvarez and Barney (2007) mean is that transaction cost economics hitherto has not devoted much attention to exploring entrepreneurial decision-making in the context of uncertainty, the critique seems more justified. However, the recent problem-solving perspective in transaction cost economics may be seen as an attempt to cope with entrepreneurial decision-making (Nickerson & Zenger, 2004; Leiblein & Macher, this volume). Essentially, opportunity discovery starts with a problem that needs to be solved. The entrepreneur uses a cognitive representation to search the space of possible resource combinations (Gavetti & Levinthal, 2000) and then uses sequential adaptation to fine-tune and exploit the business opportunity. In contrast, if adaptation does not require coordinated responses among resource owners, the entrepreneur may rely on market contracting to achieve autonomous adaptation.

Safeguarding Against Opportunism

Here, we are less concerned with the problem of adaptive capacity in value creation, but more with the cooperation problem manifest in the opportunism assumption of transaction cost economics. How can an entrepreneur safeguard her investments into a business idea against the appropriation by other contracting parties? Williamson's (1985, 2000) simple contracting scheme suggests that contracting parties match the governance mode to the transaction attributes to safeguard investments. The entrepreneur becomes tied to a resource coalition if the investment into a business idea is relationship-specific. The exploitation of the business idea then requires access to other resources, leading to bilateral or multilateral dependency between contracting parties. Dependency not only increases the need for continuous adaptation, but also creates a possible hold-up situation for the entrepreneur. Other resource owners may block the pursuit of the business idea, unless they receive a larger share of the generated income. Thus, the entrepreneur must also decide on contractual safeguards to protect entrepreneurial rents in designing the business model.

Human agents are assumed to be boundedly rational, but transaction cost economics insist that they are far from myopic in designing a business model. Rather, contracting is assumed to be far-sighted (Williamson, 1996; Williamson, 2000; cf. Foss, 2001). When entering a contractual relationship, the parties consider possible contractual hazards that may emerge and try to structure the safeguards accordingly. Without safeguards, a contracting party may be reluctant to invest into

specific assets, since it may suffer from the holdup problem after making the investment. Thus, an entrepreneur may be keenly aware of problem of safeguarding possible entrepreneurial rents before devoting resource to searching and developing a business idea. She will attempt to protect herself against opportunism by others and structure the business model around these hazards. However, transaction cost economics does not assume that there always is an optimal match between transaction characteristics and contractual safeguards (Williamson, 1985). Contracting parties may fail to identify a hazard when entering a relationship; safeguards may not work effectively. Disappointments are bound to happen. Thus, contracting may be farsighted, but it is far from perfect or comprehensive. Contracting partners do not form rational expectations of the (net) benefits (utilities) that may flow from a relation (Kreps, 1996), although they can be assumed to form rough estimates and "confidence intervals" of these. Viewed from this angle, the simple contracting scheme offers a process perspective on economic organization. It suggests that how a given transaction is governed may change over time, as the contracting parties learn and adapt the modes of governance (Furubotn, 2006). In turn, contracting partners may revise their estimates of such benefits.

Such process issues were downplayed (if noted) in Williamson's seminal research in favour of a comparative-institutional and essentially static approach. This gave rise to the critique that a static approach was at variance with, for example, the assumption of bounded rationality, which would seem to naturally imply that agents make efforts to change the bounds on their rationality (Dow, 1987). Bounded rationality could only be aligned with the static approach by relegating it to playing the limited role of explaining the incompleteness of contracting (Foss, 2003). However, recent research has increasingly drawn attention to the dynamic aspects of governing transactions, in effect taking seriously what seem to be natural implications of the assumption of bounded rationality and decision-making under "genuine" (or Knightian) uncertainty. For example, Mayer and Argyres (2004) find many changes in the contractual relationship between two parties in the personal computer industry that cannot be fully explained by changes in the asset specificity. They conclude that "the nature of this learning appears to have been quite incremental and local, that is, not very far sighted."[3] Other studies also found that learning and adaptation may play an important role in governing transactions over time (Argyres & Mayer, 2007; Argyres, Bercowitz & Mayer, 2007; Vanneste & Puranam, 2009). Moreover, Liebeskind and Argyres (1999) argue that the choice of governance modes itself may be highly path-dependent (cf. Leiblein, 2003). That is, past governance choices constrain how transactions could be organized in the future. They point to two important sources for path-dependencies in governance evolution. The first source is a formal or informal

[3] This suggests that the expectations of boundedly rational agents may be more adaptive and myopic than farsighted.

contractual commitment that is binding to the degree that to renegotiate or to dissolve an agreement will be costly. The second source points to unexpected changes in the bargaining positions that may force a contracting party to hold on to an otherwise inefficient mode of governance. This line of analysis has clear implications for studying the economic organization of entrepreneurship, since it highlights heterogeneity both in opportunity discovery and appropriation resulting from past governance choices.

OWNERSHIP AND ENTREPRENEURIAL SEARCH

In contrast to transaction cost economics, the new property rights approach (Hart, 1995) assumes that contracting parties form rational expectations about contractual hazards. Contracts remain incomplete by the presumed inability of outside parties like legal courts to verify and enforce contracts. In a nutshell, contracting parties anticipate their bargaining position after entering a contractual relationship and adapt the incentives to make relationship-specific investments accordingly. The stronger the *ex post* bargaining position, the higher the *ex ante* incentives to make relationship-specific investments. Obtaining ownership rights over tangible and intangible assets strengthen the bargaining position. Ownership rights include the residual rights to control over an asset, the right to fill "in the blanks" of a contract, and allow the owner to exclude others from accessing an asset. In the new property rights approach, acquiring ownership rights is thus seen to be an overarching instrument to strengthen the bargaining position. Furthermore, the allocation of ownership rights influences the incentives to engage in entrepreneurial search and to invest into the development of a business idea.

