

A revolution in interaction

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A new study of interactions reveals how pervasive they are

As they increase, answers to fundamental questions about integration, scale, and scope will change

What will happen when workers can carry out their jobs in half the time?

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THE MODERN WORLD ECONOMY is in the early stages of a profound change in the shape of business activity. Two centuries ago, dramatic shifts in the economics of transformation – of production and transportation – precipitated the Industrial Revolution. An upheaval of equal proportions is about to be triggered by unprecedented changes in the economics of interaction.

Interactions – the searching, coordinating, and monitoring that people and firms do when they exchange goods, services, or ideas – pervade all economies, particularly those of modern developed nations. They account for over a third of economic activity in the United States, for example. More than that, interactions exert a potent but little understood influence on how industries are structured, how firms are organized, and how customers behave. Any major change in their level or nature would trigger a new dynamic in economic activity.

We would like to acknowledge the transaction cost school of economists and Tom Malone at MIT; their ideas helped shape our thinking on interaction costs. Several colleagues contributed to this article; Neeraj Bhargava deserves special mention.

ABOUT THE RESEARCH

The research underpinning this article is part of a special initiative to deepen the understanding of the impact of global forces such as technology and deregulation. Drawing on our proprietary industry database, we measured how different types of workers in different industries spend their time at a microlevel. We estimated interaction costs for 24 worker categories and 23 industry types in the United States, and developed similar estimates for Germany and India.

Workers were classified into eight generic types – doers, caregivers, strategists, coordinators, analytic knowledge workers, interpersonal knowledge workers, data manipulators, and data harvesters and

communicators – and a detailed “stereotypical” activity profile was developed for each type. The activities were divided into interactive and non-interactive, and the costs associated with each group were isolated. We then used national statistics to gross up these calculations to the industry and economy level.

In addition, we conducted a series of experiments and simulations to gauge the potential impact of new technologies on the time and cost of routine economic interactions. The simulations were selected to provide surrogates for the 50 most commonly performed activities identified by McKinsey databases on worker activity.

Just such a change is now beginning to occur. A convergence of technologies is set to increase our capacity to interact by a factor of between two and five in the near future. This enhanced interactive capacity will create new ways to configure businesses, organize companies, and serve customers, and have profound effects on the structure, strategy, and competitive dynamics of industries.

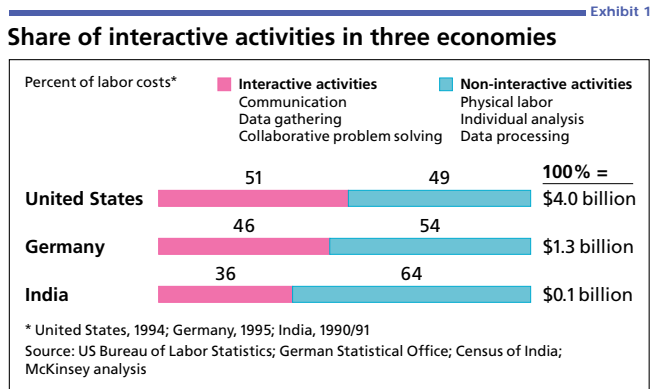
Yet business leaders will find it difficult to anticipate the opportunities and threats this change will present because our assumptions and thinking about strategy and organization are based much more on the economics of transformation than on the economics of interaction. To recognize, understand, and act on the hidden power of interactions, we will need to adopt new mindsets, new measurements, and new vocabularies.

What are interactions?

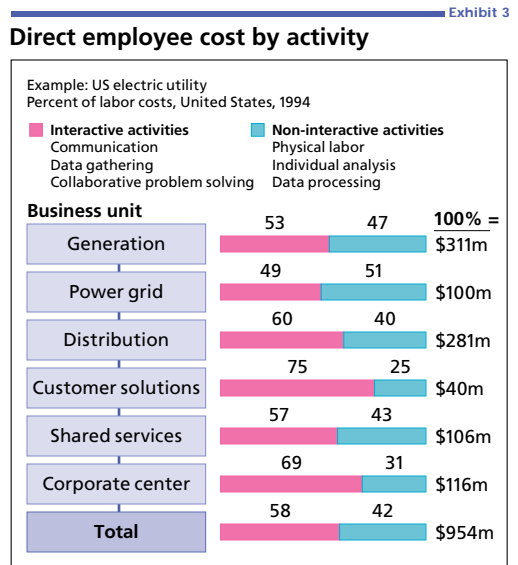
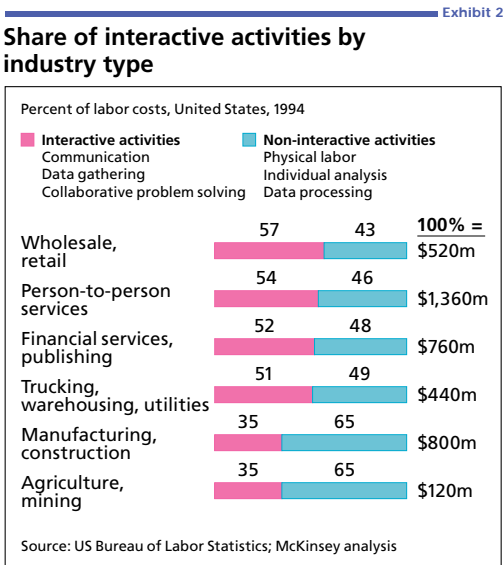
Economic interactions play a ubiquitous role in the world economy. Individuals and organizations interact to find the right party with which to exchange; to arrange, manage, and integrate the activities associated with this exchange; and to monitor performance. These interactions occur within firms, between firms, and all the way through markets to the end consumer. They take many everyday forms – management meetings, conferences, phone conversations, sales calls, problem solving, reports, memos – but their underlying economic purpose is always to enable the exchange of goods, services, or ideas.

