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1 Introduction

In October of 1991, Linus Torvalds, a 21-year-old computer-science student at the University of Helsinki, made available on the Internet a kernel of a computer operating system he had written. Called Linux, it was a rudimentary version of the ubiquitous UNIX operating system, which for more than a decade had been a mainstay of corporate and academic computing. Torvalds encouraged other programmers to download his software — for free — and use it, test it, and modify it as they saw fit. A few took him up on the offer. They fixed bugs, tinkered with the original code, and added new features, and they too posted their work on the Internet.

As the Linux kernel grew, it attracted the attention of more and more programmers, who contributed their own ideas and improvements. The Linux community grew steadily, soon coming to encompass thousands of people around the world, all sharing their work freely with one another. Within three years, this loose, informal group, working without managers and connected mainly through the Internet, had turned Linux into one of the best versions of UNIX ever created.

Imagine, now, how such a software development project would have been organized at a company like IBM or Microsoft. Decisions and funds would have been filtered through layers of managers. Formal teams of programmers, quality assurance testers, and technical writers would have been established and assigned tasks. Customer surveys and focus groups would have been conducted, their findings documented in thick reports. There would have been budgets, milestones, deadlines, status meetings, performance reviews, approvals. There would have been turf wars, burnouts, overruns, delays. The project would have cost an enormous amount of money, taken longer to complete, and quite possibly produced a system less valuable to users than Linux.

For many executives, the development of Linux is most easily understood (and most easily dismissed) as an arcane story of hackers and cyberspace — a neat *Wired* magazine kind of story, but one that bears little relevance to the serious world of big business. This interpretation, while understandable, is shortsighted. What the Linux story really shows us is the power of a new technology — in this case, electronic networks — to fundamentally change the way work is done. The Linux community, a temporary, self-managed gathering of diverse individuals engaged in a common task, is a model for a new kind of business organization that could form the basis for a new kind of economy.

The fundamental unit of such an economy is not the corporation but the individual. Tasks aren't assigned and controlled through a stable chain of management but rather are carried out autonomously by independent contractors. These electronically connected freelancers — e-lancers — join together into fluid and temporary networks to produce and sell goods and services. When the job is done — after a day, a month, a year — the network dissolves, and its members become

independent agents again, circulating through the economy, seeking the next assignment.

Far from being a wild hypothesis, the e-lance economy is, in many ways, already upon us. We see it not only in the development of Linux but also in the evolution of the Internet itself. We see it in the emergence of virtual companies, in the rise of outsourcing and telecommuting, and in the proliferation of freelance and temporary workers. Even within large organizations, we see it in the increasing importance of ad-hoc project teams, in the rise of "intrapreneurs," and in the formation of independent business units.¹

All these trends point to the devolution of large, permanent corporations into flexible, temporary networks of individuals. No one can yet say exactly how important or widespread this new form of business organization will become, but judging from current signs, it is not inconceivable that it could define work in the twenty-first century as the industrial organization defined it in the twentieth. If it does, business and society will be changed forever.

2 Businesses of One

Business organizations are, in essence, mechanisms for coordination. They exist to guide the flow of work, materials, ideas, and money, and the form they take is strongly affected by the coordination technologies available. Until a hundred or so years ago, coordination technologies were primitive. Goods and messages were transported primarily by foot, horse, or boat, and the process was slow, unreliable, and often dangerous. Because there was no efficient way to coordinate disparate activities, most people worked near their homes, often by themselves, producing products or services for their neighbors. The business organizations that did exist — farms, shops, foundries — were usually small, comprising a few owners and employees. When their products had to reach distant consumers, they did so through a long series of transactions with various independent wholesalers, jobbers, shippers, storekeepers, and itinerant peddlers.

It was not until the second half of the nineteenth century, after railroad tracks had been laid and telegraph lines strung, that large, complex organizations became possible. With faster, more dependable communication and transportation, businesses could reach national and even international markets, and their owners had

¹ For more about the influence of information technology on business organizations, see Thomas W. Malone, "Is 'Empowerment' Just a Fad? Control, Decision-Making, and Information Technology," *Sloan Management Review*, Winter 1997, p. 23; Thomas W. Malone, JoAnne Yates, and Robert I. Benjamin, "Electronic Markets and Electronic Hierarchies," *Communications of the ACM*, June 1987, p. 484; and Thomas W. Malone and John F. Rockart, "Computers, Networks, and the Corporation," *Scientific American*, September 1991, p. 128.

the means to coordinate the activities of large and dispersed groups of people. The hierarchical, industrial corporation was born, subsuming a broad array of functions and, often, a broad array of businesses, and it quickly matured to become the dominant organizational model of the twentieth century.

