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Todd H. Chiles

*University of Missouri*, [chilest@missouri.edu](mailto:chilest@missouri.edu)

Chris S. Tuggle

*University of Nebraska-Lincoln*, [ctuggle2@unl.edu](mailto:ctuggle2@unl.edu)

Jeffery S. McMullen

*Indiana University - Bloomington*, [mcmullej@indiana.edu](mailto:mcmullej@indiana.edu)

Leonard Bierman

*Texas A & M University - College Station*, [len-bierman@tamu.edu](mailto:len-bierman@tamu.edu)

Daniel W. Greening

*University of Missouri*, [GreeningD@Missouri.edu](mailto:GreeningD@Missouri.edu)

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# Dynamic Creation: Extending the Radical Austrian Approach to Entrepreneurship

Todd H. Chiles,<sup>1</sup> Christopher S. Tuggle,<sup>1</sup> Jeffery S. McMullen,<sup>2</sup>  
Leonard Bierman,<sup>3</sup> and Daniel W. Greening<sup>1</sup>

1. University of Missouri; 2. Indiana University; 3. Texas A&M University

## Abstract

We develop a new perspective on entrepreneurship as a dynamic, complex, subjective process of creative organizing. Our approach, which we call “dynamic creation”, synthesizes core ideas from Austrian “radical subjectivism” with complementary ideas from psychology (empathy), strategy and organization theory (modularity), and complexity theory (self-organization). We articulate conjectures at multiple levels about how such dynamic creative processes as empathizing, modularizing, and self-organizing help organize subjectively imagined novel ideas in entrepreneurs’ minds, heterogeneous resources in their firms, and disequilibrium markets in their environments. In our most provocative claim, we argue that entrepreneurs, by imagining divergent futures and (re)combining heterogeneous resources to create novel products, drive far-from-equilibrium market processes to create not market anarchy but market order. We conclude our exposition of each dynamic creative process by offering one possible direction for future research and articulating additional conjectures that help point the way. Throughout, we draw examples from CareerBuilder—a firm that has played a major role in creating and shaping the online model in the job search/recruiting industry—and its industry rivals (e.g. Monster, Yahoo’s HotJobs) to illustrate selected concepts and relationships in dynamic entrepreneurial creation.

**Keywords:** Austrian economics, empathy, entrainment, entrepreneurship, modularity, projection, radical subjectivism, real options, self-organization

In January 2009, CareerBuilder, a leading job recruiting firm, reached millions of Super Bowl viewers with its 60-second TV spot, “Tips,” which used office humor to target employees frustrated with their current jobs. But perhaps even more innovative and forward-looking than the TV ad itself was what CareerBuilder did in other media to promote the “Tips” campaign. The firm’s eclectic online strategy included leaking the ad on video, partnering with Facebook to get it shared and rated, launching a microsite that lets users e-mail animated insults to their annoying coworkers, and sponsoring an office humor video contest (Young 2009). CareerBuilder’s multi-pronged strategy suggests the extent to which its managers envision the future of the recruitment industry as strategically intertwined with an array of rapid and complex social and technological changes. Online job boards like CareerBuilder and Monster, for example, no longer compete chiefly with the classified ad sections of now-moribund newspapers, nor do they even compete exclusively with one another. Their new rivals include

vertical job search engines or job aggregators, such as Indeed, SimplyHired, and Jobster (Davenport 2009); social networking sites such as Facebook and LinkedIn; and search optimizing firms such as Jobs2Web and OptiJob that help corporations attract job seekers directly to their own Web sites using search engine optimization (SEO) and other online strategies (Hennessy 2009).

The recruitment industry is just one of the many industries struggling to cope with the accelerating pace of change in today's turbulent markets. Continual disruption, high volatility, and growing diversity have come to characterize market dynamics in many sectors, including retailing, information technology, health-care, education, pharmaceuticals, and a host of others. To understand this phenomenon, entrepreneurship scholars need a more thorough understanding of disequilibrium markets and the processes that drive them.

Few would dispute that entrepreneurship is a complex disequilibrium process.<sup>1</sup> Yet even as they acknowledge the vital role disequilibrium processes play in competitive entrepreneurial markets, most scholars still privilege equilibrium, whether implicitly or explicitly, by invoking theories based on competitive equilibrium (Alvarez and Busenitz 2001; Knott 2003), punctuated equilibrium (Schumpeter 1934; Haveman et al. 2001; Tan 2007), or equilibrium seeking (Kirzner 1973; Shane and Venkataraman 2000; Aldrich and Ruef 2006). Scholars in organization theory (Meyer et al. 2005) and strategy (Bromiley and Papenhausen 2003) have pointed out this contradiction and the problems it raises in the context of their own fields. In the field of entrepreneurship, however, it has gone virtually unnoticed. This omission is particularly problematic because equilibrium-based theories entirely ignore or significantly underplay core features of entrepreneurship (McKelvey 2004a; Chiles et al. 2007)—features that researchers have empirically observed in disequilibrium markets (Chiles et al. 2004; Berglund 2007; Chiles et al. 2010). These include (1) entrepreneurs as originators of a continual stream of novel, forward-looking, subjectively imagined thoughts; (2) firms as vehicles for entrepreneurs to combine and continually recombine heterogeneous resources necessary to turn their imaginative thoughts into creative actions; and (3) markets as disequilibrium processes that continually marshal myriad entrepreneurs' imaginative thoughts, creative actions, and unstable interactions to generate increasing variety and new order.

To begin addressing these gaps, Chiles et al. (2007) recently proposed a new approach to entrepreneurship grounded in "radical subjectivism,"<sup>2</sup> an alternative thread of Austrian economics that jettisons equilibrium assumptions and explores how entrepreneurs use their active imaginations to create new ideas, resources, and markets (Shackle 1979a; Lachmann 1986). In contrast with equilibrium-based approaches, radical subjectivism emphasizes how entrepreneurs think, act, and interact in ways that make markets increasingly diverse and drive them farther from equilibrium—a process and outcome that, despite mounting evidence (Arikan 2004; Chiles et al. 2004; Chiles et al. 2010), entrepreneurship scholars have almost entirely ignored. In *A Farewell to Alms*, Clark (2007) helps us understand just how critical this oversight is by dividing the broad sweep of world economic history into two perspectives: (1) a pre-industrial economy characterized by equilibrium processes that reduce differences, and (2) a modern economy characterized by dynamic processes that magnify differences and drive increasing diversity.

In the placid, slow-paced world that preceded the modern era, an equilibrium-based approach provided an adequate model for understanding how entrepreneurship worked. But in the volatile, rapidly changing world of contemporary entrepreneurship—a world that is increasingly exceeding equilibrium-based theories' capacity to comprehend it (Clark 2007)—a disequilibrium approach such as radical subjectivism is required. As the continual disruption, high volatility, and increasing diversity of disequilibrium prevail in more and more markets across a broad spectrum of industries, fewer and fewer markets find themselves in or even approaching equilibrium. This trend in competitive entrepreneurial markets gives radical subjectivism an increasingly important place in entrepreneurship scholars' theoretical toolkits.

Far from representing complete anarchy and chaos, disequilibrium environments, as we argue below, exhibit a high degree of order—albeit an order very different from the kind usually associated with equilibrium. While entrepreneurship scholars in organization studies have used radical subjectivism to address order in disequilibrium markets resulting from the structure of capital, the operation of equilibrating forces, and the role of institutions (Chiles et al. 2007; Foss et al. 2007; Foss and Ishikawa 2007; Loasby 2007a), they have all but ignored how a unique market order might result from the disequilibrating processes themselves. By virtue of their fundamental interest in organizing processes, these scholars are well suited to address such a processual basis of order. They will, however, find their familiar equilibrium-based approaches inadequate for the task, and will need to adopt new disequilibrium ones. As they begin to use radical subjectivism's disequilibrium insights to understand the nature of order in disequilibrium environments, these scholars will need to supplement such insights with ideas from other areas to help them explain the multilevel organizing processes that generate a unique market order away from equilibrium.<sup>3</sup> In this article, we begin filling this gap in the literature and developing such an explanation.

Specifically, we extend the nascent “radical Austrian” approach to entrepreneurship (Chiles et al. 2007) by synthesizing its core ideas with complementary ideas from psychology (empathy), strategy and organization theory (modularity), and complexity theory (self-organization). This synthesis, which we call “dynamic creation” (DC), builds on Chiles et al. (2007) to articulate conjectures at multiple levels about how such dynamic creative processes as empathizing, modularizing, and self-organizing help organize subjectively imagined novel ideas in entrepreneurs' minds, heterogeneous resources in their firms, and disequilibrium markets in their environments. We chose these three processes because they complement radical subjectivism's fundamental focus on the forward-looking entrepreneurial imagination with new insights into how entrepreneurial ideas, resources, and markets are organized.<sup>4</sup> While most entrepreneurship scholars treat these three processes as operating at distinct, objectively real “levels,” our core assumptions suggest it may be more useful to conceptualize them as fluid features of an ongoing, recursive organizing process each individual entrepreneur subjectively perceives, imagines, and acts on.

In our most provocative claim, we go beyond Chiles et al. (2007) and other work in the organizational entrepreneurship literature informed by radical

subjectivism (e.g. Berglund 2007; Foss et al. 2007; Foss & Ishikawa 2007; Loasby 2007a; Foss et al. 2008) to argue that entrepreneurs' divergent imaginations and the novel products that result from them drive far-from-equilibrium market processes to create not market anarchy, as many scholars assume, but market order. We define "market order" as a coordinated pattern of thoughts and actions that characterizes market processes. Our argument challenges the received wisdom that market order implies equilibrium, a state where expectations converge, products are homogeneous, and change is predictable (Kirzner 1973). Finally, we explore some of the consequences of this argument by articulating additional conjectures that connect core ideas in dynamic creation with the concepts of projection, real options, and entrainment to offer new directions for future research.

Our argument proceeds as follows. To set the stage, we first identify important differences between dynamic creation and other approaches to creative organizing. Next, we articulate the core of radical subjectivist (RS) assumptions central to our approach. We then build on this core to develop conjectures about three creative organizing processes—empathizing, modularizing, and self-organizing—and how they interact. Specifically, we show how entrepreneurs organize their visions of future markets (by empathizing with imagined future customers) and the heterogeneous resources they acquire based on these visions (by continually combining and recombining them into modules); and how self-organizing processes generate market order far from equilibrium (by creatively coordinating entrepreneurs' divergent imaginations and the combinations of heterogeneous resources that result from them). Throughout, we draw examples from CareerBuilder—a firm that has played a major role in creating and shaping the online model in the job search/recruiting industry—and its rivals (e.g. Monster, Yahoo's HotJobs). We use these examples not as a source of data for grounded theory building but, more modestly, to illustrate selected aspects of each process. We conclude our exposition of each process by offering one possible research direction to advance the DC approach.

### **What Makes Our Approach to Creative Organizing Unique**

Other approaches to creative organizing are based, often implicitly, on assumptions that lead them to ignore or underplay key issues we wish to spotlight. Three such approaches—enactment, social construction, and complexity theory—are particularly salient because they come closest to ours, yet emphasize social systems that tend toward homogeneity and equilibrium, or human agents who react to imposed environments, search existing terrains, or recall actions already taken.<sup>5</sup> We focus on these three approaches because they are, to our mind, the most venerable and longest-standing perspectives on creative organizing used by organizational entrepreneurship scholars.

In enactment, as in our approach, individuals create their environment, which in turn constrains them (Weick 1979). Unlike our approach, however, enactment privileges action (Weick 1995: 36), especially action that precedes thought. Cognition plays only a secondary role. Weick discusses thought primarily to explain how individuals retrospectively make sense of their actions (Weick 1995: 37).