Drawing on both public sources and McKinsey proprietary data, we have for the first time been able to estimate the scale of interactions in modern economies:

◆ At an **economy** level, interactions represent as much as 51 percent of labor activity in the United States – the equivalent of over a third of GDP. Even in a less developed economy such as India’s, 36 percent of all labor content is made up of interactions (Exhibit 1).



◆ At an **industry** level, interactions account for over 50 percent of all labor in service industries, and even in mining, agriculture, and manufacturing, they amount to 35 percent (Exhibit 2).



◆ At a **firm** level, interactions make up a large part of even an industrial company’s activities: in one US electric utility, 58 percent of all employee activity could be attributed to interactions (Exhibit 3).

◆ At an **individual** level, interaction activities vary with the type of worker. They peak at nearly 80 percent for managers and supervisors, and trough at 15 percent for workers primarily involved in physical labor (Exhibit 4). As the labor mix continues its shift toward information workers, interactions will become still more important (Exhibit 5).

Exhibit 4

Share of interactive activities by worker type

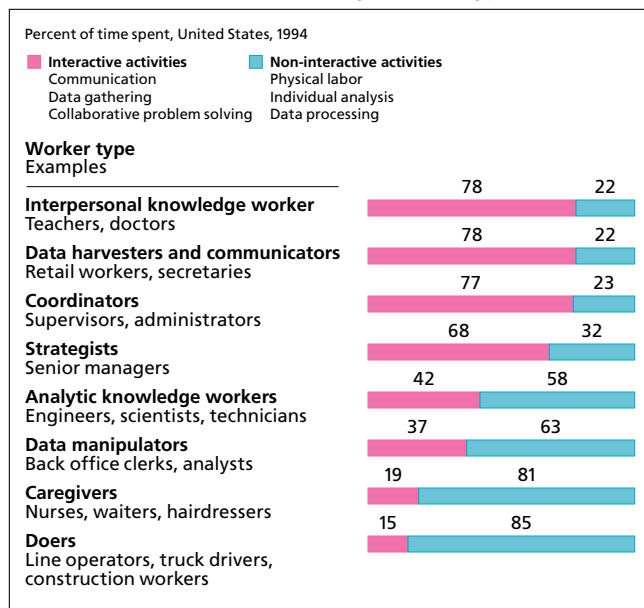
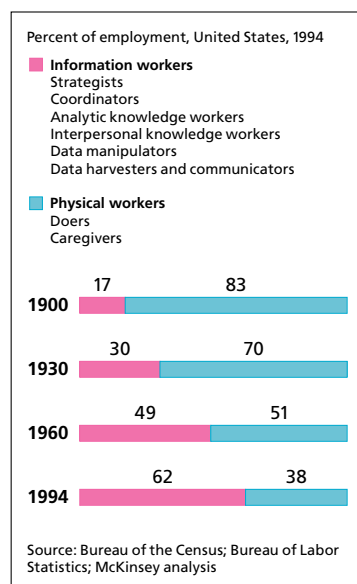


Exhibit 5

Share of information workers over time



How interactions shape economic activity

Given the ubiquitous nature of interactions, it is hardly surprising that they are important determinants of how firms and industries are structured, and how customers behave.

Firms trade off the value of specialization against the interaction costs associated with external suppliers when they set their boundaries and choose their focus. There is a balance to be struck between the transformation costs of production and delivery, and the interaction costs of arranging and coordinating exchanges. Typically, interaction costs are lower when production occurs within the firm, while production costs are lower for specialist outside suppliers. The structure of firms and industries at any given time is designed to minimize the total costs of transformation and interaction.

Consider by way of analogy a two-person economy. Both participants currently hunt and fish for food, but one is better at hunting and the other at fishing. Should they each hunt and fish for themselves? Or should one hunt and the other fish, and trade part of their output at the end of the day? What if a third person joins the economy? Should they set up a market to exchange their wares, or should they barter in pairs?

The answers are naturally influenced by the participants' relative skill (or comparative advantage) at fishing and hunting. Equally, however, they are

shaped by the interaction costs associated with exchanges – the amount of time and effort needed to search for the other party, negotiate the exchange, and monitor the other’s performance.

Similarly, **companies trade off the effectiveness of alternative organizational forms against the interaction costs involved in managing them.** Are departments the natural way to configure a modern corporation, for example? Do they have to be co-located? Is a central structure needed to monitor them? Are ad hoc teams more effective than permanent structures? Are flat or hierarchical structures easier to manage?

If interaction costs were negligible, an organization could in theory be atomized into a collection of individuals, geographically dispersed but connected by a communications network. In reality, however, substantial interaction costs and the human aspects of effective interaction limit the range of realistic configurations.

Customers choose products and providers by trading off the interaction costs of additional search against the marginal value expected from it. In a world where searching cost nothing, consumers would search exhaustively until they found the exact product of their choice at the lowest price available. Clearly, this is a hypothetical case, but what if today’s search costs fell by 90 percent? Wouldn’t customers’ selection criteria and processes change too?

