



ISSN: 1286-4892

**Editors:**

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2002

Non-Linear Dynamics  
in Entrepreneurial and Management Careers,  
*M@n@gement*, 5(1): 31-47.

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# Non-Linear Dynamics in Entrepreneurial and Management Careers

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Dramatic changes in 21st century careers have generated the need for a new set of theoretical lenses that view careers in a more dynamic, fluid way. Several characteristics of this new complexity lens that directly apply to dynamic career systems include discontinuities in career progression, non-proportionality of effects of effort, sensitive dependence on initial conditions, viewing a system in terms of constraints and triggers for change, and the impact of mutual causality of structural emergence. Two extensive case studies are presented and explained using these concepts, providing an expanded understanding of careers in management and in entrepreneurship.

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## INTRODUCTION

Career development is an important topic in human resource management (Callanan and Greenhaus, 1999) and in career theory (Hall and associates, 1986). The conventional wisdom about career development typically involves three steps: 1/ assessing ones skills, interests, and preferences; 2/ identifying objectives and a realistic plan; and 3/ obtaining training and relevant experiences to follow the plan (London and Stumpf, 1982). Underlying this approach is the assumption that careers progress over time in small steps through intra-organizational job changes that incrementally increase the individual's level of responsibility and skill.

Movement and upward directionality have also imbued the early career literature (Jennings, 1971; Hall, 1986). Jennings was one of the earlier writers to assert that movement was a vital aspect of managing a career; jobs should be changed every two years. Rationally choosing the next job, having a clear plan and moving in that direction was important for career success. However, not everyone portrayed careers as systematic progression upward. Schein (1978: 22) explained that in career stages, «each cycle contains smooth, even stretches as well as bumpy, obstruction-filled stretches.»

Recent developments in career and organization theory support the need for a new way to understand careers. First, organizations have

become flatter and more de-centralized, leaving fewer steps in an orderly vertical career progression (Gutteridge, 1986). Second, the nature of the job—one of the core foundations of traditional career theory—is fundamentally changing. The notion of a “job” as a fixed entity is becoming less relevant in many industries, where formal jobs are being replaced by more temporary, fluid assignments (Bridges, 1994; Parker and Arthur, 2000). Moreover, in many industries these dynamic and innovative projects are not simply designed and carried out by large corporations; instead, “temporary organizations” are formed when a market opportunity is linked to a set of competencies that individuals within the industry can enact (Faulkner and Anderson, 1987). As such, individuals within one of these dynamic industries gain competencies by working on projects within multiple organizations, some of which disappear when the project is completed (Jones and DeFillippi, 1996; Jones and Lichtenstein, 2000). Thus, careers frequently move across traditional organization boundaries and can evolve in unique ways.

Prominent career theorists of the last two decades, like Schein and Hall, have also recognized that careers are not as systematic they can sometimes be depicted. Organizations have become less orderly and more complex entities (Brown and Eisenhardt, 1997; Dooley, 1997; Kelly and Allison, 1999), while careers are increasingly recognized as uneven, obstacle-laden processes (Lichtenstein and Mendenhall, 2002). Taken in the context of the dramatic changes in organizational design and environmental dynamism, a more radical reformulation of career thinking may be necessary (Bird, 1998).

In response to this need, a new set of theoretical lenses is emerging that views careers in a more dynamic, fluid way. A dynamic approach questions the old wisdom of careers as a linear, hierarchical progression that is centered around a specific organization. For example, Arthur and his colleagues (Arthur, 1994; Arthur and Rousseau, 1996) used the label “boundaryless careers” to define career progressions that focus on one’s skills and competencies as they develop through participation in projects and assignments spanning several organizations over time. The new sciences can help explain and make sense of a dynamic view of careers as competency development and career progression (Gleick, 1987; Wheatley, 1993; Bird, 1998). One branch of the new science is “complexity” research, which focuses on the emergence of structures in interdependent systems such as careers (Holland, 1998; Anderson, 1999; Black, 1999; Kelly and Allison, 1999). According to insights from complexity science, the emergence of structures, like the progression of competencies, is not a linear, incremental process, but happens in a discontinuous, unpredictable fashion from apparently chaotic origins (Lichtenstein, 2000a). When understood in the context of dynamic interactive systems like project ventures, non-linearity also provides a pragmatic framework for making sense of careers that cross traditional boundaries as opportunities present themselves (Lichtenstein and Mendenhall, 2002).

