Office Kaizen 2

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Harnessing Leadership, Organizations, People, and Tools for Office Excellence

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Preface

The Japanese term *kaizen* has come to mean many things. It's hard to pin down a precise definition, even from native Japanese speakers, because it has morphed over time from a word to an icon of a business philosophy. Kaizen is a compound word: *Kai* means "small" and *Zen* means "good." To some, kaizen is a philosophy that contends that excellence and competitiveness are attained by pursuing many small improvements in waste reduction rather than seeking a smaller number of breakthrough improvements. Breakthrough improvements are not bad; they just cannot serve as the sole road to competitiveness. To others, kaizen represents a body of tools and techniques that improve processes by eliminating waste and thus making the processes faster, more efficient, and of higher quality. To still others, kaizen is viewed as an adjunct to lean manufacturing methods (the tools and approaches of the Toyota Production System [TPS]). As Chapter 1 shows, kaizen is a bit of all these, but it needs to be much more if it is to function as a strategy for creating maximum value in an organization over the long term.

Office Kaizen is, by definition and focus, the application of kaizen and its adjuncts to nonmanufacturing processes. Nonmanufacturing processes are those that involve paper, data, and people processes in areas other than the factory floor. Thus, Office Kaizen is usually thought to involve "typical" office areas such as purchasing, logistics, finance, human resources, quality control, engineering, planning, and so on. Factory processes are generally considered to be those that involve equipment, manufacturing lines, heavy machinery, and the like.

However, the distinction between office and factory is not as clear-cut as it might first appear. Few factory processes operate without extensive software, paper, and data support integrated into them in regard to materials, purchasing, engineering, plant maintenance, scheduling, and planning. The nature of modern machine processes demands that Office Kaizen approaches,

however they are defined, be implemented side by side with other world-class tools to optimize the effectiveness of equipment. So, whether you're in a factory or a law office (yes, even a law office), you won't get to where you want to go (or, rather, where you *should want* to go) without using the methods of Office Kaizen.

The forerunner to this book is *Office Kaizen: Transforming Office Operations into a Strategic Competitive Advantage* (referenced from here on as *Office Kaizen 1*, or *OK1*). *OK1* presents a focused leadership system for structuring and maximizing the involvement and participation of intact work groups (IWGs) and ad hoc teams pursuing process improvements. *OK1* was focused in this manner because these two groups present the single greatest opportunity for obtaining kaizen benefits: fully engaging and maximizing the day-to-day efforts of employees. Properly focused IWGs (the seven people in an engineering work group, the four people in a customer service work group, and so on) are closest to the processes and can improve things at a very organic level. Ad hoc work stream teams (WSTs) provide an opportunity to pursue cross-functional improvements that are beyond the reach of IWGs. If you were to do only one "kaizen thing" in an organization's office and/or manufacturing areas, the structures presented in *OK1* are that one thing. Chapter 6 gives a brief overview of the concepts of *OK1* that are important to get the most out of *Office Kaizen 2 (OK2)*.

Yet, there is much more to leading a successful Office Kaizen initiative than maximizing the waste removal activities in IWGs and forming WSTs to implement more complex improvements. Office Kaizen will produce only a shadow of its potential unless managers and leaders do what is necessary to structure and sustain results. Results cannot be sustained unless leadership understands how to support and maintain significant cultural change. An organization that effectively utilizes kaizen (and/or lean manufacturing and/or Lean-Six Sigma) methods over the long term as part of everyday business is one that has dramatically changed its culture from what it was before. That so many organizations fail in implementing world-class methods suggests that many of the successes are based on happenstance or luck. Having the right people at the right time with the right approaches working on the right processes is an outstanding strategy when it occurs. However, it doesn't occur very often by chance. And even if lightning does strike, the luck that produces good kaizen results is almost never enough to keep things going or provide a model for extending the success to another location in the same organization.

Expanding on what *OK1* presented, *OK2* continues to forgo dependence on good fortune and completes the picture of what's required for a compre-

hensive, sustainable Office Kaizen implementation. The purpose is to provide predictable, defined structures and methods to replace circumstance and luck in the pursuit of excellence. *OK2* pursues specific objectives in order to complete the road map to kaizen success:

1. *Provide leadership at all levels with an understanding of how human motivation and group and organization dynamics influence what everyone does every minute at work.* Leadership's failure to more completely understand how and why people perceive and interpret reality, make decisions, and influence one another is by far the single biggest source of loss in business. Many billions of dollars are lost every year because leaders attempt to compel people to work against the dictates of basic human nature. Once management understands the inner compulsions and operating characteristics of individuals and groups, it is better able to harness the true human potential of its organization in every pursuit. This objective is critical to Office Kaizen, but it applies to every person, every day, in every process and in every type of initiative in every business.

