Liberating Our Collective Greatness through Slowification, Simplification, and Amplification

# Wiring the Winning Organization



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WIRING THE WINNING ORGANIZATION

### From Gene

To the loves of my life: my wife, Margueritte, who allows me to pursue my dreams; and our three sons, Reid, Parker, and Grant, who cheer me on.

To the achievements of the DevOps Enterprise scenius, where so many of the insights that went into this book come from

### From Steve

With love and admiration for Miriam, my *b'shert*, without whom none of this would exist. With deep appreciation for the three young adults who've let us share their journeys: Hannah, Eve, and Jesse.

### In memory of loved ones who passed away during this book project:

Byung Kim
Vincent Hung Vu

Dr. Angel Tropp z"l
Mrs. Anita Wasserman z"l

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# FOREWORD

By its own admission, *Wiring the Winning Organization* presents a theory of performance. In my experience, the best theories describe complex things in a way that is elegant and simple. The theory set out in this book meets these criteria, presenting the ideas of slowification, simplification, and amplification as mechanisms to consistently create superior performance. Gene and Steve provide a clear and accurate way of understanding the very complex problem of designing a successful architecture for success.

But "elegant and simple" does not necessarily translate to "easy." Often, it takes some dedicated effort to get the full value out of an important theory. Let me say three things about the theory presented in *Wiring the Winning Organization*:

1. I wish I had access to this book and theory at the beginning of my career because,
2. it absolutely works—as I read more, I found myself saying, "yes… that totally resonates…," and
3. it provides a simple and elegant framework and a vocabulary that I did not have when I was leading and teaching others to lead—something that is *so* valuable.

I would have been much more successful if I had known about and practiced the ideas that are put forward in *Wiring the Winning Organization*. I would have been more deliberate and efficient as a leader, and I would have

been more clear and effective as a teacher and mentor for other leaders. All this is to say, it's worth every minute of your time to study and understand Gene and Steve's theory of performance. The payback is enormous.

Most of my professional experience is in the US Navy. I have led at every level, from a junior division officer (leading a team of about fifteen people on a submarine) up to the Chief of Naval Operations, the senior officer in the US Navy (leading a team of about six hundred thousand people deployed around the world). One of the most challenging and rewarding jobs I had was commanding the nuclear-powered attack submarine USS *Honolulu*.

The most challenging task for a submarine crew is to deploy at sea, far away from home, for six or more months. During such a deployment, a submarine spends about 85% of the time submerged, operating independently without any outside support, performing a wide array of missions in very stressful conditions, with severe consequences should a mistake be made.

The at-sea time is punctuated by visits to foreign ports, where the crew gets a chance to rest and relax. But even in these port visits, the sailors serve as ambassadors of the United States to the country they're visiting. So the mission never stops.

I think every reader can imagine the complexity of preparing for and successfully completing such a deployment. The material condition of the ship must be in absolute top condition. All of the logistics support for six months must be purchased, procured, received, and loaded in the submarine, which is already densely packed with equipment and people.

The crew must also be trained to do their jobs across a wide variety of disciplines. The engineers must keep the power plant and other equipment running. There are no windows on a submarine, so the ship senses its way through the ocean by sound. The sonar operators must be able to detect the faintest sound signals from among the myriad sounds of the ocean. The navigation team must plan and execute detailed plans for driving the ship submerged, weaving it through the topography of the sea floor and ocean currents. The communications team must be experts in the art of communicating in a way that is both predictable and undetectable. And the entire crew needs to do all of this while remaining unseen and always ready to defend themselves or press home an attack. And very importantly, the crew

must be individually ready, healthy, and with all their personal affairs in order so that they and their families can succeed with the crew out of communication for long periods of time. It's focused and intense. And a mistake could mean the loss of the ship and everybody on board.

How did we go about preparing for such a mission? Let me describe the major steps we took as we moved through this challenge, and I think you'll see why I'm so excited about this book.

First, we got organized into teams: functional teams to maintain and supply the ship and operational teams to run the ship. Because space is so scarce on a submarine, every person in the crew serves on both types of teams—a functional team to supply and maintain the ship's material and personnel status in top condition and an operational team to drive the ship through the water, executing its mission 24/7/365. Our chiefs and junior officers (line leaders) ran these teams. We set up coordination meetings every day, sometimes twice a day, to coordinate resources, space, and time. As Captain of the boat, I partnered with my senior enlisted advisor, my Chief of the Boat, Master Chief Billy Cramer, who was the crew's representative directly to me.

We started by reviewing universal concepts valid for the general operation of a submarine. Then we specialized and focused on the specific places we'd go and the specialized missions we would be performing. We spent a tremendous amount of time optimizing the personnel in these teams to ensure we had the right talent in the right places. Eventually, all of these teams had to combine together into a "team of teams"—much like a football team is composed of offense, defense, and special teams—and those are further broken down into linesmen, backs, etc.

Little did I know then, but we were *simplifying* our task by modularizing—forming coherent teams that could train and perform their required tasks with little interference to or from adjacent teams. We linearized our approach into discrete work streams to prepare for extended operations. Then we incrementalized our tasks—first focusing on fundamentals and then learning the specific challenges for this specific mission.

That's just the first part—simplifying in time and space. Once that was done, we had to prepare for the mission. We had to ensure that we could safely operate the submarine: "rigging the submarine for dive" to

operate submerged, being able to navigate into new places, being able to drive the ship among other ships, being able to operate the nuclear power plant within operational limits and recover from the unexpected to maintain propulsion. This was all just to go to sea safely! Then we needed to be able to "fight the ship," meaning to stealthily and effectively conduct high-end operations against an alerted adversary. This included, if necessary, being ready for combat operations. We were going to bring everybody home, no matter what happened.

We broke down complex tasks into basic training building blocks: first developing individual skills on personal computers, then bringing together small operational teams in more complex multi-operator simulators, and finally bringing the whole team together for at-sea training. At each step, we ensured that the challenge was representative of the tasks we would face. We trained in nominal and off-nominal situations. We simulated that various pieces of equipment failed, that the weather was terrible, and that some personnel were out of action. We stopped often to ensure we were learning as we went. As the saying goes, "Practice doesn't make perfect; perfect practice makes perfect!" We tried to make our practice perfect. At the end, we were certified for deployment by an inspection team.

What were we doing with all of that practice? We were *slowifying*! We moved the fast and complex job of operating a submarine at sea in combat into a slower, pace-controlled environment where we could get lots of "sets and reps," stopping and learning in between each one and escalating in difficulty over time. We tested our plans and execution with personal trainers, team trainers, and with the entire ship.

Now we were ready to deploy. We would spend more than 180 days away from home port, spending about 85% of our time underwater on mission. It's an unforgiving environment—the sea and the enemy are pressing in, and the slightest relaxation or the most minor problem could mean we lose the ship. It's so complex that we knew, despite all of our simplification and slowification, that we couldn't possibly anticipate every possibility. We had a vision of how things would go, but we needed to be alerted immediately when things—even the smallest things—departed from that vision. Small problems that aren't fixed combine to become big

problems that will explode into catastrophes, often at the worst possible time. So we trained to become hypersensitive to finding and fixing small problems. We frequently held "alertness drills" to see if our teams were sensitive to finding, reporting, and swarming to solve small problems. In fact, we did this so much during our slowification that it had become part of our DNA. On USS *Honolulu*, we did not walk past small problems—we fixed them.

In the context of *Wiring the Winning Organization*, we were *amplifying*. We knew that we had to keep on learning and improving—during the training phases and also during performance. Learn and improve all the time through feedback and correction—through amplification.

We prepared and were certified. And then we deployed. We got stronger and better every day, even while we were operating far from any support for long periods of time. In fact, especially while we were operating far from any support for long periods of time. We didn't know it then, but we improved rapidly and sustained that growth by simplifying, slowifying, and amplifying. Or at least we came as close as we could on our own. If I had read *Wiring the Winning Organization* back then, we would have been much more focused. This theory of performance just truly—no kidding—works.

And the counterfactual is also true—neglecting these principles does not work. In addition to the many case studies and examples in the book, I have seen too many instances where the operational theory of performance was not thoughtfully and coherently employed, and the system failed, sometimes catastrophically.

The decay in performance usually starts with neglecting amplification—suppressing meaningful feedback in the interest of schedule or fiscal pressure. The team loses awareness of itself, of how dramatically performance is degrading. Small errors build up, shortcuts become the norm, and the system proceeds, relying on being lucky rather than being knowledgeable and rigorous. So feedback stops first.

Next, and very quickly, slowification gets sidelined. In the interest of time, all schedule and cost problems are often "paid for" by reducing training time and complexity. The team convinces themselves they are "good enough"—no training needed. After all, we've not seen or heard of

any problems (because…you guessed it…no amplification). So proficiency degrades because slowification degrades. The degradation goes unnoticed because there's no amplification of feedback.

The last thing to go is simplification. You see, the three aspects of operational excellence—slowification, simplification, and amplification—all serve to reinforce one another. Once the first two go away, simplification, including its three techniques (modularization, linearization, incrementalization), just evaporates.

In the absence of the corrective forces of simplification, slowification, and amplification, low standards and luck become the norm, until luck runs out, disaster strikes, and the investigation uncovers the tragic timeline that shows how the team's wiring became frazzled and undone.

After my time in operational command was complete, I was assigned as a deputy squadron commander to help the submarines in our squadron, and then as the teacher for prospective submarine commanders. During those assignments, I would have treasured the clarity and vocabulary provided by *Wiring the Winning Organization*. Elegant and simple, it's a teacher's best companion—a lesson plan for teaching the theory of performance.

You have what I did not. You can learn the theory of operation and performance that *Wiring the Winning Organization* teaches. If you're just starting a new project with a new team—use the principles that Gene and Steve describe and design your approach to win. If you're inheriting a team in the middle of a project, take as much of a break as conditions allow and rewire your approach. You'll see the return on that investment almost immediately. And just to be clear, this must come from the top. Without clear prioritization and continual reinforcement by the boss and senior leaders (the C-suite!), it will fade into the background of day-to-day tactical priorities. If you are a new leader or a seasoned CEO, learn what this book teaches.

One last thing. During our time on the USS *Honolulu*, we established and met very high standards of performance for ourselves. But we worked smart; every minute was spent on achieving outcomes at the most decentralized level of capable performance. We understood and shared the mission, and we didn't waste time. Our morale showed it—we had terrific retention and promotion rates. Anybody who had a choice of which subma-

rine to work with chose us. And when a member of our team left to go to another team, they instantly became a leader. High performance and high morale…that's magic.

We were performing at super-high levels of performance, and we were having a great time doing it. We were Wired to Win! Study this book, and you can be too.

—Admiral John Richardson, US Navy (retired)
31st Chief of Naval Operations
August 10th, 2023

# PREFACE

Every day, people badge in, buzz in, swipe in, scan in, sign in, log in, or otherwise just walk into their places of work. From that common beginning, the differences in their experiences are vast.

For some, work is marked by drudgery or even danger. Their days are filled with frustration amid the regular confusion of figuring out what to do, when and how to do it, and even why it needs to be done. Too often, they're left cynical about what's going on around them and exhausted from trying to get meaningful things accomplished.

However, some people experience the opposite. They are well equipped and capable of succeeding at what they've been tasked to do; they are respected and appreciated for doing their work well; and they leave the workplace knowing they've added value for others and to their own lives.

We have observed that when people's days are miserable, the organization's performance is miserable too. On the other hand, when people's experiences are outstanding, the organization excels across all metrics: workplace safety, resilience, agility, time to market, quality, profitability, etc.

What's remarkable is that these vastly different outcomes don't require trade-offs; better experiences for individuals and their organizations are not bought at the cost of resources. People with the best experiences need fewer resources, less capital equipment, and less time to accomplish greater things.

We have observed this phenomenon regardless of the type of work being done or the products and services being generated and delivered. It is the management system that establishes the difference between whether

work is miserable versus delightful, boring versus engaging, and whether individual experiences translate into an organization's failure or success.

*Wiring the Winning Organization* explains how leaders are responsible for enabling their people to work easily and well, generate and deliver valuable products and services that benefit society, and feel appreciated and treated with dignity.

The best leaders create, sustain, and improve their organizations' *social circuitry*,* the overlay of the processes, procedures, routines, and norms that enable people to do their work easily and well. While individual specialists are focusing their attention on the problems immediately in front of them, this social circuitry establishes the patterns by which information, ideas, materials, and services flow, setting up people for success and integrating individual efforts for common purpose.

When that circuitry is well wired, the whole is greater than the sum of its parts. Conversely, when an organization is not well wired, people's efforts are squandered, and they are unable to put their full efforts toward achieving organizational goals. Too often, the parts don't come together into an effective whole, likely because leaders massively underestimate the difficulty of synchronizing disparate functional specialties toward a common purpose. It should be no surprise, then, why leaders of great organizations are so invested in creating outstanding processes and procedures. These leaders are rewarded with outsized performance benefits and tremendous competitive advantage.

Effective social circuitry is designed around the ingenuity and limitations of individual and collective human intellect. It allows people to repeatedly and persistently see and solve difficult problems and bring what they discover into practice quickly and well. In this way, the organization's



* We chose the term *social circuitry* (or *organizational wiring*) very carefully. Circuits exist to move a resource (e.g., electrical energy, pneumatic or hydraulic pressure, data) from where it is to where it is needed. Similarly, organizational circuits are the connections by which ideas, information, materials, services, resources, and support can flow from where they are to where they are needed so that effective collaboration, problem-solving, and value creation can occur. When an organization is wired to win, the movement of whatever is needed is accurate, fast, effective, and efficient. In contrast, when an organization is not wired to win, the organizational wiring is convoluted, which constricts, distracts, drains, diffuses, and saps energy from people, ensuring the systems that they are a part of perform badly.

resources are used to their best possible potential, and that potential continuously expands.

*Wiring the Winning Organization* is the culmination of a decade-long collaboration, to which we both bring our own perspectives and motivations. We'd like to take a moment to share a little about how we came to write this book and what we hope to achieve with it.

## Gene

Many say the goal of science is to explain the most observable phenomena with the fewest number of principles, confirm deeply held intuitions, and reveal surprising insights. By doing so, we create robust and testable theories that can explain the world around us.

Scientists have been able to do this for the physical sciences, which has enabled so many of the modern miracles that we benefit from today. Many believe, as I do, that we are missing this same clarity when it comes to understanding how and why organizations work the way they do, both in the ideal and not ideal.

This motivated my study of high-performing technology organizations, which began in 1999. This was informed tremendously by working with Dr. Nicole Forsgren and Jez Humble on the State of DevOps research, a six-year, cross-population study that surveyed over thirty-six thousand technology professionals from 2013 to 2019.

This journey also led me to take a two-day executive education workshop from Steve Spear at MIT in 2014, which changed how I view the world. Personally, I attribute at least a one-year slip in the creation of *The DevOps Handbook* to this, as I tried to integrate what I had learned into the book.

I took the workshop because I had read Steve and Dr. H. Kent Bowen's famous *Harvard Business Review* article "Decoding the DNA of the Toyota Production System" in 2004 and read Steve's book *The High-Velocity Edge* when it was published in 2010.

What was so exciting about my interactions with Steve was a hint that there was something in common between agile, DevOps, lean, the Toyota Production System, safety culture, resilience engineering, and so much more—that they were all incomplete expressions of a far greater whole.

I am not exaggerating when I say that coauthoring this book has been the most intellectually challenging thing I've ever done.

There was a moment in the summer of 2022 when I almost gave up and considered abandoning the project. Steve and I had been struggling to create a simple scenario that would show the principles we were trying to explain, which we believed were the underlying mechanisms that have made great organizations great. After weeks of being unable to create a satisfactory example, I went for a walk on the beach, telling my wife that I wouldn't come back until I could explain to myself in a simple scenario what our theory was actually trying to say.

Six miles later, I was convinced that either I wasn't smart enough to understand what Steve was trying to explain to me, or I didn't understand software development well enough, or maybe even that our theory wasn't correct. Attempts to create a simple scenario using restaurant operations led me to conclude that I didn't understand restaurant operations well enough, or movie theater operations, or many others.

This is what led to a scenario based on the activities of moving furniture and painting a room. It was an extension of two vignettes we had created earlier in the year to explore the concept of coordination cost. I was so excited to share this idea with Steve and even more excited when he understood it within seconds.

We spent months debating and arguing what should and shouldn't be in the vignette. But I know all those deliberations were worth it. What resulted was a simple and concrete scenario that made it easy to determine what the essential concepts of our theory actually were. Furthermore, these debates often led to some of the largest "aha moments" of my career.

I am grateful for my collaboration with Steve, which is now a decade long, and I am certain that this book could come only from a collaboration like this. We share many common beliefs but come from very different research backgrounds and industry experiences. To massively oversimplify, my career has been in software, while Steve's career has been nearly everywhere outside of it. But I believe that this commonality and complementarity are what made this book possible—and this book is another example of what cross-functional problem-solving can achieve.

