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The New Productivity Challenge

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The single greatest challenge facing managers in the developed countries of the world is to raise the productivity of knowledge and service workers. This challenge, which will dominate the management agenda for the next several decades, will ultimately determine the competitive performance of companies. Even more important, it will determine the very fabric of society and the quality of life in every industrialized nation.

For the last 120 years, productivity in making and moving things—in manufacturing, farming, mining, construction, and transportation—has risen in developed countries at an annual rate of 3% to 4%, a 45-fold expansion overall. On this explosive growth rest all the gains these nations and their citizens have enjoyed: vast increases in disposable income and purchasing power; ever-wider access to education and health care; and the availability of leisure time, something known only to aristocrats and the “idle rich” before 1914, when everyone else worked at least 3,000 hours a year. (Today even the Japanese work no more than about 2,000 hours each year, while Americans average 1,800 hours and West Germans 1,650.)

Now these gains are unraveling, but not because productivity in making and moving things has fallen. Contrary to popular belief, productivity in these activities is still going up at much the same rate. And it is rising fully as much in the United States as it is in Japan or West Germany. Indeed, the increase in U.S. manufacturing productivity during the 1980s—some 3.9% a year—was actually larger in absolute terms than the corresponding annual increases in Japan and

Germany, while the 4% to 5% annual rise in U.S. agricultural productivity is far and away the largest recorded anywhere at any time.

The productivity revolution is over because there are too few people employed in making and moving things for their productivity to be decisive. All told, they account for no more than one-fifth of the work force in developed economies. Only 30 years ago, they were still a near-majority. Even Japan, which is still manufacturing intensive, can no longer expect increased productivity in that sector to sustain its economic growth. Indeed, the great majority of working people in Japan are knowledge and service workers with productivities as low as those in any other developed country. And when farmers make up only 3% of the employed population, as they do in the United States, Japan, and most of Western Europe, even record increases in their output add virtually nothing to their country's overall productivity and wealth.

The chief *economic* priority for developed countries, therefore, must be to raise the productivity of knowledge and service work. The country that does this first will dominate the twenty-first century economically. The most pressing *social* challenge developed countries face, however, will be to raise the

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productivity of service work. Unless this challenge is met, the developed world will face increasing social tensions, increasing polarization, increasing radicalization, possibly even class war.

In developed economies, opportunities for careers and promotion are more and more limited to people with advanced schooling, people qualified for knowledge work. But these men and women will always be a minority. They will always be outnumbered by people who lack the qualifications for anything but low-skilled service jobs—people who in their social position are comparable to the “proletarians” of 100 years ago, the poorly educated, unskilled masses who thronged the exploding industrial cities and streamed into their factories.

In the early 1880s, intelligent observers of every political persuasion were obsessed with the specter of class war between the industrial proletariat and the bourgeoisie. Karl Marx was hardly alone in predicting that the “immiserization” of the proletariat would lead inevitably to revolution. Benjamin Disraeli, perhaps the greatest of the nineteenth century conservatives, was equally persuaded of the inevitability of class war. And Henry James, the chronicler of American wealth and European aristocracy, was so frightened by the prospect that he made it the central theme of *The Princess Casamassima*, one of his most haunting novels.

What defeated these prophecies, which seemed eminently reasonable, indeed almost self-evident to contemporaries, was the revolution in productivity set off by Frederick W. Taylor in 1881, when he began to study the way a common laborer shoveled sand. Taylor himself worked in an iron foundry and was deeply shocked by the bitter animosity between the workers and managers. Fearful that this hatred would ultimately lead to class war, he set out to improve the efficiency of industrial work. And his efforts, in turn, sparked the revolution that allowed industrial workers to earn middle-class wages and achieve middle-class status despite their lack of skill and education. By 1930, when according to Marx the revolution of the proletariat should have been a *fait accompli*, the proletariat had become the bourgeoisie.

Now it is time for another productivity revolution. This time, however, history is on our side. In the past century, we have learned a great deal about productivity and how to raise it—enough to know that we need a revolution, enough to know how to start one.