If providers anticipated this, wouldn’t they communicate and develop and distribute products in a very different manner? What if their costs of interacting with customers also declined? Many of these circumstances may soon come to pass. When they do, falling interaction costs will trigger dramatic changes in the relationship between companies and their customers.

The types of tradeoff described above are not made explicitly and transparently. Rather, they have become hardwired with time into the assumptions made in designing organizations and setting strategies – assumptions about customer behavior, distribution economics, manufacturing scale, insourcing versus outsourcing, and a range of other variables. In each case, relative interaction cost is a key component of the assumption. This variable is about to undergo radical change. We believe that the interactive capacity of modern economies will at least double, and could increase as much as five-fold, over the next five to ten years.

How technology will revolutionize interactions

Technological progress is bringing about a massive increase in interactive capability. All modern forms of interaction – whether they be as simple as writing a letter or as complex as solving a problem in a team – are shaped

by computing and communications technologies. The past couple of decades have brought remarkable innovations in these fields, but modern economies have yet to exploit opportunities to increase the quantity and quality of interactions and reduce their cost.

Until now, our ability to manipulate and process data has far outstripped our ability to communicate and interact. However, a number of converging factors are set to change this situation. New networking capabilities, technologies that enhance connectivity and bandwidth, and standards that drive new applications are coming together in an environment of spiraling processing power and deepening technological penetration. This potent combination heralds a new age of abundant interactive capability.

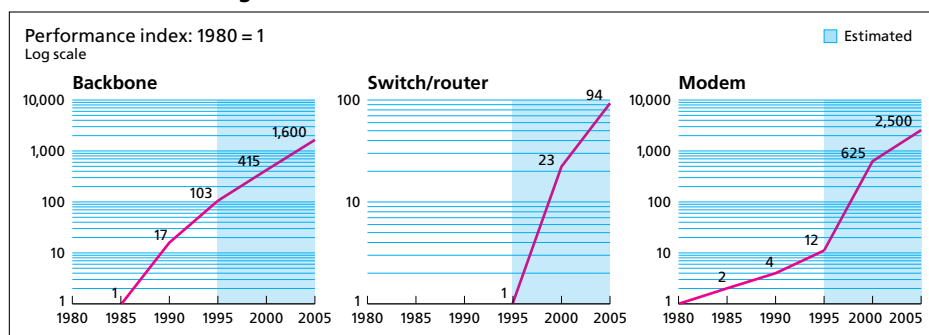
Underlying changes in interactive technologies

The growing use of networks will create an explosion in the ability to interact. Historically, computing has progressed through a number of eras. In the data processing era from 1960 to about 1980, mainframes were used to automate low-level processes like payroll, MRP, and general ledger accounting. Then the microprocessing era of the 1980s brought computing power to the desks of mid-level workers. Though these eras boosted the productivity of certain tasks, overall gains were more elusive, probably because there was no improvement in the interactive elements that occupied most of the mid-level professionals' time.

The early 1990s saw in a new era in which computers were progressively linked into networks. Networking allows people to communicate with each other via e-mail, to share plans and blueprints over group software, and to work collaboratively across the globe. Each additional node in a network increases the scope for interactions exponentially, not arithmetically. Even if no new computers were added to the current installed base, simply to network existing machines would create an immense groundswell of interactive power.

Exhibit 6

Connective technologies



Vast improvements in connectivity and bandwidth technologies over the next five to 10 years will multiply the interactive power of networks. A new generation of high-speed switches and routers is emerging to guide messages on their journeys around networks. Networked PCs and Internet access via TV will allow new users to join these networks. The price-to-performance ratio of modems is improving at 55 percent a year (Exhibit 6). Fiber-optic cables are proliferating, and the performance of old copper wires is being boosted by new technologies. Cellular, satellite, cable, and wireless technologies will expand the bandwidth available for communications, enabling new applications and new connectivity.

Computer power will not be a bottleneck.

Processing power and memory will continue to get faster, cheaper, and more abundant; adequate power for today's applications will be both affordable and widely available across the world (Exhibit 7). While concern about how long this pace of improvement can be sustained is justified, the indications are that price/performance will nosedive over the next decade, dropping from 0.31 cents per kilobit today to 0.004 cents per kilobit in 2005 – a fall of 98 percent.

The emergence of a new set of standards will boost network usage and applications development. One of the consistent lessons of technological innovation is that the emergence of standards stimulates both uptake and investment. In the early part of this century, for example, convergence on voltage and current standards sparked an explosion in electrical devices and usage. Similarly, GSM communication standards sent the number of mobile telephone users rocketing in the early 1990s. Today, standards including HTTP (HyperText Transfer Protocol), HTML (HyperText Markup Language), and IP (Internet Protocol) are propelling rapid growth in Internet and intranet usage and applications. Even the least optimistic estimates project exponential growth in users over the next four years, and innovative applications are being generated at a startling pace.