This paper will present a few key principles of emergent order from a complexity perspective, and relate them to the dynamic organizing that

happens in boundaryless careers. These concepts will be illustrated through two extended case examples, with the goal of helping individuals understand how their careers are impacted by system-wide dynamics like non-linearity and emergence.

## **NON-LINEARITY IN CAREERS**

### **DEFINING CHARACTERISTICS OF EMERGENT ORDER**

Careers can be understood as dynamic, interactive systems in which competencies meet opportunities in unexpected ways (Bird, 1994; DeFillippi and Arthur, 1994; Arthur and Rousseau, 1996). A useful vocabulary for understanding and explaining these qualities can be drawn from complexity science and dynamic systems theories (Gleick, 1987; Dooley, 1997; Eve, Horsfall and Lee, 1997). The characteristics of complexity research that apply to dynamic career systems include discontinuities in career progression (Thelan and Smith, 1994), non-proportionality of effects of effort (Goerner, 1994), sensitive dependence on initial conditions (Thiéart and Forgues, 1995), and viewing a system in terms of constraints and triggers for change (Lichtenstein, 2000a). Each of these concepts will be briefly introduced, then illustrated in two case studies that follow.

One of the hallmarks of complexity is the recognition that systems do not develop in incremental, gradual ways, but through discontinuities—cycles of slow movement punctuated by bursts of change. On the surface, a period of densely clustered events appears to indicate intense progress, whereas periods with virtually no movement can feel like stagnation. However, theories of complexity recognize that all events are interdependent, which means that every experience, however seemingly inconsequential, is inexorably linked to the evolution of the system as a whole. This creates an often unnoticed cumulative build-up of experiences which, if properly triggered, can “explode” into an emergent structure that brings all of the events together in a new, unexpected way.

A closely linked aspect of dynamic systems is non-proportionality. In traditional linear systems models, a given input will cause a proportional output response. In contrast, a dynamic system rarely exhibits this kind of regular behavior. Instead in an interdependent system that has built up a lot of cumulative energy and experience, outputs are not directly proportional to inputs. For example, after an especially challenging day during a period of high stress and intensity, our response to a small problem may be much more explosive than the problem actually warrants. Likewise, career experiences can exhibit this quality of non-proportionality. The pace of new projects or assignments can vary over time (Bridges, 1994) as can the results or outcomes derived from them relative to the amount of effort (Jones and DeFillippi, 1996). Initial efforts may yield little benefits despite extensive efforts, while later efforts with minimal effort can lead to unexpectedly large outcomes. These non-proportionalities are inherent to dynamic systems like careers.

A third characteristic of dynamic systems is sensitive dependence on initial conditions. In conventional terms, system outputs loop back to the inputs, providing feedback. When the feedback loops in dynamic complex systems are non-proportional, the systems take on special properties that are referred to as chaos. Chaotic systems appear random, but from a mathematical perspective, at every point in time the system remains within a specific region of behavior, called an attractor. The key insight from chaos theory is that the entire system attractor is highly sensitive to initial conditions (Lorenz, 1963; Gleick, 1987). In other words, one small action or distinction made early on in the system's formation will be dramatically amplified over time, creating a chain reaction that can transform the system itself (Briggs and Peat, 1989). At the same time, a particular issue or quality can become embedded in the system, keeping it stuck within a relatively small arena of behavior.

Fourth, dynamic systems can be explained with reference to external constraints on action, and internal triggers for change. Constraints are more than blocks or impediments—they are system-wide issues that limit the total amount of energy that can flow into the system itself. Triggers are also systemic, creating “cubic centimeters of chance” that can be leveraged if and when the individual is open to them. More than opportunities, triggers are critical change points, which can allow individuals to generate a new attractor or region of behavior for their career.

