



Enterprise IT Capabilities and Business Performance

Marco Iansiti, David Sarnoff Professor of Business Administration,
Harvard Business School
George Favaloro, Principal, Keystone Strategy, Inc.

March 16, 2006

ACKNOWLEDGEMENTS: We are grateful to the following people
who contributed to this research.
From Keystone Strategy: Paul Lee, Julio Gomez, Alexander Stein,
Michael Pao, and Edward Prewitt
From Harvard Business School: David Brunner
From the Center for Information Systems Research,
Massachusetts Institute of Technology: George Westerman

Table of Contents

	Page
Executive Summary	1
I. Debate	3
II. Methodology	5
II.a. The Conceptual Model	5
II.b. Scoring IT Capability	5
II.c. Survey Participants	7
II.d. Business Performance Measurement	8
II.e. Business Drivers	9
III. Findings	10
III.a. Does IT Drive Business Performance?	10
III.b. IT's Impact on Business Drivers	11
III.c. Understanding the Impact of Individual IT Functions on Business Drivers	13
III.d. Direct IT Function Contribution to Revenue Growth	14
IV. Further Discussion	17
IV.a. Practical Application of the Study Findings	17
IV.b. Addressing the Gaps	18
Conclusions	19
Appendix	20

Enterprise IT Capabilities and Business Performance

Executive Summary: Information Technology Drives Growth

Better information technology (IT) makes a quantifiable, positive difference in business performance. That is the core finding of this multi-country research study from Keystone Strategy, Inc., sponsored by Microsoft Corporation and conducted under the direction of Professor Marco Iansiti of the Harvard Business School. The study found that:

- Firms with superior IT grow faster than their peers. Managers in enterprises with better IT enjoy more insight into their business and their workers are more productive.
- Measuring IT as it supports executives, managers, employees, and key business processes (rather than measuring IT investment or other proxies for the impact of IT) results in an unprecedented window into IT's positive impact.
- A stable and robust IT infrastructure with well-implemented software to support operations and excellent IT management practices is important in achieving these superior results.

Our research, conducted through interviews with IT executives from 161 large manufacturing companies in the United States, Japan, and Western Europe, reinforces many widely discussed IT best practices:

- Chief information officers (CIOs) must be able to envision business possibilities and initiate them with supporting technology.
- CIOs have to balance their vision for how to transform the business with core IT challenges of consolidation, integration, service levels, and other fundamental operational needs.
- The success of the CIO depends on the steady support of the rest of the management team through establishment of a stable and robust infrastructure that becomes a platform for higher-level applications that can transform the business.

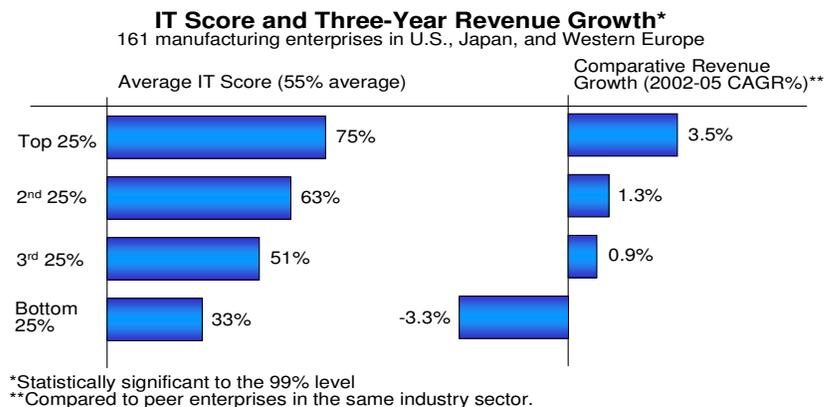
This study sought to go beyond these best-practice tenets and quantitatively demonstrate the impact of IT on business performance. To do so, we took a new approach to measuring IT capability within a company. Previous studies used indicators such as IT spending or PCs per employee and other measures of IT investment as a proxy for the impact of IT and consequently failed to find a positive relationship between business performance and IT. This led to broad pronouncements on the dubious value of IT, most prominently Nicholas Carr's 2003 article titled "IT Doesn't Matter."¹

In a departure from those studies, we examined the reach and quality of each company's IT-enabled business processes by analyzing how IT systems are used in several key areas: sales and marketing, product and service development, operations and finance, and partner and supplier management. In addition, each company's IT infrastructure and IT management practices were also systematically analyzed to determine which elements had the greatest impact on business performance.