Finally, a whole new section of the global economy will see its interactive capacity boosted as basic technologies penetrate more deeply over the next decade. In the past three years, the number of PCs in less developed

Exhibit 7
Computing technologies

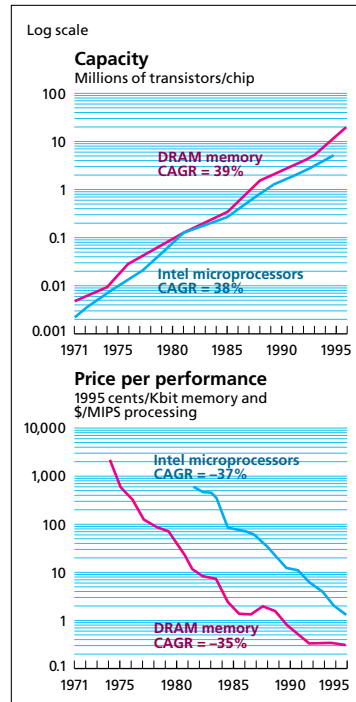
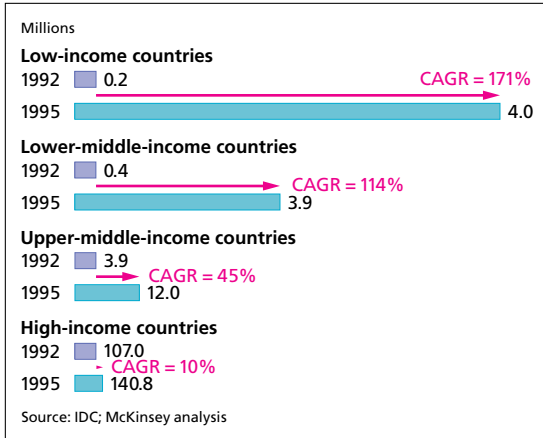


Exhibit 8

Number of installed PCs



countries has multiplied between ten-and twenty-fold (Exhibit 8); at the same time, advanced economies have become more fully wired. Telephone penetration is rising in all parts of the world regardless of income level as the cost of installing telecommunications infrastructure falls (Exhibit 9). Lower-income countries are registering double the growth rate of high-income nations in newer wireless and cellular services as they attempt to leapfrog technologies (Exhibit 10).

Exhibit 9

Telephone density

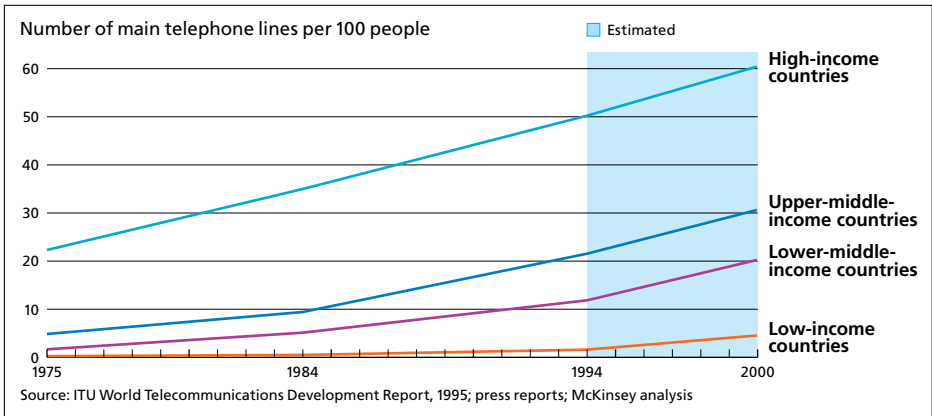
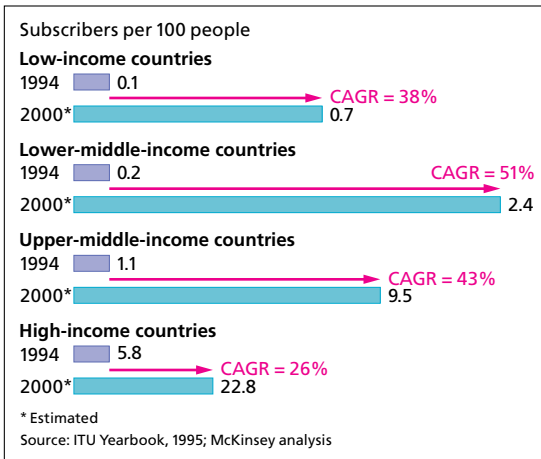


Exhibit 10

Cellular phone penetration



One company, Starlight Communications, has installed wireless public telephones in Somalia. Already universal in the developed world, access to television continues to burgeon in developing countries. China and India have both seen annual growth of over 20 percent for the past 15 years, and large parts of the population in such nations as Indonesia, Thailand, and Malaysia now have access to television.

The cumulative effect on interaction capability

Over the past decade, the rate at which data can be transmitted over a line has increased about four-fold. Over the next decade, it will increase 45-fold. The time it takes to transmit 100 kilobits of data fell by 75 percent between 1985 and 1995; by 2005, it will have fallen by a further 97 percent (Exhibit 11).

Increases in the rate of transmission don't automatically translate into improvements in interactive capability, however. Most interactions have a human component that remains largely unaffected by technological innovation. Technology may enable us to write and distribute a memo very quickly, but it doesn't tell us what to say or how to say it.

To estimate the likely change in real-life interactive capacity, we conducted a number of experiments with routine economic interactions. The results were impressive. They suggest that simple acts that we take for granted, but that form a large part of our everyday work, will be transformed.

