



## ENTREPRENEURSHIP, SUBJECTIVISM, AND THE RESOURCE-BASED VIEW: TOWARD A NEW SYNTHESIS

NICOLAI J. FOSS,<sup>1</sup> PETER G. KLEIN,<sup>2</sup> YASEMIN Y. KOR,<sup>3</sup> and  
JOSEPH T. MAHONEY<sup>4\*</sup>

<sup>1</sup>Center for Strategic Management and Globalization, Copenhagen Business School, Frederiksberg, Denmark

<sup>2</sup>Contracting and Organizations Research Institute, University of Missouri, Columbia, Missouri, U.S.A.

<sup>3</sup>Department of Management, Moore School of Business, University of South Carolina, Columbia, South Carolina, U.S.A.

<sup>4</sup>Department of Business Administration, University of Illinois at Urbana-Champaign, Champaign, Illinois, U.S.A.

*This article maintains that the consistent application of subjectivism helps reconcile contemporary entrepreneurship theory with the strategic management literature, particularly the resource-based view of the firm. The article synthesizes theoretical insights from Austrian economics, Penrose's (1959) resources approach, and modern resource-based theory, focusing on the essential subjectivity of the entrepreneurial process. This new synthesis describes entrepreneurship as a creative team act in which heterogeneous managerial mental models interact to create and arrange resources to produce a collective output that is creatively superior to individual output. Copyright © 2008 Strategic Management Society.*

### INTRODUCTION

It has long been recognized in the research literature that entrepreneurship is the core of the dynamics of capitalism (Baumol, 1993) and that the entrepreneur is 'the driving force of the whole market system' (Mises, 1949: 249). More recently, management scholars have begun to recognize the importance of incorporating entrepreneurship into strategic management research (e.g., Alvarez and Barney, 2004; Hitt *et al.*, 2001b). However, it is not clear how such a link is best established. The current article

maintains that the consistent application of *subjectivism* helps reconcile contemporary entrepreneurship theory with strategic management research in general, and the resource-based view in particular.<sup>1</sup>

Keywords: entrepreneurship; resource-based view; subjectivism; managerial mental models

\*Correspondence to: Joseph T. Mahoney, Department of Business Administration, University of Illinois at Urbana-Champaign, 140C Wohlers Hall, 1206 South Sixth Street, Champaign, IL 61820, U.S.A.

E-mail: josephm@uiuc.edu

<sup>1</sup>The current article defines the 'resource-based view' to include: (1) the resources approach (Barney, 1991; Peteraf, 1993; Rumelt, 1987; Wernerfelt, 1984); (2) commitment (Ghemawat, 1991); (3) dynamic capabilities (Dierickx and Cool, 1989; Helfat, 1997; Rindova and Kotha, 2001; Teece, Pisano, and Shuen, 1997); and (4) the knowledge-based view (Grant, 1996; Kogut and Zander, 1992; Spender, 1996). Alvarez and Busenitz observe that 'heterogeneity is a common attribute of both resource-based and entrepreneurship theory—although resource-based logic has tended to focus on heterogeneity of resources, while entrepreneurship theory has tended to focus on heterogeneity in beliefs about the value of resources' (2001: 756). The concept of heterogeneity is usefully unpacked in terms of entrepreneurial cognition (Barr, Stimpert, and Huff, 1992), entrepreneurial discovery (Kirzner, 1997), changing market opportunities (Shane and Venkataraman, 2000), and differential capabilities in the coordination of knowledge (Conner and Prahalad, 1996).

By subjectivism, we mean the notion that research in social science, including management, must take account of the facts that individuals hold different preferences, knowledge, and expectations, and more specifically, ‘the pre-supposition that the contents of the human mind, and hence decision making, are not rigidly determined by external events. Subjectivism makes room for the creativity and autonomy of individual choice’ (O’Driscoll and Rizzo, 1985: 1).<sup>2</sup> Within economics, the Austrian School (e.g., Hayek, 1948; Menger, 1871; Mises, 1949) has been the most systematic exponent of subjectivism.

Despite its well-established foundations, explicit acknowledgement of subjectivism is rare in the strategic management literature, the resource-based view included. And yet, one of the founding contributions to the resource-based view, Penrose’s (1959) *The Theory of the Growth of the Firm*, is an exemplar of a subjectivist perspective applied to the study of resources. Penrose’s (1959) resource-based view is as an application of the subjectivist approach learned from Boulding (1956) and Machlup (1967).<sup>3</sup> By elaborating Penrose’s (1959) research contributions in this context, the current article responds to recent calls for *infusing the resource-based view with entrepreneurship* (Alvarez and Barney, 2006; Kim and Mahoney, 2006). We maintain that this infusion can be accomplished by the consistent application of subjectivism, leading to novel implications for both entrepreneurship and resource-based research, such as team-based entrepreneurial judgment and discovery as a distinctive competency. It is emphasized here that Austrian subjectivism and the resource-based view are highly congenial approaches. Thus, at crucial points in the development of

resource-based theory, there are connections with subjectivist insights. For example, consider Barney’s (1986) resource-based analysis of information imperfections in strategic factor markets as a necessary condition for competitive advantage. Barney explains that ‘strategic factor markets will be imperfectly competitive when different firms have different expectations about the future value of a strategic resource’ (1986: 1231). Thus, what subjectivist economics refers to as the *subjectivism of expectations* is a central analytical category within the resource-based view, underscoring the partly overlapping nature of these two approaches.<sup>4</sup>

The current article’s research focus, therefore, helps advance theoretical understanding concerning the role of subjectivism in strategic management, and complements the focus of the extant entrepreneurship literature where subjectivism has had considerable influence already (e.g., Busenitz, 1996; Sarasvathy, 2001; Shane, 2000). However, this focus also helps us recognize an important gap in the research literature. Classic contributions to the theory of entrepreneurship from Cantillon (1755), Knight (1921), Schumpeter (1934), Kirzner (1973), and others, tend to portray entrepreneurial activity as an individual endeavor, and thereby neglect the possibility that entrepreneurial judgment and the recognition and enactment of opportunities may be derived from social processes, such as dynamic interactions among entrepreneurs in a team setting. Only individuals think, act, and choose, but entrepreneurial discovery and judgment are influenced by the composition and team dynamics of the entrepreneurial management team. Thus, this article not only gives close attention to the subjectivist nature of individuals’ creativity, knowledge, and expectations, but also emphasizes the *social and cognitive interactions among team members’ heterogeneous mental models*.

To build bridges between contemporary entrepreneurship theory and the strategic management literature—particularly the resource-based view of the firm—we begin by clarifying the central construct of subjectivism, drawing on the Austrian School of economics. Focusing on entrepreneurial alertness and entrepreneurial judgment, we show how

<sup>2</sup>There is also an important methodological dimension to subjectivism, namely that explanations of individual and social action must begin with the mental states of the relevant individuals and must take into account the relevant differences in mental states (Hayek, 1955).

<sup>3</sup>Penrose’s *The Theory of the Growth of the Firm* (1959) was written at Johns Hopkins University and was highly influenced by Fritz Machlup. In turn, Machlup’s dissertation advisor was the Austrian economist Ludwig von Mises, considered the leader of the *third generation* of the Austrian School. (See Connell, 2007, for details on the relationship between Machlup and Penrose.) Thus, it is not difficult to link the origins of resource-based view with entrepreneurship and Austrian subjectivism by closely examining Penrose’s (1959) seminal work. Coming full circle, recent research has rediscovered the connections between entrepreneurship and the resource-based view. We thank Professor Asli Arıkan for this observation. For detailed evaluations of Penrose’s (1959) contributions, see Mahoney and Pandian (1992), Foss (2002), Pitelis (2002), and Kor and Mahoney (2004).

<sup>4</sup>We thank an anonymous reviewer for pointing out that Barney (1986) can be logically reconstructed from an Austrian economics lens. That said, we also note that without using the notion of subjectivism, Rumelt (1987) also linked entrepreneurship to Barney’s (1986) strategic factor market logic.

subjectivism underpins the distinctively Austrian approach to entrepreneurship. We also show that subjectivism in the Austrian approach is, in many ways, remarkably close to Penrose's (1959) view, bringing to our attention the importance of management (team) cognition and resource specificity in firm-level growth. Based on these key insights, we present a subjectivist approach to entrepreneurship in which the team—rather than the individual entrepreneur—is the unit of analysis, and in which subjective dimensions of the team's capital and resources are the key determinants of entrepreneurial activity. We also discuss implications of subjectivism and team entrepreneurship for contemporary practice and research in entrepreneurship and strategy.

## **SUBJECTIVISM, ENTREPRENEURSHIP, AND RESOURCE HETEROGENEITY**

### **Subjectivism in the Austrian tradition**

The Austrian tradition is increasingly well known in the management literature for its research contributions to the theory of entrepreneurship and complementary *market-process* explanations of economic activity (e.g., Hill and Deeds, 1996; Jacobson, 1992; Roberts and Eisenhardt, 2003; Shane, 2003). However, other ideas in the Austrian tradition that are likely to prove relevant to strategic entrepreneurship—such as the time structure of capital (Hayek, 1941) and the heterogeneity of capital goods (Lachmann, 1956)—have, as of yet, received little research attention (but see Chiles, Bluedorn, and Gupta, 2007). Similarly, the strategic management research literature has yet to explore the implications of subjectivism, a concept central to the current article.

Subjectivism holds that individuals have different preferences, knowledge, and expectations, and explanations in social science must take these mental states as an ultimate starting point. The fundamental statement that voluntary exchange is mutually beneficial (*ex ante*) is an application of subjectivism. The fact that each participant forgoes one good or service in exchange for another shows that the good or service acquired ranks higher on the individual's value scale than the good or service foregone. Similarly, the significance of a particular capital asset to the production of a consumer good is determined, subjectively, by the entrepreneur, as expressed in a

willingness to pay for the services of that asset, and not by some objective, technological characteristics of the asset (Kirzner, 1966). More generally, (opportunity) cost itself is ultimately a subjective concept (Buchanan, 1969).

At the market level, observed outcomes are often unintended consequences of the inter-action of multiple actions that have each been taken on the basis of subjectively held preferences, knowledge, and expectations. Subjectivism maintains that any explanation of human action and interaction must take into account not only the mental states of the relevant individuals, but also the relevant differences among these mental states (Mises, 1949; Machlup, 1978). Hayek notes that competitive dynamics involves 'a process of the formation of opinion . . . a process which involves a continuous change in the data and whose significance must therefore be completely missed by any theory which treats these data as constant' (1948: 94). Entrepreneurs can be usefully described as envisioning and enacting economically valuable opportunities, which lead to market dynamics that drive the economic system (McGrath, 2001; Thornhill and Amit, 2001). Yet, such a perspective is only intelligible if subjectivism is the starting point.

An important step in the development of subjectivism is the *subjectivism of knowledge*, that is, the explicit recognition in theorizing that individuals hold different knowledge that may be private, tacit, and subject to change (Polanyi, 1962). As Hayek (1945) pointed out, there is a division of knowledge in society that matches the division of labor. The Austrian emphasis on dispersed, subjectively held knowledge goes beyond the contemporary (e.g., agency-theoretic) emphasis on asymmetric information (c.f. Kirzner, 1997). Indeed, Lachmann (1986) maintains that information received needs to be interpreted with regards to its possible uses in practice, and that the act of interpretation is a genuine problem-solving activity. The subjectivism of knowledge renders the information relevant to economic activity inherently subjective.