These four qualities offer a new lens with which to view traditional and non-traditional careers. These can be illustrated through the following case of Sarah, whose 20-year career appears traditional and organization centered. However, the new lens from dynamic systems theory helps identify discontinuous elements in her career, the periods of non-proportional activity, the sensitive dependence on initial conditions in her career, and the impact of external constraints and systemic triggers that she used to create new opportunities for herself.

## SARAH'S MANAGEMENT CAREER

Sarah began her career after high school working as a licensing clerk for a security firm. Sensing little future in this position, she enrolled in a computer school and received a certificate in office information systems. Sarah applied her training to her next jobs, first as a technician for two years and then as a word processing supervisor for another two years. She worked well and pleased her boss. However, he liked her performance so much that he would not allow her to apply for other jobs in the large insurance company. Sarah became frustrated by the stagnation and apparent lack of opportunities. She explored a new industry, making a lateral move to an executive secretary position at a locally based manufacturing corporation, reporting to a divisional vice president of Finance. Here, she acquired additional competencies such as presentation and budgeting skills; however, the division was closed down a few years later.

Sarah transferred to corporate headquarters in 1991. Due to her strong performance, she was appointed to a payroll consolidation project that her boss was running. She enjoyed work on this project and learned about the compensation side of human resources. One manager on the task force offered her a job as an HR associate. Sarah had not completed her bachelor's degree; hence she was limited to the associate position instead of a generalist one with more responsibility. Still, this position expanded her horizons. Her assignments involved assisting in the restructuring of a unit, a project that extended her prior work on payroll consolidation. This work was somewhat out of the range of the typical HR associate's assignments.

The manager who hired her into the restructuring position then left. A new manager, Karen, took a special interest in Sarah (becoming her mentor) and giving her new assignments to stretch and develop her such as gathering data and completing Equal Employment Opportunity reports, merit planning, and benefits. Sarah then took another roughly lateral step to one of the divisional headquarters. Sarah's new boss was a financial manager who judgmentally scrutinized Sarah's work while not developing her skill base. During this manager's tenure, Sarah became interested in an HR generalist position; however, the lack of a college degree limited her progress. She made a proposal for on-the-job training and movement into a HR generalist position but her critical manager declined, stressing the need for a college degree. Sarah had been taking two courses a semester pursuing her baccalaureate degree but had about sixteen courses remaining.

Some months later around 1995, Sarah applied for a generalist position at a nearby division of the corporation. This was a heavy manufacturing division and Sarah worked extensively with labor representatives, further building her HR skill repertoire. She continued here for four years quietly developing her skills.

In 1999, she applied for a promotion into another corporate division. The first time she did not receive the position (because of her degree). The position was given to a journalism major without much background in HR. When this individual did not work out, Sarah was called and asked to apply again for the position. This time she received the offer.

Later that year she was nominated as the division's United Way representative. Individuals are chosen for this role because of their reputation, personality and high potential in the organization. Sarah had mixed feelings about the position. It offered her visibility with senior management and opportunities to network, but the prior representative was laid off upon returning from the full time service assignment. After speaking about her concerns with Karen her mentor, she accepted the offer and found the assignment helpful in developing new competencies such as public speaking, organization building and leadership.

As the United Way activities were finishing, a corporate-wide freeze on hiring was established, confirming her earlier fears. Then, someone left in the management of expatriates area, and Sarah was told that she had to take this position. She started training for the new position and began training a replacement for her current position.

Then, that position was withdrawn, and she returned to the HR generalist position she had held prior to the United Way post. She again has a new boss and that individual is offering her enriching experiences, such as greater involvement in business partnering with internal clients.

Her managers have repeatedly encouraged her to complete her degree and she is making progress. They have also suggested that enrollment in their executive MBA program is possible in the near future after completion of her bachelor's degree.

## THE NON-LINEAR DYNAMICS IN SARAH'S CAREER

Sarah's career involved several discontinuities. She began her work career as a licensing clerk, then moved to office systems as a technician and then as a supervisor and finally executive secretary work before making a larger jump into human resources. The periods in between these moves lasted from a few months to several years, including the period of technical schooling between her clerking and office systems careers. Although her modal time in positions was two years, the intervals were neither regular nor predictable. Since moving into the field of HR, she has spent approximately three and one-half years in the associate position and another four as a generalist before moving to another division and accepting the United Way staff position, which lasted a 3-4 months. Although she is currently experiencing some uncertainty about the immediate future, her career seems poised for another shift or abrupt change. As with the prior changes, the timing of this one will be variable and hard to predict.