A Simple Property Rights Example

To provide texture to our argument, we draw on Hart and Moore (1990) and Hart (1995) and work through a simple example that illuminates the salient features of the new property rights approach. Assume that there are two aspiring entrepreneur, Bill and Mary, who interact in a vertical value chain. Bill is active upstream from Mary, producing an intermediate product with the help of a resource A. Mary produces and sells the final product, using the resource B. Both could invest into searching for a business idea that makes production on the respective stage of production more efficient or enhance its quality. We assume that the business ideas lead to a higher quality of the final product in the following. Both Bill and Mary are interested in making the final product more competitive through quality benefits, thereby allowing charging a higher price than competitors. That is, the vertical structure and the existing resources A and B provide guidance in the entrepreneurial search. The implementation of a business idea requires access to both assets A and B. The investments into a business idea are therefore relationship-specific.

For the sake of simplicity, we assume that the relationship only exists for two periods. In t1, Bill and Mary separately decide on investments into searching and developing business ideas that increase the price of the final product. However, in t1, there is uncertainty about the exact specification of the intermediate product to be delivered to Mary, so the two contracting parties are unable to write a complete contract. Uncertainty about the specification of the intermediate product is resolved in t2, the final product is produced and sold. Under those conditions, both contracting parties may be reluctant to make substantial investments into a business idea, since they anticipate a possible holdup by the other contracting party. For example, after Bill making substantial investments into a quality-improving idea, Mary might demand a much higher quality from Bill for the agreed-upon price. Since Bill's business idea requires access to both resources A and B, Bill grudgingly has to accept a much lower share of profit to cover his initial investment costs. This reasoning corresponds to the analysis in transaction cost economics (Williamson, 1985; Klein et al., 1978). By investing into a relationship-specific business idea, the contractual relationship undergoes a fundamental transformation, making both parties bilaterally dependent on each other. The suggested remedy is vertical integration – placing the resources A and B under common ownership – to safeguard the specific investments. However, transaction cost economics does not address who should acquire whom, and, thereby, who will be the entrepreneur with a business idea.

The answer provided by the new property rights approach is that ownership of resources influences the incentives to make specific investments. Ownership of a resource is defined in terms of having the residual control rights over a resource, especially the right to exclude others from a resource. The allocation of ownership rights thereby shapes the bargaining positions of contracting parties. If Mary owns resources A and B, she can exclude Bill from accessing the resources and implementing his business idea. Due to her ownership position, she can hold Bill up and appropriate most of the value created by Bill's business idea.

The benefits of vertical integration and placing both resources under common ownership are therefore the increase in bargaining power by the owner and the strengthening of the owner's incentive to invest money into the search for a business idea. It also implies that there are costs to vertical integration, the weaker incentives to engage in entrepreneurial search by non-owners. If Mary owns both resources, Bill does not have a high-powered incentive to search for business ideas for these, since Mary can appropriate much of the value created simply by threatening Bill with exclusion from the needed resources. Ownership over resources thus influences the ability to appropriate entrepreneurial rents, and thereby shape the incentives to search for opportunities in the first place. It also implies that the identity of the entrepreneur matters. From a new property rights perspective, who develops and implements a business idea and acquires ownership rights to assets

critically depends on the respective potential for value creation. Mary acquires ownership rights over A and B if she expects that the added value outweighs the surplus created by Bill. Under those conditions, Mary is ready to offer a higher price for acquiring the resources and placing them under common ownership. Thus, what ultimately drives the vertical integration and the boundaries of a business model are the rational expectations about value creation. The entrepreneur forms rational expectations about the value of business opportunity and is willing to bet her money on the viability of her business idea.

Implications

The simple model nevertheless allows one to derive some empirical propositions about the formation and evolution of business model. First, a straight-forward implication is that Mary becomes the owner of the business model, if Bill's search for a business idea is insensitive to incentives. Under those conditions, there is no downside to vertical integration, just the positive effect on Mary's incentives to engage in entrepreneurial search. Both Bill and Mary are entrepreneurs in the sense of searching for new business ideas. Mary is the owner of the company, while Bill is an employee. Second, an entrepreneur only integrates the resources A and B when they are complementary and relationship-specific investments make them more valuable. For example, if Bill's business idea makes the resource A more productive, but he does not need resource B to create value, there is no need for vertical integration. Bill could sell his improved intermediate product to many producers of final goods. Third, financial constraints faced by an entrepreneur drives integration and common ownership towards resources that add relatively more value by relationship-specific investments (Bhide, 2001). In other words, she integrates resources that provide the maximum expected profit per available cash (Jacobides & Winter, 2007). For resources beyond her reach, the entrepreneur chooses very low levels of relationship-specific investments and relies on generic resources obtained through market contracts, accepting the associated loss in value creation. Alternatively, she could also rely on hybrid contractual arrangements that provide safeguards for relationship-specific investments (Williamson, 1991; Dyer & Singh, 1998). Over time, the ownership of resources and the boundaries of a business model seem to be driven by two conflicting forces: On the one hand, a successful entrepreneur becomes wealthier, easing the financial constraint she faced in the start-up stage. On the other hand, the success of a business idea tends to increase the size of the market over time, increasing the number of possible trading partners for resources (Langlois & Robertson, 1995). Hence, investments tend to become less relationship-specific, a powerful incentive for vertical disintegration of a business model (Hart, 1995).