It is my fondest hope that the simple metaphors we use in the book—moving a couch as a metaphor for joint problem-solving and cognition, and moving furniture and painting an old Victorian hotel as a metaphor for how we integrate different functional specialties toward a common purpose—help clarify what leaders at all levels need to do to liberate everyone's ability to collaborate, use their full creativity, and solve ever more important and larger problems together.

Further, I hope that this work helps unify the language of how leaders manage systems, regardless of industry, domain of work, or the system being managed. As a consequence, I hope that those leaders are able to create immensely more value, both for the people they are responsible for, as well as the people who depend upon them.

## Steve

The differences between well-managed organizations and those that are not are extraordinary. In organizations that are led best, all stakeholders benefit: employees invest their time to do work that is appreciated by others; investors gain returns on resources they provide; and the students, patients, customers, and others receive exceptional products and services in exchange for the trust they've placed in providers. In those less well managed, people's time is squandered, spirits are squashed, material resources are wasted, and societal needs are left unmet.

My awareness of the differences between the exemplars and their more ordinary peers started in the 1980s. At the time, once-storied American companies couldn't keep up with their Japanese counterparts. One by one, well-established firms—ranging from electronics to steel to automobiles—struggled, with some collapsing completely.

Many in my generation tried to grasp the causes of such differences and find solutions. In truth, many of us initially found the answers we were looking for. Those with a technical bent found fantastic tools, techniques, or algorithms. Those with a transactional mindset celebrated metrics and incentives that guaranteed, they thought, more commitment from the workforce to do the right thing.

The problem was, putting those ideas into practice didn't work. Each solution provided only a glimpse into what true superior performance might be. The technologists focused only on what people *used* to do their work; the transactionalists, on *how hard* they tried. They missed how management systems enhanced or inhibited people's ability to work together, in particular to solve difficult problems collectively and bring solutions into practice effectively.

Many practitioners and researchers came to appreciate just that point in the 1980s and 1990s. Following their leads, I saw how the "objective function" of the best leaders was creating such opportunities. My first deep dive on this was an immersive study of Toyota that informed "Decoding the DNA of the Toyota Production System" and *The High-Velocity Edge*.

Toyota had been an awful auto industry competitor in the late 1950s, emerging from the wreck of World War II. By the 1980s, though, it was the industry leader, a position it has expanded on in the forty years since.

This point was reinforced by working with Alcoa, which had become the safest employer in the country (despite the hazards of its industrial processes). Their safety success did not come with a trade-off. Alcoa was also a leader in quality, yield, and other competitive metrics.

The fact that the best lead by actively managing the design of the processes and procedures that comprise their social circuitry, regardless of competitive sector or technological domain, was validated by working with medical care providers. Some had simultaneously improved access, affordability, capacity, patient safety, and workforce experience.

Since then, experiences in a widening array of situations have validated the point: the common issue across all situations is creating conditions in which people's ingenuity can be liberated for its best possible use. Do that, and whatever resources are available will be put to great uses. Don't do that, and no matter how many resources are available, outcomes will be disappointing.

This book distills our research and experience to a few essential mechanisms that anyone responsible for coordinating the efforts of other people can use to generate greater outcomes quicker and easier than otherwise would have been possible. Scale doesn't matter: whether it's five, fifteen,

forty-five, or five hundred people, there are ways to set them up for success (or not). This is regardless of whether they're doing esoteric, upstream research or are involved in the most basic production and delivery of goods and services. And it is regardless of the sector in which they work. There are better and worse ways to bring the parts into an outstanding whole.

This clarity was possible as a direct result of my decade-long collaboration and friendship with Gene and his background in fields in which I have little experience. It would have been easy to say, "Oh, that's a technology problem versus an industrial problem" and dismissively wave away commonalities in light of differences in products and services being designed, produced, and delivered or the science and technology used to create them. What has made this partnership work and enabled us to reach the conclusions presented here was a shared conviction that bona fide, testable science is better than simple, analogical reasoning.

One last thought before moving on. Each Sabbath, Miriam, our kids (Hannah, Eve, and Jesse), and I preface our lunch with a biblical declaration that we should be doing our work for six days and resting on the seventh. That's an admonition that life shouldn't be only toil; it should have dignity.

However, the declaration doesn't say that dignity is just for some people and not for others. Rather, for those who received this declaration, it is also for their sons, their daughters, their maids, their servants, the animals on which they depend for labor, and even the strangers who may have appeared at the city gates before the Sabbath commenced. Dignity is a universal right.

Our family is also blessed by living in "a nation, conceived in Liberty, and dedicated to the proposition that all men are created equal," as Lincoln said at Gettysburg. We aren't blind to gaps between people's lived reality and that espoused aspiration, but we take inspiration in knowing so many who actively close that gap for others each day. Miriam and I are proud our own children are crafting their lives to help close the gap between reality and aspiration too.

With sentiments like those in mind, Gene and I try to always write about people and the work they do with respect, appreciation, and admiration. If what we share here helps you bring more dignity and a sense of

lived value to yourselves and those for whom you are responsible—whether that's five, fifteen, forty-five, or five thousand—then we will consider our own labors successful.

## Conclusion

Our purpose in this book isn't to replace the major tools and processes that have been adopted by organizations to help them overcome hurdles, both small and large. Lean, agile, DevOps, and so forth are excellent approaches to problem-solving and value creation. However, these are concrete examples of the more general ideas we're introducing here.

A theme common across these various tools is that they recognize organizations as "platforms" through which people collaborate toward achieving common purposes. Focusing on the human element is consistent with Dr. Douglas McGregor's Theory Y, from *The Human Side of the Enterprise*, which emphasizes the positive motivations people have toward shared objectives, taking responsibility, and being creative and imaginative. It is also consistent with Dr. W. Edwards Deming's teachings on collaboration, systems thinking, and profound knowledge.* Deming also showed how management systems must fully engage people's ingenuity and motivation as active participants, to their benefit, that of the organization, and society more broadly.

We seek to make clear the specific mechanisms that are alluded to in these theories and that we've found and studied in many different organizations in a wide variety of industries that make the exceptional ones exceptional. We seek to create a way for leaders to take these, until now unknown, characteristics and apply them to their own organizations.

As you read, our hope is that you take away a deep understanding of the powerful mechanisms that can be used to wire your organization to win, an appreciation for the collective genius of the people who make all of your endeavors a reality, and a drive to achieve the greatness that is possible in all organizations.

—Gene Kim and Steve Spear, 2023

* For more on the lineage of ideas introduced in this book, please see Appendix A.

PART I

# A New Theory of Performance Management

Chapter 1

# The Pinnacles of Human Achievement and Why We Form Organizations

On July 20, 1969, masses crowded into Times Square, Central Park, Trafalgar Square, the city centers of the Soviet Union, North and South Vietnam, Hong Kong, and other places around the world. They gathered to watch *Apollo 11* astronauts Neil Armstrong and Buzz Aldrin start their descent to the lunar surface.[1] All told, 650 million people shared that experience,[2] watching and listening in theaters, taverns, airport and train terminals, and at home, in wonder and awe, as Armstrong stepped onto the Moon and declared, "That's one small step for man, one giant leap for mankind."

Armstrong's small step and mankind's giant leap were the culmination of three hundred thousand people's efforts, employed by twenty thousand industrial firms and universities, integrated into collective action for that common purpose.[3] In fact, just broadcasting Armstrong and Aldrin's landing and excursion required more than one hundred people, mostly young people in their early twenties,[4] who staffed tracking stations in Australia, receiving and processing the multiple signals being transmitted from 250,000 miles away, so those hundreds of millions could see and hear them wherever they were.[5]

All that was accomplished less than nine years after President John F. Kennedy addressed a congressional joint session in May 1961 and put forth the challenge "before this decade is out, of landing a man on the Moon and returning him safely to the Earth."[6]

This magic of collective human endeavor isn't just for the extraordinary; it can also be found in the seemingly mundane. Consider that right

now, across the world, there are millions of people preparing their medication for the day. They are each shaking out a pill from a bottle and taking it with a glass of water. One of those millions might be taking medication to help relieve symptoms of her cardiac disease, helping her live a more fulfilling, healthier life, just as all the other medications being shaken out of all those other pill bottles right now will help all the other people live more fulfilling, healthier lives.

Those common medications, which convert diseases that were once horrific and terminal into conditions that can be managed if not cured, aren't simple or easy to create. They are made possible by thousands of person-years of work, spread across a decade, and performed by myriad specialists: chemists, biologists, pharmacologists, computational biologists, medicinal chemists, logisticians, clinical trial managers, doctors, nurses, computational chemists, data scientists, software engineers, and production experts. All their contributions are integrated and harmonized into the invention, production, and provision of that pill.

All that distributed genius—thousands of people working toward a common goal, inventing in parallel, with individual teams each working on their challenging problems and knowing that their efforts are important and fit into a larger goal—all that came together, be it in that small step on the moon or in that medication shaken out of a bottle. Both are pinnacle accomplishments that organizations achieved and that no single individual could have imagined doing alone.

Many of us have been lucky enough to work on projects like these once in our career—and it was likely the most rewarding experience of our life, not because the job was easy, but because the job was challenging and involved solving problems and conquering challenges much larger than ourselves.*



* For example, I (Steve) once mentioned to my Uncle Larry that I'd seen an SR-71 Blackbird spy plane on the deck of the *Intrepid* aircraft carrier museum. "That was the greatest program I was ever part of," he said. His comment surprised me. He and my aunt, Diane, had moved to California to work on that project when they were very young. He was a newly minted electrical engineer, and it was hard to imagine he had that much responsibility within such an enormous undertaking. But I'd missed the point. It wasn't his part that was great; it was the larger whole that gave the experience such meaning.

The sad and dismal reality is that too often daily work has little of this magic, regardless of the job, the industry, the importance of the mission, or even a person's seniority. In these situations, people are frustrated because they don't have what they need to succeed (e.g., information, approvals, requirements, time). In the absence of overwhelming clarity of purpose, people become exhausted from the heroics and politicking required to get even the smallest things done, and they are too often put in hazardous situations because obvious problems have not been resolved.

Over time, it's easy to understand how people in these situations become jaded, cynical, and bored, sometimes feeling that any effort is futile and that their dignity has been eroded away. Whatever potential someone thought they could bring to the job has been diminished, as they know they are unable to contribute to the larger goal.

But this is not a book about how leaders can make people feel inspired to work in these dismal conditions. Instead, this is a book that presents a *theory of performance* about how leaders can create the conditions so that people can do their work easily and well. By doing so, the part of the enterprise they are responsible for can succeed spectacularly.

This is the product of our thirty years (each) of studying organizations across almost every industry vertical* and across nearly every domain of work.† This combined work includes surveying over thirty-six thousand organizations to correlate practices with performance and gathering case studies from over five hundred organizations. We have also directly worked with or closely studied nearly one hundred organizations across nearly every industry vertical and in nearly every phase of value creation. Additionally, we have worked with leaders at nearly every level to help them achieve their organizational goals.



* The industries we have been able to study include airlines, automotive, banking, biotechnology, consulting, defense, enterprise software, entertainment and media, gaming, government agencies, healthcare, heavy industry, high tech, industrial production, insurance, manufacturing, military and intelligence agencies, oil and mineral exploration, pharma, retail, semiconductors, social services, software, sportswear, telecommunications, and universities.

† Domains of work studied include research and development, new product design, software development, factory design and construction, fabrication and production, and delivery and after-sales service.

Our research and combined experience have uncovered three surprisingly simple mechanisms that enable the magic that is found in the extraordinary and exemplary endeavors of the large number of organizations we have studied. With these three mechanisms, leaders can wire their organization for success instead of mediocrity.

We assert that greatness is created through three mechanisms, which create the difference between success and failure:

- **slowification,** to make solving problems easier to do,
- **simplification,** to make the problems themselves easier to solve,
- and **amplification,** to make it obvious that there are problems that demand attention and whether they've been seen and solved.

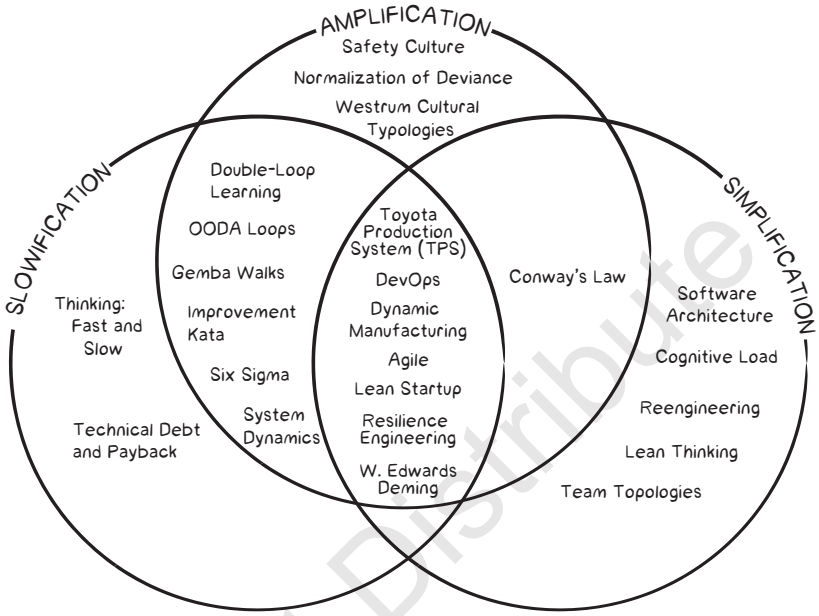
Our theory of performance explains many of the things we've seen in our respective and disparate journeys across industries and time. Many management concepts and methodologies already offer a glimpse into how greatness is achieved.

You may be familiar with agile, DevOps, Dr. W. Edwards Deming, the Toyota Production System, OODA (observe, orient, decide, act) loops, improvement katas, and Lean startup. Or you may have heard of system dynamics, learning organizations, double-loop learning, cognitive load, psychological safety, Westrum's organizational typology model, empowerment and participative management, enabling front-line workers, and normalization of deviance. And you may be using tools such as "gemba walks," Team Topologies, software architecture, Conway's Law, modularity, resilience engineering, and paying down technical debt.

All of these are *tools* for wiring the organization (the social circuitry of processes, procedures, policies, and routines by which individuals' efforts come together into a greater whole). Figure 1.1 shows how these different practices are examples of the three mechanisms of slowification, simplification, and amplification.

But none of the aforementioned methods or tools alone can wire your organization for success. (TPS and DevOps are arguably two of the most important changes in the management of organizations in the last fifty years, and they come the closest to wiring a winning organization.)

**FIGURE 1.1** Venn Diagram of How Different Practices Slowify, Simplify, or Amplify






Before we dive deeper, let's take a brief step back and look at organizations broadly to better understand how these three mechanism can help you wire a winning organization.

## Why We Join and Form Organizations

We create organizations for a variety of reasons, but certainly one of them is to accomplish seemingly common but actually audacious undertakings that one person cannot do alone. The goal may be as ambitious as sending a man to the moon or as common as providing a commercial product or service, such as running a restaurant, bakery, or hospital. Or the goal could be to help society by ensuring national security, educating children and adults, or providing places of worship or shelter for those in need.

Almost every organization has a mission or goal. And in all but the smallest organizations, these missions and goals require undertaking activ-

ities that are so vast, complex, difficult, specialized, or intricate that they are beyond the ability of any individual to fully comprehend, let alone execute, regardless of how smart, organized, strong, or dedicated they are.

What's exhilarating for some (those who pull it off) and frustrating for others (those who do not) are the enormous differences otherwise similar organizations have in fulfilling their aspirations.

## The Paradox of Unlevel Performance on a Level Playing Field

It's been proposed that organizations gain competitive advantages largely by seizing opportunities that are unavailable to others. This concept, led by Dr. Michael Porter's "five forces" from his book *Competitive Strategy*,[7] asserts that organizations enjoy unfair returns by having made the playing field unlevel: by locking in customers (so they cannot consider alternative vendors), preventing suppliers from finding other outlets for their wares, or barring rivals from offering competitive products and services.

It would follow from such thinking that when the competitive environment is otherwise fair and free, enterprises would likely be unable to sustain advantage by large margins for long durations. After all, rivals compete for attention from the same customers; source the same capital equipment, IT systems, and raw materials from the same suppliers; are subject to the same rules, regulations, taxation systems; and so forth.

Yet, such predictions are refuted by reality. Even in sectors where the levelness of the playing field makes for free—even brutal—competition, some organizations create and sustain enormous advantages regardless of how they are measured: quality, affordability, availability, resilience, reliability, safety, security, responsiveness, speed, or agility. The best organizations generate more value in less time, at lower cost, and seemingly with less effort. They are simply "wired to win."

## Obvious in Outcomes

Consistent and durable winners dominate their industry, sometimes for decades, by large margins, and across many metrics and dimensions,

whereas mediocre organizations are unable to.* The winners are better by a lot and for a long time.†

Let's explore what this means, whether it's through cross-sectional or longitudinal comparisons.