Second, her career was not strictly progressive in terms of regular upward movements. The move from office systems supervisor to executive secretary entailed some increase in status but was mostly lateral. Even the move from executive secretary to HR associate was not a large upward step, but more lateral in nature. It was, nonetheless, a major change in function and raised the ceiling for later progression. Although the steps were irregular and uneven, the development of skills was cumulative. The office systems and listening skills of secretarial work are useful for HR systems and listening to clients needs in a partnering context. This cumulation of competencies has been more crucial to her career development than the few promotions she has received.

Third, Sarah's career exhibited several instances of non-proportionality. In some periods she worked long and hard with no apparent payoff. For example, she spent 3-4 years in labor activities when she began as an HR associate, with no tangible consequence. At other times she made larger moves, due to an unexpected opportunity, such as the payroll consolidation project or the United Way position.

Fourth, project opportunities and competency development were a key to her success. These short-term assignments provided access to people and to the generation of new skills that she could leverage in ways that significantly expanded her career options. For example, the

initial restructuring position proved to be a breakthrough opportunity. Here, she gained a positive reputation, leading to recognition by a manager that hired her into a new, expanded role. This position developed career momentum and initial energy. Similarly, the United Way position extended her reputation throughout the corporation, interacting with representatives and senior management from all divisions. These contacts will lead to new potential opportunities that have yet to be realized.

Finally, the presence of constraints and triggers were significant and crucial to her career. Two of her bosses became roadblocks to her success, keeping her away from desired opportunities. Her lack of a college degree was often mentioned as a constraint, yet she was still able to gain access to jobs with higher responsibility, in part due to her commitment and progress toward completing the degree. She also used education as a trigger in her technical training, which provided the initial impetus for movement into office systems. Karen continues to serve as Sarah's mentor, pointing out opportunities and giving advice. Even during this stagnant period, she maintained contact with Karen to remain motivated and to find out about possible opportunities.

Sarah's case highlights the role of projects and of mentors in creating trigger points for change. At the same time, these triggers would have been ineffective without the long periods of very slow but patient competency building, which set the stage for her to take advantage of a confluence of opportunities. As such, the internal dynamics of careers can take on a life of their own, as competencies cumulate and emerge as structural opportunities that bring the individual into new realms of competency development.

Emergent career opportunities represent situations for learning and growth for both the individual and the company. From the individual perspective, each project assignment allowed Sarah to expand her skill base by pursuing tasks and facing situations she had not previously faced. From the organizational perspective, Sarah provided needed resources for the achievement of specific organizational goals. In this way the development of career competencies has motivating benefits for the individuals involved and for the larger organizational system. As such, the continuous development and learning of members is a critical component of sustaining competitive advantage, and is a hallmark of dynamic careers systems thinking (Hall and associates, 1986; Morrison and Hock, 1986; Lichtenstein and Mendenhall, 1999; Boyatzis and Kolb, 2000) For boundaryless careers, the actual outcomes of projects may be less important than development of competencies of individuals working on them. Thus, learning organizations encourage risk-taking and new projects as a means of pushing individual and organization competencies (Bowen, Clark, Holloway and Wheelwright, 1994). As these project experiences contribute nonlinearly to individual career development, so do the contributions of individuals contribute nonlinearly project and organizational success. These concepts are illustrated in the following entrepreneurial case study.

## MICHAEL'S ENTREPRENEURIAL CAREER

Michael's diverse and entrepreneurial career started after receiving his college degree—a B.A. in History. Although he graduated from a prestigious liberal arts college, in his words he «never set out to do anything.» At the same time, he recognized two skills that he knew he could be confident in: he was an excellent salesman, with an ability to sell just about anything to anyone. Michael was also the most persistent and diligent person he knew. He took a job selling cars in a large local dealership, making what was then (particularly to a college graduate) a significant amount of money.