The analysis by the new property rights approach also casts light on the stability of a business model over time. Tangible assets such as machines or buildings and intangible resources like patents,

client lists, or brands stabilize a business model by providing a set of core resources under common ownership. Without such core resources, a business model may quickly fall apart. No resource owner within the business model then has a strong incentive to invest into the search for a business opportunity requiring other resources, as he will fear a possible hold-up after making substantial investments into entrepreneurial search. Thus, business models that create value primarily on the basis of the human capital often choose partnerships and joint ownership as the primary governance mechanism. A core resource, like client lists or brand reputation, may add stability by strengthening the bargaining position of the owner, thereby providing strong incentives for sustained entrepreneurial search. The flipside of the coin is that the set of core resources already in place provide guidance in entrepreneurial search (Foss & Foss, 2008). The entrepreneur within an existing business model tends to search for business opportunities that make use of and draw on resources already owned. The search for new resource combinations therefore is a path-dependent process, with existing resources providing guidance in the vast space of possible resource combinations (Denrell, Fang & Winter, 2003).

Overall, the new property rights approach adds important insight into entrepreneurship by highlighting the importance of the *ex post* bargaining position for the *ex ante* incentives to engage in entrepreneurial search. Expectations about possible rewards drive the search for business opportunities. The primary way to secure prospective entrepreneurial rents, according to the new property rights approach, is to acquire ownership rights of complementary resources. Ownership rights contain residual rights of control over a resource and especially the right to exclude other from accessing a resource. They increase the bargaining position of the owner *vis-à-vis* other resource owners. In addition, the resources currently under common ownership guide entrepreneurial search in the vast space of possible resource combinations. However, the new property rights approach at best allows for a stark, somewhat limited picture of entrepreneurship – only owners engage in entrepreneurial search and make substantial investments into relationship-specific resources. It is unclear how non-owners may be motivated to engage in entrepreneurial search. However, other insights from organizational economics allow for a richer analysis of entrepreneurial search, incentives, and the economic organization of entrepreneurship.

THE INTERNAL STRUCTURE OF THE FIRM AND THE GROWTH OF ENTREPRENEURIAL VENTURES

Incentives for Value Capture

An entrepreneur with a potentially valuable business idea faces a dilemma (Rajan & Zingales, 2001). One the one hand, he needs specialization and relationship-specific human capital investments

to increase the total value of the business idea. The problem is that he cannot own these human resources (absent slavery), so he needs to find contractual or organizational mechanisms to induce relationship-specific investments by safeguarding resource owners and protecting them against *ex post* re-contracting. This applies to prospective employees, but also to suppliers and complementors that he cannot integrate due to financial constraints. The property rights approach offers no solutions for that problem. On the other hand, he has to give the employee access to her business idea (cf. Rajan & Zingales, 1998). Without access to the business idea, an employee will not be able to make the relationship-specific investment or work productively. For example, assume that the entrepreneur's idea rests on a new technology that the employee has to develop further. The employee needs access to the technology to work with it. However, gaining access to the technology also means that the employee may learn about the business idea, and then walk away with it to start his own venture. Without any protection against the pre-market appropriation of entrepreneurial rents (Stieglitz & Heine, 2007), the entrepreneur is reluctant to give access to the business idea. Less value is created and, ultimately, appropriated (Foss & Foss, 2005). In sum, if no safeguards for both parties exist, there will be no specialization, with both parties being worse off. Thus, the entrepreneur has to find mechanisms that allow for value capture by both parties to induce relationship-specific investments. Again, the *ex ante* incentives to invest are shaped by the *ex post* bargaining position.

Internal Organization: Privileged versus Direct Access

A possible solution to this conundrum is to give a prospective employee privileged access to the business idea within a vertical hierarchy (Rajan & Zingales, 1998). Access is privileged in the sense that only a few employees—the "managers"—have direct access to the entrepreneur's business idea, while other, lower-level employees (subordinates) only have indirect access to it, provided by the managers above them. The vertical hierarchy gives managers an incentive to specialize by giving them positional power over subordinates and the ability to capture a slice of the value created by subordinates. The vertical hierarchy decreases the danger of employees walking away from the firm, since each manager on his own will not be able to compete with the entrepreneur. The relation-specific investments by the managers gives them a stake in the firm that a) binds them to the entrepreneur by becoming more specialized and b) allows them to participate in the rent streams generated by subordinates. The business idea is thereby protected by the web of complementary human capital investments. However, the web must be orchestrated and built over time, putting a brake on the business model's growth (Rajan & Zingales, 2001).