- Toyota has led in design and production in the auto industry for some fifty years. Despite being woefully uncompetitive in the late 1950s, it gained advantages through superior quality and productivity (and hence affordability).[8] It built on those leads by cutting in half the time required for major model upgrades,[9] by cutting from weeks to minutes the time to convert plants from one model year to the next, and by being incredibly fast to introduce whole new products and invent whole new technologies.[10] (Learn more in the exemplar case study in Chapter 10.)
- In 2007, Apple released the groundbreaking iPhone, with only dozens of software developers creating its applications and user interface libraries. The resulting product redefined what consumers expect from mobile devices. As a result, they were able to dethrone Nokia's dominance in the smartphone market and beat them, and the rest of the industry, in terms of profitability, market share, etc. (Learn more in the Apple/Nokia case study in Chapter 8.)

Similarly, longitudinal comparisons show how organizations were able to massively improve their performance when leaders changed the organizational wiring:

- Toyota rewired an organization with its joint venture with General Motors in Fremont, California (New United Motor Manufacturing, Inc., or NUMMI).[11] Within two years, what had been one of the worst



* Imagine two sports teams with nearly identical players. The only thing different is the coach. Yet one team consistently beats the other team. When they switch coaches, the other team consistently wins. Here we can conclude that the decisive factor of performance is who is coaching the team. (Indeed, this is what happened in numerous case studies we present in the book, such as at NUMMI.)

† Prolonged mediocrity will inevitably lead to failure and losing.

facilities in the country became one of the best. This was achieved by changing the management system in the facility. The result was that the same people who'd been so unproductive when working for General Motors achieved world-class outcomes when working with Toyota leadership.

- In manufacturing microprocessors, the differences between the leaders and the rest are huge in terms of throughput times, quality, yield, and sustained product variety within a single plant, etc. What's encouraging is that such performance is replicable. One plant cut its throughput times by two-thirds, increased yield, reduced scrap, and otherwise made it far easier for engineers and technicians to use the sophisticated capital equipment they had. The benefits were enormous: $10 million per month in additional profitability.[12]
- In 2002, Amazon struggled to upgrade its e-commerce software, able to make only twenty software changes (deployments) per year because of the high risk of outages and the difficulty of coordinating across hundreds or even thousands of software engineers. In 2014, however, Amazon was making some 136,000 deployments every day, quickly and safely. This didn't just make their online retailing more competitive. It became the basis for the cloud computing market. By 2020, this generated $80 billion in revenue for Amazon, 75% of its overall profits.[13] (Learn more in the Amazon case study in Chapter 8.)
- The US Joint Special Operations Command (JSOC) was struggling to dismantle Al Queda in Iraq, despite "a huge advantage in numbers, equipment, and training." A "team of teams" rewiring allowed JSOC to reduce its response times, increase its operational tempo, and dismantle the terrorist network.[14] (Learn more in the Team of Teams case study in Chapter 8.)
- Organizations such as Allegheny General Hospital (AGH) and Western Pennsylvania Hospital have improved safety, access, and affordability—better care, for more people, at less cost—while reducing overburden on staff. For instance, AGH completely eliminated deaths due to CLAB* infections from nineteen in 2003 to zero

* Central line–associated bloodstream infections.

in 2006, which was replicated by University of Pittsburgh Medical Center, Monongahela.[15]

These are just a fraction of the examples that show how some organizations are better at accomplishing great things across sectors—planes, trains, automobiles, tech, high tech, biotech, education, medical care and health services, heavy industry, national defense, public sector services, and so on.

## Obvious in Experience

Differences between exceptional and ordinary performance aren't just obvious in aggregated, lagging measures of performance. They're obvious by observing the experiences of people doing their work. When people have difficulty doing their work easily and well, despite investing their best time and energy to support the larger effort, we shouldn't expect the enterprise as a whole to perform well either. This is an organization that has not been wired to win.

Conversely, if the organizational wiring regularly sets people up for success, it shouldn't be surprising that the enterprise as a whole succeeds outstandingly. You find this connection between individuals and the organization in the list of organizations in the previous section.

Consider the transformation of an emergency department. It started as a place where it was difficult to be a clinician and frustrating to be a patient. After leaders rewired the organization, the emergency department became a very different place, one where clinicians could do their work easily and well, and where patients appreciated the fantastic care they received. Plus, care was available to more patients because of all the liberated capacity of people and place.

Initially, patients and their family members were crowded in a waiting area, many anxious to get a clinician's attention. That's probably familiar to those who've needed emergency care. Patients started with registration and triage but found themselves waiting after each step in the experience: in exam rooms, on chairs, or on gurneys in hallways. Their frustration didn't end there, even after waiting an hour or more for clinicians' atten-

tion. Nurses were often distracted from providing care because they had to track down missing information, equipment, or supplies that weren't readily available. Doctors were invariably tethered to computer monitors, trying to navigate medical systems instead of examining and treating people in need. One young resident was seen to throw her hands up in frustration and mutter, "I didn't go to medical school to do this!"

Now consider the same emergency department after it rewired its social circuitry to better integrate everyone's individual effort toward a common goal. The waiting area was nearly empty, despite patients constantly arriving for care. This was because they changed the registration process. Instead of all the extended waits, patients signed in, were registered almost immediately, and triaged. Within eighteen minutes, they were being examined by a doctor, nurse practitioner, or physician assistant.

Getting patients through sign-in to examination more quickly had tremendous impact. Nearly three-quarters of the patients could be discharged with a prescription or referral right away. Another 10%–15% were in serious enough condition to be admitted directly to the hospital. Only a few patients had to be held in the emergency department for observation, pending more advanced imaging and monitoring. The emergency department became a better place for both patient and caregiver.

The new social circuitry enabled moving patients gracefully, capably, and respectfully through the department. This meant space was no longer occupied by the many patients stuck somewhere mid-process. The space was repurposed for better uses: Imaging equipment was brought in to save time on having to transport patients to the imaging department. Space was set aside for residents to study collaboratively, to become more skillful in their specialties, and to otherwise have a quiet space for an interlude between often urgent and demanding cases.

What caused the transformation? The department leaders, the medical director (the head doctor) and the unit manager (the head nurse), changed how problems of processes, procedures, norms, and routines were addressed. Rather than having their colleagues struggle with the same obstructions, inconveniences, and obstacles that plagued them every day, the leaders amplified problems and devoted time to solving them, creating solutions that could be systematized.

For instance, registration had required reconciling names, IDs, SSNs, and medical record numbers; staff figured out how to get patients into the system faster and more reliably, even with limited information. Exam rooms had been stocked and equipped somewhat haphazardly; staff methodically identified exactly what was needed, where and when, and created a reliable restocking system. The result was that everything was on hand. Similarly, they methodically figured out how to get the right information where and when it was needed and in the right format. Doctors and nurses no longer wasted their time, energy, and creativity searching and foraging for items. Instead, they could examine, diagnose, and treat patients.

By rewiring the organization, leaders helped clinicians and administrators do great work for patients. They spared themselves from always firefighting and expediting for people and resources. Instead, they could lend their own expertise to solve difficult medical problems.

What they experienced is what we observe in all organizations that are wired to win: It's easier to work. Collaboration seems choreographed. Performance is graceful. And beneficiaries are grateful. Hopefully, you've had reason to be the source and the subject of such feelings.

## The Three Layers Where We Create Value

All organizations are sociotechnical systems, people working with other people, engaging (sometimes complex) technology to accomplish what they are collaborating on. This was certainly true for the clinicians mentioned in the example above; the professionals working at Toyota to develop, design, produce, and deliver vehicles; the software developers at Apple; and the engineers and technicians in the microprocessor plants. Regardless of domain, collaborative problem-solving occurs on three distinct layers, where people focus their attention and express their experience, training, and creativity:

**Layer 1** contains the technical objects being worked on. These are the technical, scientific, and engineered objects that people are trying to study, create, or manipulate. These may be molecules in drug development, code in software development, physical parts in manufacturing,

or patient injuries or illnesses in medical care. For people in Layer 1, their expertise is around these technical objects (i.e., their structure and behavior), and their work is expressed through designing, analyzing, fabricating, fixing, repairing, transforming, creating, and so forth.

**Layer 2** contains the tools and instrumentation. These are the scientific, technical, or engineered tools and instrumentation through which people work on Layer 1 objects. These may be the devices that synthesize medicinal compounds in drug development, the development tools and operational platforms in software development, technologies that transform materials in manufacturing, or the technologies to diagnose and treat patients' illnesses and injuries. Layer 2 capabilities include the operation, maintenance, and improvement of these tools and instruments. These first two layers are the "technical" part of a sociotechnical system.

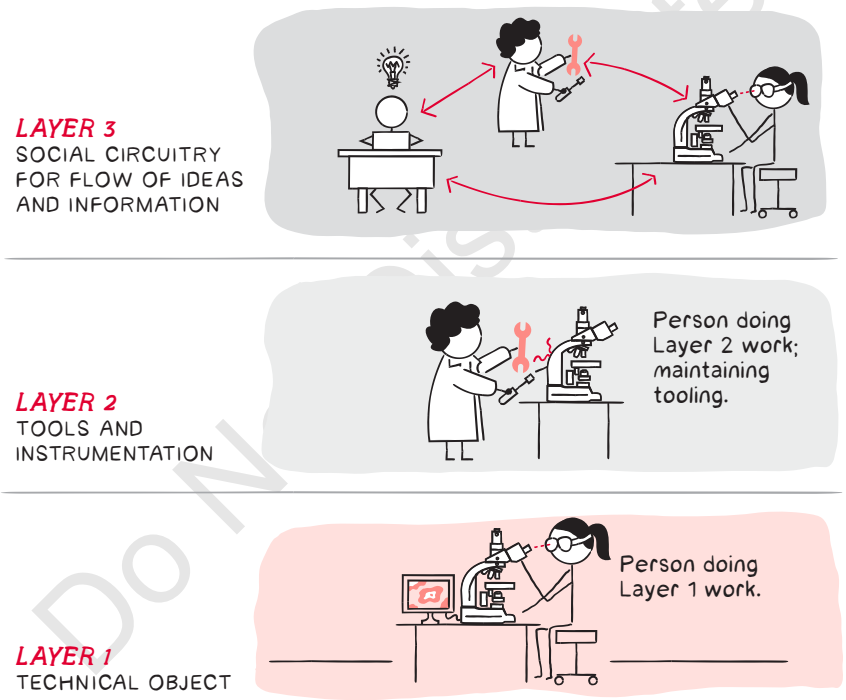
**Layer 3** contains the social circuitry. This is the overlay of processes, procedures, norms, and routines, the means by which individual efforts are expressed and integrated through collaboration toward a common purpose. This is the "socio" part of a sociotechnical system.

When leaders wire their Layer 3 (social circuitry) well, the people for whom they are responsible have what they need, when they need it, and in the format they need it.* Problems have been redefined so that they are easier, safer, and faster to solve. As a result, people can invest their full creative energies and focus on solving their problems, either in Layer 1 (the work object) or Layer 2 (the tools or instruments to do their work). Their collective efforts flow together as a team, gracefully, as if precisely choreographed.

* Again, this explains why we very deliberately chose the term *social circuitry*. Circuits exist to move a resource (e.g., electrical energy, pneumatic or hydraulic pressure, data) from where it is to where it is needed. Similarly, organizational circuits are the connections by which ideas, information, services, resources, and support can flow from where they are to where they are needed so that effective collaboration, problem-solving, and value creation can occur.

In contrast, consider when the wiring in Layer 3 is inadequate. People doing work are unable to do that work easily or well. They must spend their energy, effort, and cognitive capacity to get what they need, coping and compensating for Layer 3 problems. They are unable to generate and deliver value that others will appreciate. This is because Layer 3 was either overlooked or misaligned with the needs of people working in Layers 1 and 2.

**FIGURE 1.2** The Three Layers




## *Danger Zones* and *Winning Zones* for Solving Really Difficult Problems

Leaders manage the social circuitry (Layer 3) that determines whether their organizations get dismal or great outcomes. How this circuitry is designed and operated dictates the conditions in which people can solve difficult

problems, continually generate great and new ideas, and put them into impactful practice. Certain conditions make it more difficult to solve problems or generate new and useful ideas. We call that the *danger zone*. Other conditions make getting good answers easier. We call that the *winning zone*. The *danger zone* and *winning zone* differ across five dimensions, as outlined in Table 1.1.

**TABLE 1.1** *Danger Zone* vs. *Winning Zone*

| DIMENSIONS | DANGER ZONE | WINNING ZONE |
|---|---|---|
| Nature of problems. | ⚠ Complex problems with many highly intertwined factors. | ✓ Simplified problems that are well bounded, have fewer factors, and can be addressed by smaller teams. |
| Hazards and risks. | ⚠ Dangerous and risky. | ✓ Less hazardous and less costly failures. |
| Speed of environment in which we're trying to solve problems. | ⚠ Fast moving and not controllable. | ✓ Slower moving with the opportunity to control pace and introduce pauses. |
| Opportunities to learn by experience or experimentation. | ⚠ Experiences are singular or "one-off" so feedback may be missing and learning loops may not exist. | ✓ Experiences can be repeated to gain experiential and experimental learning, and knowledge can be captured for recurring use. |
| Clarity about where and when to focus our problem-solving efforts. | ⚠ It is not obvious that problems are even occurring, so they get neither contained nor resolved. | ✓ It is obvious when problems are occurring, so attention is given to containing and solving them; and it's obvious whether the problems have been contained and resolved or not. |

In the *danger zone*, problems are complex, with many factors affecting the system at once, and their relationships are highly intertwined. Hazards

are many and severe, risks of failure are high, and costs of failure can be catastrophic. Systems in the *danger zone* are difficult to control, and there are limited, if any, opportunities to repeat experiences, so feedback-based learning is difficult if not outright impossible.

In contrast, leaders enable much more advantageous conditions in the *winning zone*. Problems have been reframed so they are simpler to address. The hazards and risks have been reduced so failures are less costly, especially during design, development, testing, and practice. Problem-solving has been shifted into slower-moving situations, where the pace of experiences can be better controlled. Opportunities to learn by experience or experimentation are increased to allow more iteration. And finally, there is much more clarity about where and when to focus problem-solving efforts, because it is obvious when problems are occurring, so attention is given to containing and solving them.

When we leave ourselves and our colleagues in the *danger zone*, it becomes extremely difficult to develop and design products and services and to develop and operate systems through which we collaborate and by which we coordinate. In fact, in such conditions, given the complexity and pace of the environment, it's often difficult to even recognize that significant problems are occurring and that they must be addressed to avert disaster.

In contrast, when we change our experiences so they happen in the *winning zone*, generating good answers to difficult problems is much easier, because people are better able to put their capabilities to best use. We can move ourselves from the *danger zone* to the *winning zone* using the three mechanisms of slowification, simplification, and amplification.

Let's take a closer look at defining each of these mechanisms:

**Slowification** makes it easier to solve problems by pulling problem-solving out of the fast-paced and often unforgiving realm of performance (i.e., operations or execution). Instead, solve problems this in the more controllable, forgiving, lower-cost, less-demanding, and repeatable realms of planning and practice.* This shifting of Layer 3

* Examples of slowification practices: using mock-ups, prototypes, simulations, scale model tests, offline problem-solving, land-based models, etc.

problem-solving into planning and practice allows people to engage in deliberative, reflective, experientially, and experimentally-informed reasoning rather than having to constantly react with whatever habits, routines, and legacy approaches have already been ingrained.

**Simplification** makes the problems themselves easier to solve by reshaping them. Large problems are deliberately broken down into smaller, simpler ones through a combination of three techniques: incrementalization, modularization, and linearization. By doing so, we partition complex problems with many interacting factors into many smaller problems. These problems have fewer interacting factors, making them easier to solve. Furthermore, Layer 1 (technical object) problem-solving can be done in parallel, with less need for Layer 3 coordination, increasing independence of action.*

**Amplification** makes it obvious there are problems, and makes it clear whether those problems have been seen and solved. Mechanisms are built into Layer 3 (social circuitry) to amplify that little things are amiss, drawing attention to them early and often. This focuses attention on containing and resolving small and local glitches before they have a chance to become large and systemically disruptive.†

Ideally, an organization will have the latitude to do all three: slow things down to make problem-solving easier; partition big problems into smaller ones that are simpler to solve, and amplify problems so they're addressed sooner and more often. Even if we cannot do all three, doing two or even one still brings us closer to the *winning zone*, making it easier for us to take situations about which we know too little and can do too little and convert them into situations in which we know enough and can do enough.

