The Net Impact Study

The Projected Economic Benefits of the Internet
In the United States,
United Kingdom, France and Germany[†]

V2.0

January 2002

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† This study of the Internet is the product of a collective endeavor of the authors, sponsored by the Cisco Systems, Inc. The opinions and findings contained in the study are solely those of the authors. Hal Varian is dean of the School of Information Management and Systems at the University of California at Berkeley. Among his many publications is *Information Rules: a Strategic Guide to the Network Economy*, co-authored with Carl Shapiro. Robert E. Litan is vice president and director of Economic Studies at The Brookings Institution. Among his numerous publications, Litan is co-author of *Beyond The Dot.Coms: The Economic Promise of the Internet* and co-editor of *The Economic Payoff from the Internet Revolution*, both co-authored with Alice M. Rivlin. Andrew Elder and Jay Shutter are principals in the Momentum Research Group. Strategic input provided by Genelle King and Gilad Fishman of Cisco Systems, Inc.

About the Net Impact Study

Although the Internet is fast becoming an essential tool for economic and social economic activity, there is relatively little empirical data about its economic impact. The purpose of the Net Impact Study is to help provide that data, collected at the firm level, both for the purpose of estimating how much impact the Internet has had to date and to project what impact it might have in the future. Ultimately the goal of the study is to translate current and anticipated cost savings (directly related to Internet technology) into an estimate of the impact on the productivity growth rate in the economies of the United States, United Kingdom, France and Germany.

For the purposes of this study we define Internet business solutions as: any initiatives that combines the Internet with networking, software and computing hardware technologies to enhance or improve existing business processes or create new business opportunities.

This report provides findings related to the overall revenue increases and cost savings related to Internet business solutions as well as their impact on productivity growth rates. The study also contains findings relating to:

- The extent to which businesses have adopted or implemented Internet business solutions
- The overall time frame in which organizations have implemented Internet business solutions and when they expect to complete implementation
- The relationship between level of adoption (in terms of areas of Internet technology implementation) of Internet business solutions and cost savings
- Both barriers to adoption as well as attitudinal/cultural traits that encourage adoption of Internet business solutions
- Comparisons of the above measures across five vertical industries as well as aggregate all of these measures into estimates for the economies of each economy

The Net Impact Study

A total of 2,065 U.S. organizations interviewed for the study were selected from Dun & Bradstreet's database of businesses, one of the largest and most comprehensive global databases of private and public organizations.

The sample was stratified to allow separate estimates for each of five vertical industry segments. The researchers chose to focus on the following five industries:

- Healthcare (SIC: 80)
- Wholesale and Retail Trade (SIC: 50-59)
- Manufacturing, including both durable and non-durable (SIC:20-39)
- Financial Services (SIC: 60)
- Service Providers and Telecommunications (SIC: 4812, 4813, 4841)

All other U.S. industries, including government organizations were included in a sixth 'all-inclusive' vertical. With estimates generated from these six groups, this study effectively measures the financial impact of Internet Business Solutions across all industries in the U.S.

economy.

The Net Impact Study was replicated in Europe focusing on the three largest European economies: the United Kingdom, France and Germany. A total of 634 organizations were interviewed for this portion of the study. Organizations were primarily selected from Dun & Bradstreet's database of European businesses, although the Service Providers and Telecommunications segment was supplemented by industry lists to ensure adequate representation.

Similar to the U.S. study, the sample was stratified to allow separate estimates for each of five vertical industry segments. We chose to focus on the following five industries:

- Government (Includes public administration, health and education)
- Wholesale and Retail Trade (SIC: 50-59)
- Manufacturing, including both durable and non-durable (SIC:20-39)
- Financial Services (SIC: 60)
- Service Providers and Telecommunications (SIC: 4812, 4813, 4841)

As in the United States, all other industries were included in a sixth 'all-inclusive' vertical. With estimates generated from these six groups, this study effectively measures the financial impact of Internet business solutions across all industries in the United Kingdom, France and Germany.

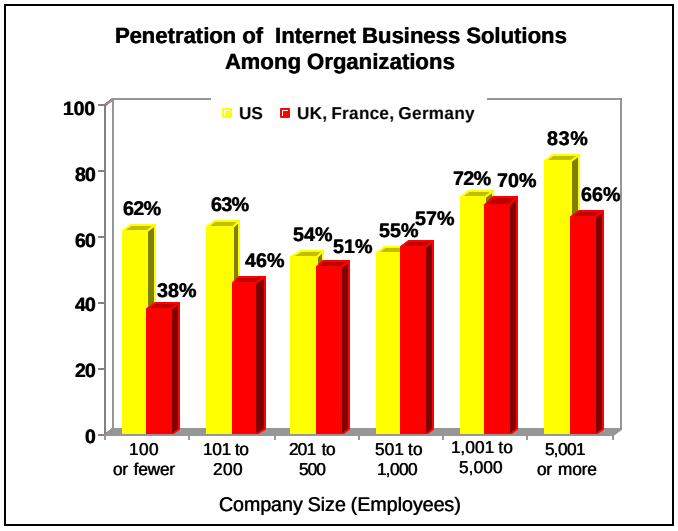
Additional details about the study are included in the section on research methodology.

Key Findings

The adoption of Internet business solutions is occurring in more than just enterprise-sized organizations, dot.coms and technology companies.

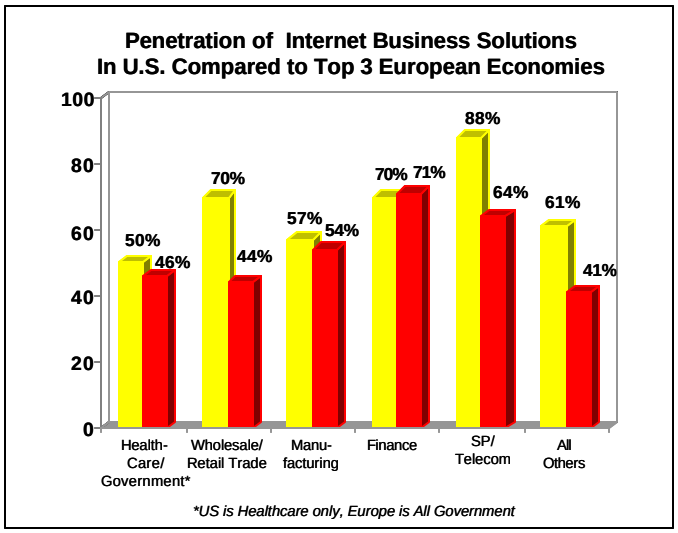
- Organizations of all sizes and across industries have adopted Internet business solutions as a tool for lowering operating costs and increasing revenues. Of the organizations sampled in the United States, 61 percent have already implemented Internet business solutions. Enterprises (5000+ employees) have a larger adoption rate, with 83 percent of organizations of this size having already implemented Internet business solutions. Across all of the organizations sampled in the United Kingdom, France and Germany, 47 percent have adopted Internet business solutions. Smaller organizations in the United States were much more likely to have adopted Internet business solutions than those in the United Kingdom, France and Germany.

Figure 1: IBS Adoption



- Adoption of Internet business solutions is widespread across industries. Service Providers and Telecommunications organizations have the highest adoption rate in the United States driven by their need to not only provide Internet technology to their clients but also their need to leverage technology for their own business processes. Healthcare in the United States has the lowest penetration of Internet business solutions, but the cost-reducing impact of these solutions in this sector are likely to be substantial according to a study by The Brookings Institution.[1] Financial Services organizations have the highest Internet business solutions adoption rate in the United Kingdom, France and Germany, followed quickly by Service Providers and Telecommunications.

Figure 2: IBS Adoption by Industry



[1] Litan, Robert and Alice Rivlin, ed. "The Economic Payoff from the Internet Revolution." 2001. Brookings Task Force on the Internet. Washington, D.C.: Internet Policy Institute, Brookings Institute Press, 2001.

Organizations in the United States, United Kingdom, France and Germany currently deploying Internet business solutions have realized a cumulative cost savings of $163.5 billion with the majority of the savings occurring since 1998.

- The adoption of Internet business solutions has already yielded a current, cumulative cost savings of $155.2 billion to U.S. organizations that have adopted Internet business solutions. In addition, these organizations indicate that their Internet business solutions have also helped to increase revenues cumulatively to approximately $444 billion.

Figure 3:

Current Financial Impact of Internet Business Solutions in U.S.[1]

	Current Estimate (through 2001)
Revenue Increases[2]	$443.9 Billion
Cost Savings[2]	$155.2 Billion

[1] *Estimated impact on U.S. economy only from organizations that have implemented IBS and have reported cost savings and/or revenue increases.*

[2] *Cost savings and revenue increases are cumulative from the earliest year of implementation through 2001 and are based on estimates reported by companies participating in study.*

- Adoption of Internet business solutions in the United Kingdom, France and Germany has resulted in a current, cumulative cost savings of €9 billion (U.S. $8.3 billion) to organizations deploying Internet business solutions. These organizations estimate Internet business solutions have also helped enhance their revenues by €86.4 billion (U.S. $79 billion) to date.

Figure 4:

Current Estimated Financial Impact of Internet Business Solutions on Top Three European Economies[1]

	Current Estimate (through 2001)
Revenue Increases[2]	€ 86.4 Billion
Cost Savings[2]	€ 9.0 Billion

[1] *Estimated impact on combined economies of the U.K., France and Germany only from organizations that have implemented IBS and have reported revenue increases or cost decreases.*

[2] *Cost savings and revenue increases are cumulative from the earliest year of implementation through 2001 and are based on estimates reported by companies participating in study.*

U.S. organizations that are currently deploying Internet business solutions *expect* to realize more than $.5 trillion in cost savings once all Internet businesses solutions have been fully implemented by 2010.

- Once all current solutions have been fully implemented, the Net Impact of these cumulative cost savings is expected to account for .43 percentage points of the *future* increase in the annual U.S. productivity growth rate. To put this in perspective, for every 0.1 percentage point addition to annual productivity growth, the federal budget surplus in 10 years is projected to be more than $50 billion larger.[1]

Figure 5:

Expected Financial Impact of Internet Business Solutions in U.S.[1]

	Projected Estimate (through 2010)
Revenue Increases[2]	$1,551.9 Billion
Cost Savings[2]	$528.3 Billion

[1] *Estimated financial impact on U.S. economy when all current and planned IBS are 100% complete only from those organizations that have implemented or plan to implement IBS.*
[2] *Projected cost savings and revenue increases are cumulative from the earliest year of implementation through 2010 and are based on estimates reported by companies participating in study.*

- If sustained for 10 years, these cumulative cost savings and their .43 percentage point contribution to the increase in the productivity growth rate will have a very strong positive impact on the standard of living in the United States. These improvements in productivity translate into *permanent* wage increases.

Organizations deploying Internet business solutions in the United Kingdom, Germany and France *expect* to realize more than €88 billion in cost savings once all Internet business solutions have been fully implemented by 2010.

- Once all current solutions have been fully implemented, the Net Impact of these cumulative cost savings in the United Kingdom, France and Germany is expected to be approximately €88 billion and the cumulative revenue increases is expected to be an estimated €230 billion. The cumulative savings that the organizations from Europe's three largest economies expect to realize could account for .11 percentage points of the *future* increase in the productivity growth rate for these three economies combined.

[1] Congressional Budget Office, *The Budget and Economic Outlook: An Update*, August 2001.

Figure 6:

Expected Financial Impact of Internet Business Solutions on Top Three European Economies[1]

	Projected Estimate (through 2010)
Revenue Increases[2]	€ 230.1 Billion
Cost Savings[2]	€ 88.2 Billion

[1]*Estimated financial impact on the economies of the U.K., France and Germany when all current and planned IBS are 100% complete among those organizations that have implemented or plan to implement IBS and reported that they expect cost savings or revenue increases.*

[2]*Projected cost savings and revenue increases are cumulative from the earliest year of implementation through 2010 and are based on estimates reported by companies participating in study.*

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- If U.S. organizations achieve the projected $528.3 billion ($155.2 billion current + $373.1 billion estimated) in cumulative cost savings – a 2-3 percent savings over 10 years. – this would result in a *permanent* increase in per capita income of $1,000 - 1,500 at the end of 10 years. (The study assumes that median income will rise from approximately $36,000 in current dollars to $50,000 in 10 years.)

The .43-point impact of firms adopting Internet business solutions on the productivity growth rate could account for almost half of the projected increase in U.S. productivity from 2001 – 2011.

- The Congressional Budget Office estimates that the U.S. productivity growth rate will continue to grow during the next 10 years at a rate of 2.1 percent. This 2.1 percent represents an acceleration of .9 percentage points over the productivity growth rate of 1.2 percent from 1974-1995.[3] The Net Impact Study findings estimate that Internet business solutions could contribute roughly 48 percent of the .9-point increase in the productivity growth rate.

Figure 7:

Estimated Productivity Impact of Internet Business Solutions in U.S. [1]

Time Period	Percentage Impact [2]	Cost Savings in Time Period	Impact on Annual Productivity
1996 to 2000	.88%	$72.8 Billion	+ .17%†
2001to 2010	4.3%	$452.5 Billion	+ .43%†

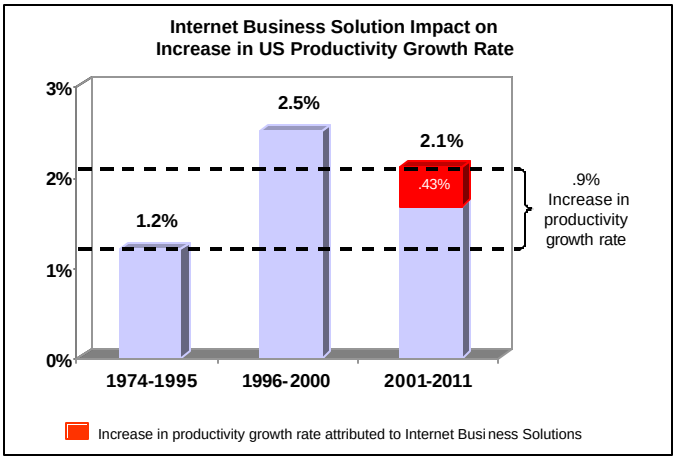
[1] *Estimated impact on U.S. economy only from organizations that have implemented IBS and have reported a revenue increase or a cost decrease.*

[2]*This figure is expressed as total cost savings as a percent of average GDP for this time period.*

† Estimate expressed as a percentage point impact on the annual productivity growth rate, based on savings reported by companies participating in study.

[3] Congressional Budget Office, *The Budget and Economic Outlook: An Update*, August 2001.

Figure 8:



With an .11-point impact on the productivity growth rate, organizations in the United Kingdom, France and Germany adopting Internet business solutions could account for more than one-third of the projected increase in the combined growth rate from 2001 – 2011.

- Based on the last decade of productivity performance, the *future* combined productivity growth rate for the next decade in the United Kingdom, France and Germany is 1.5 percent. This 1.5 percent represents an acceleration of .3 percentage points over the productivity growth rate of 1.2 percent from 1996-2000.[4] The Net Impact study findings estimate that Internet business solutions could contribute roughly 36 percent of the .3-point increase in the productivity growth rate.

