

Organizational Evolution in a 'Boundaryless' Organization

by

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Abstract

Organizational Evolution applies the metaphor of biologic evolution to learning processes in organizations. An organization's policies, the rules people follow during their daily activities, are its genes, and evolutionists study how policies change as people in an organization make decisions and learn from each other.

'Boundarylessness' was developed at General Electric in the late 1980s and early 1990s, and it is one of the cultural elements General Electric credits for its phenomenal success over the last fifteen years. Proponents of boundarylessness believe traditional boundaries between layers of management (vertical boundaries) and divisions between functional areas (horizontal boundaries) have stifled the flow of information and ideas among employees. A boundaryless culture seeks to overcome the limitations imposed by these and other internal corporate divisions.

This paper provides a brief introduction to Organizational Evolution and then evaluates boundarylessness at General Electric from an evolutionary perspective. Through an analysis of boundarylessness as explained in its literature and through interviews with four former General Electric Employees, it seeks to determine if General Electric's boundaryless culture encourages a high level of evolutionary behavior.

In addition, this paper suggests areas where boundarylessness and Organizational Evolution (as ways of thinking about organizations) can contribute to each other.

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1 Introduction

Corporations are our most often tuned (not to say our most finely tuned, however) social systems. Families tend to be more central to people's lives; cities, countries, and other geopolitically defined communities tend to be larger; and armies and other military organizations receive more rigorous and more specialized training; but no other social systems have been designed, redesigned, tuned, evaluated, and written about the way business organizations (including not-for-profit organizations) have. Entire libraries, literally, are filled with books on management, leadership, strategy, organizational design, compensation and reward systems, and an alphabet soup of quality and productivity programs (JIT, TQM, DFM, etc.)¹. In addition, despite all this readily available material on management of almost every conceivable corporate issue, management consulting companies are some of the most prestigious and profitable firms of our time. And even with armies of consultants available to help implement the library of business improvement material, very few corporations operate as effectively as their managers believe they can and should. Why?

One possibility is that we humans, despite all our efforts, just haven't figured out the key to organizing businesses. Pessimists can point to all our effort and say that we're just not smart enough. Optimists can point to all the progress we really have made in understanding organizations and judge that we

¹ Just In Time, a supply chain management process; Total Quality Management, a quality improvement methodology; and Design For Manufacturability, a design, engineering, and manufacturing cooperation plan which improves quality and reduces manufacturing costs.

must keep trying. After all, many of the ideas in the business books filling those libraries do genuinely shed light on the business of organizing businesses.

There is, however, another view. Perhaps it is not simply that we as people and our organizational ideas aren't yet good enough, although that is part of the problem. Perhaps the issue lies in the complexity of organizations.

Organizational Evolution takes this view. Organizational Evolution theory states that companies and improvement programs fail not because people do the "wrong" things when the "right" things are available and possible, but because organizational systems, with their myriad interdependencies and time delays between policy changes and the effects of those changes, are too complex for human minds to understand.² In other words, the "right" things to do are understandably beyond people's grasp. Organizational Evolution also proposes an alternative method of analyzing and understanding organizations. Rather than working to understand directly how organizations work, organizational evolutionists use the metaphor of biologic evolution to understand and evaluate the way organizations change. It "replaces the impossible task of understanding our complex organizations with the merely difficult task of understanding evolutionary mechanisms."³

From an evolutionary perspective then, the study of successful companies is important for two reasons. First, since successful companies are, at least in their time, the "fittest," it may be useful to study successful organizations to see why they've flourished. Perhaps it is because they are lucky, but more likely,

² Hines, 1998.

³ Hines, 1998.

especially considering organizations which succeed over a long period of time, it is because they do *something* right. More importantly, however, if Organizational Evolution theory is correct, successful companies should display a high level of evolutionary behavior. (See chapter 2 for an introduction to Organizational Evolution.) This paper performs such a study, and it represents the first attempt to use Organizational Evolution theory in evaluating another organizational paradigm.

By any measure, General Electric is one of the late twentieth century's most successful enterprises, and *boundaryless behavior* or *boundarylessness* is one of the primary cultural elements GE credits for its success.⁴ In this paper, I will provide introductions to Organizational Evolution theory and boundarylessness and point out links between the two bodies of thought. More importantly, however, this paper also contains a small cultural audit of General Electric. Four former General Electric employees were interviewed on the subject of boundarylessness, and those interviews have been analyzed to determine if boundarylessness at General Electric encourages Organizational Evolution.

⁴ Talk given by Stephen Kerr, General Electric's Vice President of Leadership Development, at the Sloan School of Management. September 26, 2000.

2 Organizational Evolution

2.1 *Genes and Policies*

Organizational evolution uses the concepts and terminology of evolutionary biology to analyze and describe change processes in organizations. In using the word “fittest” in the introduction, this paper references the most common colloquial definition of evolution. Ask someone on the street what evolution is, and you’re likely to get the response, “Survival of the fittest.” In my ninth grade biology class however, we learned that a one word addition to the standard colloquial definition of evolution made the sentence more accurate. “Survival of the fittest *genes*,” we were taught, is a more appropriate tag line for evolution.⁵ Genes, of course, are the building blocks of life. They are complex molecules which encode the rules for building organisms, and they are central to the study of species evolution. Study how genes change, and you’ll understand how organisms evolve.

Policies are genes’ analog in Organizational Evolution. Study how policies change, and you’ll understand how organizations evolve. The word “policy,” here, has a specific definition. To qualify under this definition of policy, a rule must drive people’s behavior. They must use the rule to make decisions.⁶ The rule need not be written down, and in fact many rules found in corporate policy manuals are not policies at all by this definition because they are ignored. Rules, in fact, need not even be consciously applied or even articulated to qualify

⁵ Praying Mantises and Black Widow spiders were two of the reasons given for adding “genes” to the definition. In both Praying Mantises and Black Widows, females kill and eat males after

as policies. If a rule drives decisions, it's a policy. That's it. And just as organisms are manifestations of their collections of genes, organizations are manifestations of their collections of policies.⁷

2.2 Mutation

Mutation and *recombination* are biology's two mechanisms for changing genetic material, and Organizational Evolution uses these same two terms to describe the ways organizational policies can change. In biology, a mutation occurs when a gene is changed on a chromosome. When a genetic mutation occurs, one of an organism's "rules of life" is changed. In organizations, policy mutations can occur in two ways. Just as in biology, unintended policy changes can result from errors in communicating policies from one person to another. If a store manager tells a new employee that the store closes at 10:00 every night, but Sarah, the employee, remembers 10:30 by accident, a policy mutation has occurred. In biology, random mutations rarely improve an organism, and in organizations, random mutations such as the one described above are generally corrected.

Organizational policies can also be changed by intentional mutation. Using our example from above, if Sarah had *decided* to keep the store open past 10:00 on nights when business was good and the store was crowded, her new idea is a mutation. Some organizations encourage this sort of mutation by calling it initiative, others discourage it by calling it a policy infraction. There is

mating. Thus, in these two species, the fittest males *don't* survive. But since these males are mates before they become meals, their genes *do* survive.

⁶ Forrester, 1961.

⁷ Hines and House, 2001.

evidence that too much mutation can inhibit evolution because policies are changed before their effects are known.⁸

2.3 Recombination

Recombination is biology's far more common method of creating new genetic material. An organism's sex cells (sperm or eggs) contain a single chromosome of each chromosome pair to be paired with the single chromosome of that pair in a mate's sex cells. To create the single chromosome of each pair in a sex cell, genetic material is taken from both chromosomes in the pair and combined into a wholly new chromosome. This is recombination: the creation of new genetic material by joining genetic material from different sources. When two parents mate successfully, their offspring is created with these new chromosomes. Recombination is also far more common in organization than is mutation. Most of the time, recombination in organizations is called learning. As employees learn the policies of an organization, they generally do not copy and use those policies exactly.⁹ More likely, and especially in cases where policies are not articulated, are complex, or both, they learn pieces of the new policies and combine them with policies they already know. Returning to our example of Sarah figuring out when to close her store, if her motivation to keep the store open because it was crowded at the usual closing time was not a flash of her own inspiration but instead was that her previous employer's rule was never to close the store if there were more than ten people browsing, the example becomes one of recombination instead of mutation. Now, Sarah has combined,

⁸ Hines, 1998.

⁹ Hines, 1998.

or recombined, her old employer's rule, never close the store when it's crowded, with her new employer's rule, close the store at 10:00, to form a recombined policy: Close the store at 10:00, unless there are more than ten people browsing, in which case close the store as soon as the number of browsers drops below ten.

