

Entrepreneurial Paradoxes: implications of radical subjectivism

**Peter Lewin
School of Management
University of Texas at Dallas**

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Introduction and Background – the influence of Austrian Economics

In recent years many academic studies in the field of management have turned to the phenomenon of entrepreneurship. It is probably the fastest growing sub-field of the many sub-fields of management studies today. As such it manifests the influences of multiple and diverse core disciplines – economics, psychology, philosophy (especially epistemology), mathematics (complexity and emergence) and biology (especially evolutionary biology). Perhaps the most surprising characteristic of this literature is the, often independent, discovery of ideas on entrepreneurship that appear to be “essentially Austrian.” The influence of Hayek, Kirzner and Lachmann are now widely acknowledged in this field. While Austrian ideas continue to be mostly ignored by the neoclassical orthodoxy, they are actively engaged and developed within the “applied economics” of management studies.

Specifics on the study of entrepreneurship are discussed below. More generally, however, the relevance of Austrian ideas can be found also in other management sub-fields like strategic management and organization studies. There one finds in fact an implicit Austrian “theory of the firm.” I refer to the Resource-Base-View and the Knowledge-Based-View of the firm, which can be shown to be crucially related to a more basic Capital-Based-View of the firm, drawing from the much-neglected, now resurrecting, Austrian theory of capital from Menger to Lachmann (see Lewin & Baetjer, 2011 which contains references to this literature).¹ Entrepreneurship can also be shown to be capital-based. The entrepreneur is the agent that adds value by combining (capital) resources in novel ways. This article is a contribution to this general literature by focusing on some paradoxical aspects of entrepreneurship. Paradoxes can be revealing in exposing essential characteristics in a novel way. We begin first with a brief discussion of the conceptions of entrepreneurship.

Conceptions of Entrepreneurship

Entrepreneurship is a concept suffused with paradox. It is at once familiar and mysterious, crucial yet elusive, absolutely necessary for the market process. Its essence lies in *innovation*, the new, the previously unknown, the unpredictable. Every day, in many different ways, millions of entrepreneurial actions are taken. The entrepreneur is the driving force of economic growth; but the ideal types of our academic musings often bear scant resemblance to the real-life acting human beings who actually populate the category.

The origin of the concept “entrepreneur” has been traced to Richard Cantillon (Cantillon, 1755 [2001]), who saw him as having a distinct function apart from wage-earners and other productive resources. In Cantillon’s view, entrepreneurs made production decisions in conditions of uncertainty, thus taking on risk for which, if successful, a return was earned. In the modern period, Joseph Schumpeter is perhaps the most well-known exponent of the entrepreneur as the disequilibrater *par excellence*, the originator

¹It is also true that in its earliest incarnation the Resource Based View (RBV) of the firm derived directly from the neoclassical economic model of perfect competition. The overriding concern of strategic management studies is the establishment and maintenance of a “competitive advantage” in business. The RBV thus counseled an approach that boils down to the exploitation of “barriers to entry.” Implicitly this approach makes no distinction between competitive profits and monopoly rents. It is precisely this static view that the management literature has recently escaped with its “discovery” of the dynamic Austrian paradigm.

of the gales of “creative destruction” that propel the economy forward (Schumpeter, 1942 [2010]; 1911 [1982]). More recently, in contrast to Schumpeter, Israel Kirzner has presented a concept of the entrepreneur as an equilibrator, an all-purpose arbitrageur (Kirzner, 1973, 1979a, 1985, 1992, 2009). Kirzner imagines the entrepreneur as an *alert discoverer of opportunities* for profit. Such opportunities represent a “hole” in the market, an indicator of disequilibrium in which resources are not priced to reflect those opportunities. By revealing an opportunity, the entrepreneur may set in motion a series of actions that move the economy toward the equilibrium price configuration in which all resources are priced to reflect the value of that opportunity and all actions aiming to appropriate that value are mutually coordinated.

Kirzner was concerned exclusively with the systemic implications of entrepreneurship. It is the entrepreneur who provides the answer to the question: how do equilibrium prices ever get established in a dynamic world? Without the entrepreneur, the market economy could not function and anything that impedes the entrepreneurial function, will encumber the smooth functioning of the market (Kirzner, 1979b). So Kirzner’s research is directed toward providing an understanding of the market process in general and economic policies appropriate to the fostering of entrepreneurship.

The management literature is interested in Kirzner’s work for different reasons, however. It is his concept of “opportunity discovery” that has recently become the central focus of research into the nature and workings of entrepreneurship in real world markets, most notably by Scott Shane and his collaborators (Shane 2000, 2004, Shane & Venkataraman 2000, Eckarhdt & Shane, 2003). Drawing from Kirzner’s basic idea, Shane enquires into the nature of entrepreneurial opportunities and the people who discover and exploit them.² And a large literature has grown up around these themes.³

More recently, scholars have turned to a parallel and, to some extent rival, strand of Austrian economics, that has been developed primarily by Ludwig Lachmann and his followers, owing much to the work of (the non-Austrian) George Shackle (Lachmann, 1976, 1986; Lavoie, 1994; Lewin, 1997, 1999; O’Driscoll & Rizzo, 1996; Shackle, 1969, 1972, 1979; Vaughn, 1998); and also reaching further back to the original contributions of Ludwig von Mises (1996 [1949]) and Frank Knight (Knight, 1921). In some ways this new research harks back to the Schumpeterian approach, which emphasized disequilibrium, but it goes deeper. Lachmann’s work characterizes the *radical subjectivist* branch of the modern Austrian literature, which emphasizes the importance of the passage of real time and uncertainty for human action and especially for the entrepreneur.⁴ Likewise Mises’s approach to the entrepreneur emphasizes the role the entrepreneur plays in appraising the value of resources in a world in which the

²Shane’s entrepreneur is, however, not Kirzner’s entrepreneur. The latter is a disembodied function whose general characteristics lie beyond the realm of empirical research. Kirzner’s contribution to the management literature, though substantial if one notes the large number of studies – empirical and theoretical – leveraging the concept of “opportunity,” was unintended (Kirzner, 2009).

³ Foss & Klein 2010; Klein, 2008; Foss, Klein, Kor, & Mahoney, 2008; Foss & Klein, 2008; Foss, Foss, & Klein, 2007; Alvarez & Barney, 2007; McMullen, Plummer, & Acs, 2007; Davidsson, 2004; to list just a few.

⁴ For recent applications see Chiles, Bluedorn, & Gupta, 2007; Chiles, et. al. 2010; Foss, et. al., 2008; Matthews, 2010; Mahoney & Michael, 2005; McMullen, 2010.

future is unknown. And Knight famously drew attention to the role of *uncertainty* (where the set of possible outcomes was unknown and unknowable) as distinct from *risk* (where the set of possible outcomes was known and probabilities could be attached to them). Knight proposed that the entrepreneur supplies *judgement* in order to make decisions in an uncertain world, and judgement has recently been emphasized as a crucial aspect of entrepreneurship in a number of recent contributions (for example, Foss & Klein, 2008, 2010). This (radical) subjectivist approach informs the examination of the paradoxical nature of entrepreneurship below.