In contrast, a horizontal hierarchy gives every employee direct access to the business idea, but not enough to compete head-on with the entrepreneur. Instead of capturing part of the value created

by subordinates, employees in the horizontal structure are motivated by the possibility of replacing the entrepreneur and inheriting her critical resource (e.g. business idea). This is the prize that the employees compete for, and the expected value of that prize governs the size of the horizontal hierarchy. Employees only specialize if the costs and risks of specialization are outweighed by the possible gains of making it to the top. The horizontal hierarchy will be especially prevalent if the entrepreneur's critical resource is not easily expropriated by an employee, and its protection is relatively less important than specialization. While the horizontal hierarchy may enjoy higher growth in the beginning (since there is no need to slowly build vertical layers in the hierarchy), its overall size is limited by the expected size of the prize.

What the analysis points to is, first, the importance of the internal structure of a business model for understanding value creation and value capture. How a business model is internally structured governs what business ideas may be developed in the future. Second, the analysis may also shed light on how a firm interacts with and governs external parties in the resource coalition that are not employees. For example, in governing suppliers, an entrepreneur is confronted with exactly the same issues: It wants to motivate suppliers to make relationship-specific investments while protecting its critical resource. A vertical hierarchy then corresponds to a multi-tiered system of suppliers, with a core of specialized suppliers tightly connected to the focal firm. A horizontal hierarchy has several suppliers competing for the ultimate prize, namely full access to business idea as a privileged partner. Note that these decisions translate into critical decisions about the internal and external governance of the firm that may have long-lasting consequences (Argyres & Liebeskind, 1999). A firm that has adopted a vertical hierarchy may find it very hard to switch to a different governance mode, since it destroys positional power of the resource owners that protect the core resource. Again, it suggests that a firm seeks out new business opportunities that are complementary to its existing internal resources (Rajan & Zingales, 2001; Rotemberg & Saloner, 1995).

EMPLOYEE ENTREPRENEURSHIP AND ORGANIZATIONAL INCENTIVES

Although the entrepreneurship literature seems biased towards upstart firms, many business opportunities are in actuality discovered, evaluated and captured by existing firms. Employees often play a key role for developing and pursuing business opportunities (Baumol, 1993; Bhardwaj, Camillus & Hounshell, 2006; Foss, Foss & Klein, 2007). A problem for senior management is how to motivate employees to engage in the costly search for business opportunities. Usually, it is very difficult to compensate employees directly, since the effort tends to be costly to observe. A reward is possible if an employee's business idea is adopted and implemented by the company. However, not all (sound) business ideas may be adopted, if implementation is costly. This creates an additional

problem: How does an employee form reliable expectations about what projects are adopted? Once again, the ex ante investment into an activity – effort into searching for a promising project – is driven by *ex post* bargaining power – the probability of a project being adopted and rewarded.

The *ex post* bargaining position has two components. First, a firm needs to credibly commit itself to reward an employee for an adopted project (Kreps, 1990; Gibbons, 1999; cf. Baker, Murphy & Gibbons, 1999; Foss, 2003 on the problem of credible managerial delegation). Second, the firm needs to credibly convey what *kind* of projects it will adopt. With unclear criteria, employees may be reluctant to exert effort in searching for business opportunities, since they anticipate fiercer competition for internal funding among projects. The firm may then be better off by sticking to a narrow business strategy (Rotemberg & Saloner, 1994, 1995; Rajan & Zingales, 2001). It commits itself to only consider business ideas within a narrow, but highly profitable set of business activities, while disregarding all business opportunities outside of that narrow domain.[4] The commitment sends a clear signal to employees that a project gets funded if it appears profitable and falls within the business domain of a firm. Hence, employees will be more motivated to search for business opportunities within the narrow domain, while disregarding possibilities that lay outside of the narrow business strategy. Obviously, this approach comes at the cost of forgoing attractive opportunities that are incompatible with the firm's current business strategy. Viewed from this perspective, "sticking to your knitting" is an effective way to stimulate entrepreneurial search by employees. The analysis suggests that more innovative firms have a narrower scope of business activities than less innovative firms.

An alternative approach to motivating employees' effort into entrepreneurial search by strengthening their bargaining position is to employ a visionary CEO (Rotemberg & Saloner, 2000; Van den Steen, 2005). A visionary CEO pursues a vision for the business model's future and evaluates proposed projects whether or not they fit within the vision. The CEO is therefore constantly biased toward certain types of projects. In that sense, the visionary CEO corresponds to a narrow business strategy that channels opportunity discovery. However, the CEO may recognize a sufficiently good project that falls outside the range of her narrow vision and may nevertheless choose to implement it. A necessary condition for such a decision-making process is to have a layer of autonomous middle managers between the CEO and the employees. In contrast to the CEO, middle managers do not have a bias; they promote projects solely based on their expected profit potential. While the CEO makes the ultimate decision about what projects to implement and reward, middle managers are charged with the responsibility of allocating resources to nascent projects

[4] Obviously, such a strategy also yields the familiar Smithian specialization advantages.

proposed by employees. In this way, the middle managers act as an information filter for the CEO, passing on projects for possible implementation that are either consistent with the CEO's vision or have great profit potential. It also helps employees to decide on whether to pursue a project further and exert effort, since allocating resources to a project sends a strong signal that it might get implemented and the effort rewarded. The organizational structure reduces a major weakness of a narrow business strategy, which eschews all business opportunities outside the narrow domain.

