Andrew S. Grove emigrated to the United States from Hungary in 1956. He participated in the founding of Intel, and became its president in 1979 and chief executive officer in 1987. He was chosen as *Time* magazine’s Man of the Year in 1997. In 1998, he stepped down as CEO of Intel, and retired as chairman of the board in 2004. Grove taught at the Stanford University Graduate School of Business for twenty-four years. He lives in the San Francisco Bay Area.
Acknowledgments

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**Introduction**

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I. What happened after 1983
I wrote this book in 1983. It was the result of twenty years of managerial work during which I learned a variety of ways to make things take place more effectively. What I learned were the basics of managerial work, particularly as they pertained to middle managers. More than a decade has passed since, but I find that most of the things that were useful then are still useful now; the basics of management remain largely unaffected.

However, two critical events took place in the 1980s that altered the environment in which we managers do our work—and this made me realize that an updated Introduction to this book was necessary. Those events were the Japanese memory onslaught and e-mail.

Let me explain their implications.

By the mid-eighties, the Japanese producers of Dynamic Random Access Memories, or DRAMs for short—the most popular computer memory devices, used in computers of all kinds—had perfected their technological capability and honed their manufacturing prowess to the extent that they could take on the American producers (who had pioneered the market and totally dominated it for the first fifteen years of its existence). The mid-eighties were also when the personal computer revolution took place. And because personal computers require a lot of memory, the Japanese DRAM juggernaut had a ready market for its products centered in the United States. Everything was primed for an attack.

Intel, where I work, was one of the companies that got caught up in this assault. In fact, Intel was one of the early producers of DRAMs. More than that, in its earliest years, we had practically the whole market to ourselves. However, by the mid-eighties, competition both from the United States and, increasingly, from Japanese manufacturers whittled down our share of the market. Under the ferocious attack of aggressively priced, high-quality Japanese DRAMs, we were forced to retreat and cut prices to a level where being in the DRAM business brought us major losses. Ultimately, the losses forced us to do something extraordinarily difficult: to back out of the business that the company was founded upon, and to focus on another business that we thought we were best at—the microprocessor business.

While this adjustment sounds quite logical and straightforward in theory, in reality its implementation required us to move and redeploy a lot of our employees, let some of them go, and shutter a number of factories. We did all this because under this strong attack, we learned that we must lead with our strength. Being second best in a tough environment is just not good enough.

Ultimately, we—Intel and the U.S. semiconductor industry—prevailed over the onslaught of the Japanese manufacturers. Intel grew to become the largest semiconductor manufacturer in the world, and U.S. manufacturers recently surpassed their Japanese counterparts overall. Nevertheless, in retrospect it’s clear that this assault was just one wave of a much larger tide—the tide of globalization.
Globalization simply means that business knows no national boundaries. Capital and work—your work and your counterparts’ work—can go anywhere on earth and do a job.

Some of us are fortunate to be residents of a country, the United States, that enjoys one of the highest standards of living. The U.S. market for goods and services is the largest in the world. And until recently, it has been easier to supply that market from inside the United States than from abroad.

Today, many markets outside the United States are growing faster than markets inside the U.S. And the domestic market can be supplied from anywhere in the world. For example, I recently bought a Gore-tex jacket from Patagonia (the clothing manufacturer, not the region in South America), and I saw that it was made in China: American brand, American technology (the high-tech fabric was invented and made in the United States), and assembled to the specifications of the reseller (Patagonia) in a foreign country.

The consequence of all this is very simple. If the world operates as one big market, every employee will compete with every person anywhere in the world who is capable of doing the same job. There are a lot of them, and many of them are very hungry.

Another consequence also follows. When products and services become largely indistinguishable from each other, all there is by the way of competitive advantage is time. And that’s where the second critical development of the eighties comes in—e-mail.

Just as the Japanese DRAM attack was the first wave of a much greater tide, e-mail is also the first manifestation of a revolution in how information flows and how it is managed.

The informed use of e-mail—short for computer-to-computer electronic messaging—results in two fundamentally simple but startling implications. It turns days into minutes, and the originator of a message can reach dozens or more of his or her co-workers with the same effort it takes to reach just one. As a result, if your organization uses e-mail, a lot more people know what’s going on in your business than did before, and they know it a lot faster than they used to.

Let me interject a bit of irony. Back in the eighties, when the Japanese seemed invincible, one explanation advanced for their ability to act quickly and decisively was the way Japanese offices were set up. In a Japanese office, a manager and his subordinates all sit around a big long table. People work on their own assignments but when they need to exchange information, everybody they work with sits within speaking distance, right around the same table. So information is exchanged in minutes and everybody can be reached with the same effort. As a result, because of the ease with which Japanese office workers communicate, they have, in fact, been slow to embrace electronic mail.