2. *Provide leadership at all levels with an understanding of what cultural change is and how it can be most effectively led.* Many leaders view cultural change as something distinct and often preliminary, if it is not ignored outright, to process improvement. I've heard many times, often from senior executives, "We must change our culture before we focus on _____" (insert lean, Six Sigma, kaizen, project management, etc.). Or, the converse is often heard, "We don't have time for culture change; first we must make _____ (insert lean, Six Sigma, kaizen, etc.) work before we worry about culture." These views are incorrect and dangerous. Cultural change is achieved by using world-class tools within a framework of leadership structures. Any methodology will have a limited impact if its implementation is not pursued as part of an organized plan to effect cultural change, that is, the manner in which everyone in the organization thinks about and approaches work all day long. Every process improvement, instance of waste removal, project team action, and functional work group activity must be guided by the defined structure of an overarching cultural change initiative. If not, the benefits of the best tool use in the world won't be 10% of what they could be, they won't last, and they will not create any long-term change in the existing culture, except to make people more cynical. Make no mistake about it—all sustainable

successes demand a primary focus on cultural change as a strategic initiative that is enacted by the disciplined use of world-class tools and structured leadership. Those with a desperate need for bottom-line impacts should not despair—this approach is no less intense than a focus on fast results; in fact, focusing on culture with structure gets faster and more impressive results than tools alone.

3. *Present and explain why, how, and when the principal methods and tools of Office Kaizen can best be applied.* While leadership's understanding of human nature and cultural change can provide (if the understanding is applied) a solid foundation for tool usage, inefficient tool usage can discourage management and process workers, waste resources, and lead to poor plans and decisions. Chapter 7 presents instructions on how to apply what I consider the basic elements of the world-class kaizen "toolbox." Many parts of this toolbox are integral to Six Sigma and lean approaches as well.

4. *Provide guidance for planning, conducting, and following up on continuous improvement events.* A *continuous improvement event* (CIE; sometimes called rapid improvement events or kaizen blitzes) is a four- to five-day "blitz" in which a team of four to six people gives its focused, full-time attention to a process to analyze, test, and implement solutions. Most of the time the principal focus of a CIE is the removal of waste. This is because waste reduction is relatively easy to achieve compared with implementing innovations. CIEs are one of the most visible elements of a lean or kaizen initiative in offices and factories. However, as with most things that provide tremendous benefit, the best results can only be obtained by following best practices with unerring discipline. *OK2* devotes several chapters to planning, conducting, and following up on various types of events.

5. *Present detailed approaches for leading kaizen-based cultural change initiatives at various levels of the organization, from single work groups to corporate-wide efforts.* From what I've observed over the last 25 years, it's easy to conclude that many people believe that a lean, kaizen, and/or Six Sigma change initiative requires nothing more than a series of CIEs and some tools training. If this were true, almost every enterprise in the industrialized world would have a world-class culture. It takes a lot more than an occasional week of hoopla, excitement, box lunches, and a few process improvements—

however exciting—to create lasting change. Chapters 16–18 describe the structural and leadership requirements for transformations of everything from a single work group to an entire corporation.

6. *Provide insights into applying value stream mapping (VSMapping) in nonfactory settings.* VSMapping has become an almost mandatory analysis tool in the past 10 years. Despite its popularity, few references detail the unique methods necessary to make VSMapping fit requirements of office processes. Chapters 8–10 discuss the creation of current and future state value stream maps (VSMs) as well as improvement action plans for office processes.

OK2 is not intended to be a comprehensive, detailed how-to encyclopedia of all lean and kaizen tools for nonfactory applications. While many tools and techniques are discussed and usage details presented where they are important and not obvious, the primary focus of this book is to provide guidelines for method and tool applications within the context of leading successful Office Kaizen cultural change initiatives.