Paradoxes

Some of the issues discussed in the literature mentioned above are⁵: What is an opportunity? (Murphey, 2010: 6; McMullen, Plummer, & Acs, 2007; Casson & Wadeson, 2007). Are opportunities discovered or created? (Alvarez & Barney, 2007; Foss & Klein, 2010; Holcombe, 2003; Buenstorf, 2007). Are opportunities subjective or objective? (Foss & Klein, 2008; Klein 2008; Companys & McMullen, 2007; Plummer, Haynie, & Godesiabois, 2007; McMullen & Shepperd, 2006). Who are the entrepreneurs? (Shane, 2008). What is the nature of their ability to discover or create opportunities? (Sheppard & DeTienne, 2005; Shane, 2000; also more generally Harper, 2003). What is the connection between opportunity discovery (creation) and business strategy? (Foss & Foss, 2008; Foss & Klein, 2005). What is the nature of entrepreneurship research and what are its limitations? (Minniti & Levesque, 2008). Can one teach entrepreneurship and how? (Klein & Bullock, 2006).

What follows is an attempt to contribute toward a resolution of these questions by examining a set of paradoxes connected with entrepreneurship.

Paradox #1: Entrepreneurial opportunities are complicated by uncertainty but would not exist without uncertainty.

Uncertainty is a fact of life, but so is predictability. In order to act we need some things to be predictable. Some things are thought to be *perfectly predictable* (the sun will rise tomorrow) while others are *imperfectly predictable* (there is a sixty percent chance that it will rain) and some are *contingently predictable* (if it rains people will use umbrellas). But there are some events that are simply outside the set of predictable events – they are “radically uncertain” (as distinct from simply risky) (Langlois, 1992; Knight, 1921) - like the nature and timing of the arrival of a new technology or product or work of art. Entrepreneurship is mostly about this last set of events, grand and small. Entrepreneurs precipitate them and they react to them. This bears closer examination.

Uncertainty is a result of the *interaction* of individuals in real time – time as we experience it, as distinct from theoretical time as we describe it or analyze it, where interactions are, for the most part, banished (O’Driscoll and Rizzo 1996; Langlois, 1992). The past is our only guide to the future, and in some respects it is more reliable than in others. Clearly there must be a discernable momentum in human affairs (Shackle, 1972), a stability of certain underlying conditions, or else action would be impossible. Action is

⁵ For a recent review see Koppl & Minniti, 2010.

by definition future-oriented, provoked by the conviction of effectiveness in bringing about some preconceived situation. Recognizing this, theorists and researchers have responded in different ways.

In the mainstream (neo-classical) economics literature the response has been effectively to define away the problem of uncertainty. Uncertainty is very inconvenient for the development of neoclassical economic models (as opposed to risk, which is measurable and can be modeled). These models, for example of production within a firm, depend on the actors possessing shared knowledge of the characteristics of resources – what they are capable of doing and to what degree (a production function), that is to say what products can be produced and how; and what products can be sold, at what prices and at which dates, etc. All this knowledge, about technical and economic matters, is solid and is shared by the decision-makers. In such a context, action (if it can be called that) is simply the predictable solution to a constrained maximization problem – that of maximizing net revenue (profit) subject to the known technical and economic constraints.

The payoff for adopting these assumptions has been the development of an impressive and extensive theoretical framework connecting all aspects of microeconomic behavior.⁶⁶ It is a rigorous and coherent working out of the implications of the “pure logic of choice” (Buchanan 1964). As such, it provides many valuable insights into the nature of economizing, the consequences of many types of economic policy like the imposition of minimum wages and taxes and tariffs.

But, by its very nature, this “pure logic of choice” is limited to situations that are fundamentally static in nature. It cannot deal with fundamental (endogenous) change, and, therefore, it has no room for, or role for, the entrepreneur (Baumol, 1968). Endogenous change, the arrival of something unexpected, is the result of action and interaction in real time. In order to know everything relevant about the future, and thus avoid surprises, one has to know what others will do in various circumstances. But in order to predict the actions of others, one would have to know what they will know, since all action depends on prior knowledge. And future knowledge cannot be had before its time – by definition (O’Driscoll and Rizzo 1996, Popper, 1945). Thus, social situations involving change also involve inherent unpredictability. This is most graphically seen in the *diversity of expectations* that exists at any point in time (Lachmann, 1978: 24). Different entrepreneurs have different expectations involving the uses and values of the same sets of resources. Diverse expectations imply that, at most, only one person’s expectations can be right, and all the others must be in error. This is part of the experimental nature of the market process.

On the one hand, this is encouraging. It suggests that the market process is dynamic and selective, allowing only viable entrepreneurial visions to be actualized. The existence of error makes room for the entrepreneur, the person who notices and exposes these errors as opportunities (Kirzner 1973). As a result of the entrepreneur, resources tend to flow to where they are most highly valued.

⁶⁶ It is true that neoclassical economics is no longer a valid description for “mainstream” economics in which developments in game-theory in particular have moved away from the models of large numbers of anonymous price-taking economic agents. In many ways, however, the modern mainstream has preserved what its regarded to be the most important elements of the neoclassical edifice – in particular the ability to assert the establishment of equilibria – even though they may be multiple, in a world in which the acting agents are informed by shared information of a certain or probabilistically certain nature.

On the other hand, it is not clear how the entrepreneur can act at all. How is one to know which “opportunities” are real, in the sense that they will appear profitable in retrospect? How is the entrepreneur to predict how other people will act in the circumstances he envisages.

For radical subjectivists this is a recurring problem, sometimes referred to as the “Lachmann problem.” (After Koppl 1998: 61; see also Foss & Garzarelli, 2007; Lewis and Runde, 2007, Lewis, 2008 and McMullen 2010). Stated succinctly by McMullen (2010: 114) the Lachmann problem is: “if one’s plans are contingent upon the complicit behavior of others, whose plans are in turn based on the data and preferences that change over time, and if future data and preferences [and we might add knowledge] cannot be known a priori, then how is socio-economic order possible? What prevents the economy from devolving into anarchy and rescues scholarly attempts to study it from being fruitless encounters with nihilism?” (114).

Lachmann himself addressed the problem via his work on institutions (Lachmann, 1971). By relying on shared understandings of social institutions like property rights, contracts, business practices and the like, entrepreneurs are able to coherently implement their plans, forming reliable expectations of the actions of others. In a well-known passage he writes:

An institution provides a means of orientation to a large number of actors. It enables them to coordinate their actions by means of orientation to a common signpost. If the plan is a mental scheme in which the conditions of action are coordinated, we may regard institutions, as it were, as orientation schemes of the second order, to which planners orientate their actions to a plan. ... The existence of such institutions is fundamental to civilized society. They enable us to rely on the actions of thousands of anonymous others about whose individual purposes and plans we know nothing. They are nodal points of society, coordinating the actions of millions whom they relieve of the need to acquire and digest detailed knowledge about others and form detailed expectations about their future action (Lachmann, 1971: 49-50).