Another crucial dimension of subjectivism, the *subjectivism of expectations*, is based on an indeterminate ontology (Lachmann, 1977; Shackle, 1972). This subjectivist view of entrepreneurship emphasizes the non-deterministic nature of dynamic capabilities and entrepreneurial activities (O'Driscoll and Rizzo, 1985). One form of indeterminism can be found in Nelson and Winter (1982), which maintains that search for superior heuristics is partly

deterministic and partly stochastic, a notion that is captured in their use of Markov processes. In the Austrian tradition, however, individuals are modeled as purposeful, goal-seeking, and action-oriented agents (Grimm, Lee, and Smith, 2006), such that stochastic processes cannot fully capture the essence of entrepreneurial behavior.<sup>5</sup> Kirzner's concept of entrepreneurial discovery represents a mild form of indeterminism, one that is still anchored in the concept of purposeful human action. 'The notion of discovery, midway between that of the deliberately produced information in standard search theory, and that of sheer windfall gain generated by pure chance, is central to the Austrian approach' (1997: 72). A stronger form of indeterminism is Lachmann's (1976) characterization of the future as not merely unknown, but *unknowable*—though not unimaginable. Entrepreneurs use *imagination* to interpret economic data and anticipate future market conditions. Entrepreneurship is seen as human action that creatively formulates and solves new problems (Mises, 1949). In either case, the point is that because the future is not known with certainty, there is room for entrepreneurial action to create value. Indeed, research literature from the Austrian School tradition has provided more specific treatments of the entrepreneurial function, which we turn to next.

### Subjectivism and entrepreneurial judgment<sup>6</sup>

The entrepreneurial function has been variously defined. Moreover, the entrepreneurship research literature frequently mixes *occupational* and *structural* concepts of entrepreneurship with *functional* concepts emphasized here, which are drawn from classic contributions to the economic theory of entrepreneurship (Knight, 1921; Lachmann, 1986). *Occupational* theories—found in labor economics and within the psychology literature—define entrepreneurship as self-employment and treat the individual as the unit of analysis, describing the characteristics of individuals who start their own businesses and

explaining the choice between employment and self-employment (Kihlstrom and Laffont, 1979; Parker, 2004). *Structural* approaches—found within industry dynamics, firm growth, clusters, and network research—treat the firm or industry as the unit of analysis, defining the *entrepreneurial firm* as a new or small firm (Aldrich and Wiedenmayer, 1993; Audretsch and Keilbach, 2007). Indeed, the idea that one firm, industry, or economy can be more *entrepreneurial* than another suggests that entrepreneurship is associated with a particular market structure (i.e., a market with many small or young firms).

By contrast, classic contributions to the economic theory of entrepreneurship from Knight (1921), Schumpeter (1934), Mises (1949), Kirzner (1973), and others model entrepreneurship as a *function*, activity, or process, and not as an employment category or market structure. The entrepreneurial function has been characterized in various ways including: *judgment* (Knight, 1921), *innovation* (Schumpeter, 1934), and *alertness* (Kirzner, 1973). In each case, these functional concepts of entrepreneurship are independent of occupational and structural concepts. The entrepreneurial function can be manifested in large and small firms, in old and new firms, by individuals or teams, and across a variety of occupational categories and market settings (Alvarez and Barney, 2005b). The entrepreneur can be an owner, a manager, or even a team of managers who go through the entrepreneurial discovery process and take actions (Grimm, Lee, and Smith, 2006). By focusing too narrowly on self-employment and start-up companies, contemporary research literature may be understating the role of entrepreneurship in the economy and in business organization.

The Austrian literature includes at least two different concepts of the entrepreneurial function: one concept interpreting entrepreneurship as *alertness* (Kirzner, 1973, 1979), and another concept characterizing entrepreneurship as *judgment* (Foss and Klein, 2005; Knight, 1921).<sup>7</sup> Since the alertness concept is, perhaps, best known in management (Ardichvili, Cardozo, and Ray, 2003; Busenitz, 1996; Sorensen and Sorenson, 2003; Venkataraman, 1997), we briefly consider the concept of alertness

<sup>5</sup>Note that describing individuals' behavior as purposeful and goal oriented (Bird, 1988) does not mean that the aggregate, social result of human action is the result of deliberate design. On the contrary, the Austrian tradition from Menger (1871) to Hayek (1945) and Lachmann (1986) has placed particular importance on the unintended consequences of action. That is, aggregate phenomena and institutions can be understood as 'the result of human action but not the result of human design' (Hayek, 1948: 7).

<sup>6</sup>This section draws on material in Foss and Klein (2005).

<sup>7</sup>Langlois (2007: 1109) states that: 'Kirzner is about *discovery*, about alertness to new opportunities; Knight is about *evaluation*, about the facility of judgment in economic organization; and Schumpeter is, of course, about *exploitation*, about the carrying out of new combinations and the creative destruction that often results there-from.'



first. However, as we maintain below, the alertness approach to entrepreneurship is not sufficient for bridging the entrepreneurship and strategic management research literatures.

### Entrepreneurship as alertness

While present in Cantillon's (1755) notion of entrepreneurship, the alertness concept has been elaborated most fully by Kirzner (1973), who follows Hayek (1968) in describing *competition as a discovery process*. As examples, an arbitrageur may discover a discrepancy in present prices to obtain financial gain, or an entrepreneur may be alert to a new product or superior production process and subsequently fill this market gap before others respond (Jacobson, 1992). Success, in this discovery process view, comes from having some asymmetric knowledge or new insight.

This notion of entrepreneurship as arbitrage has been influential in the entrepreneurship literature, leading to a focus on exogenously determined *opportunities* waiting to be discovered as the unit of analysis. As summarized in Shane (2003: 4), entrepreneurship 'is an activity that involves the discovery, evaluation, and exploitation of opportunities to introduce new goods and services, ways of organizing, markets, processes, and raw materials through organizing efforts that previously had not existed.' These opportunities are treated as objective phenomena, though their existence is not known to all agents. Inspired by Kirzner (1973), the opportunity identification literature seeks to build a positive research program by operationalizing the concept of alertness (Gaglio and Katz, 2001). For example, empirical research attempts to understand the cognitive foundations of discovery and the characteristics of discoverers and non-discoverers.

Kirzner's (1973) alertness approach, however, has important drawbacks as a foundation for applied entrepreneurship research. Kirzner's (1973) aim is not to characterize entrepreneurship *per se*, but rather to explain the tendency for markets to clear, thereby achieving market equilibrium. Entrepreneurial opportunities are entirely (exogenous) arbitrage opportunities (Klein, 2007). Thus, Kirzner (1973) offers no theory of how opportunities come to be identified and who identifies them. For example, Kirzner (1973) does not analyze the effect of social processes, such as the interactions among managers in a team on entrepreneurial activity (Penrose, 1959). In short, what Kirzner (1973) calls

*entrepreneurial discovery* is simply that which causes markets to equilibrate.

Moreover, Kirzner's (1973) entrepreneurs do not own capital and, thus, are dissociated from the firm (Rothbard, 1962). Hence, Kirzner's concept of alertness only points to 'an extremely transitory phenomenon which the firm might not be able to repeat with any consistency' (Mosakowski, 2002: 110). This realized theoretical shortcoming of the current dominant view of entrepreneurship within management brings us to the second concept of entrepreneurship, which is an important alternative view for future management research to consider more closely.

### Entrepreneurship as judgment

An alternative view, also part of the Austrian tradition, describes entrepreneurship *not* as alertness to existing opportunities, but rather as the exercise of judgment regarding an uncertain future (Knight, 1921; Mises, 1949). This view traces its origins to the first systematic treatment of entrepreneurship, which views entrepreneurship as judgmental decision making under uncertainty (Cantillon, 1755). Judgment refers to action when the range of possible future outcomes, let alone the likelihood of individual outcomes, is generally *unknown*—what Knight (1921) terms uncertainty—rather than mere probabilistic risk.

The concept of judgment is distinct not only from alertness, but also from boldness or imagination (Aldrich and Wiedenmayer, 1993), innovation (Ahuja and Lampert, 2001), leadership (Witt, 1998), and other concepts of entrepreneurship that appear in the entrepreneurship literature.<sup>8</sup> Judgment must be exercised not only for strategic decisions, but also for tactical decisions, and for ongoing operations as well as for new ventures (Knight, 1921). The market test sorts out which entrepreneurial ideas are workable in the world of experience (Klein and Klein, 2001).

<sup>8</sup> Whether Schumpeter (1934, 1942) belongs to the Austrian School of economics has often been debated. While Austrian by birth and a student of Eugen von Böhm-Bawerk (see, e.g., 1889), Schumpeter (1934, 1942) dissociated from Austrian economics, notably with respect to methodology, general equilibrium, and the theory of capital and interest. Still, Schumpeter's (1934) emphasis on the entrepreneur is closely related to the Austrian School of economics.

Knight (1921) introduces judgment to connect firm-level economic profitability to the concept of uncertainty. Judgment refers to the process of entrepreneurs forming estimates of future events in which the relevant probability distributions are unknown. In this sense, Knightian uncertainty is consistent with subjectivism of expectations (Littlechild, 1986). Similarly, Schumpeter emphasizes the concept of subjectivism of expectations and the related concept of differential skills of intuition by noting that ‘intuition, the capacity of seeing things in a way which afterwards proves to be true, even though it cannot be established at the moment and of grasping the essential fact, discarding the unessential, even though one can give no account of the principles by which this is done’ (1934: 85).

Entrepreneurship represents a particular form of judgment that is non-contractible (Knight, 1921). Kirzner maintains that ‘entrepreneurship reveals to the market what the market did not realize was available, or indeed, needed at all’ (1979: 181). Casson takes a more Schumpeterian position stating that ‘[t]he entrepreneur believes he is right, while everyone else is wrong. Thus, the essence of entrepreneurship is being different—being different because one has a different perception of the situation’ (1982: 14). The implication is that there is no market for entrepreneurial judgment and, therefore, exercising such judgment requires the person to start an entrepreneurial venture. Both entrepreneurial profitability and economic losses indicate that market participants have heterogeneous entrepreneurial judgments about future conditions.

In a simplified theoretical framework that is posited to consist of homogeneous capital (including homogeneous human capital) the entrepreneur’s problem is simple and there is no basis for sustained economic rents (Barney, 1991; Foss and Klein, 2005). However, capital is a set of *heterogeneous* capital goods, each of which possesses multiple attributes (Lachmann, 1956) and, thus, effective judgment concerning the combination and deployment of capital goods is required.<sup>9</sup> Resource uses are not data, but are created as entrepreneurs envision new ways of using the productive services of these resources for

different goods and services (Penrose, 1959).<sup>10</sup> As Alchian and Demsetz note ‘efficient production with heterogeneous resources is a result not of having *better* resources, but in *knowing more accurately* the relative productive performances of those resources’ (1972: 793). To use Penrose’s (1959) terminology, resources potentially may yield many different kinds of *services*. What services these resources yield, and in which quantities and qualities, is partly a matter of the entrepreneurial imagination, and partly a matter of the governance structures of the firm. These ideas, as we shall see, are central in Penrose’s (1959) work, to which we now turn.