Knowledge and service workers range from research scientists and cardiac surgeons through draftswomen and store managers to 16-year-olds who flip hamburgers in fast-food restaurants on Saturday afternoons. Their ranks also include people whose work makes them “machine operators”: dish-

washers, janitors, data-entry operators. Yet for all their diversity in knowledge, skill, responsibility, social status, and pay, knowledge and service workers are remarkably alike in two crucial respects: what does not work in raising their productivity and what does.

The first thing we have learned—and it came as a rude shock—is about what does not work. Capital cannot be substituted for labor. Nor will new technology by itself generate higher productivity. In making and moving things, capital and technology are *factors* of production, to use the economist’s term. In knowledge and service work, they are *tools* of production. The difference is that a factor can replace labor, while a tool may or may not. Whether tools help productivity or harm it depends on what people do with them, on the purpose to which they are being put, for instance, or on the skill of the user. Thirty years ago, for example, we were sure the efficiency of the computer would lead to massive reductions in clerical and office staff. The promise of greater productivity led to massive investments in data-processing equipment that now rival those in materials-processing technology (that is, in conventional machinery). Yet office and clerical forces have grown at a much faster rate since the introduction of information technology than ever before. And there has been virtually no increase in the productivity of service work.

Hospitals are a telling example. In the late 1940s, they were entirely labor intensive, with little capital investment except in bricks, mortar, and beds. A good many perfectly respectable hospitals had not even invested in readily available, fairly old technologies: they provided neither x-ray departments nor clinical laboratories nor physical therapy. Today hospitals are hugely capital intensive, with enormous sums invested in ultrasound, body scanners, nuclear magnetic imagers, blood and tissue analyzers, clean rooms, and a dozen more new technologies. Each piece of equipment has brought with it the need for more highly paid people but has not reduced the existing staff by a single person. (In fact, the worldwide escalation of health-care costs is largely the result of the hospital’s having become a labor-intensive and capital-intensive monstrosity.) But hospitals, at least, have significantly increased their performance capacity. In other areas of knowledge or service work there are only higher costs, more investment, and more people.

Massive increases in productivity are the only way out of this morass. And these increases can only come from what Taylor called “working smarter.”¹ Simply, this means working more productively without working harder or longer.

The economist sees capital investment as the key

to productivity; the technologist gives star billing to new machines. Nevertheless, the main force behind the productivity explosion has been working smarter. Capital investment and technology were as copious in the developed economies during the first 100 years of the Industrial Revolution as they have been in its second 100 years. It was only with the advent of working smarter that productivity in making and moving things took off on its meteoric rise.

And so it will be for knowledge and service work—with this difference: in manufacturing, working smarter is only one key to increased productivity. In knowledge and service work, working smarter is the only key. What is more, it is a more complex key, one that requires looking closely at work in ways that Taylor never dreamed of.

When Taylor studied the shoveling of sand, the only question that concerned him was, "How is it done?" Almost 50 years later, when Harvard's Elton Mayo set out to demolish Taylor's "scientific management" and replace it with what later came to be called "human relations," he focused on the same question. In his experiments at Western Electric's Hawthorne Works, Mayo asked, "How can wiring telephone equipment best be done?" The point is that in making and moving things, the task is always taken for granted.

In knowledge and service work, however, the first questions in increasing productivity—and working smarter—have to be, "What is the task? What are we trying to accomplish? Why do it at all?" The easiest, but perhaps also the greatest, productivity gains in such work will come from defining the task and especially from eliminating what does not need to be done.²

A very old example is still one of the best: mail-order processing at the early Sears, Roebuck. Between 1906 and 1908, Sears eliminated the time-consuming job of counting the money in incoming mail orders. Rather than open the money envelopes enclosed with the orders, Sears weighed them automatically. In those days, virtually all Sears customers paid with coins. If the weight of the envelope tallied with the amount of the order within fairly narrow limits, the envelope went unopened. Similarly, Sears eliminated the even more time-consuming task of recording each incoming order by scheduling order handling and shipping according to the weight of the incoming mail (assuming 40 orders for each pound of mail). Within two years, these steps accounted for a tenfold increase in the productivity of the entire mail-order operation.³

A major insurance company recently increased the productivity of its claims-settlement department nearly fivefold—from an average of 15 minutes per claim to 3 minutes—by eliminating detailed check-

ing on all but very large claims. Instead of verifying 30 items as they had always done, the adjusters now check only 4: whether the policy is still in force; whether the face amount matches the amount of the claim; whether the name of the policyholder matches the name on the death certificate; and whether the name of the beneficiary matches the name of the claimant. What provoked the change was asking, "What is the task?" and then answering, "To pay death claims as fast and as cheaply as possible." All that the company now requires to control the process is to work through a 2% sample, that is, every fiftieth claim, the traditional way.