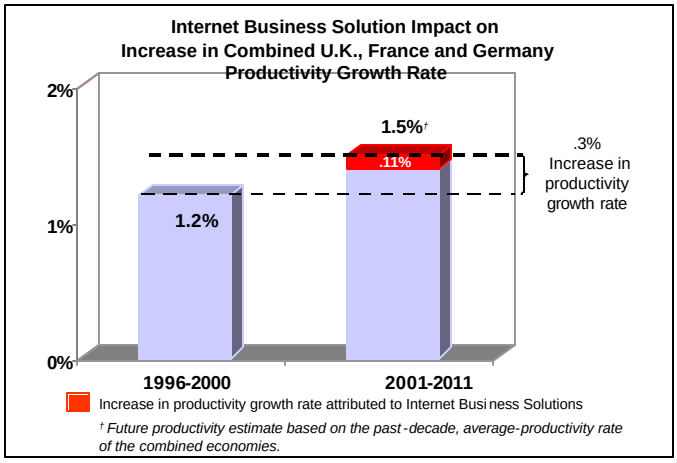
Figure 9:

Expected Productivity Impact of Internet Business Solutions [1] on Top Three European Economies

Time Period	Percentage Impact[2]	Cost Savings in Time Period	Impact on Annual Productivity
1996 to 2000	.09%	€ 5.2 Billion	+ .017%†
2001 to 2010	1.1%	€ 81.9 Billion	+ .11%†

[1] *Estimated impact on combined economies of the UK, France and Germany only from organizations that have implemented IBS and have reported a cost decrease.*
[2] *This figure is expressed as total cost savings as a percent of average GDP for this time period.*
† Estimate expressed as a percentage point impact on the annual productivity growth rate and are based on estimates reported by companies participating in study.

Figure 10:



[4] Organization for Economic Co-Operation and Development <http://www.oecd.org>

Productivity and Net Impact Overview

The Internet stands as one of the most important innovations of our time and its impact is just beginning to be measured and understood. That the Internet has had a substantial impact on the way business is conducted is incontrovertible. The quantifiable impact however has been, to date, difficult to fully measure. The extent to which information technologies have contributed to substantial cost savings and profitability increases in businesses have not been measured beyond the macro-data level.

The success of the Internet is typically measured by the volume of sales in so-called "business to business" (B2B) or "business-to-consumer" (B2C) transactions. By this standard, the current impact of the Internet in the United States is measured in the hundreds of billions of dollars, with the possibility of a trillion dollars or more within several years.

A far more useful, and ultimately the most important, measure of the Internet's overall impact, however, is the extent to which it enhances the *standard of living* of all those who use it. This is the way that the impact of other important innovations – such as the automobile and electricity – is judged, and the Internet is and should be no different.

Innovations like the Internet enhance the standard of living, in large part, by improving the *growth rate of productivity*, or the additional output that is generated for any given level of input (most commonly, labor). To the extent that outputs and inputs can be measured, so can the productivity of the Internet.

The Internet also generates benefits that are not easily measured, or even if they can be, are not easily expressed in monetary terms. These benefits are things like the added convenience, the ability to customize products and services, and the social benefits of new forms of interaction, communities, and expression that the Internet has made possible.

Since the Internet is such a recent phenomenon, it is not surprising that relatively few studies so far have examined its likely economic impact. By and large, these studies have relied on anecdotes and limited survey evidence, and quickly become outdated. Nonetheless, the consensus seems to be that the Internet, at a minimum, could generate added productivity growth of at least .5 percent annually.

Why is the Economic Impact of the Internet Important?

So much has been written about the Internet that it has become increasingly difficult to separate reality from hype. Several things are clear, however. The Internet stands as one of the most important innovations of our time; its impacts are just beginning to be felt; and the benefits it will bring to the economies and societies of the world eventually will be substantial.

It may be a cliché that information is power, but that makes it no less true. Similarly, the ability to communicate information at faster speeds and in ways that allow it to be used more efficiently is critical to improving the capability of the economy to generate goods and services. This has happened in the past with such transformative innovations as the telegraph, telephone

and television. It is happening and will continue to happen with the Internet, especially as "bandwidth" widens and communications speed up as the build-out of broadband networks continues.

How much of an economic transformation is the Internet likely to produce in the global economy? This is the main question this study seeks to answer. It is an important question because of the impact the Internet will have on individuals, businesses, and the entire global economy.

With respect to individuals, more than half of Americans currently have access to the Internet at their homes with this share certainly being larger when access at work and at public facilities are counted. Similar Internet penetration trends exist in the United Kingdom at 45 percent and Germany at 43 percent, but France lags behind at only 25 percent penetration.[5]

Access is an important issue because the Internet benefits individuals by affording them access to a wider array of goods and services, customized to suit their needs, at potentially lower cost and certainly greater convenience than is available in the physical world. The benefits of lower prices show up because the Internet lowers the costs of generating and delivering products and services, a subject we will address. These consumer benefits are quantifiable, visible and very real.

The benefits of added convenience and customization are inherently much more difficult to quantify, and are not likely to show up in official measures of national Gross Domestic Product (GDP), but they are no less real. Indeed, many consumers may view these non-quantifiable benefits of the Internet as important, if not more important, than the benefits that statisticians and economists can quantify in monetary terms. Nonetheless, this study concentrates on benefits that can be measured, and thus the quantitative estimates shown here understate the overall economic benefits of the Internet.

With respect to businesses, the Internet is important because it represents the single most important technology of this generation for firms to cut costs, improve service and expand markets. Below, we concentrate on the cost cutting, and thus productivity-enhancing benefit of the Internet, but its other features are no less important for firms that make effective use of the technology. Firms that discover ways to use the Internet productively will be on the cutting edge of their markets. For a time, the gains will show up in higher profits. But in a competitive economy, these additional profits get competed away as other firms adopt the technology. Why then should other firms invest in the Internet to make themselves more productive? Because in a competitive economy, they have no other choice: they must adopt the most efficient and effective ways of doing business or else face certain destruction. Intel co-founder Andrew Grove certainly was right when he presciently titled his book: *Only The Paranoid Survive.*

Finally, and most importantly for everyone, the benefits of the Internet also accrue to entire economies. As more firms use the Internet to cut costs, the growth rate of productivity for

[5] NFO Infratest Euro.net study www.nfoeurope.com/i . July 2001. http://www.nfoeurope.com/ib/CountryProductDetail.cfm?lan=en&country=deu&objectid=F7CB39E8-712C-4F42-A5AE70CA4D590981

the whole economy will improve. Faster productivity growth improves living standards for average citizens in several ways:

- through more rapid growth in real wages (which ultimately reflect productivity),
- slower inflation (which also enhances real wages), and
- through larger government surpluses, which leave room for tax cuts and/or added spending on social programs that improve quality of life

Productivity Growth and IT in the United States

The last point underscores the importance of productivity growth for economic policy making. For those who set governmental budget policy, projections of productivity growth are the most critical – albeit the most uncertain – element in long-range budget forecasting. Future growth in revenues, and to a lesser extent in expenditures, depends on the long-run growth of the economy, which is determined by the growth of the labor force (projected at about one percent for the next decade) and productivity (currently projected at 2.1 percent over the next 10 years).[6] For every 0.1 percent addition to annual productivity growth, the federal budget surplus in 10 years is projected to be more than $50 billion larger.[7] Thus, even seemingly small changes to productivity, can have potentially very large impacts on the federal budget, and thus on the ability of our government to finance additional programs and/or to lower taxes paid by the American people.

Productivity growth is no less important for the Federal Reserve Board, which sets monetary policy. Other things being equal, faster productivity growth enables the economy to grow at a more rapid pace without igniting an acceleration of inflation. In other words, the faster productivity rises, the higher the "speed limit" that the Fed can set for the economy – or the pace of growth it will tolerate before feeling it necessary to raise interest rates in order to prevent inflation from increasing.

Until the mid-1990s, it was conventional wisdom among most economists – and most likely even within the Federal Reserve – that the U.S. economy's speed limit was about 2.5 percent annually (one percent growth in the labor force plus 1.5 percent annual growth in productivity). The Fed would permit the economy to grow faster than that as long as unemployment was below its "non-accelerating rate," which at the time was presumed to be in the neighborhood of 5.5 percent. As the decade wore on, however, unemployment continued to fall, while output grew at nearly four percent – and all the while inflation remained stable in the 2-3 percent range.

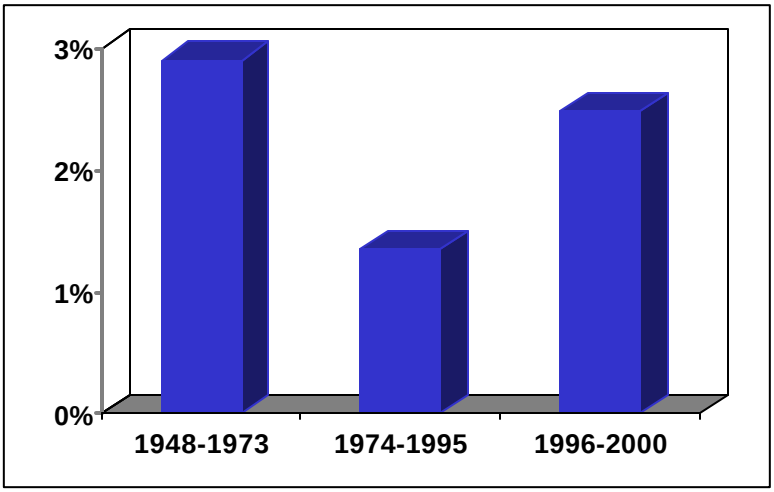
This coincidence of factors convinced the Fed to stay its hand at any attempt to restrain growth, until mid-2000 when unemployment was four percent while output was galloping ahead at roughly a six percent annual rate. The Fed permitted the unemployment rate to fall to four percent – thus generating roughly two million extra jobs annually – only because productivity growth had accelerated well above rates once thought possible.

[6] Congressional Budget Office, *The Budget and Economic Outlook: An Update*, August 2001.
[7] *Ibid*.

Looking ahead, therefore, there is no more important an indicator of how the Federal Reserve will conduct monetary policy in the long run than the continued pace of productivity growth. As strongly implied by the discussion below, that outcome, in turn, will depend heavily on the pace of change in the high-tech sector, and specifically the contribution of Internet business solutions toward future productivity growth.

Since the end of World War II, the United States has had roughly three distinct periods of productivity growth. Between 1948 and 1973, now looked back on as a "golden age," productivity marched upward at close to three percent annually, a rate that doubled average incomes during this period. This extraordinary economic performance, well above prior historical norms, is generally attributed to the legacy of technological advances pioneered before and during World War II, which were unleashed in the domestic economy right after the war.

Figure 11:
Three Distinct Periods of U.S. Productivity Growth



The second period started with the oil price shock of 1973-74 and productivity growth slowed dramatically, increasing at about 1.4 percent, or about half the rate as in the preceding quarter century. Economists have studied this period extensively to understand the reasons for the sharp turnaround and still no consensus has been reached. But various factors have been cited as contributing causes:

- the oil price shock itself
- an influx of relatively untrained baby boomers into the work force
- the growth of various forms of "social regulation"
- and an abrupt halt in innovation in some industries

By the early to mid-1990s, the productivity slowdown was such an accepted "fact" of economic life that few economists or other analysts saw much hope of significantly reversing it.

But then something of a miracle happened. Beginning in 1995, a year in which the U.S. economy seemed already to have bounced back from the 1991-92 recession, productivity growth began to surge again, averaging 2.5 percent until 2000. A cottage industry has since developed

seeking to explain the productivity resurgence, but most explanations have converged, in one fashion or another, on the productivity-enhancing effect of "information technology" or IT.

At first blush, the focus on IT as an explanation seems a bit odd, since the computer revolution has been with us throughout the post-War period. Why, all of a sudden, would IT loom so important in generating productivity gains? After all, skeptics such as MIT economist Robert Solow had previously remarked in the late 1980s that "one can find the effect of computers on productivity everywhere but in the productivity statistics."[8]

The 1995-2000 period has pretty much put an end to such skepticism, at least for that period, due to the weight of evidence that economists have amassed that indicates that IT is the most likely explanation for the productivity resurgence.

One school of thought, perhaps best illustrated in the work of Northwestern University's Robert Gordon, is that productivity improvements in the *IT industry itself* and in the use of IT in the manufacturing sector alone explained most of the productivity miracle.[9] In the IT industry, the major development was a sharp acceleration in "Moore's Law" – the well-known observation by Intel co-founder Gordon Moore that the computer power of semiconductors doubles every 18 months – to the point where the doubling was now occurring every *year*. The net result was that prices of semiconductors fell at annual rate of roughly 30 percent during the 1995-2000 period, reducing the cost of, and enhancing the productivity of, everything that used semiconductors: telecommunications equipment, computers, and many manufacturing processes.

A different school of thought is that the vast improvements in the IT sector were not just confined to IT itself or to the manufacturing sector, which accounts for just about a quarter of the nation's economic output, but also benefited much of the rest of the economy. The evidence for this proposition comes from various studies finding that productivity improvements in the post-1995 period have tended be concentrated in sectors of the economy. This includes the services industries, whose output makes up most of the economy – where IT investment has been especially heavy.[10] One recent study, by McKinsey Global Institute, has been portrayed as downplaying this conclusion, highlighting instead the important role that productivity improvements in the retail sector (Wal-Mart in particular) played in the productivity resurgence of the late 1990s.[11] Yet even this study documents that retail, as well as other sectors, made heavy use of IT during this period.[12]

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[8] Solow, Robert M. "We'd Better Watch Out", *New York Times Book Review*, July 12, 1987.

[9] Gordon, Robert M. "Has the 'New Economy' Rendered the Productivity Slowdown Obsolete?" *Journal of Economic Perspectives*, Vol. 14 (Fall 2000), pp. 49-74.

[10] Baily, Martin N. and Robert Z. Lawrence, "Do We Have a New E-conomy?", *American Economic Review*, 91(2), pp. 308-12.; Kevin J. Stiroh, "Investing in Information Technology: Productivity Payoffs for U.S. Industries", *Current Issues in Economics and Finance*, Federal Reserve Bank of New York, June 2001. See also Dale W. Jorgenson and Kevin J. Stiroh, "Raising the Speed Limit: U.S. Economic Growth in the Information Age," *Brookings Papers on Economic Activity*, 2000 (1), pp. 125-211; and Oliner, Stephen D. and Daniel S. Sichel, "The Resurgence of Growth in the Late 1990s: Is Information Technology the Story?", *Journal of Economic Perspectives*, 14(4), pp. 3-22.

[11] McKinsey Global Institute. "Productivity in the United States 1995-2000" McKinsey & Company Online. Oct. 17, 2001.

[12] See Baker, Gerard and Paul Abrahams, "Forget IT, It Was Wal-Mart Behind That US Miracle," *Financial Times*, October 17, 2001, p. 9.

Whatever the precise mechanism, it is now clear in retrospect that IT played a significant role in the U.S. productivity resurgence since the mid-1990s. The critical question going forward, which has provoked a new debate, is how much, if any, of this resurgence is likely to last beyond the current economic downturn, and how much is likely to remain relatively permanent for the foreseeable future? Or, in the technical language of economists, how much of the productivity miracle of the late 1990s was cyclical and how much structural?

At this writing, the jury is still out and definitive answers will not be known until sometime after the recovery from the downturn. However, there is reason to believe that much of the improvement is expected to be permanent, or at least to last through the next decade. As noted earlier, the latest forecast by the Congressional Budget Office, the official budget scorekeeper for Congress, projects productivity growth through 2010 at 2.3 percent. This figure is a bit below the 2.5 percent average of the 1996-2000 period, but nonetheless significantly higher than the disappointing productivity growth rate of the pre-1995 era. If this projection proves to be accurate, then continued IT advances and their use by the rest of the economy will prove to be a largely permanent feature of the U.S. economic landscape for the foreseeable future.