## PENROSE (1959): AN AUSTRIAN VIEW OF STRATEGIC ENTREPRENEURSHIP

### From Austrian economics to Penrose’s resource-based approach

While Penrose’s (1959) *The Theory of the Growth of the Firm* is widely acknowledged as a pioneering work, the mainstream resource-based view has yet to appreciate fully the substance of this work (Foss, 2002). Similarly, with few exceptions (e.g., Foss, 1998; Loasby, 1991; Spender, 2006), the connections between Penrose (1959) and the Austrians are not fully appreciated, either within the strategic management field (where Austrian-inspired contributions have increased in number; e.g., Jacobson, 1992; Roberts and Eisenhardt, 2003) or within contemporary Austrian economics. We maintain here that Penrose’s (1959) classic contribution to the resource-based view of the firm can be considered a continuation of the subjectivist tradition in (Austrian) economics. Penrose (1959) was *primarily* concerned with developing a theory of firm-level growth emphasizing Austrian themes of cognition, learning, and adaptation. Penrose’s (1959) emphasis on entrepreneurship, resource heterogeneity, and process represents an important application of Austrian analysis to heterogeneity based on the

<sup>9</sup>The implications of entrepreneurial judgment and capital heterogeneity for organizational economics are explored in Foss et al., 2007.

<sup>10</sup>In this regard, Rumelt’s (1987) notion of entrepreneurial discovery can be viewed as similar to the notion of entrepreneurial judgment in the Austrian sense. Rumelt states that ‘[t]he two basic kinds of entrepreneurial discovery concern the value of resource combinations and the pattern of demand’ (1987: 144). Superior foresight as a source of entrepreneurial profit involves not only creativity but also judgment about new products, new resource combinations, new cost-saving technologies, and superior anticipation of demand.

services rendered from resources, placing this heterogeneity in a dynamic context in which management-resource interactions are given utmost importance.

Penrose (1959) advanced our understanding of a subjectivist theory of entrepreneurship. Penrose (1959) interprets resources/capital assets in distinctly subjectivist terms and emphasizes disequilibrium and path dependencies based on cumulative growth of collective knowledge in the context of a purposive firm. Moreover, Penrose (1959) applies key insights from the subjectivism of knowledge and expectations to managerial groups, rather than to individual decision-makers, and lays the foundations for a subjectivist theory of teams. This theory anchors analysis of subjectivist expectations firmly in the experiences of the managerial team and in the resources the firm controls. We build on these key subjectivist points in the following section.

### **Subjectivism and the heterogeneity of the services of resources**

Penrose's subjectivist approach to heterogeneity highlights that productive services of resources emerge over time, as managers interact with resources and make subjective decisions about resource allocation, deployment, development, and maintenance (Kor and Leblebici, 2005; Mosakowski, 1993). Future resource attributes are created as entrepreneurs envision new ways of using resources. Penrose emphasizes that 'it is never *resources* themselves that are the *inputs* in the productive process, but only the *services* that the resource can render' (1959: 24–25). Extracting different services from similar (or even identical) resources makes firms not only heterogeneous, but also defines their uniqueness.

Therefore, a firm's entrepreneurial growth process involves at least two major forms of heterogeneity. First, firms differ from one another in the resources they possess, and this *resource heterogeneity* influences strategy and helps explain sustained profitability differences among firms (Barney, 1991). However, the second form of heterogeneity, that is, *heterogeneity of productive services from resources*, is more concerned with how firms with similar resource bundles may still significantly differ in their entrepreneurial productivity. As Penrose explains, 'it is the heterogeneity, and not the homogeneity, of the productive services available or potentially available from its resources that gives each firm its unique character' (1959: 75).

This second form of heterogeneity is at the heart of entrepreneurial creativity because it acknowledges the central role of management in converting resources to entrepreneurial services, where the subjective nature of entrepreneurial imagination results in unexpected variations in resource deployments and applications. As Penrose states, 'the decision to search for opportunities in an enterprising decision requiring entrepreneurial intuition and imagination and must precede the *economic* decision to go ahead with the examination of opportunities for expansion' (1959: 34). As the main actor of the dynamic entrepreneurial process, the *resource of management* molds the quality and versatility of the services currently available from resources, as well as their potential in yielding enhanced and novel contributions to entrepreneurial activities (Mahoney, 1995). Much less appreciated in the current entrepreneurship and resource-based view research, this second level of heterogeneity may be the more promising level of analysis for studying subjective processes of entrepreneurial creativity and discovery in firms (Kor, Mahoney, and Michael, 2007). This *ex ante* approach to firm resources also helps disentangle the contribution of resource heterogeneity versus managerial decisions, processes, and behaviors to competitive advantage (Mosakowski, 2002). Thus, following Penrose's (1959) resources approach, we give close attention to the entrepreneurial services provided by the firm's managers, who play a central role in envisioning and cultivating heterogeneous services from the firm's resources. Serving in this central role, managers can have a long-lasting impact on the organization's collective creativity and learning capacity.

### **The subjective and firm-specific nature of entrepreneurial discovery**

The development and entrepreneurial growth of the firm is an evolutionary and cumulative process of experimentation and learning about resources (Hayek, 1968; Spender, 1996) in which resources and capabilities may serve as cognitive drivers for strategy (Itami and Roehl, 1987). As Mahoney puts it, '[m]anaging involves a[n] entrepreneurial] discovery procedure in which heterogeneous models of managers using heterogeneous firm-specific resources are involved in an ongoing competition' (1995: 97). This competitive process provides feedback for entrepreneurial conjectures, providing a means of *testing* these conjectures against experience. Therefore, the

entrepreneurial process involves both purpose—the objectives of individual entrepreneurs and entrepreneurial teams—and evolutionary change. Embracing subjectivism, Penrose (1959) emphasizes heterogeneity in the activities produced by material and human resources that is inextricably intertwined with the *heterogeneity of managerial mental models* (Fiol, 1991). In an uncertain world with complex and ambiguous information, managerial mental models (with knowledge components and a structure that links these components) allow managers to perceive and interpret information. From this perspective, managers can see their way through a bewildering flow of information to make decisions (Walsh, 1995) and identify and screen alternative opportunities. In terms of the heterogeneity of entrepreneurial visions in firms, Penrose states that in the process of growth ‘the imaginative effort, the sense of timing, and the instinctive recognition of what will catch on or how to make it catch on become of overwhelming importance. *These services are not likely to be equally available to all firms.* For those who have them, however, a wider range of investment opportunities lies open than to firms with a less versatile type of enterprise’ (1959: 37).<sup>11</sup> Penrose (1959) observes that firms differ *because of* qualitative aspects of their managerial resources, such as creativity, level of ambition, ingenuity in fund-raising, and the ability to exercise their good judgment (Barney and Arikan, 2001).

Vital connections between heterogeneous services from resources and the heterogeneity of managerial mental models are often under-appreciated in both entrepreneurship and strategy literatures (Mosakowski, 1998b). Due, at least in part, to uncertainty and to the heterogeneity of these mental models, strategic factor markets may fail to price new resources accurately and may fail to anticipate the innovative ways firms accumulate and leverage their resources (Sirmon, Hitt, and Ireland, 2007). Relatedly, heterogeneous mental models may not only lead to differential *recognition* of the economic

value of existing uses of resources, but also to the *creation* of new resource uses in the processes of entrepreneurial imagination and enactment. The manager’s *image* (Boulding, 1956) gives rise to a *subjective productive opportunity set* for the firm (Penrose, 1959), which is a driver of firm heterogeneity via *differential* absorptive capacity (Cohen and Levinthal, 1990; Zahra and George, 2002). Frequently, managers’ past decisions, decision rules, and tacit understandings derived from prior experience are the basic genetics which firms possess. Entrepreneurs’ diverse sets of experiences shape knowledge search and acquisition processes that are used in creating and revising the opportunity set for the firm (Fiet, 2007).

In Penrose’s (1959) resources approach, entrepreneurial perceptions and imagination are shaped by managers’ *personal (subjective) knowledge of the firm’s resources and their attributes* (e.g., functionality, versatility, and specificity). Thus, the availability of firm-specific managerial talent (i.e., managers with tacit knowledge of the firm’s resources) acts as the primary limit on the rate of firm growth and initiation of new entrepreneurial activities (also known as the Penrose effect, see, e.g., Tan and Mahoney, 2005). Penrose states ‘... since the services from *inherited* managerial resources control the amount of new managerial resources that can be *absorbed*, they create a fundamental and inescapable limit to the amount of expansion a firm can undertake at any time’ (1959: 48). Until new managers develop sufficient firm-specific knowledge, they may not intuitively understand the casually ambiguous connections between the firm’s strategic resources and activities and its economic returns, due in part to the idiosyncratic complexity within the firm and the firm’s interdependencies with the market (Mosakowski, 1997).

Thus, the current article suggests that *entrepreneurial processes are inherently both subjective and firm specific*. The value of a particular resource to an entrepreneur can be drastically different from its market value because this entrepreneur perceives a unique strategic opportunity in the use of this resource, given the entrepreneur’s idiosyncratic information concerning how it may be productively deployed with the remainder of the firm’s assets (Denrell, Fang, and Winter, 2003). This proposition also suggests that when managers lack personal knowledge of the firm’s resources, their perceptions of the firm’s productive possibility set may be truncated, misinformed, or unfit.

<sup>11</sup> Spender (2006) maintains that Penrose’s (1959) model of managerial learning is an accessible instance of the epistemological approach proposed by Austrian economists such as Hayek, Kirzner, and Schumpeter. In the current article, we concur that Penrose’s (1959) emphasis on *subjective opportunity set* incorporates the view of entrepreneurship as alertness. Moreover, we maintain that Penrose’s (1959) model of learning incorporates Knight’s (1921) theory of entrepreneurship as judgment. Indeed, alertness and judgment may be usefully thought of as complementary entrepreneurial capabilities.



The firm-specific nature of the entrepreneurial process underscores the relevance of the social context in a particular firm setting, especially the composition and dynamics (interactions) in entrepreneurial teams, as this context may influence the ability of the team to discover and pursue new opportunities (Dew, Velamuri, and Venkataraman, 2004). The team context of entrepreneurship deserves close attention because the economic value of a team of entrepreneurs is likely to be a function of the (synergistic) interactions among members of the team and their joint interactions with the firm's tangible resources. We further explore the team context of entrepreneurship in the following section. Table 1 provides a comparison of the key insights and assumptions of the three theoretical perspectives (i.e., Austrian economics, Penrose's (1959) resources approach, and the modern resource-based view) we use to develop a subjectivist theory of team entrepreneurship.

## SUBJECTIVISM AND TEAM ENTREPRENEURSHIP

Most of the entrepreneurship and economics literature takes the individual entrepreneur as the unit of analysis (Harper, 2006). Only in *market structure* approaches to entrepreneurship (e.g., Audretsch and Keilbach, 2007)—in which the unit of analysis is the firm, industry, or cluster, and the measure of entrepreneurship is new firm formation, growth, or innovation—are groups or teams modeled as *entrepreneurial*. While the current article's subjectivist view of entrepreneurship highlights individual-level differences in preferences, knowledge, and expectations as sources of creativity, we emphasize that entrepreneurial behavior is embedded in a social context, such as the composition of the entrepreneurial management team (Kor, 2003).

In a subjectivist approach to team entrepreneurship, a firm's productive possibility set is often envisioned and enacted by an entrepreneurial management team. Subjectivism serves as a key property of teams in the sense that each management team is *unique* in the productive opportunity set that is collectively envisioned. Two essential elements of these teams involve (1) heterogeneous managerial mindsets that are engaged in subjective processes of discovery, creativity, and learning; and (2) positive team dynamics that enable the team to capitalize on its knowledge assets.

We focus here on the top management team, although the creative processes described above can be found, to varying degrees, throughout all levels of an organization. Nonetheless, because the top management team holds key rights of decision management and control, we focus on the implications of subjectivism for the structure and activities of management, abstracting from potential problems of delegation and control (see Foss, Foss, and Klein, 2007, for discussion of delegation in a related context).