Sympathetic critics have pointed to the problem that institutions themselves are evolved and evolving phenomena arising out of the heterogeneous expectations of multiple actors and, therefore, cannot be seen as fixed points on a shifting landscape (Horwitz, 1998; Lewis and Runde, 2007; McMullen 2010); and have offered various “fixes.” For example, McMullen argues that what is necessary to anchor interacting expectations is the practice of “perspective taking” in which entrepreneurs are able to orient themselves to the imagined mental pictures of others – most especially those intended to be the buyers of their products. Lewis and Runde offer a resolution based on “transcendental realist social theory”⁷ (Lewis and Runde, 2007; also Lewis 2008). And Foss and Garzarelli appeal to the ideas of Alfred Shutz and to the new institutional economics to affirm the power of Lachmann’s theory of institutions as “knowledge capital” to stabilize expectations and facilitate action. “It is precisely by pointing to the presence of institutions in Lachmann’s thinking that we shall be able to exonerate him ..., for institutions stabilize the social landscape by stabilizing actions and expectations. Hence, there is no necessarily inconsistency in Lachmann’s thinking: it is possible to be skeptical as to whether the market process is everywhere and always equilibrating, and at the same time argue that there is order on account of the role of institutions as a stabilizing factor.” (791).

⁷ An examination of which is beyond the scope of this paper.

All of these works ignore a simpler explanation, one that I believe is implicit in Lachmann's work, though he never spelled it out. It involves the simple recognition that not all expectations are categorically alike. The question "expectations of what?" is a crucial one. Relatedly, not all evolutionary social processes are alike. There are definitely some processes that are convergent in nature – in which the expectations particular to that category of actions tend to converge. For example, the adoption of uniform standards for driving on the right side of the road, weights and measures, monetary units, business practices and so on are the results of convergent social processes. This is now well-known as the manifestation of network-effects, and such processes are ubiquitous in civilized societies. Convergence results from the easily perceived mutual gains from standardization.

My own theory along these lines (Lewin 1999) makes use of the distinction between different kinds of knowledge and the events related to them. I distinguish between events that are predictable (either perfectly, probabilistically or contingently, see above in the previous section) and events that are not. In other words, *predictability in one sphere of knowledge coexists with unpredictability in others.*

To see this consider further the question of knowledge. One may categorize knowledge into three types. *Type 1 knowledge – knowledge of the natural world, knowledge of natural laws* (apples always fall to the ground when dropped); *Type 2 knowledge – knowledge of the social world, knowledge of social "laws"* (people tend to stop at red lights, people open their umbrellas when it rains, we all mark time the same way to facilitate coordination); *Type 3 knowledge – knowledge of unique historical events or unique events yet to come.*

Action based on the third category of knowledge cannot be predicted in the same way as action based on the first two categories. Entrepreneurial action is based on Type 3 knowledge. It is essentially unpredictable, but it is possible because it occurs *within* the world of knowledge Types 1 and 2. All action presupposes a stable world, where nature and human reactions can be predicted within certain well-understood limits. So, while the entrepreneur may not be able to accurately predict whether and in exactly which way she will succeed in implementing her particular entrepreneurial vision (which, in any case, may not be perfectly specified ahead of time), she knows what the "rules of the game are." She knows the social laws and conventions that will reward certain actions and punish others and the nature of the rewards and punishments. Should she fail to earn a profit she will not be executed, though she may have to sell some assets, and find another line of work. This she can contingently predict. It is only because these social laws, these institutions, are stable over the time period of her projected actions that she is able to act at all, and this enables us to say some very important things about entrepreneurship.

Though it may be disequilibrating (in the sense of destabilizing the plans of others and forcing a revision of resource valuations) [\[a better definition of "disequilibrating" is needed here – or at least a clarification\]](#) and though it obviously occurs within disequilibrium (in the sense that plans may be mutually incompatible to start with), entrepreneurial action must occur within a world of social equilibrium, in which the expectations of most people, *regarding most things*, are indeed compatible and correct because of the existence of social institutions. The designation "institution" connotes an image of permanence, of reliability. Institutions exist as fixed points in time within which individuals can make their choices in the knowledge (knowledge type 2) that they, the institutions, at least, will remain unchanged.

It must be noted, however, that this permanence must be relative, for, as mentioned above, we have the fact of institutional change. Standards come and go. Categories change. Rules appropriate to one

society often disappear as the society changes. Even language evolves. How does this affect the ability of entrepreneurs to act? The answer must be in the rapidity of change. A society in which everything changed too rapidly would be one devoid of any perceptible order. History is possible only because the historian is able to know something about the enduring orientations inside people's minds. The historical context is defined by the meaning of the institutions of the society under examination. But as the context changes, institutions may be seen at one point in time as fixed points, while at another they may be seen as aspects of change. It depends on the purpose of the analysis and the time-span involved. What is fixed and what evolves is itself a matter of context. There seems to be a continuing interaction between the foreground and the background, and which is moving depends very much on which you have in focus, much like a three-dimensional holographic picture. Commercial law is necessary for the conduct of economic life and indeed facilitates the emergence of unpredictable novelty in economic life. But economic (and technological) changes of certain types put a strain on aspects of the law that prompt it to change. For example, the emergence of electronic communications has suggested the acceptance of facsimile signatures and has raised difficult legal questions relating to copyright and privacy on the Internet.⁸

If the world were like the world of neoclassical economics there would be no entrepreneur because in that world everything is known. And if the world had no stable laws of nature and of social action there would be no entrepreneur either, because very little would be known and any kind of prediction would be impossibly unreliable. Opportunities for profit exist because there is a place for action that introduces novelty within a stable social framework, in the firm, in the market and in society at large. Uncertainty makes entrepreneurship possible even as it makes it difficult to analyze.

About which more below.

Paradox #2: An entrepreneurial opportunity for everyone is an opportunity for no one in particular.