Despite all the recent talk of decentralized management, empowered employees, and horizontal processes, the large, industrial organization continues to dominate the economy today. We remain in the age of multinational megacompanies, and those companies appear to be rushing to meld into ever larger forms. The headlines of the business press tell the story: Compaq buys Digital. WorldCom buys MCI. Citibank merges with Travelers. Daimler-Benz acquires Chrysler. British Airways allies with American Airlines (which in turn allies with US Airways). Some observers, projecting this wave of consolidation into the future, foresee a world in which giant global corporations replace nations as the organizing units of humanity. We will be citizens of Sony or Shell or Wal-Mart, marching out every day to do battle with the citizens of Philips or Exxon or Sears.

Such a scenario certainly seems plausible. Yet when we look beneath the surface of all the M&A activity, we see signs of a counterphenomenon: the disintegration of the large corporation. People are leaving big companies and either joining much smaller companies or going into business for themselves as contract workers, freelancers, or temps. Twenty-five years ago, one in five U.S. workers was employed by a *Fortune* 500 company. Today the ratio has dropped to less than one in ten. The largest private employer in the United States is not General Motors or IBM or UPS. It's the temporary-employment agency Manpower Incorporated, which in 1997 employed 2 million people. While big companies control ever larger flows of cash, they are exerting less and less direct control over actual business activity. They are, you might say, growing hollow.

Even within large corporations, traditional command-and-control management is becoming less common. Decisions are increasingly being pushed lower down in organizations. Workers are being rewarded not for efficiently carrying out orders but for figuring out what needs to be done and then doing it. Some large industrial companies like Asea Brown Boveri and British Petroleum have broken themselves up into scores of independent units that transact business with one another almost as if they were separate companies. And in some industries, like investment banking and consulting, it is often easier to understand the existing organizations not as traditional hierarchies but as confederations of entrepreneurs, united only by a common brand name.

What underlies this trend? Why is the traditional industrial organization showing evidence of disintegration? Why are e-lancers proliferating? The answers lie in the basic economics of organizations. Economists, organizational theorists, and business historians have long wrestled with the question of why businesses grow large or stay small. Their research suggests that when it is cheaper to conduct transactions internally, within the bounds of a corporation, organizations grow larger, but when it is cheaper to conduct them externally, with independent entities in the

open market, organizations stay small or shrink. If, for example, the owners of an iron smelter find it less expensive to establish a sales force than to contract with outside agencies to sell their products, they will hire salespeople, and their organization will grow. If they find that outside agencies cost less, they will not hire the salespeople, and their organization will not grow.

The coordination technologies of the industrial era — the train and the telegraph, the automobile and the telephone, the mainframe computer — made internal transactions not only possible but also advantageous. Companies were able to manage large organizations centrally, which provided them with economies of scale in manufacturing, marketing, distribution, and other activities. It made economic sense to directly control many different functions and businesses and to hire the legions of administrators and supervisors needed to manage them. Big was good.

But with the introduction of powerful personal computers and broad electronic networks — the coordination technologies of the twenty-first century — the economic equation changes. Because information can be shared instantly and inexpensively among many people in many locations, the value of centralized decision making and expensive bureaucracies decreases. Individuals can manage themselves, coordinating their efforts through electronic links with other independent parties. Small becomes good.

In one sense, the new coordination technologies enable us to return to the pre-industrial organizational model of tiny, autonomous businesses — businesses of one or of a few — conducting transactions with one another in a market. But there's one crucial difference: electronic networks enable these microbusinesses to tap into the global reservoirs of information, expertise, and financing that used to be available only to large companies. The small companies enjoy many of the benefits of the big without sacrificing the leanness, flexibility, and creativity of the small.

In the future, as communications technologies advance and networks become more efficient, the shift to e-lancers promises to accelerate. Should that indeed take place, the dominant business organization of the future may not be a stable, permanent corporation but rather an elastic network that may sometimes exist for no more than a day or two. When a project needs to be undertaken, requests for proposals will be transmitted or electronic want ads posted, individuals or small teams will respond, a network will be formed, and new workers will be brought on as their particular skills are needed. Once the project is done, the network will disband. Following in the footsteps of young Linus Torvalds, we will enter the age of the temporary company.

3 The Temporary Company

From the 1920s through the 1940s, the movie business was controlled by big studios like MGM and Columbia. The studios employed actors, directors, screenwriters, photographers, publicists, even projectionists — all the people needed to produce a movie, get it into theaters, and fill the seats. Central managers determined which films to make and who would work on them. The film industry was a model of big-company, industrial organization.