The efficiency of data gathering could increase by a factor of at least three, written and oral communication by around two, and group problem-solving interactions by 1.5. Straightforward searches, say for a simple banking product, could be conducted in a fraction of the time they currently take; an inventory item reordered in a tenth of the time; and an investment portfolio updated in less than 30 seconds (Exhibit 12). Put differently, if technology were more broadly applied, the economic capacity to search could increase more than ten-fold, and the capacity to coordinate and monitor certain activities could grow by a factor of between two and ten.

Exhibit 11
Interaction capability*

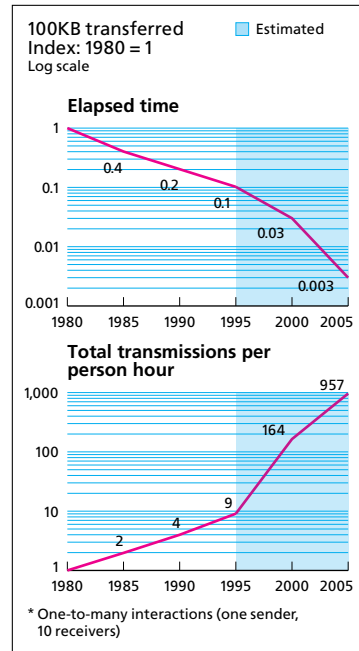
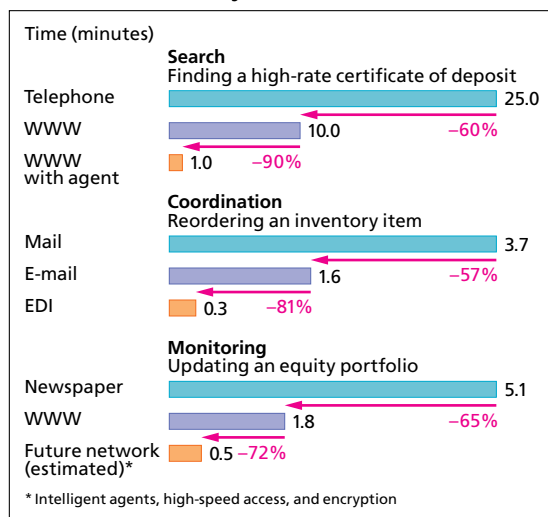


Exhibit 12
Interaction efficiency



All in all, taking a conservative view and factoring human limitations into the pace of technological change, we believe that the overall interactive capability in developed economies could increase by a factor of two to five over the next five to 10 years.

A new economics for the age of interactions

In the face of a massive increase in interactive capability, many of our traditional assumptions about the natural forms of economic activity will fall by the wayside. The tradeoffs that shape economic activity – firms trading off specialization against interaction costs, customers weighing current selections against further search costs, organizations considering alternative configurations – will each find a new point of balance as one side of the scale tips down. New ways to configure businesses, serve customers, and organize companies will emerge. Harbingers of some of these new models are already in evidence, but they tend to be seen as isolated exceptions. With greater interactive capacity, many of these exceptions will become the norm.

New ways to enhance productivity

The most straightforward interpretation of the increase in interactive capability is that **workers could do their jobs in less than half of the time they currently spend**. This means that a salesman will be able to spend much more time with customers, for instance, while R&D staff will have to spend much less time collecting data and waiting for test results. For the US economy alone, such savings could translate into productivity gains worth at least \$1 trillion, or a third of GDP.

At one level, interactive technology will be used to boost efficiency and cut jobs. However, we believe that **in the long run there will be a net increase in employment, generated by a rise in the overall demand for interactions** and the creation of new products and services that were previously uneconomic to deliver. Consider the transport industry, where cheaper road and air transport precipitated a surge in business trips, visits to friends and relatives, and travel for pleasure. Similarly, electronic stock exchanges may have eliminated the jobber, but they have given market and underlying corporate activity a fresh impetus.

New ways to configure business

Vertical integration will become less valuable and disaggregation, outsourcing, and the use of external markets will increase. Whether a company makes or buys depends on the comparative costs of transformation (production and transportation) and interaction. While outsourcing or purchasing from a market allows buyers to benefit from the superior economics of specialized suppliers, it tends to involve

substantial interaction costs. As these costs fall, the relative attractiveness of arm's-length purchases will rise.

Integrated business systems will give way to more specialized ones, and disaggregation and outsourcing will burgeon. In textiles, for example, EDI has allowed players to disaggregate procurement, spinning, weaving, finishing, logistics, and retailing, and contract them out to specialists along the industry chain. Similarly, the utility industry is fragmenting into separate generation, transmission, distribution, wholesale, and energy services businesses, partly as a result of the ease and economy of conducting arm's-length transactions via Internet and wireless technologies. In outsourcing, the growth potential of specialized functional businesses is illustrated by operations like

For the US economy, the increase in interactive capability could translate into productivity gains worth a third of GDP

Rosenbluth International, a \$40 million company from Philadelphia that has built a \$1 billion international business in outsourced corporate travel, and Federal Express's logistics, electronics, commerce, and catalog business, which expects to turn over more than \$1 billion by 2000.

In contrast, **horizontal integration and cooperation will become more economically attractive.** Horizontal integration brings benefits when carrying out a set of activities jointly rather than separately yields economies of scope in the form of higher returns or lower costs. As falling interaction costs allow companies better to coordinate the marketing and distribution of a wider variety of products and services, the value of horizontal integration should increase. Mail-order firms such as Fingerhut are among the first to exploit the new economies of scope by cross-selling over a single channel.