### Heterogeneity of mental models

Heterogeneity in the range and versatility of entrepreneurial services produced by material and human resources is inextricably intertwined with the heterogeneity of managerial mental models (Barr, Stimpert, and Huff, 1992). Embracing heterogeneity of mental models<sup>12</sup> in entrepreneurial teams involves bringing together managers with different knowledge, experience, and skills that enable task-related diversity, which can boost the likelihood of success for entrepreneurial action.

Diversity of knowledge, experiences, views, and interests among members is a necessary condition for initiation and development of a creative team act, because creativity requires that individuals are exposed to different and even contrasting stimuli (Arieti, 1976). A diverse entrepreneurial team can create *bisociation* (Koestler, 1964) by connecting insights, information, and knowledge that were not formerly seen to be connected. This creative bisociation results in the team perceiving or crafting new opportunities that others have not noticed, imagined, or enacted (Smith and Di Gregorio, 2002). Here the creative output of the team is unique and team specific, as it involves a synthesis of objective and subjective inputs of the team members. Diversity of distinct knowledge and experience domains within the team is a *sine qua non* of this creative bisociation (Amabile, 1996). With exposure to diverse

<sup>12</sup> Similar to the notion of mental template, a managerial mental model consists of organized, subjective knowledge about an information environment (e.g., a specific firm or an industry) that enables interpretation and action in that environment (Walsh, 1995). This pre-existing knowledge system represents beliefs, theories, propositions and *dominant logics* that managers develop over time that are based on personal experiences (Prahalad and Bettis, 1986).

Table 1. Key differences among focal theories

	Austrian economics	Penrose's subjectivist approach	The resource-based view	A subjectivist theory of team entrepreneurship
Key contributors	Menger (1871) Hayek (1948) Mises (1949) Lachmann (1956) Rothbard (1962) Kirzner (1973)	Penrose (1959)	Wernerfelt (1984) Rumelt (1987) Dierickx and Cool (1989) Barney (1991) Peteraf (1993)	Bringing insights together from all three perspectives and building on: Mahoney (1995) Kor (2003) Foss, Foss, Klein, and Klein (2007) Kor, Mahoney, and Michael (2007)
Explanatory aims	Explaining individual and social phenomena in terms of purposeful human action, focusing on subjectivism, capital heterogeneity, and distributed knowledge	Explaining the firm's growth as an entrepreneurial process, focusing on the firm's unique productive opportunity set envisioned by the management team	Uncovering the necessary and sufficient conditions of sustained competitive advantage	Showing how interactions between heterogeneous resources and heterogeneous managerial mental models generate cognitive and creative team output (i.e., collective entrepreneurial judgment); the firm's productive opportunity set
Unit of analysis	Human action	The firm as a bundle of resources	Individual resources	Firm and the entrepreneurial management team
Mode of explanation	Process oriented; traces out the causal sequence from human action to social outcomes	Process oriented; availability of firm-specific managerial resources serves as the bottleneck for growth and diversification	Focuses on states ( <i>equilibria</i> ) in which firms earn sustained competitive advantage	Process oriented; focuses on essential elements of team entrepreneurship, including positive team dynamics, experiential knowledge of the firm's resources, and time as a scarce resource
Portrayal of entrepreneurs	Individuals who exercise alertness or judgment	Entrepreneurship is exercised by a team; emphasizes alertness as well as judgment	Entrepreneurship is not emphasized	Acknowledges individuals as sources of creativity, but emphasizes entrepreneurship as a <i>creative team act</i> ; emphasizes judgment
Concept of resources	What make some goods resources (i.e., capital goods) are not their physical characteristics, but their place in an entrepreneur's plan	Services, rather than resources, are emphasized, including the services of the management team	Resource heterogeneity sustains competitive advantage; a strategic resource to one firm is also a strategic resource to another firm	Three forms of heterogeneity: 1) heterogeneity of resources; 2) heterogeneity of managerial mental models; 3) heterogeneity of services from resources An <i>ex ante</i> approach to entrepreneurship

information and a rich endowment of subjective knowledge, a team can produce a larger and more prolific opportunity set than could a single entrepreneur working alone (Fiet, 2007). As the scope of knowledge and experience domains owned by the team expands, its creative output becomes more radical and disruptive (involving more advanced and complex combinations of previously unrelated matrices of information), creating a state of confusion and unresponsiveness among competitors (Smith and Di Gregorio, 2002).

Moreover, heterogeneity of mental models underscores the importance of assembling *complementary* intangible assets in an entrepreneurial team. Entrepreneurs individually may not have the complete set of skills and knowledge to meet a particular venture's needs. However, a team of entrepreneurs can bring together multiple perspectives and pool team members' knowledge, skills, and efforts to produce high-quality outcomes (Kor, 2003). With the inclusion of complementary knowledge, skills, and resource connections in the team, the cooperative entrepreneurial team can overcome the limitations of its individual members (Barnard, 1938) and be effective in identifying, evaluating, and enacting entrepreneurial opportunities. For instance, Mosakowski (1998a) suggests that in team entrepreneurship, the team members with greater creativity and alertness may be better suited to identify and initiate the entrepreneurial activity, whereas team members with more intuition and foresight may be better suited to coordinate and control the entrepreneurial activity. By considering a broader range of information and strategic options (Jackson, 1992), heterogeneous teams reflect a higher level of cognitive complexity, and can perceive their business and competitive environment more comprehensively and creatively than homogenous teams (Ginsberg, 1994).

With diversity in experience and cognitive models, entrepreneurial teams are also more likely to engage in dialectic processes that welcome intellectual disagreements, consider a wider range of strategic options in decision making, and avoid groupthink and behavioral inertia (Eisenhardt and Schoonhoven, 1990; Levine, Resnick, and Higgins, 1993). Diverse team membership gives entrepreneurs access to different sources of information and enriches the team's pool of creative inputs, such as perceptions and insights derived from individual experiences. Heterogeneity in the level of experiential knowledge about the firm and industry, for example, can

enrich the team's cognitive resources and stimulate vigorous discussions about new entrepreneurial initiatives, which can be important in highly competitive, complex, and changing environments (Carpenter, 2002; Rajagopalan and Datta, 1996). In these environments, versatile cognitive resources allow for an interplay of multiple dominant logics in the entrepreneurial team (i.e., plurality in knowledge, beliefs, and expectations about new business opportunities), enabling the team to develop creative resource combinations (Pralhad and Bettis, 1986). With cognitive diversity in the team, entrepreneurs are encouraged to stretch their imagination and belief systems, learn from each others' experiences, and continuously *modify* their mental models. As a result, a diverse team of entrepreneurs is less likely to become rigid in its thinking and develop commitment to a status quo view of productive opportunity set for the firm.

If subjectivism is at the heart of entrepreneurship, then firms must assure that their organizational environment is closely matched to their heterogeneity of mental models (e.g., diversity of ideas and entrepreneurial skills) at all levels, especially at the upper-level management. Frequently, firms lack such diversity at the upper ranks because existing managers often prefer hiring or promoting individuals who are demographically similar to themselves, as such individuals may have similar mindsets (Finkelstein and Hambrick, 1996; Westphal and Zajac, 1995). However, an organization composed of managers with very similar perceptions of the competitive environment and the potential services from firm's resources is likely to have a truncated set of productive opportunities (Dosi, 1988). The innovation research literature has established that innovation very often comes from outsiders (Tushman and Anderson, 1986; Utterback, 1994), and that homogeneity in mental models may harm innovation. In team entrepreneurship, the team can be as effective as the creative inputs provided by its members, which can expand and be enriched when members learn from each others' diverse ideas, perceptions, and expectations (i.e., developing a synergistic cognitive synthesis). However, over time, team members may come to hold increasingly homogenous mental models. Such homogeneity may threaten the entrepreneurial capability of a team. Thus, striking the proper balance between the team diversity that yields novel insights *and* the homogeneity that eases communication and alignment of ideas is a key issue for top managers.

### Positive team dynamics

Heterogeneity of mental models stimulates debates among different perspectives within the team, but does not always equate with positive dynamics. Diversity in cognitive resources, perceptions, and expectations may cause incompatibility and conflict among members (Hambrick, Cho, and Chen, 1996; Wanous and Youtz, 1986). While some level of disagreement promotes learning and new ways of thinking, severe conflicts can interrupt the processes of collective entrepreneurial behavior and may even block the emergence of a synergistic cognitive synthesis. Thus, along with cognitive diversity, positive team dynamics is needed for successful team entrepreneurship. Positive team dynamics involves a healthy mix of debating, which stimulates members to think differently and consider new insights, as well as a shared sense of respect, support, and care for members.

Positive team dynamics often emerges with shared experiences within the team possessing ‘knowledge of the particular circumstances of time and place’ (Hayek, 1945: 521). Penrose notes that an organizational team is ‘something more than a collection of individuals; it is a collection of individuals who have had experience in working together, for only in this way can *teamwork* be developed’ (1959: 46). While working together, team members can learn to exchange ideas, challenge one another’s views, and collectively make decisions. Only when entrepreneurs develop some familiarity about each others’ skills, strengths, weaknesses, and idiosyncratic habits, can they make the best use of the team’s diversity of talent, ideas, and perspectives. Positive team dynamics matter to the team’s collective learning and decision-making processes (March, 1991; Simon, 1991) and allow the team to produce a product that is greater than the sum of separable outputs of each member (Alchian and Demsetz, 1972). With common vocabulary and familiarity with each others’ mental models (Zenger and Lawrence, 1989), a diverse team of entrepreneurs can more effectively formulate and efficiently implement entrepreneurial decisions (Earley and Mosakowski, 2000). The experiential knowledge of the skills and habits of the team members prepares them for taking risky endeavors and saves time in coordination (Kor and Mahoney, 2000).

Shared experience involves accumulating a *stock* of group-based knowledge (Dierickx and Cool, 1989) that is the combination of individuals’ thoughts

about all team players (e.g., their skills and habits) and how they operate as a team (Berman, Down, and Hill, 2002). While individuals also need private time to formulate their creative ideas and process stimuli (Shalley, Zhou, and Oldham, 2004), *team time* facilitates the processing and absorption of new insights generated by the team members. Shared team experience helps build *team-specific internal absorptive capacity*—the collective capacity to learn from each other during debates and idea exchanges, despite disagreements. We emphasize that only with a shared understanding of team members’ mental models can a team work towards a cognitive synthesis, which captures different subjective perceptions of managers, and often results in changes in managers’ mental models (Kor, Mahoney, and Michael, 2007). Thus, in team entrepreneurship, a synergistic cognitive synthesis requires a diversity of mental models within the management team *and* shared team-specific experience to facilitate group experimentation, cooperation, and learning. Indeed, high diversity without shared experience or lengthy shared experience without diversity can be detrimental to team creativity and productivity (Berman, Down, and Hill, 2002). Just as cognitive diversity alone may cause divisive conflicts and paralyze the team, harmony and cooperation alone may extinguish the creative spark necessary for innovation (Goncalo and Staw, 2006).