By the 1950s, however, the studio system had disintegrated. The power had shifted from the studio to the individual. Actors, directors, and screenwriters became freelancers, and they made their own choices about what projects to work on. For a movie to be made, these freelancers would join together into a temporary company, which would employ different specialists as needed from day to day. As soon as the film was completed, the temporary company would go out of existence, but the various players would, in time, join together in new combinations to work on new projects.

The shift in the film business from permanent companies to temporary companies shows how entire industries can evolve, quite rapidly, from centralized structures to network structures. And such transformations are by no means limited to the idiosyncratic world of Hollywood. Consider the way many manufacturers are today pursuing radical outsourcing strategies, letting external agents perform more of their traditional activities. The U.S. computer-display division of the Finnish company Nokia, for example, chose to enter the US display market with only five employees. Technical support, logistics, sales, and marketing were all subcontracted to specialists around the country. The fashion accessories company Topsy Tail, which has revenues of \$80 million but only three employees, never even touches its products through the entire supply chain. It contracts with various injection-molding companies to manufacture its goods; uses design agencies to create its packaging; and distributes and sells its products through a network of independent fulfillment houses, distributors, and sales reps. Nokia's and Topsy Tail's highly decentralized operations bear more resemblance to the network model of organization than to the traditional industrial model.

For another, broader example, look at what's happened to the textile industry in the Prato region of Italy. In the early 1970s, Massimo Menichetti inherited his family's business, a failing textile mill. Menichetti quickly broke up the firm into eight separate companies. He sold a major portion of equity — between one-third and one-half — to key employees, and he required that at least 50% of the new companies' sales come from customers that had not been served by the old company. Within three years, the eight new businesses had achieved a complete turnaround, attaining significant increases in machine utilization and productivity.

Following the Menichetti model, many other big mills in Prato broke themselves up into much smaller pieces. By 1990, more than 15,000 small textile firms, averaging fewer than five employees, were active in the region. The tiny firms built

state-of-the-art factories and warehouses, and they developed cooperative ventures in such areas as purchasing, logistics, and R&D, where scale economies could be exploited. Textile production in the area tripled during this time, despite the fact that the textile industry was in decline throughout the rest of Europe. And the quality of the products produced in the Prato region rose as innovation flourished. Textiles from Prato have now become the preferred material for fashion designers around the world.

Playing a key role in the Prato textile industry are brokers, known as *impannatori*, who act as conduits between the small manufacturing concerns and the textile buyers. The *impannatori* help coordinate the design and manufacturing process by bringing together appropriate groups of businesses to meet the particular needs of a customer. They have even created an electronic market, which serves as a clearinghouse for information about projected factory utilization and upcoming requirements, allowing textile production capacity to be traded like a commodity.

The Prato experience shows that an economy can be built on the network model, but Prato, it could be argued, is a small and homogenous region. How would a complex, diverse industry operate under the network model? The answer is: far more easily than one might expect. As a thought experiment, let's take a journey forward in time, into the midst of the twenty-first century, and see how automobiles, the archetypal industrial product, are being designed.

General Motors, we find, has split apart into several dozen separate divisions, and these divisions have outsourced most of their traditional activities. They are now small companies concerned mainly with managing their brands and funding the development of new types and models of cars. A number of independent manufacturers perform fabrication and assembly on a contract basis for anyone who wants to pay for it. Vehicles are devised by freelance engineers and designers, who join together into small, ever shifting coalitions to work on particular projects. A coalition may, for example, focus on engineering an electrical system or on designing a chassis, or it may concentrate on managing the integration of all of the subsystems into complete automobiles.

These design coalitions take many forms. Some are organized as joint ventures; some share equity among their members; some are built around electronic markets that set prices and wages. All are autonomous and self-organizing, and all depend on a universal, high-speed computer network — the descendant of the Internet — to connect them to one another and exchange electronic cash. A highly developed venture-capital infrastructure monitors and assesses the various teams and provides financing to the most promising ones.

In addition to being highly efficient, with little managerial or administrative overhead, this market-based structure has spurred innovation throughout the automotive industry. While much of the venture capital goes to support traditional design concepts, some is allocated to more speculative, even wild-eyed, ideas, which if successful could create enormous financial rewards. A small coalition of engineers may, for example, receive funds to design a factory for making indi-

vidualized lighting systems for car grilles. If their idea pans out, they could all become multimillionaires overnight. And the next day, they might dissolve their coalition and head off to seek new colleagues and new challenges.