But now the pendulum is swinging in the other direction. As businesses become more widely spread out around the globe and as time becomes the key competitive weapon, American organizations are often better positioned than their Japanese counterparts. Why? Because the same ease of communication that prevailed by
natural means in the Japanese office now effectively travels around the world through electronic means.

And e-mail is only the first wave. Everything today is going to a digital format: sound, photos, movies, books, financial services. And everything that’s digital can be shipped around the world just as fast as it can be shipped down the hall at your workplace.

Here is an interesting illustration of the consequence of such a capability. I am told that the post office sorts 90 percent of all letters automatically. For the 10 percent the machines can’t decipher, a human reader types the addresses into a machine. Recently, to lower the cost of this work, the postal service tried a new system. A machine takes a digital photograph of the illegible envelopes, instantly ships the digital image to a lower-labor-cost region where someone reads and keys in the address from the digital image, then electronically ships the address back to the regional postal center. This is the beginning of a trend that will become all-encompassing in the next twenty-five years.

Simply put, the information revolution does away with hiding places anywhere, in any line of work. So the questions are: What are businesses to do and what are managers themselves to do?

II. Operating in the new environment
Let’s back off for a moment and consider whom this book is aimed at. I am especially eager to reach the middle manager, the usually forgotten man or woman of any organization. The first-line supervisor on the shop floor and the chief executive officer of a company are both well appreciated. You’ll find many courses designed to teach the former the fundamentals of his work, while practically all of our leading business schools are set up to turn out the latter. But between the two is a large group of people—the middle managers, who supervise the shop-floor foremen, or who work as engineers, accountants, and sales representatives. Middle managers are the muscle and bone of every sizable organization, no matter how loose or “flattened” the hierarchy, but they are largely ignored despite their immense importance to our society and economy.

Middle managers are not confined to big corporations. In fact, they can be found in almost any business operation. If you run a small tax department at a law firm, you are a middle manager. The same is true if you are a school principal, an owner of a distributorship, or a small-town insurance agent. When people from each of these enterprises read the original manuscript of this book, their reactions confirmed what I suspected: the managerial ideas that were developed at Intel as it grew from a very small to a very large organization were broadly applicable.

Another group should also be included among middle managers—people who may not supervise anyone directly but who even without strict organizational authority affect and influence the work of others. These know-how managers are sources of knowledge, skills, and understanding to people around them in an organization. They are specialists and experts of some sort who act as consultants to other members of the organization; they are, in effect, nodes in a loosely defined network of information. Teachers, market researchers, computer mavens, and
traffic engineers shape the work of others through their know-how just as much as or more than the traditional manager using supervisory authority. Thus a know-how manager can legitimately be called a middle manager. In fact, as our world becomes ever more information- and service-oriented, know-how managers will acquire greater importance as members of middle management. In short, know-how managers should also read on.

Whether you are a know-how manager or a traditional manager, your company has no choice but to operate in an environment shaped by the forces of globalization and the information revolution. Companies today basically have two choices: Adapt or die. Some have died in front of our eyes; others are struggling with the adaptation. As they struggle, the methods of doing business that worked very well for them for decades are becoming history. Companies that have had generations of employees growing up under a no-layoff policy are now dumping ten thousand people at a time onto the street. Unfortunately, that’s all part of the process of adaptation.

All managers in such companies need to adapt to the new environment. What are the rules of the new environment? First, everything happens faster. Second, anything that can be done will be done, if not by you, then by someone else. Let there be no misunderstanding: These changes lead to a less kind, less gentle, and less predictable workplace.

Again, as a manager in such a workplace, you need to develop a higher tolerance for disorder. Now, you should still not accept disorder. In fact, you should do your best to drive what’s around you to order. The breakfast factory metaphor of this book—the idea that you should run your managerial processes like a well-oiled factory—is every bit as much the ideal now as it was when I wrote this book. But you as a manager need to be mentally and emotionally ready to be tossed into the turbulence generated by a mega-merger that takes place in your industry—perhaps in this country, perhaps on the other side of the globe. You should be prepared for the shockwaves engendered by a brand-new technique pioneered by someone you had never even heard of before.

You need to try to do the impossible, to anticipate the unexpected. And when the unexpected happens, you should double your efforts to make order from the disorder it creates in your life. The motto I’m advocating is “Let chaos reign, then rein in chaos.”