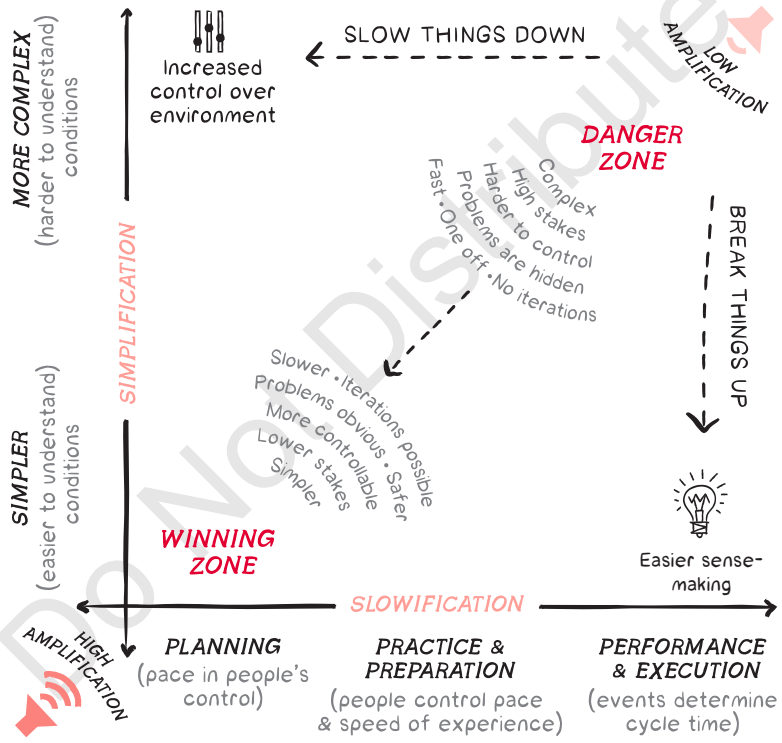
Figure 1.3 shows the *danger zone* in the upper right-hand corner and the *winning zone* in the lower left-hand corner. Slowification, which makes

* Examples of simplification practices: simple workflows, agile software development, modularization, just-in-time, pull systems, etc.

† Examples of amplification practices: stress tests, andon cords, smoke detectors, etc. to flag problems sooner rather than later.

problem-solving easier to do, moves us from right to left. Simplification, which reformulates problems so they are easier to solve, moves us from the top to the bottom. Note the small signal symbol in the upper right-hand corner, which denotes a lack of amplification, while the larger signal symbol in the lower left-hand corner denotes high amplification.

**FIGURE 1.3** Moving from the *Danger Zone* to the *Winning Zone* through Slowification, Simplification, and Amplification






## Leadership and the Circuitry They Create

There has been much written on the difference between leaders and managers.* In this book, we use the terms interchangeably and define leaders as

* See for instance "Managers and Leaders: Are They Different" by Dr. Abraham Zaleznik or "How Managers Become Leaders" by Dr. Michael D. Watkins.

those tasked with creating the conditions in which the people whom they manage can achieve the goals or complete the missions for which they are responsible. In all but the smallest endeavors, a leader's primary contribution is not doing the work required to achieve the goal. Instead, they are responsible for everything required to enable that work to be done easily and well. This is achieved through the social circuitry by which people's collaborative efforts are easily coordinated and integrated.

Much has also been written on change being driven from the "bottom up" versus the "top down." The first suggests that the change is a grassroots initiative driven by lower- to mid-level leaders, while the second suggests that the change is being driven by the highest-level leadership.

What we have found is that in winning organizations, leaders are deliberate about ensuring that Layer 3 (social circuitry) is supportive of people's efforts in solving Layer 1 (technical object) and Layer 2 (tools) problems. Their role is less supervisory, in the characterized fashion of directive leadership or command and control (e.g., "I say, you do" "compliance without question"). Rather, it is more supportive, continuously monitoring the conditions in which people are working and then adapting and adjusting so those conditions are most conducive to success.

This might remind some of the concepts of servant leadership or frontline empowerment, but this is more than that. It is an emphasis on leaders actively engineering the social circuitry of their organization, so when people for whom they are responsible badge in, buzz in, and otherwise arrive to do work, they walk into situations that are constructed to be the most conducive for success.



## What to Expect in This Book and How to Read It

This book is organized into four parts. Here in Part I, we present all of the key concepts and terms needed to explain the theory and show their application through two vignettes. We designed these vignettes as simple models to introduce fundamental concepts, stripped of real-world complexity. Consider these the equivalent of using pendulums to illustrate Newtonian mechanics in physics or using supply and demand of widgets to illustrate the basics of economics.

Understanding more complex situations doesn't depend on adding new concepts. It depends on using the same ones but with more sophistication. For instance, the more advanced case might be a pendulum that bounces into a spring, swinging through a viscous fluid. Supply and demand might be for a product with imperfect markets. By the time you finish reading Part I, you should understand the main ideas of this book.

In the next three parts, we go into more detail on the three mechanisms of slowification, simplification, and amplification. Each part starts with an illustrative case study, showing the mechanism in action to help readers understand the high-level concept. That is followed by an explanation of the theory underpinning the mechanism, with references back to the introductory case study to highlight key points.

Next, we present a number of case studies of that mechanism at work, drawn from numerous and varied situations. The quantity and variety of cases is to make a point: the same Layer 3 mechanisms apply, from small scale to large (from an individual artist or small design team up to enormous undertakings), across industry sectors (planes, tech, education, healthcare), and at different phases of value creation (R&D, design, production). These case studies also help generalize the principles so you can better recognize the problems you encounter in your organization and more easily generate useful solutions.

Finally, each part concludes with an exemplar case study, which shows the mechanism being used in a consequential and significant situation to create an advantage. You'll likely have heard of these exemplars. Our goal is to interpret what happened through the lens of the three mechanisms so it's clear how using them makes great outcomes possible.

Although we wrote the book to be read from the beginning to the end, there are alternatives. You might want to focus on the theory (the "why"), before diving into the details (the "what" and "how"). If this sounds like you, you might skip over the case study chapters (5 and 8).

Or, you might want to see these mechanisms in pinnacle use. If so, make sure you read the exemplar case studies in Chapters 6, 9, and 10.

Or, you might love reading a lot of stories about people accomplishing great things. If this is you, you'll likely love reading the case study chapters and perhaps skimming the theory chapters.

No matter your personal style, if you are reading this book, we assume you are someone who is responsible for leading a group of people to achieve something important. This is something that can be achieved only through collaborative effort, requiring a considerable amount of problem-solving, ideally by everyone, every day, and about most things.

Regardless of how you read this book—whether start-to-finish, theory first, details first, or reading what the world's best do—our goal remains the same: that after reading this book, you're equipped with ideas and examples that make you more effective at making your colleagues outstandingly successful.

## A Call to Action

The preface began with the observation that everyday people badge in, buzz in, swipe in, scan in, sign in, log in, or otherwise just walk into their places of work. From that common beginning, the differences in their experiences are vast. For some, they can regularly say that they've been able to succeed, that their work was appreciated, and that they added value to their own lives. For too many, they faced regular impediments, felt unrecognized, and had to do work discordantly with what they otherwise value. Either way, those individual experiences are tightly associated with how well the organizations—of which people are a part—perform.

Our hope is that we provide enough theory and examples and offer enough detail and clarity to help you reshape the experiences of those for whom you are directly responsible, improve on your own experiences as a leader, and, in doing so, change in some positive way the fortunes of the organization of which you are part.

CHAPTER 2

# Navigating from *Danger Zones* to *Winning Zones*

In this chapter, we present two vignettes to introduce the key concepts of wiring an organization to move from the *danger zone* to the *winning zone* through the mechanisms of slowification, simplification, and amplification. These two vignettes are simple models to illustrate fundamental concepts. We will use the same concepts to explain far more complex situations, such as the case studies in Chapters 4 through 10.

This mirrors how many topics are taught, and for good reason. In many fields, expertise does not depend on juggling ever more concepts. Rather, mastery is acquired by practicing some few concepts, first in simple situations and then gradually gaining facility using them expertly in extremely challenging ones.

For instance, in physics, Newtonian mechanics (i.e., $F=ma$) is introduced with examples like single forces on point masses or with calculations of the period of a pendulum. Eventually, the same concepts are used to understand the flight path of interstellar space probes, as well as the structural designs of the probes themselves. Similarly, in finance, the time-value-of-money is introduced with an intuitive understanding of why getting paid a dollar today is better than getting paid the same dollar tomorrow. The same concept is applied to multi-period cash flows, with payment and discount rate uncertainty added on, eventually becoming the tools by which complex transactions can be constructed.

Following the same approach, the first vignette is about two people moving a couch. It reveals that even "brawn work" involves significant "brain work." Even two people moving a couch requires joint problem-

solving and cognition. This is to help leaders recognize that everyone is doing "knowledge work" of some form, regardless of the nature of their work in Layers 1 and 2.

We will show how leaders can help or hinder knowledge work by the decisions they make in Layer 3 (the social circuitry). It is insufficient to focus primarily on the flow of materials or information through machines, with people merely as bystanders. Rather, leaders must shape the social circuitry so that people can best engage their ingenuity and problem-solving capabilities.

In the first vignette, we use the act of moving a couch to describe how the boundary of a group solving problems must be large enough that it is coherent, having all the people and resources needed to solve the problem. However, the boundary must also be small enough to not require large amounts of coordination. We also show how leaders must ensure the communication channels are sufficiently direct and have sufficient bandwidth to support joint problem-solving.

The second vignette is about two people managing the refurbishment of an old Victorian hotel. This requires three interdependent steps from two functional specialties: movers must first remove furniture from the room, painters must prep and paint the room, at which point, the movers return the furniture back into the room.

We will show how the social circuitry (Layer 3) that leaders create has direct and profound impact on how well people can work and use their professional expertise in Layer 1 (technical object) and Layer 2 (tools and instrumentation). And we'll show how leaders can use the three mechanisms to rewire the social circuitry of their organization to dramatically improve the conditions for people to do their work easily and well. But first we will show how decisions leaders make in Layer 3 can create spectacularly bad outcomes for even this simple scenario. This will provide insight on how to manage far more complex situations in the real world, spanning different sectors and across different phases of value creation.

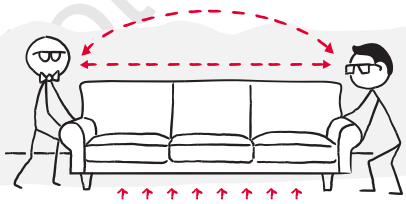
As you read the vignettes, you might notice familiar concepts from industry practices such as agile software development, DevOps, lean, Toyota Production System, cross-functional teams, organizational topologies, safety culture, or software architecture. The mechanisms are not replacements for sound practice. Rather, those sound practices are specific

examples of the slowification, simplification, and amplification mechanisms in practice.*

## Vignette One: Moving a Couch, Together

Gene and Steve are trying to move a couch. This may seem like a problem that involves physical labor only. However, in order to succeed, they must collaborate to solve many important problems. These include: Where should they place their hands to lift the couch? How do they keep the couch balanced when they move? To get through a narrow doorway, do they orient the couch vertically or horizontally? To get down a narrow and winding staircase, who should go first? And should they face forward or backward?

Gene and Steve don't need to conduct elaborate studies to answer these questions. They assess the couch and the room it's in, lift it to get a feel for its weight and balance, and work together so their efforts are coordinated. Through trial and error and fast feedback, as well as by communicating and coordinating, Gene and Steve are able to generate the information they need to solve their problems.



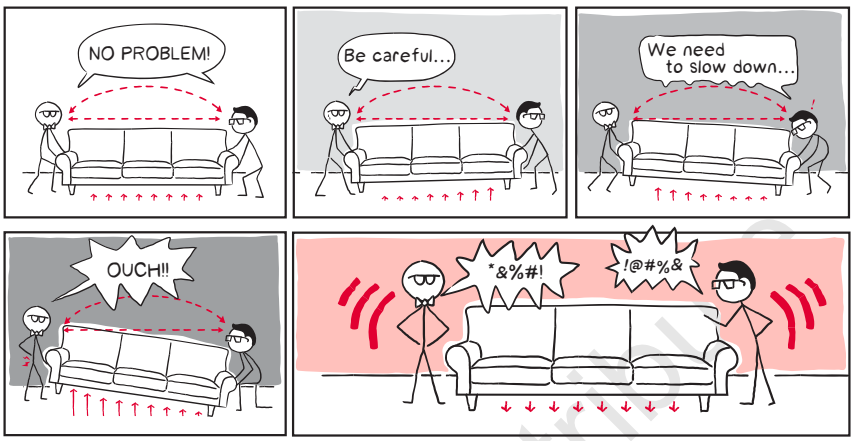


As they go, there are unforeseen problems, such as balance, positioning, and pace. They resolve some issues by talking, but some are communicated by gestures—nodding in which direction to move, shifting a grip, vocalizing when the effort is too great. Regardless of how problem-solving occurs, it must be a team effort. Gene can't just change his grip without risking Steve losing his. And Steve can't speed up the stairs without putting Gene at risk.

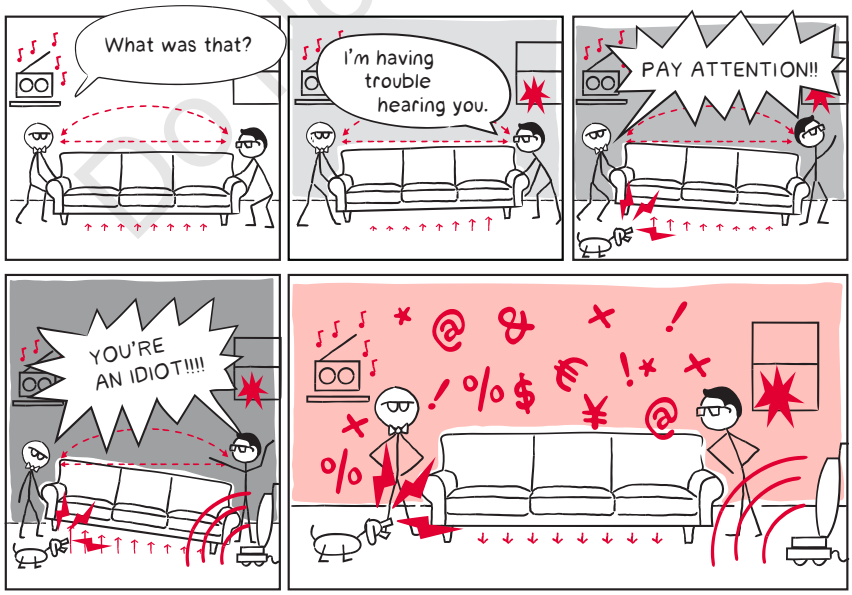
Of course, their ability to collaborate can be compromised. When the sun sets, the room where they are working gets darker. Because Gene and Steve are no longer able to see and sense what's around them, everything takes

* For a deeper dive on that point, readers are invited to review the Appendix.

more time. Furthermore, someone may trip over something on the floor, or someone's finger might get pinched.

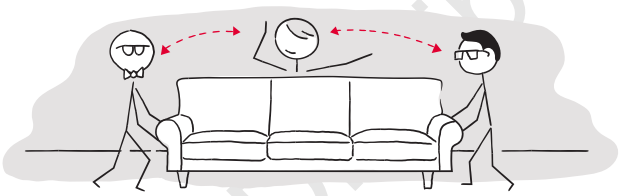



Their work may also become even more difficult when a fire alarm goes off or a car alarm starts blaring outside. This is because they are no longer able to hear each other's concerns and corrections, reducing their ability to communicate and coordinate.



It is important to note that the added noise does not make the task at hand more difficult, unlike with the loss of light. In this situation, it is Gene and Steve's inability to communicate that makes it more difficult to solve problems and complete their task.

Yet another way for their work to become more difficult is if an intermediary is introduced. Let's say a friend tries to help, relaying messages between Gene and Steve, telling them what's going on, what to do, how to do it, and why. Despite their best efforts, the friend may actually make matters worse. This is because the friend cannot convey information with nearly the frequency, speed, detail, or accuracy as compared with when Gene and Steve communicate directly.





## Key Concepts

Two people moving a couch together is different from two people each moving a chair. When moving the chairs, the two people can work independently. However, two people moving a couch is collaborative, requiring communication, coordination, and interaction. And when their ability to collaborate degrades (e.g., the room becomes too dark to see, too noisy to hear, or the friend intermediates their communication), their task becomes increasingly difficult.

In the beginning, Gene and Steve worked together in a *coherent* environment. The conditions for doing the brain work were hospitable, which enabled them to succeed in the brawn work. Conversely, when the conditions became incoherent, the brain work was more difficult, and so too was the brawn work.

By *coherent*, we mean having the quality of a unified whole. The elements that interact frequently and intensely (e.g., Gene and Steve) are in

the same group, and they can communicate directly and with needed frequency, speed, accuracy, and detail. This is necessary for the performance of the whole to be logical and consistent. In this case, a well-lit, relatively quiet room meant Gene and Steve could solve problems as they arose. On the other hand, a poorly lit and noisy room with an intermediary degraded that coherence, which made moving the couch much more difficult.

For now, let us state that leaders make many Layer 3 decisions about the social circuitry of their organization that create or destroy coherence. For Gene and Steve, diminishment in lighting, increase in noise, and intermediation in communications were all arbitrary events. However, in more complex situations, leaders often make decisions that deliberately or accidentally improve or impede people's ability to make sense of their situation (e.g., the lighting), to exchange information (e.g., the noise), or communicate and collaborate directly (e.g., the intermediating friend).