This book does not provide an in-depth review of lean manufacturing methods. A properly implemented lean manufacturing initiative involves many of the Office Kaizen methods discussed in this book insofar as many of the tools are effective in almost any environment. However, a number of specific lean manufacturing methods, such as total preventive maintenance (TPM) and single minute exchange of die (SMED), among others, are specifically designed for machine environments and have only tangential application to office settings. Other elements of lean manufacturing apply in concept to office processes but don't always work well in practice. One of these involves the concept of takt time. *Takt time* is the time period in which one unit of work must be completed in an activity in order to meet customer demand in a defined time period (a shift, a day, or a week), whether the customer is the next workstation or the final customer.

If every worker/machine/station in a process creates one unit of work at the takt time and immediately passes it (or it flows) to the next person/station, there is no buildup of inventory and no waiting for work at any station: The process will produce just what the internal customer wants. A central concern of lean manufacturing is to determine the takt time of a process and then modify each task in the process so that the work flows smoothly from station to station. This concept applies to any type of work, but it does not always work as well when applied in rote fashion to office processes.

For example, a factory worker or a machine often performs the same action to a great many consecutive "pieces" (units of work) that pass through the station. Each piece is essentially the same. In an office setting, a worker may appear to be dealing with the same situation when reviewing, for example, one of a succession of medical insurance forms to ensure that it has the proper diagnostic, payment, and provider codes. While each claim form may ask for similar information and appear to be an equivalent, some may be easy and routine and others may be very complex and unique. Complex claims take more time. Even more at variance with factory work, office workers are often required to do many other tasks at unpredictable times and for varying durations during the day, such as answer phones, call others for information, go to meetings, provide data to supervisors, consult with colleagues, and so on. Few office workers, except those in paper/data "factories" such as credit card processing, do only a single task all the time. Thus, a feverish focus on takt time in most office processes does not always produce the best return for the effort invested. This concept and other concepts that do not fit well in most office analysis situations are not discussed in depth in this book.

There are four sections of this book. Part I, Chapters 1–5, provides an overview of the Office Kaizen arena and the challenge that leaders and managers face when attempting to change their organizations. The information presented in these early chapters, particularly Chapters 2–5, is new, perhaps surprising, and hopefully stimulating for most leaders because the content is not typically discussed in the business press or business schools. These relatively new (with more supporting research arriving every day) insights into the mechanisms of human behavior and decision making can provide leaders with the knowledge to better guide and shape their organizations.

Part II, Chapters 6–10, discusses the basic tools and methods of Office Kaizen. Chapter 6 presents the concepts and mechanics of structural configurations: the organizational and leadership skeleton that provides the form and shape of world-class organizations. Chapter 7 presents an Office Kaizen toolbox that meets 80% of data collection and analysis requirements in both Office Kaizen and many general factory situations. The methods range from simple problem-solving tools such as Pareto charts and spaghetti diagrams to RACI charts and one-point lessons for office tasks. Chapters 8–10 complete the tools and methods presentation by reviewing the best methods for constructing and using VSMapping for office processes.

Part III, Chapters 11–14, drags you face down through every element and nuance of planning successful CIEs. If you apply the structures, forms, coaching tips, and insights of Chapters 11–14, your CIEs will be viewed as both improvement miracles and applied learning and leadership workshops.

Part IV, Chapters 15–18, describes the processes, structures, and leadership requirements to conduct various transformations in an organization. Chapter 15 is especially important, insofar as it describes a method that is central to successful change: action leadership (AL). AL is a method for structuring critical leadership actions in support of implemented process improvements, employee effectiveness, and a focus on bottom-line results. AL focuses a small but vital portion of leadership attention and involvement to those parts of the organization that seldom benefit from attention. The returns can be immense for everyone involved. AL is presented at this point in *OK2* because the earlier chapters provide the basis for many essential leadership actions.

Chapter 16 broadens the scope of implementation by describing the methods, schedules, and leadership approaches required to transform a single work group, a section, or a department. Chapter 17 describes the additional mechanics and approaches for implementing a comprehensive transformation at an entire site. Chapter 18 outlines the particular considerations that must be dealt with when a multisite organization attempts to transform itself. Finally, Chapter 19 offers a few final comments and observations.

Good hunting on the battlefields of waste. Come back with your completed kaizen to-do list (see Figure 13.4) or on it!

PART I

The Landscape of Office Kaizen

What challenges does a leader face when he or she begins an Office Kaizen change initiative? The leader's answer to this question determines the strategies and methods that are selected. All too often, a well-intentioned leader does what he or she thinks is required, but the Office Kaizen effort falls short. The leader did not know the right answer to the question.