2.4 Parenting and “Pointing and Pushing”

The sources of an organism's genes are uniquely determined by the biological process of mating. Each new person, puppy, penguin, prawn or any organism created through sexual reproduction gets to start life with its parents' genes. The parents, by virtue of their surviving to reproductive maturity and successfully mating, get to pass their genes on to another generation.

Parenting, then, is nature's way of biasing the gene selection process so that the best genes are passed on while the weakest genes are not. “Survival of the fittest genes.”

Organizations do not have such an iron clad method of determining which rules survive and which die, so they have to invent mechanisms. These mechanisms are called *pointing and pushing* methods.¹⁰ Returning yet again to Sarah, our poor employee who just wants to know when to close her store so she can go home, let's imagine that after her boss left instructions to close the store at 10:00, a salesperson in the empty store said at 9:30, “Hey, the store's empty, it's raining outside, and we're just wasting time and money by staying open this last half hour. Let's shut down, clock out, and go home early.” It

¹⁰ Hines, 1998.

seems to be a sensible suggestion, but there's a problem. Sarah's boss said the store stays open until 10:00, and his policy didn't allow any flexibility. Sarah's coworker has now suggested an alternative policy. Whose policy will Sarah choose to recombine with her own? The smart money says Sarah decides to keep the store open until 10:00. Why? Even though Sarah's coworker's suggestion is reasonable, perhaps even optimal in this situation, by virtue of her position in the company Sarah's boss carries more clout with Sarah than her coworker does. Thus, position is one of the most important pointing and pushing mechanisms. By putting people in positions of authority, organizations can indicate that these people have been successful, and that their behavior, and hence the rules that give rise to their behavior, should be imitated. There are many other pointing and pushing mechanisms available to organizations: company cars, corner offices, employee of the month awards, access to training, etc. Each of these not only rewards the employee receiving the benefit for good results, it also presents the awarded employee as an example to the rest of the organization. Other employees are more likely to combine their own policies with the policies of these "pointed-to" employees.

3 'Boundaryless' Literature from an Organizational Evolution Perspective

I believe organizational evolution and the foundations of boundaryless organizations thinking are related. Both focus on the ways organizations can best change to meet their challenges. Organizational evolution focuses on the “grass roots level,” looking at the structure and process of actual change transactions in companies. Organizations are organisms, and business policies are their genes. Evolution occurs when policy actors (employees) learn from other, often more senior, employees the “correct” way to make decisions or process work. Most often, however, the employees won't learn other employees' existing policies exactly. Rather, they will be engaged in recombination. “They will be taking pieces [of policies] they [understand] and fitting those pieces into their own pre-existing understanding.”¹¹ Nearly all of the time, the policy changes made by employees will be corrected by others in the organization. In biology also, most mutations fail. However, sometimes these new and different ideas will give an organization an advantage, and the new policy will be embraced as official policy by the organization.

I've focused my attention on three specific ideas which appear in the boundaryless literature; the ideal that adapting an idea is as valuable as inventing an idea; the town meeting concept, where diverse individuals come together to confront an issue and make appropriate changes; and pointing and pushing, or the lack thereof, described in boundaryless organizations. This section introduces boundarylessness, evaluates it from an Organizational

Evolution perspective, and proposes relationships between boundarylessness and Organizational Evolution for exploration in interviews.

3.1 Development of Boundarylessness at General Electric

There are several examples in the literature of boundaryless organizations, but General Electric is considered the model boundaryless company. I found no material which pinpointed exactly where or with whom the idea of boundarylessness started, but Jack Welch certainly propelled it into the world's corporate consciousness with his Work-Out program at General Electric in the early 1990s. In 1992, he described boundarylessness this way:

GE's diversity creates a huge laboratory of innovation and ideas that reside in each of the businesses, and mining them is both our challenge and an awesome opportunity. Boundaryless behavior is what integrates us and turns this opportunity into reality, creating the real value of a multi-business company -- the big competitive advantage we call Integrated Diversity.¹²

Jack Welch believed that rigid, hierarchical organizations were poorly structured to compete in the fast-moving, information-centric, customer-focused competitive environment of the 1990s and beyond. He also recognized that General Electric's people, and especially their diversity of knowledge, talents, and ideas could become a tremendous competitive weapon for the company in the new business environment. Work-Out, GE's boundary-breaking program of the early 1990s, made GE into a boundaryless company and launched boundarylessness both as a management philosophy and a potential field of study.

¹¹ Hines and House, 2001.

¹² Welch, 1992.

3.2 *The Boundaryless Organization, Breaking the Chains of Organizational Structure*

Ron Ashkenas, Dave Ulrich, Todd Jick, and Steve Kerr are the primary authors writing about boundaryless organizations, and each worked intensely with General Electric during its transition from a rigidly hierarchical organization to a boundaryless one. After their experiences with General Electric, these four authors collaborated on the primary text in boundaryless organizations. It is called, not surprisingly, *The Boundaryless Organization, Breaking the Chains of Organizational Structure*.

Boundarylessness (or boundaryfullness, I suppose) can be seen along four dimensions: vertical, horizontal, external, and geographic. Vertical boundaries divide management from employees and divide layers of management from each other. Do the different layers communicate effectively? Horizontal boundaries divide divisions and departments within a corporation from each other. Do different functional areas cooperate with or compete against each other? External boundaries divide a company from others in its value chain. How well does a company collaborate with its customers and suppliers? Does it take an “us against them” attitude, or does it view cooperation and collaboration among members of its value chain as a way to improve everyone’s bottom line? Geographic boundaries are a special form of horizontal boundary. How well does a company cross the national and cultural boundaries that divide its international operations from each other and itself from foreign markets?

Although all four dimensions are important in the boundaryless literature, the horizontal and vertical dimensions are most important for this evolutionary

evaluation of boundarylessness at General Electric because those are the two dimensions concerned with day-to-day interactions among coworkers.

3.2.1 Why Boundarylessness?

It is important to point out that “boundarylessness” should not be taken literally. It *does not* imply a completely amorphous organization. Rather, a boundaryless organization has learned to permeate the four boundary types listed above to better serve its customers and capitalize on good ideas. According to proponents of boundarylessness, for most of the 20th century, size, role clarity, specialization, and control were among the crucial dimensions against which companies measured themselves to become successful. Economies of scale were the crucial driver here, and to take advantage of them, companies became as large and as specialized as possible.¹³ Boundaryless organization literature treats as true the notion that in the late 1980’s and 1990’s, the world’s competitive landscape changed, and new dimensions defined corporate success or failure.¹⁴ While this paper will not challenge or evaluate that assumption, it is important to note that not everyone believes the competitive landscape of the late twentieth century is markedly different from the rest of the post-industrial revolution landscape.

Based on the assumption that our era has seen an increase in the pace of change, adherents to boundarylessness propose that speed, flexibility, integration, and innovation have replaced size, role clarity, specialization, and control as the primary dimensions along which companies must measure

¹³ Ashkenas et al., 1995.

¹⁴ Ashkenas et al., 1995.

themselves.¹⁵ The primary thesis of boundaryless organization literature, then, is that organizations that break down the four boundaries will be faster, more flexible, better able to marshal their resources into products and services (this is the integrative dimension), and therefore better able to generate, harness, and capitalize on new business ideas.

3.2.2 Vertical Boundaries

As described earlier, the boundaryless organization school does not advocate the complete elimination of vertical positions. Rather, it emphasizes the creation of “healthy hierarchies.” Since the industrial revolution, hierarchies designed around the virtues of size, role clarity, specialization, and control have generally been successful. Boundaryless theory states that today, however, similarly designed hierarchies are cumbersome and incompatible with the new virtues of speed, flexibility, integration, and innovation.

In organizations with unhealthy hierarchies where vertical boundaries are too strong, observable status (e.g. rank or position) carries more privilege and authority than less observable but more important qualities such as knowledge, expertise, and experience. A boundaryless organization strives to give authority to those with the appropriate knowledge, expertise, and experience to handle a situation, not to the employee with the highest rank. The military is a classic example of a vertically rigid organization, and it follows from the premises of boundaryless thinking that the authoritarian style of the military is not a good organizational model for companies.

¹⁵ Ashkenas et al., 1995.

This de-emphasis of hierarchical status is problematic where Organizational Evolution is concerned. On one hand, since shared information and improved communication among employees at different levels is a goal of a healthy hierarchy,¹⁶ one can imagine that healthy hierarchies would allow for more recombination than rigid hierarchies. On the other hand, however, the corporate hierarchy is one of a company's most powerful pointing and pushing mechanisms. One would therefore expect to see boundaryless organizations employing other pointing and pushing mechanisms to compensate.