¹ Nicholas G. Carr, "IT Doesn't Matter," *Harvard Business Review*, May 2003

The most prominent finding is that higher IT capability directly correlates with superior revenue growth. The top performing companies grew on average 3.5 percent (compounded annually for 2002-2005) faster than the average for all peers in their industry. The companies in the bottom quartile on average grew 3.3 percent slower than their peers. The results were statistically significant with a very high degree of confidence (see Figure 1).

Figure 1. Correlation Between IT Capabilities and Business Performance



Our research reinforces the critical need to build IT on top of a robust infrastructure. Firms in the top quartile of IT capability enjoyed a 23 percent advantage in revenue per employee compared with firms in the bottom quartile of IT capability. The analysis shows that the primary driver of this difference is superior IT infrastructure in the form of an optimized combination of access, security, maintenance, backup/recovery, and messaging systems.

This research also confirms that better software provides managers with the tools they need to have better insight into, and control over, key dimensions of their business. For example, firms with better financial and operations systems, such as systems that support order management, asset and inventory control, forecasting, and reporting, reported significantly better insight into customer and product profitability, as well as better control over product pricing and more influence over their business partners.

Firm performance was measured relative to peer group companies from within the same industry sector. While this research was conducted with manufacturing firms, our previous research with midsized companies in service industries² showed a similar positive impact of IT on revenue growth. In both studies, IT capability scoring was based on a business activity-driven measure of IT capability. The studies looked at actual in-use IT and excluded IT capabilities that were present but not used in the normal course of business.

The Enterprise IT Capability Study provides new insights into the impact IT has on business. The study shows that enterprises with better software systems achieve higher productivity and have greater insights into and control over their businesses, resulting in substantially higher revenue growth. This study provides clear evidence that IT matters and that better IT makes a quantifiable, positive difference on business performance.

² Marco Iansiti, George Favaloro, et al., "Why IT Matters in Midsized Firms," Harvard Business School Working Paper Series No. 06-013, 2005

I. Debate

A significant volume of research has investigated the links between IT investment and a firm's growth and productivity.³ The results of these efforts have been ambiguous and often contradictory.

For example, the results of early studies indicated that increases in IT spending might actually decrease productivity. This led to the declaration of a "Productivity Paradox." This early pronouncement was subsequently refuted by analysis on better data demonstrating that IT investment actually increased productivity at the economy, industry, and firm levels.⁴

A similar situation has arisen with links between a firm's profitability and its IT investment. Many studies have failed to find a relationship between profitability and IT investment - or if they found a link, it was the reverse of the one expected. In this research, growth in profitability seemed to drive growth in IT investment, not the other way around; good financial performance in one year was an indicator of increased IT investment in subsequent years.⁵ The ambiguity of this research naturally produced broad pronouncements on the value of IT. Most prominently, Nicholas Carr in his 2003 article titled "IT Doesn't Matter" claimed that IT was merely a ubiquitous utility, like electricity, that conferred no strategic advantage to the firms that employed it.

Again, these pronouncements were likely premature. The most critical consideration appears to be the use of IT spending as a surrogate measure of IT performance. Numerous studies indicate that it is a poor measure.⁶

Therefore our research is based on the proposition that IT effectiveness depends not on how much a company invests but how effectively managers make use of their IT dollars. We propose to reformulate the challenge of measuring IT impact: to develop a useful way of measuring a firm's comparative level of IT capability and then test the relationship of superior IT capability to business performance.