It follows from the discussion above that knowledge about opportunities must be idiosyncratic. If too many people know about a (potential) opportunity, it may not be exploited. There is a strategic problem when everyone perceives an opportunity whose value depends on not too many people trying to exploit it. G. S. Richardson (1960) has insightfully explained this:

It may seem paradoxical to regard ignorance, in its role as a restraint on investment, as actually furthering, in certain circumstances, a successful [exploitation of opportunities for profit]. And yet it is clear that an entrepreneur may undertake a certain project chiefly on the grounds that only he, and possibly a very few other producers, are aware of the impending increase in demand. Ignorance, by checking the response of some, may be a necessary condition for any response by others; an unequal distribution of knowledge of final demand, therefore, may actually promote successful adjustment. A general profit opportunity, which is both known to everyone, and equally capable of being exploited by everyone is, in an important sense, a profit

⁸ The relative permanence of the institutional environment causes the degree of uncertainty to vary. If institutions are very unstable, individual planners will choose short planning horizons. Stable institutions facilitate long term planning and entrepreneurial ventures (see Koppl & Butos, 2001). See also Harper, 2003, chapters 4 and 5, for an extended examination of how institutions facilitate entrepreneurship.

opportunity for no one in particular; it will create the incentive to invest only provided some people are less able to discern it, or to respond to it, than others. (Richardson, 1960: 57-58).⁹

Richardson refers to these conditions of ignorance and inertia as “helpful imperfections,”¹⁰ but, in truth, they are not imperfections, but merely conditions of the real world, a world in time in which entrepreneurial expectations and abilities are heterogeneous in nature. Entrepreneurial producers may indeed possess, and need to possess, a kind of “temporary monopoly of information about a general profit opportunity. ... Profits may be earned ,... both by foresight and by innovation.” (Richardson, 1960: 57). No producer enters a market that is a “clean slate” – there is history. An opportunity obvious to one person may be invisible to another because he sees the world through different lenses framed by different experiences and presumptions. This is a necessary part of the market process as an implicit experimental process that pits one perceived opportunity against another.

One important implication of this is that current and historical perceptions of appropriate anti monopoly policy (anti-trust) may be in error if the objective of the policy is to foster and encourage competition. Anti-trust regulators and litigators know no more, and arguably know less, about the viability of perceived opportunities than business practitioners do. Profits earned from the successful exploitation of opportunities will most likely result in (at least temporarily) high market shares for those who succeed. And a substantial amount of time may be involved. Application of principles gleaned from full-knowledge micro-economic models may be seriously misleading for the dynamic world of entrepreneurial action (Teece & Coleman, 1998; Liebowitz & Margolis, 1999).

Paradox #3: Entrepreneurial opportunities are subjective and objective; discovered and created.

Much recent discussion concerns the ontological or epistemological nature of opportunities (Alvarez & Barney, 2007; Foss & Klein 2010; Klein 2008). Do opportunities exist (objectively) waiting to be discovered, like the peak of a high mountain, or are they created by the entrepreneur’s subjective perception of them – not “existing” until the moment of perception, *ergo* a moment of creation? The actions put in motion to exploit the opportunity in this sense “create” it (Alvarez and Barney, 2007).

The key aspect of opportunities is that they are opportunities *for profit*. As such they are subjective until they are actualized by certain *necessary actions* (Koppl, 2002). Opportunities require actions to become “real.” They are undoubtedly based, to some degree, on the existence of objective conditions – the mountain is there as everyone can see; but the opportunity itself depends on certain conditions not yet existing – it may be possible to advertise the existence of this challenging peak and charge people for

⁹ Also: “[O]ppportunity finds its meaning in the context of human action and human action occurs within the flux of time, making it inherently uncertain (Mises, 1966 [1949]). Thus it seems that one cannot have opportunity without uncertainty but because the human condition is characterized by the passage of time, there will always be uncertainty and therefore, some form of opportunity. ... individuals appear to experience uncertainty differently as a function of knowledge, motivation, ability, geography, etc. enabling some but not others to act.” (McMullen, Plummer and Acs, 2007: 279).

¹⁰ Alvarez and Barney refer to “competitive imperfections” (2007: 13).

the knowledge and gear necessary to climb it or for access to it. Once the necessary actions are taken and successfully lead to the earning of profit, the opportunity will acquire an objective nature - in the sense of being universally recognized (McMullen, Plummer and Acs, 2007). In retrospect we may say that the entrepreneur “discovered” certain conditions that led him to believe he could “create” an opportunity for profit. The element of creativity is in the perception of something hitherto unperceived.

There is another sense in which opportunities are created. To be successful opportunities depend on successfully combining resources (capital goods). Opportunities are “happened upon” in the sense that the pattern of the precise combination of resource elements comes to one suddenly – though, no doubt, causally preceded. This can be rationalized, though one can never be quite sure of the causal chain. There is an apparently unaccountable “creative” element.

Kirzner’s theory of entrepreneurship is based on the notion that the entrepreneur “discovers” opportunities. This view has been repeatedly challenged over many years on the basis that it assumes that opportunities are objective in nature and bound to be successful, seeming to belie the fact that some (many, most?) perceived opportunities may turn out to not to be opportunities at all.¹¹ Alternatively, one may see Kirzner as *defining* opportunities as successful opportunities – implying that entrepreneurial action is by definition successful (High 1982; Lewin, 2002; for a recent review see Koppl & Minniti, 2010).

Kirzner has endeavored valiantly to respond and to account for these objections. He has not denied that uncertainty implies that entrepreneurial action may be unsuccessful and that it may be seen as creative. He has spoken of the discovery of *higher level* [not his term] “opportunities to create opportunities.” (Kirzner 2009). At the base of this debate lies Kirzner’s conviction that the entrepreneur is an equilibrator – who *discovers* a “hole” in the market and thereby sets in motion actions that will remove it; thus entrepreneurial action is coordinating rather than discoordinating, and he has resisted any attempt to move him away from this.

Whatever may be gained by semantic disputation and rationalization, however, it remains key to the nature of entrepreneurship that action is required for the realization of opportunities, that such actions respond to and yet also likely generate further disequilibrating forces (of which more below), that actions in pursuit of profitable opportunities often fail, and that successful entrepreneurial actions rely on hitherto unperceived opportunities. Within this understanding it is possible to speak of the

¹¹ Davidsson advocates for dropping the term “opportunity” altogether:

The term “opportunity” refers to something not yet realized. The increased use of this term in entrepreneurship research therefore signals the sound development that the field is really turning towards a focus on emergence, rather than starting from existing firms and established business founders. However, there is a huge linguistic problem with adopting “opportunity” as a central concept in entrepreneurship research. By almost any definition, an opportunity is something known to be favorable. ... the use of the term “opportunity” for an unproven venture idea is fundamentally opposed to acknowledging uncertainty as an inescapable aspect of the environment (Davidsson 2004: 506-521).

entrepreneur as discovering and creating opportunities that are both subjective and objective depending on what you mean (Kirzner most subtle defense occurs perhaps in Kirzner 1982).

Paradox #4: Entrepreneurial action is both equilibrating and disequilibrating, successful and unsuccessful.

Once we understand that action is possible in disequilibrium (a situation of mutual inconsistency of plans), we should not be surprised to discover that entrepreneurial action itself can be, and most often is, disequilibrating.