The Events of September 11, 2001

What impact will the terrorist attack on the United States in September 2001 and its aftermath have on this relatively sanguine long-term productivity outlook? Here, too, it is almost certainly too early to advance a certain answer, but a few thoughts nonetheless seem noteworthy.

On the negative side, the additional expenditures for security to be spent by both the private and public sectors will add to input costs without corresponding benefits in measured output, thus depressing productivity growth somewhat. In addition, the current IT investment slump will reduce the growth of capital per worker, while the continued economic uncertainty is likely to dampen risk-taking throughout the economy for some time, factors which will both also dampen productivity growth. A further dampening factor may be the significant reduction in long-run budget surpluses arising from the increased government spending for security and to increase military expenditures (totally apart from any temporary economic stimulus package that Congress may enact). Other things equal, lower budget surpluses are likely to lead to somewhat higher long-term interest rates, and thus a higher cost of capital, which will discourage investment over the longer run to some degree.

On the other side of the ledger, businesses may find surprising savings from any permanent reduction in business travel, finding that telephone, videoconferences and e-mail may provide a more efficient substitute for communication. In addition, although the bursting of the "dot.com bubble" has been extremely painful for the firms and workers involved, the subsequent diffusion of many former "dot.commers" into the workforce is spreading useful, Internet-related skills to all kinds of firms that previously had difficulty attracting or retaining technological-savvy workers. This movement of labor between sectors should be productivity enhancing in the longer run.

The impact of the September terrorism attacks on the future of globalization, and hence indirectly on future U.S. productivity growth, appears to be mixed at this point. Prior to the attack, it was plausible that increasing globalization had helped to accelerate productivity growth by reducing frictions in trade and capital flows across countries. Many firms found it cheaper to source from a variety of countries in a world that looked increasingly friction-free.

Since September, however, firms have discovered that operating plants and facilities in different countries have become – at least temporarily – more costly than anticipated. It now takes more time to ship and inspect goods that cross borders. Flows of immigrants, who have contributed in important ways to U.S. economic growth, have slowed. If these frictions continue in the future, the pace of globalization may also slow, thus detracting from productivity growth in the United States.

Working in the other direction, however, is the fact that the September attacks have spurred greater interest at home and abroad in advancing another round of trade liberalization. To the extent this accelerates the removal of formal barriers to trade and investment, the developments on the political front that encourage globalization may offset any near- to intermediate-term frictions in the private sector that have been introduced since the terrorist attacks.

Whatever the net effects of the September attack may be on medium-term productivity growth, they should not materially affect the long-term productivity-increasing effect of the continued use and exploitation of Internet technology.

Productivity and the Internet

Despite much of the hype about the potential impact of the Internet, it cannot have had a large impact to date on productivity growth – and, in particular, on the productivity "miracle" of the late 1990s – because commercial use of the Internet is still relatively new. Moreover, it is difficult to project the Internet's future impact on productivity for several reasons. For one thing, productivity growth itself is something of a black box and difficult to forecast with a high degree of certainty. Moreover, because the Internet is so new, there are not sufficient data yet for economists to use their standard statistical tools for estimating the relationship of the new technology to economic growth. As a result, any projections of the Internet's future impact must rely on informed projections, recognizing that the many ways in which the Internet is likely to generate gains are also not fully realized or yet understood.

Nonetheless, in principle, there are several reasons for believing that the Internet *will* in fact lead to productivity enhancements. At bottom, the Internet represents a new and highly powerful way to communicate information more rapidly, cheaply, and with greater flexibility. This should allow firms to reduce their *transaction costs* of locating and purchasing required supplies (including labor); to enhance the efficiency of *producing and delivering goods and services* (through lower inventories, enhanced cooperation among designers of new products and services in different locations, whether inside or outside the firm); and to reduce the cost and improve the effectiveness of *dealing with customers*. In addition, to the extent that the Internet promotes transparency, it should *enhance competition* in many (but not necessarily all) markets,

and thus intensify pressures on firms to adopt the cost-saving improvements facilitated by the Internet.

What this short list of potential improvements should indicate is that the Internet represents a powerful tool for *improving the efficiency of the firm.* In this sense, the conventional distinctions between B2C (retail use of the Internet) and B2B (commercial use of the Internet) are somewhat beside the point. While volumes of both B2C and B2B are important in their own right, the gains that firms – and thus the economy as a whole – can reap from the Internet depend overwhelmingly on the extent to which firms use the Internet to *reorganize the way they do business*. In simplistic terms, the Internet allows bits to replace paper, while permitting firms to generate more goods and services with fewer people than before.

This does not mean that the Internet will lead to unemployment. As with any technology that allows firms to use its labor force more productively, the Internet facilitates the reshuffling of people throughout the economy into jobs with the highest value and thus the highest wages. It is the job of macroeconomic policy-makers to sustain aggregate demand for the full range of goods and services so that firms and government will continue to want workers. Barring unforeseen shocks to the global economy (like the terrorist attack on the United States) and excesses that crop up from time to time (that lead to inflation and hence to more restrictive monetary policy or to excessive investment, as has occurred more recently), our policy makers have a relatively good record of sustaining strong aggregate demand and thus high employment. Indeed, throughout the high-tech driven productivity miracle of the late 1990s, the U.S. economy continued to generate roughly two million net new jobs a year, despite the reshuffling of employees among firms that are associated with rapid productivity growth and a highly dynamic economy like that of the United States.

Because the Internet has been such a recent phenomenon, there have been relatively few studies of its likely potential impact on productivity. By and large, these studies have relied on limited surveys and interviews of firms as well as the judgment of various researchers expert in the field. So far, this is what they have found:

- One of the earliest studies, by researchers at Goldman Sachs, suggested that the Internet would enhance U.S. productivity growth (over the rate at which it would otherwise grow) by approximately 0.25 percent annually over a ten-year period.[13] However, this study counted as a productivity improvement both a reduction in costs and reduced profit margins on sales (driven by more intense competition induced by the Internet). Slimmer profit margins, however, represent an income transfer – and ultimately a savings to consumers – but not a reduction in resources or costs (although the squeeze on profits should induce firms to adopt more quickly any Internet-related technologies that can lead to cost savings).

- A more recent study – a collective effort by professors from leading universities led by Robert Litan and Alice Rivlin of The Brookings Institution -- estimated that by 2005 annual cost savings generated by the Internet could generate annual productivity

[13] Brookes, Martin and Zaki Wahaj, "The Shocking Economic Impact of B2B", Global Economic Paper 37, Goldman Sachs, New York, February 3, 2000.

improvements of somewhere between 0.25 and 0.5 percent annually, depending primarily on the pace at which organizations experimenting with Internet technologies deploy them widely enough to change their underlying ways of doing business.[14] The study concentrated on eight sectors of the U.S. economy that cumulatively account for about 70 percent of U.S. output. If extended over a 10-year horizon, the cost savings estimated in the Brookings' study would generate economy-wide cost savings of roughly 2.5 to 5 percent.

- An even more optimistic estimate of the potential cost savings has recently been published by a research team from AMR by the Council of Logistics Management.[15] This study breaks down potential savings into several categories, concluding that potential cost savings may eventually reach six percent of overall private sector revenue.

We cannot emphasize too strongly that the benefits to the global economy the Internet will generate do not depend on the continued existence of the many "dot.coms," many of which by now are no longer in business. Like electricity, the Internet is a new cost-saving technology whose benefits will be derived overwhelmingly from its *use* by other firms throughout the global economy.

Annual productivity increases measured in the tenths of percentage points also may seem small, but when accumulated over time, the gains to output and to average standards of living can be quite substantial. Thus, in the United States for example, if the Internet were to increase economy-wide productivity by just 0.3 percent annually for 10 years, by the end of the decade, the net increase to average incomes would be on the order of three percent, or about $1,500 per person.

[14] Litan, Robert and Alice Rivlin, ed. Brookings Internet Task Force, *The Economic Payoff from the Internet Revolution* (Brookings Institution Press, 2001).
[15] Bauer, Michael J. et al, *E-Business: The Strategic Impact on Supply Chain and Logistics* (Council of Logistics Management, 2001).

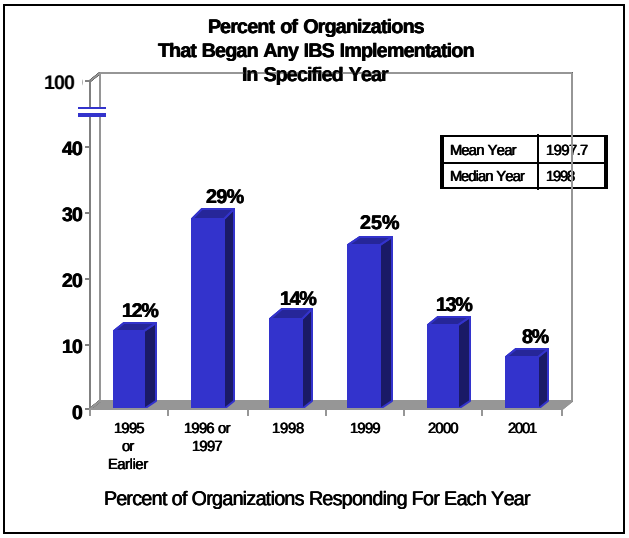
The Net Impact Study – Detailed U.S. Findings

Most U.S. organizations began implementing Internet business solutions in 1998, but some organizations began adopting as early as 1991.

Although Internet business solutions have been available for some time, not all organizations have embraced Internet technologies as a means for managing and growing their business. Approximately 61 percent of the U.S. organizations contacted for the Net Impact Study were currently implementing Internet business solutions.

Not all of the organizations that indicated they are using Internet solutions in their business started adopting the technology at the same time. Based on the responses from organizations that have adopted Internet business solutions, there appear to be two "waves" of adoption with respect to the year in which these organizations began to implement Internet solutions. Some organizations caught the early wave in 1996/1997 and another wave of adopters jumped in around 1999.

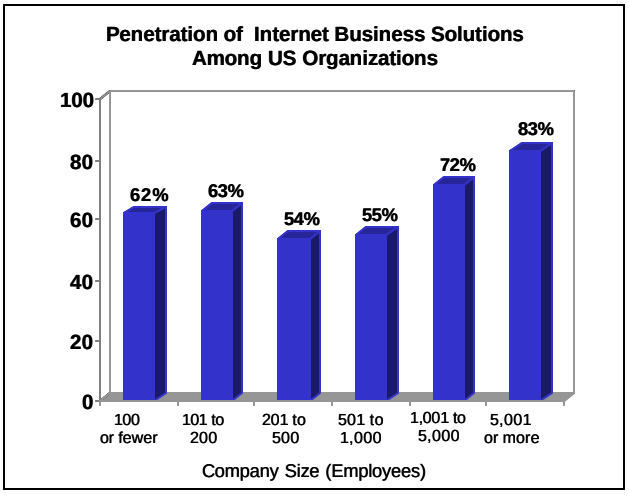
Figure 12:



The adoption of Internet business solutions is occurring in more than just large enterprises, dotcoms and technology companies.

Organizations of all sizes and across U.S. industries have adopted Internet business solutions as a tool for lowering operating costs and increasing revenues. Enterprises (5000+ employees) have a larger adoption rate, with 83 percent of organizations of this size having already implemented some Internet business solutions. With their greater resources and possibility of cost savings from optimizing their operations, larger enterprises were earlier adopters of Internet technologies.

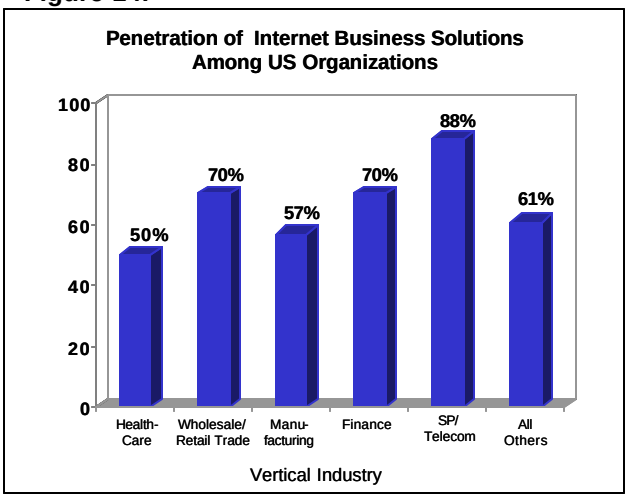
Figure 13:



Adoption of Internet business solutions is not limited to a few industries. While some verticals began adopting the technology earlier than others, Internet business solutions have now become widespread across U.S. industries. Service Providers and Telecommunications companies have the highest adoption rate driven by their need to not only provide Internet technology to their clients but also their need to leverage the Internet for their own business processes. With a 50 percent

penetration, Healthcare has the lowest penetration of Internet business solutions, but may have the greatest upside with regards to cost savings according to a study by The Brookings Institution.[16]

Figure 14:



U.S. organizations deploying Internet business solutions have already realized cost savings from their efforts.

U.S. organizations are already seeing financial returns from their Internet business solutions, despite the fact that most have not completed their implementation efforts. Organizations estimate that their adoption of Internet business solutions has yielded a current, cumulative cost savings of $155 billion with the majority of savings occurring since 1998. In addition to these cost savings, these organizations indicated that their Internet solutions have also helped increase revenues cumulatively by approximately $444 billion over a three-year period. The volume and short-term timeframe of these financial gains suggest why organizations of all sizes and industries are now deploying Internet business solutions.

The first wave of Internet business solution deployment is nearing completion in 2003.

The majority of organizations currently deploying Internet business solutions throughout their operations estimate that they will complete these implementations in approximately two to three years, or in 2004 or 2005 with the remainder of organizations completing their efforts by 2010.

Organizations expect accelerated financial returns their Internet business solutions after the solutions become fully operational in 2003-4. When all organizations complete their implementation efforts, they estimate their cumulative savings attributable to Internet business solutions to be approximately $528.3 billion. The estimated impact on cumulative revenue gains is even greater with organizations expecting $1.55 trillion in incremental revenue to be generated from their Internet technology efforts.

Revenue gains are not necessarily net gains to the economy, as some increased revenues are at the expense of other organizations that have not adopted Internet business solutions. For this report, no attempt has been made to identify the extent to which these revenue gains are impacting the productivity growth rate. Further analysis will look at this relationship and determine to what extent these revenue gains are contributing to the productivity growth rate.

[16] Litan, Robert and Alice Rivlin, ed. "The Economic Payoff from the Internet Revolution." 2001. Brookings Task Force on the Internet. Washington, D.C.: Internet Policy Institute, Brookings Institute Press, 2001.

'Waves' or Continuous Stream?

Organizations may have begun deploying Internet solutions in a series of waves, but from an insider's perspective the deployment of Internet technology has been a constant and continuing stream of work. The most common, initial response to the question of when a company's Internet business solution initiatives would be complete was "never."

Technology managers told us they are seeing their Internet initiatives as an ongoing process that will never be completely finished.

> "Are you kidding? We'll never be done. Never. There will always be new initiatives. We'll finish projects, but we'll never finish the process." [*Telecommunications*]
>
> "The Internet changes all the time. The market changes all the time. Business changes all the time. We'll never be finished because you've got to keep moving to stay ahead of the competition. The Internet is not a means for you to sit on your laurels." [*Financial Services*]
>
> "It's hard to say when everything will be complete. We do everything incrementally, so I'm not sure we can ever be completely done." [*Manufacturing*]

Despite the constant stream of new technology, many companies are coordinating their technology strategy at the headquarters level to prioritize efforts and give IT staffs an opportunity to catch their breath and measure their progress.

Specific Internet business solutions are being adopted at different rates.