Thus, scholars of entrepreneurial enactment focus much more on entrepreneurs' interpretations of their past experience and prior actions (Gartner et al. 2003) than on their expectations of an imagined future, and on existing rather than imagined customers (Porac et al. 1989). Enactment is part of a larger evolutionary model (Weick 1979), based on variation–selection–retention, that emphasizes reducing variety and seeking equilibrium (McKelvey 2004a). Entrepreneurship research that uses enactment (Gartner et al. 1992; Aldrich and Ruef 2006) is therefore ill equipped to explain how novelty and order are created far from equilibrium (McKelvey 2004a). While Weick's concept of enactment is partly consistent with our approach, we agree with Tsoukas and Chia (2002) that it retains vestiges of traditional thinking about organizational change, and that a more thoroughly subjectivist approach to disequilibrium processes is needed. Specifically, we emphasize how entrepreneurs use their subjective expectations of the future to create new ideas, new resources, and new markets far from equilibrium.

The literature on the social construction of technology and markets resonates with many of our ideas: for example, that no two actors interpret the same event in exactly the same way, that technology is embodied knowledge, that markets are actively constructed artifacts, and that interacting agents drive continuous change (Bijker et al. 1987; Pinch and Bijker 1987; Pinch 2001; Garud and Karnøe 2003). But our argument differs substantially from this literature in two basic ways. First, social construction assumes homogenization and equilibrium or equilibrium seeking (Pinch and Bijker 1987; Hargadon and Douglas 2001; Pinch 2001; Samuels 2004). For example, social constructionists are concerned with *closure*, in which actors' varied interpretations are winnowed to a consensus view; and *stabilization*, in which a system's components interact "harmoniously" and "optimally" in a state of "equilibrium" (Bijker et al. 1987: 12–14). We, however, argue for increasing heterogeneity and far-from-equilibrium markets. Second, social construction focuses on how entrepreneurs interpret prior experience (Hargadon and Douglas 2001) or present reality (Pinch and Bijker 1987), perceive existing customers (Hargadon and Douglas 2001; Pinch 2001; Garud and Karnøe 2003), and use rational expectations to construct new markets (White 1981). We, on the other hand, emphasize entrepreneurs' subjective expectations of an imagined future, including imagined future customers.

The complexity theory literature overlaps with our focus on nonlinear, far-from-equilibrium processes that generate variety and create order. Complexity theory is not a single theory; its numerous theoretical strands include deterministic chaos, agent-based modeling, and dissipative structures. Complexity theory's "anchor point phenomenon" is emergence: the creation and continual re-creation of unintended systemic order when purposeful individuals repeatedly act and interact based on their local knowledge, without direction from a central controller (Chiles et al. 2004: 502; also see Sawyer 2005: 2–3). Austrian economics is itself a strand of complexity theory (Vaughn 1999), a connection not widely recognized in entrepreneurship and organization studies.

We differ in several fundamental ways from other entrepreneurship and organization studies scholars who have used complexity theory. (1) They spotlight boundedly rational agents who *search* locally on *existing* landscapes (Gavetti and Levinthal 2000; Fleming and Sorenson 2001).<sup>6</sup> We emphasize entrepreneurs who use their bounded imaginations to *create* as-yet *unknown* resource combinations



and business artifacts. (2) They focus on agents who draw on prior experience (e.g. Smith and Gemmill 1991; Gavetti and Levinthal 2000).<sup>7</sup> We highlight forward-thinking entrepreneurs who use their subjective expectations to create mental images of an unknown future. (3) The human agency they emphasize is more responsive than creative (Leifer 1989; Smith and Gemmill 1991), with agents often described as reacting to imposed external environments (McKelvey 2004a,b). While responsive action and exogenous forces are certainly part of the story,<sup>8</sup> we wish to spotlight the relatively neglected creative aspect of human behavior and the endogenous processes such behavior drives. (4) A number of otherwise excellent complexity articles fall into the trap of “ontological oscillation” (Burrell and Morgan 1979: 266). For example, scholars sometimes treat equilibrium as the natural reference point for social systems, even though their central concern is far-from-equilibrium phenomena (see Meyer et al. 2005). We try to avoid this pitfall.

### **Distilling Radical Subjectivism’s Core Concepts**

Is reality “given” or actively constructed? Is our experience of it objective or subjective? How one answers these questions has far-reaching implications for the study of entrepreneurship. Our proposed dynamic creation perspective, like RS Austrian economic theory (Lachmann 1977; Shackle 1979a), combines constructivist ontology with subjectivist epistemology (McMullen and Shepherd 2006). Drawing on RS theorists’ assumptions, we articulate a core of ideas about three interrelated questions central to entrepreneurship: (1) How do entrepreneurs use their subjective imaginations to create novelty? (2) How do they imagine combinations of resources to make these ideas a reality? (3) In what direction (equilibrium or disequilibrium) do they drive market processes through these imaginative thoughts and acts?<sup>9</sup>

#### ***Expectations of an Imagined Future***

RS theorists assume entrepreneurs imagine alternative future courses of action and their consequences, and choose from among these subjective mental constructs the one most desirable course. Each choice is singular and originative, an “uncaused cause” (Shackle 1983: 7), a creative act “injecting something essentially new into the world” (Shackle 1958: 34). Entrepreneurs can thus create novelty and introduce it into the system through forward-looking, creative mental acts. Moreover, they can do so continually, using their “individual imagination to create afresh from moment to moment” (Shackle 1958: 33). Entrepreneurs formulate plans (however sketchy or uncodified) oriented not only to their subjective interpretation of past experience, but also to their subjective expectations of an imagined future (Lachmann 1986).<sup>10</sup>

#### ***Capital Combinations and Continual Reshuffling***

RS theorists argue that entrepreneurship must address not only the mental acts that create these novel ideas but also the material resources that turn them

into new products and services (Lachmann 1986). Entrepreneurs imagine combinations of capital resources to realize their potential to produce products and services in the future. Their plans are oriented not only to their knowledge (based on interpreting past experience) but also, and especially, to their expectations (derived from imagining future possibilities) (Lachmann 1956). Because the capital structure can be traced to individual entrepreneurs' subjective knowledge and expectations, it is heterogeneous (Lachmann 1956). Such capital combinations imply that capital complementarity, across as well as within organizations, constitutes the fabric of the economy's complex network of production, or capital structure. In this network, where change is incessant and unexpected, and where plans constantly collide, fail, and evolve, capital substitutability is critical to "the real function of the entrepreneur": continually "reshuffling" capital resources into new combinations (Lachmann 1956: 13).

### ***Disequilibrium Market Processes***

As entrepreneurs assemble capital combinations in this way to realize the novel ideas they subjectively imagine, they collectively impact market processes. Because "each individual in each moment of time may imagine different future economic situations" (Gloria-Palermo 1999: 126), entrepreneurs' plans constantly change and collide in the market and so can never be fully coordinated. Thus, although individual entrepreneurs may exert "both equilibrating and disequilibrating forces" in the market (Lachmann 1986: 9), most markets not only never achieve but may never tend toward equilibrium.

Implicit in the core RS assumptions about these three key issues is a pattern of dynamic creation in which plans, resources, and market forces are constantly in flux. This ferment spawns new plans, new resources, and new forces in an unending cycle of reiterative creation. In the next section, we extrapolate from this core a set of questions, suggestions, and propositions about how entrepreneurs organize this rich diversity.

### **Developing a Dynamic Creation Perspective of Entrepreneurship**

A primary task facing DC entrepreneurship scholars is to understand how the novelty entrepreneurs create can be marshaled and organized. *Novelty* lies at the heart of entrepreneurship (Davidsson 2004) and cuts across the entire ongoing and recursive process of creative organizing. The word connotes originality, difference, innovation—qualities inherent in the unique human actions an entrepreneur's imagination sets in motion. Whereas novelty is a property of a system's elements (the entrepreneurs—and, by extension, the firms and the products—that collectively constitute the market), *heterogeneity* is a property of the relationships among these elements and of the system itself. The introduction of novelty into a system makes it more heterogeneous. As novelty and heterogeneity evolve, they drive markets toward increasing *disequilibrium*. All three of these qualities—novelty, heterogeneity, and disequilibrium—are potential sources of both creative tension and destructive confusion. The challenge for researchers is to understand



how entrepreneurs can organize these elements to minimize the confusion without destroying the tension.

In the following sections, we focus on three dynamic creative processes—empathizing, modularizing, and self-organizing—to help us understand how entrepreneurs organize the ideas, resources, and markets that their subjective imaginations supply. In the first section, we focus on empathizing processes that help entrepreneurs imagine their future customers' needs. This focus provides a natural link to capital combinations (discussed in the second section) because these resource mixes embody such forward-looking entrepreneurial imagination, and to disequilibrium markets (taken up in the third section) because entrepreneurs and customers constitute a market's key participants. In the second section, we focus on modularizing processes that help entrepreneurs flexibly organize and continually reorganize the resources that connect active entrepreneurial minds (emphasized in the first section) with rapidly changing markets (highlighted in the third). In the third section, we focus on self-organizing processes that coordinate market participants' thoughts and actions (spotlighted in the first and second sections) to create market order far from equilibrium.

To illustrate these concepts, we draw examples of dynamic entrepreneurial creation from CareerBuilder ([www.careerbuilder.com](http://www.careerbuilder.com)), which has emerged as a leading player in the job search/recruiting industry, and its industry rivals, including Monster and Yahoo's HotJobs. We chose these examples because CareerBuilder's executives not only created novel ideas and heterogeneous resources in a highly uncertain and dynamic market context (CareerBuilder IPO Prospectus 1999: 5), but also played a major role in creating and shaping this very context.<sup>11</sup>

At its inception in 1995, CareerBuilder was little more than the vision of two suburban Maryland neighbors, Rob McGovern and Mark Gruhin, for improving resumé management software. But as the Internet became commercialized in the late 1990s, that vision changed: the two entrepreneurs imagined the Internet would eventually revolutionize the job search/recruiting process, drastically reducing the importance of traditional newspaper classified help-wanted advertising (then a \$9-billion-plus-per-annum industry); and they envisioned CareerBuilder's role shifting from software workflow solution to highly interactive, sophisticated Internet job site. This shift required a "90 degree change—moving from a traditional software company to a pioneering online company" (Entrepreneur Stories 2007). CareerBuilder made the transition in 1997 and was purchased by a joint venture of two major newspaper chains, Tribune and Knight Ridder, in 2000, shortly after its 1999 stock market IPO. In 2002, Gannett, the owner of *USA Today*, came aboard.

CareerBuilder achieved differentiation and success during its first decade largely through its strong newspaper linkages. Its rivals, in contrast, did so either by creating similar linkages but employing different strategies, or by creating different linkages altogether (e.g. Monster's with advertising agencies, HotJobs' with a major Internet portal). CareerBuilder has achieved further differentiation and success over time by creating strategic alliances with companies such as Automatic Data Processing, Microsoft Sidewalk, America Online, Microsoft Network, Facebook, and Univision. Broadening its offerings to create even more

differentiation and success, CareerBuilder's executives eventually expanded beyond the United States by tailoring its software to the needs of users in a host of countries from the United Kingdom to Romania to India and partnering with international job sites such as Bumeran in Latin America, GulfTalent in the Middle East, and 51job in China. CareerBuilder illustrates how entrepreneurs creatively imagine ideas with future customers in mind (via empathy); how they turn these ideas into differentiated products by combining and recombining resources (via modularity); and how these products and their rivals' continually inject novelty into emerging markets, driving them to greater heterogeneity, disequilibrium, and order (via self-organization).