It may be true, following Kirzner, that successful entrepreneurs help to coordinate (equilibrate) markets. This was Adam Smith's basic insight that it was not from benevolence that the butcher brought us meat, but from his attention to profit. Successful entrepreneurship entails the delivery of goods or services to consumers who value them more than the combined total (historical) value of the resources that were needed to produce them. The successful entrepreneur, in effect, saw that these resources were undervalued when one considered the opportunity to use them to produce a new, valuable good or service for the market. The entrepreneur is the bridge between the market for resources (a resource-based view) and the market for the outputs (a Porter view (Porter, 1979))¹². And the entrepreneur is the "driving force" that causes the market to clear at a price that satisfies the plans of all consumers and producers (Kirzner, 2000).

But having said this, one must also recognize that the successful entrepreneur inevitably disrupts the plans of his unsuccessful rivals. And these disrupted plans may set in motion further dis Coordinating adjustments. Suppliers counting on the successful implementation of a plan of their client, that subsequently fails, will find their plans disrupted, all the way down the supply chain. Successful plans will draw in resources and unsuccessful ones will repel them. There is an incessant churning as resource owners struggle to find their most valuable uses. This may happen spontaneously, but it is not instantaneous, and it is not easy.

Paradox #5: Entrepreneurs act on plans that are never completely successful.

We speak of successful and unsuccessful plans, but, in truth, success and failure of plans is a matter of degree. This is another consequence of the passage of time. Time as imagined is never the same as time as experienced. Plans can incorporate only a tiny fraction of the detail of events to come (just as memory retains at most only a tiny fraction of the details of events past). Without exception, the event as experienced will differ from the event as imagined, the latter being only the barest "outline" of the former. Consequently, even a successful entrepreneurial vision will differ in essential ways, some welcome some not, from what was imagined. One dimension of success is profit-earned. But another is the experience as measured by the entrepreneur against the plan. Needless to say this is a subjective

¹² I thank Susanna Khavul for this point.

metric. One should not be surprised to find the entrepreneur striving after more than profit in a dogged effort to continually “do it better.”¹³

Paradox #6: Entrepreneurial action can be understood but not predicted.

Enough has been said to establish that the results of individual entrepreneurial actions (or indeed the actions themselves) cannot be predicted with any degree of definiteness. Not even the individual entrepreneur can do this. This is the ultimate nail in the coffin for the vision of a comprehensively centrally-planned economy. Such an economy could only function, if at all, by suppressing all entrepreneurial activity, hence all innovation and development. The unpredictable, uncertain nature of the market is what allows entrepreneurs to function.

Less comprehensive, more piecemeal top-down economic policy, specifically entrepreneurship policy, is similarly encumbered. The entrepreneurial market process is necessarily decentralized.

The entrepreneurial market process consists of the daily decision making of many independently acting entrepreneurs, each striving to establish, maintain, or develop an enterprise. Each entrepreneur responds principally to the business environment consisting of rival, input suppliers, and output demanders. The overall result of the process is generated by the distributed decisions of many entrepreneurs (and others). The overall result is the unintended consequence of all those decisions, unintended because the actors have not gotten together ahead of time to coordinate their actions. The aggregate level and type of entrepreneurial activity emerges as the unintended consequence of the actions taken by all independent entrepreneurs in the attempt to seize profit opportunities.

The process is decentralized and therefore unplanned, even though each individual entrepreneur plans. (Koppl, 2008: 919-920)

Economic policies aimed at developing specific types of entrepreneurial activities, in the hope of fulfilling particular national economic agendas, must contend with this. Centralization is inimical to entrepreneurship – crucial knowledge cannot be centralized (Hayek 1945), does not even exist prior to the market process that generates it, and entrepreneurship depends upon the existence of profit opportunities idiosyncratically perceived by individual entrepreneurs. Policies that attempt to control entrepreneurial outcomes are bound to fail.

In retrospect, of course, sense can be made out of both successful and unsuccessful entrepreneurial ventures by attributing states of mind to the actors. Actions that are retrospectively comprehensible are not necessarily predictable. And much can be learned from this type of history; for example in terms of the kinds of social institutions most likely to allow for the development of creative entrepreneurial activity (Lewin, 2002).

¹³ Some work that addresses this in different ways are Harper (1996) and Sarasvathy (2009)

Paradox #7: Entrepreneurship can be learnt but not taught

The same logic that applies to the impossibility of centrally planning entrepreneurial activity applies also the teaching of entrepreneurship.

Some business professors dream of finding a grand algorithm that will allow them to guide entrepreneurial decisions and to judge in advance which decisions are good and which bad. [This has been revealed to be] a form of magical thinking. We need entrepreneurs to make their decisions for themselves precisely because it is impossible for us to make those decisions for them. (Koppl 2008: 925).

To be sure, individuals who have learned certain crucial concepts (like those typically taught in business schools) may be in a better position to exploit perceived opportunities. But this is neither a necessary nor a sufficient condition for successful entrepreneurial practice (Klein and Bullock, 2006). It is surely plausible that an understanding of the workings of a business and its contextual environment could help a creative mind see opportunities that might otherwise elude her. But this relationship is variable and elusive. Enduring generalizations about entrepreneurship seem to be available only at levels of abstraction too high to be of use in the discovery, creation and exploitation of individual opportunities. Indeed Ludwig von Mises tells us that entrepreneurship “defies any rules and systematization. It can be neither taught nor learned.” (Mises, 1949: 585; Klein and Bullock, 2006: 435).

With regard to this last statement, however, there is probably a sense in which aspects of entrepreneurship might be learnt. Much of the knowledge utilized by an entrepreneur in the course of indentifying and exploiting an opportunity is tacit. Tacit knowledge is gained, if at all, by experience and observation. Immersion in the flow of actions is often the best breeding ground for entrepreneurship. This is surely the logic behind the use of case-studies as teaching devices, though whether, and to what extent, they are able to simulate real world situations so that the experience is “real” for the student is another matter. And this is also perhaps what is behind the observation that, much more often than not, successful entrepreneurs have experienced prior failures. Not much has been done in researching the question of entrepreneurial failure and this would appear to be a fruitful area for future work.

Paradox #8: The elements of the category “entrepreneur” are all unique individuals whose characteristics (almost) defy generalization.

There is much discussion over what and who an entrepreneur is and definitions abound. From the above discussion we would have to say that entrepreneurial aspects inhere in almost all human actions. Action occurs in time and individuals are continually responding to unexpected situations in “creative” ways. More usefully though, entrepreneurship refers to those human actions that have a large component of the new and innovative. Successful entrepreneurship produces something that is new and valuable. This is as much as is common to all components of the category “entrepreneur.” The unique, individualistic aspects loom large.

Thus while we may be able to readily consign certain actions and individuals to the category entrepreneur, it is often difficult (impossible?) to describe what common characteristic they all possess. Clearly the successful earning of profit is the key, but this is identification by result rather than by characteristic. Can we say more than entrepreneurship is that which enables some to successfully create value by innovation?