Adoption of Internet business solutions, while driven by specific firm-level needs, seems to have followed a common progression across most organizations. Across all industries, adoption rates for E-Marketing, Customer Service & Support, and E-Commerce solutions were higher, suggesting that most organizations tackled customer-facing solutions first before focusing on back-office solutions like Human Resources, Finance & Accounting and Supply Chain Management.

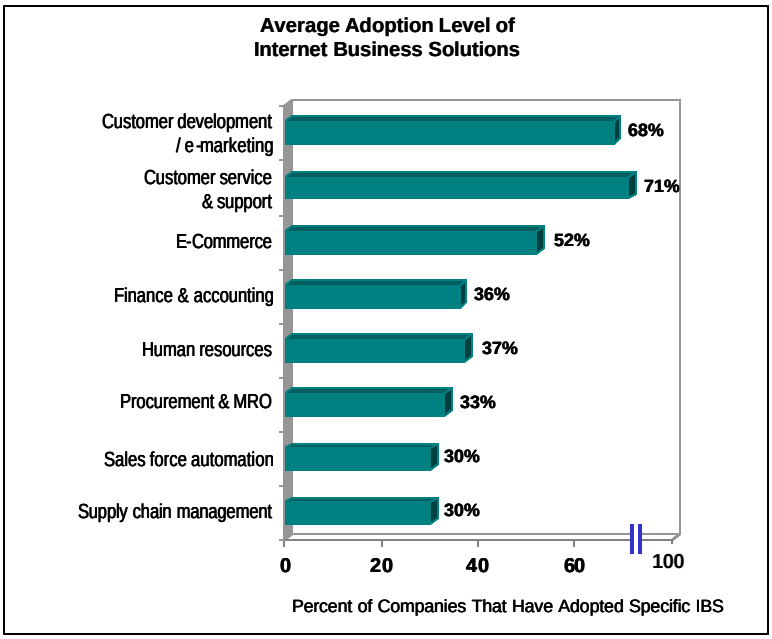
- Customer Service & Support is the most commonly adopted Internet business solution and reflects U.S. organizations' attempt to get closer to their customers. E-Marketing is also widely adopted showing that most U.S. organizations have put up Web sites to allow customers to access important product and service information as well as provide a means for accessing Customer Service & Support.

- The lower adoption of back-office solutions such as Finance and Accounting, Human Resources and Supply Chain Management reflects the newness of these solutions to the market as well as their relative importance with respect to improving relationships with customers.

Smaller organizations are not limiting themselves to customer-facing solutions.

Similar to the distribution of Internet business solutions across industries, businesses of all sizes are adopting the Internet into their operations. Many have already finished implementing E-Marketing and E-Commerce applications and are moving on to more back-office applications.

Figure 15:



As the earlier adopters of Internet solutions, larger enterprise are much more likely to have adopted back-office solutions such as supply chain management. This fact should not lead one to believe that application adoption is a linear process and that smaller organizations will follow the same implementation timeline. In fact, many smaller organizations have already begun adopting back-office solutions as they are required to by larger enterprise customers/suppliers, and as solutions are developed for the specific needs and budgets of smaller organizations.

Figure 16: Internet Business Solution Deployment by Company Size

	100 or fewer	101-200	201-500	501-1,000	1,001-5,000	5,001 +
E-Marketing	74%	59%	58%	54%	76%	68%
Customer Service and Support	73%	65%	72%	68%	76%	56%
E-Commerce	50%	56%	55%	34%	55%	69%
Finance and accounting	30%	46%	45%	46%	46%	33%
Human Resources	32%	48%	42%	35%	41%	53%
Procurement /MRO	33%	31%	32%	28%	23%	58%
Sales Force Automation	28%	34%	34%	32%	19%	43%
Supply Chain Management	26%	40%	26%	27%	22%	54%

Figure 17: Adoption of IBS by Vertical Industry - U.S.

	Healthcare	Wholesale/ Retail Trade	MFG.	Financial Services	SP/ Telecom	All Other Industries
E-Marketing	60%	59%	73%	71%	74%	71%
Customer Service and Support	60%	73%	64%	78%	86%	73%
E-Commerce	37%	62%	50%	50%	69%	50%
Finance and accounting	57%	39%	23%	61%	42%	35%
Human Resources	63%	23%	24%	27%	37%	43%
Procurement /MRO	34%	36%	32%	23%	44%	32%
Sales Force Automation	13%	46%	27%	22%	50%	28%
Supply Chain Management	31%	31%	31%	15%	27%	29%

Organizations are expanding direct access to corporate networks.

Since many large organizations have implemented Internet business solutions contained within the enterprise, like Customer Service & Support, it seems logical that the next phase would focus on using this infrastructure to help tie together external systems with customers, suppliers and partners.

Figure 18:
Groups With Direct Network Connections Using Internet Technology
Companies Using Internet Business Solutions

	100 or fewer	101-200	201-500	501-1,000	1,001-5,000	5,001 +
Customers	26%	32%	38%	32%	47%	68%
Suppliers	20%	26%	20%	18%	33%	41%
Partners	28%	41%	35%	18%	42%	72%
No group has direct access	46%	32%	36%	45%	38%	15%

The largest enterprises have already made significant strides in establishing direct connections for outside groups. The degree of direct connections is probably due to larger enterprises having:

- more sophisticated network infrastructures capable of handling the additional requirements
- the greater need for business efficiencies and cost reductions resulting from direct connections

Incremental Projects -- From Small Acorns do Large Oaks Grow

Not surprisingly, IT managers from a variety of industries and company sizes commented on the incremental approach they are taking to Internet business solutions. As IT initiatives become more complex and are held to more rigorous business returns, managers are turning to pilot projects and incremental implementations to manage the organizational risks.

While not a new trend, many managers indicated a new ruthlessness in canceling projects that were not meeting expectations -- even if they were showing *some* value to the organization, but not fully living up to expectations.

> "We do a lot of 'acorn projects' – investments in companies or projects that we may want to take mainstream at a later date. We decide which projects go forward based on customer demand: if they use it, or it increases revenue or profitability it will probably go forward. Otherwise, it's done." [*Financial Services*]

> "We're doing everything incrementally, that's just our culture. There are elements of various Internet solutions that are up and working throughout [the company], but it'd be hard to point out… which will go into full production. We have to see which ones work, and which ones don't." [*Manufacturing*]

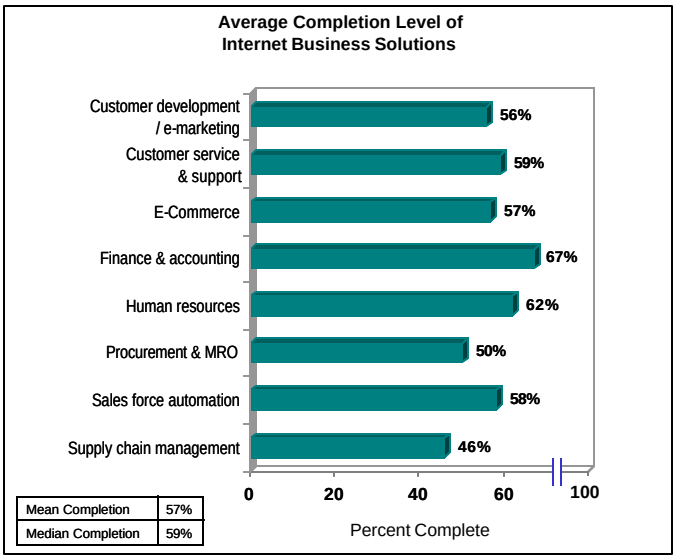
What is not clear is how much of this incrementalism is due to breaking large, monolithic initiatives into manageable pieces versus increased experimentation with a wider range of Internet applications before a decision is made to deploy a technology across the company.

Internet business solution implementations are at varying stages of completion.

On average, organizations say they are 57 percent complete with the implementation of all of their Internet business solutions. Not surprisingly, this number is significantly higher among organizations that began adopting Internet technologies earlier than others.

Despite the tendency to focus on customer-facing applications first, there is not a significant difference in completion rate for each of the applications measured.

Figure 19:

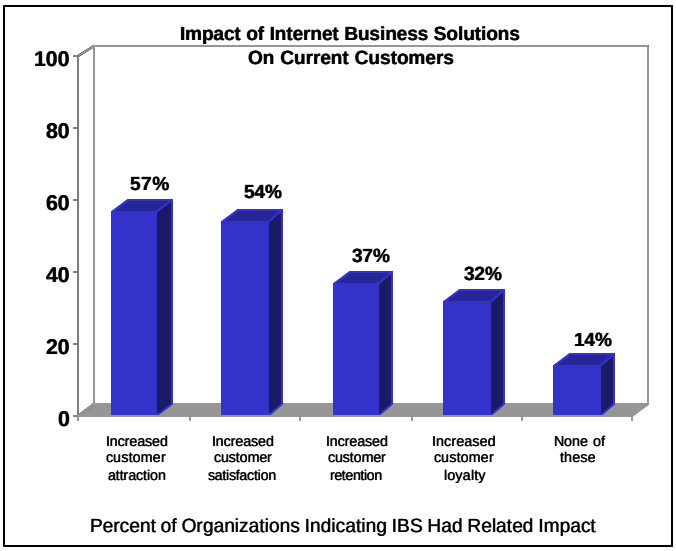


Organizations indicated they are taking more time to consider their technology options and test applications before moving to a full-scale deployment. This increasingly cautious behavior, in addition to unforeseen implementation difficulties, may help explain why more Internet business solutions are not complete despite being an area of intense focus for several years.

Organizations are experiencing increased customer satisfaction and attraction from their Internet business solutions.

With the early focus on customer-facing solutions it's not surprising that organizations point to increased customer satisfaction and customer attraction as the most frequent impacts Internet business solutions are having on their business.

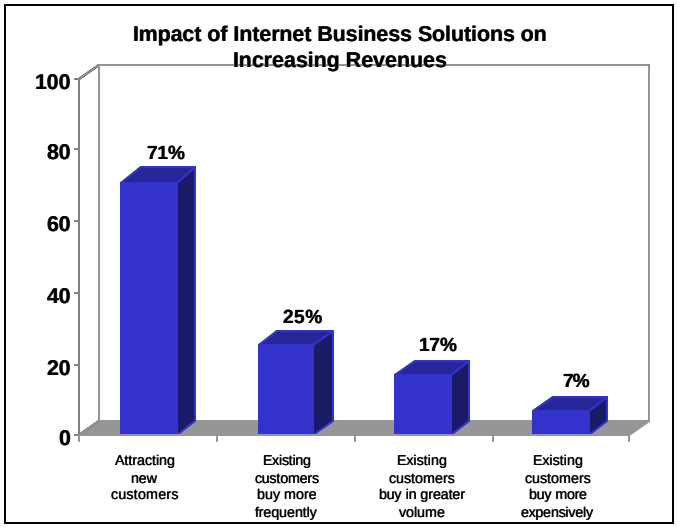
Figure 20:



Customer retention and increased loyalty may be seen as equally important outcomes, but most organizations are seeing more rapid growth and financial returns from new customers.

With this growth of new customers, organizations see customer attraction as the number one contributor to their revenue attributable to Internet business solutions. However, not all of these new customers may be truly "new" to the company. Some of the customers attracted through Internet solutions might be existing customers that have shifted their existing purchases to a different channel. These customers appear new to the enterprise because they may not have been directly visible to the company in their earlier behavior.

Figure 21:



In addition to attracting new customers, and identifying existing customers, Internet business solutions are allowing some organizations to develop closer relationships that are leading them to greater levels of retention and loyalty.

Customer Attraction: a Zero-Sum Game for the Economy?

We can assume that there are only a certain number of customers interested in any given good or service at a particular time. When this is a mature market where most customers have access to the product and there are few customers entering the market, most "new" customers a company attracts are from its competitors. These customers aren't really "new" because they haven't added more demand to the market, they've only shifted where they make their purchases.

In a market without a growing pool of customers, customer attraction becomes a zero-sum game where the overall market revenue or value does not grow, but simply shifts from one company to another. In this type of environment, it can be more expensive for a company to compete for market share than to focus on its existing customers and incrementally grow by more completely meeting the customer's needs for a good or service.

Industry dynamics are determining whether organizations focus on customer attraction vs. retention.

Healthcare organizations reported having the most success with attracting new customers, but have had little success in increasing revenue within their existing customer base. This is not surprising considering the nature of the Healthcare industry. Sectors that lend themselves to recurring relations reported having the most success with building revenue within existing customers, especially Wholesale/Retail and Financial Services. In a moderate growth market, like the United States, earning incremental revenue from existing customers, instead of trying to attract completely new customers becomes an increasingly important growth opportunity.

Figure 22: Impact on Customers With Internet Business Solutions

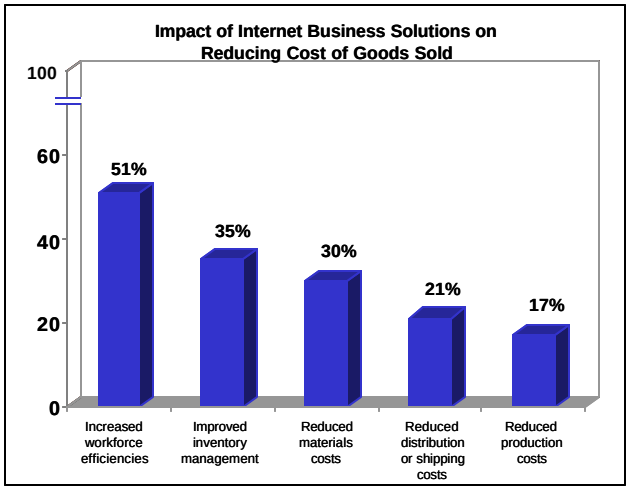
	Healthcare	Wholesale/ Retail Trade	MFG.	Financial Services	SP/ Telecom	All Other Industries
Existing customers buy						
… more frequently	4%	32%	22%	31%	18%	27%
… in greater volume	1%	15%	19%	29%	17%	19%
… more expensive goods/services	2%	17%	9%	13%	19%	4%
Attract new customers	77%	65%	69%	63%	40%	75%

Organizations see reduced Cost of Goods Sold through Internet business solutions – expect to see greater savings in the future.

Increased workforce efficiency is the most frequently mentioned way in which Internet business solutions have contributed to reducing Cost of Goods Sold (COGS). Other impacts on reducing costs include improved inventory management and reduced materials costs.

The fact that organizations have already seen $101.9 billion in COGS reduction from Internet business solutions is impressive given the lower completion levels for COGS-focused Internet business solutions. For example, organizations deploying Procurement & MRO solutions are on average 50 percent complete with their implementation, and Supply Chain Management initiatives are 46 percent complete. Overall COGS reductions should accelerate as organizations finish implementing their production and distribution-focused technology initiatives.

Figure 23:



The potential for COGS reduction is even greater when you consider the number of organizations that have not started any production-oriented Internet business solutions. Of all organizations, Internet business solutions such as Procurement & MRO, Manufacturing and Supply Chain Management have been deployed by less than one-third of all U.S. organizations.