ENTREPRENEURSHIP, THE FORMATION OF BELIEFS, AND THE ORGANIZATIONAL EVALUATION OF OPPORTUNITIES

Entrepreneurial Beliefs as a Research Gap

In the introduction, we asked how expectations about value appropriation drive entrepreneurial search and the design of business models. The issues involved here are all cognitive ones: How do such expectations arise in the first place; how do they impact entrepreneurial search for business opportunities, and how do they link to business models? Precious little is known about them. In fact, cognitive issues of this kind are usually black-boxed in the search for antecedents of entrepreneurship. Indeed, to the extent that cognition is represented it is usually through examining whether entrepreneurs are more prone to cognitive biases.[5]

Transaction cost economics, the new property rights approach, and organizational economics are useful starting points to address this research gap. Transaction cost economics highlights the role of contractual safeguards to protect entrepreneurial rents and suggests how governance mechanisms evolve over time. The new property rights approach puts its emphasis on how the ex post bargaining position secured by ownership rights influence the ex ante intensity and allocation of search efforts. Organizational economics helps to open up the black box of a business model by highlighting how the internal structure and organizational incentives influence search for business improvements by employees and other resource owners. As in the new property rights approach, the core mechanism in the analysis is how expectations about future rewards shape the search for and investment into value-increasing resources and projects. However, the theoretical analysis both in the new property rights approach and in (formal) organizational economics fundamentally rests on the assumption of rational expectations. Assuming rational expectations not only creates the logical problem of justifying incomplete contracts (Kreps, 1996; Tirole & Maskin, 1999), but it also does not sit very well with the insistence on Knightian uncertainty in much of the entrepreneurship and strategy

[5] The exception to this statement is Sarasvarthy's work on "effectuation" which explicitly tries (through "think aloud" methods developed in cognitive science) to map entrepreneurs' cognitive processes (Sarasvathy, 2008).

literature (Foss, 2001). Entrepreneurs may not make optimal use of all available information (Sarasvarthy, 2001), their judgment may be biased (Busenitz & Barney, 1997), and rational expectations simply aren't well-defined under the uncertain conditions faced by entrepreneurs.[6]

Transaction cost economics, on the other hand, with its insistence on bounded rationality and its taking account of genuine uncertainty (Williamson, 1985; Foss, 2003), seems more germane to many relevant issues in entrepreneurship and strategy (Furubotn, 2002). Transaction cost economics has intellectual roots in the behavioral theory of the firm (Simon & March, 1958; Cyert & March, 1963), but differs in an important respect: In contrast to the adaptive expectations assumed in the behavioral tradition, Williamson's concept of farsighted contracting suggests a middle ground between adaptive, essentially backward-looking expectations and rational, forward-looking expectations. Exploring the murky ground between adaptive and rational expectations provide ample opportunities for future theoretical and empirical research.

Judgment and Expertise

As indicated, most contributions to the entrepreneurship literature in economics have essentially black-boxed entrepreneurial alertness (Kirzner, 1973), imagination (Witt, 1998), and, the focus here, judgment (Knight, 1921) (Sarasvarthy & Dew, 2008). While one reason could be that these mental processes simply escape scientific investigation,[7] the traditional reason is that the purpose of economics work in entrepreneurship is not to explain the entrepreneurial act *per se*, but rather its *consequences* in terms of (the existence of) profit, firms, business cycles or economic growth (cf. Klein, 2008); therefore entrepreneurship is characterized in at best a highly abstract manner. For example, Langlois (2005:5) characterizes judgment as the "(largely tacit) ability to make, under conditions of structural uncertainty, decisions that turn out to be reasonable or successful ex post," but doesn't provide details on this "ability."

However, if the aim is to examine entrepreneurship explicitly at the firm level, rather than some aggregative consequences of it, it makes sense to look more closely at the nature and antecedents of judgment. One take on judgment, which is consistent with the bounded rationality emphasis of transaction cost economics, is to treat judgment as an outcome of Smithian

[6] As Furubotn (2002: 89) argues: "… since Knightian uncertainty prevails, the firm is not in a position to adjust its structure optimally for operation over time. In particular, decision-makers cannot rely on probabilistic calculations … it can be argued that the New Institutional Economics requires analysis to be very clear in explaining how the boundedly rational entrepreneur makes decisions and acquires information, and in indicating how much information he can reasonably be expected to acquire in any given situation."

[7] Thus, according to Knight (1921:) "The ultimate logic, or psychology, of these deliberations is obscure, a part of the scientifically unfathomable mystery of life and mind. We must simply fall back upon a "capacity" in the intelligent animal to form more or less correct judgments about things, an intuitive sense of values. We are so built that what seems to us reasonable is likely to be confirmed by experience, or we could not live in the world at all."

specialization, namely a specific *expertise*. The most ambitious treatment of entrepreneurship along such lines is Sarasvarthy's which explicitly draws on Simon's work on expertise (Simon, **1983**). Contrary to the view of entrepreneurs as envisioning some opportunity (that however, is too tacit to communicate to others, notably the capital markets), Sarasvarthy (Sarasvarthy & Dew, 2008: 20) argues that

> Expert entrepreneurs do not necessarily begin with an opportunity or market research. Instead, they start with who they are, what they know and whom they know. These are their primary means. What they have – i.e. capital assets, is a function of their identity, knowledge and networks. As we will see in the elaboration of the process, these assets will fluctuate in their value as they get invested, manipulated, combined with others and transformed into unprecedented new possibilities. … Expert entrepreneurs may or may not begin with a clear vision for a new venture. Instead their entrepreneurial strategies are predominately means-driven and *result* in new ends embodied in goals and subgoals that are usually characterized by specific *courses of action* rather than outcome variables.