### ***Dynamic Creation and Expectations of an Imagined Future***

As noted above, radical subjectivists assume that entrepreneurs make forward-looking plans by continually assessing and reassessing their past experiences and future expectations. "Expectation" is "the act of creating imaginary situations, of associating them with named future dates, and of assigning to each of the hypotheses thus formed a place on a scale measuring the degree of our belief that a specified course of action on our own part will make this hypothesis come true" (Shackle 1949: 1). Tackling the issue of time directly, radical subjectivists separate knowledge of the past from the novelty of an unknowable future. They point out that choice, to be meaningful, must be based not on physical, sensory experiences that already have occurred, but on expectations of imagined experiences yet to come (Shackle 1984). Thus, imagination is a uniquely human faculty that "allows us to open up our stored representations and to contemplate a future which is more than mapping from the past, thus making possible a reasoned choice of novelty" (Loasby 2001: 11; also see Loasby 2007b). It is this imaginative capacity to organize a coherent vision of a future they themselves will create that enables entrepreneurs to form and implement plans.

RS theory conceives of imagination as *visualization* (Perky 1910), a psychological concept used to examine both problem solving (Adeyemo 1990) and product design (Dahl et al. 1999). Kosslyn (1994) distinguishes between visualization based on imagination and visualization based on memory. "Memory visualization" refers to "events or occasions that one has personally experienced or observed" (Dahl et al. 2001: 8): for example, creating a visual image of yesterday's breakfast. Memory visualization is conceptually consistent with several experiential learning-based approaches to human action. Schütz (1967), for instance, views a situation's typicality as a source of "everyday knowledge" rooted in the past that enables us to form expectations of an otherwise unknowable future. Similarly, Loasby (2001) suggests new situations may evoke memories of past routines we can apply in the present. Such backward-looking approaches, common to managerial and organizational studies (e.g. Weick 1979, 1995), neglect the cognitive, forward-looking dimension of human action, which involves beliefs about action-outcome linkages (see Gavetti and Levinthal 2000).

"Imagination visualization," by contrast, refers not to recalling past experiences, but to constructing new, never-before-experienced events (Perky 1910): for example, imagining tomorrow's breakfast as covered in polka dots. Like

memory visualization, imagination visualization uses memory-based visual images (breakfast and polka dots), but it recombines them in novel and previously unseen ways (Dahl et al. 2001) to create something new and different. Such recombinations can include the additive combinations that Weick (2006: 447) refers to as *fancy*—“the power of inventing the novel and unreal by recombining the elements found in reality.” Unlike physical objects, thoughts tend to be amorphous, fragmentary, and fluid elements. As a result, their recombination is capable of yielding entirely new compounds in a fashion similar to a chemical reaction. Therefore, just as sodium and chlorine (which are poisonous if ingested alone) form salt, imagination visualization has the potential to be more than a sum of its parts. Thus, it is also capable of incorporating the shaping and modifying power of Weick’s (2006: 447) *imagination*—“an ability to conceive of something, seen only fragmentarily or superficially, as a complete, perfected, and integrated whole.” Unlike Weick’s firm-level notion of imagination, however, imagination visualization is a decidedly individual-level concept, consistent with RS theory’s adherence to methodological individualism.

As imagination visualization, RS’s “forward-looking” imagination may provide a cognitive supplement to the memory-based experiential learning models that currently dominate the literature. Radical subjectivists view the imagination as a mental process by which people choose among thoughts about “deeds to be done” and “moves to be made” (Shackle 1979a: 11). These thoughts are rival possibilities that the mind constructs from symbolic elements.<sup>12</sup> Whereas people use language to construct endless variety and novelty from symbols in the form of letters of the alphabet (Shackle 1979a: 21), they use thoughts to construct endless rival courses of action from symbols about material and human means—e.g. financial accounts, written contracts, electoral results, experiences describable in terms of places and persons, descriptions of technological constructions (Shackle 1979a: 23). These elements must be capable of being assembled freely, not under “rigid dictation by their form like the pieces of a jigsaw ... Material things will interact according to natural principles when brought together, as tools act on the substance which is being fabricated, or as seeds germinate in damp soil. But the applying of one thing to another is a decision of the individual, an act of origination of history” (Shackle 1972: 24).

Despite arguing that imagination serves as the “uncaused cause” that recombines elements to form the thoughts from which people choose a particular course of action (Shackle 1983), radical subjectivists say remarkably little about how this recombination occurs. Psychologists and organizational scholars have proposed a number of mental processes, including metaphor (Cornelissen 2005), analogy (Gavetti et al. 2005), and pattern making (Loasby 2007b), that may enable imagination visualization by facilitating *bisociation*—bringing together two apparently incompatible frames of thought (Koestler 1964). However, discussion of these processes in the literature is not always consistent with the perpetually occurring imagination of radical subjectivism. For example, Gavetti et al.’s (2005) discussion of analogy as an episodic response to novel situations, Weick’s (2005; 2006) conception of imagination as a mindful response to surprise, and Loasby’s (2007b) elaboration of pattern making as selecting and rearranging environmental stimuli view imagination as an infrequent reaction

to unexpected environmental conditions. With the possible exception of Cornelissen's (2005) conception of metaphor as a process by which we continuously construct reality, existing models of the process by which entrepreneurs recombine ideas and resources are inconsistent with radical subjectivists' view of imagination as a perpetually occurring process stimulated primarily in the actor's mind.

Failure to delineate between memory visualization and imagination visualization contributes to theoretical shortcomings and confounds theoretical critiques. For instance, by equating imagination exclusively with imagination visualization, Shackle's theory of decision opens itself to criticism for exaggerating the importance of novelty in choice (e.g. Augier 2001; Koppl 2001). Comparing the theories of Schütz (1967) and Shackle (1979b), Koppl (2001) observes that Shackle's use of imagination may have allowed his entrepreneur to escape the meaninglessness of path-dependent choice, but in the process a new criticism arises: too much freedom. Koppl (2001) adds that even Shackle (1979b: 20) recognizes that choice is powerless if "each present leaves its successor wholly unconstrained, so that any state of the world can be followed by any other state." Without elements of both novelty and typification, Koppl (2001: 187) argues, choice remains unbounded, becoming as "illusory as it seems under the hypothesis of determinism." Extending this argument, Augier (2001) suggests Schütz's (1967) "typifications" may be necessary to constrain Shackle's concept of imagination. Shackle assumes that agents have access to knowledge on which they can base decisions. "This knowledge, in turn, causes "imagination" to be different from "fantasy or daydream", to be *constrained* imagination" (Augier 2001: 198).<sup>13</sup> Yet, as Augier points out, Shackle fails to identify the source of this constraining and organizing knowledge.<sup>14</sup>

Continuing this theme, Loasby (2001: 10) suggests that routines—"evolved procedures which are provisionally matched to a poorly specified range of circumstances"—may constrain imagination and enable a reasoned choice of novelty. Likening internal routines of the brain to the external phenomena of institutions, which "classify phenomena, simplify complexities, dissolve uncertainties and constrain choices", Loasby (2001: 12–13) suggests we sometimes adopt others' conventions as a problem-solving routine: "the rule is to follow the fashion." Consequently, Loasby (2001) proposes that failures of these routines stimulate imagination, but he avoids the temptation to explain this stimulus exclusively in terms of discrete events such as failed attempts to apply existing routines to new situations. Instead, he points to a second, perpetually occurring stimulus more consistent with imagination visualization: "ideas of impressions and actions" (2001: 11). Thus, Loasby recognizes two sources of imagination— failed routines and ideas of impressions and actions—but he does not discuss what, if anything, constrains or organizes the latter.

Whereas novelty arising from failed routines is *exogenous* (evoked by changes in the environment) and thus highly consistent with evolutionary-based, backward-looking models of social construction (e.g. Weick 1979, 1995), novelty arising from "ideas of impressions and actions" is *endogenous* (attributable exclusively to forward-looking imagination) and thus more consistent with imagination visualization and the unconstrained imagination of radical subjectivists.

Therefore, although Austrians, behavioral economists, post-Keynesians, institutionalists, and other subjectivists have proposed backward-looking explanations of how individuals make a reasoned choice of novelty (Augier 2001), they have devoted little attention to the constraints that organize the forward-looking imagination. If the “knowledge” that enables us to make a reasoned choice of novelty when we employ imagination visualization does not come from “typifications” or “routines,” where *does* it originate? And, if the forward-looking imagination is truly unbounded, how does order emerge in a world where we each construct our own subjective reality?

Attempts to answer these questions may be advanced by delineating between novelty and creative value. For instance, Amabile (1996) uses “novelty” and “appropriateness” to explain how people evaluate creative acts. She notes, “A product or response will be judged as creative to the extent that (a) it is both a novel and appropriate, useful, correct or valuable response to the task at hand and (b) the task is heuristic rather than algorithmic” (1996: 35). Extending this logic, Lepak et al. (2007: 182) suggest that target users determine the level of a product’s new value creation by subjectively evaluating its novelty and appropriateness: “The greater the perceived novelty and appropriateness of the task, product, or service under consideration, the greater the potential use value and exchange value to the user.” The “creative value” of CareerBuilder’s online job search/recruiting process, for example, derived not from its novelty alone, but from the degree to which its target users found it an appropriate and useful way to recruit employees or find a new employer. All creative value is novel, but not all novelty has creative value.

Ultimately, novelty matters only to the extent that it helps an entrepreneur generate new value propositions. As Richardson (1960: 105) points out, imagination lets entrepreneurs envision resource combinations that are not merely novel but also “meet consumers’ desires.” For example, CareerBuilder’s founders approached plans for international expansion warily because, according to one co-founder, “it was just extremely hard to imagine how companies and job seekers in countries like Italy were going to react to our novel technological approach” (M. I. Gruhin, personal communication, 5 October 2007). Thus, we propose that entrepreneurs use imagined future consumer desires as criteria to determine appropriateness, which in turn constrains the entrepreneurial imagination by organizing ideas, separating the valuable from the merely novel.

Entrepreneurial problem solving thus differs from more general human problem solving in that it involves a transaction with some intended future customer. Entrepreneurs are indeed problem solvers, as radical subjectivists suggest, but they try to solve their problems (desire for wealth, achievement, status, power, etc.) by solving other people’s problems—a fact that is too often ignored (see Dickson 1992). Entrepreneurial success thus depends partly on entrepreneurs’ ability to imagine the problems customers will try to solve using the products or services they plan to provide. Will customers find the entrepreneur’s value proposition appealing? Will they perceive it as both novel and appropriate to their problem? As Loasby (2001: 18) notes, “People do not buy goods, or even bundles of objectively-defined characteristics; they construct solutions to problems.” But because customers and their suppliers usually think about problems differently,



Drucker (1964: 87) suggests, “the customer rarely buys what the business thinks it sells’ (cited in Loasby 2001: 18).

Efforts to understand customers’ problems have ranged from traditional marketing methods, such as surveys or focus groups, to anthropological approaches, such as observing how customers use goods or services in their “natural habitat” (e.g. Leonard and Rayport 1997). Though often helpful, however, all these techniques focus on *existing* firms’ observation of *existing* customers. But what about new markets in which customers do not yet exist and observation is not yet possible? For example, how do entrepreneurs generate value propositions to commercialize technology that lets them create new markets and new businesses to serve *future* customers? The uncertainty associated with such new markets is often considered the domain of entrepreneurs—their *raison d’être* (McMullen and Shepherd 2006). In such instances, questioning and observation are unlikely to provide meaningful insight into consumer desires. How, then, do customers’ problems constrain entrepreneurial imagination when these customers do not yet exist?

One possible answer lies in the psychological concept of *empathy*, especially as it relates to perceived consensus. Empathy is “an imaginative transposing of oneself into the thinking, feeling, and acting of another” (Norman and Ainsworth 1954:53). Cottrell and Dymond (1949) view it as taking another’s role, placing oneself in another’s shoes, and perceiving the situation from another’s perspective. Similarly, Grossman (1951) defines empathy as perceiving the world correctly from another person’s frame of reference. In contrast, failure to empathize correctly has been defined operationally as *projection*. For example, Remmers (1950) suggests that if our estimates of another’s state differ significantly from his or her self-assessment of that state, we can be said to be projecting our own thoughts, desires, and feelings onto the other. Research on perceived consensus suggests projection is likely because we commonly assume others think, want, and feel what we ourselves think, want, and feel (Hoch 1987; Epley et al. 2004).