Figure 24:

Percent of All U.S. Companies Deploying IBS

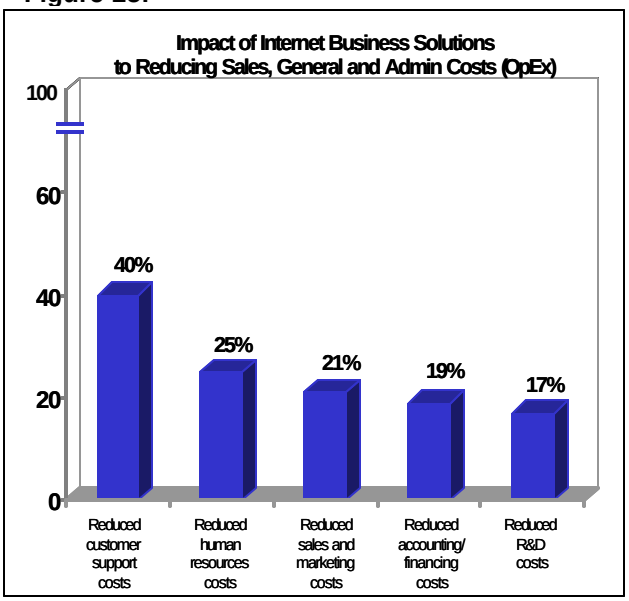
Function	Percent
Research & Development	26%
Procurement & MRO	20%
Supply Chain Management	18%
Manufacturing	8%

Internet business solutions are reducing Sales, General and Administrative (SG&A) expenses primarily through reduced customer support costs.

In addition to COGS reductions, Internet business solutions are also contributing to the reduction in Sales, General and Administrative (or operating expense) costs. U.S. organizations estimate that they have already realized $53.3 billion in SG&A savings from their Internet business solutions and expect to save almost triple that, $154.2 billion, by 2005.

The most frequently mentioned impact on overhead costs is the reduction in customer support costs, followed by reduced HR, and sales and marketing costs.

Figure 25:



Organizational mindset toward Internet business solutions has shifted.

Throughout the Net Impact Study, IT managers at larger enterprises identified that a significant mindset shift has taken place in their organizations over the last 12-18 months. As the economy slowed, many IT managers saw their e-business initiatives being evaluated more closely on their ability to meet specific business objectives. Much of the sense of leniency or urgency that had been granted to technology investments in the past evaporated as IT managers found themselves justifying their efforts on an even basis with other, non-technology business initiatives.

While most managers did not see this shift as either positive or negative, they do see it having a direct impact on the environment they operate in. Examples of this impact included:

- having to compete on identical investment criterion as any other business initiatives
- no longer enjoying a preferred status for senior management time or other decision-making resources
- requirements to quantify financial returns in the near term
- requirements to identify very specific business objectives instead of relying on overly-general or immeasurable objectives

The presence of this shift was obvious from the number of respondents who corrected us when we asked about how technology was driving their business plans.

> "We've made a real transition in the past year from having Internet initiatives to business initiatives. E-business is no longer a technology story, it's a business story that just happens to use technology." *[Financial Services]*

"We no longer tend to have technology-driven plans. As business needs and opportunities arise, we'll [IT staff and business decision makers] collaborate to meet specific objectives." [*Manufacturing*]

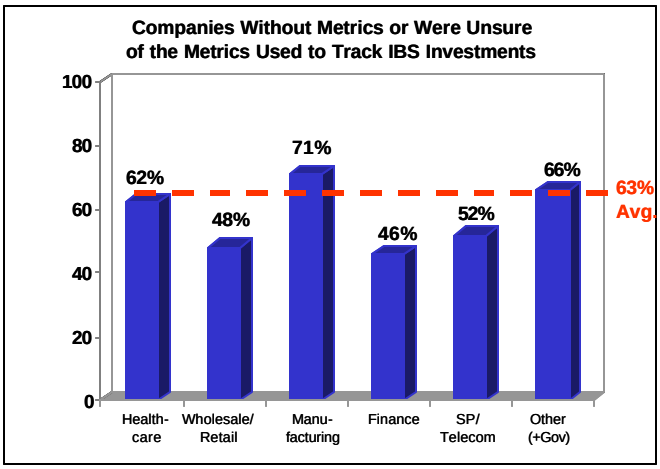
"Everything we [IT] do is in the context of business goals. That is how we prioritize our initiatives – by specific business objectives. There are 50 plus goals we're approaching at any given time through technology." [*Manufacturing*]

"You have to understand that we're not technology-focused, but that technology is becoming imbued in each part of our business. We look for a business problem first and a technology solution second. That's what's so powerful about technology, is that it is broadly applied." [*Manufacturing*]

Metrics for tracking returns exist, but are not pervasive or standardized.

With the shift to holding Internet business solutions accountable to similar criterion as other business investments, one would think measurement would be top-of-mind for technology initiatives. While managers agreed that metrics are important, and that they are under increasing pressure to deliver on them, there was little commonality among the metrics organizations used for the technology efforts.

Figure 26:



The more commonly cited metrics included:

1. **Financial metrics** – including return on investment (ROI), net present value (NPV), relative cost savings or revenue generation
2. **Operating metrics** – inventory turn, workforce efficiency, revenue per customer, customer acquisition cost
3. **Satisfaction metrics** – customer satisfaction, customer loyalty, employee satisfaction

In addition to the variety of metrics, each company described a slightly different calculation for measurements such as ROI and total cost savings suggesting that no generally accepted measurement method has developed for Internet business solutions.

Figure 27:
Metrics Used to Track IBS Returns
All Respondents

Metric	Percent
Customer/constituent satisfaction	9%
Other*	8%
Revenue per customer	6%
Accounting/financial tools	4%
Employee satisfaction	3%
Customer acquisition cost	3%

**Identified a metric specific to a particular company or industry*

> "In our industry, there's a lot of metrics floating around since IT is 'our factory.' Because of its importance we tend to track everything back to the financial statement." [*Telecommunications*]

> "Metrics are set by the business units so they can measure their progress against corporate goals. Of course, all of the metrics were set *after* the projects were approved and we began implementing everything." [*Wholesale/Retail*]

> "We measure things like customer value, NPV [net present value] of customers, ROI… but shareholder value is the driving force for the whole company. With banking and all the different ways to shift assets around, it can be pretty easy to fool other metrics than shareholder value." [*Financial Services*]

Despite the recent emphasis on measurement, the lack of standardized metrics for Internet business solutions within a company is not necessarily a limiting factor to the deployment of the technology. Some organizations, especially some focusing on incremental projects, indicated that they spend considerable time developing unique standards of success for each project. Several managers in organizations that tailored metrics to each project indicated this was a conscious decision by senior management to help ensure that the more intangible or softer benefits unique to a specific effort, such as the user- or brand-experience, were not ignored in the decision-making process.

> "Each [technology] opportunity is held up against the specific business objectives we're trying to achieve. We're not just calculating a full ROI and holding every project accountable to that. There are many components of serving customers and not all of them are focused on costs. We are making sure that in aggregate we are the best provider of service for our customers." [*Manufacturing*]

Strategic planning is concentrated at the headquarters level.

Despite their size and global distribution, 65 percent of larger enterprises indicated they primarily set their Internet business solutions strategy at the headquarters level. Qualitative interviews suggest that this is not a dictatorial process, but one in which headquarters are increasing defining business objectives and then giving individual business units the flexibility to meet objectives by technology or other means.

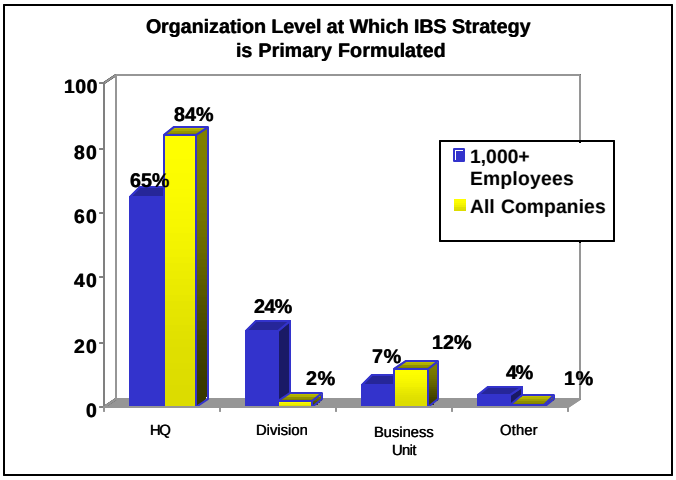
> "We have corporate initiatives, guidelines and objectives that are issued, but it's really up to the lines of business to make it come alive." [*Service Provider and Telecommunications*]

> "Strategy is set at both the headquarters and business unit level. We start at corporate with identifying a business process and opportunity and then the business unit gets involved and helps specify how we'll achieve the business goal. It's a more coordinated effort between the two than it used to be." [*Wholesale/Retail*]

"Business objectives are set at headquarters and then the decision making is really pushed out to the business units. They [business unit] decides how to meet the objective, either with IT or not." [*Manufacturing*]

While many managers identified a top-down planning model, the headquarters of some geographically- or business-line distributed organizations act more as strategy clearinghouses, helping coordinate priorities and initiatives across the company.

Figure 28:



"The individual business units and geographies give feedback on their wants and needs. Then it's all standardized at the HQ level. Senior management wants to make sure we're focusing on the highest impact opportunities across the company." [*Manufacturing*]

"Domestically, strategy is set at the headquarters' level by senior management. Internationally, it's at the divisional level… they have different cost structures and are attacking different problems than we are. We're responsible for the underlying infrastructure so we spend a lot of time coordinating the divisions' efforts so the pieces work together." [*Entertainment*]

Expectations for productivity remain high, but obstacles still exist.

While financial expectations for Internet technologies have moderated since the dot.com era, many organizations see substantial technology-fueled growth in their future. Overall, organizations reported expecting $528.3 billion in cumulative cost savings and $1.55 trillion in cumulative revenue gains from their technology investments by 2010.

Figure 29:
Barriers to the Use of IBS in Business
All Respondents

Metric	Percent
Dollar cost of project	13%
Time to implementation	7%
Cost of new infrastructure	6%
Hiring people with tech skills	6%
Worker training	5%
Regulatory barriers	5%

However, organizations are well aware that obstacles still exist that could keep them from realizing these financial impacts. In addition to the most frequently mentioned obstacles including the cost, difficulty and time to implementation of Internet business solution projects, respondents also identified:

1. **Technology adoption:**
   "The largest obstacle is getting people to try it [new technology]. Getting them to take that first step and commit is the tough part." [*Financial Services*]

   "We have a mass of traditional, traditional customers. The biggest obstacle is gaining their acceptance. That will change over time, but human behavior is slow to change." [*Financial Services*]

2. **Legacy systems:**
   "We'll see the real cost savings when we can eliminate all of our legacy systems and eliminate the associated support, equipment, etc. Right now we're supporting multiple systems in multiple channels. When we get rid of those systems next year, we'll be able to do a lot more, with a lot less." [*Financial Services*]

   "Most of the cost and resource constraints come from a result of integrating all of the back-end, legacy systems. That's the limiting factor on where we *could* be with this technology." [*Service Provider and Telecommunications*]

3. **Network infrastructure and incompatibility:**
   "What we really underestimated was the Internet infrastructure and the impact that would have on how we deliver our services. We'll be ready to use this technology for everything shortly, but it'll be 2-3 years before the network infrastructure will be where we need it to be for most customers to take advantage of what we've done." [*Service Provider and Telecommunications*]

> "The only barrier we've really run into is being able to customize what we're implementing to align the customer experience between the online and offline worlds. Coordination of the online and the traditional brick & mortar systems are difficult and time consuming." [*Wholesale/Retail*]

Organizations in each industry have different perspectives on the most pressing barriers to Internet business solution implementation. While the dollar cost of projects consistently ranks as the top obstacle across industries, verticals like Healthcare are more concerned with worker training and privacy issues where the Financial Services sector faces regulatory limitations to the processes they can move over to technology. This should come as no surprise due to the different environments each industry operates in.

> "Privacy concerns keep us from exploring everything we *could* be doing. Things that would be invaluable for customers over the Internet could raise concerns with the public… legal issues. We're not pushing forward because we don't want to raise those issues and have them decided for us." [*Healthcare*]

> "Regulatory issues aren't necessarily holding us back, but they just don't let you do certain things on the Internet; specifically in bank-to-bank transactions. The way we transfer money and clear check, we've still got to process it manually. There's huge potential for savings there, but we can't take advantage of it." [*Financial Services*]

Figure 30: Largest Barriers to the Use of IBS by Industry

	Healthcare	Wholesale/ Retail Trade	MFG.	Financial Services	SP/ Telecom	All Other Industries
…dollar cost of projects	14%	11%	12%	11%	16%	14%
… time to implement projects	1%	3%	15%	9%	10%	6%
… cost of new infrastructure	5%	5%	3%	9%	10%	7%
… can't hire people with tech skills	3%	6%	7%	4%	7	6%
… worker training	9%	5%	2%	3%	7%	5%
… regulatory barriers	2%	5%	4%	9%	4%	5%

The Net Impact Study – Detailed Findings in the United Kingdom, France and Germany

Organizations in the top three European economies are behind the United States in deploying Internet business solutions, but expect to finish the implementation in a similar timeframe.

Fewer organizations in the United Kingdom, France and Germany are deploying Internet business solutions than their U.S. counterparts. Currently only 47 percent of organizations in the top three European economies are using Internet technology in their business compared to 61 percent of U.S. organizations. In addition, 45 percent of these organizations report having no current plans to use Internet solutions in their business.

The organizations in the United Kingdom, France and Germany that are deploying Internet business solutions began on average almost a full year behind the average U.S. organization. While Internet business solutions adoption in the United States occurred in two significant waves (1996/1997 and 1999), Europe has experienced one growing adoption wave that crested in 1999/2000.

Segmentation of the adoption data shows that earlier adopter organizations in Europe's top three economies tended to have the following similarities:

- IT budgets greater than €100,000
- Greater allocation of their IT budget toward communication and networking hardware, and IT personnel
- Established direct connections between their suppliers and their company network
- Formulated their Internet technology strategy at the headquarters level

Despite their slower start, organizations in Europe's three largest economies estimate they will complete their current and planned Internet business solutions in a similar timeframe as U.S. organizations in 2003. This suggests that organizations in the United Kingdom, France and Germany may be experiencing easier integration efforts or dealing with less complicated or customized implementations than U.S. organizations. This may also be a

Figure 31:

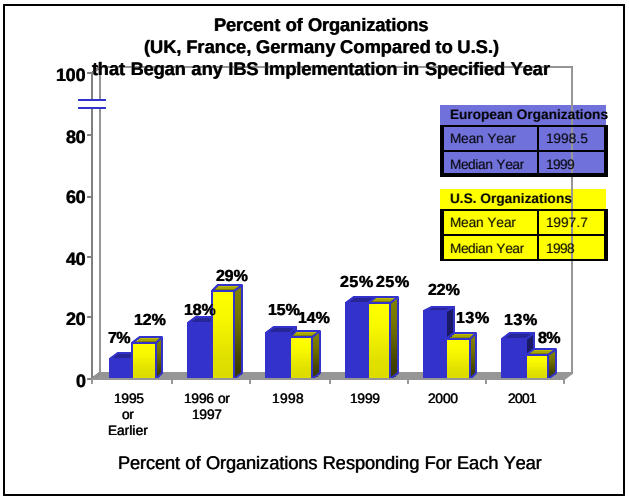
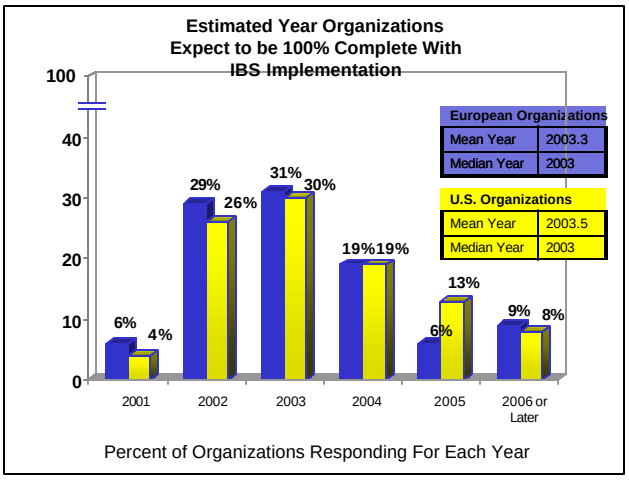


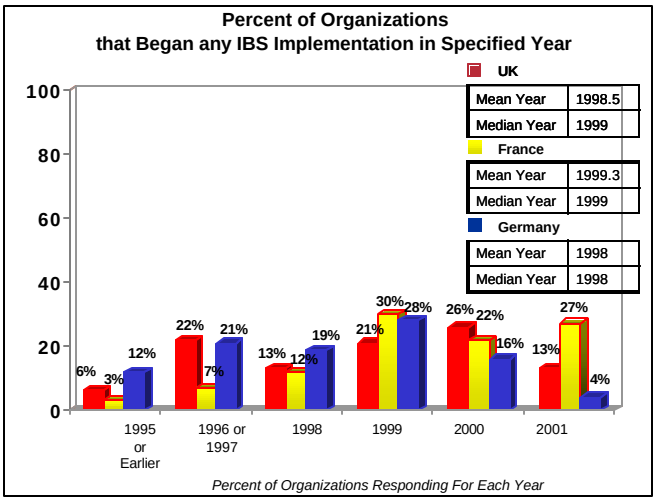
Figure 32:



reflection of organizations in the United Kingdom, France and Germany using smaller-scale projects to achieve quicker implementation and a quicker ROI.