The Boundaryless Organization (the book, that is) does include a section on rewards in a healthy hierarchy, but it only vaguely touches on a reward system's pointing and pushing functions. It points out that in healthy hierarchies, advancement up the hierarchy should no longer be the only reward for which employees strive. "People in healthy hierarchies are still motivated by money and/or power, but they can earn those rewards by being high performers and managing important processes effectively. They can benefit from staying in one job and doing it well."¹⁷ In other words, they can be rewarded without advancing up the hierarchy. Boundarylessness' motivation here is to keep people from being promoted up the hierarchy into positions for which they are not well-suited. This makes sense, but boundarylessness does not offer any other means of indicating to the organization which employees are its top contributors.

Reward systems are the drivers of employee behavior, so it is crucial to ensure congruence between corporate reward systems and desired

¹⁶ Ashkenas et al., 1995.

¹⁷ Ashkenas et al., 1995.

performance.¹⁸ Healthy hierarchies have flexible reward systems, allowing managers to assign compensation at all levels based on results, not position. Pointing and pushing is critical here, and it is interesting that the boundaryless literature does employ pointing and pushing based rewards when it discusses creating boundarylessness, but then does not consider pointing and pushing when rewarding other performance criteria. Boundaryless organization literature stresses that managers should always *publicly* recognize good boundaryless behavior in employees to establish and maintain a boundaryless culture.¹⁹

3.2.3 Horizontal Boundaries

In *The Wealth of Nations*, Adam Smith described the efficiencies gained in a pin factory when each worker concentrated on a portion of the process and passed the in-process work off to other workers. In addition to dividing the various specialties (marketing, engineering, finance, etc.) from each other, horizontal boundaries can also separate employees along other dimensions: union vs. non-union, exempt vs. non-exempt, full-time vs. part-time, etc.²⁰

Despite their historical value, over-strong horizontal boundaries cause several problems in today's competitive environment, and they are probably more of an "evolution inhibitor" than over-strong vertical boundaries. Product development is a frequent example here. Research & development designs a product, passes it to engineering, which redoes the design, builds a prototype and passes it to manufacturing. Manufacturing alters the design to make the product easier to build, and then passes the whole thing on to marketing, which

¹⁸ Kerr, 1999.

¹⁹ Ashkenas et al., 1995.

only then figures out how to sell the product.²¹ In shielding people from each other, horizontal boundaries can inhibit collaboration.

From an Organizational Evolution perspective, healthier horizontal boundaries do not present the quandary that healthier vertical boundaries did. Using the example above, recombining the product development policies from the various disciplines into policies developed with the whole product development process under consideration is likely to shorten cycle times and eliminate duplicate work. Viewing product design from a holistic perspective, R & D can no longer design new products without input from engineering, marketing, and manufacturing. Holistic processes are in and of themselves interdisciplinary, and the recombination that results from interdisciplinary work should improve the process, the product (or service), and those who develop it.

3.3 Implementing Boundarylessness at General Electric

3.3.1 Adaptation vs. Invention

Boundaryless behavior has become the 'right' behavior at GE, and aligned with this behavior is a rewards system that recognizes the adapter or implementer of an idea as much as its originator. Creating this open, sharing climate magnifies the enormous and unique advantage of a multibusiness GE, as our wide diversity of service and industrial businesses exchange an endless stream of new ideas and best practices.²²

This quote ignited my interest in the link between organizational evolution and boundarylessness. Because of its unique position as a "multibusiness" company, General Electric recognized the importance of idea adaptation, or in

²⁰ Ashkenas et al., 1995.

²¹ Ashkenas et al., 1995..

²² General Electric Annual Report, 1994.

organizational evolution terms, recombination. By creating an atmosphere where adapting and implementing a good idea from another area of GE or from outside is valued as much as or more than generating the good idea, Jack Welch focused his company on getting the maximum benefit from its diverse and powerful intellectual capital.

3.3.2 Town Meetings and Other “Recombination Labs”

“Town meetings,” developed at GE as it embraced boundarylessness, are an important tool in creating boundaryless organizations. In a town meeting, employees with a common goal or purpose (serving the same customer, working on the same product or process, etc.) but from different areas and different levels of management come together to discuss new ideas. In the organizational evolution reading of boundarylessness, town meetings are recombination workshops. Groups work for a few days before town meetings to generate and refine new ideas, and the ideas are presented, discussed, and either killed or implemented at the meetings. The town meeting format provides “safe ways” for anyone’s ideas to be challenged by anyone else, without regard to position or authority. Town meetings have two purposes. First, of course, is to generate and implement change ideas. Second however, is to educate people on their “real degrees of freedom,” to let employees know what decisions they can make on their own and to encourage them to do so.²³ This creates an atmosphere where change, i.e. recombination, is not only encouraged at town meetings, it is encouraged throughout the organization whenever and wherever it is necessary.

As discussed in section 3.2.2 (Vertical Boundaries), boundarylessness diverges somewhat from Organizational Evolution when it comes to pointing and pushing. The town meetings above seek to encourage recombination, an idea compatible with organizational evolution, by de-emphasizing the corporate hierarchy and its pointing and pushing role, and idea incompatible with organizational evolution. The de-emphasis is designed to allow any employee to contribute, a laudable goal, but raises questions about how employees tell good ideas from bad ones.

3.4 A Note on Boundaryless Careers

There is a second body of work using the term “boundaryless” in its label. In addition to boundaryless organizations, there is also the concept of *boundaryless careers*. Loosely defined, a boundaryless career is one in a boundaryless organization or a series of boundaryless organizations. I have not studied boundaryless careers extensively, but it is interesting to note how boundaryless organization concepts are described in the boundaryless career literature.

Learning: Old meaning: acquisition of knowledge committed to memory, typically by individuals. New meaning: a multilevel phenomenon, includes creation and acquisition of knowledge, collective processes for shared interpretation, and patterns of adaptation and transformation.²⁴

The above quote illustrates both the similarities between the two bodies of thought (boundaryless organizations and boundaryless careers) and also the evolutionary perspective in boundarylessness. In many ways, each approaches

²³ Ashkenas et al., 1995.

boundarylessness from a different perspective, boundaryless careers from an employee's perspective, and boundaryless organizations from the organizational or systems perspective. (One is tempted to say here that each approaches boundarylessness from the *opposite* perspective, but in a boundaryless world, employees and corporations should no longer view themselves as having opposite perspectives.) By emphasizing the collective aspect of learning, the boundaryless career's definition of learning moves toward recombination and therefore toward an evolutionary perspective of the process.

4 The Interviews

4.1 Interview Goals

Does boundaryless behavior, specifically does General Electric's boundaryless culture, lead to organizational evolution? If so, which evolutionary mechanisms (mutation, recombination, pointing and pushing) are most important in General Electric's boundarylessness culture? My primary goals in interviewing former General Electric employees was to answer those questions. To do so, I conducted what I call "cultural evolutionary audits" of General Electric. Prior evolutionary audits focus participants directly on specific evolutionary processes such as promotion criteria and on evolving policies, such as hiring policies or pricing policies.²⁵ My interview methodology was less direct, asking participants to explain boundarylessness and give examples of boundarylessness as they experienced it at GE. Only when their explanations and examples involved evolutionary concepts did I focus on organizational evolution. Thus, participants

²⁴ Arthur and Rousseau, 1996.

should have experienced our discussions as primarily about boundarylessness and only secondarily about evolution.

4.2 Interview Plan

Interview formats range from *highly scheduled*, where the questions are entirely scripted in advance and the sequence of topics is completely controlled by the interviewer to *nonscheduled* interviews where the information given by the subject determines the topics of discussion.²⁶ *Moderately scheduled* interviews occupy the range between the rigidly structured, highly scheduled interviews and the unstructured, nonscheduled interviews.²⁷

My interviews were moderately scheduled, tending more towards non-scheduled than highly scheduled. I introduced basic topics and drilled down as participants brought up topics related to organizational evolution. From both strategic and tactical points of view, it was important to allow participants wide latitude as they described General Electric and boundarylessness. Strategically, it was crucial to allow participants to speak about boundarylessness entirely from the General Electric perspective, rather than asking them to look for evolution. In this sense, the interviews were more raw material which I mined for evolutionary evidence, rather than mining opportunities themselves. Tactically, of course, it was important for the people I interviewed to enjoy the experience and to be comfortable giving me information in an area in which they were experts: I came to them seeking their expertise on General Electric and boundarylessness.