Approaching an Office Kaizen transformation without the correct answer to the question is similar to the position of nineteenth-century scientists who contemplated space flight. They had little knowledge about the nature of space, the effects of radiation and weightlessness, how to provide compact heating, cooling and oxygen generation methods, and so on. Even if they could have conceived a way to propel a manned vehicle into orbit, the crew would have died.

Today's leaders who are interested in Office Kaizen are in a predicament similar to that of nineteenth-century space scientists. They have not had an opportunity to learn the specifics of the "space" they face: how and why human beings act as they do at work, the mechanisms that create resistance to change, strategies to deal with the resistance, the dynamics of groups and organizations, and the evolution of corporate culture. This section provides the basic knowledge of these areas that twenty-first-century leaders must have before they launch their transformation missions into Office Kaizen "space."

1

The Key Principle of Change in the Universe

It isn't often in the field of human behavior and the workings of organizations that clear, inviolate principles can be described. Yet, one such principle exists. This principle, which describes and predicts whether an attempted change effort will succeed, operates so well because it underlies every change in our universe. While psychologically based principles provide insights and general predictions, they can't predict specific cases. The key principle we are about to discuss is based on physics. If you understand this principle, you can easily determine whether a change of any kind will possibly succeed. If you do not adhere to the tenets of this principle, the change effort will invariably fail. It is harder to determine whether a change effort *will* succeed, because other factors (e.g., changes in leadership, inconstant support, lack of resources, the organization being bought or sold) can doom even an endeavor that adheres to the tenets of this principle at first. However, if a change effort follows the insights that this principle generates, success is possible and conceptually easy, although it's always hard work to achieve.

This key principle derives from chaos theory and the concepts and operations of self-organizing systems. An outstanding and monumentally insightful book (in my opinion) by Kevin Kelly, called *Out of Control: The Rise of Neobiological Civilization* (more recent editions have the title *Out of Control: The New Biology of Machines, Social Systems, and the Economic World*), explains the workings of this principle and many others that relate to it. While *Out of Control* deals with robotic, biological, and neobiological systems, its principles apply to organizational change just as much as they apply to ant colonies, ponds, prairies, and artificial intelligence. My explanations borrow freely from the work of Kevin Kelly as well as Stuart Kaufman, Christopher G. Langton, and many other pioneers in the exciting field of complexity theory and self-organizing systems.

Every system is composed of entities. An *entity* is the smallest logical operating unit in a system. For an ant colony, individual ants are the entities. In a solar system, the sun and planets (and planetoids—sorry about that, Pluto) are the entities. For our universe as a whole, galaxies seem to be the entities, although an argument could be made for stars. In the human body, cells are the entities. The actions of the entities in a system are constrained by their basic nature and the rules of the environment they inhabit. A tree cannot walk to a different forest, a worker ant cannot change itself into a queen ant, and a planet cannot change its orbit by itself. A system operates successfully when the entities create a series of interactions among themselves that make it possible for the system to maintain itself as it is in its current environment. It is the actions of the individual entities and their impact on one another that determine how the overall system operates, whether it successfully adapts to change, and whether it survives (maintains itself).

Figure 1.1 illustrates the three stages of change in a system. First, these stages and their operations are described in regard to a common experience. Then, we explore how these stages relate to and impact the organizational change efforts that are so often expected to make continuous improvement (or anything else) successful. Finally, we review the "rules" that derive from the operation of these stages in successful system adaptation in our universe. The necessity of adhering to these rules is incorporated into every aspect of the concepts and suggested implementation structures provided in the later chapters in this book.

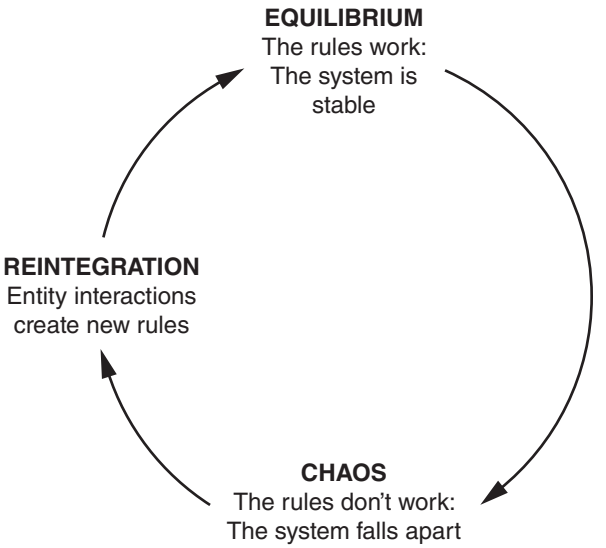

Figure 1.1 The three stages of change.