Over the past few years, under the auspices of the Massachusetts Institute of Technology's initiative on Inventing the Organizations of the 21st Century, we have worked with a group of business professors and executives to consider the different ways business might be organized in the next century.² The automotive design scenario we've just laid out was discussed and refined by this group, and we subsequently shared it with managers and engineers from big car companies. They not only agreed that it was a plausible model for car design but also pointed out that the auto industry was in some ways already moving toward such a model. Many automakers have been outsourcing more and more of their basic design work, granting ever greater autonomy to external design agencies.

A shift to an e-lance economy would bring about fundamental changes in virtually every business function, not just in product design. Supply chains would become ad hoc structures, assembled to fit the needs of a particular project and disassembled when the project ended. Manufacturing capacity would be bought and sold in an open market, and independent, specialized manufacturing concerns would undertake small batch orders for a variety of brokers, design shops, and even consumers. Marketing would be performed in some cases by brokers, in other cases by small companies that would own brands and certify the quality of the merchandise sold under them. In still other cases, the ability of consumers to share product information on the Internet would render marketing obsolete; consumers would simply "swarm" around the best offerings. Financing would come less from retained earnings and big equity markets and more from venture capitalists and interested individuals. Small investors might trade shares in ad hoc, project-based enterprises over the Internet.

Business would be transformed fundamentally. But nowhere would the changes be as great as in the function of management itself.

4 The Transformation of Management

In the mid-1990s, when the Internet was just entering the consciousness of most business executives, the press was filled with disaster stories. The Internet, the pundits proclaimed, was about to fall into disarray. Traffic on the World Wide Web was growing too fast. There were too many Web sites, too many people on-

² See Robert J. Laubacher, Thomas W. Malone, and the MIT Scenario Working Group, "Two Scenarios for 21st Century Organizations: Shifting Networks of Small Firms or All-Encompassing 'Virtual Countries?'" MIT Initiative on Inventing the Organizations of the 21st Century Working Paper No. 001 (Cambridge, Mass.: January 1997) available on the World Wide Web at <http://ccs.mit.edu/21c/21CWP001.html>.

line. Demand was outstripping capacity, and it was only a matter of months before the entire network crashed or froze.

It never happened. The Internet has continued to expand at an astonishing rate. Its capacity has doubled every year since 1988, and today more than 90 million people are connected to it. They use it to order books and flowers, to check on weather conditions in distant cities, to trade stocks and commodities, to send messages and spread propaganda, and to join discussion groups on everything from soap operas to particle physics.

So who's responsible for this great and unprecedented achievement? Who oversaw what is arguably the most important business development of the last 50 years? No one. No one controls the Internet. No one's in charge. No one's the leader. The Internet grew out of the combined efforts of all its users, with no central management. In fact, when we ask people whether they think the Internet could have grown this fast for this long if it had been managed by a single company — AT&T, for example — most say no. Managing such a massive and unpredictable explosion of capacity and creativity would have been beyond the skills of even the most astute and capable executives. The Internet *had* to be self-managed.

The Internet is the greatest model of a network organization that has yet emerged, and it reveals a startling truth: in an e-lance economy, the role of the traditional business manager changes dramatically and sometimes disappears completely. The work of the temporary company is coordinated by the individuals who compose it, with little or no centralized direction or control. Brokers, venture capitalists, and general contractors all play key roles — initiating projects, allocating resources, and coordinating work — but there need not be any single point of oversight. Instead, the overall results *emerge* from the individual actions and interactions of all the different players in the system.

Of course, this kind of coordination occurs all the time in a free market, where products ranging from cars to copying machines to soft drinks all get produced and consumed without any centralized authority deciding how many or what kinds of these products to make. More than two hundred years ago, Adam Smith called this kind of decentralized coordination the invisible hand of the market, and we usually take for granted that it is the most effective way for companies to interact with one another.

But what if this kind of decentralized coordination were used to organize all the different kinds of activities that today go on *inside* companies? One of the things that allows a free market to work is the establishment and acceptance of a set of standards — the "rules of the game" — that governs all the transactions. The rules of the game can take many forms, including contracts, systems of ownership, and procedures for dispute resolution. Similarly, for an e-lance economy to work, whole new classes of agreements, specifications, and common architectures will need to evolve.

We see this already in the Internet, which works because everyone involved with it conforms to certain technical specifications. You don't have to ask anyone for

permission to become a network provider or a service provider or a user; you just have to obey the communication protocols that govern the Internet. Standards are the glue that holds the Internet together, and they will be the glue that binds temporary companies together and helps them operate efficiently.