Similarly, a few hospitals have taken most of the labor and expense out of their admissions process by admitting all patients the way they used to admit emergency cases who were brought in unconscious or bleeding and unable to fill out lengthy forms. These hospitals asked, "What is the task?" and answered, "To identify the patient's name, sex, age, address and how to bill"—information found on the insurance identification cards practically all patients carry.

These are both examples of service work. In knowledge work, defining the task and getting rid of what does not need to be done is even more necessary and produces even greater results. Consider how one multinational company redefined its strategic planning.

For many years, a planning staff of 45 brilliant people carefully prepared strategic scenarios in minute detail. The documents were first-class works and made stimulating reading, everybody agreed. But they had a minimal impact on operations. Then a new CEO asked, "What is the task?" and answered, "To give our businesses direction and goals and the strategy to attain these goals." It took four years of hard work and several false starts. But now the planning people (still about the same number) work through only three questions for each of the company's businesses: What market standing does it need to maintain leadership? What innovative performance does it need to support that standing? And what is the minimum rate of return needed to earn the cost of capital? Then the planning people work with the operating executives in each business to map out broad strategic guidelines for achieving these goals under various economic conditions. The results are far simpler and much less elegant, but they have become the "flight plans" that guide the company's businesses and its senior executives.

When people make or move things, they do one task at a time. Taylor's laborer shoveled sand; he did not also stoke the furnace. Mayo's wiring-room women soldered; they did not test finished telephones on the side. The Iowa farmer

planting corn does not get off his tractor between rows to attend a meeting. Knowledge and service work, too, require concentration. The surgeon does not take telephone calls in the operating room, nor does the lawyer in consultation with a client.

But in organizations, where most knowledge and service work takes place, splintered attention is more and more the norm. The people at the very top can sometimes concentrate themselves (though far too few even try). But the great majority of engineers, teachers, salespeople, nurses, middle managers, and the like must carry a steadily growing load of busy-work, activities that contribute little if any value and that have little if anything to do with what these professionals are qualified and paid for.

The worst case may be that of nurses in U.S. hospitals. We hear a great deal about the shortage of nurses. But how could it possibly be true? The number of graduates entering the profession has gone up steadily for a good many years. At the same time, the number of bed patients has been dropping sharply. The explanation of the paradox: nurses now spend only half their time doing what they have learned and are paid to do—nursing. The other half is eaten up by activities that do not require their skill and knowledge, add neither health-care nor economic value, and have little or nothing to do with patient care and patient well-being. Nurses are preoccupied, of course, with the avalanche of paperwork for Medicare, Medicaid, insurers, the billing office, and the prevention of malpractice suits.

The situation in higher education is not too different. Faculty in colleges and universities spend more and more hours in committee meetings instead of teaching in the classroom, advising students, or doing research. But few of these committees would ever be missed. And they would do a better job in less time if they had three instead of seven members.

Salespeople are just as splintered. In department stores, they now spend so much time serving computers that they have little time for serving customers—the main reason, perhaps, for the steady decline in their productivity as producers of sales and revenues. Field-sales representatives spend up to one-third of their time filling out reports rather than calling on customers. And engineers sit through meeting after meeting when they should be busy at their workstations.

This is not job enrichment; it is job impoverishment. It destroys productivity. It saps motivation and morale. Nurses, every attitude survey shows, bitterly resent not being able to spend more time caring for patients. They also believe, understandably, that they are grossly underpaid for what they are capable of doing, while the hospital administrator, equally understandably, believes that they are grossly overpaid

for the unskilled clerical work they are actually doing.