Related to coherence, we'll introduce another term: *coupling*. Elements in a system are coupled when changes in one affect the other. Gene and Steve are coupled through the couch. Gene's actions affect not just the couch but Steve as well, and vice versa. For instance, if Gene twists his end of the couch, Steve has to adjust to compensate.

How much coupling there is determines how much coherence leaders must create so that people can collaborate. Two people moving a couch are coupled; two people each moving a chair are not (unless, of course, they have to go through the same narrow door at the same time).

Depending on conditions, even people in the same situations can have different degrees of coupling, necessitating a different drawing of the boundaries to maintain coherence. For example, during normal flight operations, air traffic controllers and flight crews are loosely coupled. There can be less concern for defining a small, coherent working group. Controllers need to know the location, direction, and speed of aircraft in the space for which they are responsible. Flight crews have to manage their aircrafts' controls to control their flight paths.

Because of this precise division of responsibility, communication between the controller and pilot can be terse and coded. In the following transcript from the Dallas/Fort Worth Airport tower, note the consistent wording between the tower and pilots, and how pilots repeat the control-

ler's instructions to confirm they understand, reducing the likelihood of a misinterpretation going unnoticed:[1]

> *Pilot:* "Good Morning DFW Tower, American 121, visual for one-eight right."
> *Tower:* "American 121, DFW Tower, cleared to land one-eight right, winds one eight zero at seven."
> *Pilot:* "Cleared to land, one-eight right, American 121."

> *Pilot:* "Regional approach, American 71, one-zero thousand for eight thousand, requesting direct NETEE."
> *Tower:* "American 71, regional approach, regional altimeter three zero zero six, cleared as requested. Descend and maintain six-thousand."
> *Pilot:* "Cleared direct NETEE, down to six-thousand, American 71."

From the air traffic control perspective, pilots are just a flight number, and from the pilot's perspective, controllers are just the tower. Flight crews can choose whether it's the captain or first officer on the radio without the approval of the tower. Similarly, the controllers can pass responsibility for a flight to another controller without approval from the flight crew. Both sides have independence of action.

This is an example of loose coupling. In these situations, there can be a protocol, like in the example above, that is agreed upon by both sides, of what information to exchange, how, when, with what frequency, and in what format.* What is important can be communicated in the message; it is not dependent on the messenger.

In contrast, in an emergency, pilots and air traffic controllers will do many things to increase coherence because they must be more tightly coupled. To communicate with greater frequency, intensity, and clarity, they may dedicate a controller to the pilot and move other flights to another radio frequency. That way, the pilot and controller can focus on the emergency together, without distractions from other flights.[2]

* Standards as set by the International Civil Aviation Organization.

Consider how, in 2018, Maggie Taraska, a seventeen-year-old solo student pilot, was guided to a safe landing by the controller after the landing gear fell off her plane during takeoff.

> *Tower:* "Warrior 2496X…your right main is now missing from the airplane. It's fallen off the airplane. Say your intentions."
> *Pilot:* "Can I circle back to land?"
> *Tower:* "Warrior 96X, affirmative. Are you a solo, ma'am?"
> *Pilot:* "I'm a student pilot solo, yes."
> *Tower:* "Okay. It'll be okay. Just go ahead and circle the airport for now. Make a right turn to circle. We're going to get some people out to help you, okay?"[3]

This communication was more casual, not the highly coded talk of normal operations. The tower used simple terms, such as "circle the airport for now" and "make a right turn to circle." This calmed everyone involved in the situation and made it easier for the student pilot to understand what was needed. Once the situation stabilized, the controller found the student's instructor, summoned him to the tower, and they all worked the problem.

> *Tower (Instructor):* "You're doing a great job flying the airplane. Keep doing what you're doing. They're going to stage the equipment [emergency crews, fire trucks] just in case anything is needed…We've got plenty of time; we've got plenty of fuel; we've got plenty of daylight. So, try to relax and [you've] always heard me say 'go back to the basics.' So, we're gonna work the basics here as much as possible… I can see you turning at altitude lining up the runway, so continue down like you normally do. What I'm thinking is just have you fly down the length of 09* like you're doing right now, and then, when you're comfortable, I'm [going] to have you turn to the left, enter a downwind on 09. Would that work for you?"

* "09" refers to the runway number, named after the compass bearing of the runway orientations.

*Pilot:* "Yeah, that works."

*Tower (Instructor):* "...[I'll keep] my eye on you and maybe suggest when you might want to start to turn crosswind and downwind...Okay, I know it's hard to say this, but treat it as much like a normal landing as you can. So, the power setting will be all the way down, the pitch, the airspeed, keep everything as normal as you can."

*Pilot:* "Alright."[4]

They created a small, coherent working unit to solve the problem. Together, the controller, the pilot, and her instructor landed the plane safely, with the instructor saying, "You did a beautiful job, Maggie. You've got a bunch of people clapping for you up here."[5]

This was made possible by switching from loosely coupled elements (people in planes and control towers) to tightly coupled elements in a well-defined, coherent working group (Maggie, her instructor, and a flight controller on their own frequency).

Leaders must appreciate that all the work they are managing is knowledge work. At times, some of this work is loosely coupled, while at other times, it is tightly coupled. It is not arbitrary. Instead, it depends on how much coherence has to be provided to whom, in which working groups, and the type of problem they are trying to solve. This, in turn, determines how leaders must configure the social circuitry of their organization (Layer 3). This includes the design of roles, routines, processes, and procedures. For instance, the social circuitry to support normal air traffic control operations is different from the circuitry needed to ensure the safe landing by a student pilot in a damaged aircraft.

Coupling and coherence are important, not just for Gene and Steve trying to move a couch or Maggie Taraska landing safely. Look around your own work environment and assess whether you are wired to win or not. Have many people have been placed into the same group arbitrarily, when the problems they're dealing with are not tightly coupled? If so, this is likely a couch team that is actually moving chairs. This social circuitry design error creates the predictable consequence of people being drawn into situations where they are not needed and for which they will not be affected by the

outcomes. This creates more meetings, memos, status updates, and the like, which adds work and time but does not add value.

Conversely, as you look around your work environment, are there people who are responsible for some portion of a larger problem scattered around the organization, not taking into account how coupled their work is? If so, this is likely because a couch problem is being solved by multiple chair teams. People who should be solving problems together can't. Collaboration should be frequent, fast, and rich but becomes occasional, slow, and imprecise. Instead of conversation, there are forms, work orders, tickets, intermittent meetings, and convoluted reporting channels.

Wired this way, people with tightly coupled work are not in a coherent working group. They don't have everything they need to do their work easily and well, which includes people, skills, resources, decision rights, and so forth. This makes it more difficult to find solutions, and those solutions are worse than they otherwise would have been. This is also a social circuitry design error, one of breaking things into such small pieces that coherence is lost. That's both coherence of completeness and coherence in terms of being able to act logically and reliably.

In the first case, the system was over coupled and under partitioned. In the second case, the system was under coupled and over partitioned. Later in the book, we'll describe how leaders can address both of these situations to be wired to win.

This first vignette demonstrated the effects of cohesion and coupling to make it easier or more difficult to jointly solve a problem. In the second vignette, we'll illustrate how management systems can make it easier or more difficult to integrate different functional specialties to achieve a common goal, what can go wrong, and what we can do about it.

## QUESTIONS FOR THE READER

1. What interactions within your organization are "over couched?" These are situations where there's been too little partitioning of groups around the problems you have to solve. How can you better partition a

problem, thereby returning time to people to solve Layer 1 and Layer 2 because they are no longer burdened by Layer 3 problems?

2. What interactions within your organization are "under couched?" These are situations where the contributions of people necessary to help solve problems and get things done are not within a coherent unit. What might be done to increase the coherence across those boundaries and enable better joint problem-solving, so Layer 1 and Layer 2 issues can be addressed more effectively?

## Vignette Two: Moving Furniture and Painting an Old Victorian Hotel

Due to their splendid sense of aesthetics and design, Margueritte Kim and Miriam Tropp Spear have been asked by their friend to help refurbish an old Victorian hotel in a remote part of rural Maine. The friend's idea is to turn it into a not-for-profit center for children who've undergone trauma.

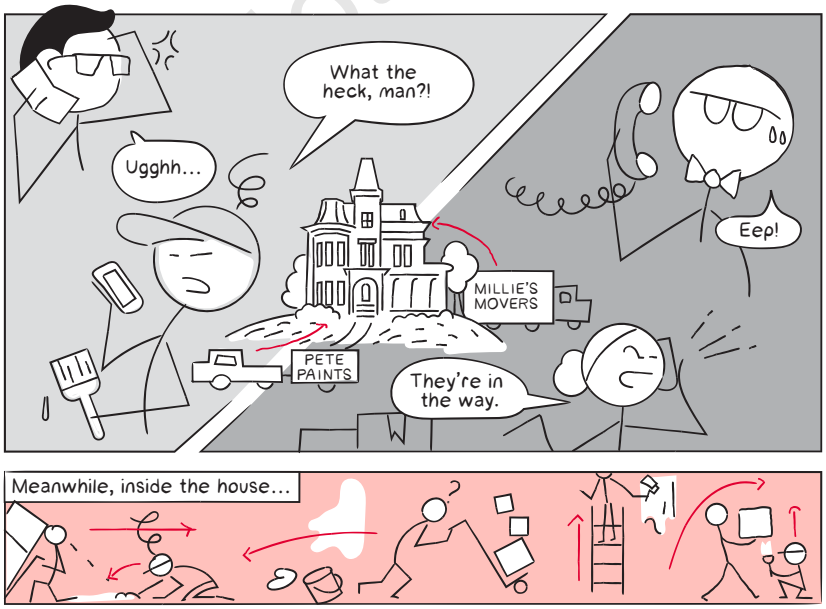
Because of its remote location and the fact that it'll be a charity undertaking, professional general contractors, who might otherwise hire the necessary tradespeople and manage their work, aren't readily available to do the work that is needed.

Given the tight deadlines to open the center, Margueritte and Miriam need to focus their time on design and help their friend with opening the center. So they ask their respective spouses, Gene and Steve, to hire people to clear the rooms of furniture, do all the necessary prepping and repainting, and return the furniture to where it belongs. Gene and Steve assure Margueritte and Miriam that they can complete this.

Steve takes responsibility for hiring and scheduling movers, while Gene takes responsibility for hiring and scheduling the painters. They pick a date to get started, thinking, "What could go wrong?"

Right after Gene and Steve assure their spouses that all will go well, everything goes wrong. Painters are calling Gene to say the rooms haven't been fully emptied, so they can't set up and do their work. Movers are complaining to Steve that they emptied the rooms but there's no sign of the painters, so they don't know when to put the furniture back. Some movers and painters are trying to work in the same place at the same time, tripping over each other.

Gene and Steve are surprised when they discover that the movers and painters started at opposite ends of the hotel. The movers wanted to do the top floors first, before they got tired. The painters wanted to start on the bottom floors so they wouldn't have to haul all their supplies up the stairs. As a result, many rooms had been started but few had been completed. Furthermore, movers and painters were getting in each other's way, either in the hallways and staircases or within the rooms they were working in.



To try to better synchronize everyone, Gene and Steve create a single moving-and-painting schedule in a spreadsheet. This assigns times for the movers to remove the furniture, the painters to paint, and the movers to return the furniture. Gene and Steve figure the schedule will ensure everyone is where they need to be, when they need to be there. However, Gene and Steve are amazed by how quickly the situation devolves into disarray. Movers show up while painters are still painting, and painters show up to rooms that haven't yet been cleared.

It turns out that Gene and Steve's estimates for the time to remove furniture is nearly always wrong—every room has a different mix of chairs, tables, bureaus, and so forth, with different sizes and weights, which require different times to move.

Their painting estimates are just as inaccurate. There are a variety of surfaces throughout the rooms, so the time required for each is different. After all, this is an old Victorian; each room has a different floor plan. As for the finishes, sometimes there is drywall and sometimes there is an older form of plastering. Sometimes there is crown molding that needs to be stained. Sometimes the crown molding needs to be replaced. And occasionally, some rooms have lead paint that needs to be managed according to code.

Because Gene and Steve's schedule did not account for these factors, tasks rarely start or finish as expected. Cajoling and hectoring from Gene and Steve don't help. Everyone is in everyone else's way. Painters are frustrated with movers, movers with painters, and everyone is rightly frustrated with Gene and Steve.

To try to get the movers and painters where they need to be, Gene and Steve do two things. First, they try to create a more accurate schedule by getting better information. They start interrupting people while they're working, asking for more accurate estimates of how long their work will take. But they discover that even these estimates are still not accurate enough. Movers and painters keep showing up too early or too late. Worse, everyone grows increasingly irritated by Steve and Gene's constant requests for status updates, especially when there is no obvious improvement.

Gene and Steve also start expediting. When a room becomes "critical," they demand that movers and painters drop their work mid-task to go work on that room. Expediting requires a lot of time and effort from Gene and

Steve, and the constant stopping and starting of tasks is even more disruptive to movers and painters trying to get work done.

When Gene and Steve propose measuring the movers on "number of pieces of furniture moved" and painters on "number of walls painted" and "percentage of wall paintings started on time," many of the movers and painters threaten to quit. Several painters, frustrated with waiting for the movers, start moving the furniture themselves. Tensions keep escalating as movers and painters start blaming each other for their inability to achieve their goals.

It gets worse. When Margueritte and Miriam return to the hotel, they are flabbergasted and mortified at how badly things are going, with so few rooms actually completed and absolutely no one proud of the work that has been done. Everyone agrees that the center cannot open in its current state, despite promises made to the community, donors, and the families of the children.

## Reflections and Key Concepts

The problems that Gene and Steve are grappling with in this vignette are likely familiar to anyone who has ever worked in a functionally oriented organization—where people are divided based on their specialties. Leaders in these organizations often assume things will naturally self-organize or that schedules can always integrate those specialties toward a common purpose. They often neglect, as Gene and Steve did, the careful design of their organizational wiring (Layer 3).

One potential result is the system is over partitioned, so no part in the system is coherent. In other words, no part of the system can work independently, requiring massive coordination effort to do anything at all.

Unfortunately, this is a common problem. For instance, Steve and Miriam took their eight-year old daughter, Eve, to the emergency department after she fell in a playground and jammed her wrist. At every step in the experience—registration, triage, examination, imaging, diagnosis (to determine that the "jam" was actually a buckle fracture), treatment (to cast her arm), and scheduling for follow-up—they found clinicians who seemed deeply concerned with providing sympathetic and quality care.

However, each step in the process was disconnected from the whole: registration took all of Eve's information correctly (Steve and Miriam saw the printout), but that printout didn't accurately make it to the triage nurse. The triage nurse slotted Eve into the orthopedic track, but Steve and Miriam sat in an exam room until they finally lost patience and went to find the physician assistant, who responded, "Oh, I didn't know you were waiting."

When they got to imaging, the technician had the sites aligned on Eve's forearm, not her wrist, because the instructions he received weren't clear enough as to where the injury was. When Eve was finally casted (which turned out to be plaster instead of the preferred, more kid-friendly and waterproof fiberglass, because of a disconnect with the supply department), Steve and Miriam tried to schedule a follow-up appointment, which they couldn't do from the emergency department. They had to call an external phone number, which they had to locate on their own.

Yes, the pieces finally came together, but only because of Steve and Miriam's repeated interventions to make it happen.

Gene had the same type of experience when his father suffered a stroke. It was left to Gene and Margueritte to get all the specialties to coordinate across multiple days in the trauma center.

After his father was transferred from the neurological intensive care unit to the neurological care unit, he was seen by various specialists during the daily rounds, which included neurologists, nurses, case managers, etc. On the first daily round, a decision had to be made about whether to put Gene's father on blood thinners. They deferred making a decision until they could examine the brain MRI images, which would be available the next day. Overhearing this, Gene showed them a picture he had taken of the brain scans the neurologist studied the day before. They huddled around Gene's phone and decided to prescribe blood thinners that day.

This is another example of Layer 3 design errors causing people to not have what they need when they need it to do their work easily and well. The different functions were poorly integrated, much as we saw in the chaotic emergency department that treated Eve's fracture. In effect, in the absence of well-designed social circuitry (Layer 3) to integrate across the different medical professions, the coordination function is often a concerned family member, with no medical training, to ensure their loved one receives timely care.

Such problems are not unique to healthcare. Consider an oil refinery that has to repair valves, pumps, and motors that help move fluids throughout the facility. In the repair department, there is a valve that has been waiting for months to be repaired. Why? Mechanics had taken the device apart to inspect and assess it. The valve required certain parts to be sent to machinists for refurbishing, while another part had to be sent to the hydraulics shop to be fixed by the specialists there. The machinists had completed their work, but the mechanics in the hydraulics shop were still waiting on some sign-offs from engineering, which is in yet another department.

Making the problem worse, mechanics who were waiting for "paperwork" from engineering or parts from other functions were idle. So, they looked for other work to do. This increased the number of open and active jobs that had to be tracked (e.g., what part was in what location and in what stage of processing). This increased even further the information needs of the system.