To return to our auto industry scenario, car designers would be able to work independently because they would have on-line access to highly detailed engineering protocols. These standards would ensure that individual component designs are compatible with the overall design of the vehicle. Headlight designers, for example, would know the exact space allocated for the light assembly as well as the nature of any connections that need to be made with the electrical and control systems.

Standards don't have to take the form of technical specifications. They may take the form of routinized processes, such as we see today in the medical community. When doctors, nurses, and technicians gather to perform emergency surgery, they usually all know what process to follow, what role each will play, and how they'll interact with one another. Even if they've never worked together before, they can collaborate effectively without delay. In other cases, the standards may simply be patterns of behavior that come to be accepted as norms — what might today be referred to as the culture of a company or "the way things are done" in an industry.

One of the primary roles for the large organizations that remain in the future may be to establish rules, standards, and cultures for network organizations operating partly within and partly outside their own boundaries. Some global consulting firms already operate in more or less this way. For example, McKinsey & Company has established a strong organizational culture with well-understood norms for how people are selected and promoted and how they are expected to work with others in the company. But the top managers do not tell individual partners what kind of work to do, which clients to work for, or which people to select for their consulting teams. Instead, the partners make largely autonomous decisions about what they will do and how they will do it. In other words, the value the firm provides to its members comes mainly from the standards — the rules of the game — it has established, not from the strategic or operational skills of its top managers.

As more large companies establish decentralized, market-based organizational structures, the boundaries between companies will become much less important. Transactions within organizations will become indistinguishable from transactions between organizations, and business processes, once proprietary, will freely cross organizational boundaries. The key role for individuals — whether they call themselves managers or not — will be to play their parts in shaping a network that neither they nor anyone else controls.

5 Thinking About the Future

Most of what you've just read is, of course, speculative. Some of it may happen; some of it may not. Big companies may split apart, or they may stay together but adopt much more decentralized structures. The future of business may turn out to be far less revolutionary than we've sketched out, or it may turn out to be far more revolutionary. We're convinced, though, of one thing — an e-lance economy, though a radical concept, is by no means an impossible or even an implausible concept. Most of the necessary building blocks — high-bandwidth networks, data interchange standards, groupware, electronic currency, venture capital micro-markets — either are in place or are under development.

What is lagging behind technology is our imagination. Most people are not able to conceive of a completely new economy where much of what they know about doing business no longer applies. Mitch Resnick, a colleague of ours at MIT, says that most people are locked into a "centralized mind-set." When we look up into the sky and see a flock of birds flying in formation, we tend to assume that the bird in front is the leader and that the leader is somehow determining the organization of all the other birds. In fact, biologists tell us, each bird is simply following a simple set of rules — behavioral standards — that result in the emergence of the organization. The bird in the front is no more important than the bird in the back or the bird in the middle. They're all equally essential to the pattern that they're forming.

The reason it's so important for us to recognize and to challenge the biases of our existing mind-set is that the rise of an e-lance economy would have profound implications for business and society, and we should begin considering those implications sooner rather than later. An e-lance economy might well lead to a flowering of individual wealth, freedom, and creativity. Business might become much more flexible and efficient, and people might find themselves with much more time for leisure, for education, and for other pursuits. A Golden Age might dawn.

On the other hand, an e-lance economy might lead to disruption and dislocation. Loosed from its traditional moorings, the business world might become chaotic and cutthroat. The gap between society's haves and have-nots might widen, as those lacking special talents or access to electronic networks fall by the wayside. The safety net currently formed by corporate benefit programs, such as health and disability insurance, might unravel.³ E-lance workers, separated from the com-

³ Workers' guilds, common in the Middle Ages, may again rise to prominence, taking over many of the welfare functions currently provided by big companies. See Robert J. Laubacher and Thomas W. Malone, "Flexible Work Arrangements and 21st Century Worker's Guilds," MIT Initiative on Inventing the Organizations of the 21st Century Working Paper No. 004 (Cambridge, Mass.: October 1997) available on the World Wide Web at <http://ccs.mit.edu/21c/21CWP004.html>.

munities that companies create today, may find themselves lonely and alienated. All of these potential problems could likely be avoided, but we won't be able to avoid them if we remain blind to them.

Twenty-four years from now, in the year 2022, the *Harvard Business Review* will be celebrating its one hundredth year of publication. As part of its centennial celebration, it may well publish a series of articles that look back on recent business history and contemplate the massive changes that have taken place. The authors may write about the industrial organization of the twentieth century as merely a transitional structure that flourished for a relatively brief time. They may comment on the speed with which giant companies fragmented into the myriad microbusinesses that now dominate the economy. And they may wonder why, at the turn of the century, so few saw it coming.