Every system strives to maintain itself and resist change. After all, if the system has been successful, why change anything? What evolutionary pressure could there be to make significant modifications to a successful system? When a system is successful at surviving in its present environment, the entities continue to interact as they always have; the system is stable by definition. The entities are not compelled to explore new rules for entity interaction. In fact, they have nothing to gain, and much to lose, by changing spuriously. This stage, shown at the top of Figure 1.1, is termed *equilibrium*. When a system is in equilibrium, its entities have a set of rules that have evolved to allow the system to survive. A system moves away from a state of equilibrium only when the external environment presents challenges that the entities cannot overcome using their current rules of interaction. This occurs in forests, ponds, glaciers, fisheries, ant colonies, human bodies, and businesses.

An organization at equilibrium resists pressure to change from any source. In effect, its entities are rewarded by feedback from the system (they get to survive) for maintaining the current status. This is a cardinal trait of traditional social and business organizations that are doing okay. These systems tend to be slower than molasses running uphill at 0°C when responding to threats on the horizon. Consider how long it is taking the US automobile industry to respond to crisis. Not only was there the inherent inertia of a stable physical system, the tendency to avoid reality was further fueled by the operation of human group dynamics, a powerful force in itself for preventing change (as Chapters 4 and 5 explain). This is why, although it is good for an organization to be in a position of equilibrium rather than a position of chaos or reintegration, a successful organization is likely to be very slow to respond to environmental pressure.

If a system's entity interaction rules are ineffective or inefficient in dealing with the external environment, the system is forced away from equilibrium and falls into chaos, shown at the bottom of Figure 1.1. The entities, experiencing the consequences of failure, begin to interact in other ways, trying new types of interactions within the constraints of the overall system. A Himalayan glacier can't relocate itself to one of the earth's poles to save itself from global warming. If the new interactions do not yield effective new rules, the system remains in chaos until it is killed off by the environment.

It is important to realize that the entities are always randomly experiencing new types of interactions even when the system is in a state of equilibrium. However, these "fringe" interactions, although they are always present, are not adopted en masse by other entities as new rules. This is because the system does not benefit from these new interactions and therefore does not provide

feedback to the entities that encourages the new actions. The continuous generation of novel interactions provides a system with an "idling engine of change" that delivers a standby capability to quickly discover more effective interactions when the external environment changes. Successful, established organizations that are able to continually come up with novel approaches show that they are able to remain in equilibrium or persistent disequilibrium (to be discussed shortly) while revving up this engine of innovation from time to time.

However, once in chaos, the entities are forced to attempt to discover the beginnings of new rules that will work for them in the changed environment. The stage of chaos is critical to survival because it causes the system to send feedback to all of its entities that the old interactions are not working. Successful adaptation demands that failed systems pushed from equilibrium must descend into chaos and work through the reintegration stage before they are successful again. In Figure 1.1, a system cannot fall to the left and move from equilibrium to reintegration and then back to equilibrium. Without the frenzied, experimental interactions that occur in chaos, new rules cannot evolve.

This law of systems adaptation cannot be violated, either by human organizations or by physical ones. One common example where business organizations frequently attempt to move counterclockwise from equilibrium to reintegration and then back up to equilibrium involves continuous improvement (CI), lean, and Six Sigma initiatives. Rather than setting a structural framework for the desired initiative and then compelling workers, supervisors, and managers (the entities) to establish a set of new interaction rules via experimentation, management typically mandates a program of training and progress reports. Everybody is trained, given a few marching orders, and sent on their way, with perhaps special in-house facilitators who are expert in the tools of the selected initiative.

Management, not being familiar with the three stages of change, thinks it is doing the right thing. After all, it is what it sees most other organizations doing. And since organizations always claim that their initiatives are successful, an outside observer would assume the approaches are working. Often, management has an uneasy feeling that letting the workers and supervisors work it out among themselves will lead to chaos in the usual sense of the word (e.g., riots among the cubicles, casual Fridays every day). It does not understand that the chaos must be not only encouraged but also structured so that the entities are required to interact within a defined framework that increases their chances of success. The elements of this framework are discussed in Chapter 6.