His parents, however, along with his mentors and other family members, decried his new job, arguing that being an automobile salesman did not befit his Phi Beta Kappa education. They insisted that he use his degree in a more “productive” way. After several months of arguments, he agreed to take a job at “Region National Bank,” where his starting salary was half of his previous income. He worked for four years there and at two other evening jobs just to stay ahead of his expenses. By 29 years old he had lost his job, was virtually broke and had very little that looked positive in his future.

Fortunately, he did secure a position at “BigCo Business Credit” as a lending officer in the Machinery and Equipment sector. Living paycheck to paycheck, he felt he had begun to develop an interesting career. After some time he was asked to develop new “lending specialties” at BigCo—lines of credit for industries in which there was no history of business financing. In other words, he was given stacks of reject loan files, and told to «do something with these files!» The stack of rejects represented businesses that no one was willing to lend to, and Michael was giving the task of creating business credit programs for these industries.

Michael was innovative and persistent, and pioneered capitalization programs for numerous emerging or misunderstood industries including jet aircraft, investment-grade diamonds, fine arts, and the exploration of in-ground oil and gas. In each case, he had to learn everything about the industry and develop his own acumen for convincing large financial institutions to finance these areas. His persistence and sales acumen paid off, and he was successful in initiating and institutionalizing the practice of business credit financing for companies in these areas of commerce.

One of the areas he became involved in was the communications industry, creating a specialty in the financing of radio, television, cable, and satellite businesses. Of all the industries he had worked with, this one was the most interesting and dynamic, and he threw himself into it. By the late 1970s BigCo Business Credit was the only institutional lender to private communications companies in America, initiating over \$350 million in loans annually.

In 1981 BigCo was sold to Barclays' Bank, and Michael found himself part of a slow and massive international bureaucracy which did not fit his style. A year later he quit, having only two real assets to his name—a \$50,000 nest egg, and a reputation for being the only source of

financing in the radio and television broadcasting industries. He made a spontaneous decision to set up a company helping others buy and finance radio and TV stations. He knew how to structure financing deals, and he figured that by charging a fee for work he had been doing for more than half a decade, he could lead his own entrepreneurial business.

Michael chose a partner with whom he had worked in the past, and they got started using only their own meager capital. With virtually no excess cash they secured the temporary use of a large storage closet in a friend's office building, turned it into an office by setting up two phone lines on cheap metal desks, and put themselves in high gear. Their first deal was a small television station in Vermont, which they agreed to purchase for \$4,000,000. After agreeing to the purchase—without knowing where the capital would come from—Michael and his partner got on the telephone day and night, seeking financing for the turn-around station. They pulled the deal together and bought and managed the station, which flourished under their leadership. Four years later they sold the TV station for nearly \$25,000,000.

This initial deal drew the attention of a large-scale investor, who wanted to develop an entire consortium of stations. The investor wanted to meet Michael and his partner in their office, which the investor assumed would be a well-appointed corporate headquarters in a fancy professional building. Michael and his partner quickly said yes to the visit, and, thinking on their feet, rented a fancy conference room in an across-the-hall law firm. Acting as if the conference room was their own, they brought in a delicious meal and a meaty proposal, and won the bid for the work. Within a week of the financing deadline Michael and his partner had raised over \$100,000,000 and tied up what would be the initial linchpin deal in their entrepreneurial business.

Setting up this high-profile consortium was the initial catalyst to their long-term success. From 1982 to 1995 the small company generated an annual average of \$350 million in loan deals, creating the largest private investment-banking firm for the communications industry in America. In addition to financing deals worth over \$2.25 billion, Michael and his partner purchased and managed their own group of stations which grew to 20 radio and 10 television companies throughout the United States.

## CONNECTIONS BETWEEN MICHAEL'S AND SARAH'S CAREER

Like Sarah, Michael's early career exhibited several qualities of non-linearity. He experienced several periods of minimal external development punctuated by larger, unexpected shifts in jobs and in competency development. Like Sara, Michael's movements were not progressive—his shift from salesman to banking clerk left him with less money and less responsibility, and his enforced move to work with rejected loans could have been experienced as a step backward in his portfolio. Similar to Sarah his college degree acted as a kind of con-

straint—although Sarah's lack of career limited the pace of her development, Michael's "prestigious" alma mater also created limits to his early development. Michael's early decisions, like Sarah's, set up initial conditions that affected key opportunities; in both cases their entire career history reveals a "sensitive dependence" on these initial conditions, which generated a constrained arena within which their career decisions and opportunities were "attracted" over time.