While this may be read as a claim that entrepreneurship is unreflective and haphazard, a more correct reading is that entrepreneurial mental models and the judgment based on such models are strongly influenced by the entrepreneur's past experience and by the possibilities of action afforded by his existing resources.

Such a reading is developed by Foss and Foss (2008) who, drawing on the resource-based view, argue that firm-level entrepreneurial opportunities emerge along paths shaped by the firm's experience. However, they also argue out that property rights and transaction cost considerations are important to understanding the discovery and exploitation of opportunities. Two mechanisms link transaction costs and opportunity discovery. First, transaction costs determine how well defined and enforced property rights to resource attributes are; in turn, this influences the value that entrepreneurial resource owners expect to appropriate, and therefore their incentives to engage in opportunity discovery (Shepherd & DeTienne, 2005). This is the "appropriability mechanism." Second, entrepreneurial experience influences opportunity discovery (e.g., Shane, 2000). However, experience (also) emerges from resource learning, that is, entrepreneurs' learning about the attributes of resources (Mahoney, 1995). Such learning entails transaction costs, for example, the costs of measuring the productivity potential of employees. The transaction costs that entrepreneurs face influence their resource learning, introduce path dependence in such learning, and therefore influence which opportunities will be discovered (the "resource learning mechanism"). In other words, the mental models firms ('managers) adopted from their learning experience of available opportunities are influenced transaction costs and property rights. Although embedded in the resource-based view

and property rights economics, the approach of Foss and Foss is thus akin to recent attempts to include learning mechanisms in transaction cost economics (Mayer & Argyres, 2004; Argyres & Mayer, 2007).

Mental Models

Recent theoretical and empirical research in the behavioral theory of the firm similarly suggests that agents use specialized mental models to navigate the vast space of possible resource combinations (cf. Nickerson & Zenger, 2004; Gavetti, 2005; Gavetti & Rivkin, 2007).[8] In a simulation model, Gavetti and Levinthal (2000) show how the effectiveness of entrepreneurial search may be substantially enhanced by cognitive representations of the resource space. A cognitive representation is a simplified picture of the resource space. A well-informed cognitive representation provides guidance in opportunity discovery and allows the entrepreneur to identify attractive regions in a problem space. Because the cognitive representation is just a coarse-grained depiction of the resource space, an entrepreneur engages in local adaptation to refine the initial business idea. Thus, the overall conception of entrepreneurial search emerging from this stream of research is that the initial identification of an opportunity is initially guided by a coarse representation of possible resource combinations. After the discovery of a potential business idea, the entrepreneur proceeds to its refinement and modification (Siggelkow & Levinthal, 2003). Hence, what the cognitive representation fundamentally represents is the entrepreneurial expectation and speculation about more attractive regions in the resource space.

The key question then is where cognitive representations come from. For technological innovations, an obvious source for a cognitive representation is basic science (Fleming & Sorensen, 2004). Basic science offers an understanding of causal laws and how certain resources combine and interact in principle. Scientific understanding leads entrepreneurs more directly to useful resource combinations, eliminates fruitless paths of research, and motivates them to press on even in the face of negative feedback (Fleming & Sorenson, 2004: 911-912). Likewise, a cognitive representation of the resource space may also be informed by analogies (Gavetti, Levinthal & Rivkin, 2005; Gavetti & Rivkin, 2007; Gavetti & Warglien, 2007). Analogies allow entrepreneurs to take insights developed in one context and apply it to a new setting. Speculative entrepreneurship is thus informed by what the entrepreneur thinks might be a similar situation. More generally, an important source of

[8] For a more sceptical look on the value of mental models, see Denrell, Fang & Winter (2003). They argue that entrepreneurs stumble upon resource combinations by serendipity. Entrepreneurial search is guided by prior access to idiosyncratic resources, but not by entrepreneurial cognition: "What is the role of strategizing and intentionality in this story? According to the argument it is unlikely that the firm acquired most of the components based on some vision of the value of the eventual combination. In this sense, the process of opportunity recognition is serendipitous" (Denrell, Fang and Winter (2003: 986).

entrepreneurship is the heterogeneity of expectations and cognitive representations held by human agents in an economy.

While much of the literature on entrepreneurship and the behavioral theory of the firm is concerned with opportunity discovery and the recombination of resources for value creation, the analysis could also be fruitfully applied to problems of value appropriation and governance choice. Entrepreneurs also form cognitive representations about the major contractual hazards and about the most effective ways of protecting against them. These initial cognitive representations imprint the structure and content of the business model. It also suggests that the same transaction might be governed very differently, as human agents may hold heterogeneous cognitive representations (cf. Argyres & Liebeskind, 1999; Furubotn, 2002; Mayer & Argyres, 2004). Cognitive representations and the viability of resulting business models get tested in the market place, and they get updated and revised by feedback (Stieglitz & Heine, 2007). Thus, heterogeneity in cognitive representations plays out on two levels. It shapes opportunity discovery as well as opportunity exploitation. The theoretical and empirical knowledge about how entrepreneurs form cognitive representations, make judgments, and implement, adapt, and discard business models over time is rather limited. Moreover, little is known about how expectations about possible rewards drive entrepreneurial search and the discovery of new resource combinations (cf. Lippman & Rumelt, 2003b, pp. 1083-1084).