²⁵ Hines and House, 1999.

²⁶ Downs, et al., 1980.

²⁷ Downs, et. al., 1980

4.3 The Participants

I interviewed four former General Electric employees for this study. All four left GE within the last two years, and a majority of each participant's career to date was with General Electric. Each participant's identity has been disguised in this paper. Two participants, "Al" and "Bill," were long standing senior managers in a General Electric research center. Both retired within the last two years after careers spanning more than thirty years at GE. I spent approximately ninety minutes with each one.

I interviewed the other two study participants, "Craig" and "Diane," together. Craig and Diane are both current business school students, and each was part of General Electric's Technology Leadership Program. In that program, both Craig and Diane rotated among different General Electric businesses working in different capacities on different assignments. Craig and Diane each worked at General Electric for five years.

4.4 Interview Results

4.4.1 Mutation and Recombination at General Electric

Based on the links between Organizational Evolution and boundarylessness I identified earlier, I expected study participants to describe both a cultural predisposition towards idea recombination and formal organizational structures and processes designed to stimulate recombination. Mutation, because of its lack of emphasis in the boundaryless literature, I thought would account for a small amount of General Electric's organizational

energy and organizational change. These expectations were borne out in the interviews.

4.4.1.1 Culture

The boundarylessness literature discusses at length the importance of establishing a culture predisposed towards idea sharing and group problem solving, and all four participants remarked that idea sharing and adaptation were part of the General Electric “mind-set.” Participants described GE’s boundarylessness as follows.

“Boundarylessness implies both a receptivity and openness to ideas, no matter their source, and a bias to actively search beyond your immediate confines for best practices when approaching problems. It also means aggressively sharing your own ideas wherever you think they might add value.” (Al)

“Attitude: everyone can learn something from somewhere else, and it’s often faster to adapt rather than invent.” (Al)

“Boundarylessness is an openness to good ideas from anywhere, the opposite of NIH [Not Invented Here]. Also a commitment to the success of the entire organization. Corollary: [Boundarylessness includes an] expectation that one is open to *giving*, as well as receiving, good ideas.” (Bill)

“I can say that I’ve never worked on more successful cross-functional teams than I did at GE. In other companies that I’ve been with, they say that they work on cross-functional teams but the truth is they just send an email to each other or a phone call here or there. But at GE we truly worked with each other on a daily basis. I worked with purchasing, sales, marketing people every single day, face-to-face, at my desk, at their desks, in meetings, etc.” (Diane, responding when asked to describe the effects of the boundaryless culture.)

Equally important, the only times participants described “bad” boundaryless behavior were either referencing work outs (see below) or

examples of people leaving GE because they didn't fit with the boundaryless culture. Based on the descriptions of this study's participants, GE walks its talk on the subject of boundarylessness.

4.4.1.2 Formal Processes

Study participants all described processes designed to stimulate idea exchange and adaptation (i.e. recombination) among business units and business functions. Each of these focuses on problem solving by interdisciplinary groups, best practice dissemination and adaptation, or idea movement through people movement.

Work out

Work out is General Electric's name for the town meetings described in the boundaryless literature, and it is both a boundaryless problem solving tool and a primary method of creating a boundaryless culture. Diane was an assistant work out facilitator, and she described the work out process in conflict resolution terms. In a manufacturing setting, the survival of the business depended on replacing older, labor intensive manufacturing lines with newer, highly-automated lines. She helped facilitate a work out process involving assembly line workers and plant management, the end result of which was agreement that the new lines were critical to the manufacturing plant's survival and a jointly developed implementation plan. Work out's relationship to recombination occurs in two areas. First, work out processes involve everyone with a stake in solving a problem or addressing an issue. In that sense, it is designed to ensure that multiple perspectives on an issue are heard and used in

developing an approach or solution. As a culture tool, work outs foster communication (often for the first time) among constituencies who often don't communicate. Work outs, then, plant the seeds for later idea exchange and recombination by encouraging employees to meet and forge relationships with other employees they would not otherwise know.

The Role of GE Corporate and the "Council" system

Bill described the central General Electric corporate organization's role in the company. Unlike many central corporate organizations which define processes and expect business units to implement them as defined, GE's corporate organization focuses mainly on recognizing and articulating problems which affect multiple business units and therefore GE as a whole. The business units are then expected to solve the problems. Although General Electric doesn't use the language of evolution, in encouraging people from different businesses to communicate often, the corporate organization also sets the evolutionary environment in which the problems are solved.

Al gave the new product introduction (NPI) process as an example. GE's corporate organization defined NPI as a crucial task for which businesses must create a formal process:

[NPI] is a series of document steps that a business needs to go through for orderly introductions and product life cycle management, starting from concept through end of life.... In the beginning, NPI was taught by a central organization. That central organization helped move ideas amongst the businesses via examples they used in the teaching process.... Around and around they went, improving with each round. The focus on NPI in all the businesses then creates a body of process knowledge which can be shared so as to improve performance.

Bill described GE's six sigma quality initiative in the same way. Jack Welch set six sigma as a crucial goal for GE in the early 1990s, and GE set up a central organization to jump-start the process and facilitate idea sharing among the GE's various businesses. Out of this process developed a six sigma council composed of quality experts from different businesses. The council met quarterly to share information about what worked and what didn't in the quest for quality. Through the council, good ideas in use in one area of GE would quickly be incorporated into other areas. Bill also described other councils, all composed of experts from GE's various businesses. Human resources, supplier management, and legal affairs all had formal councils and informal networks designed to allow the best ideas in one area of GE to quickly migrate to other areas. Important here is that each business was free to define its own policies. The councils' and networks' purpose was to allow information sharing, not to make policies and impose them on the businesses.

Design Reviews

I provided all participants in the study with a one page description of Organizational Evolution so they would better understand Organizational Evolution's perspective as I interviewed them. (See Appendix 1.) After reading the introduction, Craig and Diane described General Electric's design review process as an example of idea sharing among businesses. Like most companies, General Electric convenes a panel of experts to review product designs at development milestones. Unlike most companies, however, GE's design reviews are conducted by experts from outside the business developing

the product, not by internal experts. Again, this process results in people being exposed to the product development policies of experts from other businesses. Interestingly, Craig mentioned that people conducting design reviews are often retired and brought back on a contract basis to perform the reviews. Perhaps the reviews are an attempt by GE to ensure that retired reviewers have the opportunity to convey their knowledge to others in the company after they have left.

“People Move Around”

Craig and Diane gave me two examples of General Electric’s predisposition towards moving people around among businesses. Craig:

It seems like GE places a premium value on individuals who worked in various businesses for GE. And often times you find plant managers having been promoted from outside a particular business, being brought in from another business in GE.

Leaders who move around, of course, bring their ideas with them to their new organizations, providing plenty of opportunity for recombination between the policies of the leader and the policies of her / his new organization. In addition, by moving leaders among businesses, GE allows its leaders to develop broad networks within the company. Diane also pointed out that “if you’re in your job more than eighteen months, people start asking questions,” so changing roles and changing organizations is part of the GE career path.

Business Leader Compensation

General Electric works very hard to avoid being a conglomerate.²⁸ One way it does so, Al explained, is that “at the highest levels, business leaders’ compensation is dependent on the financial performance of GE as a whole, as well on the performance of their own businesses. So the motivation is, in fact, to share ideas, and resources.”

4.4.2 Pointing and Pushing at General Electric

While General Electric’s culture and many of its formal processes appear designed to foster idea recombination, the company seems less focused on pointing and pushing. In my four interviews, there was only one example of strong, successful pointing and pushing. There was also a pattern of General Electric’s pushing the organization towards boundarylessness, although GE used a weak pushing mechanism to do so. In addition, there were several examples of policies which weakened potential pushing mechanisms. GE, in my evaluation, does not generally seek to direct its employees’ learning through pointing and pushing.

4.4.2.1 Strong Pointing and Pushing

Craig provided the one example of strong, effective pointing and pushing from his tenure as a six sigma program black belt.²⁹ As explained earlier, Jack Welch set six sigma quality as a corporate wide goal in the early 1990’s. When the program was first initiated, Craig explains:

²⁸ Talk given by Stephen Kerr, General Electric’s Vice President of Leadership Development, at the Sloan School of Management. September 26, 2000.

²⁹ The General Electric six sigma program certified employees’ expertise using the labels of martial arts disciplines.