Of course, heterogeneity can also lead to agency and coordination problems, not only between managers and employees (as is emphasized in organizational economics), but also among members of the management team.<sup>13</sup> Neither cognitive diversity nor positive team dynamics leads to successful team entrepreneurship if members are not motivated to contribute to entrepreneurial discovery. Both individuals’ values (e.g., attitude toward learning and teamwork) and the firm’s culture and incentive system matter to the productivity of an entrepreneurial team (Alvarez and Barney, 2005a; Ginsberg, 1994). Divergences among values of the team members or discrepancies between firm’s objectives and the team’s goals can undermine the productivity of the team (Alchian and Demsetz, 1972). Without a strong corporate culture that

<sup>13</sup> Foss, Foss, and Klein (2007) explore the challenge faced by owner-entrepreneurs in encouraging employees to engage in productive acts of creation and discovery while discouraging unproductive rent-seeking behavior.



*nurtures, rewards, and demands* exchange of ideas and team-based innovation, cognitive diversity may become dormant and underutilized. If ideas, perspectives, and beliefs are not shared, discussed, and negotiated, a team mental model is not likely to develop (Klimoski and Mohammed, 1994). Power concentrations within the team will interfere with dialectic inquiry and negotiation processes (Walsh and Fahey, 1986). In the absence of leadership and incentives that reinforce interactive learning, individuals may find it easier to specialize and work alone (or work with people who are similar to themselves). Individuals may even use political processes to diminish cognitive diversity within the team or the organization (Westphal and Zajac, 1995). Thus, the overarching leadership values and (organizational and team) culture, must be aligned with entrepreneurial goals, clearly communicated, and reinforced by incentives (Harper, 2006). This process also highlights the importance of the recruitment of appropriate team members, as individuals with *key relevant common values* (e.g., passion for innovation and learning, attitude towards teamwork, and tolerance for diversity) are likely to avoid value-driven interpersonal conflicts. Unlike task-oriented disagreements, which enhance the decision quality, value-driven interpersonal conflicts often diminish individuals' contributions to the team (Amason, 1996) and are associated with significant turnover in the team (McCain, O'Reilly, and Pfeffer, 1983; Wagner, Pfeffer, and O'Reilly, 1984). Common entrepreneurial values can enable the team to focus on innovation goals and make the best of their diverse ideas and talents.

Finally, the current article emphasizes that the stock of team-based knowledge enables entrepreneurs to provide services that are *uniquely valuable* for the operations of this particular team (Penrose, 1959). Because of the social complexity (Barney, 1995) of the processes that support team entrepreneurship (e.g., processes that feed cognitive diversity and positive team dynamics), imitation of a team's idiosyncratic creativity can be difficult to achieve. Indeed, these team processes may be the most causally ambiguous source of heterogeneity that help create firms that are emulated due to their effective innovation.

### Organizational context

The centrality of subjectivism for understanding individual creativity and team entrepreneurship

underscores the importance of organizational context that affects creation and maintenance of a firm's human capital bases (Hitt *et al.*, 2001a). Human resources are able 'to learn and improve their services, to transfer their knowledge from one domain to many others, and to combine resources in increasingly productive ways' (Farjoun, 1998: 613). Human resource systems can be a catalyst for continuous development and renewal of firm-level capabilities, and can, thus, provide the foundation of dynamic capabilities (Zahra, Sapienza, and Davidsson, 2006). Incorporating subjectivism in entrepreneurship and strategy research requires dealing *constructively* with individual creativity and the partly unpredictable and social nature of knowledge-creation processes (O'Driscoll and Rizzo, 1985). Thus, contemporary entrepreneurship theories need to identify conditions that encourage entrepreneurial creativity and to address how to avoid the stifling of creativity that plagues many firms. This proposed objective suggests that entrepreneurship and strategic management (especially the resource-based view) will need to (re)focus on organizational processes that influence individual, team-based, and organizational learning (March, 1991; Mosakowski, 1997).

Capacities of human resources can neither be fixed nor scientifically engineered, although organizational conditions in which the human resources are embedded substantially influence these capacities. A firm's managers can collectively play a crucial role in shaping this environment, as they impact the processes for developing, organizing, allocating, and motivating human resources (Lado and Wilson, 1994). Specifically, recruitment and retention strategies that enable heterogeneity of mental modes *at all levels* in the organization can facilitate an entrepreneurial environment where creativity can flourish. In the absence of leadership values and culture that supports human capital development, employees can reach their entrepreneurial capacities neither in individual efforts nor team initiatives (Ireland, Hitt, and Sirmon, 2003; Kor and Leblebici, 2005). Indeed, under conditions that inhibit creative thinking, entrepreneurial experimentation, and risk taking, human resources are likely to function *substantially* below their full entrepreneurial capacity.

An environment that shows tolerance for, and interest in, divergent views promotes creativity (Arieti, 1976). Entrepreneurial creativity requires that individuals have freedom and opportunities to imagine different services of resources, deploy individual entrepreneurial capital, renew the firm's

unique productive opportunity set, and *mobilize invisible assets* (Itami and Roehl, 1987). Individuals are not only allowed to think creatively, but are also encouraged to *voice and deliberate* their creative ideas and visions about new product ideas and novel ways to utilize resources.

An entrepreneurially stimulating environment provides individuals with resource flexibility slack for calculative experimentation (Barry, 1991; Dobrev and Barnett, 2005; Smith and Di Gregorio, 2002), which helps mobilize the knowledge assets of the firm. Individual and collective learning involve taking risks, making mistakes, and experimenting with novel ideas and solutions. Pervasive fear of failure and punishment instilled in employees does not belong to entrepreneurial environments, as it can severely constrict risk taking and resource learning (McGrath and MacMillan, 2000). Effective entrepreneurship requires investments in ideas and rewarding entrepreneurial thinking and experimentation—both at the individual level and at the team level—to achieve what classical organization theory calls an *inducement-contributions* balance (Barnard, 1938, Simon, 1945). An effective allocation of inducements requires recognition of the heterogeneity of individual needs, as some individuals are more interested in material benefits while others are more motivated by social benefits and entrepreneurial engagement. An effective *entrepreneurial* organizational structure is one that encourages employees to exercise creativity, experiment, and learn in ways that increase an organization's economic value while discouraging unproductive rent-seeking behavior (Alvarez and Barney, 2006; Foss, Foss, and Klein, 2007). Thus, the allocation of property rights and the characteristics of the employment relationship are important in facilitating entrepreneurial judgment that is in the service of these organizations and society.

Here the *element of time* as a scarce resource (Mahoney, 2005; Simon, 1945) deserves special attention because developing firm's productive opportunity set requires *experiential* knowledge of the firm's resources. The experiential knowledge and heuristics of the firm can be gained only over time (Amit and Schoemaker, 1993). When operating under conditions of causal ambiguity, managers benefit from taking an experimental approach to forming a productive possibility set for the firm, where they continuously adjust and update their perceptions of the firm's resources and opportunities in the market (Mosakowski, 1993).

Thus, regardless of the availability of abundant opportunities in the environment, speedy expansion of a firm's entrepreneurial team and its level of creative output may not be successfully achieved, because absorption of new team members, new technology, and new business knowledge increases the demand for time and attention (Penrose, 1959; Simon, 1991). Without knowledge of the firm's resources, routines, language, and predispositions, and the knowledge of team members' cognitive frameworks and idiosyncratic habits that help build a fabric of trust (see e.g., Arrow, 1974), entrepreneurial teams cannot envision valuable resource combinations that help create unique strategic opportunities (Kor and Leblebici, 2005). This line of reasoning suggests that newly formed entrepreneurial teams should not be disrupted extensively by frequent changes in team composition. Entrepreneurial teams should maintain a firm-specific knowledge base through members with experiential knowledge of the firm's unique set of resources and capabilities to increase the likelihood that well-informed entrepreneurial judgments are made.<sup>14</sup>

In summary, we emphasize that *sustained entrepreneurial productivity requires internally knowledgeable team entrepreneurship and an organizational environment (including effective governance) that encourages cognitive heterogeneity, positive team dynamics, and resource learning*. Figure 1 illustrates our theoretical model on team entrepreneurship.

## DISCUSSION AND FUTURE RESEARCH

What would be lost if these fundamental insights about the subjective and social processes of

<sup>14</sup>Firm-specific path dependencies in entrepreneurial perceptions and cognition suggest that individuals, teams, and firms are likely to learn and develop in non-random directions (Penrose, 1959), i.e., in directions and patterns that are somewhat traceable to previous choices. Yet, in a world of uncertainty, being tightly locked in specific growth and innovation trajectories is not desirable. The solution for this tension, however, is not elimination of cognitive path dependencies—as human beings cannot function without them—but to have enough cognitive diversity in teams so that cognitive path dependencies themselves are rich and diverse. When cognitive path dependencies are more like a complex blend of various perspectives and cognitive templates, they represent a sophisticated evaluation of internal and external stimuli and information. A firm's path dependencies, as reflections of collective entrepreneurial judgment, can be more progressive and less entrenching to the extent that cognitive diversity is nurtured and mobilized in entrepreneurial teams. We thank the editor for bringing this particular issue to our attention.

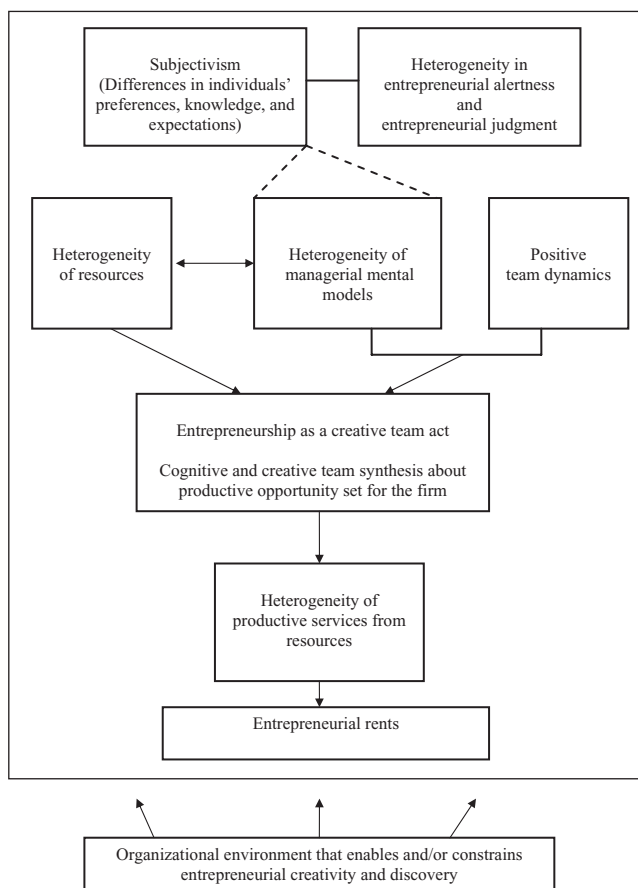


Figure 1. Subjectivism and team entrepreneurship

learning and entrepreneurial discovery went unnoticed by mainstream entrepreneurship and strategy researchers? First, we would miss an opportunity to strengthen our theories by more accurately describing and explaining the nature and dynamics of entrepreneurship. In their current state, our existing theories—built on economic concepts of entrepreneurship that treat the entrepreneurial act as a black box—do not explicitly articulate and acknowledge the centrality of subjectivism to entrepreneurial discovery and judgment. A subjectivist approach to entrepreneurship significantly benefits from the Austrian School of economics and from the contributions of Penrose (1959). Connecting these perspectives with the modern resource-based view promises a more comprehensive theoretical approach to entrepreneurship.

As summarized in Table 1 and Figure 1, Austrian economics reminds us that subjectivism is an essential principle of entrepreneurship. Subjectivism gives rise to individual differences in entrepreneurial alertness and judgment, and entrepreneurial judgment allows a firm to create new competitive advantages repeatedly (Mosakowski, 2002). Penrose’s (1959) resources approach also embraces subjectivism by highlighting that resources are not given, but must be imagined, created, and discovered over time, as managers interact with the firm’s tangible and intangible assets, other members of the managerial team, and their competitive landscapes.