Repairing the valve should have been a simple, linear sequence of work. Instead, the valve became "stuck," just like Miriam and Steve's daughter in the emergency department or Gene's father in the neurological care unit. Each was seemingly lost in all of the Layer 3 coordination required because of the insufficient coherence between functional departments.

And what happened to that valve in the repair department? It was not repaired in time. As a result, those doing maintenance on the larger system had to scavenge another valve to get things back up and running, adding even more people, machines, material, and information that needed to be coordinated and expedited.

Here's another example: Consider the complex and sprawling software systems that run the operations of a mobile phone service provider. Leadership wants to present a checkbox on their website to enable their customers to subscribe to a $4.95 monthly service, such as to watch movies or get email. Implementing this capability requires changes from over forty teams—ten parts of various applications (e.g., web front end, middleware, back end, notifications,), across every channel to the customer (e.g., retail, digital, customer support), as well as billing, collections, and so forth. Implementing the seemingly simple checkbox requires scores of project managers, near CEO-level sponsorship, and over one year to complete—delaying a new revenue stream that would bring in tens of millions of dollars every month.

Requiring one year to add this simple checkbox is not because it is technically challenging at Layer 1 (the object being worked on) or Layer 2 (the tools and instrumentation). Quite the opposite. Instead, the checkbox had become "stuck" because of the inadequate Layer 3 (social circuitry) that leaders created among the forty teams. Each team operated independently of each other. They had their own priorities, budgets, operating plans, schedules, and so forth. The checkbox was "stuck" in just the same way as the other three examples.

This is nearly the same situation that Gene and Steve created in the old Victorian hotel, where rooms became "stuck" in terms of progress not being made because the efforts of the movers and painters were not coordinated. Before we explain what Gene and Steve did to get things right, let's first analyze and reflect on what they did to get things so badly wrong. How did they miswire their Layer 3 so dismally?



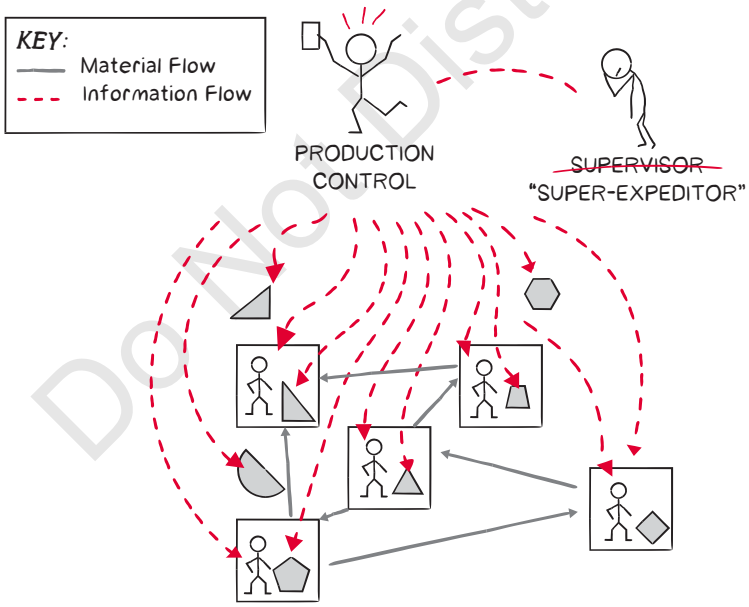
## When Schedules Fail as an Effective Integrating Mechanism

At first, Gene and Steve did not coordinate the efforts of the movers and painters at all, resulting in their starting at opposite ends of the building. Next, they tried to use a schedule as the coordination and integration mechanism but were still unable to get the movers and painters where they needed to be when they needed to be there.

What Gene and Steve did not appreciate is that scheduling a project of this complexity, let alone one of even greater complexity, is nearly impossible. They were unable to get sufficiently accurate forecasts of how much time the movers and painters needed to complete their work, nor were they ever able to get adequately complete and timely information from everyone in their system to tell people where to go.

But even if they had all that information, creating an accurate schedule is still hopeless. It was mathematically proven over fifty years ago that it is often impossible to compute a correct and optimal scheduling solution in finite time for schedules of any significant size.* Gene and Steve created the best schedule they could in their spreadsheet, based on insufficient detail, guaranteeing a poor schedule and their dismal outcomes.

**FIGURE 2.1:** Example of Production Control






* In computer science, "job-shop scheduling" is known to be "NP-Hard," a category of problem that requires exhaustive search. Because the time required to solve these problems can grow polynomially based on its input size, some are not computable in finite time. Another well-known NP-Hard problem is cryptography, which depends upon having the key to decrypt a message. Later in this book, we will discuss why scheduling is so difficult.

### Expediting Adds To, Doesn't Diminish, the Chaos

Gene and Steve also tried expediting, having movers and painters drop whatever they were doing to do something "more urgent." The resulting chaos they experienced is not an exaggeration.

In settings where there is a daily production schedule, such as in manufacturing or IT operations, many of us have experienced morning production control meetings, daily review meetings, and so forth. After schedules have been released, managers start generating hot lists (the list of urgent schedule changes), super hot lists, and extra hot lists, all while shop floor supervisors are running about trying to expedite, firefight, and reroute workflows* for "blocking" of upstream work by downstream work and "starving" of downstream work by upstream work.

Furthermore, notice how their system couples everyone to everyone else—if any mover or painter runs late, they quickly cause other rooms to become late, and the lateness spreads like a contagion. In this system, small problems quickly become large problems. As a result, expediting may provide some immediate gratification but actually makes matters worse.

As they did in scheduling, Gene and Steve ran into another theoretical limitation, this time for control systems. Their ability to see and solve problems was not able to keep up with the frequency, speed, or detail of the work of the movers and painters they were trying to coordinate and control.†



* We use the following terms interchangeably: workflows, value streams, flows of work, etc.

† Control system overlays must be faster and more reliable than the underlying systems being controlled. The Nyquist-Shannon Sampling Theorem, first introduced in 1928, explains why. A receiver (sensor) must sample at least twice the rate of the sender (the thing being monitored and controlled) to accurately measure and control a system. This theorem forms the basis of all things digital, including telecommunications, medical imaging systems, astronomy, and more. In reality, to control a complex engineered or biological system, the receiver and controller must be much faster to maintain resilience and agility. This has stark implications for top-down management. For instance, if reports are generated and reviewed once a week, they can be used to control (manage) only situations that change no faster or more frequently than every two weeks. Anything faster moving may not be detected or is not controllable. This explains why exemplary organizations are typically characterized by overlays of people in supportive roles that are uncharacteristic of their lower-performing peers. That is not "overhead" but absolutely necessary bandwidth for sustaining high performance of fast-moving, complex, dynamic systems. Just such an example is described in Part IV: Amplification.

Gene and Steve created the best schedule they could in their spreadsheet, based on insufficient detail, guaranteeing a poor schedule and their dismal outcomes.

### Parochial Performance Measures

Note how any isolated performance measure, such as "number of pieces of furniture moved" or "number of walls painted," did not improve overall performance—and may likely make things worse. For instance, to meet the furniture-moving goals, movers may start moving rooms before they are needed, jeopardizing the rooms that actually need moving. One can even imagine a situation where they "over produce" and run out of space to store the furniture.*

## Lack of Isomorphism between Layer 3 and Layers 1 and 2

At this point, we have illustrated how Gene and Steve's social circuitry (Layer 3) was profoundly unsuited for the work of the movers and painters (Layers 1 and 2). In mathematics, there is a term for this: *isomorphism*. Isomorphism is the quality of related items having similar structures. In the simplest case, the work of refurbishing a room requires movers to clear out the furniture, which signals the painters to begin their work, who, upon completion, signal the movers to bring the furniture back in when the paint is dry to the touch.

But consider how the information travels in Gene and Steve's Layer 3 wiring, which did not flow in anything like this pattern. Instead, information traveled from painters and movers when they completed their work to Gene and Steve, who would determine what people should actually be doing

* One could interpret Gene and Steve's actions so far as a "transactional" view of leadership—they believed they merely had to hire the right people; tell them exactly what to do, as well as when and where; and then measure and hector (and maybe even penalize and reward) their performance in ways that do not improve overall performance. Also, this would motivate "hiring lowest cost resources," instead of "rank and yank" practices to rank all employees and fire the bottom-performing 20%.

rather than what they were doing. Then, they sent instructions (information) back to the movers and painters.

The work, in effect, was flowing linearly through time, whereas the information had to be moved (with great effort) vertically, up and down silos. The "structural" problem was that the people who really needed to be in direct communication with each other were not. All information had to be processed through Gene and Steve as opposed to flowing directly between the movers and painters. The resulting problem (dynamics) was as described: scheduling and expediting occurred with a frequency, speed, and detail completely inadequate for the frequency, speed, and detail with which work was being done.

It is clear that Gene and Steve created organizational wiring that was incongruent, or not isomorphic, to the work being done. (We will explore this in more detail in Part III: Simplification.)*

## Summary of Gene and Steve's Problems

Gene and Steve created Layer 3 wiring that resulted in a system where movers and painters were working in nothing remotely resembling a unified and coherent whole. The functional silos divided the people who needed to coordinate and collaborate frequently and intensely. The only mechanism their system gave them to coordinate was escalating to Steve and Gene.

Let us marvel for just a moment at how thoroughly we can screw up even this relatively simple system, placing Gene and Steve very much in the *danger zone*. Of course, the consequences are graver in situations that are more complex, across all the dimensions of frequency, complexity, variety, consequence, speed, information density, the number of functional specialties, and so forth, such as the healthcare, oil refinery, and telco software examples.

Let's return to Gene and Steve's story to see what they do to rewire the system to move them into the *winning zone*.

* People in software engineering may be correctly reminded of Conway's Law, which is commonly stated as "If you have four groups working on a compiler, you'll get a 4-pass compiler." (Credited to Eric S. Raymond.) We will discuss in Part IV: Amplification.

## A Better Way

As the implications sink in of how poorly things have gone, Gene and Steve listen to the considerable frustration of the painters and movers and begin to appreciate just how much coordination has to occur between them for their work to get done. They also see the futility of trying to coordinate people through schedules and expediting.

They realize they should partition the whole project into smaller pieces, organizing people into individual "room teams," so the work in one room is less coupled to the work in other rooms. As we'll see, this is an approach of ensuring each team is coherent and less coupled to other teams. This is the opposite of what they had before: low coherence and high coupling.

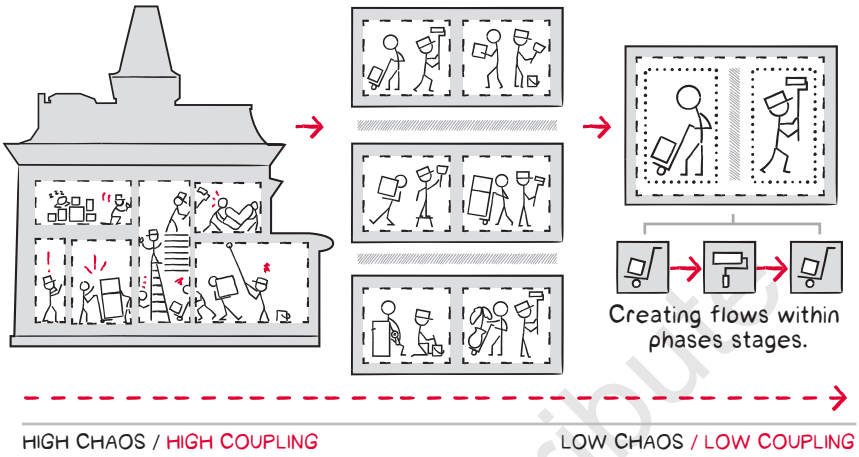
Each room team includes both movers and painters who have all the supplies, materials, and decision rights necessary to start and finish renovating a room on their own. Gene and Steve assign each team a group of rooms, which the team will complete, one after another.

Each team can now work independently because they are a coherent whole. By spreading the teams across the hotel, teams are also less likely to interfere with each other. In other words, the distance between teams reduces interference and coupling, which reduces the need to coordinate.

The work within each room becomes easier to complete too. Each room team needs to worry only about coordinating the efforts of the movers and painters within that team. They are not dependent on any other room teams to do their work, and vice versa. This one change significantly reduces the amount of friction and interference between room teams.

Now some room teams are able to partition even more, reducing interference within their own teams, specifically between the movers and painters. To do this, the movers and painters of a room team discuss with one another how to make it easier for the other group to do what they need to do. For instance, the painters explain to the movers that they don't need everything cleared from the rooms—very large furniture can be left behind, so long as it is moved away from the walls. Painters can do their work behind the furniture and cover it to prevent paint spatter. These explicit handoffs make it more obvious what each person needs to accomplish to achieve the system goals and how to get it done.

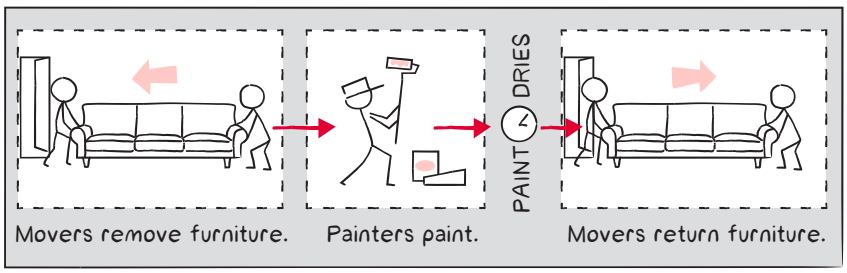
**FIGURE 2.2** Partitioning into Room Teams




Similarly, the team agrees that movers should return the furniture only after all the paint surfaces are dry to the touch and after all the fumes have left the room, preventing the movers from marring the paint and ensuring health and safety.

This creates immediate benefits for the movers and painters. By more clearly defining their boundaries and handoffs, they further partitioned their work and simplified their system. Everyone has fewer people they need to interact with and everyone is able to stay productive with fewer things to worry about. Movers and painters can work more independently of each other, and they've reduced opportunities for error.

**FIGURE 2.3** Further Partitioning within Room Teams



Note how within the room teams, movers and painters are able to continually redefine how they interact with each other. There is no risk of impacting those outside of their team. This liberates movers and painters to fix their own problems and solve their own frustrations, with no need to coordinate with anyone outside their team. In effect, by changing Layer 3 (the social circuitry), Gene and Steve made it much easier for the people for whom they were responsible (the movers and painters) to do outstanding work in Layer 1 and Layer 2.

However, the movers and painters still encounter problems that have to be solved. For instance, painters are occasionally frustrated that they need more time to find the right mix of stain for the wood in the rooms. This is time consuming to get right, meaning those rooms take longer to finish.

Instead of trying to solve these problems in the moment, while the movers are waiting for them, the painters decide to solve these problems "offline." The painters finish their day by experimenting on wood samples to test different formulations for absorption and coloration. When they discover that some paneling is oak and other paneling is elm, which stain differently, they pass this knowledge on as "standards" for the other teams, which makes these operations easier and faster to complete in the future. They've used slowification to solve difficult problems ahead of time, during planning and preparation, so they are spared surprises during performance.

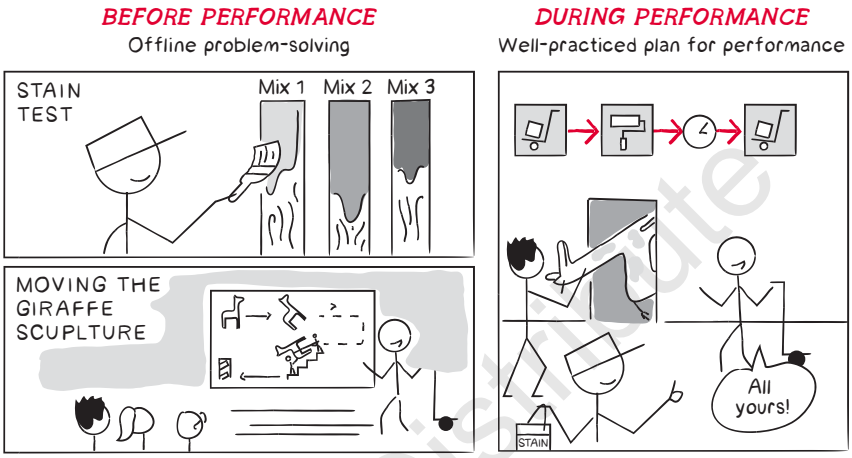
In another complication, Steve notices movers struggle with furniture through a dimly lit, narrow staircase that has a loose tread. He installs extra lighting and temporarily reaffixes the tread. Rather than "being more careful" or "working around the problem," they *solved* the actual problem. By amplifying the signal of problems and fixing them offline, work is quicker, easier, and safer.

With both the stain and the staircase, Gene and Steve helped make it easier for movers and painters to do their jobs easily and well. The workers were able focus on their work and stay "locked in," without having to keep pausing to figure out how to work around some problem.