#### MUTUAL CAUSALITY AND THE EMERGENCE OF ORDER

A big difference between Sarah and Michael is the dramatic emergence of structure in Michael's entrepreneurial career, generated through serendipity, non-proportionality, and another important construct of non-linearity: mutual causality. Mutual causality is a quality that appears in some dynamic systems, where the causation of one element in the system immediately catalyzes the creation of another element in the system, which in turn generates more of the first element, which then generates more of the second, and so on, in an accelerating feedback loop (Goerner, 1994). Examples of these types of mutually catalytic systems have been found in arenas as diverse as biochemistry (Eigen and Schuster, 1979), economics (Arthur, 1990; Day and Chen, 1993), and social evolution (Jantsch, 1980; Adams, 1988). According to scholars of non-linear dynamics and self-organization, when interdependent systems exhibit mutual causality, new structures can emerge spontaneously, generating dramatic possibilities for the system.

At BigCo Business Credit, the need to create funding programs in new or risky industries generated a new position to solve this need. At the same time, Michael's innovative and persistent approach to developing these specialties generated an opportunity in each of these industries: as soon as one business found funding or capitalization, another business in the industry learned about the potential and made contact with Michael's new department. This increased need catalyzed an increase of resources at Michael's command as his superiors recognized his success. This increase in resources and success catalyzed more attention on the programs, thus increasing requests and participation by other businesses in the industry. In this way, the industry-based need for these funding programs, and Michael's ability to satisfy this need, exemplifies a mutually causal system. As much as the businesses' needs catalyzed Michael's position, so Michael's position catalyzed similar businesses' needs, which catalyzed an increase in Michael's responsibilities, and so on, in an expanding spiral of dynamic activity.

Even more powerful is the mutually causal impact that Michael and his partner had on the growth of the radio and television industry. Here again, the needs and possibilities of organizations in the communications industry were the catalyst for Michael's development of financing opportunities in that industry. At the same time, these financing opportunities were catalysts for the growth of the industry. From 1982 through 1995, television and radio financing in the U.S. grew dramatically with double-digit percentage growth increases in most years.

Michael's firm was an important element of that increase; but more importantly, his unique approach to business finance and management was a catalyst for that industry's growth. The billions of dollars of acquisition capital provided by Michael's firm was a very substantial accelerant to fuel the industry's dramatic growth. Moreover, his internal management system became widely accepted, and is now utilized throughout the industry.

Mutual causality was at the root of Michael's entrepreneurial success, creating a business that generated a cash flow of \$5,000,000 (annual average) and revenues in the tens of millions of dollars. According to theories of self-organization (Prigogine and Stengers, 1984; Lichtenstein, 1998), emergent structures like entrepreneurial businesses are the natural result of interactions within these highly dynamic systems. When these interactions display mutual causality, an increase in energy and resources can push the system to a far-from-equilibrium state, sparking the spontaneous generation of new structures that have the capacity to take in even more of these resource opportunities (Swenson, 1989; 1992; Lichtenstein, 2000a; 2000b). As capacity increases, so does the recognition and acting on external opportunity, a dynamic that is particularly crucial in entrepreneurial firms (Shane and Venkataraman, 2000).

#### COMPETENCY DEVELOPMENT, RESPONSIBILITY, AND EMERGENCE IN CAREERS

Like the emergence of entrepreneurial business, the emergence of competencies in careers can also be viewed using the tools of new science. Consistent with previous arguments, competency development is nonlinear and is best developed in interactive, responsive systems exhibiting interdependence and mutual causality. Responsibility and opportunity are essential elements of this process (Arthur and Rousseau, 1996). An individual in a "protean career" requires a high level of self-awareness and personal responsibility to succeed (Hall, 1986). Taking responsibility for continuously improving one's skills is the key to increase opportunities for learning and success. This interaction was expressed by both Sarah and Michael, and the science of complexity helps explain how this interaction works.