People kind of looked at it with skepticism. They thought it was just another GE fad, but after a while, they see their friends and other people they know getting promoted in the company and they start thinking, "this is something I need to work on," so people started volunteering in mass to work on six sigma programs. It was pretty interesting.... Even the maintenance supervisor that had been there for 15 years now is raising his hand and saying "I want to be a green belt," with aspirations of being a black belt or something.

All four study participants mentioned the success of GE's six sigma rollout and that the six sigma program directly improved the quality of GE's products, so it is reasonable to assume that the rapid training of a large group of six sigma experts which resulted from the promotion pattern Craig mentioned helped the cause.

4.4.2.2 Negative Pointing and Pushing

Generally, when Organizational Evolution discusses pointing and pushing, it means both positive and negative pointing and pushing. Positive pointing and pushing, as described in the previous section, occurs when in seeing the people a company rewards with positions of authority, high salaries, and other benefits, other employees incorporate the rewarded employees' policies into their own. Craig's example above, however, was the only example of *positive* pointing and pushing in this study. A more common description was *negative* pointing and pushing, meaning General Electric often terminated people who didn't appropriate boundaryless behavior. Al and Bill each mentioned several times that a bounded leader would be unable to survive at GE, and each backed up the statement with examples. Both mentioned that when their research center was reorganized from small labs into larger ones, the lab managers who survived were the boundaryless ones. In addition, Bill mentioned a high profile departure

of the CEO of a very successful GE business unit. The CEO, it was understood within GE, and been forced out of his position because he was violating the boundaryless culture by putting the goals of his business unit ahead of the goals of General Electric as a whole. Thus, from this study it seems that GE views survival as its primary pointing and pushing method. Usually, employees should emulate those who are promoted. In this case, the message seems to be, “don’t do what those ex-employees did.”

4.4.2.3 Policies which Weaken Pointing and Pushing

Interestingly, General Electric’s predisposition to move leaders around in its organization may actually weaken its pointing and pushing mechanisms. For example, it was widely known that reviewers in the design review process (see section 4.4.1.2) were very successful senior employees. However, since the reviewers typically worked with the product teams for short periods of time, there was little opportunity for product team members to learn anything other than what the reviewers consciously tried to teach them. For example, it is easy to imagine that in a short period of time, design reviewers could give excellent feedback to designers about the manufacturability of product designs. Harder to communicate, however, would be the analytic process the reviewer uses to evaluate the design. On which aspects does she focus? How does she organize her thoughts? Berry and Broadbent showed in 1987 the existence of *implicit knowledge*, knowledge that people have and use but cannot articulate.³⁰ Organizations would need to spread this type of knowledge through imitation, by having expert and less experienced designers work together on a design over

time. General Electric's weak pointing and pushing makes that type of interaction less frequent. Similarly, General Electric's penchant for promoting leaders from outside its business units can have the same effect. When a new leader arrives, lower level employees have not had the benefit of seeing why the new leader was promoted. In addition, the pointer in his old organization is weakened, since old colleagues may not know he was promoted, or if they do know, they certainly don't see him operating in the new capacity.

Session C is General Electric's term for the meeting during which senior managers discuss their professional staffs to make decisions about their career development, and my discussions about these meetings were interesting because Al and Bill participated in session C meetings while Craig and Diane were talked *about* in different session C meetings. Thus, Al and Bill saw the process and saw the results from the managers' perspective, while Craig and Diane saw only the results from the "managed's" perspective.

I asked Al specifically whether the managers in the meeting considered the examples being set as people were promoted or "fast tracked" in the organization, and he said that in general, his organization considered the reward system's and career track's effects on the employee being discussed, but did not strongly consider the messages being sent to the rest of the organization. Craig's and Diane's experience of session C meetings jives with the description given by Al. They said that people in their organization did not know who was being fast tracked for a promotion, although there was a "rumor mill" which

³⁰ Berry and Broadbent, 1987.

discussed the results of the meetings. Session C, then, represents a lost pointing and pushing opportunity at General Electric.

4.4.2.4 Cultural Bias Against Pointing and Pushing

Section 4.4.1.1 proposed that General Electric's culture predisposes the company towards recombination, and in it I used several quotes to support my claim. Those same quotes, interestingly, also provide evidence that General Electric's culture is biased against pointing and pushing. Two of the quotes are reproduced here:

“Boundarylessness implies both a receptivity and openness to ideas, *no matter their source*, and a bias to actively search beyond your immediate confines for *best practices* when approaching problems. It also means aggressively sharing your own ideas *wherever you think they might add value.*” (Al)

“Boundarylessness is an openness to *good ideas from anywhere*, the opposite of NIH. Also a commitment to the success of the entire organization. Corollary: [Boundarylessness includes an] expectation that one is open to giving, as well as receiving, good ideas.” (Bill)

The egalitarian aspect of boundarylessness is illustrated by the phrases I've italicized in the quotes above. A boundaryless organization drives employees to consider all possible sources for ideas. Organizational Evolution's pointing and pushing concept, on the other hand, postulates that an organization will be better served by having its employees look primarily to pointed-at people for ideas. How can an employee tell if an idea is good? How can he know when an idea will add value? Once all the ideas from every source have been gathered, how does he decide which to use and which to discard? Organizational Evolution believes it is very difficult for any individual to answer

those questions. Evolutionary thinking came about, in fact, because organizations are too complex for human minds to decipher and analyze³¹, so it is very difficult for employees to judge ideas merely on their merits. In encouraging employees to evaluate ideas directly and in encouraging them to consider all ideas equally, General Electric deliberately short circuits the pointing and pushing mechanisms which should bias employees toward recombining good policies with their own.

³¹ Hines, 1998.

5 Simulation

Evolutionary audits are only half the work being done at the Organizational Evolution Lab. Simulation of evolutionary behavior is the other half. Simulations often yield results which tell interviewers where to focus during evolutionary audits, and as in this case, audit results can yield new questions for simulation. This section raises such a question, describes simulations run to analyze it, and presents the results. Generally, pointing and pushing mechanisms must be designed with both positive and negative pointing and pushing: they point at *positive* role models and push employees *towards* them, and they point at *negative* role models and push employees *away* from them.³² General Electric seems to emphasize almost exclusively the negative aspects of pointing and pushing. What happens when an organization uses a “negative only” pointing and pushing mechanism in the way GE appears to?

Simulation in Organizational Evolution is built on a rich methodological base including System Dynamics, agent based models, and genetic algorithms.³³ Genetic algorithms simulate the evolutionary processes of mutation, recombination, and selection to solve complex problems.³⁴ Most users of genetic algorithms, in fact, focus on the method’s *ability* to solve problems. Organizational Evolution, however, uses genetic algorithms because they represent the very learning processes at work as organizations’ policies evolve.

At the time this research was nearing completion, Ray Ro was nearing completion on his simulation based research. To explore evolution in recently

³² Hines and House, 2001.

merged companies, Ray had augmented a simulation environment originally developed by House et al.³⁵ It struck us that the single company cases Ray used for comparison purposes in his work could provide an initial exploration of negative-only pointing and pushing. Ray was gracious and generous enough to work with me to develop the simulation scenarios documented here.

This section is intended to provide readers with sufficient background to understand the simulations and to results. It is not a full theoretical and mathematical justification of the simulator. Interested readers can find that material in Ray Ro's 2001 thesis entitled *An Evolutionary Approach to Improved Performance of Merged Companies*, and this section summarizes and greatly simplifies the simulator description given in that paper.

5.1 Concepts and Terms

Our experiments simulate a software development company, and each experiment simulates a series of software projects being managed by teams of managers. Each individual manager has a policy about how many programmers she likes to hire to work on a project. The managers' policies can range from eleven to twenty programmers, and each manager starts each experiment with a random policy value. The company randomly assigns the managers into five project teams for each project cycle or *generation*, and each experiment consists of 100 generations. Each manager also has a *status*, indicating her influence as teams determine the number of programmers to hire and also indicating how likely it is for other managers to learn from her policy. Initially, all managers start

³³ Hines and House, 1999.

³⁴ Goldberg, 1989.

with equal status. For these simulations, more programmers is assumed to be a better policy than fewer because a larger team of programmers will complete a project more quickly than a smaller one. (The benefit of faster completion is also assumed to outweigh the cost of more programmers.) Thus, project teams which use more programmers are considered more successful than those which use fewer programmers.

The number of programmers each team chooses to employ in each generation is determined by computing a weighted average of the policies of the managers on the team. The weights are determined by the managers' statuses, and higher status managers have more influence over the decision than lower status managers.