On a country-by-country basis, organizations in Germany began implementing Internet business solutions first on average in 1998. Organizations in the United Kingdom followed suit an average of six months later. French organizations got the slowest start of the three largest European economies with approximately 79 percent of organizations starting their Internet business solutions efforts after 1999, a year or more after organizations in Germany and the United States.

Figure 33:



Vertical industry adoption rates of Internet business solutions in Europe's three largest economies differ from the United States.

Three of the five industries tracked in the Net Impact Study had similar adoption rates between Europe's three largest economies and the United States. The exceptions were the Wholesale/Retail, and Service Provider and Telecommunications verticals, which reported adoption rates of 26 and 24 percent lower respectively in Europe, as well as the "all other industry" segment, demonstrating the broad delay in adoption between the United States and the top three European economies.

Figure 34:
Adoption Rates of IBS – European and U.S. Vertical Industry Comparisons

	Healthcare	Wholesale/ Retail Trade	MFG.	Financial Services	SP/ Telecom	All Other Industries
UK, France and Germany	46%	44%	54%	71%	64%	41%
U.S.	50%	70%	57%	70%	88%	61%

Internet business solution adoption is not a geographically universal trend. While Internet business solution adoption rates are similar in the United States, United Kingdom and Germany, France is lagging behind. Only 29 percent of organizations in France are currently using Internet business solutions in their operations. In addition, 63 percent have no plans to use Internet solutions any time in the future –almost double the percent of organizations saying they have no Internet business solution plans in the United States, United Kingdom or Germany.

Figure 35:

Companies' Use of Internet Business Solutions in Top 3 European Economies

	UK	France	Germany	U.S.
Currently using	57%	29%	54%	61%
Plan to use	8%	8%	10%	8%
No plans to use	36%	63%	36%	30%

This lower rate of adoption, and planned adoption, will impact the French economy's ability to realize the same Internet-fueled productivity enhancements already being enjoyed in the U.S. economy. While the true impact of productivity acceleration may not be noticable yet due to the moderate levels of completed Internet business solution implementations, the impact of the lower adoption rates for French organizations should become more profound as organizations in the other economies continue to work on their Internet-solution strategies.

Despite lower, slower adoption, U.K., French and German organizations report savings from efforts.

Results of the Net Impact Study suggest that organizations in the United Kingdom., France and Germany have already experienced cost savings of .1 percent, or €9.0 billion from their Internet business solutions. In addition to cost reductions, European organizations report a nine percent revenue increase, or €86.4 billion from their Internet business solution efforts to date. These numbers are significantly lower than U.S. estimates of cost savings of .6 percent and revenue increases of 1.9 percent resulting from Internet business solutions.

Figure 36:

Current Estimated Financial Impact of Internet Business Solutions on Top Three European Economies[1]

	Current Estimate (through 2001)
Revenue Increases[2]	€ 86.4 Billion
Cost Savings[2]	€ 9.0 Billion

[1] *Estimated impact on combined economies of the U.K., France and Germany only from organizations that have implemented IBS and have reported revenue increases or cost decreases.*

[2] *Cost savings and revenue increases are cumulative from the earliest year of implementation through 2001 and are based on estimates reported by companies participating in study.*

Given the current impact, organizations in Europe's three largest economies have significant expectations for future productivity gains from their Internet technology efforts. During the next 10 years, they estimate they will experience a .9-percentage point decrease in costs (as a percentage of total revenues), or €88 billion in savings, and a 2.3 percent increase, or €230 billion, in revenue directly attributable to Internet business solutions. These expectations should result in €318.3 billion of financial impact over the next 10 years. The cost reductions alone could account for.11 percent of the future annual-productivity rate in the economies of these three countries.

Figure 37:

Expected Productivity Impact of Internet Business Solutions [1] on Top Three European Economies

Time Period	Percentage Impact[2]	Cost Savings in Time Period	Impact on Annual Productivity
1996 to 2000	.09%	€ 5.2 Billion	+ .017%†
2001 to 2010	1.1%	€ 81.9 Billion	+ .11%†

[1] *Estimated impact on combined economies of the UK, France and Germany only from organizations that have implemented IBS and have reported a cost decrease.*
[2] *This figure is expressed as total cost savings as a percent of average GDP for this time period.*
† Estimate expressed as a percentage point impact on the annual productivity growth rate and are based on estimates reported by companies participating in study.

It should be noted that the smaller expected impact of Internet business solutions in the United Kingdom, France and Germany compared to the United States is primarily due to the significantly lower Internet business solution adoption levels in Europe. A similar potential for cost savings and enhanced revenue from Internet business solutions may exist in the United Kingdom, France and Germany, but the financial impact of those technologies will not be seen until there is greater penetration among organizations in those countries.

Despite significantly different adoption rates, there are some similarities between the impacts in the United States and in Europe's top three economies. On a country-by-country basis, organizations in the United States and United Kingdom are experiencing similar levels of financial impact from their Internet business solutions. Returns in France and Germany are not as high, but organizations in these countries expect to see substantial financial impact from their Internet business solutions in the near future. Overall, organizations in the United States have seen a 1.7 percent greater increase in revenue than their European counterparts, but only a .2 percent greater reduction in costs.

Figure 38:

Financial Impact of Internet Business Solutions Through 2001[1]

	U.S.	Combined Economies (UK, France, and Germany)
Revenue Increases[2]	10.3%	8.6%
Total Cost Savings[3]	2.8%	2.6%

[1] *Estimated financial impact only from organizations that have implemented IBS and reported revenue increases and/or cost decreases.*
[2] *Revenue increases are expressed as average percentage increase of total revenues for companies that have implemented IBS.*
[3] *Cost decreases are calculated as a percentage decrease relative to total costs for companies that have implemented IBS.*

A similar pattern between U.S. and European organizations exists for revenue expectations through 2010, however, organizations in the United Kingdom, France and Germany expect a 3.3 percent greater reduction in costs from their Internet business solutions. This difference in expectations could be explained by the slower adoption rate of Internet business solutions in the United Kingdom, France and Germany, which would result in a slightly extended horizon for financial returns compared to the more early adopting United States.

Figure 39:

Expected Financial Impact of Internet Business Solutions Through 2010[1]

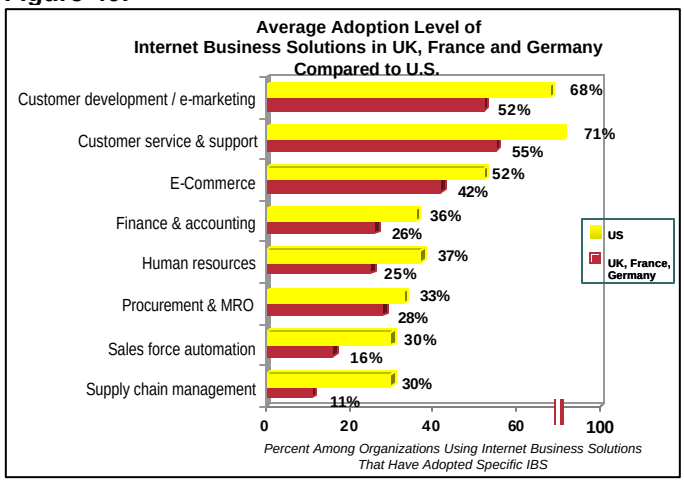
	U.S.	Combined Economies (UK, France, and Germany)
Revenue Increases[2]	14.8%	13.8%
Total Cost Savings[3]	5.5%	8.8%

[1]*Estimated financial impact when all current and planned IBS are 100% complete only reported by those organizations that have implemented or plan to implement IBS.*
[2]*Revenue increases are expressed as average percentage increase of total revenues for companies that have implemented IBS.*
[3]*Cost decreases are calculated as a percentage decrease relative to total costs for companies that have implemented IBS.*

European focus has been on customer-facing applications.

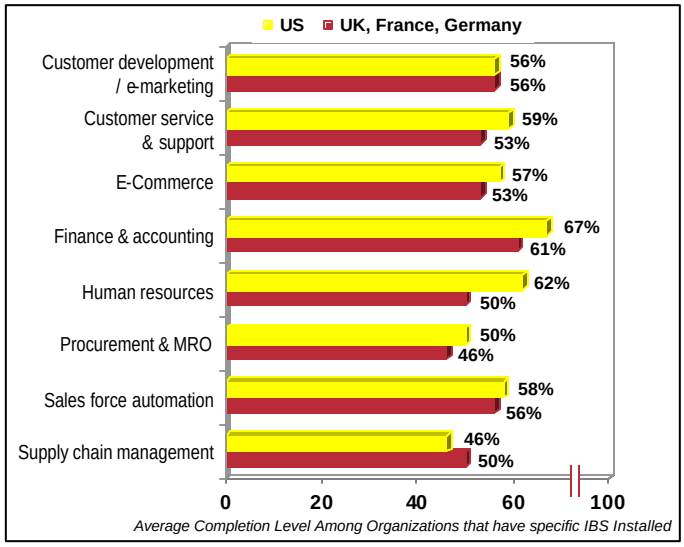
Like the overall Internet business solution adoption rate, organizations in Europe's three largest economies generally have a lower level of adoption in each of the technology solutions tracked in the Net Impact Study. Similar to the trend identified in the United States, organizations in the United Kingdom, France and Germany are most likely to have adopted customer-facing Internet business solutions. More than half of the organizations in the United Kingdom, France and Germany using Internet business solutions have started deploying E-Marketing and Customer Service & Support applications; 42 percent have begun E-Commerce initiatives.

Figure 40:



Although they generally have lower adoption rates in each category, it is important to remember the European organizations estimate they are on similar pace with U.S. organizations to complete their current efforts. This trend holds true for the Internet business solutions currently being deployed, with only Human Resources solutions show a significantly lower level of completion in the United Kingdom, France and Germany as in the United States.

Figure 41: Completion Level of IBS



Internet business solution adoption in Europe's three largest economies is weighted toward larger enterprises.

Not surprisingly, larger organizations in the United Kingdom, France and Germany tend to have the highest adoption levels in each type of Internet business solution tracked in the Net Impact Study. For example, 74 percent of organizations with 5,000+ employees are adopting E-Marketing technology compared 52 percent across all company sizes; 86 percent of these large enterprises are also adopting Customer Service & Support technology compared to 55 percent of all organizations.

Similar to the United States, larger organizations do not have the highest Internet business solution adoption rates in every business application area. Smaller organizations in the United Kingdom, France and Germany are adopting some technologies, especially in the areas of

Supply Chain Management and Sales Force Automation, at the same or higher rates than large enterprises.

Figure 42:

Adoption Level of Internet Business Solutions By Organizations in the U.K., France and Germany

	UK	France	Germany	US
E-Marketing	57%	56%	43%	68%
Customer Service and Support	54%	39%	67%	71%
E-Commerce	43%	37%	44%	52%
Finance and accounting	28%	23%	25%	36%
Human Resources	21%	28%	29%	37%
Procurement /MRO	36%	19%	24%	33%
Sales Force Automation	19%	9%	15%	30%
Supply Chain Management	14%	11%	8%	30%

Figure 43:

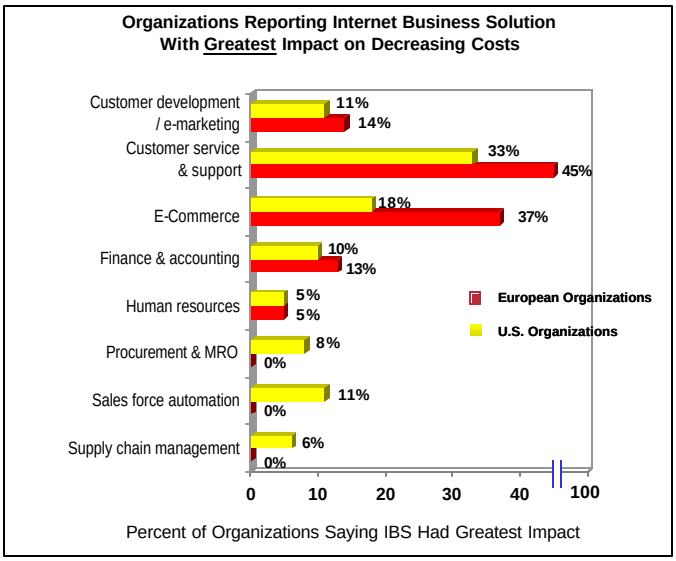
Adoption of IBS by Size of Organization - UK, France and Germany

	100 or fewer	101-200	201-500	501-1,000	1,001-5,000	5,001 +
E-Marketing	52%	47%	50%	62%	40%	74%
Customer Service and Support	47%	59%	57%	71%	42%	86%
E-Commerce	43%	36%	41%	47%	35%	62%
Finance and accounting	20%	18%	27%	32%	36%	56%
Human Resources	19%	27%	23%	32%	24%	51%
Procurement /MRO	26%	29%	18%	21%	37%	53%
Sales Force Automation	7%	18%	19%	22%	34%	21%
Supply Chain Management	11%	19%	8%	8%	4%	8%

European organizations report customer-facing solutions driving cost savings.

Organizations in the United Kingdom, France and Germany report that Customer Service & Support is the single Internet business solution with the most significant impact on reducing their costs. This is also true for the United States, but at a significantly lower level of agreement. This difference in perceptions is more pronounced in each regions' view of E-Commerce: 37 percent of firms in the United Kingdom, France and Germany see E-Commerce as the driving force behind their cost savings compared to only 18 percent of organizations in the United States.

