

■ Information Technology

Paradox lost

By Gary A. Curtis, Deepak K. Goyal and Bernhard Holtschke

After decades of disappointment, IT investments are finally paying off in dramatic economic and enterprise productivity gains. End of story? In fact, high-performance businesses have learned that this trend will only broaden and deepen as they continue to leverage technology more effectively.

■ Last year, the business press reported the news of dramatic increases in productivity with some wonderment. After more than 20 years of mostly narrow annual gains, the kind of spectacular productivity numbers once reserved for young industries or emerging economies are now being posted by developed economies. In the third quarter of 2003 alone, the United States saw an 8.7 percent gain in productivity.

Changes in economic productivity in any large economy are driven by a complex interplay of influences—some well understood, some less so. Accenture believes that part of the excitement that has greeted recent productivity gains is fueled by the sense that what Erik Brynjolfsson, economist and director of the Center

integral to the IT value equation, factors that we believe have become sufficiently large and powerful today to have significant impact on business productivity, on both economywide and organization-specific scales.

The first factor is *the scale and ubiquity of the installed base of current technology*, an aggregate investment now worth trillions of dollars. Second is *the continual functional evolution of technology itself*, which enables IT-based solutions for more complex and sophisticated tasks. The third factor is *IT-driven business process integration*—at both the business-unit and enterprise levels.

None of these factors is new, and they typically operate together. What is new is that the steady improvement of each and the sometimes spectacular way in which all three interact are having a broad and deep impact on business productivity and performance.

A key objective of Accenture's High Performance Business initiative is to glean lessons from top performers across several industries, with performance defined and measured by widely accepted financial metrics, particularly total return to shareholders. Measuring the connection between IT investment and productivity improvement is one of a number of ways that Accenture evaluates high performance. We are committed to augmenting a substantial body of productivity-related field experience with insight gained from continuous research. And that research will inform Accenture's goal of making that insight actionable.

IT scale and ubiquity

More than 40 years of public- and private-sector investment in hardware, software and communications

"You can see the computer age everywhere but in the productivity statistics."

—Robert Solow, Nobel laureate in economics, 1987

for eBusiness at MIT, and others have called "the productivity paradox" has finally been laid to rest. For years, it seemed that cumulative investment in information technology, which has been going on for decades, through every global business cycle (including the most recent one), should have produced economywide productivity results. But it didn't. Brynjolfsson called this a "clash of expectations and statistics."

At Accenture, we have anticipated this dramatic jump in IT-driven productivity for some time. Our expectations have been based on three factors that have long been

infrastructure has created an enormous foundation for IT-driven productivity growth. Still, prior to about 1997, these investments usually produced an organically grown, heterogeneous technology environment with high complexity and operating costs. This was often the result of competing technologies and standards. In Europe in particular, there was the added complication of a predominantly decentralized IT decision-making model, which allowed for a high degree of business-unit and departmental autonomy.

Two major developments changed that situation. First were the investments made between 1998 and 2000 to resolve the Y2K dilemma. For the first time, many organizations were

forced to integrate and upgrade their IT platforms, discarding many of their oldest legacy systems, retrofitting and harmonizing others, upgrading infrastructure and purchasing new software applications that worked more effectively with evolving standards.

The second development was the global economic downturn of the past three years, which has compelled companies to invest further in IT efficiency—to do more with less, to make standards (such as end-user configuration control) really work, and to reap the ensuing economic and productivity gains. A common initiative, for example, was the integration of multiple, regional enterprise-solutions systems into unified, global enterprise-solutions models.

The resulting levels of interoperability are so accepted today that they hardly seem noteworthy. Senior IT decision makers have taken advantage of the interoperability of the current installed base in ever more complete end-to-end solutions, in increasingly rich application program interfaces that allow for the leveraging of existing infrastructure, in the establishment of more effective industry standards and in the proliferation of powerful off-the-shelf software solutions.