After each generation, the five project teams are ranked in order of their success. Recall that teams which choose to employ more programmers are more successful than teams which choose fewer programmers. Once the teams are ranked, the simulator can apply a *promotion algorithm* to raise or lower the status of each team's members. The three simulations presented here each used a different promotion algorithm (see below), and the promotion algorithms were the only difference among my simulation runs.

In addition to promoting each manager after each generation, the simulator can also allow managers to learn from each other after each generation. A manager's status determines how likely it is that another manager will learn from her, with higher statuses increasing the likelihood. If manager 2 chooses to learn from manager *i*, a portion of manager *i*'s policy, represented as a

³⁵ House et al., 2000.

binary number, is copied to manager 2's policy (see Figure 1). The simulator randomly determines the "crossover point" after which the learning manager's policy digits are replaced with the target manager's digits. To allow the graphs of the experiment results to show a "steady state" before the effects of promotion and learning, the simulator in all three experiments ran initially with no promotion and no learning. It began to apply promotion algorithms after the eleventh generation and it allowed managers to learn from each other after the 41st generation.³⁶

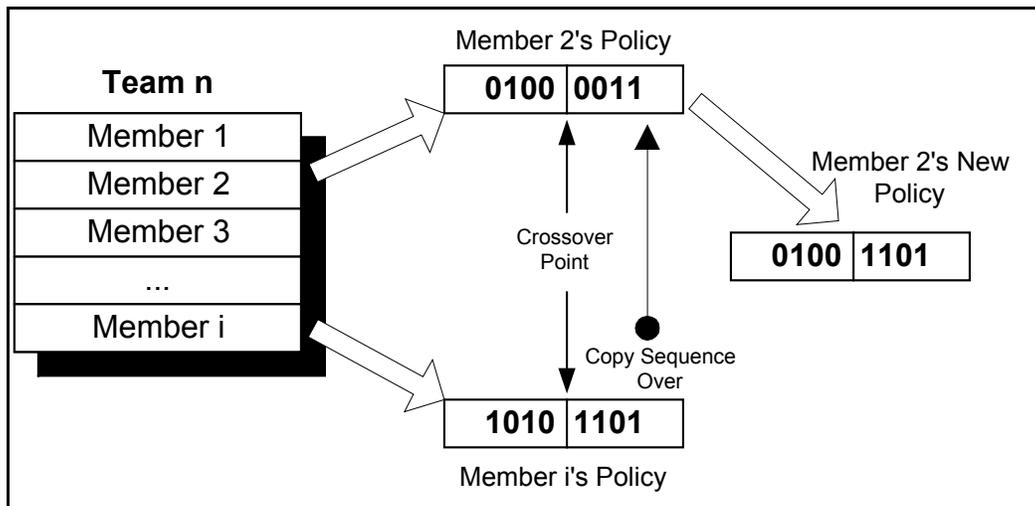


Figure 1 – Illustration of Manager 2 learning from manager i.³⁷

³⁶ This sequence was built into the simulator. It may be dynamically important in influencing the speed of organizational improvement and convergence. However, I don't believe the sequencing of promotion and learning affects the basic conclusions.

³⁷ Ro, 2001.

5.2 Promotion Algorithms

	Results	Worst	Fourth	Third	Second	Best
Experiment A	Figure 2	.5	.75	1	1.5	2
Experiment B	Figure 3	.5	1	1	1	1
Experiment C	Figure 4	.5	.625	.75	.875	1

Table 1 – Promotion multipliers and result locations for each experiment

Table 1 summarizes the promotion schemes used in each experiment. After each generation in an experiment, the project teams were ranked according to their success. The numbers in the “Worst” through “Best” columns show the value by which the managers’ statuses were multiplied after a generation to calculate the managers’ statuses for the next generation. For example, if a manager started a generation during experiment A with a status of 3 and her team was the best team (i.e. hired the most programmers) in that generation, the manager’s status would be 6 (3 x 2) starting the next generation.

Experiment A represents standard pointing and pushing. The managers on the best team are promoted, their statuses are doubled; and the managers on the worst team are demoted, their statuses are halved. The other teams’ managers’ statuses are also changed according to their rank. Experiment B roughly approximates the General Electric pointing and pushing strategy. In it, the worst performing team’s managers’ statuses were halved, and no other managers’ statuses were changed.

There are two key differences between the promotion algorithms in experiments A and B. First, of course, is experiment B’s lack of promotion. No manager’s status can increase during the experiment. In addition, experiment B’s promotion algorithm provides very little differentiation among managers. The

twenty percent on the worst team are demoted, but everyone else stays the same. Experiment C was run to determine which quality of a pointing and pushing scheme is more important, promotion or differentiation. In it, no manager can ever be promoted, but each team's statuses are adjusted according to the teams' success.

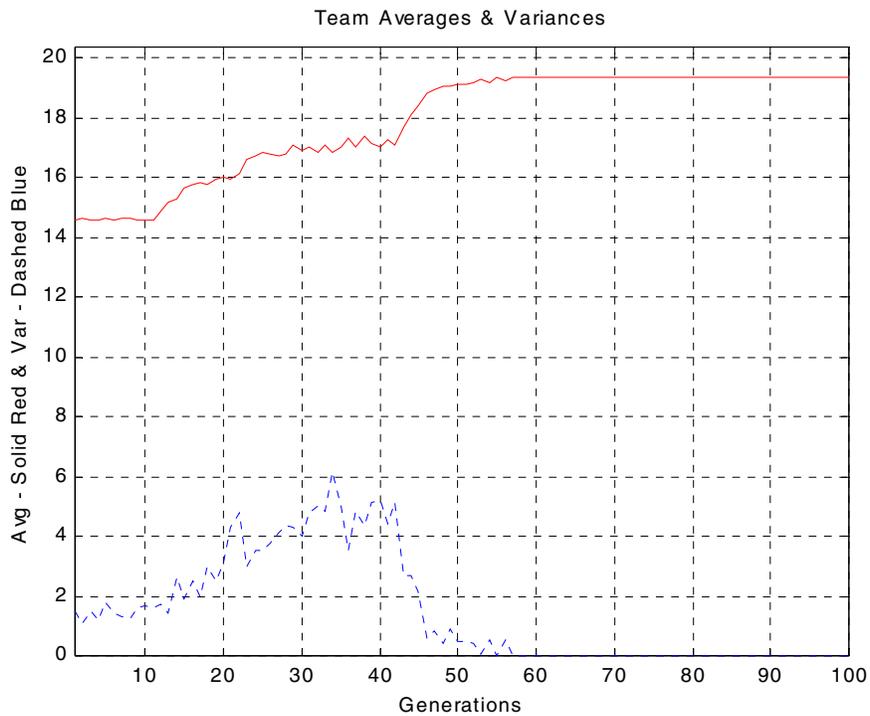


Figure 2 – Experiment A, Scaled promotion and demotion based on team performance after ten generations and learning after forty generations.

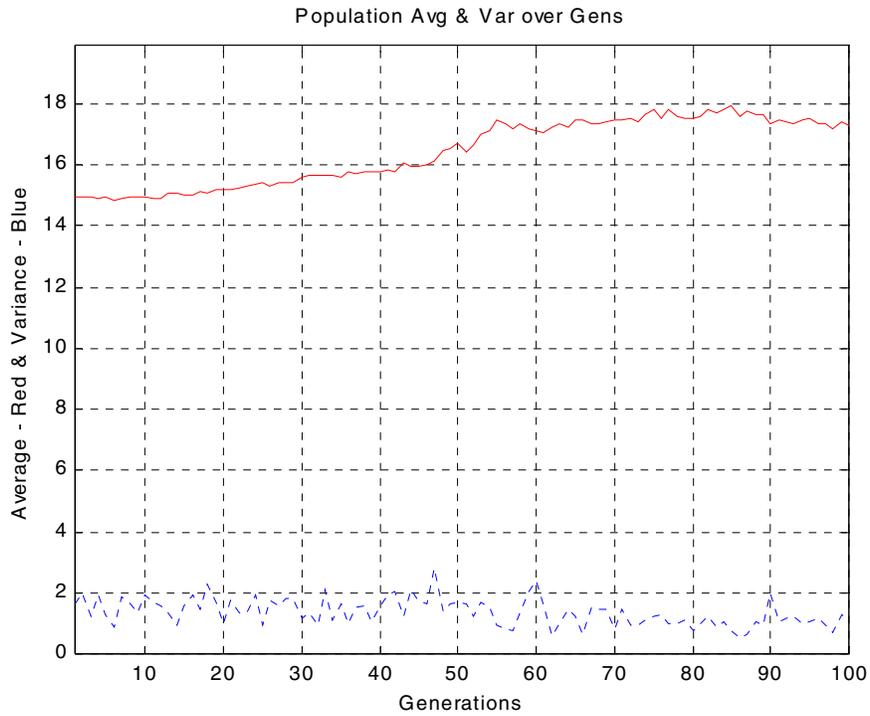


Figure 3 – Experiment B, Demotion of only the lowest performers after ten generations, and learning after forty generations.