Growing standardization will also encourage horizontal integration. Just as the expansion in transcontinental rail transport compelled US railways to standardize track size in the early 1900s, the extra traffic created by lower interaction costs will force the emergence of new communication and information standards in the 1990s. The possibility of transmitting music, photographs, and video in standard formats over a single electronic channel, for example, lies behind much of the excitement raging in media, cable, and telecommunications companies in recent months.

The strategic value of scale is likely to decline in many industries, although it will rise for networked businesses. In businesses where distribution or logistics originally made scale essential, falling interaction costs will reduce its importance. Outsourcing, alternative delivery channels, and the ability to variabilize inputs will grow, reducing fixed costs. As a result, smaller firms will proliferate in such industries as consumer goods manufacturing, applications software, specialty retailing, and design services.

By contrast, in networked businesses, where the number of possible interactions increases exponentially with the addition of each node, interaction efficiency is the key to competitive advantage. As recent acquisitions and mergers in telecommunications, transportation, banking, and mass retailing suggest, scale expansion is likely to take place in such businesses.

In general, **there will be a shift toward more networked forms of business configuration.** At its simplest, this means that companies will be able to devolve decision making from corporate headquarters as interactions become easier and cheaper. Consider Frito-Lay, with 12,000 route salespeople using

hand-held computers to record sales of over 200 grocery products, supervised by just 30 district managers.

Many present-day retail markets could assume the pricing and transparency characteristics of wholesale markets

Business systems will also become more fully networked all the way from the customer back to design. Caterpillar is linking its

design center, distributors, and technicians directly with customers in building its global spare-parts business. Numerous companies including Amdahl and the Comanche County Hospital are developing fully networked logistics that cut costs, improve service, and permit more tailored offerings. Firms in many industries are likely to broaden their networks of partners, suppliers, and allies as coordination and monitoring costs plummet. The recent emergence of network and web industry structures is partly a reflection of the growing ability to manage complexity.

The lower cost of search and communication will force a move to more efficient market mechanisms for exchanging goods and services. In general, market mechanisms such as stock markets are more efficient for high-volume or standardized exchanges than closed or hierarchical systems like most supplier relationships. As interaction costs fall, some of the features associated with markets will come into play: lower transaction costs, more transparent prices, and a larger pool of buyers and sellers who can communicate with each other. Thousands of genuine electronic markets will be created by the open standards and low interaction costs of Internet EDI – markets that will benefit all participants. Take Industry.Net, which slashes the costs and broadens the reach of 4,000 suppliers and 200,000 buyers worldwide, who contract exchanges for a range of industrial products on line.

Markets will also emerge in unexpected new arenas: consider American Airlines' recent attempt to revolutionize airline distribution by creating an auction in which buyers can bid for last-minute tickets over the Internet. This market mechanism will boost AA's load factor while enhancing customer service, and could set a precedent for many businesses with retail customers

and capacity limits, such as real estate and entertainment. Following this trend to its logical conclusion, many present-day retail markets could assume the pricing and transparency characteristics of wholesale markets if interaction costs continue to fall over a long period.

The traditional role of intermediaries will disappear or be transformed into market making or synthesis. Intermediaries have traditionally exploited the lack of transparency in supply and demand in circumstances where it is costly for buyers and suppliers to search for and communicate directly with one another. But as these interaction costs fall, more providers will go directly to consumers via telephones and the Internet, and more consumers will do their own searching using the new media and on-line search agents. Brokers in the financial services industry and travel agents in the airline business will testify to the pressures this creates for intermediaries.

Some businesses, like banking, are by definition intermediary in nature. In time, their foundations will be threatened. If electronic cash comes of age, it is difficult to imagine consumers being willing to pay for the high-cost infrastructure they currently have to use when they interact with banks. Similarly, if consumers could obtain information directly from content providers at low cost, many areas of information publishing might lose their distinctive value.

As interaction costs fall, providers will go directly to consumers, and consumers will do their own searching

Nor is this type of change confined to information-related industries. The US motor industry is right to be alarmed by Republic Industries' snapping up of dealerships and its promises to make AutoNation USA as recognizable as McDonald's across the country. A large part of the value that Republic could create will come from reducing the interaction cost of buying an automobile.

As the value they derive from searching declines, intermediaries will have to enhance other aspects of their role, or create new roles to play. Some will build businesses around pure transaction channels. Schwab, with its range of low-cost brokerage channels, is an outstanding example. Others may retreat to offering specialized advice.

The most promising roles, however, will be that of integration and synthesis, and that of market making. The former includes the aggregation of third-party information, evaluation and filtering services, and the bundling of services from multiple providers. In the past, companies such as Consumer Reports in print media and tour packagers in travel provided such services; in the future, digital networks will open up a vast new set of related

CHALLENGING OLD ASSUMPTIONS

With far greater interactive capability on the near horizon, every business leader needs to revisit and challenge the assumptions underlying existing strategy and organizational models. Here are some samples of questions you need to ask about your business. The questions may seem familiar, but the challenge is not to know the answers as they stand today, but to gauge how they will change over the coming years.