Besides providing direct insight into how IT is actually used in organizations, this method has the additional benefit of allowing detailed probing into which types of IT capabilities have the biggest positive effects. For example, across a broad set of comparable firms, we have examined what has a bigger impact on business performance: superior customer-facing information technology, such as a customer support system, or operational and financial systems. We have also

³ For more comprehensive reviews of previous literature, please refer to Crowston & Treacy 1986, Brynjolfsson 1993, Brynjolfsson & Yang 1996, Chan 2000, Dewett & Jones 2001, Kohli & Devaraj 2003, and Melville et al. 2004, among others.

⁴ Brynjolfsson & Hitt 1993, 1995, 1996 & 2000, Brynjolfsson 1993, Jorgenson & Stiroh 1995 & 2000, Lichtenberg 1995, Triplett 1999, Oliner and Sichel 2000, Kraemer and Dedrick 2001, Jorgenson 2001, Gordon 2002

⁵ Weill 1992, Kraemer & Dedrick, 1993, Brynjolfsson & Hitt, 1996, Hitt & Brynjolfsson, 1996, Siegel, 1997, Lee, Barua & Whinston 1997, Sircar, Turnbow, & Bordoloi, 2000, Shin, 2001, Hu and Plant 2001, Hitt, Wu, & Zhou, 2002.

⁶ Bharadwaj (2000) suggests, "IT investment dollars serves as a poor surrogate for assessing a firm's IT intensiveness." Devaraj and Kohli (2003) add, "Merely examining the dollars invested in IT may not be an accurate reflection of the effectiveness of IT because the extent of its usage may vary across industries, firms, or processes." Brynjolfsson and Hitt (1996) suggest another criticism of IT spending. They say that economic theory predicts that in equilibrium, companies that spend more on IT will not have higher profitability. Rather, managers will be as likely to over spend as they are to under spend. Thus a company that spends more is not necessarily "better." By their logic, the finding of a zero or weak correlation between spending and profitability does not indicate a low payoff for computers, but instead suggests an "expected" payoff.

investigated the importance of investing in these areas versus assuring a solid IT infrastructure or providing exceptional collaboration and employee empowerment with technology.

The debate over whether IT matters has cooled somewhat, with most executives willing to accept that IT can create competitive advantage. But frustration remains with the difficulty in showing *how* IT matters. This research provides new data that we believe addresses this conundrum.

II. Methodology

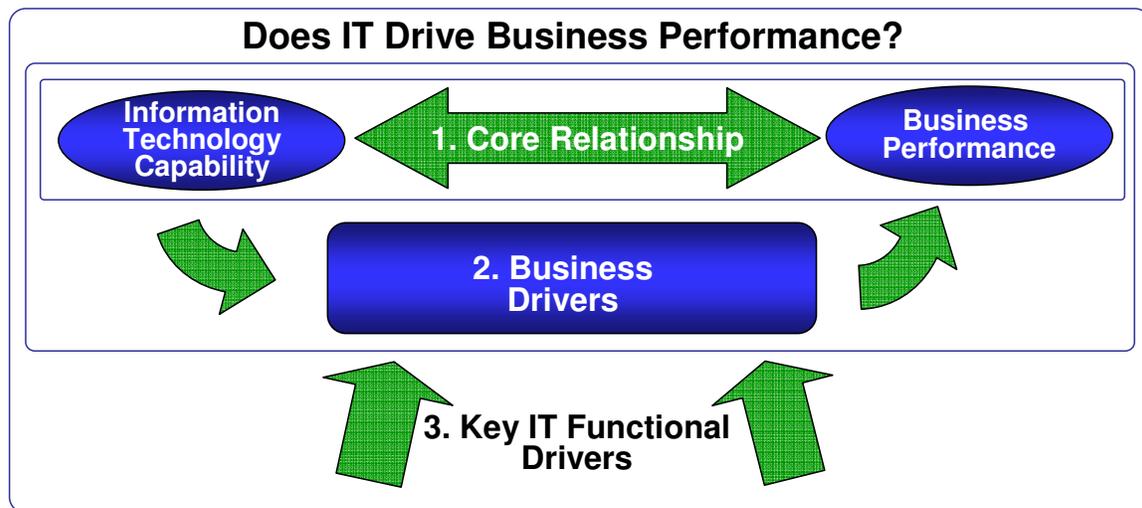
II.a. The Conceptual Model

Our research goals were threefold:

1. Explore the fundamental link between IT capability and business performance.
2. Test for the impact of IT on key business drivers and show how those drivers relate to business performance.
3. Understand how individual functional IT systems impact business performance drivers.

The resulting conceptual model that guided our analysis is illustrated in Figure 2.

Figure 2. Study Conceptual Model



II.b. Scoring IT Capability

Design Approach

To achieve the objectives of the study, we developed a new approach to measuring IT capability within a company. In a departure from previous studies that used indicators such as IT spending or PCs per employee and other measures of IT investment as a proxy for the impact of IT, we sought to assess the reach and quality of each company's software-enabled business processes. With this perspective in mind, we endeavored to design a measurement framework that:

- Is operationally relevant and generally reflects the way that enterprises conduct business.
- Provides an objective measurement encompassing the broad variety of surveyed companies.
- Is broad enough to capture IT characteristics across the enterprise.

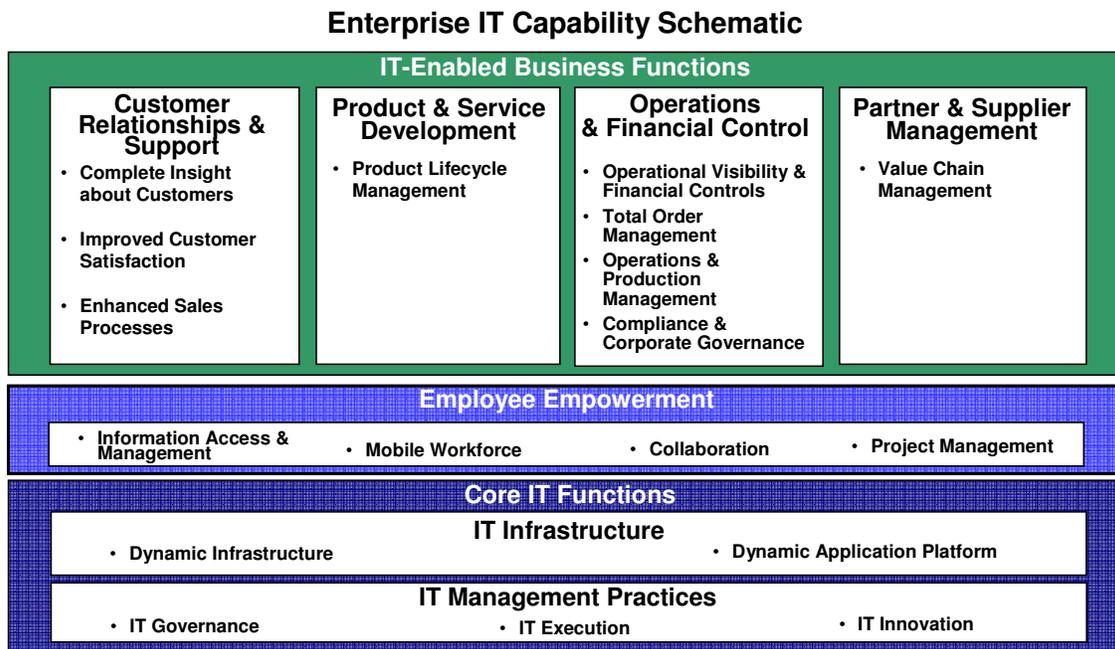
The IT Capability Measurement Framework

Following these criteria, we developed two major categorizations of functions that represent activities impacted by IT:

- IT-Enabled Business Functions: At the highest level of traditional business activities, we settled on four categories of IT-enabled business functions:
 1. Customer Relationships and Support - The systems a firm uses to develop and cultivate customer relationships.
 2. Product and Service Development - The systems used to design products and manage all aspects of a product’s life cycle.
 3. Operations and Financial Control - The systems that allow management of the operational aspects of the business as well as the systems that enable rigorous, yet efficient, financial management.
 4. Partner and Supplier Management - The systems used to manage a supply chain.
- Employee Empowerment and Horizontal IT Functions: We also included within the framework three categories of horizontal functions:
 5. Employee Empowerment - IT systems and tools that enable employees to collaborate and use the information required for them to do their jobs.
 6. IT Infrastructure - The foundation elements that provide secure, reliable connectivity to information inside and outside a company.
 7. IT Management Practices - Setting IT priorities, managing IT projects, and using IT as a tool for business innovation.

The resulting framework for measuring IT capability is illustrated in Figure 3. This framework is closely aligned with traditional business operations and processes. It captures total IT impact by examining support for business functions as well as core IT capabilities.

Figure 3. IT Capability Measurement Framework for Large Enterprises



The Scenario-Based Assessment Method

Since IT systems and their impact on business functions are diverse and complex, we needed a method to characterize IT capability that captured the impact of technology without being tied to specific features and functions. We adopted a “scenario” concept that had proved effective in our mid-market study.⁷ A business scenario is characterized as incidences of IT enablement within a business, support, or infrastructural function.

Each function contains one or more scenarios. For example, one of the IT scenarios in the customer relationships and support category is enhanced sales processes, defined as: automated sales support to ensure optimized electronic purchasing, marketing and account management, and sales pipeline management. For a complete set of scenario descriptions, see Appendix 1.

The Scoring Method

To assure consistency in scoring across firms, we developed a survey structured on the scenario framework containing approximately 115 questions. Questions were designed to expose an exact, objective level of capability based on company practices and indicators of IT-enabled functions. We conducted a pilot round of interviews with CIOs at enterprise-level companies to assure that it captured the full spectrum of IT capability levels that exists at companies today. Through the interviews, we calibrated the survey so that the median firm would score approximately 50 on a 1-100 scale.

In all cases, we looked at actual in-use IT. We excluded IT capabilities that were present but not used or that were close to rollout. This approach contrasts with indicators used in previous surveys of IT capability, such as IT spending or PCs per employee. Our approach has resulted in an accurate, business activity-driven measure of IT capability.

II.c. Survey Participants

Researchers conducted field surveys with senior IT executives at “global 2000” manufacturing companies. For sampling purposes, we divided the surveying into three geographic regions: United States, Western Europe (Scandinavia, Germany, and the United Kingdom), and Japan. Figure 4 shows the distribution of survey participants by region. Surveys were conducted both in-person and by telephone in the native language of the interviewee.

Figure 4. Survey Statistics

Geographic Regions of Survey Participants

	No. of Firms	% Public	Median Revenue (in thousands)	Median Employees
All	161	81%	\$908	3,465
U.S.	88	88%	\$1,656	4,400
W. Europe	34	56%	\$703	2,971
Japan	39	87%	\$2,518	4,460

⁷ Marco Iansiti, George Favaloro, et al., “Why IT Matters in Midsized Firms,” Harvard Business School Working Paper Series No. 06-013, 2005

The companies sampled were drawn from a broad range of manufacturing verticals and sectors, all within Standard Industrial Classification codes 2000 to 3999 (see Figure 5). We selected companies that reported more than 1,000 employees. Our largest respondent had nearly 350,000 employees.