There is no substitute for compelling entities to work it out among themselves, with all the mistakes and missteps that are inherent when a great many

entities interact. In fact, mistakes are a critical part of teaching the entities what doesn't work. To get out of chaos, entities, through constant experimentation, must discover the beginnings of new rules that work in the changed environment. If this experimentation proceeds well enough to begin to find new, more effective ways to interact, the system enters a state of reintegration; it has a chance to develop a whole new set of rules. If the entities continue to evolve better and better rules faster than the environment changes, the system may move to a new state of equilibrium with new rules that work in the new environment. A system can arrive at the reintegration stage and still fall back to chaos, however, if sufficiently effective new rules do not evolve.

Even if some trusted, followed, respected, and acknowledged expert "knew" the correct new rules for entity interaction and system survival, the rules could not be applied as dictated policies even if every entity in the system worked hard to follow them. The entities, even if they could read, hear, and understand the rules, would not have worked out the countless minute and specific interactions that would govern the almost infinite number of possible interactions among themselves. This can only occur in messy trial-and-error interactions. Without these countless interactions, the entities might try to follow the dictated rules, but, not having actually learned through experience how the details work through use, their obedience to the rules would be only superficial and the system would not survive.

Consider the human body as an example. It consists of about 10 trillion cells, about 20% of which are bacteria that are not part of the human genome (we pick them up after birth but could not live without most of them). Think about how our bodies operate from moment to moment: These 10 trillion entities are constantly interacting in ways that are not well understood with our current science and technology. There is no conscious "you" controlling the interactions of these cells, or even the interactions among huge groups of cells such as the brain, kidney, liver, and heart. Almost all of the processes of life and thought (thought is discussed extensively in Chapter 4) proceed via an almost infinite number of interactions each day, only a miniscule proportion of which are under any conscious control.

The interactions of the cells of the human body are governed by the limits and guidelines established in our genome. Operating within these evolved constraints, every one of our cells has a very specific role and a limited number of ways in which it can interact with other cells. Needless to say, these rules are extremely effective: They keep 10 trillion cells functioning as a single system for a lifetime. A person never suddenly turns into a pool of mush at a street corner because his or her cells decide to take a vacation and move around

randomly. Nobody in good health suddenly dies from walking to the door. A healthy body never "forgets" to breathe while it is asleep or distracted by TV. The human genome's design parameters permit the entities to work very well together almost all of the time.

These circumstances demonstrate why there will never be a fitness pill that will make it unnecessary for people to exercise in order to get in shape. While a pill might supply energy and/or enable faster repair of cellular damage (we already have drugs to do these things, although with some risks), there is no way that a pill of any kind would be able to mimic the effects of the almost infinite adjustments made by trillions of entities in a human body as they interact with one another quadrillions of times during just five seconds of exercise. The process of exercising and "getting into shape" requires that countless minute physical and chemical changes occur between and within entities (and subentities within cells such as mitochondria) as they do their jobs under the increased stress of unexpected exercise. We could not create a substance to mimic the results that the entities create among themselves, even if we understood exactly what happens when cells improve our physical conditioning (and we currently don't understand these processes very well, other than to describe results).

Let's consider what happens when a human system attempts to improve its physical conditioning and how that relates to the three stages of system adaptation shown in Figure 1.1. Let's say that Bill thinks he is in good shape but is told by his physician after his annual physical that he needs to take better care of himself. His doctor tells him to begin some light jogging and watch his diet. So, on the way home, Bill stops by a sporting goods store and picks up new running shoes and shorts. The next morning finds Bill standing on his front porch in his new shoes and shorts, ready to start jogging.

There are billions of muscle cells in Bill's left calf muscle. When Bill starts to take a step, these cells contract to lift his leg. They relax as the leg is lowered for the next push-off step. In the 20 years that Bill has been out of college, these cells have contracted and relaxed many, many times. Since Bill has done very little running or jumping since college, the contractions have not been strong; many of the calf muscle cells have not been required to do much work, and many have hardly been used at all (more intense exercise recruits a higher proportion of the cells). Bill has walked around the office, shopping centers, airports, his neighborhood, his yard, and his home at low speeds—nothing arduous. On this fateful morning, the calf cells don't know that Bill is standing on the front porch wearing his new running shoes. If the cells could think, they might assume that Bill was standing in the kitchen deciding what to eat for breakfast.