Some speculative remarks about the relationship between entrepreneurship and emergence

The discussion above begs the question, what is meant by the “creation” of value or opportunity. The digital age has successfully challenged inherited modes of thought. This is true in all branches of inquiry from biology to physics to philosophy. The “classical” model of the world is a closed one in which outputs (results) can be explained by a sufficient understanding of the necessary and complete inputs (causes). To be sure, the model may accommodate tractable non-linearities (like multiple mutual interaction of inputs), but, to be plausible and “scientific,” it must be complete; that is to say, an understanding of the workings of the inputs (and the inputs alone (Lewis 2010)) must suffice to completely explain the observed outputs – there is no “magic” left to be explained. Furthermore, in principle, it is possible to impute shares of the output to the various inputs (the shares of causation adding to unity) – though, in practice, the imputation problem is frequently impracticable.

The dominance of this view has been eroded. The observation that even very simple computer programs yield highly complex, unpredictable outcomes over time, has provoked the suspicion that perhaps the tight input-output model is ill-adapted to an understanding of many real-world processes (Wolfram 2002). Similar reactions have been provoked by the development of evolutionary science. The outcomes of evolutionary processes, even simple ones, turn out to be complex and unpredictable. Hence, the advent of chaos theory, complexity theory, cybernetics, and many other heterodox fields of inquiry. Most recently, many of these disparate approaches have coalesced in a view of the world that emphasizes the phenomenon of “emergence.” Emergence, a concept still in search of a consensus definition, refers to the phenomenon of non-complete causal attribution of outcomes. Results emerge that seem to transcend the capabilities of the combined inputs.

Economists and management scholars have long considered this phenomenon. Synergies, economies of scale, increasing returns, etc. all refer to essentially emergent processes of production. The issue is most clearly dealt with in the theory of capital. A “production function” is a tight input-output model in which outputs can be nicely imputed to the inputs – their marginal products. And Euler’s Law expresses the common sense expectation that, as long as we are able to account for all of the inputs and their potentials, the marginal products should add to the total output – we have constant returns to scale (CRS). Non-constant returns to scale is an indication that we have “left something out” of the model. In principle all production processes are CRS, though in practice it is impossible to account for all of the inputs and their interactions. This latter realization means that increasing and decreasing returns to scale are to be expected and can be analyzed, but, it does not suggest that the basic model of complete

attribution is to be abandoned. Indeed, progress can be gauged by the extent to which we are able to approach it in our research.

As noted earlier, this traditional micro-economic approach has been criticized for its inability to account for the role of the entrepreneur – raising the question of whether the entrepreneur is just another input (factor of production) or whether there is something else going on. Whence the value-added by the entrepreneur? One approach is to treat the entrepreneur's contribution as simply the unimputable residual; but this does not take one very far (see Baumol 1968). While perennially worrying about it, economists and management scholars have not devoted much attention to the question until recently. As noted, in the last two decades entrepreneurship studies have dramatically increased and the question of emergence has emerged!

Emergence implies and is implied by the unpredictable nature of entrepreneurial outcomes and the inability to completely impute the value-added. Entrepreneurs are above all innovators. They add value by introducing something new – new products, production processes, modes of organization and resources. They appear to catalyze the emergence of something new.

Further understanding of this process lies in the distinction between models of the material world and economic models, or, more accurately between “value” and “matter.” Tight input-output models apply naturally to physical models where matter-energy must be conserved. The covering laws of physics are immutable. There is, however, no comparable covering law for value, and therefore for economic models (Mirowski 1991). Value is inescapably subjective and can be created and destroyed in the process of production. All concepts of efficiency – relating inputs and outputs – must employ some notion of value. To come up with a metric of efficiency, the inputs and the outputs must be evaluated. Thus it is not so paradoxical to imagine adding value without adding matter. This, in effect, is what happens when innovation is successful. And innovations cannot be predicted in any usual sense of the word.

Thus emergence, in the economic world, need not imply a denial of the tight input-output model in regard to the physical phenomena that underlie production processes – though, pragmatically speaking, that model may not work very well when there are “just too many variables” considering all possible mutual and multiple non-linear interactions. Evolutionary models of selection out of complex adaptive processes may work better in this digital age and may be applicable to entrepreneurship as well.

Implications for researching entrepreneurship.

If the above discussion on the essential nature of entrepreneurship is correct, then effort expended on trying to discover recipes for successful entrepreneurship are unlikely to succeed. All entrepreneurial activity occurs in specific historical and institutional contexts. And it is from changes in and within these contexts that opportunities arise. The next big thing is unlikely to be the same as the last one. The

structure of markets, of firms, of families, and of populations change rapidly enough to render historical lessons for successful action ungeneralizable at the detail level.

Nevertheless, empirical research would seem to have value in advancing our understanding of who has been successful and who not. This empirical research should aim to uncover the facts on the ground, now and in the past.¹⁴ What follows from this type of research is not a tight formula for action at the policy and business practice level, but, rather, a body of suggestive information that may enhance the understanding of policy-makers desirous of promoting entrepreneurship and help would-be entrepreneurs gain an accurate picture of the world as it really is.

References

- Alvarez, S. A., & Barney, J. B. (2007). Discovery and Creation: Alternative Theories of Entrepreneurial Action. *Strategic Entrepreneurship Journal*, 1, 11-26.
- Baumol, W. J. (1968). Entrepreneurship in Economic Theory. *American Economic Review*, 58(2), 64-71.
- Buchanan, J. M. (1964, January). What Should Economists Do? *Southern Economic Journal*, 30(3), 213-222.
- Buenstorf, G. (2007). Creation and Pursuit of Entrepreneurial Opportunities: An Evolutionary Economics Perspective. *Small Business Economics*, 28, 323-337.
- Bullock, P. G. (2006). Can Entrepreneurship be Taught. *Journal of Agricultural and Applied Economics*, 38(2), 429-439.
- Cantillon, R. (1755 [2001]). *Essai sur la nature du commerce en general*. Piscataway, NJ: Transaction Publishers (English Edition).
- Casson, M., & Wadeson, N. (2007). The Discovery of Opportunities: Extending the Economic Theory of the Entrepreneur. *Small Business Economics*, 28, 285-300.
- Chiles, T. H., & Vultee, D. M. (2010). The Philosophical Foundations of a Radical Austrian Approach to Entrepreneurship. *Journal of Management Inquiry*, 19(2), 138-164.
- Chiles, T. H., Bluedorn, A. H., & Gupta, V. K. (2007). Beyond Creative Destruction and Entrepreneurial Discovery: A Radical Austrian Approach to Entrepreneurship. *Organization Studies*, 28(4), 469-493.

¹⁴An admirable example of this type of research is the recent book by Scott Shane on *The Illusions of Entrepreneurship* (Shane, 2008). In a study like this one must, of necessity, identify real world entrepreneurs. Shane focuses on new enterprises and self-ownership. This may be a subset of the entrepreneurship we are talking about, but it is surely a large subset, and his results are very illuminating in understanding the scope and location of entrepreneurial activity in the current American economy. On a different level of abstraction Harper, 2003 provides a multi-disciplinary approach to examining the propensity for individuals to entrepreneurially display alertness to opportunities.