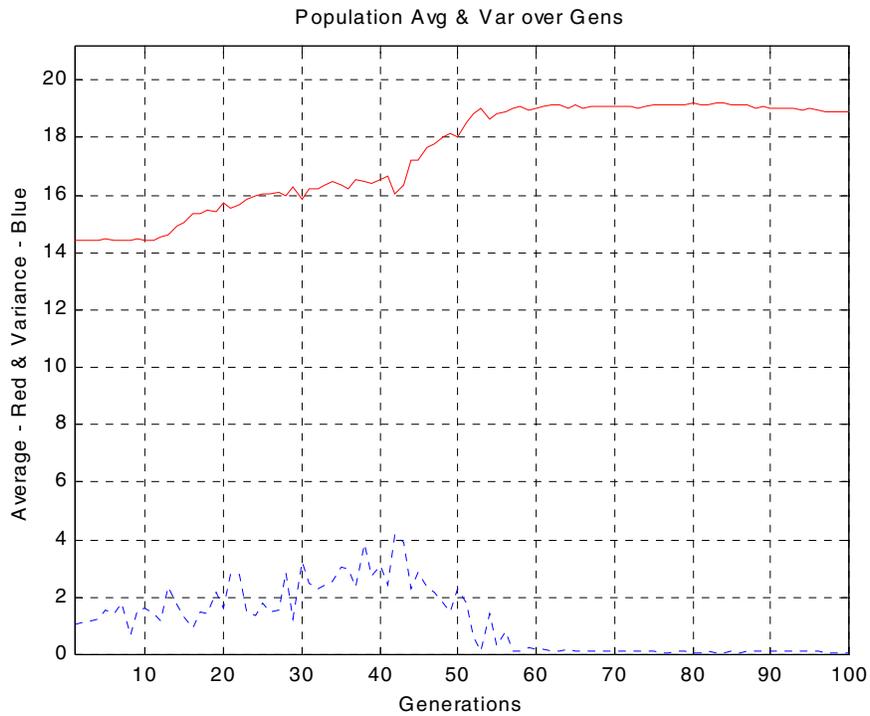


Figure 4 – Experiment C, Scaled demotion based on team performance begins after ten generations and employees begin to learn from each other after forty generations.

5.3 Interpreting the Simulation Results

The top line in each graph, or the red line if you have a color version of this paper, represents the average of all managers' policies after each generation. The bottom line, or blue line, shows the variance of the managers' policies. The first important conclusion is that the results of experiments A and C look very similar, suggesting that differentiation rather than promotion is crucial for successful pointing and pushing. In both experiments, the average policy climbs from fifteen to approximately seventeen during generations eleven through forty. Pointing and pushing, even without learning, works in both cases. The added influence successful managers enjoy shifts the teams' policies towards the optimal policy of twenty programmers. After the fortieth generation (when the simulator begins to allow learning), managers begin to learn, and they are more likely to learn from high status managers. The managers' average policy converges at nineteen, almost the optimal twenty.³⁸ In addition, in both experiments A and C, the variance of the managers' policies drops to zero. Promotion and learning have led to consensus in both these experiments.

Experiment B, run to model General Electric's policy of pointing at and pushing away from only the lowest performers, is different from the other two, and the results suggest that an undifferentiated pointing and pushing model is less effective than one which differentiates grades of performance. Between generations eleven and forty, experiment B shows very little movement (considerably less than experiments A and C) in its average policy towards the

optimal policy of twenty programmers. In addition, even after generation forty when managers begin to learn from each other, experiment B's promotion scheme does not provide enough differentiation among the managers' policies to drive the company to a consensus. The variance line stays above zero for this entire experiment, and the average policy remains below eighteen even after one hundred generations. These results suggest that General Electric's pointing and pushing scheme *can* move GE towards the best policies, but that a more differentiated pointing and pushing scheme would speed the process.

³⁸ See Hines and House, 2001, *The Source of Poor Policy: Controlling Learning Drift and Premature Consensus in Human Organizations* for a full discussion of convergence and an explanation of why the managers might converge on a slightly sub-optimal policy.

6 Conclusions and Next Steps

So in the end, what do boundarylessness and Organizational Evolution have to say about each other? This section recaps the main lessons from the previous sections, makes suggestions for each discipline, and identifies areas where further study is needed.

6.1 Implications for General Electric and Boundarylessness

The match between Organizational Evolution and boundarylessness is not perfect, but boundarylessness in general and General Electric's implementation of boundarylessness in particular appear compatible with an evolutionary view of organizations. There are several areas where organizational evolution supports a boundaryless approach, and one major area where it suggests improvements for boundaryless organizations.

6.1.1 Recombination over Mutation

Hines, in his 1998 paper *Five Rules for Evolutionary Management*, makes the case that too much policy innovation through mutation can actually slow evolution. General Electric's stated preference for adaptation of existing policies rather than generation of completely new policies is compatible with Hines' view. There are, of course, good ideas which have not occurred to anyone yet, so there is a place for mutation. However, in a company with the size, scope, and history of General Electric, the preference for external rather than internal inspiration makes evolutionary sense. Both a culture and many formal structures designed (at least in part) to foster recombination were identified in the literature of boundarylessness and in my interviews.

6.1.2 Localization

An evolutionary view also supports the environment created by General Electric's central corporate organization. GE prefers its central organization to identify issues and opportunities affecting the company as a whole, mandate that they be addressed by business units, and facilitate the process. In doing so instead of imposing its particular solutions, GE Corporate creates an environment where recombination is required. Localization is, I think, a special case of recombination, and boundarylessness uses this type of coordinated localization to overcome geographic and other horizontal boundaries.³⁹ To localize policies (adapting either to different locales or to different business types), employees must learn the new policies and then apply their existing knowledge of their businesses and locales (i.e. their existing policies) to adapt the new policy to their areas.

6.1.3 The Need for Pointing and Pushing

As has already been discussed, boundarylessness and Organizational Evolution diverge somewhat on the subject of pointing and pushing. Except where creating boundarylessness is concerned, both the literature on boundarylessness and its implementation at General Electric de-emphasize the importance of positive examples in an organization. The evolutionary view, supported by the simulations done for this study, suggests that GE would evolve better policies more quickly if it substituted other pointing and pushing mechanisms for its de-emphasized hierarchy. Interestingly, Bill (and only Bill,

³⁹ Ashkenas et al., 1995.

however) mentioned a hyper-emphasis on metrics as “quirk” of GE during our interview. He said:

GE is very strongly driven by metrics for almost everything we do. One of the first things that’s done is to figure out what’s a metric for seeing how well we are doing. So, almost everything has some sort of numbers attached to it.

I did not delve further into metrics with Bill or any other participant, but if GE has found very accurate ways of measuring its activity through metrics, GE’s focus on metrics could explain its apparent success in light of its weak pointing and pushing. A study relating General Electric’s performance measurement mechanisms to evolutionary pointing and pushing mechanisms could confirm or deny that theory, and it would certainly yield more insight into General Electric’s evolutionary behavior.

6.2 Implications for Organizational Evolution

The General Electric Corporation’s extraordinarily positive results, measured both quantitatively by profit and loss and stock price and qualitatively, as reported by interview participants and in much of the literature about the company, do not match the simulation results above which would suggest that good policies diffuse only slowly through GE. Perhaps GE’s weak pointing and pushing is still better than that of most other organizations. In addition, the simulation is a simplified model of organizational practice focusing only on team policy formation and individual learning. Recall that the reason we study Organizational Evolution in the first place is because organizations are inherently too complex for analysis along simple dimensions. There are certainly (and purposefully) factors affecting GE which are not considered in my experiments.

However, there are two other reasons worth mentioning, the first making explicit what I believe is implicit in all organizations, and the second proposing an extension to current evolutionary thought.