On ways to configure a business:

- What is the minimum and maximum level of scale in your business? How would this change if interactive capacity doubled or quadrupled? What would be the effect on your business configuration or strategy?
- Which non-core services and functions do you perform in house? What would you do differently if all functions – even those close to the core of the business – could be effectively outsourced?
- Where would you perform specific business activities if you could locate them anywhere in the world for little incremental management cost?
- What causes the biggest bottlenecks in your flow of business today? What would happen if you could increase the capacity of this bottleneck four-fold?
- In which business functions is your company's performance truly world class? Can these internal services be standardized far enough to make them detachable to serve other businesses?
- Is it necessary to have intermediaries between your firm and its customers? Can you disintermediate the flow? Are there market mechanisms for performing the same functions more efficiently?

On ways to serve customers:

- Ignoring geography, how would you define your ideal customer base? How many of your

customers have ready access to the Internet? How many will have access in five or 10 years? What stops you marketing to similar customers around the world?

- Which customers generate the biggest profits, and why? Will they have new opportunities to capture surplus from you? What imperfections do they face in the purchase and use of your products or services? How can these be eliminated?
- Are there customized products and services that compete with your standardized products and services today? What effect will it have on industry economics if the share of customized products quadruples over the next five years?
- What other products and services do your best customers purchase? How efficiently are these delivered to them? How could you deliver a wider selection or more customized versions of these products and services to your customers?

On ways to organize:

- How much time does your organization spend on interactions? Where are the biggest bottlenecks? What would you do differently if these bottlenecks could be eliminated?
- Why does your organizational structure look the way it does? What radical alternatives might be possible? What prevents you from experimenting with them?
- In which segments of your organization is productivity in the top decile? What stops you transporting skills or knowledge across organizational boundaries? How can you transfer superior processes to other countries?
- How much capital does your company invest in controlling physical assets? If you owned no physical assets, what skills and competencies could you trade with those who owned the assets? What stops you doing this?

opportunities. Market-making opportunities will proliferate in almost any industry where a derivative market can be created around information detached from the physical flow of goods. Energy futures and mortgage securities are traditional examples; electricity trading and travel and entertainment options offer exciting new possibilities.

New ways to serve customers

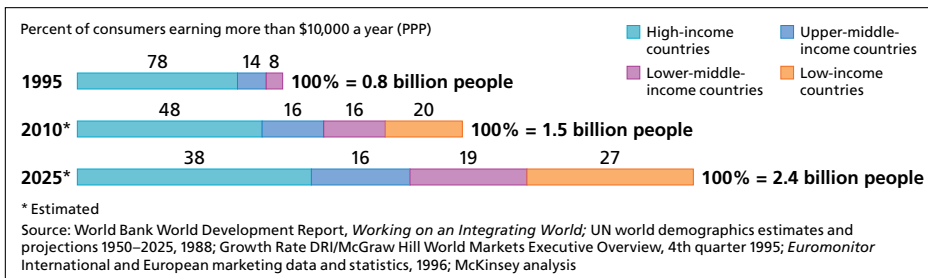
It will be far easier for any company, regardless of size, to reach new customers anywhere in the world. As interaction costs fall, traditional assumptions about distribution and consumer reach will be overturned. Once, giant multinationals with established brands and local presence were the only players that could aspire to reach consumers all over the world. Under the old model, a company sold its products locally and expanded gradually. Being global was synonymous with being huge.

This is no longer true. Many companies will be born global. Today, even the smallest start-up has access to a global market for its products. Aussie Lures, a tiny business run from a garage in Sydney, sells fishing lures to customers across the world via the Internet.

What is more, companies searching for customers will be increasingly likely to strike gold as the number of consumers earning more than \$10,000 a year at purchasing power parity swells from 800 million today to almost 2.4 billion by 2025, aided by growth in developing economies such as China, India, and Indonesia (Exhibit 13).

Exhibit 13

Distribution of wealthy customers



Direct sales and distribution will become the norm rather than the exception. Getting products to consumers is becoming cheaper and easier. The past 60 years have seen a steady decline in the cost of transporting goods across the globe. It is now possible to send a small package to virtually any city in the world for under \$100 and within three days, for example. Over the past decade, physical distribution costs have declined from 14 to 9.5 percent of US GNP. At the same time, industries ranging from retailing to financial services have seen a large-scale shift to direct forms of customer interaction – telephone, mail, and television.

Digital and Internet-based approaches will provide the next leap forward in the sales and delivery of goods and services. Using the Internet as a transaction channel, customers will be able to obtain a range of goods from wine to winterwear from nearly anywhere in the world. Suppliers will ship their chosen products straight to their door, dispensing with traditional warehousing, geographic distribution, and retailing infrastructure.

Not only will finding and reaching new customers be simpler, **tailoring products for them will be easier, faster, and cheaper as well.** Much of our current strategic mindset is inherited from an era of mass production and relatively unsophisticated segmentation. Falling interaction costs will at last enable us to plan and execute strategies based on mass customization. A personalized version of *Time* magazine is becoming available on line to subscribers in Australia, for example. It costs only a few cents and is delivered instantaneously; back in 1987, it cost \$5 and took four days.

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Levi Strauss is now able to capture customer information at point of sale and deliver custom-fit jeans within three weeks at a premium of \$15 to \$20 over the off-the-peg

price. Similarly, Customfoot uses specialist software and fully linked logistics systems to ship custom-made Italian shoes to customers in three weeks at a price well below those of competitors. Numerous other examples can be found in books, wine, banking, and home shopping. This trend toward customization is made possible by the same technology and software innovations that enhance interactive capability.