These insights from Austrian economics and Penrose (1959) inform and complement insights from the modern resource-based view (Barney, 1991). The resource-based view gives central attention to

*resource heterogeneity*, which is viewed as the main driver of competitive advantage. The founding contributions to the resource-based view (Barney 1986, 1991) focus on exploring which resources satisfy the criteria for sustainable competitive advantage, but do not question how these resources are created or why they are possessed by certain firms, beyond mere luck (Mosakowski, 2002). From this perspective, sustainable competitive advantage is predominantly attributed to having asymmetric information concerning valuable, rent-generating resources (which are acquired at an economic value less than their ex-post economic value)—an idea that we suggest is similar to Kirzner's (1973) notion of entrepreneurial alertness. Such an advantage is static in nature, highly specific in time and space, and does not lend itself for cultivation of future rent-generation opportunities. This conceptualization is a narrow view of entrepreneurial activity in firms because it denies or even rejects the possibility of superior entrepreneurial judgment—a phenomenon that enables entrepreneurs to make superior resource acquisition, development, and allocation decisions *repeatedly*, creating a series of competitive advantages across time and space that is not attributable to luck. The institutionalized conceptualization of sustained competitive advantage in the resource-based view needs to allow room for learning, experimentation, creativity, and innovation through the use of existing resources (Alvarez and Busenitz, 2001).

Many rent-generating resources and capabilities are internally developed due to consistent exercise of superior entrepreneurial judgment by managers over time. So, even though subjectivism is inherently part of the resource-based view, (e.g., causing strategic factor markets to be imperfect), the processes and mechanisms by which new resources or resource combinations are created remain a black box. Austrian economics and, particularly, Penrose (1959) help open this black box by emphasizing the importance of not just resource heterogeneity, but also heterogeneity of services from resources, shaped by firms' managers and their interactions with the firm's resources.

Broadly speaking, Austrian economics and Penrose (1959) take an *ex ante* approach to resources, while the resource-based view (Barney, 1991) takes predominantly an *ex post* approach. A subjectivist approach to entrepreneurship bridges these perspectives and brings together key insights (see Table 1). This approach also highlights that a theory of competitive advantage is bound to be incomplete without

the fundamental insights gained from entrepreneurship theories. Strategic management and entrepreneurship research streams have the potential to make significant progress through cross synergies (Barringer and Bluedorn, 1999).

We observe that for many (entrepreneurship and strategy) researchers, Austrian economics, Penrose's (1959) resources approach, and the resource-based view are somewhat unconnected. As many researchers focus on contributing to one of these research streams, these knowledge domains stay enclosed and cutoff from each other—acting like knowledge stocks as opposed to knowledge flows. The opportunity cost of this disconnect is over-reliance on a single (and perhaps insular) knowledge domain, which can restrict researchers' imaginations and slow down the pace of knowledge creation. For this reason, this article focuses on connections among these knowledge domains in order to advance the entrepreneurship and strategy literatures by helping researchers gain complementary, yet unique insights. We hope that connections among these research streams contribute to (advanced) theory development, especially in entrepreneurship and strategy research that embrace the resource-based view, where the implications of subjectivism are not fully understood or investigated.

Our synthesis of key insights from these perspectives enables the development of a new and integrative subjectivist theory of team entrepreneurship. This subjectivist theory emphasizes the nature and processes for *co-creation* and *collective* entrepreneurial behavior. Because resource attributes are subjective and ultimately determined by the managers' subjective values, knowledge, and beliefs, firms are inherently heterogeneous, even when possessing similar *objective* characteristics. Thus, a firm is best understood not only as a repository of tacit, subjectively understood knowledge, but also a mechanism by which heterogeneous managerial mental models are brought together and given necessary resources and internal environment to create a collective synthesis.

The subjectivist theory of team entrepreneurship we present here explains entrepreneurship as a *creative team act*, where heterogeneous managerial mental models interact in a process that produces a collective output, which is creatively superior to individual entrepreneurship. Given the cognitive and creative differences of their members and their internal social dynamics, entrepreneurial teams *differ* with respect to the services they extract from resources.



In bridging Austrian economics and Penrose (1959), the abstraction shown in Figure 1 indicates that subjectivism (at the individual level) manifests itself as a collection of heterogeneous mental models at the team level. Here, the cognitive and creative output of an entrepreneurial team is a complex synthesis of the heterogeneous expectations, knowledge, and perceptions of the individual team members. Thus, subjectivism is a *sine qua non* of team entrepreneurship as a creative act. Other contextual factors co-influence this creative process. For a cognitive synthesis to occur, it is important that team members spend time gaining familiarity and a working knowledge of each other. Our approach highlights that entrepreneurial teams can be a vital source of social and cognitive advantage for the firm by envisioning and enacting a comprehensive and creative opportunity set for the firm. Developing such teams requires careful planning about team composition and organization, including a delicate balance of cognitive heterogeneity and socialization (Kor, 2003).

The suggested research approach provided here implies a positive research agenda to better understand the notion of heterogeneous mental models within teams. Future research can explore how firms can assemble diverse but complementary entrepreneurial skills in teams to promote entrepreneurial productivity (e.g., combining analytical and social skills). Such empirical research must give close attention to the unique aspects of the firm, such as the specific business model and the competitive, technological, and regulatory environment, as these contingencies may call for a unique configuration of entrepreneurial team skills. Empirical research is needed to disentangle the relative contributions to competitive advantage of resources, the services of resources, and managerial mental models.

Our approach also suggests that entrepreneurship research focus not only on the discovery or creation of opportunities, but also on the *exploitation* of those opportunities through individual and group action. Ultimately, after all, as researchers and practitioners we are interested in the means by which entrepreneurship is manifested in firms and in the economy, not simply the latent—and largely unobservable—processes of cognition that go into the identification of entrepreneurial opportunities.

The entrepreneurship and strategy literatures also have much to gain from closer attention to how resources *become* heterogeneous as managers create or discover the services that may be rendered from resources and the social and cognitive processes

underlying the formation of a team's synergy. We need to study how organizational and environmental factors shape managers' values, knowledge, and expectations, both individually and during team interactions. As Penrose notes: 'If we can discover what determines entrepreneurial ideas about what the firm can and cannot do, that is, what determines the nature and the extent of the *subjective* productive opportunity of the firm, we can at least know where to look if we want to explain or to predict the actions of a particular firm' (1959: 42). The relationship between the subjective productive opportunity set and firm-level strategy is subtle, complex, and at least partly, endogenous. While the attributes of the entrepreneurial team may be a binding constraint on the rate at which the firm engages in entrepreneurial initiatives, future research may uncover ways in which its (planned and organic) growth processes spur the rate of entrepreneurial activity. Relatedly, future research also needs to consider how entrepreneurial judgment is formed on the level of the management team, as well as the level of the individual entrepreneur. What are the antecedents of processes of forming team judgment? How do the processes themselves play out? How can the need for heterogeneity of mental models in an entrepreneurial management team be balanced against the need for homogeneity that secures coordination?

We also emphasize that by uncovering the micro- and macro-conditions that stimulate entrepreneurial creation, discovery, and productivity, we can offer decision makers superior heuristics that enhance the likelihood of improved performance outcomes (Mosakowski, 1998b). There is limited systematic research in management on the processes by which new resource services are discovered or created and how organizational structure, incentives, and governance mechanisms affect the creation and use of value attributes (Foss, Foss, and Klein, 2007). A firm's organizational structure, culture, and property rights governance mechanisms either facilitate or inhibit processes of experimentation and learning within the entrepreneurial team. Equally important, the competitive landscape and regulatory shocks also affect managers' abilities to formulate production plans, create or discover resource attributes or services, and adjust their beliefs according to new information. Rapid technological change, regulatory shocks, and other industry-specific disruptions are associated with increased experimentation, but also greater *noise*, leading to higher rates of ex post reversal among entrepreneurial decisions (Klein and

Klein, 2001). The integration of the entrepreneurship and strategic management literatures may prove quite useful for public policy debates (Barney, 2005; Mahoney and McGahan, 2007).

Barney, Wright, and Ketchen (2001) suggest that the next generation of research on resource-based theory should include connections with entrepreneurship, human resource management and international business. Entrepreneurship liberalizes the economy, promotes foreign innovation, infuses new technology, and increases standards of living (Zahra et al., 2000). The growing relevance of entrepreneurship worldwide for the economic development of poorer nations and the continuing capabilities of wealthier nations to create economic wealth is apparent. Extending the current article's focus on firm-level entrepreneurship, future international business research may usefully consider the rich connections among a nation's constitutional frameworks, societal norms and culture, property rights, incentives, and entrepreneurial creativity. We anticipate that research in cognitive science will provide fruitful avenues for understanding how belief systems and ideologies change over time (North, 2005).

In conclusion, the current article underscores the importance of subjectivism for advanced theory development in entrepreneurship and strategy research. A subjectivist theory of team entrepreneurship brings together unique insights from Austrian economics, Penrose's (1959) resources approach, and the modern resource-based view, and emphasizes the social and cognitive nature of entrepreneurship, where creativity is stimulated, advanced, and put into action within and by teams. This perspective also suggests that embracing teams as the unit of analysis, with attention to their composition, configuration, and social and cognitive dynamics can enable us to understand more intuitively why firms (or specific teams) differ in their capabilities to initiate and carry out entrepreneurial discovery and actions.

## REFERENCES

- Ahuja G, Lampert CM. 2001. Entrepreneurship in the large corporation: a longitudinal study of how established firms create breakthrough innovations. *Strategic Management Journal* **22**(6): 521–544.
- Alchian AA, Demsetz H. 1972. Production, information costs, and economic organization. *American Economic Review* **62**: 777–794.