- Chiles, T. H., Tuggle, C. S., McMullen, J. S., Bierman, L., & Greening, D. W. (2010). Dynamic Creation: Extending the Radical Austrian Approach to Entrepreneurship. *Organization Studies*, 31(1), 7-46.
- Companys, Y. E., & McMullen, J. S. (2007). Strategic Entrepreneurs at Work: The Nature, Discovery, and Exploitation of Entrepreneurial Opportunities. *Small Business Economics*, 301-322.
- Currie, M., & Steedman, I. (1990). *Wrestling with Time: Problems in Economic Theory*. Ann Arbor: University of Michigan Press.
- Davidsson, P. (2004). *Researching Entrepreneurship*. New York: Springer.
- Eckarhdt, J. T., & Shane, S. A. (2003). Opportunities and Entrepreneurship. *Journal of Management*, 29(3), 333-349.
- Foss, K., & Foss, N. J. (2008). Understanding Opportunity Discovery and Sustainable Advantage: The Role of Transactions Costs and Property Rights. *Strategic Entrepreneurship Journal*, 2, 191-207.
- Foss, K., Foss, N. J., & Klein, P. G. (2007). Original and Derived Judgment: An Entrepreneurial Theory of Economic Organization. *Organization Studies*, 28(6), 1-20.
- Foss, N. J., & Klein, P. G. (2005). Entrepreneurship and the Economic Theory of the Firm: Any Gains from Trade? In R. Agarwal, S. A. Alvarez, & O. Sorenson, *Handbook of Entrepreneurship: Disciplinary Perspectives* (pp. 55-81). New York: Springer.
- Foss, N. J., & Klein, P. G. (2008). Entrepreneurship: From Opportunity Discovery to Judgement. *Working paper*.
- Foss, N. J., & Klein, P. G. (2010). Entrepreneurial Alertness and Opportunity Discovery: Origins, Attributes, Critique. In H. Landström, & F. Lohrke, *The Historical Foundations of Entrepreneurship Research* (p. Chapter 5). Northampton: Edward Elgar.
- Foss, N. J., & Klein, P. G. (forthcoming). *Organizing Entrepreneurship: Judgement and the Theory of the Firm*. Cambridge: Cambridge University Press.
- Foss, N. J., Klein, P. G., Kor, Y. Y., & Mahoney, J. T. (2008, March). Entrepreneurship, subjectivism, and the Resource-based view: Toward a New Synthesis. *Strategic Entrepreneurship Journal*, 2(1), 73-94.
- Foss, N. J., Klein, P. G., Kor, Y. Y., & Mahoney, J. T. (2008). Entrepreneurship, Subjectivism, and the Resource-Based View: Toward a New Synthesis. *Strategic Entrepreneurship Journal*, 2, 73-94.
- Foss, N., & Garzarelli, G. (2007). Institutions as Knowledge Capital: Ludwig M. Lachmann's Interpretive Institutionalism. *Cambridge Journal of Economics*, 31, 789-804.
- Harper, D. A. (1996). *Entrepreneurship and the Market Process: An Enquiry into the Growth of Knowledge*. London: Routledge.

- Harper, D. A. (2003). *Foundations of Entrepreneurship and Economic Development*. London and New York: Routledge.
- High, J. (1982). Alertness and Judgement: Comment on Kirzner. In I. Kirzner, *Method, Process and Austrian Economics: Essays in Honor of Ludwig von Mises* (pp. 161-168). Toronto: D. C. Heath and Company.
- Holcombe, R. G. (2003). The Originis of Entrepreneurial Opportunities. *Review of Austrian Economics*, 16(1), 25–43.
- Horwitz, S. G. (1998). Hierarchical Metaphors in Austrian Institutionalism: A Friendly Subjectivist Caveat. In *Koppl and Mongiovi, 1998, chapter 8*.
- Kirzner, I. (1973). *Competition and Entrepreneurship*. Chicago: University of Chicago Press.
- Kirzner, I. (1979). *Perception, Opportunity and Profit*. Chicago and London: University of Chicago Press.
- Kirzner, I. (1979). *The Perils of Regulation: A Market Process Approach*. Occasional Paper of the Law and Economics Center, University of Miami School of Law.
- Kirzner, I. (1982). Uncertainty, Discovery and Human Action: A Study of the Entrepreneurial Profile in the Misesian System. In I. Kirzner, *Method, Process and Austrian Economics: Essays in Honor of Ludwig von Mises* (pp. 139-160). Toronto: D. C. Heath and Company.
- Kirzner, I. (1985). *Discovery and the Capitalist Process*. Chicago and London: University of Chicago Press.
- Kirzner, I. (1992). *The Meaning of Market Process*. London and New York: Routledge.
- Kirzner, I. (2000). *The Driving Force of the Market: Essays in Austrian Economics*. London and New York: Routledge.
- Kirzner, I. (2009). The Alert and Creative Entrepreneur. *Small Business Economics*, 145-152.
- Klein, P. G. (2008). Opportunity Discovery, Entrepreneurial Action, and Economic Organization. *Strategic Entrepreneurial Journal*, 2, 175-190.
- Klein, P. G., & Bullock, J. B. (2006). Can Entrepreneurship be Taught? *Journal of Agricultural and Applied Economics*, 38(2), 429-439.
- Knight, F. (1921). *Risk, Uncertainty and Profit*. Boston: Hart, Schaffner & Marx; Houghton Mifflin Co. available at: <http://www.econlib.org/library/Knight/knRUP.html>.
- Koppl, R. (1998). Lachmann and the Subjectivism of Active Minds. In *Koppl & Mongiovi, 1998, chapter 4*.
- Koppl, R. (1998). Lachmann and the Subjectivism of Active Minds. In *Koppl & Mongiovi, 1998*.
- Koppl, R. (2002). What is Alertness. *Journal des Economistes et des Etudes Humaines*, 12(1), 11-21.