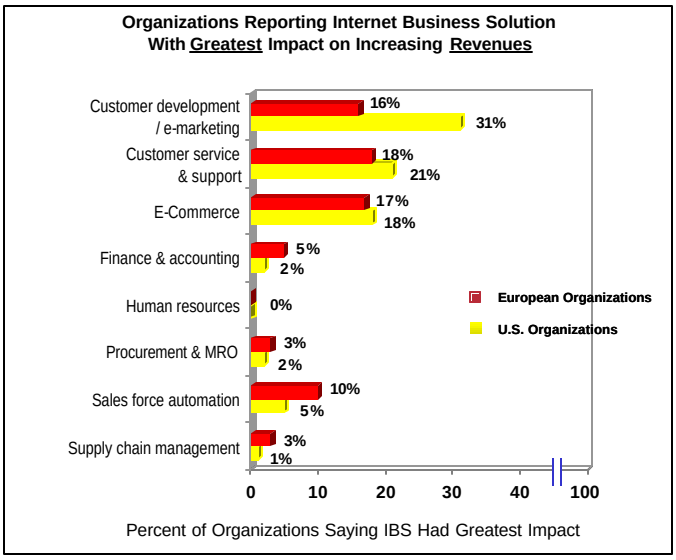
Figure 44:



Little difference between U.S. and European organizations' outlook on what Internet business solutions are driving revenue increases.

Approximately 17 percent of organizations in the United States, and 18 percent in the United Kingdom, France and Germany reported that E-Commerce was the Internet business solution with the greatest impact in increasing the firm's revenue. Significantly more U.S.-based organizations saw Customer Development & E-Marketing business solutions fueling their revenue grow, but otherwise, there is little variation between U.S. and European organizations' perceptions of what technologies are driving their revenue growth.

Figure 45:



Industry verticals focus their efforts to meet their unique needs.

Each industry covered in the Net Impact Study has a unique profile of what Internet business areas the organizations in that sector are focused on. While external forces such as regulatory issues, customer needs or technology infrastructure help shape this profile, there are still some similarities between the U.S. and the U.K., French, and German profiles. For example,

Healthcare organizations in the United States and Europe's three largest economies have a higher adoption rate of Human Resources solutions than other sectors. Similarly, Wholesale/Retail and Service Providers and Telecommunications organizations are adopting Sales Force Automation solutions at a faster pace than other industries.

The similarity of these findings suggests that business leaders recognize the impact Internet business solutions can have on fundamental business functions despite differences that exist in the operating environments of the United States and Europe.

Figure 46: Adoption of IBS by Vertical Industry - UK, France and Germany

	Healthcare	Wholesale/ Retail Trade	MFG.	Financial Services	SP/ Telecom	All Other Industries
E-Marketing	22%	61%	54%	48%	47%	48%
Customer Service and Support	51%	50%	53%	75%	74%	57%
E-Commerce	36%	47%	42%	42%	39%	41%
Finance and accounting	24%	20%	18%	61%	26%	34%
Human Resources	35%	12%	18%	20%	29%	38%
Procurement /MRO	0%	30%	33%	16%	31%	27%
Sales Force Automation	*	22%	14%	10%	27%	14%
Supply Chain Management	*	15%	11%	6%	17%	10%

Internet strategy is set at headquarters level in Europe's three largest economies.

The formulation of the Internet business strategy is highly concentrated in organizations in the United Kingdom, France and Germany with 84 percent reporting that their strategies are primarily set at the headquarter level. This trend is similar to what U.S.-based organizations are currently experiencing, but U.S. organizations tend to give more autonomy in Internet strategy planning to individual business units than their European counterparts.

Figure 47:

Organizational Level that Formulates IBS Strategy in the UK, France and Germany

	Percent
Headquarters	84%
Division	6%
Business unit	9%
Other	1%

There is some indication that the largest enterprises (5,000+ employees) in the United Kingdom, France and Germany allow their divisions significantly more strategic planning flexibility than the six percent average, but the sample is too small to allow a reliable projection of this behavior.

Universal obstacles to technology solutions are cost and time.

Organizations in the United Kingdom, France and Germany identified a similar set of barriers to adopting Internet business solutions as U.S. organizations including cost and time hurdles. Unlike the United States., organizations in Europe's three largest economies did not identify regulatory issues as a major barrier to technology adoption, but did see worker training and organizational inertia as greater stumbling blocks to the use of Internet solutions in their business.

Figure 48:

Barriers to the Use of IBS in Business

All Respondents in the UK, France and Germany

Metric	Percent
Dollar cost of project	10%
Worker training	8%
Cost of new infrastructure	7%
Time to implement projects	6%
Organizational inertia	5%

The cost of Internet technology projects and the underlying infrastructure were top concerns across industries in the United Kingdom, France and Germany. On par with the cost hurdle, government agencies and organizations identified regulatory issues as a significant barrier to deploying Internet business solutions in their operations.

At 13 percent, worker training is perceived as a significantly more pressing matter by the European Manufacturing sector than their U.S. counterparts who identified it as an obstacle only two percent of the time. This type of implementation obstacle could significantly slow or reduce the financial returns the Manufacturing industry in the United Kingdom, France and Germany expects to receive from Internet business solutions.

Figure 49:

Largest Barriers in UK, Germany and France to the Use of IBS by Industry

	Government	Wholesale/ Retail Trade	MFG.	Financial Services	SP/ Telecom	All Other Industries
…dollar cost of projects	13%	16%	12%	15%	6%	6%
… time to implement projects	3%	4%	7%	13%	8%	6%
… cost of new infrastructure	12%	12%	6%	8%	8%	4%
… can't hire people with tech skills	3%	0%	1%	2%	1%	0%
… worker training	4%	5%	13%	4%	4%	6%
… regulatory barriers	14%	1%	0%	3%	0%	1%

European organizations use more retention metrics to track Internet business solution investments.

Organizations in the United Kingdom, France and Germany seem to be doing a better job of identifying metrics to track their Internet business solutions initiatives. Compared to 63 percent of U.S. organizations, only 49 percent of organizations in the United Kingdom, France and Germany did not have any metrics or know of the metrics by which they were going to track the return on their Internet business solutions. Some of this difference may be a result of the generally slower adoption of Internet business solutions in the United Kingdom, France and Germany, and the resulting lessons learned in U.S. implementation efforts – such as the need for measurement systems to track Internet business solution returns.

While more European organizations indicated they had metrics for their Internet business solutions, there was no single or small group of measurements that were universally tracked. Customer and employee satisfaction metrics were the most frequently cited measurements that spanned multiple industries in the United Kingdom, France and Germany.

Figure 50:

Metrics Used to Track IBS Returns
All Respondents in UK, France and Germany

Metric	Percent
None of these/ Don't Know	49%
Customer/constituent satisfaction	18%
Other*	8%
Employee satisfaction	6%
Workforce efficiency	5%
Revenue per customer	5%
Customer retention cost	4%

**Identified a metric specific to a particular company or industry*

Organizations in the United Kingdom, France and Germany do have a slightly greater incidence than U.S. organizations of measuring customer value through metrics like revenue per customer and customer retention costs. While a similar percent of U.S. and European organizations track revenue per customer (five percent in the United States; six percent in Europe's three largest economies), four percent of organizations in the United Kingdom., France and Germany use customer retention costs as one of their driving metrics versus two percent of U.S. organizations.

Customer retention ranked as the fifth most-cited metric for organizations in the United Kingdom, France and Germany, while in the United States customer retention tied as the sixth-most tracked metric with:

- Sales/revenue goals
- Web site usage/tracking
- Workforce efficiency
- Inventory turnover

Figure 51: Adoption of Internet Business Solution Tracking-Metrics (U.S., and U.K., France and Germany)

Metric	U.S.	Top 3 Euro Economies
None of these/ Don't Know	63%	49%
Customer/constituent satisfaction	9%	18%
Other*	8%	8%
Employee satisfaction	3%	6%
Workforce efficiency	2%	5%
Revenue per customer	6%	5%
Customer retention cost	2%	4%

**Identified a metric specific to a particular company or industry*

This slightly higher level of focus on customer retention by European organizations may not seem significant, but it hints at a potential difference in expectations as to the role Internet technology should play with customers. At least by the metrics they

track, U.S. organizations seem more focused on using on Internet business solutions as a means to grow their customer base, while organizations in Europe's three largest economies may be focused on enhancing the value or satisfaction of existing customers.

Despite a higher incidence of retention metrics in Europe, significantly more U.S. organizations report a positive impact on customer relationships from their Internet business solutions. Part of the differences between European and U.S. impacts on the relationship with customers is undoubtedly due to the greater levels of Internet access in the United States. Internet access is a critical component of the impact in each region considering that current studies suggest that 57 percent of people in the United States have access to the Internet compared to 45 percent in the United Kingdom, 43 percent in Germany and 25 percent in France.[17]

One could expect the impact rates on customer relationships to equalize as more consumers and organizations in the United Kingdom, France and Germany gain access to the Internet and begin using Internet technology as part of their daily lives.

Figure 52:
Companies Reporting an Impact on Relationship With Customers

Impact	UK, France, Germany	U.S.
…improved customer attraction	36%	57%
… improved customer satisfaction	30%	54%
… improved customer retention	19%	37%
… improved customer loyalty	19%	32%

European organizations less optimistic about the financial impact Internet business solutions will have.

In addition to lower estimates of impacts on customer relationships than in the United States, organizations in the United Kingdom, France and Germany report having significantly lower rates of financial results from Internet business solutions. Furthermore, the results organizations have experienced vary significantly among the countries included in the Net Impact Study. For example, 37 percent of U.S. and 40 percent of U.K. firms report increased revenue from their Internet business solutions compared to 24 percent in France and only 14 percent in Germany.

Figure 53:
How IBS are Currently Impacting Organization P&L

	U.S.	U.K.	France	Germany
… increase revenue	37%	40%	24%	14%
… decrease cost of goods sold	15%	4%	7%	7%
… decrease overhead expenses	44%	17%	21%	6%
None of these	27%	49%	69%	80%

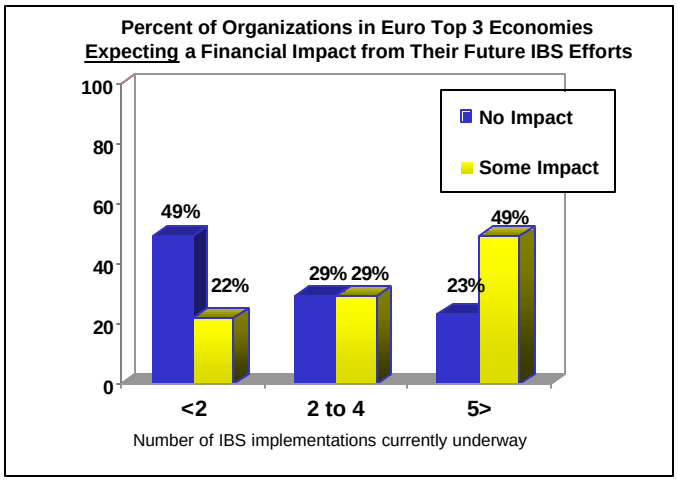
[17] Angwin, Julia. "E-Business: Has Growth of the Net Flattened?." The Wall Street Journal. July 16, 2001, B1.; NFO Infratest Euro.net study www.nfoeurope.com/i . July 2001 <http://www.nfoeurope.com/ib/CountryProductDetail.cfm?lan=en&country=deu&objectid=F7CB39E8-712C-4F42-A5AE70CA4D590981>.

These geographic differences can also be seen in the percent of organizations that reported "no impact" from their Internet business solutions. Twenty-seven percent of U.S. organizations said they had seen no impact compared to 69 percent in France and 80 percent in Germany. Based on these figures, and the lower level of estimate cost reductions and revenue increases, it is apparent that organizations in Europe's three largest economies have yet to have the same financial outcome from their Internet business solutions as companies in the United States.

Current and expected financial impact of Internet business solutions depends on number of implementations underway.

Respondents in the United Kingdom, France and Germany were deeply divided on their view of whether or not their current Internet business solution efforts had had a financial impact on their organization. This difference of opinion cannot be explained by different types of respondents – the sample of organizations and individuals who reported an impact versus those who did not are remarkably similar in terms of size and type of organization, and the role of the survey respondent in the organization.

Figure 54:



One factor that does help explain this difference in perception is the number of Internet business solutions currently being deployed by the organization. In general, the more Internet business solution areas an organization was deploying, the more likely they were to expect a financial impact. For example, 49 percent of organizations seeing no impact were deploying less than two Internet business solution technologies compared to 49 percent of organizations seeing an impact that were deploying Internet business solution in more than five areas. This finding suggests that stand-alone Internet business solutions are not likely to generate financial benefits. While individual applications may enhance certain processes, it is only when a company leverages Internet-based applications across the organization that they begin to experience noticeable gains in overall corporate performance. This hypothesis is supported by regression analysis (see Drivers of Internet Productivity section) that demonstrates that the number of Internet business solution applications is a significant predictor of whether an organization is experiencing, or expects future, financial impacts from their technology.

Drivers of Internet Productivity

Factors driving the financial impact of Internet business solutions:

The Net Impact Study demonstrates that organizations adopting Internet business solutions are realizing significant financial returns from their efforts. Another important outcome of this study is the ability to identify the characteristics and similarities of the organizations that are seeing enhanced revenue and reduced costs from their Internet business solutions efforts.

A series of regression analyses and segmentations of the data collected in the Net Impact Study were conducted to identify the common characteristics, or predictors, of organizations enjoying financial gains from their Internet business solutions.

Somewhat surprisingly, a company's size and size of IT budget were not significant predictors of a company's success in realizing either increased revenue or decreased costs from their Internet technology efforts.

The areas that are highly correlated with positive financial returns include:

- how the firms allocated their IT expenditures between hardware, software, personnel, and communications and networking hardware
- the number of Internet business solutions currently being adopted
- the role IT played in an organization's business philosophy or strategy

As an example below will demonstrate, organizations that demonstrate more of these predictors have significantly greater financial returns than the average company. This same relationship holds true for those organizations' expectations for the future returns from their Internet business solutions.

Predictors of increased revenue from Internet business solutions:

In the United States, Telecommunications organizations as a group were more likely to have increased revenue from their current Internet business solution efforts. Analysis of the data across industries showed that organizations currently experiencing increased revenue were similar in their:

- Adoption of Internet business solutions in several business application areas
- Establishment of metric systems to track the return on their Internet solutions efforts
- Experience of improved customer loyalty and customer attraction since adopting Internet business solutions

Organizations that experienced the highest levels of revenue generation from their Internet business efforts had a slightly more focused profile. Organizations that indicated the greatest levels of revenue generation:

- Spent a greater portion of their IT budget on communication and networking hardware than on other IT line items
- Were deploying multiple Internet business solutions, but specifically Customer Service & Support, and R&D-oriented technology

- Were working to enforce data standardization across the organization
- Focused on making sure mobile users had access to the same data remotely as they did on their desktop
- Were experiencing greater purchase volumes from existing customers since the adoption of Internet business solutions

These regression results are important because they suggest that organizations experiencing increased revenue from their Internet business solutions are actively tracking the impact of their efforts, are shifting existing business processes to accommodate or leverage new technologies, and are actively working on Internet-based solutions in more than one area of their business.

Similar factors lead to cost reductions from Internet business solutions:

Regression analysis shows that U.S. organizations experiencing reduced costs from their Internet business solutions had similar behaviors to those organizations experiencing revenue increases. One difference from the revenue generation profile is that organizations with greater levels of information technology spending were more likely to be experiencing current savings in their Cost of Goods Sold.

Other variables that are correlated with cost savings from Internet business solutions include:

- Adoption of a Supply Chain Management solution – Supply Chain Management was the best application area for predicting the likelihood of cost savings
- Greater portions of the IT budget spent on computing hardware and communication services
- Experiencing greater customer loyalty, satisfaction and retention levels since implementing Internet business solutions
- Focusing on reducing costs through information technology
- Working to ensure that mobile users have access to the same data they do on their desktop
- Had more than one external group – customers, suppliers or partners – with direct access to the corporate network

Similar to the factors for revenue generation, organizations experiencing the greatest levels of cost reduction in the United States were deploying Internet solutions in multiple business areas.