The cure is fairly easy, as a rule. It is to concentrate the work—in this case, nursing—on the task—caring for patients. This is the second step toward working smarter. A few hospitals, for example, have taken the paperwork out of the nurse's job and given it to a floor clerk who also answers telephone calls from relatives and friends and arranges the flowers they send in. The level of patient care and the hours nurses devote to it have risen sharply. Yet the hospitals have also been able to reduce their nursing staffs by one-quarter or one-third and so raise salaries without incurring a higher nursing payroll.

To make these kinds of improvements, we must ask a second set of questions about every knowledge and service job: "What do we pay for? What value is this job supposed to add?" The answer is not always obvious or noncontroversial. One department store looked at its sales force and answered "sales," while another in the same metropolitan area and with much the same clientele answered "customer service." Each answer led to a different restructuring of the jobs on the sales floor. But each store achieved, and fairly fast, substantial growth in the revenues each salesperson and each department generated, that is, gains in both productivity and profitability.

For all its tremendous impact, Taylor's scientific management has had a bad press, especially in academia. Perhaps the main reason is the unrelenting campaign U.S. labor unions waged against it—and against Taylor himself—in the early years of this century. The unions did not oppose Taylor because they thought him antilabor or promanagement. He was neither. His unforgivable sin was his assertion that there is no such thing as "skill" in making and moving things. All such work was the same, Taylor asserted. And all could be analyzed step by step, as a series of unskilled operations that could then be combined into any kind of job. Anyone willing to learn these operations would be a "first-class man," deserving "first-class pay." He could do the most advanced work and do it to perfection.

To the skill-based unions of 1900, this assertion represented a direct attack. And this was especially true: for the highly respected, extremely powerful unions that dominated what were then some of the country's most sophisticated manufacturing sites—the army arsenals and navy shipyards where nearly all peacetime production for the military took place until well after World War I. For these unions, each craft was a mystery whose secrets no member could divulge. Their power base was control of an apprenticeship that lasted five or seven years and admitted, as a rule, only relatives of members. And their workers were paid

extremely well—more than most physicians of the day and triple what Taylor's first-class man could expect to get. No wonder that Taylor's assertions infuriated these aristocrats of labor.

Belief in the mystery of craft and skill persisted, as did the assumption that long years of apprenticeship were needed to acquire both. Indeed, Hitler went to war with the United States on the strength of that assumption. Convinced that it took five years or more to train optical craftsmen (whose skills are essential to modern warfare), he thought it would be at least that long before America could field an effective army and air force in Europe—and so declared war after the Japanese attack on Pearl Harbor.

We know now Taylor was right. The United States had almost no optical craftsmen in 1941. And modern warfare indeed requires precision optics in large quantities. But by applying Taylor's methods of scientific management, within a few months the United States trained semiskilled workers to turn out more highly advanced optics than even the Germans were producing, and on an assembly line to boot. And by that time, Taylor's first-class men with their increased productivity were also making a great deal more money than any craftsman of 1911 had ever dreamed of.

Eventually, knowledge work and service work may turn out to be like the work of making and moving things—that is, "just work," to use an old scientific management slogan. (At least this is what Taylor's true heirs, the more radical proponents of artificial intelligence, maintain.) But for the time being, we must not treat knowledge and service jobs as "just work." Nor can we assume they are homogeneous. Rather, these jobs can be divided into three distinct categories by looking at what productive performance in a given job actually represents. This process—defining performance—is the third step toward working smarter.

For some knowledge and service jobs, performance means quality. Take scientists in a research lab where quantity—the number of results—is quite secondary to their quality. One new drug that can generate annual sales of \$500 million and dominate the market for a decade is infinitely more valuable than 20 "me too" drugs with annual sales of \$20 million or \$30 million each. The same principle applies to basic policy or strategic decisions, as well as to much less grandiose work, the physician's diagnosis, for example, or packaging design, or editing a magazine. In each of these instances, we do not yet know how to analyze the process that produces quality results. To raise productivity, therefore, we can only ask, "What works?"