6.2.1 Positive Pointing and Pushing Can't be Avoided

Despite the fact that only one of four interview participants mentioned strong, positive pointing and pushing, I believe it would be impossible to design positive pointing and pushing out of an organization. For example, as long as an organization employs rational promotion (or survival) criteria, organizational status as defined by the corporate hierarchy is an unavoidable positive pointing and pushing mechanism in all but the smallest organizations. Thus, even if an organization chooses not to pay attention to its pointing and pushing mechanisms, they can still function. In the General Electric lab manager example (see section 4.4.2.2), even though Al and Bill articulated the situation in negative pointing and pushing terms, and even though members of the organization perceived the situation in negative terms, the end result still yields some positive pointing and pushing. The lab managers are the highest status employees in any lab, and despite the negative pointing and pushing event which established them as surviving lab managers, lab employees still looked to them for example and guidance. Since these managers exhibit the best boundaryless behavior, General Electric's hierarchy works, at least somewhat, to push others *towards* boundarylessness. The same logic suggests that the hierarchy would also work to push employees towards other policies selected for by GE's promotion criteria.

6.2.2 What Are Valid Pointing and Pushing Targets?

Another way to explain in an evolutionary context the success of General Electric is to propose an addition to evolutionary thinking.

Organizations must somehow find or invent pointing and pushing mechanisms that will single out *people* who have been successful and will encourage others to learn from (or imitate) them.⁴⁰
(Emphasis mine)

In the above quote, the word *people* means individuals. Pointing and pushing mechanisms identify successful individuals and push other individuals towards them. Why identify individuals? Because policies exist in the minds of individuals. This study, however, suggests that there may be a type of policy embodied not in any one individual, but in a network of individuals, with no single individual implementing the entire policy. General Electric, with its penchant for moving people around frequently, can in fact be seen as *fostering* an environment where some policies must live in networks instead of in individuals. Boundarylessness is about the cooperation and the sharing and adaptation of ideas among different *groups* within a company. Therefore, because of boundarylessness' focus on groups, the ideas (that is, the policies) affected by boundaryless behavior are likely to be those owned and carried out by teams of people, not by individuals. Business strategies, manufacturing and quality methodologies, and human resource practices all fit into this category.

If groups can implement policies which are not embodied in any one individual, then the way to spread these policies to other organizations is to employ pointing and pushing mechanisms which point at the organizations, not

at specific individuals in them. House, Kain, and Hines have already shown, in fact, that team based promotions are effective pointing and pushing mechanisms.⁴¹ One possible reason is that “large” policies like those mentioned above are not actually individual policies in the Organizational Evolution sense, but *sets of individual policies* which must be used by different individuals in the same organization to be effective. For example, if strong pointing and pushing causes a group of product designers each to employ good design for manufacturability methods, but engineering and production don’t learn policies which take advantage of the designers’ new skills, the organization as a whole hasn’t improved at all, even though several of its members have. Perhaps for policy sets, pointing and pushing on an organizational level is required, and General Electric does employ tools which look like organizational pointers.

Table 2 - A Sample Trotter Matrix

	Initiative 1	Initiative 2	Initiative 3
Business A	●	◐	●
Business B	◐	○	●
Business C	○	●	○
Business D	◐	●	○

The best example from my interviews is the Trotter matrix⁴², a tool

which Bill described during our interview and which is used by councils (see section 4.4.1.2) and other inter-business groups at GE. He used a Trotter matrix as part of a council he ran to implement a corporate quality program. Table 2 is my representation of a sample Trotter matrix, which uses Consumer Reports style symbols to indicate various business’ success on various initiatives. Except that it points to organizations and not to people, it looks like a very strong

⁴⁰ Hines, 1998.

⁴¹ House, Kain, and Hines, 2000.

pointing and pushing mechanism. The Trotter matrix, when distributed through the various businesses, publicizes how successful each business has been with each initiative. Businesses weak in an area (open or half filled circles), are pointed immediately to businesses strong in that area (filled circles). In addition, because the matrix is so public, leaders of businesses weak in any initiative are encouraged to investigate and to learn from the strong businesses in that initiative.

6.3 Proposed Next Steps

Boundarylessness and Organizational Evolution do appear to have implications for each other, as each describes aspects of organizational behavior not addressed by the other. Organizational Evolution studies how individuals in an organizational context learn from other individuals. Using the new evolutionary language I've proposed, boundarylessness can be seen as promoting the evolution of strategies, or policy sets, among sub-organizations in a broader organizational context. If this new idea could be found operating in other organizations, perhaps other boundaryless ones, it would represent an opportunity to extend the evolutionary metaphor to companies' strategic behavior. Can companies employ evolutionary methods to develop and implement strategies on an organizational level? If they do, does it make them more successful? The General Electric case suggests so, and I would support (help, I mean, not just applaud) any efforts to study the topic in a later thesis.

⁴² The Trotter Matrix is named for Lloyd Trotter, head of General Electric's Industrial Systems business, who invented it.

Appendix 1: Materials sent to study participants

April 1, 2001

Dear "Bill":

I've enclosed a one page introduction to Organizational Evolution to give you some orientation to what I'm studying. The focus of my research is to find relationships between organizational evolution and boundarylessness, and my interviews with you and other former and current GE employees are my primary source of information.

I expect our discussion to be informal, driven primarily by your knowledge and experience. I'm looking both to understand boundarylessness from an insider's perspective (apart from any organizational evolution perspective, that is) and to find links with organizational evolution and / or examples of recombination and pointing and pushing (bringing in an organizational evolution perspective). See the enclosed document for explanation of those terms.

A few details: Our conversations will remain confidential. Both your name and any name you give me in discussing events within GE will be replaced with fictitious names in my thesis to make sure that neither you nor anyone to whom you refer can be compromised in any way. The only exception to that rule would come when, with your permission, I include a reference to you in a citation for an idea I include in my thesis. I certainly wouldn't want to claim credit for any idea I learn from you. If you are uncomfortable with your name being used in a citation, I'm sure I can cite an anonymous interview as my source. Finally, may I have your permission to record our conversation so I can transcribe it (or portions of it) and accurately recall it as I develop my conclusions? Of course, I will be very careful to guard your privacy as described above.

I'm looking forward to meeting with you.

Sincerely,

Sam Falk

The Project in Organizational Evolution Goals and Foundation *

Technological improvement is a fact of modern life. Organizational improvement, however, is not. B.F. Skinner, writing thirty years ago, observed that an ancient Greek, transported to our time, would find the machines of everyday life incomprehensible. In contrast, our Greek would feel right at home amid the bustling confusion of organizational life – its enjoyments, disappointments, politics, petty rivalries, lofty hopes and ineffectual decision making. Organizations have not improved much since ancient times.

Improving a company, a school, a city, or a government is difficult because the complexity of organizations exceed by many orders of magnitude our ability to understand. Managers today, as always, work to solve identifiable, isolated, problems. Sometimes managers succeed. But, often solutions fail to work over the long term or else spawn unintended consequences that create new problems, perhaps in other areas of the organization.

The problem of improving organizations in the face of ignorance is solvable. In fact, it *has* been solved, just not by humans: *Biological evolution* has produced excellent natural organizations (i.e. organisms) even though the organizations themselves are completely ignorant of how they are put together and why they succeed.

The question we are addressing is how to apply principles of biological evolution to the problem of organizational improvement. Central to our work is an analogy between organizational policies and biological genes. By *policy* we mean an explicit or implicit decision rule. For example, a manager might set prices by the implicit rule: Raise prices when inventories are low, and lower prices when inventories are high. Such a policy gives rise to a continuing stream of actions in the company and is quite comparable to a gene, which produces a continuing stream of actions in the cell.

The creative mechanisms in biological evolution are mutation and recombination. In our analogy, genetic mutation corresponds to policy change, intentional or unintentional. The result of such a change, for better or worse, is a new policy. Genetic *recombination* occurs when two DNA molecules mix to form a new DNA molecule. In a company, genetic recombination corresponds to a particular kind of organizational learning: Inter-personal learning whereby a person combines a part of someone else's decision rule (policy) with his or her own.

But whose decision rules should I incorporate with my own? Another crucial element in organizational evolution is “pointing and pushing.” Biology has an iron-clad method for determining whose DNA is used in recombination, parenting. Children automatically inherit their parents' genes. For companies, however, it is not so easy. The methods companies employ to show employees whom to emulate are the companies' pointing and pushing mechanisms. Titles, company cars, and large offices all act as pointing and pushing methods.

The purpose of our research is to help managers create an environment in which beneficial policy change and learning (mutation and recombination) occur. Our methodology combines two principle elements: Simulation and interview. The simulations allow us to “speed up” evolution so that we can investigate what makes it better. The interviews keep us grounded in reality, help us understand evolution in organizations better, and also allow us to create more useful simulations.

* Revised April 2, 2001 by Sam Falk for thesis work with current and former General Electric employees.

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