Communication with customers – advertising, research, and marketing – will shift from broadcast to narrowcast mode as the cost of interacting with individual consumers falls. Smart-card and telephone interactions will slash the cost of gathering data about customers. Employing trained personnel to collect data about consumer purchases cost Nielsen \$100 per month per store; using scanners cut the cost to around \$10. As customers move on line, the scope for capturing information will grow still greater, and the cost still lower.

The “magic cookie” technology embedded in Netscape, for example, enables the software to maintain an automatic record of the sites a user visits. Eventually, it will be able to capture information about the interactions themselves, such as amount spent and items purchased. In advertising, DoubleClick now offers a service that delivers targeted messages over the Internet to communities selected on the basis of sophisticated user profiles, while companies like CyberGold pay people to watch advertisements developed to suit their specific profiles. Leading

users like IBM, Bank of America, and Intel are promoting the growth of these services.

New ways to organize

The impact of the new economics on forms of organization will be equally profound. **Organizations will adopt a variety of structures that would not have been possible to manage when interaction costs were significant.** Our research shows that half or more of a company's spending on labor may be devoted to basic interaction activities, many of them internal to the organization. As the costs of search, coordination, and monitoring fall, we can expect a radical shift in the way corporations are organized. The flatter organizations of the 1990s, for example, are an early reflection of the growing ability to manage distant frontline activity through interaction technologies.

As synthesis becomes easier, firms will get smaller, with one-person companies and partnerships proliferating

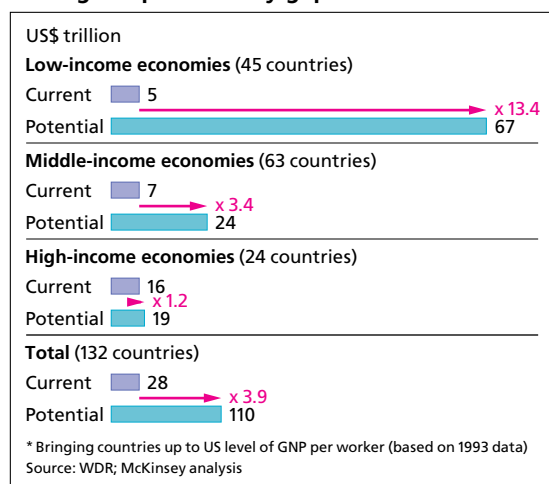
During the next decade, corporations that are currently tightly knit will disaggregate themselves and disperse geographically. Companies ranging from behemoth oil producers to tiny software houses are already heading this way. New entities will be able to opt for looser forms of organization, whether they be virtual companies, like many Internet start-ups, or networks built around individuals. As synthesis becomes easier, firms will get smaller, with one-person companies and partnerships proliferating.

Some large Silicon Valley ventures are experimenting with what should become another widespread phenomenon: the use of internal markets. Here, users bid for input from specialized professionals on contracted activities, relying on supply and demand rather than supervisors to exercise discipline. The traditional coordination and monitoring roles of managers will be transformed for ever in the organization of the future.

Expertise will become an increasingly valuable asset, to be leveraged across organizational and geographical boundaries. As interaction costs fall, transferring information and skills across borders will become much easier.

The value at stake is considerable: research by the McKinsey Global Institute has shown that closing the productivity gaps between current and best practice could raise global GNP by an astonishing 300 percent, or \$82 trillion (Exhibit 14). These gaps arise largely from differences in management practice, and are sustained by regulatory barriers and lack of international exposure. The masters of best practice will enjoy a vast opportunity to capitalize on their most valuable resource: superior insight or knowledge. Companies should recognize that returns will increasingly accrue to

Exhibit 14

Closing the productivity gap*

intellectual capital even as physical and financial capital become commoditized. As it becomes easier to leverage knowledge or skills worldwide and seek out the best resources in any given field, individuals who possess critical knowhow will attract disproportionate returns.

Why it is important to act now

Doing business in a world of plentiful and cheap interactions will clearly require new skills and a new mindset. While the exact pace and extent of change will vary by company, industry, and national economy, no

firm or sector will be left unaffected. As a rule, those who anticipate and understand the fundamental nature of the changes ahead and actively reshape their business models will be best placed to exploit the opportunities. Those that do not will face a rocky transition from the heritage of the past to the realities of the future. Among the businesses likely to be most deeply transformed are:

- ◆ Interaction-intensive industries, such as retail banking and communications, where the nature of customer interactions will be transformed for ever
- ◆ “Digitizable” industries, such as entertainment and software, in which the conversion of products from atoms to bits will create unlimited possibilities for interaction
- ◆ Intermediary industries, such as broking and wholesaling, where cheap, frequent, and direct interactions will reduce the market imperfections on which players thrive
- ◆ Integrated firms, such as many utilities and oil companies, whose natural structure and corporate boundaries will be completely changed by the falling costs of external interactions
- ◆ Firms in regulated environments, such as many European corporations, where global interactions and remote access will undermine current trade and regulatory barriers
- ◆ Multinational firms that are configured according to outmoded assumptions about manufacturing locations, distribution requirements, and achievable productivity.

As in all major economic shifts, the successful innovators will be those that develop the best understanding of the underlying change and act upon it. Success in the next five to ten years will require a deep understanding of the power of interactive capacity in both your own industry and the economy at large. 