The second category includes the majority of

knowledge and service work: jobs in which quality and quantity together constitute performance. Department store sales are one example. Producing a "satisfied customer" is just as important as the dollar amount on the sales slip, but it is not so easy to define. Likewise, the quality of an architectural drafts-woman's work is an integral part of her performance. But so is the number of drawings she can produce. The same holds true for engineers, sales reps in brokerage offices, medical technologists, branch bank managers, reporters, nurses, claims adjusters, and so on. Raising productivity in these jobs requires asking, "What works?" but also analyzing the process step by step and operation by operation.

Finally, there are a good many service jobs (filing, handling death claims, making hospital beds) in which performance is defined much as it is in making and moving things: that is, largely by quantity (for example, the number of minutes it takes to make up a hospital bed properly). In these "production" jobs, quality is primarily a matter of external criteria rather than an attribute of performance itself. Defining standards and building them into the work process is essential. But once this has been done, real productivity improvements will come through conventional industrial engineering, that is, through analyzing the task and combining the individual simple operations into a complete job.

Defining the task, concentrating work on the task, and defining performance: by themselves, these three steps will produce substantial growth in productivity—perhaps most of what can be attained at any one time. They will need to be worked through again and again, maybe as often as every three or five years and certainly whenever work or its organization changes. But then, according to all the experience we have, the resulting productivity increases will equal, if not exceed, whatever industrial engineering, scientific management, or human relations ever achieved in manufacturing. In other words, they should give us the productivity revolution we need in knowledge and service work.

But on one condition only: that we apply what we have learned since World War II about increasing productivity in making and moving things. The fourth step toward working smarter, then, is for management to form a partnership with the people who hold the jobs, the people who are to become more productive. The goal has to be to build responsibility for productivity and performance into every knowledge and service job regardless of level, difficulty, or skill.

Frederick Taylor has often been criticized for never once asking the workers he studied how they thought their jobs could be improved. He told them. Nor did Elton Mayo ever ask; he also told. But Taylor's (and

Mayo's, 40 years later) methodology was simply a product of the times, when the wisdom of the expert prevailed. (Freud, after all, never asked his patients what they thought their problems might be. Nor do we have any record that either Marx or Lenin ever thought of asking the masses.) Taylor considered both workers and managers "dumb oxen." And while Mayo had great respect for managers, he thought workers were "immature" and "maladjusted," deeply in need of the psychologist's expert guidance.

When World War II came, however, we had to ask the workers. We had no choice. U.S. factories had no engineers, psychologists, or foremen. They were all in uniform. To our immense surprise, as I still recollect, we discovered that the workers were neither dumb oxen nor immature nor maladjusted. They knew a great deal about the work they were doing—about its logic and rhythm, its quality, and its tools. Asking them what they thought was the way to address both productivity and quality.⁴

At first, only a few businesses accepted this novel proposition. (IBM was a pioneer and for a long time one of the few large companies to act on this idea.) But in the late 1950s and early 1960s, it was picked up by Japanese industrialists whose earlier attempts to return to prewar autocracy had collapsed in bloody strikes and near-civil war. Now, while still far from being widely practiced, it is at least generally accepted in theory that the workers' knowledge of their job is the starting point for improving productivity, quality, and performance.

In making and moving things, however, partnership with the responsible worker is only the *best* way to increase productivity. After all, Taylor's telling worked too, and quite well. In knowledge and service work, partnership with the responsible worker is the *only* way.

The last component of working smarter is a two-part lesson that neither Taylor nor Mayo knew. First, continuous learning must accompany productivity gains. Redesigning a job and then teaching the worker the new way to do it, which is what Taylor did and taught, cannot by itself sustain ongoing learning. Training is only the beginning of learning. Indeed, as the Japanese can teach us (thanks to their ancient tradition of Zen), the greatest benefit of training comes not from learning something new but from doing better what we already do well.

Equally important is a related insight of the last few years: knowledge workers and service workers learn most when they teach. The best way to improve a star salesperson's productivity is to ask her to present "the secret of my success" at the company sales convention. The best way for the surgeon to improve his performance is to give a talk about it at the county

medical society. We often hear it said that in the information age, every enterprise has to become a learning institution. It must become a teaching institution as well.

One hundred years ago, the signs of class conflict were unmistakable. What defused that conflict—and averted class war—was growth in the productivity of the industrial work force, something so unprecedented that even its prime mover, Frederick Taylor, had no term to describe it.