Now, I’m sure that at various times you will take exception to what you read in this book. “This may be fine at Intel,” you will say, “but it would never fly at PDQ, where I work. Nothing does until the Old Man himself decrees it. Short of a palace revolution, I can’t use anything you recommend.” Let me assure you that you will be able to use most of what I say. As a middle manager, of any sort, you are in effect a chief executive of an organization yourself. Don’t wait for the principles and practices you find appealing to be imposed from the top. As amicro CEO, you can improve your own and your group’s performance and productivity, whether or not the rest of the company follows suit.
This book contains three basic ideas. The first is an output-oriented approach to management. That is to say, we apply some of the principles and the discipline of the most output-oriented of endeavors—manufacturing—to other forms of business enterprise, including most emphatically the work of managers. Consider Intel, which is a true manufacturing and production company, making highly complex silicon chips as well as computer-like products built from them. Our company now has over thirty thousand employees. Of these, about 25 percent actually work to make the products. Another 25 percent help them as they supervise the personnel, maintain the machines, and engineer and improve the manufacturing process. Another 25 percent work in administration, where they schedule production, keep personnel records, send bills to our customers, and pay our suppliers. Finally, the remaining 25 percent design new products, take them to the marketplace, sell them, and service them after the sale.

As we founded, organized, and managed Intel, we found that all our employees “produce” in some sense—some make chips, others prepare bills, while still others create software designs or advertising copy. We also found that when we approached any work done at Intel with this basic understanding in mind, the principles and discipline of production gave us a systematic way of managing it, much as the language and concepts of finance created a common approach to evaluating and managing investments of any sort.

The second idea is that the work of a business, of a government bureaucracy, of most forms of human activity, is something pursued not by individuals but by teams. This idea is summed up in what I regard as the single most important sentence of this book: The output of a manager is the output of the organizational units under his or her supervision or influence. The question then becomes, what can managers do to increase the output of their teams? Put another way, what specifically should they be doing during the day when a virtually limitless number of possible tasks calls for their attention? To give you a way to answer the question, I introduce the concept of managerial leverage, which measures the impact of what managers do to increase the output of their teams. High managerial productivity, I argue, depends largely on choosing to perform tasks that possess high leverage.

A team will perform well only if peak performance is elicited from the individuals in it. This is the third idea of the book. Can business use whatever it is that motivates an athlete to put out his “personal best” consistently? I think business can, which is why I examine the sports analogy and the role of something called task-relevant feedback to get and to sustain a high level of performance from the members of a business team.

We must recognize that no amount of formal planning can anticipate changes such as globalization and the information revolution we’ve referred to above. Does that mean that you shouldn’t plan? Not at all. You need to plan the way a fire department plans. It cannot anticipate where the next fire will be, so it has to shape an energetic and efficient team that is capable of responding to the unanticipated as well as to any ordinary event.
Second, a responsive company should have fewer levels of managers. This concept is easier to apply today as electronic mail can carry information to anyone in the organization. One basic role of management—the role of disseminating information—is no longer as important a managerial function as it was in the past.

With fewer levels in today’s organization, each manager will have larger numbers of employees reporting to him than was the case ten years ago. One of the fundamental tenets of Intel’s managerial philosophy is the one-on-one meeting between a supervisor and a subordinate. Its main purposes are mutual education and the exchange of information. By talking about specific problems and situations, the supervisor teaches the subordinate his skills and know-how, and suggests ways to approach things. At the same time, the subordinate provides the supervisor with detailed information about what he is doing and what he is concerned about. Obviously, one-on-ones take time, both in preparing for them and in actually holding them—time that today’s busier manager may not have.

Are one-on-one meetings still needed? Absolutely. Can you have them as often with ten direct reports as with five? No. Do you need to? No again, because for the most part, these employees are more aware of what’s going on in their business through their computer network than their counterparts were a decade ago; they no longer rely on you to bring them up to date. Nor do you need to rely on one-on-ones to catch up with what your subordinates have found in their lab, factory, or sales region; you’ve already read about those developments on your computer screen, minutes after they chose to inform you.

Now consider the proverbial Japanese employees sitting around the table in a Japanese office. They don’t need to get together with their supervisors to be brought up to date. They may still need to leave the table and have a tête-à-tête with them to discuss their concerns or to bring up issues they’re uncomfortable with, but a lot of the purposes of the one-on-ones are taken care of minute by minute. It’s no different when you and your subordinates are working around the electronic equivalent of this table. So, yes, you still need one-on-ones. But you need them for fewer of the purposes I envisioned when I originally wrote this book. Therefore, you can deal with more employees less frequently and in meetings of shorter duration.

III. Managing your own career

But what about managers who are, after all, employees themselves?

I recently read an article saying that middle-aged men are twice as likely to lose their jobs today than they were in 1980, fifteen years ago. This trend is going to increase in the years ahead.