So far, the movers and painters have created advantages for themselves by creating room teams (simplification), sequencing their work within the teams (simplification again), solving more difficult problems offline (ampli-

fication and slowification), and capturing their best-known approaches as "standards" for getting each room done (simplification again).

**FIGURE 2.4** The Three Mechanisms at Work






However, despite everything, the movers and painters still run into unforeseen problems that make their work difficult. For instance, painters were still sometimes surprised by how much primer the old plaster absorbed before it was ready to be painted. Movers occasionally had to deal with large, awkward items, such as a large, delicate giraffe statue, which was very difficult to carry and navigate through the hallways.

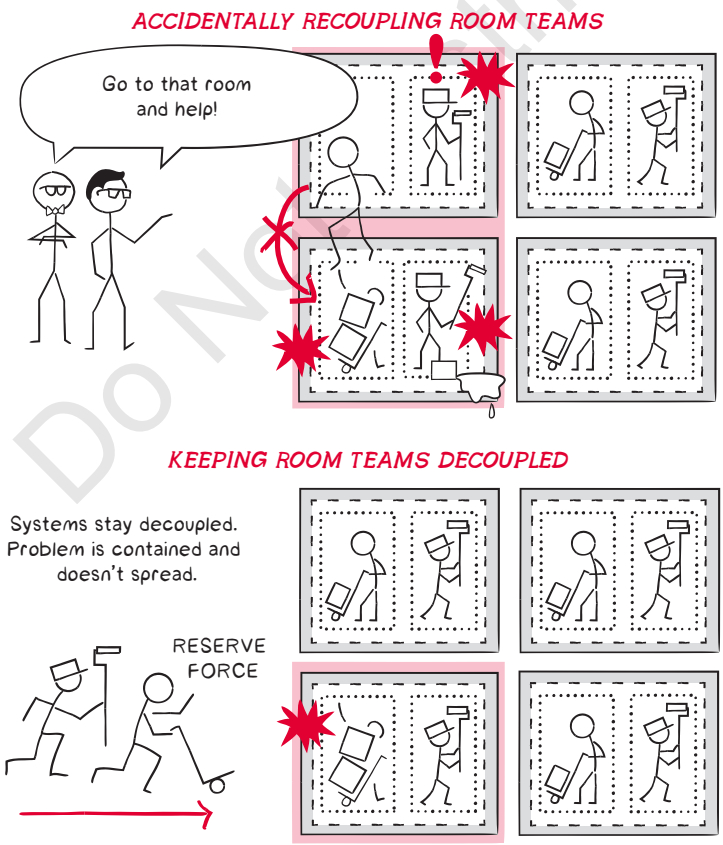
To deal with these periodic glitches, Gene and Steve first try to help by finding a mover or painter in a nearby room who doesn't seem too busy at that moment. However, to their surprise, this makes matters much worse. What they didn't realize was this caused problems to cascade out further. This is because the team from which the person was "borrowed" is now shorthanded and requires help too. In trying to be helpful, Gene and Steve inadvertently "coupled" the two rooms together, creating a problem in the social circuitry (Layer 3).

They now had two problems instead of one: the room with the original problem and the room that was now understaffed. And, of course, coupling was exactly what they were trying to reduce when they created independent room teams in the first place.

To avoid this, Gene and Steve decide to keep a few movers and painters in reserve, not assigned to any of the room teams. They choose people who are particularly good at dealing with trickier issues. Their job is to help teams deal with especially challenging situations as they arise. By doing this, problems are contained and stabilized. That is, problems in one room don't "escape," disrupting the teams around them.

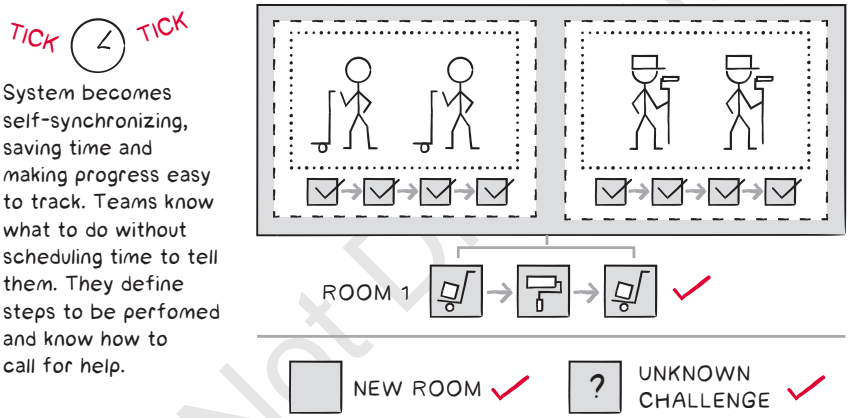
This Layer 3 mechanism ensures that room teams quickly get the help they need, instead of struggling with their problem alone—and it does so without impacting the other room teams. The effect is that problems are quickly and reliably contained, teams are able to do their work better, and work becomes smoother than ever.

**FIGURE 2.5** Example of Coupling and Decoupling



What's astonishing is that this new system quickly becomes self-synchronizing. The room teams know what they need to do next merely by examining the room, without the need for a schedule to tell them. The teams clearly define all the steps that need to be performed, as well as how each step is supposed to be done. It is now easy to tell how far along work actually is, without tedious or time-consuming reporting. It is quick and easy to call for help, and small problems stay small (and local), as opposed to having a large or lasting effect.

**FIGURE 2.6** Self-Synchronized Teams




This is all achieved without Gene and Steve having to do anything reactive, impulsive, or interruptive. Instead of having to constantly fight fires (without actually creating enduring solutions), Gene and Steve are able to assess the system's performance and help with things the movers and painters can't do alone.

Gene and Steve look around, marveling at the differences in experience and performance between when they started and now. Work is getting done quickly and beautifully. Everyone is proud of the work they are doing, as the teams keep getting better at every aspect of their work. Instead of being mired in coordination, people are able to collaborate around moving and painting with harmony. They are actively improving how they work within teams and between teams.

By changing Layer 3's social circuitry, Gene and Steve helped create conditions in which it was much easier for the movers and painters to solve the problems they faced, liberating their collective ingenuity and professional capability to push the frontiers of their performance.*

More importantly, Gene and Steve are finally able to report to Miriam and Margueritte that the hotel rooms have been refurbished. Everyone is delighted by how beautifully the rooms have been painted and restored. They all take pride in their work and their role in helping this not-for-profit center open their doors to serve children in need.

## Conclusion

In this chapter, we presented two vignettes: one with a couch as a metaphor for joint problem-solving, and another with moving furniture and painting rooms in a hotel as an example of how we integrate two functional specialties toward solving a common objective. In these vignettes, we showed good and bad characteristics, classifying them as the *danger zone* and *winning zone* respectively.

Next, we'll further explore the moving-and-painting vignette through the perspective of the three mechanisms to wire a winning organization: slowification, simplification, and amplification.



* These are not exaggerations. Every study comparing outstanding organizations with those less well-managed found productivity differences of several multiples, quality differences of several orders of magnitude, and differences in reliability and workplace safety, also in the hundreds if not thousands of times better. See, for instance, State of DevOps Research by Forsgren, Humble, and Kim, 2019; Garvin's 1983 "Quality on the Line"; Krafcik's 1988 "Triumph of the Lean Production System"; Ward, Sobek, and Liker's 1993 "The Second Toyota Paradox"; and *Dynamic Manufacturing* by Clark, Hayes, and Wheelwright.

CHAPTER 3

# Winning Based on Liberating Ingenuity

In Chapter 1, we described the change in experiences for both patients and staff at a hospital's emergency department. Modifying the emergency department's social circuitry (Layer 3) made it easier for clinicians to deliver outstanding care easily and well.

The same thing happened in Chapter 2 with Gene and Steve's efforts to help refurbish the old Victorian hotel. They were able to make the work of movers and painters easier by changing how they wired the social circuitry. The basic nature of the work at Layer 1 (technical object) and Layer 2 (tools and instrumentation) did not change. Movers still used carts, dollys, and hoists to relocate furniture. Painters still used sanders, scrapers, and brushes to paint and prep each of the rooms. It was changing Layer 3 that made the difference. Ultimately, Gene and Steve helped move their teams out of the *danger zone* and into the *winning zone*.

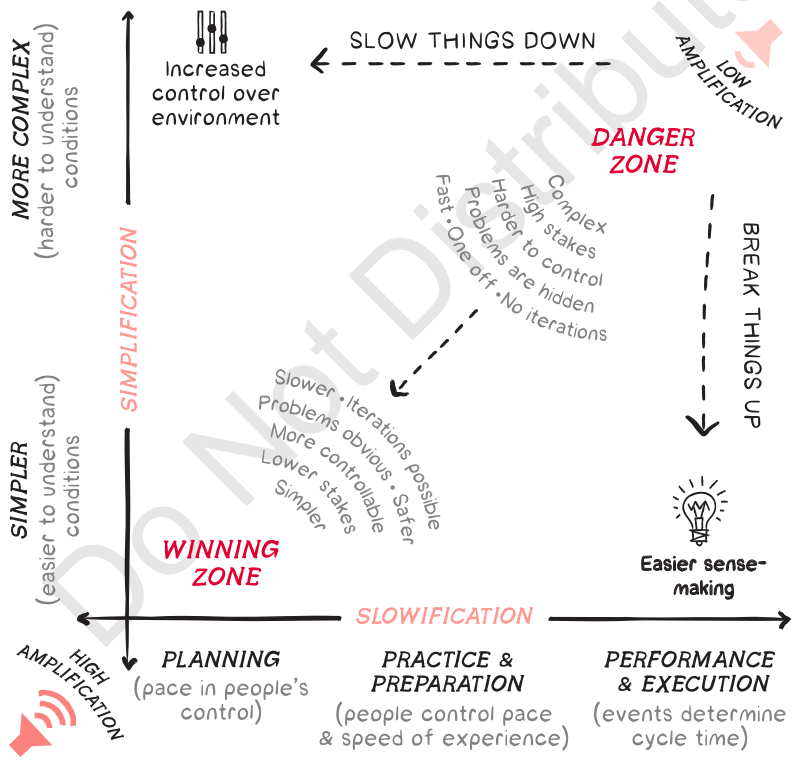
People working in the *danger zone* are unlikely to be able to fully use their ingenuity, to solve difficult problems individually and collaboratively, and to bring new and useful insights into practice effectively. In the *danger zone,* conditions are complex, fast changing, and unforgiving. It's hard to exercise control and the stakes are high. Learning from experience is challenging in this space.

On the other hand, when leaders put those same people in the *winning zone*, conditions are simpler and slower moving. Control can be exercised and the stakes are lower. Learning from experience is possible. And people are capable of inventing wildly innovative and useful solutions to challenging problems.

Leaders can help their organizations move from the *danger zone* to the *winning zone* by changing how they wire their organization's social circuitry

(Layer 3). This is achieved through some combination of three mechanisms—slowification, simplification, and amplification (see Figure 3.1). Slowification makes solving problems easier to do, simplification makes difficult problems easier to solve, and amplification makes it obvious that there are problems that demand attention and whether or not they've been adequately addressed.

**FIGURE 3.1** Moving from the *Danger Zone* to the *Winning Zone* through Slowification, Simplification, and Amplification

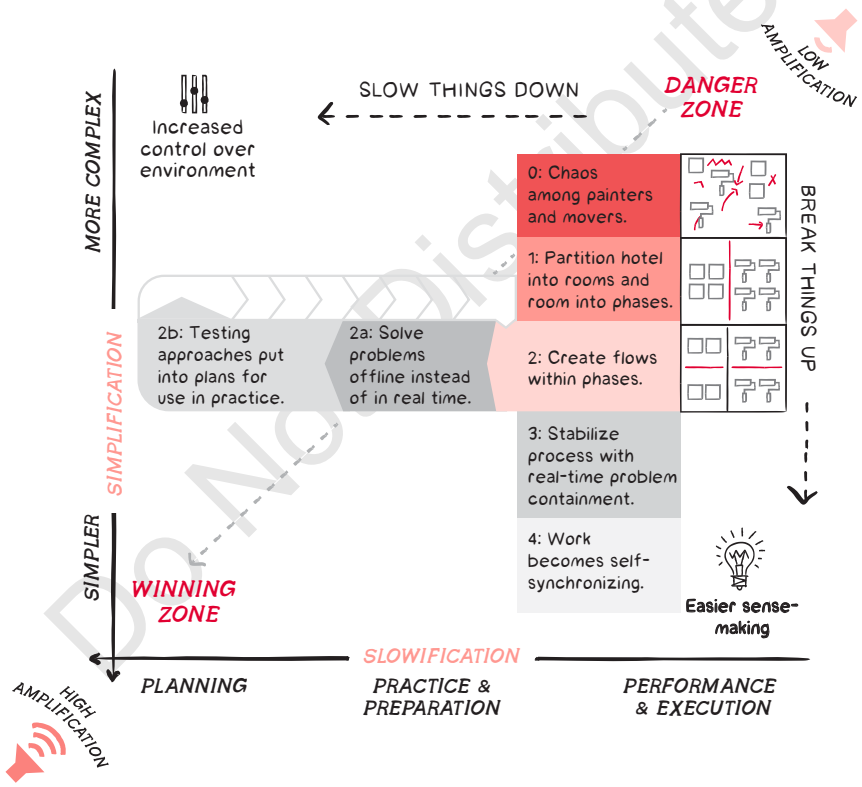



In this chapter, we will explain the moving-and-painting vignette through the perspective of these three mechanisms, which gives us insight into how to succeed in complex real-world situations.

## Interpreting the Narrative: Navigating from the *Danger Zone* to the *Winning Zone*

In the moving-and-painting vignette, the jobs of moving and painting were improved by slowification, simplification, and amplification, which helped everyone move from the *danger zone* to the *winning zone* (Figure 3.2).

**FIGURE 3.2** Hotel Refurbishment: Moving from the *Danger Zone* to the *Winning Zone*






### Slowification in Action

Slowification changed how and when problem-solving occurred, so people could be more deliberate and creative in solving problems. It was essential

to first slowify before they could simplify, because people needed opportunities to figure out how to decouple their work (as we'll see in the next section). But slowification showed up in many more places.

In the beginning, movers and painters were forced to solve challenging problems in the production environment, solving problems as the work was being done. That's in the *danger zone*, the wrong time to solve such problems.

Fortunately, Gene and Steve had enough sense to pause. Instead of expecting teams to solve these problems in the production environment, teams were able to shift their problem-solving into the more forgiving environments of planning and preparation.

Later, Steve, freed from having to "supervise," as he and Gene had done with scheduling and expediting, supported movers by setting up extra lighting in the dimly lit stairs and installing a temporary tread on a questionable step. Painters set up "laboratories," with Gene's help, to test and try out stains. And, movers worked out how to handle particularly awkward pieces of furniture before actually committing to moving through halls, in and out of doorways, and up and down stairs.

These acts of slowification created opportunities to capture knowledge of local discoveries and then share the new insights across all the room teams. All this was made possible by deliberateness and time being committed to slowification by Gene and Steve.

To slowify or not is a choice that leaders make. Gene and Steve could have stuck to their (doomed) plan and insisted on "getting the work done," doubling down by setting objectives such as "number of walls painted." They got lucky that the movers and painters—using their brains, talents, and experiences—were able to help them create better ways of working by slowifying.

## Simplification in Action

Simplification helped move the situation out of the *danger zone* by making the problems themselves easier to solve. In the beginning, the entirety of the refurbishment project was the only coherent unit. No portion of the system could start and complete a room independently. Instead, Gene and

Steve allocated movers and painters to rooms through schedules and expediting, which was completely inadequate.

This changed when they partitioned the whole project into individual room teams, an example of modularization, which is one of the three techniques of simplification. Each room team had all the resources needed to refurbish a room independently, with no need to coordinate with anyone outside of the team. This made things simpler, because everyone had fewer people they needed to interact with.

Later, the room teams further partitioned their work by defining the handoffs between movers and painters (i.e., the conditions created by removing furniture, painting the room, and returning furniture to it). This created even more opportunity for independent problem-solving, meaning more people's ingenuity was being put to good use at the same time. They could solve more problems simultaneously.

This recursive nesting of modules (i.e., from the entire hotel to room team to stages to steps, while still protecting coherence) enabled easier, clearer, faster problem-solving between the people doing the work. Work was increasingly able to be performed and improved in parallel. Collectively, this helped fully unleash the movers' and painters' skills, expertise, and ingenuity to better use, all without Gene and Steve having to do anything, let alone constantly interfering.

*Modularization*, the first technique of simplification, is a concept that is used heavily in computer science. It refers to partitioning large systems into smaller ones, which are each coherent. They connect to each other through pre-established interfaces (just as air traffic controllers and flight crews followed a terse and coded protocol during normal operations in Chapter 2). This property allows modules to hide internal complexities, which is called "information hiding."

The goal of information hiding is not duplicity or deception. Rather, it enables modules on either side of an interface to operate together (e.g., exchange information, goods, or services) without having to know how the work is actually performed inside the other module.