All of a sudden, Bill starts jogging. The calf cells get a command from the motor area of the brain to contract, but this time it's CONTRACT! relax CONTRACT! relax CONTRACT! relax CONTRACT! The cells have no choice but to obey, as that is a parameter that is built in. However, the interactions the entities have adapted to over the years concerning glucose processing, pain transmission, mitochondrial operations, lactic acid disposal, oxygen uptake, and so on, are not up to the task at hand. CONTRACT! relax CONTRACT!—the entities cannot dispose of the rapidly building lactic acid—relax CONTRACT! relax CONTRACT!—oxygen uptake cannot keep up with expenditures—relax CONTRACT! relax CONTRACT! relax C-NT-ACT!—the calf entities are suddenly awash in hormones secreted by the adrenal gland entities as the hypothalamus entities do what they can to keep up the muscle effort—rreellaaxx C-N—C-!—whole groups of entities can no longer contract—rrrllxxxx—_ _ _ _ R _ C!!!—. Finally, over 70% of the calf entities are not able to respond to contraction orders, and a massive cramp locks them all in a state of CC!!CO!!!NN!!T!!RA!!!C!TI!!!O!N!!! Defeated by the failure of billions of his out-of-shape calf entities, Bill stops and limps home, cursing his doctor under his breath and hoping that no neighbors see him.

If the calf entities had had a choice, they might have opted to leave the calf muscle when the jogging started, crawl down the leg, and seek out a new career opportunity in the leg of a dedicated couch potato who ignored the physician's orders. The parameters of cell design, the structure in which they operate, do not allow that. Some of the entities may have wanted to kill themselves after half a block of jogging, but there are very strict rules built into the genome about when a cell can end its life. Perhaps some of the entities with connections in the brain might have preferred to leave the calf and migrate up to the cortex for a job in corporate. After all, the brain entities don't move; all they do is process data from the rest of the organization—sounds a lot like corporate to me. However, cells can't go where they want; they must stay and work it out.

So, pushed out of equilibrium and thrown into a state of chaos by Bill's jogging, the calf entities have no other choice but to begin to interact in different ways if they are to deal with the feedback the system is giving them, as the jogging causes all sorts of problems. Each of the entities has no broader knowledge of the challenge than what it experiences from interactions with nearby entities; none of them understand what's happening except that they are suffering (well, they don't actually understand anything at all, but some degree of anthropomorphism is necessary for the story). Yet, as Bill continues to jog several times a week for the next few months, something almost magical happens. In a matter of a few weeks, Bill's entities begin to enter a state of

reintegration. All of a sudden, they do their job as Bill jogs a mile or two with only mild discomfort.

In no time, the entities are able to handle the demands more effectively. Bound by the specific design principles of each type of cell, they influence one another in countless new ways. There will be mistakes, such as numerous sore muscles, perhaps shin splints, and a few calf cramps at night. But all of Bill's entities, from calf to lung to heart to back muscle entities, will become more efficient because they are required to work it out among themselves at the entity level. Three months after Bill started jogging, his system has entered a new stage of equilibrium: He can cruise along for several miles without a care—all made possible by forcing 10 trillion entities to work it out among themselves. This is a classic example of successful system adaptation to change.

Bill's system would have remained in equilibrium indefinitely if nothing had changed. But one day, Bill meets Jim on a run and Jim convinces Bill to join him in training for a marathon that is taking place in four months. To have any chance of completing the race, Bill will have to increase his mileage. Let's say that, prior to meeting, Bill and Jim each had been training about three miles a day for three to four days a week. They agree to start training together. Bill and Jim, feeling macho like many novice runners, convince each other that it would be fun to go on a 10-mile run to kick off their training regimen. This will almost certainly push Bill's and Jim's entities from equilibrium into chaos; it is simply asking too much of as-yet-undertrained-for-a-marathon entities. If Bill and Jim attempt to maintain their daily mileage, at 6–10 miles per workout (about 40 miles per week), their entities are likely to remain in chaos for several months, and they may be at risk for some severe setbacks. While they will eventually move into reintegration and then into a new state of equilibrium, there will be much pain and suffering.

It is well known in running circles that it is dangerous and painful to dramatically increase mileage in a short time period; chaos hurts in this case because pain is the system's feedback to entities that things are not working. Runners (and many other types of athletes) long ago discovered a key element of safely pushing the envelope toward improved system performance. This element, called *persistent disequilibrium*, is a critical tool for improving any system's performance without dangerously hurting it. It is illustrated in Figure 1.2.