Differential Beliefs and the Evaluation of Business Opportunities

The bounded rationality of human agents also implies that entrepreneurs may differ in how they evaluate a new resource combination (Simon, 1955; Knudsen & Levinthal, 2007). Heterogeneity may enter the picture in the generation and in the evaluation of alternatives. Human agents may look at the same possible new resource combinations, but hold very different beliefs about its business potential. They evaluate the same opportunity differently. Two types of errors are possible (Sah & Stiglitz, 1988). A human agent may underestimate the real potential of a business opportunity, choosing not to pursue it further. She therefore rejects a superior alternative (Type I error). In contrast, an aspiring entrepreneur may overestimate the business potential of an opportunity, thereby accepting an inferior alternative (Type II error). Prior work on joint decision-making structures (Sah & Stiglitz, 1988) shows that hierarchical structures prevent Type II errors and are prone to make Type I errors: They steer clear away from bad alternatives, but thereby also greatly dampen entrepreneurship by rejecting good alternatives. Polyarchic structures, on the other hand, in which just one decision-maker has to agree to an alternative, accept good as well as bad alternatives. They make more Type II errors. These findings are clearly relevant for the study of team entrepreneurship. In addition, it also suggests a direct link between organizational decision-making structures and entrepreneurship. Both represent instances of joint decision-making. The organization

of decision-making thereby influences the evaluation of business opportunities (Knudsen & Levinthal, 2007; Christensen & Knudsen, 2008).

It also suggests that the differential ability of human agents to assess and evaluate opportunities has been underestimated in prior work. One way to capture this fundamental property of bounded rationality is the recent work on individual evaluation abilities (Knudsen & Levinthal, 2007; Christensen & Knudsen, 2008). It captures the ability of decision-makers to screen and evaluate business opportunities in probabilistic terms. Decision-makers have a high probability of accepting very good alternatives and a very low probability of very bad alternatives. This implies that most low-hanging fruits are already taken, and aspiring entrepreneurs have no troubles steering away from very bad ideas. However, an individual's ability to evaluate opportunities comes into play between these two extremes. Here, differential ability to evaluate translates into heterogeneous beliefs about the potential of a business opportunity. Moreover, the ability to evaluate an opportunity is largely driven by an individual's prior experience. It reflects learning and specialization. For example, an individual may greatly enhance the ability to evaluate opportunities within a narrow domain. Note that the ability to evaluate business opportunities encapsulates beliefs about possible rewards and channels entrepreneurial search. An entrepreneur seeks out business opportunities in domains she deems to be attractive.

So far, these new behavioral foundations have not been applied to issues of entrepreneurship and its economic organization. One obvious avenue for further research is to apply differential screening abilities to the emergence and evolution of business models. Transactions with very high or very low level of asset specificity lead to a more uniform way of governing them across agents, because the contractual hazards and their solutions are rather obvious and largely independent of an individual's screening ability. Rather, it is at intermediate levels of asset specificity were one expects to observe different governance modes to manage similar transactions.[9]

Implications

Explicitly accounting for the heterogeneity of the mental models of management teams and entrepreneurs introduces an evolutionary twist that so far has been absent from transaction cost economics. In the context of different governance modes existing for managing similar transactions, Williamson (1985) refers to "mistaken integration." However, in an entrepreneurial setting with fundamental uncertainty and heterogeneity, it is not necessarily obvious what is and what isn't "mistaken" economic organization (Furubotn, 2002). In particular, because managers and

[9] Furthermore, it also offers an explanation of how entrepreneurs turn into managers, namely by becoming more adept at evaluating opportunities within a narrower domain of the resource space (cf. Alchian & Demsetz, 1972; Casson & Wadeson, 2007).

entrepreneurs hold different mental models, they will value resources differently (Barney, 1986; Denrell, Fang & Winter, 2003); (changes in) the boundaries of the firm may be understood in this light (Foss & Klein, 2005).

Specifically, mergers, acquisitions, divestitures, and other reorganizations can be viewed as responses to a valuation discrepancy. Acquisition, for example, occurs when the value of an existing firm's resources is greater to an outside party than to its current owners. New resource combinations can generate efficiencies by replacing poorly performing managers, creating operating synergies, or establishing internal capital markets. The academic literature suggests that corporate restructurings do, on average, create value (Andrade, Mitchell, and Stafford 2001). Given such benefits, why are many mergers later "reversed" in a divestiture, spin-off, or carve-out? The first is the one associated with agency theory, that is, entrenched managers make acquisitions primarily to increase their own power, prestige or control, producing negligible efficiency gains, and that acquisitions by manager-controlled firms are likely to be divested ex post. Thus, acquisitions are *ex ante* inefficient.

However, Matsusaka (2001) argues that often profit-seeking entrepreneurs can only learn about opportunities by literally trying various combinations of activities by diversifying into new industries (cf. also Mosakowski 1997). In fact, firms may make diversifying acquisitions *even* if they know these acquisitions are likely to be reversed in a divestiture. The process generates information that is useful for revising entrepreneurial plans, and thus an overall acquisition strategy may be successful even if individual acquisitions are not. More generally, a divestiture of previously acquired assets may mean simply that profit-seeking entrepreneurs have updated their forecasts of future conditions or otherwise learned from experience. On this view, arguing in favor *ex ante* inefficiency is suspect.