For instance, an air traffic controller does not need to know how the flight crew set their flaps and rudders. The controllers have confidence that the flight crew can control the plane and can proceed in the direction and

altitude instructed. Changes can be made inside the module without having to get permission or coordinate with people on the other side of the interface

There is another required property of modularity: problems inside the module are contained, as opposed to escaping outside of the module. Initially, when room teams ran into trouble, Gene and Steve stole movers and painters from other room teams. This inadvertently coupled the room teams together, causing local problems to spread.

To solve this, they created a reserve team who helped room teams in trouble. In this way, the problems were contained. The more frequent and severe the problems, the more people need to be held in reserve.

The enormous differences in performance in the moving-and-painting vignette were not achieved in one step or as a grand mandate from Gene and Steve, prescribing exactly what the end state should look like and how it was to be achieved. Instead, it emerged through *incrementalization*, the second technique of simplification. Rather than changing everything all at once, what was known was kept intact and novelty was added bit by bit.

For instance, there was the iterative (incremental) approach to partitioning the project into rooms, rooms into phases, and phases into steps. Then, within these modules, there were small iterations and experiments that the room teams performed to deal with difficulties as they emerged. It was not someone trying to outline in advance every possible issue they could imagine occurring, and then designing and implementing those solutions all at once.

Within the room teams, once the movers and painters defined their handoffs, they linearized their work. *Linearization* is the third technique of simplification. This made it more obvious what work was being done and what had to occur next, further enabling independence of action. (Linearization does for sequential processes what modularization does for parallel processes.)

As we'll see in Part III, simplification, through the techniques of modularization, incrementalization, and linearization, makes it far easier to engage large numbers of people in managing and mastering large, complex, and otherwise unwieldy situations.

### Amplification in Action

Amplification makes it more obvious, earlier and more often, that problems exist for which people's ingenuity is needed to create solutions. Also, the continued existence of problems makes it evident that these problems have not been seen and successfully solved. Amplification is the opposite of suppressing signals that something is amiss, thereby letting problems persist or even cascade into larger problems.

In the beginning of the vignette, due to the high coupling within the system, there were problems everywhere, all the time. Gene and Steve were so overwhelmed worrying about which movers and painters were in what rooms that they couldn't help solve other problems, like loose stair treads or difficult-to-stain trim. There were signals of problems everywhere, but they couldn't respond to any.

As the teams became increasingly able to focus on moving and painting problems in Layers 1 and 2, rather than the problems of sense-making and coordination in Layer 3, amplification played an ever-larger role in triggering further improvement. When painters struggled with unpredictable stains, and when movers struggled with furniture that could be surprisingly hard to handle, these both triggered a pause. The result was assigning some movers and painters to a "stabilizing" role, so they could help teams before problems spiraled out of control.

By increasingly specifying ahead of time what the work was, how it should be performed, and how it should be handed off, movers and painters could generate signals earlier and more frequently when things were not going as planned. Each of these helped trigger more improvements and helped everyone push the frontiers of performance.

## Further Considerations for Leaders

Winston Churchill said, "We shape our buildings and afterwards our buildings shape us." Similarly, we shape the architecture of our organizations (how they are wired), which then shapes the behavior of the people within them.

How we wire our organizations dictates whom we interact with, what we interact about, when we interact, and how we are allowed to interact. In an ideal situation, to get what we need done, we are talking to only the right people, on the right teams, at the right time, in the right way, about the right things.

However, all too often, organizations have flawed wiring (Layer 3), which means we spend all our time and energy talking to the wrong people, at the wrong time, in the wrong way, and often about the wrong things. Under these conditions, it is no wonder that doing even small things requires heroics.

Our organizational wiring also dictates the type of feedback that is generated. Ideally, everyone gets direct and fast feedback on the work they do, so they can see the effects of their actions, which can be used to stabilize systems and improve. After all, in any complex, adaptive system, there are unexpected events and a general tendency toward entropy. We need fast and frequent feedback to keep our systems under control.

As a leader, you are responsible for the achievement of your organization's goals and for creating the organizational and management systems that everyone in that organization uses to contribute to those goals. Thus, it is your professional and moral responsibility to create the conditions so that people can contribute to those organizational goals and create value for both the customers that depend on your organization and the colleagues who depend on them. In particular, this requires you to adopt a developmental mindset, one oriented around designing, sustaining, and improving the social circuitry that lets people do great work easily and well. This, as we show throughout this book, is antithetical to a transactional mindset, reflecting an assumption that leadership is largely a matter of giving instructions and determining who is doing what, when, where, and with what resources.

## Building Your Model Line

Through creating great management systems, leadership creates great value. However, when done poorly, leadership destroys value or, at least, squanders it. Exercised well, leadership can be the reason work is mean-

ingful to those who do it. It can be the reason why products and services are a source of delight for those who receive them. In turn, work is done well because the conditions in which it is performed are managed well. This results in excellent financial and operational metrics that reflect how effectively or efficiently resources were utilized.

Success is enabled by changing the structure (i.e., organizational wiring) and the resulting dynamics of the processes by which people's efforts are integrated through collective action toward a common purpose. Those structures and dynamics are brought into effect through slowification, simplification, and amplification.

This is where the *model line* as a transformative tool comes in, which is a segment of the larger enterprise where new approaches can be tested, tried, and "modeled." It's an opportunity for people to feel what it is like to change their behaviors, which is a precursor for changing their beliefs.

The very first thing a leader has to do to make that transformation is to literally carve out a piece of their larger enterprise and learn to manage it using the mechanisms of slowification, simplification, and amplification. They and their colleagues use this platform to learn while doing, and their colleagues can use the platform to teach others to do the same.

In the moving-and-painting vignette, a model-line approach might have designated one room or a small set of rooms as the platform for the model-line team. However, in that case, the undertaking was such an abject failure, time pressures were so great, and the scale of the work was small enough that transitioning through a model line might not have been a reasonable approach.

The model line is a microcosmic set of processes relative to the enterprise as a whole. While model lines are small, they are still coherent. There's a natural boundary around these model lines with natural beginnings and ends and obvious starts and stops. It's in the model line that people can practice applying and mastering slowification, simplification, and amplification.

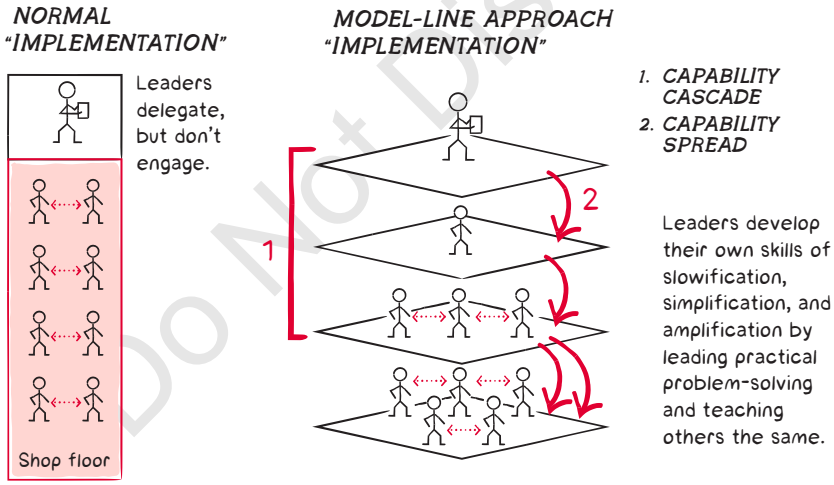
A model line usually starts with relatively few people. With fewer people, you can accelerate learning through faster problem-solving because you're concerned with a smaller set of activities. Likewise, the development of capabilities is accelerated because the people dedicated to the model line

have the chance to test ideas and practice new concepts with frequent and fast iterations.

After all, when we talk about rewiring the organization, we're really talking about rewiring people's behaviors and beliefs. Dr. Jerry Sternin, of the Harvard Business School, explained how important it was to focus on changing behaviors in order to change beliefs: "It's easier to act your way into a new way of thinking than think your way into a new way of acting."[1]

The model line is a small, unobtrusive, "safe" environment to introduce and reinforce new behaviors, the positive results of which convince people to believe in a new way of managing the situations for which they are responsible.

**FIGURE 3.3** Implementation of a Model Line




Creating a model line creates the conditions in which everyone, including leaders, learn to behave differently in order to get different outcomes. Within the model line, everyone performs experiments together, learning what works and what doesn't, and the causal mechanisms that result from those outcomes.

Of course, once the model line is up and running, the chance for spreading greatness is created. Other colleagues can experience firsthand what it feels like to work in slowified, simplified, and amplified conditions. Those who've learned how to slowify, simplify, and amplify can be envoys into adjacent areas, meaning that everyone can be less overburdened on coordination problems (Layer 3) and can be more engaged with practical problems (Layers 1 and 2). We will be revisiting the model-line concept throughout the book to demonstrate how it can be used effectively in an organization to practice slowification, simplification, and amplification.

## Conclusion

In this chapter, we described the three mechanisms of slowification, simplification, and amplification that leaders can use to rewire their organization so they are configured to win, albeit in the simplified example of refurbishing an old Victorian hotel. In the following chapters, we will describe each of these mechanisms in more detail, providing more information about the underpinning theories on which they are based, as well as case studies of their usage in examples far more complex and consequential.



## QUESTIONS FOR THE READER

The three mechanisms of well-wired organizations move us from the *danger zone* to the *winning zone*. Slowification makes problem-solving easier, simplification makes the problems themselves easier to solve, and amplification makes it more obvious when there are problems so they can be seen and solved.

As a leader, consider a challenging situation for which you have responsibility: it could be the design of something novel and complex, or it could be the operations of something complex and dynamic. Then rate yourself on the following:

1. *Slowification: On a scale of 1–10 (1 is not at all, 10 is completely), to what extent have you allocated dedicated time for your people to solve difficult problems in a deliberative and rigorous fashion, during offline planning and practice, instead of expecting people to solve those problems while performing their work?*
2. *Simplification: On the same scale, to what extent have you taken your large programs, projects, or processes and deliberately broken them into smaller, coherent pieces, so that smaller groups of people can solve simpler problems simultaneously?*
3. *Amplification: And finally, using the same scale, to what extent have you created opportunities for fast, detailed, and accurate feedback into the experiences people are having, so that it's immediately obvious when and where problems are occurring that need to be quickly contained and resolved?*

## KEY CONCEPTS AND TERMS

In Chapter 1, we promised that by the end of Part I, you would have an introduction to all the concepts and terms to explain organizations that are wired to win or not. The ideas and mechanisms listed below are sufficient to explain success and failure in designing, operating, and improving the wiring (Layer 3) of complex technical systems and organizations, to assess existing designs and improve on them, and to predict success and failure.

**Amplification:** The act of calling out problems consistently so help is generated and swarms the problem to contain it and investigate, so causes can be found and corrective actions created to prevent recurrence.

**Coherence:** The quality of having a unified whole, which requires that elements that interact frequently and intensely are included in the same grouping so their interactions can be well managed, and that those that are not are excluded. This is necessary for the behavior of the whole to be logical and consistent.

**Control system characteristics:** In control theory, the control system (in our case, the management system) must have a frequency, speed, accuracy, and detail of control greater than the underlying system being controlled (as per the Nyquist-Shannon Theorem). Otherwise, the system being controlled will tend to instability or even chaos. (In system dynamics parlance, the structure is the extent to which there is isomorphism among Layers 1, 2, and 3, and the dynamics are the stability or instability of the system.)

**Coupled:** Two entities are coupled when a change in the state of one changes the state (the condition) of the other.

**Decoupled:** Two entities are decoupled when a change in the state of one does not change the state (the condition) of the other.

**Functionally organized:** In functional organizations, experts are responsible for ensuring people within that function can do work according to the standards expected of that profession. However, when functional managers also try to determine the timing of work, they risk interference between functions that haven't been adequately synchronized.

**Incrementalization:** A technique within simplification of partitioning a large problem-solving effort (a great leap) into small, incremental steps. This involves establishing a stable base and then iterating and testing changes in a few factors at a time as opposed to testing the effect of changing many factors all at once.

**Isomorphism:** The quality of related items having similar structures so they can fit and operate together (e.g., "hand in glove"). In our context, we use *isomorphic* most frequently to describe to what extent the Layer 3 social circuitry supports and enables the work being done in Layer 1 (technical object) and Layer 2 (tooling and instrumentation). When Layer 3 is not sufficiently isomorphic, the organization is in the *danger zone*. (Isomorphism can also apply to other layers. An example of Layers 1 and 2 not being isomorphic: the tools aren't available at the right time for work to occur. An example of Layers 2 and 3 not being isomorphic: parts, materials, information, etc. are not in the right place at the right time for work to occur.)

**Joint problem-solving:** The activity where solving a problem requires two or more people to identify, describe, characterize, investigate, and

resolve, who must actively exchange ideas, information, perspectives, etc. in a real-time, nuanced, noncoded fashion. (See also: *Moving a couch*.)

**Knowledge capture and knowledge sharing:** The deliberate commitment to (a) codify what's discovered when problems are seen and solved, so similar experiences don't recur locally and (b) share what has been discovered, so similar experiences can be avoided elsewhere throughout the system. How knowledge can be usefully shared varies, depending on what has to be conveyed from whom to whom, and about what. It could be as visually simple as directions on assembling an IKEA® cabinet; more complex instructions like in a cookbook; more elaborate like in a journal article, a physical part such as a jig, or code or automated tests in software; all the way to the sophistication of a simulation or virtualization, or recreated, shared problem-solving experience.*

**Layer 1 problem:** A problem with the object on which work is being done (e.g., "I don't understand the design or the function of this thing.").

**Layer 2 problem:** A problem with the instrumentation or equipment used in the work (e.g., "I'm having problems with the equipment needed to make the part.").

**Layer 3 problem:** A problem with the social circuitry or organizational wiring (e.g., "I don't even know what part I'm supposed to be making right now.").

**Linearization:** A technique within simplification of *sequencing* tasks associated with completing a larger set of work so that they flow successively, like a baton being passed from one person to the next. What follows is *standardization* for those sequences, for exchanges at partition boundaries, and for how individual tasks are performed. This creates opportunities to introduce *stabilization*, so when a problem occurs, that triggers a reaction that contains the problem and prevents it from enduring and from its effects spreading. Those allow for *self-synchronization*, so the system is self-pacing without top-down monitoring and direction.

* See, for instance, Chapter 8 in *The High-Velocity Edge*.

**Limitations of expediting:** A reaction to a failed schedule when someone attempts to, on the fly, redirect people and products and reassign processes to "keep things moving." For large, complex, fast-moving systems, expeditors cannot keep pace. The problem is, they're making decisions that seem to make sense immediately and locally but might actually make matters worse—like Gene and Steve pulling a "spare painter or mover" from one room to help in another, only to realize they've now got compromises in both.

**Limitations of scheduling:** In a system that is too scheduled, it is assumed that the antidote for failures of a functionally managed system is building complex schedules that determine who does what, when, and where. The failure mode for that is trying to arrive at a "solution" that is comprehensive across all the work and all the workers. It turns out that arriving at a solution requires so many computations and calculations that it borders on impossible to generate. So, even with the best of intentions to adhere to a schedule, generating a schedule that is precise enough to solve the coordination problem often cannot be done.*

**Modularization:** A technique within simplification of partitioning a system that is unwieldy in its size, complexity, and inter-wiredness of relationships among its many component pieces into more, smaller, simpler, coherent pieces.

**Moving a couch:** An example of a situation in which those tasked with solving a problem and completing a task are coupled in their undertaking and have to engage in joint problem-solving and so must be grouped in a coherent fashion. (See also: *Joint problem-solving*.)

**Moving-and-painting:** An example of a situation that starts out poorly managed, with a chaotic and frustrating experience for the participants, resulting in a disappointing performance. The scarce and precious resource of the participants' time and creativity is exhausted on figuring out what to do, when to do it, and with whom coordination has to occur (organizational wiring issues in Layer 3), leaving too little of those resources left to solve the actual problems of moving furniture and painting rooms (Layers 1 and 2 of technical objects and

* This is because "job-shop scheduling" is an NP-Hard problem in computer science, as described in the previous chapter.

tooling and instrumentation). However, the systematic application of slowification, simplification, and amplification mechanisms reduces the distractions of figuring out how to fit into the larger enterprise and makes it quicker and easier to solve practical problems and do the actual work for which people have been engaged.

**Simplification:** Reducing the number of interactions one component of the system has with other components of the same system (e.g., technical interactions between component parts in an engineered system or among people in a working group). Simplification contains three techniques: incrementalization, modularization, and linearization.

**Slowification:** Shifting problem-solving from performance (operation, execution) back to practice (preparation) and planning with forceful backup, stress testing, and other deliberate ways of finding flaws in thinking before they become flaws in doing.

**Social circuitry (organizational wiring):** The connections by which ideas, information, services, and support can flow from where they are to where they are needed so that effective, collaborative problem-solving and value creation can occur. It is the overlay of processes, procedures, routines, and norms by which individual efforts are integrated through collective action toward a common purpose.