- Aldrich HE, Wiedenmayer G. 1993. From traits to rates: an ecological perspective on organizational foundings. In *Advances in Entrepreneurship, Firm Emergence, and Growth*, Katz J, Brockhaus R (eds). JAI Press: Greenwich, CT; 145–95.
- Alvarez SA, Barney JB. 2004. Organizing rent generation and appropriation: toward a theory of the entrepreneurial firm. *Journal of Business Venturing* **19**: 621–635.
- Alvarez SA, Barney JB. 2005a. How entrepreneurs organize under conditions of uncertainty. *Journal of Management* **31**: 776–793.
- Alvarez SA, Barney JB. 2005b. Resource-based theory and the entrepreneurial firm. In *Strategic Entrepreneurship: Creating a New Mindset*, Hitt MA, Ireland RD, Camp SM, Sexton DL (eds). Blackwell: Malden, MA; 89–105.
- Alvarez SA, Barney JB. 2006. Discovery and creation: alternative theories of entrepreneurial action. Working paper, 2006-01-005, The Ohio State University.
- Alvarez SA, Busenitz LW. 2001. The entrepreneurship of resource-based theory. *Journal of Management* **27**: 755–775.
- Amabile TM. 1996. *Creativity in Context*. Westview Press: Boulder, CO.
- Amason AC. 1996. Distinguishing the effects of functional and dysfunctional conflict on strategic decision making: resolving a paradox for top management teams. *Academy of Management Journal* **39**(1): 123–148.
- Amit RH, Schoemaker PJH. 1993. Strategic assets and organizational rent. *Strategic Management Journal* **14**(1): 33–46.
- Ardichvili A, Cardozo R, Ray S. 2003. A theory of entrepreneurial opportunity, identification, and alertness. *Journal of Business Venturing* **19**(5): 637–658.
- Arieti S. 1976. *Creativity: The Magic Synthesis*. Basic Books, Inc.: New York.
- Arrow KJ. 1974. *The Limits of Organization*. W.W. Norton and Company: New York.
- Audretsch DB, Keilbach M. 2007. The theory of knowledge-spillover entrepreneurship. *Journal of Management Studies* **44**(7): 1242–1254.
- Barnard CI. 1938. *The Functions of the Executive*. Harvard University Press: Cambridge, MA.
- Barney JB. 1986. Strategic factor markets: expectations, luck, and business strategy. *Management Science* **32**(10): 1231–1241.
- Barney JB. 1991. Firm resources and sustained competitive advantage. *Journal of Management* **17**(1): 99–120.
- Barney JB. 1995. Looking inside for competitive advantage. *Academy of Management Executive* **9**(4): 49–61.
- Barney JB. 2005. Should strategic management research engage public policy issues? *Academy of Management Journal* **48**(6): 945–948.
- Barney J, Arkan A. 2001. The resource-based view: origins and implications. In *Handbook of Strategic Management*,

- Hitt MA, Freeman RE, Harrison JS (eds). Blackwell: Malden, MA; 124–188.
- Barney J, Wright M, Ketchen DJ. 2001. The resource-based view of the firm: ten years after 1991. *Journal of Management* **27**(6): 625–641.
- Barr PS, Stimpert JL, Huff AS. 1992. Cognitive change, strategic change, and organizational renewal. *Strategic Management Journal* **13**(Summer): 15–36.
- Barringer BR, Bluedorn AC. 1999. The relationship between corporate entrepreneurship and strategic management. *Strategic Management Journal* **20**(5): 421–444.
- Barry D. 1991. Managing the bossless team: lessons in distributed leadership. *Organizational Dynamics* **21**(1): 31–47.
- Baumol WJ. 1993. *Entrepreneurship, Management, and the Structure of Payoffs*. MIT Press: Cambridge, MA.
- Berman SL, Down J, Hill CW. 2002. Tacit knowledge as a source of competitive advantage in the National Basketball Association. *Academy of Management Journal* **45**(1): 13–31.
- Bird B. 1988. Implementing entrepreneurial ideas: the case for intention. *Academy of Management Review* **43**: 442–453.
- Böhm-Bawerk EV. 1889. *The Positive Theory of Capital*. 1923 reprint of 1891 Smart translation. Stechert: New York.
- Boulding KE. 1956. *The Image*. University of Michigan Press: Ann Arbor, MI.
- Buchanan JM. 1969. *Cost and Choice: An Inquiry in Economic Theory*. Markham Publishing: Chicago, IL.
- Busenitz LW. 1996. Research on entrepreneurial alertness. *Journal of Small Business Management* **34**(4): 35–44.
- Cantillon R. 1755. *Essai Sur La Nature de Commerce en General*. Higgs H (ed). Macmillan, London; 1931.
- Carpenter MA. 2002. The implications of strategy and social context for the relationship between top management team heterogeneity and firm performance. *Strategic Management Journal* **23**(3): 275–284.
- Casson MC. 1982. *The Entrepreneur: An Economic Theory*. Martin Robertson: Oxford, U.K.
- Chiles T, Bluedorn AC, Gupta VK. 2007. Beyond creative destruction and entrepreneurial discovery: a radical Austrian approach to entrepreneurship. *Organization Studies* **28**: 467–493.
- Cohen WM, Levinthal DA. 1990. Absorptive capacity: a new perspective on learning and innovation. *Administrative Science Quarterly* **35**(1): 128–152.
- Connell CM. 2007. Discerning a mentor's role: the influence of Fritz Machlup on Edith Penrose and *The Theory of the Growth of the Firm*. *Journal of Management History* **13**(3): 228–239.
- Conner KR, Prahalad CK. 1996. A resource-based theory of the firm: knowledge versus opportunism. *Organization Science* **7**(5): 477–501.
- Denrell J, Fang C, Winter SG. 2003. The economics of strategic opportunity. *Strategic Management Journal* **24**(10): 977–990.
- Dew N, Velamuri RV, Venkataraman S. 2004. Dispersed knowledge and the entrepreneurial firm. *Journal of Business Venturing* **19**(5): 659–679.
- Dierickx I, Cool K. 1989. Asset accumulation and sustainability of competitive advantage. *Management Science* **35**: 1504–1511.
- Dobrev SD, Barnett WP. 2005. Organizational roles and transition to entrepreneurship. *Academy of Management Journal* **48**(3): 433–463.
- Dosi G. 1988. Sources, procedures, and microeconomic effects of innovation. *Journal of Economic Literature* **26**(September): 1120–1171.
- Earley PC, Mosakowski E. 2000. Creating hybrid team cultures: an empirical test of transnational team functioning. *Academy of Management Journal* **43**(1): 26–49.
- Eisenhardt KM, Schoonhoven CB. 1990. Organizational growth: linking founding team, strategy, and growth among U.S. semiconductor ventures, 1978–1988. *Administrative Science Quarterly* **35**: 504–29.
- Farjoun M. 1998. The independent and joint effects of the skill and physical bases of relatedness in diversification. *Strategic Management Journal* **19**(7): 611–630.
- Fiet JO. 2007. A prescriptive analysis of search and discovery. *Journal of Management Studies* **44**(4): 592–611.
- Finkelstein S, Hambrick DC. 1996. *Strategic Leadership: Top Executives and Their Effects on Organizations*. West Publishing Company: St. Paul, MN.
- Fiol CM. 1991. Managing culture as a competitive resource: an identity-based view of sustainable competitive advantage. *Journal of Management* **17**(1): 191–211.
- Foss K, Foss NJ, Klein PG. 2007. Original and derived judgment: an entrepreneurial theory of economic organization. *Organization Studies* **28**(12): 1893–1912.
- Foss K, Foss NJ, Klein PG, Klein SK. 2007. The entrepreneurial organization of heterogeneous capital. *Journal of Management Studies* **44**(7): 1165–1186.
- Foss N. 1998. Austrian and post-Marshallian economics: the bridging work of George Richardson. In *Economic Organization, Capabilities, and Coordination: Essays in Honor of G. B. Richardson*, Foss NJ, Loasby B (eds). Routledge: London.
- Foss N. 2002. Edith Penrose, economics, and strategic management. In *The Growth of the Firm: The Legacy of Edith Penrose*, Pitelis C (ed). Oxford University Press: New York.
- Foss N, Klein PG. 2005. Entrepreneurship and the economic theory of the firm: any gains from trade? In *Handbook of Entrepreneurship: Disciplinary Perspectives*, Agarwal R, Alvarez SA, Sorenson O (eds). Kluwer: Norwell, MA; 55–80.
- Gaglio M, Katz JA. 2001. The psychological basis of opportunity identification: entrepreneurial alertness. *Small Business Economics* **16**: 95–111.

- Ghemawat P. 1991. *Commitment: The Dynamic of Strategy*. Free Press: New York.
- Ginsberg A. 1994. Minding the competition: from mapping to mastery. *Strategic Management Journal* **15**(Winter): 153–174.
- Goncalo JA, Staw BM. 2006. Individualism-collectivism and group creativity. *Organizational Behavior and Human Decision Processes* **100**: 96–109.
- Grant RM. 1996. Toward a knowledge-based theory of the firm. *Strategic Management Journal* **17**(Winter): 109–122.
- Grimm CM, Lee H, Smith KG. 2006. *Strategy as Action: Competitive Dynamics and Competitive Advantage*. Oxford University Press: New York.
- Hambrick DC, Cho ST, Chen MJ. 1996. The influence of top management team heterogeneity on firms' competitive moves. *Administrative Science Quarterly* **41**: 659–684.
- Harper DA. 2006. Toward a theory of entrepreneurial teams. Working paper, New York University.
- Hayek FA. 1941. *The Pure Theory of Capital*. University of Chicago Press: Chicago, IL.
- Hayek FA. 1945. The use of knowledge in society. *American Economic Review* **35**: 519–530.
- Hayek FA. 1948. *Individualism and Economic Order*. University of Chicago Press: Chicago, IL.
- Hayek FA. 1955. *The Counter-revolution of Science: Studies in the Abuse of Reason*. Liberty Press: Indianapolis, IN.
- Hayek FA. 1968. Competition as a discovery procedure. Trans. Snow MS. *Quarterly Journal of Austrian Economics* **5**(3): 9–23.
- Helfat CE. 1997. Know-how and asset complementarity and dynamic capability accumulation: the case of R&D. *Strategic Management Journal* **18**(5): 339–360.
- Hill CWL, Deeds DL. 1996. The importance of industry structure for the determination of firm profitability: a Neo-Austrian perspective. *Journal of Management Studies* **33**: 429–451.
- Hitt MA, Bierman L, Shimizu K, Kochhar R. 2001. Direct and moderating effects of human capital on strategy and performance in professional service firms: a resource-based perspective. *Academy of Management Journal* **44**(1): 13–28.
- Hitt MA, Ireland RD, Camp SM, Sexton DL. 2001. Strategic entrepreneurship: entrepreneurial strategies for wealth creation. *Strategic Management Journal* **22**(6): 479–492.
- Ireland RD, Hitt MA, Sirmon DG. 2003. A model of strategic entrepreneurship: the construct and its dimensions. *Journal of Management* **29**(6): 963–989.
- Itami H, Roehl T. 1987. *Mobilizing Invisible Assets*. Harvard University Press: Cambridge, MA.
- Jackson SE. 1992. *Diversity in the Workplace: Human Resources Initiatives*. Oxford University Press: New York.
- Jacobson R. 1992. The 'Austrian' school of strategy. *Academy of Management Review* **17**(4): 782–807.
- Kihlstrom R, Laffont JJ. 1979. A general equilibrium entrepreneurship theory of the firm based on risk aversion. *Journal of Political Economy* **87**(4): 719–748.
- Kim J, Mahoney JT. 2006. How property rights economics furthers the resource-based view: resources, transaction costs, and entrepreneurial discovery. *International Journal of Strategic Change Management* **1**(1): 40–52.
- Kirzner IM. 1966. *An Essay on Capital*. Augustus M. Kelley: New York.
- Kirzner IM. 1973. *Competition and Entrepreneurship*. University of Chicago Press: Chicago, IL.
- Kirzner IM. 1979. *Perception, Opportunity, and Profit: Studies in the Theory of Entrepreneurship*. University of Chicago Press: Chicago, IL.
- Kirzner IM. 1997. Entrepreneurial discovery and the competitive market process: an Austrian approach. *Journal of Economic Literature* **35**(March): 60–85.
- Klein PG. 2007. The place of Austrian economics in entrepreneurship research. Working paper, McQuinn Center for Entrepreneurial Leadership, University of Missouri.
- Klein PG, Klein SK. 2001. Do entrepreneurs make predictable mistakes? Evidence from corporate divestitures. *Quarterly Journal of Austrian Economics* **4**(2): 3–25.
- Klimoski R, Mohammed S. 1994. Team mental model: construct or metaphor? *Journal of Management* **20**(2): 403–437.
- Knight FH. 1921. *Risk, Uncertainty, and Profit*.: August M. Kelley: New York.
- Koestler A. 1964. *The Act of Creation*. MacMillan: New York.
- Kogut B, Zander U. 1992. Knowledge of the firm, combinative capabilities, and the replication of technology. *Organization Science* **3**(3): 383–397.
- Kor YY. 2003. Experience-based top management team competence and sustained growth. *Organization Science* **14**(6): 707–719.
- Kor YY, Leblebici H. 2005. How do interdependencies among human-capital deployment, development, and diversification strategies affect firms' financial performance? *Strategic Management Journal* **26**(10): 967–985.
- Kor YY, Mahoney JT. 2000. Penrose's resource-based approach: the process and product of research creativity. *Journal of Management Studies* **37**(1): 109–139.
- Kor YY, Mahoney JT. 2004. Edith Penrose's (1959) contributions to the resource-based view of the firm. *Journal of Management Studies* **41**(1): 183–191.
- Kor YY, Mahoney JT, Michael SC. 2007. Resources, capabilities, and entrepreneurial perceptions. *Journal of Management Studies* **44**(7): 1185–1210.
- Lachmann LM. 1956. *Capital and Its Structure*. Sheed Andrews and McMeel: Kansas City, MO.