Today we know that productivity is the true source of competitive advantage. But what we must also realize is that it is the key to social stability as well. For that reason, achieving gains in service productivity comparable with those we have already achieved in manufacturing productivity must be a priority for managers throughout the developed world.

It is an economic truth that real incomes cannot be higher than productivity for any extended length of time. Unless the productivity of service workers rapidly improves, both the social and the economic position of that large group of people—whose numbers rival those of manufacturing workers at their peak—must steadily go down. At a minimum, this raises the prospect of economic stagnation; more ominously, it raises the prospect of social tensions unmatched since the early decades of the Industrial Revolution.

Conceivably, service workers could use their numerical strength to get higher wages than their economic contribution justifies. But this would only impoverish all of society, dragging everyone's real income down and sending unemployment up. Alternatively, the income of unskilled and semiskilled service workers could continue to fall in relation to the steadily rising wages of affluent knowledge workers. But this would lead to an even wider gulf between the two groups as well as to increasing polarization. In either case, service workers can only become increasingly bitter, alienated, and ready to see themselves as a class apart.

Fortunately, we are in a much better position than our ancestors were a century ago. We know what Marx and his contemporaries did not know: productivity can be raised. We also know how to raise it. And we know this best for the work where the social need is most urgent: unskilled and semiskilled service work—maintenance jobs in factories, schools, hospitals, and offices; counter jobs in restaurants and supermarkets; clerical jobs in insurance companies, banks, and businesses of all kinds. In essence, this is production work. And what we have learned during the past 100 years about increasing productivity applies to such work with a minimum of adaptation.

Further, a model of sorts exists in the steps some

multinational maintenance companies have already taken to improve their employees' productivity. These U.S. and European employers have systematically applied the approach this article discusses to low-skilled service jobs. They have defined the task, concentrated work on it, defined performance, made the employee a partner in productivity improvement and the first source of ideas for it, and built continuous learning and continuing teaching into the job of every employee and work team. As a result, they have raised productivity substantially—in some cases even doubled it—which has allowed them to raise wages. As important, this process has also greatly raised the workers' self-respect and pride.

It is no coincidence that outside contractors achieved these improvements. Obtaining major productivity gains in production-type service work usually requires contracting it out to a company that has no other business, understands this work, respects it, and offers opportunities for low-skilled workers to advance (for example, to become local or regional managers). The organizations in which this work is being done, the hospitals that own the beds, for instance, or the colleges whose students need to be fed, neither understand it nor respect it enough to devote the time and hard work that are required to make it more productive.

The task is known and doable. But the urgency is great. To raise the productivity of service work, we cannot rely on government or on politics altogether. It is the task of managers and executives in businesses and nonprofit organizations. It is, in fact, the first social responsibility of management in the knowledge society.

1. Among the few attempts to apply working smarter in health care are Roxanne Spitzer's *Nursing Productivity: The Hospital's Key to Survival and Profit* (Chicago: S-N Publications, 1986) and Regina Herzlinger's *Creating New Health Care Ventures* (Gaithersburg, Md.: Aspen Publishers, 1991).

2. See Michael Hammer, "Reengineering Work: Don't Automate, Obliterate," HBR July-August 1990, and Peter F. Drucker, "Permanent Cost Cutting," *Wall Street Journal*, January 11, 1991.

3. See Boris Emmet and John E. Jeucks, *Catalogues and Counters: A History of Sears, Roebuck & Company* (Chicago: University of Chicago Press, 1965).

4. In my 1942 book, *The Future of Industrial Man* (Westport, Conn.: Greenwood, 1978 reprint of original), and my 1950 book, *The New Society* (Greenwood, 1982 reprint), I argued for the "responsible worker" as "part of management." Edwards W. Deming and Joseph M. Juran developed what we now call "quality circles" and "total quality management" as a result of their wartime experiences. Finally, the idea was forcefully presented by Douglas McGregor in his 1960 book, *The Human Side of Enterprise* (New York: McGraw Hill, 1985, twenty-fifth anniversary printing), with its "Theory X" and "Theory Y."