Figure 5. Sectors Sampled

Manufacturing Verticals and Sectors

Vertical	Sector	Vertical	Sector
Basic Materials	Commodity Chemicals	Industrials	Aerospace
	Paper		Building Materials & Fixtures
	Specialty Chemicals		Business Support Services
	Steel		Commercial Vehicles & Trucks
Consumer Goods	Apparel - Clothing		Containers & Packaging
	Auto Parts		Defense
	Automobiles		Diversified Industrials
	Brewers		Electrical Components/Equipmt.
	Distillers & Vintners		Electronic Equipment
	Durable Household Products		Industrial Machinery
	Food Products		Pharmaceuticals
	Furnishings		Steel
	Recreational Products		
	Sporting Goods		
Consumer Services	Publishing	Oil & Gas	Oil Equipment & Services
Health Care	Medical Equipment	Technology	Communication Equipment
			Computer Hardware
			Electronic Office Equipment
			Semiconductors
			Telecommunications Equipment

II.d. Business Performance Measurement

To complete our model, we needed a corresponding set of business performance indicators. For each company in the study, we compiled publicly available information on several key traditional performance metrics, including revenues, operating profits, assets, and market capitalization. In cases where publicly available information was not available, we used self-reported figures.

Individual performance for each company in our sample was normalized to identify performance differences relative to a company's specific peer group and to remove variability caused by sector-by-sector performance differences (see Figure 6). We adjusted the data to reflect continuing operations only, thereby eliminating effects of extraordinary actions such as mergers and divestments.

Figure 6. Sector Normalization

Survey Sectors – Total Population and Surveyed

Sector	Global Manufacturing 2000			Surveyed Firms		
	Count	2002-05 Revenue CAGR	Variance (Std Dev.)*	Count	Average IT Score**	2002-05 Revenue CAGR
Industrial Machinery	174	9.7%	5.7%	18	51.9%	8.9%
Building Materials & Fixtures	106	8.4%	5.4%	15	51.9%	9.9%
Electrical Components & Equipment	152	8.5%	6.1%	13	56.4%	8.0%
Auto Parts	129	12.0%	6.5%	12	50.1%	11.9%
Electronic Equipment	87	10.1%	6.5%	9	57.3%	10.3%
Food Products	123	6.9%	7.0%	9	55.4%	6.4%
Commercial Vehicles & Trucks	76	13.7%	8.5%	7	55.8%	16.5%
Medical Equipment	48	11.7%	7.5%	7	61.9%	15.9%
Commodity Chemicals	49	12.9%	5.1%	6	53.0%	14.1%
Specialty Chemicals	116	10.4%	4.9%	6	57.7%	8.5%
Steel	77	15.2%	7.4%	6	40.7%	14.1%
Paper	33	4.8%	4.3%	5	51.2%	5.1%
Aerospace	31	8.6%	4.8%	4	49.2%	7.4%
Semiconductors	72	10.1%	7.2%	4	60.8%	14.6%
Containers & Packaging	41	8.3%	5.5%	3	48.5%	5.4%
Distillers & Vintners & Brewers	19	8.1%	6.7%	3	71.1%	3.7%
Furnishings	38	4.7%	8.4%	3	65.4%	10.9%
Oil Equipment & Services	20	12.7%	4.3%	3	53.7%	12.6%
Apparel - Clothing	89	6.7%	5.3%	2	73.9%	3.8%
Recreational Products & Sporting Goods	38	8.5%	6.1%	2	40.5%	7.5%
Other	652	8.6%	7.3%	24	59.5%	12.2%
Grand Total	2170	9.4%	6.9%	161	55.1%	10.3%

* Variance represents the amount of difference in growth rates between the companies within each sector expressed in terms of the standard deviation. We normalized the growth rates of individual companies by calculating the how much they exceeded or lagged the average revenue CAGR for their sector.
 **As scored on Keystone's 1-100% scale.

II.e. Business Drivers

Insight and Control Measures

To determine if there were other factors that might help explain how IT impacts business performance, we collected a secondary set of information related to business management and its interaction with IT. We sought two types of indicators:

- The level of business insight on critical business elements, such as customer profitability..
- Control that executives have over key levers of their business, such as product prices.