Although taking responsibility for continuously improving skills and developing competencies are keys for successful project-based work, some may question how this process is nonlinear. The principle of mutual causality provides one explanation. Competence or capability and responsibility influence one another in mutual ways—they both emerge in the wake of the other. Career theorists have shown how learning and growth arise in interactions that are interdependent, mutual and reciprocal (Hall, 1986). For these project-based systems to work, shared responsibility between the individuals is needed. For example, Katzenbach and Smith (1993) identified responsibility as a key element to the success of team-based systems, most of which are based in projects. Responsibility and responsiveness produce nonlinear learning, which in turn led to new opportunities (Keeney, 1983). Both cases reflect a responsiveness to opportunity as the individuals

develop their competencies preparing them for the next opportunity, whenever it may arise.

These cycles of movement are also nonlinear in the sense that developing competencies, making social contacts, and taking on new responsibilities require energy expenditures that may not yield proportionate returns. Sarah's responsibility for her ongoing education, and her desire to continue learning in each position she held, has generated non-proportional affects in her career, exemplified by an initial slow build-up of competencies, until two key projects expanded her capacity in nonlinear ways, generating important new opportunities for her career. In Michael's case, responsibility has always been a key to his career success, as he said very directly: «I made my career by being the guy at the circus who walks behind the elephant with the shovel. I trained myself to be the most dependable person, the "go-to" guy in every situation. There's nothing that I won't do; this has given me the reputation of being dependable, reliable, and someone to be counted on.

With this level of responsibility, one's competency grows over years and years, which increases the contacts and competencies one can gain over time. The implications of this and the other facets of non-linearity are discussed next.

## **IMPLICATIONS OF A NON-LINEAR APPROACH TO CAREERS**

Viewing careers from a nonlinear dynamic perspective generates a number of practical implications. Rather than recommending specific actions per se, these suggestions are meant to educate and motivate individuals to take certain categories of actions over time that may influence their work lives in a positive manner. Similarly, to the extent that managers can shift their mindsets regarding careers—recognizing that careers are not controllable in a linear sense but are emergent in a nonlinear sense—healthier strategies for career management strategies should ensue. For both individuals and managers, implications from non-linear dynamics include perseverance and responsibility, careers as containers for competencies, seeing mistakes as learning, and taking advantage of leverage points.

### **PERSEVERANCE AND RESPONSIBILITY**

As mentioned above, when individuals exhibit responsibility in their career, the competencies, skills, and contacts generated are not in proportion to the energy the individual expends. This nonlinear process is expressed by a logarithmic curve—earlier in the career more work produces little outward development, whereas over time there are bigger and bigger rewards for the energy one puts in. When one changes professions these levels of development do not drop to zero; previous learning accumulates over the long term, creating new opportunities that may seem disconnected from one's previous expertise (Mirvis and Hall, 1996).

From the nonlinear perspective, the progress can be viewed from the long-term results of various inputs into the system over time. Rather than focusing on the socio-economic status of a single job (e.g., how much the job pays) the non-linear career creator will focus on the numerous skills s/he is learning at any time, and on how those skills can be applied in other areas. In addition, shifting from being reactive against the appearance of a job to being responsive to the job's learning potential can allow one to identify new opportunities and take advantage of them. In other words, by trusting perseverance, and by continuously enacting an ability to respond in a network, positive change can be produced (Lichtenstein and Mendenhall, 2002).

#### CAREERS AS CONTAINERS FOR COMPETENCIES

Numerous scholars of knowledge-based careers have recognized the importance of key competencies such as "knowing-why", "knowing-how", and "knowing-what" in boundaryless careers (Bird, 1994; DeFillippi and Arthur, 1994; Jones and DeFillippi, 1996). Specifically, "knowing-why" identifies the passions and meanings individuals make of their careers (Jones and Lichtenstein, 2000), and the interplay of these individual values with the culture of the specific company or industry one is working in (Parker and Arthur, 2000). "Knowing-how" identifies the individual-based knowledge necessary for accomplishing a job, and the company-based and industry-based knowledge necessary for creating new opportunities and building a career. "Knowing-whom" identifies the social contacts that can provide these opportunities or resources, whether inside an organization or throughout an entire industry network. From a non-linear perspective, then, competency development and lifelong learning are satisfying and crucial elements for building a successful career (Lichtenstein and Mendenhall, 2002).