Empathy’s power to constrain choices and actions has long been understood. Empathy is the institutional fabric that holds together Adam Smith’s (1759/1982) moral treatise, *Theory of Moral Sentiments*, and his (1776/1981) theory of economic development, *Wealth of Nations* (Tajima 2007). Smith (1776/1981: 9) views empathy, or “fellow-feeling,” as automatic to the human condition; a faculty of imagination, not of reason:

By the imagination we place ourselves in [another’s] situation, we conceive of ourselves enduring all the same torments, we enter as it were into his body, and become in some measure the same person with him, and thence form some idea of his sensations, and even feel something which, though weaker in degree, is not altogether unlike them.

Fellow-feeling, Smith suggests, teaches us to judge appropriateness through the eyes of an “impartial spectator” we create in our own imagination (Tajima 2007): the propriety of our actions depends on our answer to the question, “Will others, as represented by this imagined impartial spectator, sympathize with my choices?”

With the growing rediscovery of Smith’s work and the emergence of neuroscience, empathy has resurfaced as an important concept in institutional economics (Tajima 2007), game theory (Fehr and Gächter 2000), and both neuroeconomics and neuropsychology (Preston and de Waal 2002; Singer and Fehr 2005). It



has also been studied experimentally to examine managerial predictions of others' risk preferences (Faro and Rottenstreich 2006) and effective product design (Dahl et al. 2001). But what role does empathy play in organizing ideas to generate new value propositions?

We suggest empathy is an organizing process entrepreneurs use to gauge the appropriateness of their novel ideas. By acting as a bridge connecting islands of subjectively constructed reality, empathy lets entrepreneurs propose and provide novel solutions to other people's problems: first, by enabling entrepreneurs to understand, if imperfectly, the problems others face and the solutions currently available to them (Leonard and Rayport 1997); and second, by constraining and organizing entrepreneurial imagination so that valuable solutions can flow from the novel ideas of an otherwise unbounded forward-looking imagination. For example, Dahl et al. (2001), studying the role of empathy in concept design, found that when empathetic images of the end user were combined with imagination visualization—but not with memory visualization—actual end users judged concept designs more useful and more appealing. Dahl et al. (2001: 26) conclude, "Using the end user to bound the free flow of images resulting from imagination visualization, i.e. the use of bounded imagination, leads to more appealing designs."

But the ability to use empathy as an organizing principle in the design process may depend significantly on familiarity with the imagined end user. Research on empathy and risk preferences suggests people fail to predict accurately the risky choices of others who are not highly familiar to them. Faro and Rottenstreich (2006) find that people predict others' choices will be closer to risk neutrality than their own. This regressive tendency, however, does not generalize to predictions of close friends, with whom it is presumably easier to empathize. The less familiar we are with others, however, the likelier we are to predict they will be less risk-seeking in loss situations and less risk-averse in gain situations than we ourselves would be. Thus, it was relatively easy for the founders of CareerBuilder to empathize with technologically savvy job seekers who were able and willing to use a highly interactive Internet site for job searches. "Our early design," said Gruhin, "was clearly geared toward technologically advanced clients, both corporate clients and individual job searchers" (M. I. Gruhin, personal communication, 5 October 2007). Later, however, the founders' broad, potentially revolutionary job search/recruiting vision for CareerBuilder was bounded by the realization that they would have to persuade unfamiliar imagined future customers to use and pay for its offerings. This effect of familiarity on empathy may be related to Loewenstein's (1996) observation that, when forming predictions, we tend to believe others share our *type* of emotional states, but we underestimate the *intensity* of those emotional states in others.

Extended to the field of entrepreneurship, these findings suggest that the more unfamiliar and abstract imagined customers become (e.g. future consumers in new markets), the likelier it is that entrepreneurs will become susceptible to regressive mispredictions of those customers' risk preferences. Thus, when evaluating novel ideas and choosing among imagined alternative courses of action, entrepreneurs tend to become more conservative in predicting what imagined customers will deem appropriate and valuable. They are thus more likely to underestimate their imagined customers' willingness to tolerate the risk of novel

solutions, even when they themselves believe they would find the product appealing if they were in their customer's shoes.

This tendency toward overly conservative misprediction diminishes, however, as the perceived empathy gap between individuals and imagined others decreases (Faro and Rottenstreich 2006). Thus, the more familiar entrepreneurs perceive imagined customers to be, the likelier they are to experience perceived consensus—to expect customers to think, desire, and feel as they themselves think, desire, and feel. This should embolden entrepreneurs in assessing which novel ideas are appropriate for solving imagined customers' problems. It also suggests familiarity with imagined customers will enhance, for better or worse, the novelty of the value propositions entrepreneurs generate. Thus, the constraining effect of unfamiliarity with imagined customers and the overly conservative predictions of appropriateness it produces weaken as the empathy gap narrows. The founders of CareerBuilder, for example, given their strong familiarity with high-tech companies like Hewlett Packard, felt comfortable imagining other high-tech companies using the Internet for job recruiting. The closer entrepreneurs feel to their imagined customers, the less bounded their imaginations, and the more novel the ideas that are likely to become value propositions.

### **One Direction for Future Research**

Do entrepreneurs use empathy to define the problems imagined customers face and then seek to create novel solutions? Or do they imagine novel solutions to self-identified problems and then use projection to assume or simply hope others will perceive the problems as they do? Both scenarios can lead to entrepreneurial success but for significantly different reasons.

In the first scenario, empathy is a skill or intentional act that operates from the outside inward to help entrepreneurs imagine what future customers will think, want, and feel, providing them a better understanding of the problems customers are likely to face and the solutions appropriate for solving those problems. Entrepreneurs begin by focusing on the needs of real or imagined others, then use empathy both automatically and intentionally as an organizing principle to design and propose solutions that are not only novel but also appropriate and therefore valuable.

In the second scenario, entrepreneurs solve problems that just happen to generalize to others, stumbling into entrepreneurship as they discover that others share their problems and are willing to pay for the novel solutions they have constructed to address them. Thus, entrepreneurs experience perfect empathy with their customers, but only because they *are* their own customers. They achieve empathy accidentally, through projection. Entrepreneurs understand the problem because it is *their own*. As both customers and producers, entrepreneurs need not ask others whether their solution is appropriate. This, in turn, diminishes the conservatism associated with an empathy gap, encouraging entrepreneurs to propose more novel solutions. Thus, we propose that entrepreneurs who rely primarily on projection as an organizing principle will generate more novel value propositions than those who rely primarily on empathy.

Though accidental empathy, or projection, may account for the birth of many new ventures, it appears far less adaptable to changing consumer needs than a more intentionally empathetic approach. Unless entrepreneurs' thoughts, wants,

and feelings remain close to those of their archetypical consumer, an empathy gap is likely to emerge between entrepreneurs and their customers. In contrast, intentionally empathetic entrepreneurs appear more likely to account for these changes as they weigh the appropriateness of their novel ideas for solving imagined customers' problems. Thus, we propose that entrepreneurs who rely primarily on empathy as an organizing principle will generate value propositions with higher customer appeal than those who rely primarily on projection.

Moreover, because empathy enables entrepreneurs to imagine future customers well enough to define their problems and create appropriate solutions to them, entrepreneurs who rely more on empathy than on projection should be better equipped to avoid becoming proverbial "one-hit wonders." Thus, intentionally empathetic entrepreneurs should be better prepared than accidentally empathetic ones to make the difficult transition from founding an enterprise with a single successful product to managing a firm with multiple successful product offerings.

Empathy with imagined future customers, then, plays a critical role in shaping the subjective expectations entrepreneurs act on when they combine and recombine their resources to create products they believe will solve those customers' problems effectively in a radically uncertain market. In the following section, we turn our attention to the next step in this process: how entrepreneurs use capital combinations to embody the novel ideas their empathy with future customers helps them produce.

### ***Dynamic Creation and Capital Combinations/Continual Reshuffling***

Radical subjectivists believe entrepreneurs can reap the rewards of their plans only by acting on them: by coordinating capital to turn their subjectively created novel solutions to future customers' problems into new products and services. It is this perpetual, subjective, creative process of capital accumulation, (re)combination, and divestment that connects active entrepreneurial minds with rapidly changing markets. To extend the insights Chiles et al. (2007) and others have provided for understanding this process, we draw on the modularity literature from strategy and organizational theory and the related concepts of complementarity and substitutability.

The synthesis of RS theory and modularity lets us address a fundamental question in entrepreneurship: how can entrepreneurs organize resources not only to respond to dynamic markets and perceived opportunities but also to participate actively in their creation—in other words, to strategize (Mathews 2006)? Although two recent studies have explored this question using an RS approach,<sup>15</sup> entrepreneurship scholars have focused on how managers organize resources to react to, rather than to anticipate, changes in the market. Below, we explore the implications of this question, introducing the key concept of heterogeneity to clarify how entrepreneurs anticipate their customers' changing needs by creating modular combinations of capital resources both within and across firms.

Organizational scholars developed the concept of modularity to answer a central question in their field: how do managers organize their firms' resources to respond to dynamic markets buffeted by continuous change, abrupt shifts, and

unpredictable competition (Sanchez and Mahoney 1996; Schilling 2000; Ethiraj and Levinthal 2004; Pil and Cohen 2006)? A module is “a unit whose structural elements are powerfully connected among themselves and relatively weakly connected to elements in other units” (Baldwin and Clark 2000: 63). The architecture of modular systems establishes common interface specifications that give managers who adopt highly modular designs two important advantages over their less modular competitors. First, they can design unique modules that function in concert without disrupting one another’s performance. Second, they can recombine individual modules into novel configurations to adapt to changing markets without altering the system’s overall structure (Pil and Cohen 2006). Modular designs thus let entrepreneurs manage complexity by isolating it largely within modules of tightly coupled, heterogeneous elements with relatively simple interfaces in a loosely coupled, heterogeneous system.

CareerBuilder’s founders first began to exploit these advantages of modularity when, in 1997, they faced the problem of how to “bridge” their original TeamBuilder resumé management software to their vision of an online job search resource (CareerBuilder IPO Prospectus 1999: 10). The creative TeamBuilder software would remain useful only to the degree that it could complement the sophisticated, interactive Internet job site the company’s founders envisioned but had yet to develop. To meet this challenge, they created two complementary modules: (1) TeamBuilder software resources and (2) software design resources for connecting the TeamBuilder template to an envisioned national (US) customer audience. Soon afterwards, they began to design and assemble additional modules to expand CareerBuilder internationally. These modules were tailored to the technological, cultural, and linguistic needs of users in each country. The one constant among these modules was compatibility, or complementarity, with CareerBuilder’s resumé management software, which continued as a module interfacing with these sites as they evolved. Designs of this kind ensure organizational flexibility and environmental fitness by letting managers seamlessly recombine modules over time to continually differentiate their firms’ products in response to dynamic environments (Baldwin and Clark 2000; Schilling 2000; Pil and Cohen 2006).

In the previous section, we focused on how forward-looking entrepreneurs create novelty by imagining future customers and developing innovative solutions to their problems. We now consider how such entrepreneurs organize the novel capital resource (re)combinations they create when they implement these innovative plans. The reiterative process of combining and recombining resources to realize novel solutions to future customers’ problems constitutes the heart of entrepreneurship (Lachmann 1956; Sanchez and Mahoney 1996; Pil and Cohen 2006). By combining a wide-angle subjectivist perspective on capital activity with the finer-grained organizational research on modularity, we get a more nuanced view of how this process works. The literature suggests that entrepreneurs who organize these resource combinations into loosely coupled modules enjoy several advantages over their competitors, including greater flexibility, quicker reaction time, and more streamlined solution searches (Pil and Cohen 2006). But by assuming entrepreneurs merely react to existing opportunities rather than create novel ones, the modularity literature begs a vitally important

question: To what extent do modules help forward-looking entrepreneurs reshuffle resources as they organize their subjective visions of future customers' needs into material reality?