- Lachmann LM. 1976. From Mises to Shackle: an essay on Austrian economics and the kaleidic society. *Journal of Economic Literature* **14**(1): 54–62.
- Lachmann LM. 1977. *Capital, Expectations, and the Market Process*. Sheed Andrews and McNeel: Kansas City, MO.
- Lachmann LM. 1986. *The Meaning of the Market Process*. Basil Blackwell: Oxford, U.K.
- Lado AA, Wilson MC. 1994. Human resource systems and sustained competitive advantage: a competence-based perspective. *Academy of Management Review* **19**: 699–727.
- Langlois RN. 2007. The entrepreneurial theory of the firm and the theory of the entrepreneurial firm. *Journal of Management Studies* **44**(7): 1107–1124.
- Levine JM, Resnick LB, Higgins ET. 1993. Social foundations of cognition. *Annual Review of Psychology* **44**(1): 585–612.
- Littlechild SC. 1986. Three types of market processes. In *Economics as a Process*, Langlois RN (ed). Cambridge University Press: Cambridge, MA; 27–39.
- Loasby BJ. 1991. *Equilibrium and Evolution: An Exploration of Connecting Principles in Economics*. Manchester University Press: New York.
- Machlup F. 1967. *Essays in Economic Semantics*. Norton and Company: New York.
- Machlup F. 1978. *Methodology of Economics and Other Social Sciences*. Academic Press: New York.
- Mahoney JT. 1995. The management of resources and the resource of management. *Journal of Business Research* **33**: 91–101.
- Mahoney JT. 2005. *Economic Foundations of Strategy*. Sage Publications: Thousand Oaks, CA.
- Mahoney JT, McGahan A. 2007. The field of strategic management within the evolving science of strategic organization. *Strategic Organization* **5**(1): 79–99.
- Mahoney JT, Pandian JR. 1992. The resource-based view within the conversation of strategic management. *Strategic Management Journal* **13**(5): 363–380.
- March JG. 1991. Exploration and exploitation in organizational learning. *Organization Science* **2**(1): 71–87.
- McCain BE, O'Reilly C, Pfeffer J. 1983. The effects of departmental demography on turnover: the case of a university. *Academy of Management Journal* **26**(4): 626–41.
- McGrath RG. 2001. Exploratory learning, innovative capacity, and managerial oversight. *Academy of Management Journal* **44**: 118–131.
- McGrath RG, MacMillan IC. 2000. *The Entrepreneurial Mindset*. Harvard Business School Press: Boston, MA.
- Menger C. 1871. *Principles of Economics*. New York University Press: New York. [1985 edition].
- Mises LV. 1949. *Human Action: A Treatise on Economics*. Yale University Press: New Haven, CT.
- Mosakowski E. 1993. A resource-based perspective on the dynamic strategy-performance relationship: an empirical examination of the focus and differentiation strategies on entrepreneurial firms. *Journal of Management* **19**(4): 819–839.
- Mosakowski E. 1997. Strategy making under causal ambiguity: conceptual issues and empirical evidence. *Organization Science* **8**: 414–442.
- Mosakowski E. 1998a. Entrepreneurial resources, organizational choices, and competitive outcomes. *Organization Science* **9**: 625–643.
- Mosakowski E. 1998b. Managerial prescriptions under the resource-based view of strategy: the example of motivational techniques. *Strategic Management Journal* **19**(12): 1169–1182.
- Mosakowski E. 2002. Overcoming resource disadvantages in entrepreneurial firms: when less is more. In *Strategic Entrepreneurship: Creating a New Mindset*, Hitt MA, Ireland RD, Camp SM, Sexton DL (eds). Blackwell: Malden, MA; 106–126.
- Nelson RR, Winter SG. 1982. *An Evolutionary Theory of Economic Change*. Harvard University Press: Cambridge, MA.
- North DC. 2005. *Understanding the Process of Economic Change*. Princeton University Press: Princeton, N.J.
- O'Driscoll GP, Rizzo M. 1985. *The Economics of Time and Ignorance*. Basil Blackwell: Oxford, U.K.
- Parker S. 2004. *The Economics of Self-Employment and Entrepreneurship*. Cambridge University Press: Cambridge, U.K.
- Penrose ET. 1959. *The Theory of the Growth of the Firm*. John Wiley: Cambridge, U.K.
- Peteraf M. 1993. The cornerstones of competitive advantage: a resource-based view. *Strategic Management Journal* **14**(3): 179–191.
- Pitelis C. 2002. *The Growth of the Firm: The Legacy of Edith Penrose*. Oxford University Press: New York.
- Polanyi M. 1962. *Personal Knowledge: Towards a Post-Critical Philosophy*. University of Chicago Press: Chicago, IL.
- Prahalad CK, Bettis RA. 1986. The dominant logic: a new linkage between diversity and performance. *Strategic Management Journal* **7**(6): 485–501.
- Rajagopalan N, Datta DK. 1996. CEO characteristics: does industry matter? *Academy of Management Journal* **39**(1): 197–215.
- Rindova VP, Kotha S. 2001. Continuous 'morphing': competing through dynamic capabilities, form, and function. *Academy of Management Journal* **44**(6): 1263–1280.
- Roberts PW, Eisenhardt KM. 2003. Austrian insights on strategic organization: from market insights to implications for firms. *Strategic Organization* **1**: 345–352.
- Rothbard MN. 1962. *Man, Economy, and the State*. Ludwig Mises Institute: Auburn, AL [2004 edition].
- Rumelt RP. 1987. Theory, strategy, and entrepreneurship. In *The Competitive Challenge*, Teece D (ed). Ballinger: Cambridge, MA; 137–158.

- Sarasvathy SD. 2001. Causation and effectuation: toward a theoretical shift from economic inevitability to entrepreneurial contingency. *Academy of Management Review* **26**: 243–63.
- Schumpeter JA. 1934. *The Theory of Economic Development: An Inquiry into Profits, Capital, Credit, Interest, and the Business Cycle*. Harvard University Press: Cambridge, MA.
- Schumpeter JA. 1942. *Capitalism, Socialism, and Democracy*. Harper and Row: New York.
- Shackle GLS. 1972. *Epistemics and Economics*. Cambridge University Press: New York.
- Shalley CE, Zhou J, Oldham GR. 2004. The effects of personal and contextual characteristics on creativity: where should we go from here? *Journal of Management* **30**(6): 933–958.
- Shane S. 2000. Prior knowledge and the discovery of entrepreneurial opportunities. *Organization Science* **11**: 448–469.
- Shane S. 2003. *A General Theory of Entrepreneurship: The Individual-Opportunity Nexus*. Edward Elgar: Cheltenham, U.K.
- Shane S, Venkataraman S. 2000. The promise of entrepreneurship as a field of research. *Academy of Management Review* **25**(1): 217–226.
- Simon HA. 1945. *Administrative Behavior*. The Free Press: New York.
- Simon HA. 1991. Bounded rationality and organizational learning. *Organization Science* **2**(1): 125–133.
- Sirmon DG, Hitt MA, Ireland RD. 2007. Managing firm resources in dynamic environments to create value: looking inside the black box. *Academy of Management Review* **32**(1): 273–292.
- Smith KG, DiGregorio D. 2002. Bisociation, discovery, and the role of entrepreneurial action. In *Strategic Entrepreneurship: Creating a New Mindset*, Hitt MA, Ireland RD, Camp SM, Sexton DL (eds). Blackwell: Malden, MA; 129–150.
- Sorensen JB, Sorenson O. 2003. From conception to birth: opportunity, perception, and resource mobilization in entrepreneurship. *Advances in Strategic Management* **20**: 89–117.
- Spender JC. 1996. Making knowledge the basis of a dynamic theory of the firm. *Strategic Management Journal* **17**(Winter): 45–62.
- Spender JC. 2006. The RBV, methodological individualism, and managerial cognition: practicing entrepreneurship. Paper presented at the annual meeting of the Academy of Management, Atlanta, GA.
- Tan D, Mahoney JT. 2005. Examining the Penrose Effect in an international business context: the dynamics of Japanese firm growth in U.S. industries. *Managerial and Decision Economics* **26**(2): 113–127.
- Teece DJ, Pisano G, Shuen A. 1997. Dynamic capabilities and strategic management. *Strategic Management Journal* **18**(7): 509–533.
- Thornhill S, Amit R. 2001. A dynamic perspective of internal fit in corporate venturing. *Journal of Business Venturing* **16**: 25–50.
- Tushman ML, Anderson P. 1986. Technological discontinuities and organizational environments. *Administrative Science Quarterly* **31**: 439–465.
- Utterback JM. 1994. *Mastering the Dynamics of Innovation*. Harvard Business School Press: Boston, MA.
- Venkataraman S. 1997. The distinctive domain of entrepreneurship research. In *Advances in Entrepreneurship, Firm Emergence, and Growth*, Katz J. (ed). JAI Press: Greenwich, CT; 119–38.
- Wagner WG, Pfeffer J, O'Reilly CA. 1984. Organizational demography and turnover in top management groups. *Administrative Science Quarterly* **29**: 74–92.
- Walsh JP. 1995. Managerial and organizational cognition: notes from a trip down memory lane. *Organization Science* **6**(3): 280–321.
- Walsh JP, Fahey L. 1986. The role of negotiated belief structures in strategy making. *Journal of Management* **12**(3): 325–338.
- Wanous JP, Youtz MA. 1986. Solution diversity and the quality of group decisions. *Academy of Management Journal* **29**(1): 149–59.
- Wernerfelt B. 1984. A resource-based view of the firm. *Strategic Management Journal* **5**(2): 171–180.
- Westphal JD, Zajac EJ. 1995. Who shall govern? CEO/board power, demographic similarity, and new director selection. *Administrative Science Quarterly* **40**: 60–83.
- Witt U. 1998. Imagination and leadership: the neglected dimension of an evolutionary theory of the firm. *Journal of Economic Behavior and Organization* **35**: 161–177.
- Zahra SA, George G. 2002. Absorptive capacity: a review, reconceptualization, and extension. *Academy of Management Review* **27**(2): 213–240.
- Zahra SA, Ireland RD, Gutierrez I, Hitt MA. 2000. Privatization and entrepreneurial transformation: emerging issues and a future research agenda. *Academy of Management Review* **25**(3): 509–524.
- Zahra SA, Sapienza HJ, Davidsson P. 2006. Entrepreneurship and dynamic capabilities: a review, model, and research agenda. *Journal of Management Studies* **43**(4): 917–955.
- Zenger TR, Lawrence BS. 1989. Organizational demography: the differential effects of age and tenure distributions of technical communication. *Academy of Management Journal* **32**(2): 353–376.