The impact these factors have on financial returns:

Segmentation of the data along these factors provides an idea of the scope and magnitude these characteristics can have on a company's financial experience with Internet business solutions.

If we segment out organizations that are only deploying customer relationship technologies, defined as E-Marketing and Customer Service & Support technology for this example, the average, current financial impact these organizations are experiencing is a 3.0 percent increase in revenue and a .9 percent decrease in costs. This is a significant impact considering that organizations not adopting customer relationship technologies first are only experiencing a .4 percent increase in revenue and a .1 percent decrease in costs from their efforts.

As mentioned before, one of the stronger indicators of financial returns from Internet business solutions is the adoption of multiple solutions. This holds true for organizations deploying customer relationship technology at the same time as either a Supply Chain Management or Sales Force Automation technology. Organizations adopting customer relationship technology and one of the other solutions have experienced increased revenue of 5 percent and decreased costs of 2.3 percent. Organizations adopting all three Internet business solutions are experiencing the greatest financial returns with an increase of 8.8 percent in revenue and a 2.3 reduction in costs – well above the financial impacts of companies deploying just a single solution.

Figure 55:
Estimated Financial Impact on U.S. Companies Adopting Specific Internet Business Solutions

	Revenue	Cost Savings	Base Size
No customer relationship applications*	.4%	.1%	995
Customer relationship applications only	3.0%	.9%	422
Customer relationship and either Supply Chain Mgmt or Sales Force Automation	5.0%	2.3%	455
Customer relationship and both SCM and SFA applications	8.8%	2.3%	193

** Customer relationship applications defined as Customer Service & Support, and e-Marketing Internet business solutions. Companies not deploying customer relationship solutions in this analysis were implementing other Internet solutions.*

Adoption of multiple solutions is correlated with higher levels of returns.

The same relationship between adopting multiple Internet business solutions and greater financial returns is true for the returns organizations expect in the future.

Organizations currently deploying customer relationship, Supply Chain Management and Sales Force Automation expect the greatest returns with a 19.5 percent increase in revenue and a 6.8 percent reduction in costs from their Internet business solutions. These expectations significantly exceed the financial impact

Figure 56:
Financial Impact U.S. Companies Expect to Achieve from Adopting Specific Internet Business Solutions

	Revenue	Cost Savings	Base Size
No customer relationship applications*	3.3%	1.6%	995
Customer relationship applications only	9.0%	3.8%	422
Customer relationship and either Supply Chain Mgmt or Sales Force Automation	13.6%	6.0%	455
Customer relationship and both SCM and SFA applications	19.5%	6.8%	193

** Customer relationship applications defined as Customer Service & Support, and e-Marketing Internet business solutions. Companies not deploying customer relationship solutions in this analysis were implementing other Internet solutions.*

the average organization is currently experiencing and the average *future* expectations of 14.8 percent revenue increase and 3.1 percent cost reduction.

Multiple-solutions relationship holds true in the United Kingdom, France and Germany.

While the regression analysis was not conducted on the European data due to the smaller sample size, the relationship for multiple Internet business solutions seem to hold true for organizations in the United Kingdom, France and Germany.

The similarity can be seen in the same example of the impact of customer relationship technology on financial returns. Organizations in the United Kingdom, France and Germany not deploying customer relationship solutions first are currently not experiencing any reduction in costs and only a .26 percent increase in revenue. On the other hand, customers deploying customer relationship solutions, and either Supply Chain Management or Sales Force Automation technologies are seeing a 4.7 percent revenue increase and a .12 percent cost reduction – significantly greater results than organizations deploying a single solution.

There are too few organizations deploying customer relationship, Supply Chain Management and Sales Force Automation solutions in the United Kingdom, France and Germany to reliably calculate the returns these organizations are experiencing.

Figure 54:
Actual Financial Impact on Companies in UK, France and Germany Adopting Specific Internet Business Solutions

	Revenue	Cost Savings	Base Size
No customer relationship applications*	.26%	.0%	403
Customer relationship applications only	.92%	.14%	130
Customer relationship and either Supply Chain Mgmt or Sales Force Automation	4.7%	.12%	77

**Customer relationship applications defined as Customer Service & Support, and e-Marketing Internet business solutions. Companies not deploying customer relationship solutions in this analysis were implementing other Internet solutions.*

Finally, organizations that are deploying Internet business solutions in addition to customer relationship technology have higher expectations for their future returns from these efforts. Organizations with customer relationship, Supply Chain Management *and* Sales Force Automation solutions expect approximately eight percent higher revenues and two percent lower costs than their counterparts who are not deploying customer relationship applications.

Figure 57:

Financial Impact Companies in the UK, France and Germany Expect to Achieve from Adopting Specific Internet Business Solutions

	Revenue	Cost Savings	Base Size
No customer relationship applications*	.9%	.16%	403
Customer relationship applications only	3.0%	1.4%	130
Customer relationship and either Supply Chain Mgmt or Sales Force Automation	9.1%	2.4%	77

**Customer relationship applications defined as Customer Service & Support, and e-Marketing Internet business solutions. Companies not deploying customer relationship solutions in this analysis were implementing other Internet solutions.*

Research Methodology

How many and what types of organizations were interviewed?

Interviews for this study were completed in September and October of 2001 and were conducted by telephone. A total of 2,699 companies and organizations were interviewed for the study (2,065 in the United States, 634 in the United Kingdom, France and Germany). The sample in both studies was selected from Dun & Bradstreet's database of global businesses, one of the world's largest and most comprehensive databases of private and public organizations. This database provided both contact and financial information for the organizations contacted in the study.

A probability sampling technique was used to assure that small, medium and large organizations were included in our sample frame. Our sampling technique was designed to strike a balance between the volume of small organizations that make up the bulk of all organizations and the influence of large organizations which are much more likely to have implemented Internet business solutions and have a greater impact on total cost savings.

A stratified sampling methodology was used to allow for comparisons across five vertical industry segments. We chose to focus on the following five industries as well as a "sixth" vertical that accounts for the remaining industries:

- Healthcare (United States Only)
- Government (United Kingdom, France and Germany only – includes healthcare)
- Wholesale and Retail Trade
- Manufacturing (including both durable and non-durable)
- Financial Services (including banking, finance and insurance)
- Service Providers and Telecommunications
- Other (all remaining industries, including Government in the United States)

For the study, branch locations were excluded in order to avoid double counting of corporate initiatives extending across multiple sites within an organization. This also allowed us to obtain the most comprehensive estimate of the Internet business solution implementations from decision-makers responsible for implementations across their organization's many branch locations, divisions or subsidiaries. While it is almost certain that decisions about Internet business solutions are not always centralized at the corporate headquarter location, overall these locations are able to provide the most comprehensive estimate of the total corporate impact of all Internet business solution implementations. In fact, our study shows that more than 80 percent of all decisions about Internet strategy are primarily formulated at the headquarter level with the remainder being made at the business unit level.

Who were the respondents for the study?

The level or title of the target respondent is *one* of the key drivers for the budget as well as the quality of any research study. We attempted to contact the most senior person available to answer the survey questions, but given the harried nature of the most senior individuals at a company, we were not always able to reach that person. Of greater importance than the level of

respondent was their ability to accurately answer questions about Internet business solutions and financial metrics.

To qualify for the study a respondent must have met the following criteria:

- Senior decision-maker whose formal job responsibility includes either the design, purchase or implementation of Internet business solutions for their company
    - Survey respondents included CEOs, CFOs, CIO/CTOs, vice president- or director-level technology decision-makers as well as managers and other technical staff
- Knowledge of financial metrics used to track performance or impact of Internet business solutions

The results of this study reflect the knowledge of the individual who self-qualified for the study based upon our qualification criteria. There is much debate over which decision-maker within any organization has all of the most accurate information. More than anything, the accuracy of any research study depends upon the depth of information that is readily available to decision-makers and whether they have access to that information.

Other than conducting an accounting audit of the respondent's organization, we believe our methodology was the best available approach for collecting the information required to make our estimates about the impact of Internet business solutions.

What questions were asked to calculate the estimates?

It took an average of 25 minutes for a respondent company to complete the Net Impact survey. There is such a great need to understand all aspects of how technology is impacting both the top line and the bottom line of organizations that a significant effort was required to cut back the length of the questionnaire – there were so many things that could have been asked.

Driven by the overall research objectives, our primary focus was to assess the level of adoption of Internet business solutions and to measure their impact on revenues and costs. The general topic areas of the survey and some explanations of how the questions were used are outlined below. A more detailed version of the questionnaire (without interviewer notes and instructions) is included in the appendix.

1) Qualification and screening questions
    a. Responsibility for decisions related to Internet business solutions
    b. Knowledge of financial metrics and impact of Internet business solutions
2) Areas to which businesses are applying Internet business solutions
   The focus was on broad business areas as well as keying in on specific Internet business solutions such as Supply Chain Management or Procurement
    a. … Customer Development & E-Marketing
    b. … Customer Service & Support
    c. … E-Commerce (including B2B)
    d. … Finance & Accounting
    e. … Human Resources

   f. … Manufacturing
   g. … Procurement & MRO
   h. … Research & Development
   i. … Retail & Wholesale Operations
   j. … Sales Force Automation
   k. … Supply Chain Management

3) Year company first began implementing Internet business solutions – single year estimate
   This question provides the beginning point for estimating the total cost savings related to Internet business solutions
4) Current completion level of Internet business solutions – in percent complete
   Understanding the completion level of all Internet business solutions allows for the calculation of current impact versus future impact on businesses and the economy
5) Planned completion date for all Internet business solutions – single year estimate
   This question provides the future endpoint of Internet business solutions implementation for estimating the total time frame for realizing all cost savings and revenue gains
6) Planned areas of Internet business solutions implementation – same list as current implementation
   Knowing what applications are planned will allow for more precise estimates of future cost savings or revenue increases
7) IT spending
   The goal was not to replicate existing estimates of current and future IT spending, rather, our goal was to explore the relationship between IT budgets and IT infrastructure, and the level of cost savings or revenue increases
   a. Most recent annual IT budget in dollar terms
   b. Market value of technology infrastructure
   c. Distribution of IT budget among the following areas:
      i. Communications and networking hardware purchases
      ii. Communications services
      iii. Computing hardware purchases
      iv. Total software spending (including Internet software solutions – Customer Relationship Management, Supply Chain Management, etc., packaged software, application development, application maintenance)
      v. Other personnel and consulting

8) Current financial impact of Internet business solutions – all Internet business solutions considered together.
   The questions asked in this section depended upon the type of company interviewed. For example, financial services organizations do not report Cost of Goods Sold (COGS) or Sales, General and Administrative expenses (SG&A), but report operating expenses. Government agencies were also treated differently with respect to revenues and operating expenses.
   a. Increasing revenues?
   b. Decreased costs of good sold (COGS)?
   c. Decreased sales, general and administrative expenses (SG&A) or operating expenses (OPEX)?
9) Future or expected financial impact of all Internet business solutions
   a. Increasing revenues?
   b. Decreased COGS?
   c. Decreased SG&A or OPEX?
10) Current and *future* changes in revenues and costs *directly* related to Internet business solutions
   a. Revenues?
   b. COGS and SG&A derived through estimates of gross and net margin from operations?
   c. Percent increase in revenues?
   d. Percentage decrease in COGS?
   e. Percentage decrease in SG&A or OPEX?
11) Ways in which Internet business solutions impacted costs and revenues
   These responses were asked based on their relationship to revenues, COGS and SG&A or OPEX
   a. Revenues
      i. … Improved customer loyalty?
      ii. … Improved customer satisfaction?
      iii. … Increased customer attraction?
      iv. … Increased customer retention?
      v. … Existing customers buy more frequently?
      vi. … Existing customers buy in greater volume?
      vii. … Existing customers buy more expensive products or services?
      viii. … Attracting new customers?
   b. COGS
      i. … Increased workforce efficiencies?
      ii. … Reduced materials costs?
      iii. … Reduced production costs?
      iv. … Reduced distribution or shipping costs?
      v. … Improved inventory management?

c. SG&A or OPEX
    i. … Reduced accounting or finance costs?
    ii. … Reduced human resources (HR) costs?
    iii. … Reduced sales & marketing costs?
    iv. … Reduced R&D costs?
    v. … Reduced customer support costs?

12) Metrics for tracking return on investment (ROI) from Internet business solutions
This question was a non-read list of responses with the goal of finding out what types of metrics businesses were using to track their investments
    a. Workforce efficiency
    b. Employee satisfaction
    c. Customer satisfaction
    d. Revenue per customer
    e. Inventory turnover
    f. Revenue per employee
    g. Product to market time
    h. Customer acquisition cost
    i. Customer retention cost

13) Barriers to adoption of Internet business solutions
For businesses that are adopting, what are the challenges that their organizations are facing with respect to implementing these solutions
    a. Dollar cost of projects
    b. Time to implement projects
    c. Cost of new infrastructure
    d. Support from upper management
    e. Worker training
    f. Organizational inertia
    g. Uncertain return on investment
    h. Can't hire people with necessary technical skills
    i. Bad experiences in the past
    j. Inadequate planning
    k. Regulatory barriers

14) Cultural attitudes toward the use of IT
    a. Self-directed work groups
    b. Other attitudinal differences in the use of IT (see questionnaire)

15) Network connectivity of organization to…
    a. Customers?
    b. Partners?
    c. Suppliers?

16) Firmographics/demographics

How were the estimates for cost savings and productivity calculated?

We used the information provided directly by senior influencers at each organization to determine the impact of Internet business solutions. Each respondent provided estimates of current and future revenue growth and gross cost savings directly attributable to Internet business solutions, which included the following measures:

- Annual revenue: provided by the respondent, supplemented with Dun & Bradstreet or financial records where possible
- Gross margin: provided by the respondent, supplemented with financial records where possible
- Net margin: provided by the respondent, supplemented with financial records where possible
- Current /future percent revenue increases due to Internet business solutions: provided by the respondent
- Current /future percent cost of goods savings due to Internet business solutions: provided by the respondent
- Current /future percent sales, general and administrative cost savings due to Internet business solutions: provided by the respondent

The revenue and cost savings estimates were applied to the company's overall financial metrics to determine their impact as a percent of overall revenues. Revenue increases were applied directly to revenue estimates, while cost savings were applied to the cost structure backed into using the gross and net margins provided. Organizations that did not have any Internet business solutions installed, or did not claim any specific benefits from them were given a value of zero for their revenue increases or cost savings.

Once calculated as a percent of overall revenues, these estimates were applied within each vertical. Each company's results were weighted according to their probability of selection within the study, which reflects their distribution within the Dun & Bradstreet database. The overall average for each increase and savings estimate (expressed as a percentage of revenues) was then applied to a total revenue estimate for each vertical. These estimates were derived from the Economic Census, which profiles the U.S. economy every five years.[18] Since the most recent Economic Census is based on 1997 data, we applied value-added output growth estimates to simulate revenue growth by vertical through to 2001.[19] These were supplemented by government figures for on-budget outlays as the basis for estimating revenue and cost implications in the public sector as part of the "catch-all" sixth vertical.

Revenue and savings estimates were calculated in the same manner for the United Kingdom, France and Germany. Revenue estimates for each company were obtained from DRI-WEFA. Gross Domestic Product estimates were obtained from the Organization for Economic Co-Operation and Development (OECD) and grown based on predictions made by the national offices of each country.

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