The features of modularity that, according to the literature, allow managers to exploit existing opportunities more efficiently are even more critical in a world where entrepreneurs do not merely search for "existing" opportunities but actively participate in creating novel ideas, solutions, or value propositions (and hence opportunities). Modules help entrepreneurs organize firm resources by leveraging the organizing tension between entrepreneurial imagination (novelty) and market perception (usefulness to imagined future customers). Resource modules help entrepreneurs organize material resources in much the same way that imagined future customers help them organize ideas: they provide an efficient and effective structure for managing the tensions among competing choices.

Modules help entrepreneurs achieve these efficiencies by simplifying product design, thus (according to the literature) "enhancing the speed with which firms can search the solution space" (Pil and Cohen 2006: 1001). But just as the DC perspective shifts our attention from entrepreneurs's perceptions of existing customers to their visions of future ones, it also reconceptualizes this "solution space" from an objective realm entrepreneurs merely search to a subjective one they continually (re)construct through creative imagination. In their quest to produce novelty, managers strategize (Mathews 2006) around the challenges of this moving target. The complexity of this task makes the advantages of modularity critical to creative organizing.

Because entrepreneurs imagine and assemble the capital structure through their subjective expectations of the future (and interpretations of the past), that structure is not only novel but inherently *heterogeneous*. Organizational resources and resource combinations reflect this heterogeneity. They give managers a competitive advantage in some activities and a disadvantage in others (Schilling and Steensma 2001), and "form the basis for product/market strategies" (Brush and Chaganti 1999: 233). Strategy is thus the pursuit of heterogeneity (Knott 2003), which managers may achieve in one of two ways: through unique resources or through novel resource combinations.

In a disequilibrium environment, demand is also heterogeneous (Alderson 1965). Schilling and Steensma (2001: 1153) suggest that "when inputs and demands are both heterogeneous, modularity can greatly enhance the ability to meet diverse demands with diverse system configurations." Modularity facilitates diversity by multiplying the ways entrepreneurs can combine and recombine heterogeneous resources;<sup>16</sup> and "the more heterogeneous the demands ... the more valued such recombability becomes" (Schilling and Steensma 2001: 1153).

If heterogeneity is an important resource managers can use to position a firm for an uncertain future, *complementarity* and *substitutability* are even more critical (Lachmann 1956). Complementarity can take one of two forms: *plan complementarity* of capital resources within a single firm or *structural complementarity* of capital resources controlled by different firms that interact with one another in the market (Lachmann 1956).

Heterogeneous resources do not lend themselves to arbitrary combination. All complementary resources are heterogeneous (Lachmann 1977: 197-213), but not



all heterogeneous resources are complementary. For a given number of heterogeneous resources, only a few modes of complementarity are technically possible; and of these, even fewer are economically significant. It is among the latter that the entrepreneur must seek the best possible combinations (Lachmann 1976a).

Thus, for example, at an early stage CareerBuilder began devoting resources to expanding internationally, but only in the context of subjective expectations that such expansion would both complement existing domestic operations and generate profitable growth (CareerBuilder IPO Prospectus 1999: 9–10, 39). The criteria for judging the technical possibility and economic viability of resource complementarity are the subjective expectations of each entrepreneur.

Modular complementarity promotes stability in a dynamic environment. As Garud et al. (2006: 286) note, “designs that are purely modular have limited emergence capabilities as module interfaces and interactions are prespecified.” Indeed, such modular prespecification may appear problematic if we assume entrepreneurs merely react to exogenous, “existing” opportunities. But if, as we argue, entrepreneurs create novel ideas, solutions, or value propositions (and hence opportunities) endogenously, through their subjective expectations of an uncertain future, such prespecifications are limiting in a more positive sense: they provide an organizing structure and stability on which entrepreneurs can build to create new order.

While complementarity provides stability, another feature of modularity – *substitutability* – facilitates change (Lachmann 1956). In highly modular systems, individual elements can be removed and replaced with minimal disruption or loss of productivity (Schilling 2000; Pil and Cohen 2006). This “plug-and-play” capability gives highly modular systems more flexibility than their less modular competitors. Thus, modularity can help organize the creative tension between stability and flexibility: compiling complementary resources within each module reinforces organizational stability, while compiling diverse substitutable modules promotes organizational flexibility. To achieve a balance of flexibility and stability, resources within modules should complement one another, but the modules themselves should be substitutable with others capable of upgrading their functionality.

Because managers base their evaluation of such resource combinations on their subjective expectations of the future, the expectations that garner the greatest benefit will ultimately be those that customers find most useful. Modularity is based on the traditional Austrian assumption that resources should be organized to react quickly to prior market change (Kirzner 1973); we suggest, on the contrary, that successful entrepreneurs look ahead to where the market will be and indeed help drive it there. Although the nature of market change is unpredictable, knowing that change will inevitably occur is itself a boon to entrepreneurs, because it lets them assemble resources in configurations that anticipate and actively shape future markets (see Lichtenstein and Brush 2001). Heterogeneous capital, organized into modules of complementary resources that entrepreneurs can assemble and deploy based on such forward-looking plans, offers firms a flexible design for keeping pace with the entrepreneurial imagination.

In addition to the plan complementarity such intentional resource combinations exemplify, heterogeneous capital can also exhibit structural complementarity.



Such cross-firm relationships mean that changes in one organization's resources can have unpredictable effects on the resources other organizations use (Lachmann 1976a, 1977). To compete effectively in dynamic markets, then, managers must be able to organize and reorganize more quickly than their competitors. Because modularity results in more rapid incremental innovation and increases the likelihood of radical innovation (Pil and Cohen 2006: 996), substitutable modules offer an especially valuable strategy for influencing such markets.

As the law of requisite variety (Ashby 1956) reminds us, entrepreneurs can deal effectively with the complexity and uncertainty of a diverse environment only if the internal resource structure of the organization is at least as diverse as the environment itself. Accordingly, the more unpredictable and heterogeneous the market, the more resource heterogeneity is needed to engage it. But the pursuit of heterogeneity for its own sake is both costly and inefficient. Managers must decide which finite resources are most worth acquiring. We propose two refinements in understanding the role of resource heterogeneity: (1) It is the complementarity of modular resources, rather than the sheer quantity of heterogeneous resources, that gives managers the flexibility to reorganize quickly in anticipation of new market developments. (2) Entrepreneurs with well-defined expectations can rely less on heterogeneous modules as a hedge against uncertainty. Entrepreneurs with hazier expectations, on the other hand, require more heterogeneous resources subsumed in more modules, which implies higher costs.

### **One Direction for Future Research**

How do forward-looking entrepreneurs organize modularly to introduce heterogeneous resources into an organization? We argued above that modularity helps entrepreneurs organize material resources partly by highlighting organizational tensions (e.g. between novelty and usefulness to imagined future customers, or stability and flexibility). Baetjer (1998) suggests the real value of organizing modularly is what it does for the individuals working on the structure of the organization itself. Organizing modularly simplifies the organizational resource structure, making it easier for entrepreneurs and employees to understand and manipulate. However, we know very little about how forward-looking entrepreneurs develop heterogeneous resources through modules, or how other organizational employees interact with such modules during development. While entrepreneurs may wish to maximize their freedom by designing independent, future-focused modules they can easily adjust to their subjective expectations, employees may try to minimize their risk and uncertainty by building interdependencies with future-focused modules that appear likely to be integrated into the organizational system.

To refine and extend our understanding of how forward-looking entrepreneurs introduce heterogeneous resources into an organization, scholars may wish to explore real options reasoning, which addresses costly investments in heterogeneous resources made incrementally during times of significant uncertainty (McGrath 1997; McGrath et al. 2004). Real options are investments entrepreneurs make to avoid finalizing their choices—to “keep their options open.” The more uncertainty entrepreneurs perceive, the more attractive such options become, because they serve as hedges against misplaced bets (McGrath 1997). Future

researchers could treat modules as specific technology options, letting entrepreneurs select the most favorable outcome by determining when to exercise such modular options, when to hold them, and when to let them expire.

While we focused on intra-firm modularity, future researchers should also consider inter-firm modularity options: product architectures that span firm boundaries and comprise inter-organizational relationships such as joint ventures, strategic alliances, and outsourcing arrangements. CareerBuilder's important strategic alliance with Automatic Data Processing, which began in 1998, is a good example along these lines. So are the modules they designed for strategic alliances with Microsoft Sidewalk in 1999, America Online in 2003, Microsoft Network in 2006, and Facebook in 2008. These modules were designed to be flexible in direction and growth, yet maintain compatibility with CareerBuilder's software and interfaces. More generally, DC researchers may want to bring a subjectivist perspective to bear on real options reasoning, which has thus far neglected the forward-looking entrepreneurial imagination.

The role of modularity, then, is to help entrepreneurs organize their heterogeneous resources in ways that (1) embody the novel, subjectively imagined ideas that their empathy with future customers generates; and (2) successfully introduce these novel products into volatile, quickly shifting markets. In the next section, we focus on the nature of the order that results when entrepreneurs use such modularizing processes to interface between the imagined needs of their future customers and markets that may never achieve equilibrium.

### ***Dynamic Creation and Disequilibrium Market Processes***

In disequilibrium market processes, novelty and heterogeneity achieve their broadest scope and most complex interactions, presenting entrepreneurs with the greatest creative organizing challenges. In this section, we focus on two fundamental questions: How are heterogeneity and novelty created and continually recreated in competitive entrepreneurial markets far from equilibrium? Can order exist in such markets, and if so, how is it created and continually re-created? To answer these questions, we show how RS theory can benefit from a dialogue with complexity theory and one of its key concepts: self-organization.

Scholars recognize significant overlaps between Austrian and complexity theories (Vaughn 1999), but have given them scant attention. RS theorists are aware of complexity theory, especially Prigogine's Nobel Prize-winning work on self-organization (e.g. Rizzo 1996, Loasby 2007b), but they have yet to explore how it relates to disequilibrium market processes. Organizational scholars, who are just beginning to bring self-organization theory to bear on entrepreneurship (McKelvey 2004a; Lichtenstein et al. 2007), remain largely unaware of RS theory. Thus, although elements of both theories appear in the literature, they are not yet "conversing."

Self-organization scholars recognize the broad and important implications of their work for the social as well as the physical sciences (Prigogine and Stengers 1984; Swenson 1992). Self-organization, they argue, can occur in systems of molecules, organisms, individuals, technologies, or organizations (e.g. Swenson 1992). Because firms, industries, and markets *are* self-organizing systems, their

theory provides more than a loose analogy in organization studies.<sup>17</sup> Self-organization theory's vision of "creative" order production (Swenson 1992: 211) and a future "under perpetual construction" (Prigogine 1996: 1) through far-from-equilibrium processes is particularly relevant. This vision grows out of work on *dissipative structures*: orderly patterns that emerge spontaneously from small fluctuations or variations when an open system is maintained far from equilibrium.

In Prigogine's own field, thermodynamics, dissipative structures appear in the behavior of heated liquid (Prigogine and Stengers 1984; Swenson 1989, 1992). When a liquid is in thermodynamic equilibrium, it has a uniform temperature throughout, and all points are identical. As heat is applied to the liquid from below, the temperature difference between the top and bottom of the liquid (energy potential) creates "tension" (McKelvey 2004a,b) that energizes the molecules and makes them fluctuate. Below a critical magnitude of temperature difference in an area where the relationships among molecules are linear and their movements are uncorrelated, the macroscopically homogeneous liquid begins to flow (Swenson 1992). As the heat continues to be applied and the temperature difference rises above a critical minimum value, the liquid moves farther from equilibrium into an area of nonlinear relationships and correlated movements among molecules. There, fluctuations are no longer dampened, but instead are spontaneously amplified into a qualitatively new order by positive feedback processes. At this threshold or *bifurcation point*, the fluid shifts abruptly from disorder, incoherence, and homogeneity to order, coherence, and heterogeneity. In this new order, hundreds of millions of molecules coordinate to form rolling columns of hexagonal cells, called *Bénard cells*. Such structures effectively dissipate tension and, while energy constantly flows through them, maintain their coherence far from equilibrium.