Technology evolution

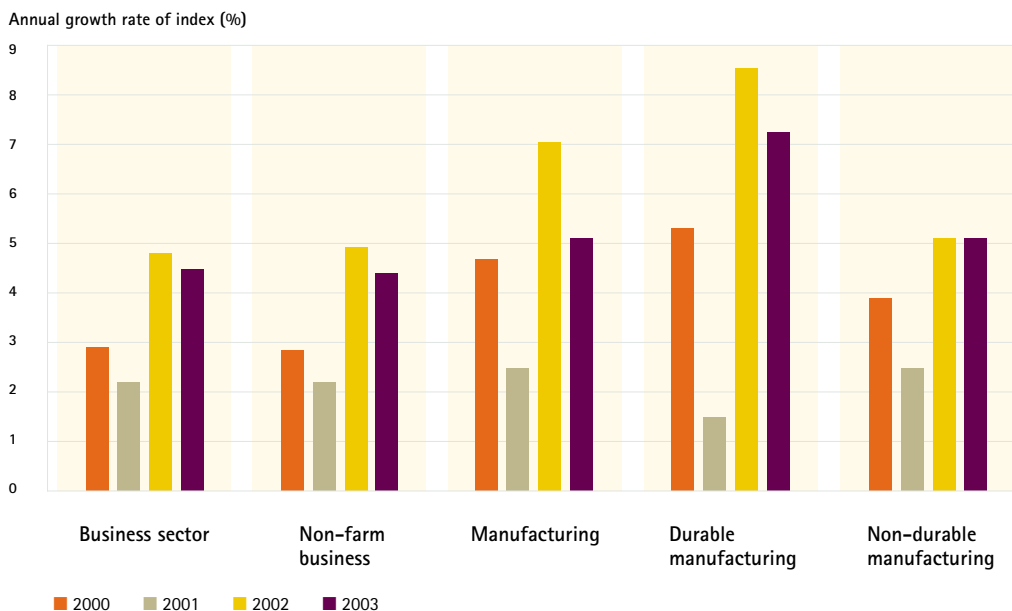
During the same time period, existing technologies have improved while new technologies have continued to evolve relentlessly. When these old and new technologies are

On the increase

Productivity gains remained stubbornly modest for much of the past 20 years. Beginning in 2002, however, annual growth in productivity has increased significantly—jumping by nearly 5 percent in the business sector in the United States, for example, and by more than 8 percent in the durable manufacturing sector.

United States labor productivity

Annual growth in output per hour of all persons (Index: 1992 = 100)



SOURCE: US DEPARTMENT OF LABOR, BUREAU OF LABOR STATISTICS, MARCH 4, 2004; ACCENTURE ANALYSIS

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combined, they have dramatic and multiple effects that go way beyond the impact of the exponential increase in computing power during the past 30 years. What is different now is the speed at which new technologies are able to leverage the existing IT base to deliver on their original promises.

Typical examples include wireless high-speed networking, which extends the power of large physical infrastructure to in-the-field applications, and location-based technologies such as RFID tags, which (often in combination with wireless networking) can shorten cycle times and improve inventory management. Other examples include the use of web-based CRM services, which allow both customers and service/product providers a range of relationship options, and collaborative technologies that enable concurrent engineering and development processes across borders and business-unit boundaries.

The power of such new technologies no longer needs to be harnessed in piecemeal fashion or in incremental steps. On the contrary, new technologies can be integrated more quickly and efficiently into existing platforms, with immediate benefits available throughout the enterprise.

Process integration

While the potential productivity impact of information technology was appreciated early on, it has taken time for enterprises to understand how to leverage their own IT most effectively—through the redesign of business processes, for example, the introduction of new processes or the redesign of legacy processes to reflect new IT innovation. Companies that are considered trailblazers in their industries—think of Apple Computer’s innovative

inroads into high-design personal-entertainment electronics—have generally been those where senior line managers and a business-oriented IT leadership have worked together most closely.

One particularly noteworthy development is extramural process integration—the increasing ability of companies to collaborate with alliance partners, outsourcing vendors and third-party utility providers. Enterprises can choose to acquire expertise rapidly, decide to out-task selectively or in end-to-end configurations, or rent scale effectively on an as-needed basis.

In Germany, for example, the semiconductor maker Infineon Technologies has established cross-company process collaboration to increase manufacturing efficiency. In the US commercial banking sector, the advent of industry-specific, back-office outsourcing providers like Metavante Corporation has given smaller banks a new range of choices for configuring their IT operations.

Some recent examples of what private companies and public-sector institutions have accomplished clearly illustrate the link between our three IT-based factors and productivity improvement. Although the proportional mix of the three factors varies, they are all present in each case.

Citizen self-service

With a surge in unemployment in Kansas in December 2000, claims filed with the state’s Department of Human Resources’ unemployment insurance program tripled. The sudden explosion in activity—as many as 7,500 claims per week—threatened to overwhelm the agency’s IT infrastructure, which still included 30-year-old legacy applications.

The solution lay in the development and delivery of three IT-driven productivity improvements: a new web-based service channel, improved call routing and the integration of a comprehensive CRM application with back-end legacy systems. Routine functions were simplified for citizen self-service through a system dubbed TABS (the Tax, Appeals and Benefits Self-Service System). Program staff, who were retrained to service more complex claims, were armed with new workflow support tools for scheduling, case management and file sharing. Off-the-shelf software was customized to integrate with the insurance program's existing technology platform.

Within three years, the systemwide average time required to process claims dropped by nearly 80 percent, from 47 minutes in 1999 to 11 minutes in 2002. Internet functionality expanded the program's effective hours of operation by more than 250 percent, to 109 hours per week, while the agency's annual claims-processing capacity grew by 81 percent. Without any reduction in staff, Kansas's unemployment insurance system leveraged its existing IT infrastructure with new work processes to become a national model of citizen service. Citizens got what they needed much faster, while department productivity was greatly increased.