CONCLUDING DISCUSSION

Furthering Entrepreneurship Research by Means of the Theory of the Firm

Although a number of economists and management scholars have pointed to a link between the economics of the firm and entrepreneurship (Foss, 1993; Langlois & Cosgel, 1993; Casson, 1997; Foss & Klein, 2005; Alvarez and Barney, 2007), explications of the link has usually been limited to elaboration of the Knightian argument that the existence of the firm is closely tied to the exercise of entrepreneurship, although a few papers link entrepreneurship to other key issues in the economics of the firm, notably internal organization (Foss, Foss & Klein, 2007; Stieglitz & Heine, 2007; Hsieh, Nickerson & Zenger, 2007), and the boundaries of the firm (Foss, Foss, Klein & Klein, 2007). This paper has proceeded on the assumption that the overlap between the economics of the firm and the

entrepreneurship field is much larger, and has suggested a number of avenues along which synthetic work can proceed.

We began by suggesting that the understanding of the links between specific assets, property rights, value capture and value creation in organizational economics yields significant insight into the entrepreneur's incentives to engage in search for opportunities, to adopt business models that systematize the search for and exploitation of opportunities, and to structure internal organization and the boundaries of the firm in such a way that expected appropriable value from opportunities is maximized. Essentially, this reasoning suggests that – perhaps contrary to common perception – there is a lot of leverage in the existing theory of the firm regarding the understanding of the organizational dimensions of entrepreneurship.

However, we also explored various insights in entrepreneurship that significantly challenge existing theory. Much of the theory of the firm is based on "closed" neoclassical models (Foss & Klein, 2005) that are clearly challenged by implications of making room for entrepreneurship and bounded rationality, notably that mental models differ across entrepreneurs, uncertainty is pervasive, and opportunity discovery is a function of past differential learning and experience. An attraction of much recent research in property rights theory and organizational economics certainly is that its analysis highlights the interactions among individual agents and how these interactions translate into collective outcomes on the organizational level. The analysis of these interactions among individual agents generally rests on game theory (Gibbons, 1999). However, the closed-form solutions in game theory come at the price of assuming representative agents and rational expectations. As we argued above, important ingredients of entrepreneurship are precisely bounded rationality, pervasive uncertainty, and the heterogeneity of mental models and beliefs.

One way to address the interactions among heterogeneous agents is to draw on computational models in building and testing theoretical insights (Epstein, 2006; Miller & Page, 2006; Davis, Eisenhardt & Bingham, 2007). Broadly, computational models use simulation techniques to capture dynamic interactions among heterogeneous agents within a task environment. These interactions are constrained and influenced by the economic or organizational structure. Structure may encompass such elements as information flows and feedback conditions, the allocation of decision rights, norms and organizational culture, and incentives to motivate agents (see Chang & Harrington, 2006 for a recent survey). Prior applications of simulation models in strategy and organization include the evolution of organizational structures (e.g. Carley & Svoboda, 1996; Miller, 2001), individual effort and free-riding (Axtell, 1999), organizational norms (March, 1991), information-processing (Carley, 1992; Barr & Saraceno, 2002), and adaptation in complex task environments (Levinthal, 1997; Rivkin & Siggelkow, 2005; Ethiraj & Levinthal, 2002; Knudsen & Levinthal, 2007). While these

contributions have shed light on organizational processes, explicit contributions to fundamental issues of entrepreneurship are thus far virtually non-existent, providing fertile ground for future research.

Researching Entrepreneurship and the Theory of the Firm

The main purpose of this essay has been to argue that there is a significant potential for *theoretical* development of the intersection between entrepreneurship and the theory of the firm beyond the existing small amount of mainly Knightian work on this (Langlois & Cosgel, 1993; Foss & Klein, 2005). We have thus pointed to several distinct research streams in, particularly, the theory of the firm literature and indicated various ways in which it can illuminate the understanding of the exercise and organization of entrepreneurship. Several research questions emerge from the discussion, for example, concerning the role of access as an antecedent of employees' entrepreneurship, whether the diversity of the firm's product portfolio influences the amount of employee entrepreneurship, and the role of the organizational structure in the process of evaluating potential entrepreneurial opportunities. While levels issues may be involved in researching these topics (because they link employee behaviours and organizational structure and scope), calling for a multi-level empirical methodology, these research questions still seem researchable with fairly conventional cross-sectional approaches, and significant empirical progress may be made on the basis of even single-respondent designs.

Significant challenges to empirical research seem to arise, however, in conceptualizing the relevant dependent variables and in introducing behavioural elements. With respect to the former, there are few established methodologies for measuring entrepreneurship. The empirical literature seems to be converging on the notion of "opportunity discovery" (Shane, 2002, 2003) as the relevant variable, but is by no means obvious how it should be measured. In fact, Klein (2008) suggests that it is inherently a latent variable which obviously leaves substantial discretion regarding its conceptualization and measurement.

An even bigger challenge concerns building and modeling suitable behavioral foundations for understanding the link between entrepreneurship and economic organization. It is, for example, far from clear how mental models of entrepreneurial opportunities are best modeled, not to speak of differential mental models, and how such models exactly translate into implications for the economic organization of entrepreneurship (cf. Knudsen & Levinthal, 2007; Christensen & Knudsen, 2008 for recent advances along these fronts). A significant problem in extending thinking about entrepreneurship and economic organization lies in finessing these issues.

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