Outside the laboratory, however, self-organization occurs not exogenously, with the intentional application of heat, but endogenously. Work applying self-organization theory to organizational settings has often borrowed too literally from this lab experiment. Consequently, it has placed too much emphasis on environmentally imposed "adaptive tensions" in which agents respond to external forces, opportunities, and resources (Leifer 1989; McKelvey 2004a,b). In recent work, however, entrepreneurs create adaptive tension<sup>18</sup> that moves the system away from equilibrium, allowing positive feedback processes to amplify small differences and propel the system into a qualitatively new order (Lichtenstein et al. 2007; Plowman et al. 2007). We extend this work by expanding the concept of endogenous sources of tension to include entrepreneurs' novel, subjectively imagined solutions to future customers' problems and their expression in firms' modular (re)combination of resources and the products that result from them (see Loasby 2007b).<sup>19</sup>

As we have already seen, entrepreneurs imagine future customers in order to organize their ideas, and create resource modules in order to organize their material resources. These processes work because they allow entrepreneurs to manage the tensions between competing choices. Similarly, we seek to show how self-ordering processes creatively organize competitive entrepreneurial markets by generating far-from-equilibrium market order. This order emerges

from tensions between equilibrium, with its imitation, negative feedback, and homogeneity; and disequilibrium, with its innovation, positive feedback, and heterogeneity.

Despite its value as a “fertile and unique intellectual space” (Low 2001: 22), the nexus of disequilibrium and heterogeneity has received little attention from entrepreneurship scholars. Their knowledge about how novelty emerges in disequilibrium markets is severely limited, and their assumption that markets are heterogeneous (Shane and Venkataraman 2000; Davidsson 2004) begs the question of how such heterogeneity originated. The extant literature offers little to explain, for example, how CareerBuilder’s novel college student internship interface with Facebook emerged in 2008 amid the ferment of the volatile job search/recruiting market. By creatively synthesizing insights from RS theory and self-organization theory on novelty, heterogeneity, and disequilibrium, the DC perspective begins to fill these gaps in the entrepreneurship literature.

One of our core assumptions, as noted above, is that entrepreneurial choice is originative and forward-looking, and that creative actions flowing from it generate new markets that operate away from equilibrium. However, the underlying dynamics of this process, described abstractly as successful product “invention” or “innovation” (Lachmann 1986), remain unclear. Our synthesis offers a more detailed explanation: an entrepreneur, as we suggest above, imagines a novel product that a future customer might find useful, thereby generating knowledge of an as-yet-unrealized potential. This knowledge, in turn, creates “opportunity tension” (B. B. Lichtenstein, personal communication, 1 July 2007). When the entrepreneur brings this imagined opportunity to material fruition by (re)combining resource modules within a firm to create novel product offerings, this tension generates fluctuation in the system. At a certain distance from equilibrium, positive feedback processes amplify this fluctuation. At this critical distance from equilibrium, the initially homogeneous market, like self-organization theorists’ fluctuating elements, starts to move toward increasing heterogeneity and disequilibrium. These ideas not only extend RS theorists’ conception of how markets originate, but also affirm their association of homogeneity with equilibrium and heterogeneity with disequilibrium (Shackle 1972; Lachmann 1977; Oakley 1999; Lewin and Phelan 2002).<sup>20</sup>

How, then, do heterogeneity and novelty, once created, evolve through continual re-creation in far-from-equilibrium markets? Entrepreneurship scholars have only recently recognized the potential in understanding how market heterogeneity evolves, and they have yet to connect these unexplored dynamics to market disequilibrium (Davidsson 2003, 2004) or investigate explicitly how novelty evolves in markets. These gaps arise, in part, from inattention to markets and to longitudinal studies in entrepreneurship generally (Chandler and Lyon 2001; Davidsson and Wiklund 2001). Strategy researchers have studied how intra-industry firm heterogeneity evolves, but not in an explicitly disequilibrium context (Noda and Collis 2001; Hambrick et al. 2005). They have explored how persistent heterogeneity fuels sustained innovation in an industry, but only in an explicitly equilibrium context (Knott 2003). The DC perspective begins to fill these gaps by elaborating a co-evolutionary process between heterogeneity and novelty that endogenously drives markets farther from equilibrium.

In competitive entrepreneurial markets, divergent forces associated with entrepreneurs' unique expectations about future customers' needs can be expected to dominate convergent forces associated with the diffusion of prior knowledge (Lachmann 1976b; Gloria-Palermo 1999). Divergent expectations spawn divergent plans, resources, and products that keep markets from settling into equilibrium (Oakley 1999; Vaughn 1999; Boehm et al. 2000). More specific claims that convergent forces are "always overtaken" by divergent forces (Lachmann 1976b: 60) and that heterogeneity is "always known to be increasing" (Shackle 1966: 756) imply that such markets evolve farther from equilibrium over time. Self-organization theorists (Swenson 1989, 1992; Prigogine 1996) make this suggestion explicit by spotlighting spontaneous processes that continually create novelty and heterogeneity, driving open systems farther from equilibrium to states of increased heterogeneity.

In this light, findings of increasing heterogeneity in a wide range of markets and industries (Kraatz and Zajac 1996; Noda and Collis 2001; Knott 2003; Chiles et al. 2004; Hambrick et al. 2005) are particularly intriguing. In the job search/recruiting industry, for example, the major players imitated the online model (convergence) but developed important differences over time (divergence): for example, CareerBuilder's linkages with newspapers, Monster's with advertising agencies, and HotJobs' with a major Internet portal. Even when imitation occurred, as with the strong newspaper industry linkages that virtually all the major companies in this industry developed, novel product offerings served to differentiate each company from its rivals over time. For example, while Monster emphasized local market penetration through its linkages with the New York Times Company and others, CareerBuilder worked with its newspaper co-owners—especially Gannett, publisher of the widely distributed *USA Today*—on a strong national advertising thrust. As Gannett Digital's president put it, "We intend to sell Internet advertising differently" (Angwin 2007). As CareerBuilder developed novel product offerings in other areas (e.g. its interfaces with Facebook and the Spanish-language television network Univision), industry rivals sought to differentiate themselves with even more novel variations, such as Craigslist's unique online job partnership with eBay and Monster's resumé writing service. Such perpetual novelty generation has driven the industry toward increasing heterogeneity and disequilibrium.

The co-evolution of novelty and heterogeneity is the heart of disequilibrium market processes. We suspect that the farther the market is from equilibrium, the greater the heterogeneity, and hence the greater the incentive for individuals to engage in novel action to improve their competitive strength. This novelty (energy) increases the market's heterogeneity and distance from equilibrium, and the process repeats. In this co-evolutionary process, novelty and heterogeneity continually re-create each other and, in so doing, drive the market farther from equilibrium. Ever-increasing injections of novelty thus eventually drive increasingly heterogeneous markets to a bifurcation point, where additional injections of novelty (fluctuations) can overcome the damping forces of the existing market order, and positive feedback processes can amplify that novelty into a new market order (Leifer 1989; Chiles et al. 2004).

We suspect that such self-organized transitions, discussed in greater detail below, occur only when markets become sufficiently heterogeneous—that is,



when they reach a “threshold of diversity” (Strogatz 2003: 54). But we also suspect that there can be such a thing as too much diversity—that unless firms’ product offerings are sufficiently similar, markets will not self-organize (see Strogatz 2003: 59). By imitating the same online model, for example, job search/recruiting firms became similar enough to render the industry capable of self-organizing. But by continually differentiating themselves—that is, by (1) creating novelty based on their empathy with subjectively imagined future customers and (2) materializing that novelty by (re)combining resource modules within a firm to produce novel products—they fueled the co-evolution of novelty/heterogeneity, as described above, and spontaneous order-creating market processes, as described below.

Moreover, the actions of entrepreneurs who follow in the footsteps of industry pioneers are likely to affect market potential and opportunity tension in two important ways:<sup>21</sup> (1) Their efforts to *imitate* the core features of the pioneers’ product will *dissipate* such potential and tension (negative feedback/equilibrating/ convergent process). (2) At the same time, their efforts to *differentiate* their products from those of the pioneers and other rivals (through some “twist”) will continually *re-create* this same potential and tension (positive feedback/disequilibrating/divergent process). Such “imperfect imitation” combines “imitative” and “innovative” entrepreneurship within a single agent; thus, in their efforts to imitate rivals, entrepreneurs innovate not accidentally, as many argue (Alchian 1950; Hill and Deeds 1996), but purposefully. Such purposeful imitation, like the intentional (as opposed to accidental) empathy described earlier in this article, plays an important role in entrepreneurs’ creative organizing process. Given these conditions, if markets can diffuse imitation (based on prior knowledge) but not innovation (based on subjective expectations), and if, as we argue above, the forces of divergence are stronger than the forces of convergence, then markets will endogenously increase their (energy) potential and tension as they move away from equilibrium.

Finally, organizational scholars have recently begun to view entrepreneurship as an order-creating process, in which heterogeneous entrepreneurs act and interact far from equilibrium to create new socioeconomic order: new firms, new industries, and new markets (Chiles et al. 2004; McKelvey 2004a). We hope the DC approach can catalyze progress in entrepreneurship research on the important but little-understood question of how order is created in disequilibrium market processes. Unlike most Austrian scholars, who assume order—what Hayek called “spontaneous order”—occurs only at or near equilibrium (see Vaughn 1994; Gloria-Palermo 1999), RS theorists believe order can be achieved in disequilibrium markets, with the help of social institutions that allow entrepreneurs to form reasonable expectations about the needs of future customers and orient their actions to a “common signpost” (Lachmann 1970).<sup>22</sup>

While we acknowledge that equilibrating forces and social institutions (as well as capital structure) help stabilize disequilibrium market processes, we propose asking how disequilibrium market processes themselves create market order far from equilibrium, a question RS theorists to our knowledge have not considered. Fortunately, complexity theorists have made important progress on this front (Prigogine and Stengers 1984; Swenson 1989, 1992). Indeed, because complexity theory focuses on how heterogeneous agents act and interact to create order far



from equilibrium, it appears better positioned to advance “entrepreneurship-as-order-creation” research than traditional theories that assume agents are homogeneous, firms and industries already exist, and markets converge to equilibrium (see Chiles et al. 2004; McKelvey 2004a).

In self-organization theory, order is created through fluctuations that positive feedback processes then amplify at a distance from equilibrium to create qualitatively new ways of operating (new order) in systems far from equilibrium. While organizational researchers have begun to test these new ideas empirically in emerging entrepreneurial markets (Arikan 2004; Chiles et al. 2004), they have not extended them conceptually. We make a modest effort to do so here.

We propose that entrepreneurs’ subjective expectations about the needs of imagined future customers, which generate opportunity tension, trigger the creation of market order. Specifically, we propose that these expectations, and their expression in firms’ modular combinations of heterogeneous resources and product offerings, represent an important endogenous source of novelty (like self-organization theorists’ fluctuations in a liquid) that moves markets away from equilibrium and initiates order creation. As positive feedback processes take hold, such novelty increases the market’s heterogeneity, begetting more novelty, which further increases the market’s heterogeneity. This heterogeneity in turn begets still more novelty, and so on in an ongoing rivalrous process that generates increasing product heterogeneity as the market moves farther from equilibrium (Chiles et al. 2004).