#### SEEING MISTAKES AS LEARNING

Another useful implication of non-linear perspectives focuses on how these competencies are gained over time. Because the career creator understands the logarithmic nature of a career, behaviors that were once labeled as failures can now be evaluated as "learning" and as "investments." Similarly, behaviors once labeled as "successes" are more accurately seen as "evidences of learning" and "gaining competencies," or the interaction between external circumstances and individuals' efforts to learn and grow.

Overall the goal of learning is the long-term accumulation of skills and experience, rather than individual approach to a particular job or task. In this sense, every career experience provides some "transferable skills" (Bolles, 1978) that can build up and be leveraged over time.

#### TAKING ADVANTAGE OF LEVERAGE POINTS

In the process of constant learning, are there principles or conditions that support career success over career failure? As mentioned above, the competencies of knowing-what, knowing-how and knowing-whom can push one's career forward into an accelerating motion (Jones and

DeFillipi (1996). However, in and of themselves, these skills may not necessarily produce a functional career.

A greater level of success revolves around finding and using leverage points. Leverage points are catalysts, elements of a system that if toggled can produce large, amplified effects (Holland, 1998). Where an individual fully takes responsibility in his/her career and has a choice to behavior in their professional life, the leverage points can be best identified and used. The qualities of self-awareness, responsiveness, learning, and listening are keys to finding these levers of opportunity (Lichtenstein and Mendenhall, 2002). When one's actions are consistent with the competencies of response-ability, freedom and willingness, those actions will be felt more powerfully, leading to greater long-term benefits in one's career. An awareness of the dynamical and emergent nature of career systems and a willingness to constantly learn about those dynamics increase the likelihood that these leverage points will be identified and acted on, improving one's career in unexpected, non-linear ways.

### **CONCLUSION: INDIVIDUAL AND SOCIETAL RESPONSIBILITY FOR DYNAMIC CAREERS**

Both Sarah and Michael experienced this nonlinear growth, which put each of them in positions to leverage the past for greater and greater benefits in the present and future. Others in jobs like Sarah's position have not moved or grown. Perhaps they have not been as responsive or as skilled or had the benefit of mentors who could provide opportunities for mutual gain. If someone is not connected to a social network that encourages such opportunities, an initial career pattern may continuously repeat itself, where the individual simply does not have the tools to break out of it. These individuals become stuck in single jobs or dead-end careers. At some point, they cease to exert more than minimal effort, since no amount of momentum appears to generate a shift in that behavior pattern (Lichtenstein and Mendenhall, 2002).

In other cases, it is the lack of social opportunity that constricts the amount of responsibility that one can take for their own learning and competency development. That is, some individuals find themselves in limiting social structures that are self-reinforcing of defeat and failure. Even if they decided to re-exert themselves, they no longer have opportunities and the reputation to interact and affect the system. In other words, it is the lack of social opportunity that limits the amount of responsibility that one can take for their learning and competency development. In these cases, although the individuals may recognize that responsibility is a key to competency, there are internal and social constraints on the type of responsibility that can be expressed, and on the long-term potentialities that can be reached.

Though responsibility is an inexorable catalyst for nonlinear emergence, the capacity to take responsibility is socially defined as much as it is individually learned (Robbins, 1991; Csikszentmihalyi, 1993). In this way society is implicated as an actor in individual careers, for the

ability to gain access to necessary initial career opportunities is moderated by issues of socioeconomic class and other sociological effects. Yet, as the cases of Sarah and Michael demonstrate, within those constraints each person has the capacity to utilize their responsibility to a great extent. We would suggest that the extent to which individuals do exert high levels of responsibility and aspiration for developing competencies, they will generate careers that are nonlinear, dynamic, and expansive. This expansive quality may be a key to generating a successful managerial profession or creating a unique new venture. If so, then non-linear dynamics and complexity theory can be useful for understanding and enacting entrepreneurial and management careers.

**Endnote.** Special thanks to Payal Gada for her editing of the third section, and especially to Helmi Cotter for her wonderful support and friendship.

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