As a general rule, you have to accept that no matter where you work, you are not an employee—you are in a business with one employee: yourself. You are in competition with millions of similar businesses. There are millions of others all over the world, picking up the pace, capable of doing the same work that you can do and perhaps more eager to do it. Now, you may be tempted to look around your workplace and point to your fellow workers as rivals, but they are not. They are outnumbered—a thousand to one, one hundred thousand to one, a million to one—
by people who work for organizations that compete with your firm. So if you want to work and continue to work, you must continually dedicate yourself to retaining your individual competitive advantage.

In a slow or no-growth environment, there is another factor that you have to contend with as well: ambitious junior employees who desire to move upward in the organization. They may very well be ready to do so but can’t because you’re in the way. Sooner or later, your boss will inevitably have to make a choice: whether to hold on to you, who is doing a good job but is in the way of another person. The responsibility to avoid such situations is yours.

The recipe for success for the generation of managers who worked in the sixties, seventies, and much of the eighties was to join stable and enlightened companies and help them do well; these companies in turn would reward such managers with a career. Obviously, that is no longer the case.

The point is, the clichés of globalization and the information revolution have real meaning—potentially deadly meaning—for your career. The sad news is, nobody owes you a career. You own it as a sole proprietor. You must compete with millions of individuals every day, and every day you must enhance your value, hone your competitive advantage, learn, adapt, get out of the way, move from job to job, even from industry to industry if you must and retrench if you need to do so in order to start again. The key task is to manage your career so that you do not become a casualty.

I can offer you no surefire formula. But here are a few questions to ponder:

1. Are you adding real value or merely passing information along? How do you add more value? By continually looking for ways to make things truly better in your department. You are a manager. The central thought of my book is that the output of a manager is the output of his organization. In principle, every hour of your day should be spent increasing the output or the value of the output of the people whom you're responsible for.

2. Are you plugged into what’s happening around you? And that includes what’s happening inside your company as well as inside your industry as a whole. Or do you wait for a supervisor or others to interpret whatever is happening? Are you a node connected to a network of plugged-in people or are you floating by yourself?

3. Are you trying new ideas, new techniques, and new technologies, and I mean personally trying them, not just reading about them? Or are you waiting for others to figure out how they can re-engineer your workplace—and you out of that workplace?

I am an engineer by training and a manager of a high-technology company by profession. As a manager, I am also a member of the group of individuals—many millions strong in the United States alone—that holds the key to increased productivity: generating more and better goods and services to meet people’s needs. I am an optimist and believe our potential to increase our wealth has hardly been tapped.

But I also think that people do not always face up to the changes they have to deal with, so at times I feel I have to be a realist, too. You can’t be optimistic about
the future until you have survived the crucible of change. The key to survival is to learn to add more value—and that ultimately is what this book is about.

From my own experience at Intel, I strongly believe that applying the methods of production, exercising managerial leverage, and eliciting an athlete’s desire for peak performance can help nearly everyone—lawyers, teachers, engineers, supervisors, even book editors; in short, middle managers of all kinds—to work more productively.

So, let us proceed by taking a field trip to a factory…. 

Andrew S. Grove
April 1995

Foreword to the Vintage Books Edition

I first read High Output Management in 1995. In those days, there were no blogs or TED Talks teaching us about entrepreneurship. In fact, there was almost nothing of use written for people like me who aspired to build and run a company.

Against this backdrop, High Output Management had an almost legendary status. All the best managers knew about it. The top venture capitalists gave copies of it to their entrepreneurs, and aspiring leaders in Silicon Valley devoured its contents. It amazed all of us that the CEO of Intel had taken the time to teach us the essential skill of entrepreneurship: how to manage.

This was no small thing because Intel was known as the best company in the technology industry. It had pulled off the greatest transformation in the history of the business: moving from the memory business to microprocessors more than a decade after its founding. Beyond that, Intel ran with legendary precision, which gave it the ability to make multibillion dollar investments with high confidence. If you wanted to hire a great operational manager, then Intel was the place to go—but good luck getting one to leave the best-managed company in Silicon Valley.

Andy himself was a legendary figure. He had grown up Jewish in Hungary during a time when the country was occupied by the Nazis and, later, by the Soviet Communists. Arriving in New York, he spoke no English and had almost no money. He enrolled himself at the City College of New York, overcame his language deficiency, and went on to get a PhD from UC Berkeley. This nonnative English speaker would then write an important textbook on semiconductors in English while working at Fairchild Semiconductor. As a result, he was considered a scientific pioneer even before helping to launch Intel in 1968, building it into the seminal technology company of the era. Later, in 1997, Time magazine would recognize his nearly impossible accomplishments and name him Man of the Year.

This is in part what made High Output Management so extraordinary. Andy Grove, who built himself from nothing to run Intel, stopped what he was doing to teach us his magic. And not through some ghostwriter either—Andy wrote this book himself. What an incredible gift.
End of this sample Kindle book.
Enjoyed the preview?

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