- Koppl, R. (2008). Computable Entrepreneurship. *Entrepreneurship Theory and Practice*, 919-926.
- Koppl, R. (2008, September). Computable Entrepreneurship. *Entrepreneurship Theory and Practice*, 919-926.
- Koppl, R., & Butos, W. (2001). Confidence in Keynes and Hayek: Reply to Burczak. *Review of Political Economy*, 13(1), 81 – 86.
- Koppl, R., & Minniti, M. (2010). Market Process and Entrepreneurial Studies. In H. Landström, & F. Lohrke, *Handbook of Entrepreneurship Research* (p. Chapter 9). Northampton: Edward Elgar.
- Koppl, R., & Mongiovi, G. (1998). *Subjectivism and Economic Analysis: Essays in Memory of Ludwig M. Lachmann*. London and New York: Routledge.
- Lachmann, L. M. (1971). *The Legacy of Max Weber*. Berkeley, CA: Glendessary Press.
- Lachmann, L. M. (1976, March). From Mises to Shackle: An Essay on Austrian Economics and the Kaleidic Society. *Journal of Economic Literature*(XIV), 54-62.
- Lachmann, L. M. (1978 2nd ed. [1956]). *Capital and Its Structure*. Mission, KS: Sheed, Andrews and McMeel.
- Lachmann, L. M. (1986). *The Market as Economic Process*. Oxford: Basil Blackwell.
- Langlois, R. N. (1992). Transaction-Cost Economics in Real Time. *Industrial and Corporate Change*, 1(1), 99-127.
- Lavoie, D. (1994). *Expectations and the Meaning of Institutions: Essays in Economics by Ludwig Lachmann*. New York: New York University Press.
- Lewin, P. (1997). Capital in Disequilibrium: A Reexamination of the Capital Theory of Ludwig Lachmann. *History of Political Economy*, 29(3), 523-548.
- Lewin, P. (1999). *Capital in Disequilibrium: The Role of Capital in a Changing World*. London and New York: Routledge.
- Lewin, P. (2002). Entrepreneurship and the Defense of Capitalism: An Examination of the Work of Israel Kirzner. *Journal des Economistes et des Etudes Humaines*, 12(2/3), 203-212.
- Lewin, P., & Baetjer, H. (2011). The Capital-Based View of the Firm. *Review of Austrian Economics*, 24(4), 325-354.
- Lewis, P. A. (2008, November). Solving the "Lachmann Problem" - Orientation, Individualism, and the Causal Explanation of Socioeconomic Order. *American Journal of Economics and Sociology*, 67(5), 827-857.

- Lewis, P. A. (2010). Emergent Properties in the Work of Friederich Hayek. *Unpublished paper, King's College London.*
- Lewis, P. A., & Runde, J. H. (2007). Subjectivism, Social Structures and the Possibility of Socio-Economic Order. *Journal of Economic Behavior and Organization*, 62, 167-186.
- Liebowitz, S. J., & Margolis, S. E. (1999). *Winners, Losers & Microsoft: Competition and Antitrust in High Technology*. Oakland: The Independent Institute.
- Mahoney, J. T., & Michael, S. C. (2005). A Subjectivist Theory of Entrepreneurship. In S. Alvarez, R. Agarwal, & O. Sorenson (Eds.), *Handbook of Entrepreneurship* (pp. 33-53). New York: Springer.
- Matthews, J. A. (2010). Lachmannian Insights into Strategic Entrepreneurship: Resources, Activities and Routines in a Disequilibrium World. *Organization Studies*, 31(2), 219-244.
- McMullen, J. S. (2010). Perspective Taking and the Heterogeneity of the Entrepreneurial Imagination. In R. Koppl, S. Horwitz, & P. Desrochers (Eds.), *What is so Austrian about Austrian Economics 2010* (pp. 113-144). Bingley: UK: Emerald.
- McMullen, J. S., & Shepperd, D. A. (2006). Entrepreneurial Action and the Role of Uncertainty in the Theory of the Entrepreneur. *Academy of Management Review*, 31(1), 132-152.
- McMullen, J. S., Plummer, L. A., & Acs, Z. J. (2007). What is an Entrepreneurial Opportunity. *Small Business Economics*, 28, 273-283.
- Minniti, M., & Levesque, M. (2008). Recent Developments in the Economics of Entrepreneurship. *Journal of Business Venturing*, 23, 603-612.
- Mirowski, P. (1991). *More Heat Than Light: Economics as Social Physics, Physics as Nature's Economics*. Cambridge, UK: Cambridge University Press.
- Mises, L. v. (1966 [1949]). *Human Action*. Chicago: Henry Regnery.
- Mises, L. v. (1996 [1949]). *Human Action*. Irvington, NY.: Foundation for Economic Education, Inc.
- Murphey, P. J. (2010, March). A 2 X 2 Conceptual Foundation for Entrepreneurial Discovery Theory. *Entrepreneurship Theory and Practice*, 1-16.
- Plummer, L. A., Haynie, J. M., & Godesiabo, J. (2007). An Essay on the Origins of Entrepreneurial Opportunities. *Small Business Economics*, 28, 363-379.
- Popper, K. (1945). *The Open Society and Its Enemies*. London: Routledge.
- Porter, M. E. (1979). How Competitive Forces Shape Strategy. *Harvard Business Review*(March/April).
- Richardson, G. B. (1960). *Information and Investment: A Study in the Working of Competitive Economy*. Oxford: Clarendon Press.

- Rizzo, M. J., & O' Driscoll, G. P. (1996). *The Economics of Time and Ignorance*. London and New York: Routledge; 2nd ed.
- Sarasvathy, S. D. (2009). *Effectuation: Elements of Entrepreneurial Expertise (New Horizons in Entrepreneurship)*. Northhampton: Edward Elgar.
- Schackle, G. L. (1969). *Decision, Order and Time in Human Affairs*. Cambridge: Cambridge University Press.
- Schackle, G. L. (1979). *Imagination and the Nature of Choice*. Edinburgh: Edinburgh University Press.
- Schumpeter, J. (1911 [1982]). *The Theory of Economic Development*. Piscataway, NJ: Transaction Publishers.
- Schumpeter, J. (1942 [2010]). *Capitalism, Socialism and Democracy*. London: George Allen and Unwin.
- Shackle, G. (1972). *Epistemics and Economics: A Critique of Economic Doctrines*. Cambridge: Cambridge University Press [reprinted 2009 by Transaction Publishers, NJ].
- Shackle, G. L. (1972). *Epistemics and Economics: A Critique of Economic Doctrines*. Cambridge: Cambridge University Press [reprinted 2009 by Transaction Publishers].
- Shane, S. (2000). Prior Knowledge and the Discovery of Entrepreneurial Opportunities. *Organization Science*, 11(4), 448-469.
- Shane, S. (2004). *A General Theory Of Entrepreneurship: The Individual-opportunity Nexus*. Northhampton: Edward Elgar.
- Shane, S. (2008). *The Illusions of Entrepreneurship: The Costly Myths That Entrepreneurs, Investors, and Policy Makers Lives By*. New Haven and London: Yale University Press.
- Shane, S., & Venkataraman, S. (2000). The Promise of Entrepreneurship as a Field of Research. *Academy of Management Review*, 1, 217-226.
- Sheppard, D. A., & DeTienne, D. R. (2005). Prior Knowledge, Potential Financial Reward, and Opportunity Identification. *Entrepreneurship Theory and Practic*, 91-112.
- Teece, D. J., & Coleman, M. (1998, Fall-Winter). The Meaning of Monopoly: Antitrust Analysis in High-Technology Industries. *The Antitrust Bulletin*, 801–857.
- Vaughn, K. I. (1998). *Austrian Economics in America: The Migration of a Tradition*. Cambridge: Cambridge University Press.
- Wolfram, S. (2002). *A New Kind of Science*. Wolfram Media.