If such heterogeneity is “the very archetype of order” (Prigogine and Stengers 1984: 169), we begin to see how “order acts back upon order to produce more order” (Swenson 1992: 207). The same kind of heterogeneity is associated with divergent expectations (about future customers’ needs, their expression in firms’ modular resource (re)combinations, and the products that result from them) that are generated endogenously—but not diffused—by the ongoing market process. It is just such heterogeneity that constitutes a far-from-equilibrium market order. Thus, contrary to received wisdom that divergent expectations preclude market order from emerging (Lachmann 1976b; Vaughn 1994; Gloria-Palermo 1999), we suggest it is such expectations that make market order possible: entrepreneurs’ expectations about future customers’ needs lead them to (re)combine heterogeneous resources into modules, which in turn generate novel products. The resulting market order is not the conventional order of equilibrium, but a unique order associated with processes far from equilibrium—what Juarrero (1999) termed “structures of process.”

In sum, we propose that the co-evolution of product novelty and heterogeneity not only increases product novelty and heterogeneity as it drives markets farther from equilibrium, but also creates much of the order in such markets. The DC approach thus fundamentally reconceptualizes disequilibrium markets as processes in which the diversity of entrepreneurs’ imaginations (about future customers’ needs, the modular combinations of heterogeneous resources that result from such expectations, and the novel products such combinations make possible) constitutes not anarchy, chaos, and disorder, but coherence, stability, and order.

This order is dynamic: processes create it initially and continually re-create it over time. This concept, vital to understanding the ongoing, recursive nature of entrepreneurship in disequilibrium market processes, has received almost no attention from entrepreneurship researchers. Before dissipative structures ever exhibit order-destroying, disequilibrium, chaotic behavior,<sup>23</sup> they first evolve in a series of “cascading bifurcations,” each marking the creation of a new, qualitatively distinct order, more heterogeneous and farther from equilibrium than the last (Prigogine and Stengers 1984; Chiles et al. 2004). This model of evolution, with the co-evolutionary processes that drive it, refines the metaphor of a “kaleidic” world, in which unpredictable events inevitably disrupt existing market patterns: a world “interspersing its moments or intervals of order, assurance and beauty with sudden disintegration and a cascade into a new pattern” (Shackle 1972: 76).

As markets evolve farther from equilibrium, we thus expect to see the pattern of entrepreneurial imaginations about future customers’ needs, modular resource (re)combinations, and novel product offerings continually re-created at bifurcation points. Moreover, the spiraling dynamics of momentum in organizations (Jansen 2004), the increasing momentum of positive feedback processes leading to a single bifurcation (Lichtenstein et al. 2007), and the temporal spacing of multiple bifurcations in markets (Chiles et al. 2004) all lead to an important expectation: positive feedback processes should progressively increase momentum and decrease the time between bifurcation points that separate one disequilibrium order from another. In contrast with the punctuated equilibrium model that dominates theoretical conversations on market dynamics (Haveman et al. 2001), change-based momentum (Jansen 2004), entrepreneurial transitions (Tan 2007), and even the transformation of dissipative structures themselves (MacIntosh and MacLean 1999), such market processes match (and indeed refine) a virtually unknown *punctuated disequilibrium* pattern in which markets shift abruptly from one disequilibrium order to another (Chiles et al. 2004).

The recent history of the job search/recruiting industry illustrates this process. For generations, the regime of order for job search/recruiting was newspaper help-wanted ads. Then, within the past two decades, three distinct bifurcation points have occurred at increasingly short intervals. (1) With the advent of the Internet in the mid-1990s, the pioneering entrepreneurial actions of CareerBuilder, soon imitated by rivals HotJobs and Monster, built a momentum that ushered in a whole new disequilibrium order: a mixed model in which newspaper help-wanted ads remained important but were supplemented by online services. (2) In the following decade, CareerBuilder again catalyzed a positive feedback process by differentiating itself from its competitors through strong links with the newspaper industry, which HotJobs and Monster again imitated. Together these alliances generated a new disequilibrium order in which standalone newspaper help-wanted ads became less important than online services, until by 2007 virtually all major newspapers had strong online job search/recruiting linkages. (3) At this writing, a host of new players (including vertical job search engines, social networking sites, and search optimizing firms), aided by the accelerating pace of technological innovations, are rapidly driving the industry toward the brink of yet another disequilibrium order—one in which online job search/

recruiting firms, like the newspapers they themselves displaced, are likely to play a less prominent role (Davenport 2009; Hennessy 2009).

### One Direction for Future Research

We argued above that positive feedback processes amplify and mobilize entrepreneurs' divergent expectations/imaginings, resources, and products to create much of the order in far-from-equilibrium markets. But how do countless heterogeneous agents spontaneously "communicate" to create such order? This issue is so challenging and under-researched (Strogatz 2003; Sawyer 2005) that we can only begin to sketch one possible avenue scholars pursuing DC research might investigate: entrainment.

Entrainment synchronizes the different rhythms phenomena display by coordinating them with one primary or "dominant" rhythm (Ancona and Chong 1996; Bluedorn 2002). The entrainment literature emphasizes *exogenous* synchronization, in which organizational rhythms adjust to an external rhythm such as day/night. In contrast, we emphasize *endogenous* synchronization, in which organizational rhythms adjust to other organizational rhythms within the same industry or market. Such synchronization is possible because "[o]rganizations are entangled in an ecology in which one agent's actions help construct another agent's environment" (Meyer et al. 2005: 471). By emphasizing temporality, entrainment provides a new perspective on the fundamental problem of coordination (Ancona and Chong 1996: 275) that may help explain how order emerges spontaneously "*in time*" (Strogatz 2003: 2). While organizational research on entrainment has focused on aligning a few rhythms, often deliberately (Bluedorn 2002), to implicitly achieve an equilibrium state (A. C. Bluedorn, personal communication, 10 October 2007), entrainment can also self-organize a multitude of rhythms (Ofori-Dankwa and Julian 2001; Strogatz 2003) and promote disequilibrium. Moreover, organizational research has focused on entrainment in work groups, organizations, and strategic alliances, but not, to our knowledge, in industries and markets.<sup>24</sup>

Entrainment may spontaneously order not only entrepreneurs' actions, but also their temporal orientations, including the "future-to-present orientation" associated with "a future-directed vision", in which entrepreneurs ground their "[present] actions completely in a view of the future" (Ofori-Dankwa and Julian 2001: 422). Entrainment does not imply that such actions or thoughts become homogeneous; rather, it emphasizes how their rhythmic differences are accommodated to coordinate the phenomena displaying them (Bluedorn 2002: 146-147; also see Sawyer's [1997] work on collective creative performance generally and Berliner's [1997] on improvisational jazz specifically).<sup>25</sup> Thus, entrainment of entrepreneurs' activity/thought patterns in competitive entrepreneurial markets may spontaneously create a far-from-equilibrium market order that is both heterogeneous and coherent.

Moreover, studies of entrainment in emergent urban forms (Rosser 1994) lead us to suspect that a fluctuation in the aggregate pattern of competitive entrepreneurial action/thought rhythms may trigger positive feedback processes that drive the market beyond a bifurcation point into a new order. For example, as entrepreneurs of a dominant rhythm (say, CareerBuilder) notice others (Monster

and HotJobs) adjusting to them, the dominant rhythm may change to maintain its differentiation. This change may continue in a self-reinforcing process, driving the job search/recruiting market to a qualitatively new operating mode (e.g. newspaper help-wanted ads dominant, supplemented by online services \_ online services dominant, with linkages to major newspapers). In sum, we believe scholars may advance DC research by focusing on the entrainment of a multitude of action/thought rhythms as one specific way entrepreneurs “communicate” to create order in far-from-equilibrium markets over time.<sup>26</sup>

## Conclusion

In this article, we proposed that entrepreneurs engage in dynamic processes of creative organizing at multiple levels, in which novelty, heterogeneity, and disequilibrium play key roles. We identified and described three such entrepreneurial processes—forming expectations of an imagined future, continually reshuffling combinations of capital resources, and participating in disequilibrium market processes—that fundamentally affect how we understand these three important elements of entrepreneurship. We suggested that entrepreneurs shape and drive these processes through their plans and actions. Specifically, we proposed that entrepreneurs create novelty by planning innovative solutions to their imagined future customers’ problems; that they create heterogeneity by continually shuffling and reshuffling diverse capital resources into new modular combinations based on those plans; and that they consequently drive markets on a course that may never tend toward equilibrium.

We then addressed how order emerges from these three entrepreneurial processes—in other words, how the three related concepts of novelty, heterogeneity, and disequilibrium operate as entrepreneurs organize novel ideas, heterogeneous resources, and disequilibrium markets into a dynamic yet coherent order. Within this order, we identified three interrelated patterns of entrepreneurial organization: (1) entrepreneurs organize their novel ideas by empathizing with imagined future customers; (2) managers organize their heterogeneous resources by combining and continually reshuffling modules and their components; and (3) self-ordering processes organize the disequilibrium market conditions entrepreneurs and firms continually create and re-create in an ongoing, recursive process.

Finally, we suggested potentially fertile new directions for building on these foundations to increase our understanding of how entrepreneurs create this dynamic order. Specifically, we recommended that future researchers (1) identify alternative strategies, such as projection, that help entrepreneurs imagine the needs of future customers, and explore the conditions under which they are more or less effective than empathy; (2) filter the principles of real options reasoning through a subjectivist lens to examine how entrepreneurs choose among possible alternative modular combinations of heterogeneous resources; and (3) draw on the insights of the growing literature on entrainment to help us understand how endogenous as well as exogenous rhythms might contribute to creating order in self-organizing processes such as those observable in disequilibrium markets.

The connections among these three entrepreneurial processes and their related concepts are necessarily dynamic, complex, and recursive across multiple levels. While our sequential treatment of novelty, heterogeneity, and disequilibrium in entrepreneurship may suggest that the trajectory of the entrepreneurial process is simply linear – that is, that entrepreneurs generate novel ideas that lead to heterogeneous resources combinations, which in turn lead to market disequilibrium – it is important to remember that, as we have described above, all three processes feed back into one another. The order that emerges from these dynamic creative processes is thus not the static, linear order of equilibrium; rather, it is a continually shifting, intricate pattern that – as we have attempted to demonstrate – is no less worthy of the term “order” for all its dynamic complexity.

Our initial ideas, conjectures, and suggestions for future research on entrepreneurship as a dynamic, complex, subjective process of creative organizing constitute the DC approach. As Venkataraman (1997: 135) observes, “The usual theoretical structures often do not seem to work for explaining entrepreneurship. But we have no well-developed, or reasonably articulated alternatives to take their place.” Such development and articulation require time. We offer the DC approach as a provisional alternative perspective of entrepreneurship that will naturally change as this approach grows and evolves.

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## Notes

1. In this article, we define *market disequilibrium* as a dynamic process in which actors’ beliefs diverge, products are heterogeneous, and change is unpredictable. In place of the Austrian school term *disequilibrium*, which some have misleadingly associated with “topsy-turvy, vertiginous, stumbling around”, Prigogine and other complexity theorists adopted the term *far-from-equilibrium* (Goldstein 1994: 14). In our Austrian school-complexity theory synthesis in this article, we use these terms synonymously. For us, entrepreneurs create disequilibrium by introducing novel products and services in markets and by pitting their imaginative conjectures about such offerings against those of other entrepreneurs who, in turn, introduce their own novel offerings, and so on. Such actions and continual counteractions by entrepreneurs “to undermine each other’s positions, ... working against each other and trying to outdo each other” (Shackle 1983: 6) produce unstable, disruptive market interactions that continually discoordinate entrepreneurs’ plans, make their products increasingly diverse, and move their markets farther from equilibrium. Such a disequilibrium/far-from-equilibrium perspective is important because, despite a growing body of empirical evidence for the continual emergence of novelty, increasing product heterogeneity, and movement away from equilibrium in a variety of markets (e.g. Arikian 2004; Chiles et al. 2004; Meyer et al. 2005; Chiles et al. 2010), the equilibrium-based theories that currently dominate the field ignore such phenomena.
2. This strand of Austrian economics diverges from the more traditional approaches of Schumpeter (1934) and Kirzner (1973). For a discussion of this divergence, see Chiles et al. (2007, 2010).
3. Chiles et al. (2007) acknowledge a link between market order, radical subjectivism, and the disequilibrating processes described by complexity theorists, but they do not elaborate it in any detail. In this article, we begin to flesh out these and other details about such organizing processes.
4. Our inspiration for this choice was stimulated by our prior theoretical and empirical work, our reading of various literatures, and our practical experience in a number of entrepreneurial contexts (see Langley 1999: 708). In the spirit of developing a Lakatosian research program, our choice represents a provisional perspective of dynamic entrepreneurial creation that will naturally change over time. Thus, we encourage other scholars to use their unique insights to add other creative organizing processes and/or to modify the three we emphasize here.