Field tested

RWE Thames Water, with 70 million customers in 23 countries, is the world's third largest water utility. (The company, which is private, is a subsidiary of multi-utility RWE, Germany's fifth largest industrial company.) When Thames's senior management committed itself to increasing the productivity and efficiency of its UK field force, it targeted the system used to transfer customer information between headquarters and the field. Providing real-time

information to 1,000 field employees was cumbersome, done either via mobile computers with dial-up connections or with paper-based systems.

Thames developed and deployed wireless handheld devices expressly designed for rugged field use. A robust wireless infrastructure insured that information could be available anywhere. A new scheduling application and its integration with mainframe-based customer management systems created a foundation for the rapid integration of wireless technologies.

As a result, productive time in the field increased by 25 percent, with significant improvements in customer service. With job instructions and job-support information dispatched electronically, the need to visit Thames Water supply depots for schedules, directions and documents was significantly reduced. Further, field staff members were able to get off to a faster start each day, move from job to job more quickly, coordinate work with other teams more efficiently and avoid repeat work.

By taking advantage of wireless technology unavailable just two years earlier, and by leveraging its legacy systems, Thames Water recast its field-service model with substantial productivity benefits for the company and its customers.

Quicker discovery

In the mid-1990s, one pharmaceuticals giant found itself lagging behind its competitors in the deployment of R&D-related information management processes, known as "informatics." In the all-important area of drug development, this meant clinical-process bottlenecks and a consequent stretching out of the typical 10- to 15-year development pipeline. As just one

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example, the company's investment in a system capable of storing 1 million compounds was significantly underutilized because of a lack of the information and skills needed to run it.

The company targeted three areas for investment: drug discovery, the drug-candidate decision-making process and clinical development. The overall objectives were clear: to shorten drug-development pipelines, and to increase the number of drugs sent annually to national regulatory authorities for approval.

The company developed and implemented a standardized, centralized and integrated capability for global trial planning and management. A redesigned data analysis system helped improve decision making earlier in the drug-discovery process. The company combined business process redesign with new functional applications that were quickly integrated into an already capable, but underleveraged, technology base. Today, it processes compounds nine times faster than it did before the transformation, while the design test primary screening results process has been reduced from one year to three months. In 2003 alone, this resulted in a net savings of 10,000 labor days, which freed up resources to focus on additional drug discovery.

Real-time commitments

Milan-based Pirelli is one of the world's leading manufacturers of tires, power and telecommunications cables, and transmission systems, with a market presence in more than 20 countries and a worldwide marketing network. Increasing competition in the tire market had put continuous pressure on margins. One clear response: better utilization of existing resources to manage Europe as a single business, to be measured in increased sales volumes and margins, as well

as improved use of working capital through optimized inventories and days-of-sales outstanding.

Pirelli initiated a process based on the strong centralizing of IT governance as well as the standardizing of processes. A new, single SAP-based sales, supply chain, and finance and accounting information system consolidated former country-based systems.

The new capabilities permitted, among other things, the real-time commitment at order across Pirelli's entire European supply chain, a prioritization backlog based on customer segmentation and order profitability, a multisourcing approach for sales orders, and a standardized pricing logic. This strategic capability combined common processes, responsibilities and key performance indicators with harmonized data and codes, and with information systems that were integrated and complete in terms of end-to-end coverage.

Results include a 20 percent reduction in lost orders (and consequent increases in net sales), the consolidation of warehouses and the ability to serve more than 25 percent of the European replacement channel and almost 100 percent of original equipment clients through direct factory shipment (with subsequent savings in logistics costs and working capital).

As Brynjolfsson and other productivity experts have noted, this is not the first time that excitement about IT-based productivity has surfaced in the business press—usually followed by disappointment. But we think this wave of productivity gains is different for a number of reasons. First, the latest increases seem to be taking place very broadly—across industry lines, in

both the public and private sectors, and in organizations of all sizes.

Second—and from our perspective, more significantly—these increases go well beyond the wringing out of labor costs that is historically characteristic of cyclic downturns. We are confident that the recent increases in productivity are being driven as well by the technology-based factors, which we've illustrated here, that make existing labor forces far more productive by leveraging technology's scale and ubiquity; capitalizing on technology's continuing functional evolution; and putting to work more and better technology-driven process integration.

During the past three decades, the three IT-based productivity drivers we have cited have shown themselves immune to business conditions and economic cycles. The installed IT base will continue to grow. The pace of technology evolution will continue to accelerate. Organizations will continue to learn how to best improve business processes to leverage these IT developments. Having now perhaps established a productivity-gain "tipping point," the three drivers are highly unlikely to falter. Only the pace will vary, not the direction. ■

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