The key element in persistent disequilibrium is pushing a stable system just a bit toward the edge of chaos, just a bit away from comfortable equilibrium. This forces the system to change and adapt without invalidating the

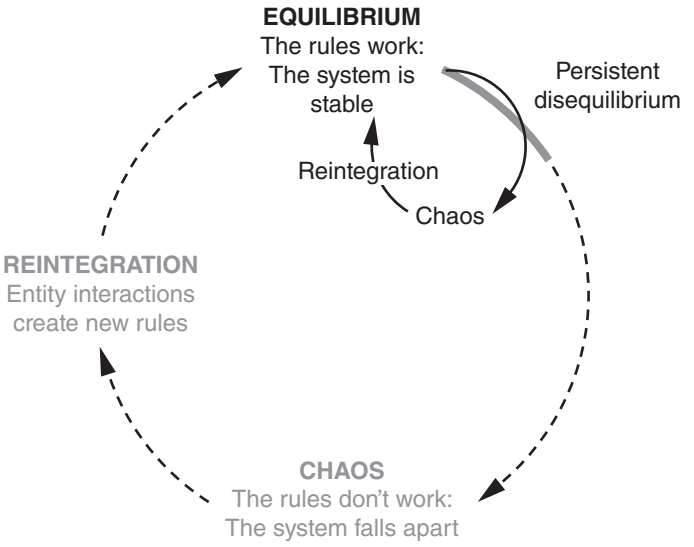

Figure 1.2 The mechanism of persistent disequilibrium.

entire set of rules that have been working. Persistent disequilibrium stresses the system a bit but does not risk casting all of the entities into chaos with the attendant risk of system chaos or failure. This is what happens when weight lifters add a few pounds to a workout or when runners like Jim and Bill add a mile to their daily workout once or twice a week for a couple of weeks and then add another mile a couple of times a week for the next two weeks. Eventually, they are running an extra 10 miles per week without casting their entities into chaos. Various portions of their system may be a little sore and tired from time to time, but there is little risk of systemwide failure.

This same persistent disequilibrium must be constantly applied to any system that strives for improvement. It is the central improvement mechanism for evolution. Aside from dramatic changes mandated by radical changes in the environment (e.g., whatever killed off the dinosaurs), life-forms evolve by generating a myriad of tiny, tiny modifications on a continual basis. Most come to nothing. However, every now and then, one of the random modifications makes it easier for the system (organism) to succeed in its present environment, even if there are not any dramatic challenges to its survival.

Human organizations have a profound advantage over inanimate and cellular-based systems. It is possible for the entities (people) in a human organization to understand the principles of system change and persistent disequilibrium. Unlike human calf cells, people in an organization can understand what is happening if they are informed and involved. As is discussed in later chapters, this can be used to accelerate and improve changes. When

people are the entities, their effectiveness in adapting to change and producing more change can be increased if a few guidelines are followed:

1. The people must be allowed to experiment within acceptable guidelines, to try new things, and to test the limits to see what works. In a non-self-aware system such as most of the human body, the system gets feedback only when it begins to fail. In a self-aware system, the individual entities can evaluate whether a change might work for their part of the entire system. While they might be incorrect, given their limited perspective of the entire system, with appropriate information and feedback from management they will find many beneficial improvements. Of course, as we will see in later chapters, human assumptions and expectations can also be a liability in motivating people to change.
2. The people must be given detailed information about the results of their efforts and how their processes were improved or compromised by what they did. This is not usually the case in most human organizations. Self-aware entities cannot experiment effectively if they do not know the desired results in all of their details.
3. Mistakes must be viewed as precious learning moments. If we are encouraging entities to try new things within a framework of guidelines that everyone uses and understands, there can be no "bad" mistakes. Therefore, mistakes must be considered as valuable learning experiences to be discussed and dissected in order to discover why a good idea with good motivations did not work.
4. Energy must be devoted to continually encouraging the entities to push the envelope and ensure that established rituals and habits do not automatically censure or kill any new ideas. There must be a fine balance between maintaining persistent disequilibrium, challenging established practices, and improving the mechanisms that are set up to foster the generation of new ideas.

As you read the following chapters, consider how the operation of persistent disequilibrium would be engaged by the use of the tool or method. Think of the organization as a mass of entities that must be shepherded to come up with ways of working within the guidelines presented in the various chapters.

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