5. We thank a reviewer for pointing out two scholars (on whose shoulders we stand) who were far ahead of their time, and who took the field closer to understanding the significance of disequilibrium dynamics: Wroe Alderson and George Richardson. Alderson's (e.g. 1965) work in marketing broached a number of RS themes, including entrepreneurial expectations, markets as organized behavior systems, and heterogeneous markets in disequilibrium (Reekie and Savitt 1982). Alderson (1965) viewed markets as inherently tending toward (but never actually reaching) an equilibrium state. His work tackled not entrepreneurial "empathizing" but entrepreneurial "guessing" (Reekie and Savitt 1982). Similarly, Richardson's (e.g. 1960) work in post-Marshallian economics explicitly adopted a number of RS ideas (e.g. subjective expectations, capital complementarity, heterogeneous markets in disequilibrium). His writings appear rooted not in creative agency and proactive change, but in responsive agency and adaptive change (Foss 1998).
6. *Search* is associated with neoclassical economics, which maintains a close allegiance to equilibrium and rationality; imagination is associated with radical subjectivism, which maintains no such allegiance (Littlechild 1986; Loasby 2001). Radical subjectivism assumes individuals are not irrational but arational (Garrison 1986). Moreover, complexity theorists using computer simulations (such as those based on fitness landscapes) are often silent on (dis)equilibrium (Gavetti and Levinthal 2000). However, in describing the emergence of order in artificial societies, Sawyer (2005: 150–151) argues that "structural phenomena emerge, attain equilibrium, and remain stable over time." In addition, Sawyer (2005: 20) asserts that the idea of "fitness landscapes" is rooted in equilibrium theories.
7. Gavetti and Levinthal (2000) also consider "forward-looking" agents; however, the "cognitive" landscape these agents search is a simplified, low-dimensional representation of the "actual" landscape *that already exists*.
8. What is exogenous, of course, depends on where one draws the system's boundaries.
9. We explicitly chose not to focus on social institutions, equilibrating forces, or capital structure because, while central to RS theory, they – unlike disequilibrium/far-from-equilibrium market processes – are well-understood sources of market order. Moreover, space constraints prohibited us from discussing them. For a summary of these aspects of RS theory, see Chiles et al. (2007).
10. For an excellent analysis of Lachmann's enlargement of the plan concept, see Gloria-Palermo (1999: 125–127).
11. Additionally, one author had unique access to CareerBuilder since its inception by way of ongoing discussions with one of the company's founders.
12. Research in visual cognition (e.g. Arnheim 1969; Hoffman 1998) offers a similar treatment of thoughts as representations of symbolic elements. However, it tends to focus on "vision" as perception of what is as opposed to "visualization" as imagination of what could be.
13. Ironically, Weick (2006) appears to accuse Shackle (1979c: 30) of precisely the opposite problem. "Constraints, interaction, commitments, and hopes," Weick (2006: 448) argues, "all can "deadend" imagination and turn it toward memory and associations."
14. See Loasby (2007b) for further articulation of the tension underlying Shackle's (1979a) conception of choice and its implications for both organization and organizations.
15. Foss et al. (2007) use RS economics to explain how entrepreneurs organize heterogeneous capital; Foss and Ishikawa (2007) use it to add a dynamic dimension to the resource-based view.
16. For example, an entrepreneur with three different complementary resources can form only four different modules. But with four such resources, the number more than doubles (to 10); with five, 23 combinations are possible.
17. Not all scholars share this view. Sawyer (2005), a psychologist/sociologist specializing in creativity, represents a case in point. He views Prigogine's theory from the natural sciences as a useful source of metaphors for the social sciences, but one that is inherently unable to rigorously address the underlying processes of social emergence. (Recent empirical work by Arian [2004], Chiles et al. [2004], Lichtenstein et al. [2007], and Plowman et al. [2007] leads us to a different conclusion.) Interestingly, our DC approach, which integrates ideas from Prigogine and the radical subjectivists, appears largely consistent with Sawyer's (2005: 26) primary objective of building a "third wave" of systems theory appropriate for explaining the emergence of complex social phenomena. However, our focus on competitive entrepreneurial markets in disequilibrium diverges sharply from Sawyer's (2005: 19) belief that most social systems reside in equilibrium.
18. Lichtenstein et al. (2007) define "adaptive tension" as the difference an entrepreneur perceives between a system's current and desired states.
19. While Loasby (2007b: 1743) doesn't explicitly use the term "[adaptive] tension", he argues that "imagination" in Shackle's theory of economic decision making provides "a place for man" in Prigogine's theory of self-organization.



20. This belief is shared by Austrian economists (Kirzner 1973) and organizational researchers applying complexity theory to entrepreneurial processes (Chiles et al. 2004; McKelvey 2004a), as well as scholars in fields ranging from archaeology (Bogucki 1991) and chemistry (Kang and Pessin 2005) to rhetoric (Lemke 1993) and marketing (Alderson 1965).
21. Our conjecture is informed by a synthesis of ideas on the concurrent operation in disequilibrium market processes of (1) imitation/negative feedback and innovation/positive feedback effects (Chiles et al. 2004), (2) exhaustion and re-creation of potential (Boulding 1980), and (3) convergent/ equilibrating and divergent/disequilibrating forces (Lachmann 1976b).
22. Richardson's (e.g. 1960) work, which bridged post-Marshallian and Austrian economics, addressed the stabilizing effect of firms' dissimilar yet complementary investment activities in competitive entrepreneurial markets (Foss 1998).
23. Even in such turbulent, chaotic disequilibrium, if the system is "driven harder", order may eventually re-emerge in "windows of order inside chaos" (Gleick 1987: 74). It is also possible that a market could become over-saturated by entrepreneurial attempts at novelty, facilitating an industry consolidation that might reduce market heterogeneity. Both issues are beyond this article's scope.
24. Garud and Karnøe (2003: 294) make passing reference to entrainment as a way of facilitating interaction among distributed actors in disequilibrium industry contexts.
25. Improvisational jazz performance emerges spontaneously as a result of the interplay of myriad "communications" among musicians and evolves unexpectedly as musicians inject novel ideas into the ever-shifting musical flow (Berliner 1997). The performance achieves "musical coherence" (musical order) as the bassist and drummer synchronize their rhythms to establish a "groove" that stabilizes the music's foundation; as the (more adventurous) soloist and horns align their rhythms to this dominant rhythm at major structural points; as players interlock their rhythmic patterns by filling spaces in the soloists' melodic pattern; as musicians harmonize their rhythmic patterns by combining fragments of others' rhythmic patterns into their own; etc. (Berliner 1997). Moreover, such performance entails sympathetic interaction, rhythmic embellishments, disrupted expectations, kaleidophonic characteristics, the creation and resolution of musical tension, the energizing power of ideas, and the purposeful borrowing and transforming of others' ideas (Berliner 1997). Taken together, these connections to our DC approach suggest another potential research direction—one that is related to, but distinct from, entrainment.
26. Prigogine repeatedly refers to the importance of "communication" among molecules in far-from-equilibrium processes, including its role in stabilizing such processes (Prigogine and Stengers 1984: 13, 148, 180, 187–189, 295). However, he does not explain how such communication might work in the social sphere. In their study of radical change in a church and its environment, Plowman et al. (2007: 540) found that a leader's choice and use of words provided coherence to a disequilibrium pattern of change. Other organizational scholars have begun to explore the role of language in competitive entrepreneurial markets (Rindova et al. 2004), but have yet to investigate how language, text, and conversation might generate order in disequilibrium market processes. Taylor's work on communication as a self-organizing dynamic process may provide important insights in this regard. Taylor and Van Every, for example, argue that conversations among participants spontaneously emerge into "a common text for all the conversations", which provides organizational coherence, continuity, and stability (2000: 12–13, 35, 40). More specifically, myriad local conversations among participants are "laminated" or "interlaced" to form "a pattern that knits together the organization as a whole" (Taylor and Van Every 2000: 13). Moreover, Taylor treats communication—especially conversation—as performative in character, thus connecting with Sawyer's (1997) work on collective creative performance and Berliner's (1997) on improvisational jazz performance. (Indeed, Berliner's informants repeatedly emphasized that playing improvisational jazz with musicians was like having a "conversation" with them.) Taylor, for example, contends that participants (1) keep the "beat" going by adding their own "variations" to the ongoing dynamic conversation (Taylor and Van Every 2000: 15), (2) reduce "tension" by aligning and continually realigning their "conversational patterns" with those of others (Cooren, Taylor and Van Every 2006: 8), and (3) phrase their conversational interventions in "rhythms" recognizable to others in their community (Taylor and Van Every 2000: 39). While beyond this article's scope, these connections to the DC approach and to entrainment suggest yet another future research direction.

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**Todd H. Chiles** is an Associate Professor of Management at the Robert J. Trulaske, Sr. College of Business, University of Missouri. He received his PhD from the University of Oregon. His research interests are in entrepreneurship, organization and process theory, and their intersection. His work in these areas explores complex, dynamic, social processes such as organizational emergence, strategic change, and novelty creation. His research has appeared in *Academy of Management Review*, *Organization Studies*, *Journal of Management Studies*, and *Organization Science*.

**Christopher S. Tuggle** was an Assistant Professor of Management at the Robert J. Trulaske, Sr., College of Business, University of Missouri. He is currently (2014) Assistant Professor in the Department of Management in the College of Business Administration at the University of Nebraska-Lincoln. He received his PhD from Texas A&M University. His research interests are in organizational governance, minority entrepreneurship, and entrepreneurship within existing organizations. His research has been published or is forthcoming in *Academy of Management Journal*, *Strategic Management Journal*, and *Harvard Business Review*.

**Jeffery S. McMullen** is an Assistant Professor of Entrepreneurship at the Kelley School of Business, Indiana University. He received his PhD from the University of Colorado. His research interests are in subjectivist economics, entrepreneurial cognition and action, and entrepreneurial empathy. His research has been published in *Academy of Management Review*, *Journal of Business Venturing*, *Journal of Management Studies*, and *Journal of International Business Studies*.

**Leonard Bierman** is a Professor of Management at Mays Business School, Texas A&M University. He received his JD from the University of Pennsylvania. His research interests are in labor relations, organizational governance, and management of professional service firms. His research has been published in *Academy of Management Journal*, *Strategic Management Journal*, and *Harvard Business Review*.

**Daniel W. Greening** is an Associate Professor of Management at the Robert J. Trulaske, Sr. College of Business, University of Missouri, where he teaches courses in strategic management and entrepreneurship. He received his PhD from The Pennsylvania State University. His research interests include stakeholder management, social entrepreneurship, and entrepreneurial cognition. He has published articles in the *Academy of Management Journal*, *Journal of Business Venturing*, *Journal of Management Studies*, *Business and Society*, and *Journal of Management Inquiry*.