Productivity Measures

Measures of productivity in industry and academia vary in composition as well as complexity. Fundamentally, productivity must be measured as some form of output against a form of input. For this study, we collected company data on the number of employees and revenues. These provided a simplistic but reasonably effective proxy measure for productivity. All subsequent productivity references within this report refer to a measure of revenue per employee.

In our efforts to define the interaction between IT and business performance, we ran a spectrum of multivariate regression models, testing a range of different business performance variables. All results presented within this report are highly significant, and where there is a range of statistical significance, exact results are shown.

III. Findings

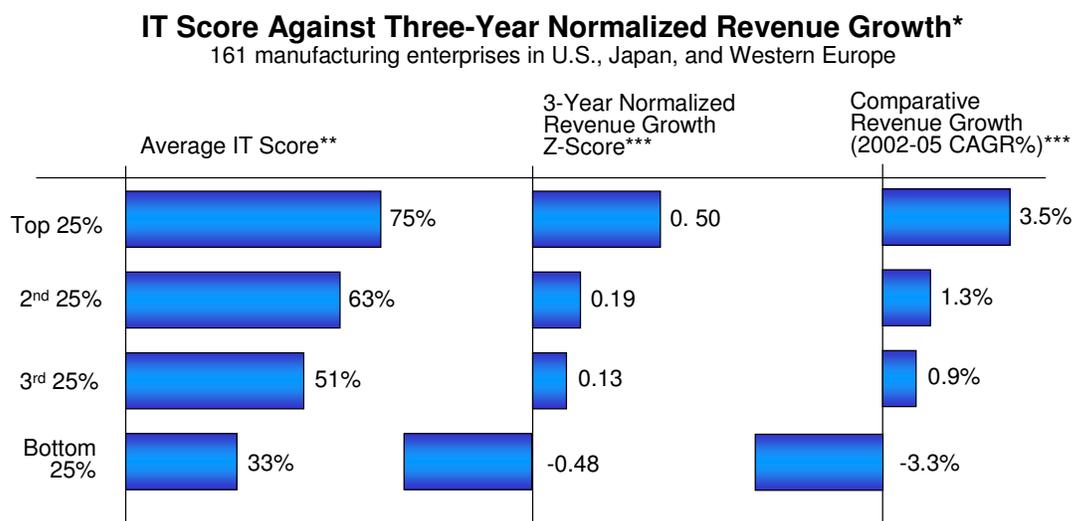
We examined the impact of IT capability on business performance at three levels of increasing specificity: the fundamental relationship between IT and business performance, IT's relationship to key business drivers, and the impact of specific functional IT systems on the business drivers.

III.a. Does IT Drive Business Performance?

At the highest level of analysis, our research found that superior IT drives top-line growth. A quartile view of IT capability scores tallied from survey results shows distinct differences between high- and low-performing companies (see Figure 7). On average, firms in our survey that scored higher in IT capability grew more rapidly than firms with lower IT capability scores.



Figure 7. IT Capability and Normalized Business Performance



* Statistically significant to the 99 percent level⁸

** IT Score based on IT Capability Measurement Framework, 1-100 scale

*** Growth rates for individual firms are normalized against mean and standard deviation for all firms in their sector. The population (manufacturing 2000) revenue CAGR mean is 9.4 percent, standard deviation is 6.9 percent.

This exceptional growth in the top line is matched on the bottom line. Our analysis showed that the firms with stronger revenue growth maintained their profit margins. Thus firms with superior IT capabilities grew their bottom lines commensurately with top-line growth.

We explored but eliminated several other business performance measures that appeared to show no statistically significant relationship to IT capability. These included margin measures (earnings before interest and taxes, return on assets, and net income) and valuation measures (market

⁸ In a regression with three-year sales growth a function of IT score and firm size, and with controls for country, the t-stat of the coefficients on the IT score was significant at the 99 percent level.

capitalization, price to earnings ratio, and stock price). These findings are as yet inconclusive - perhaps a source for further investigation.

III.b. IT's Impact on Business Drivers

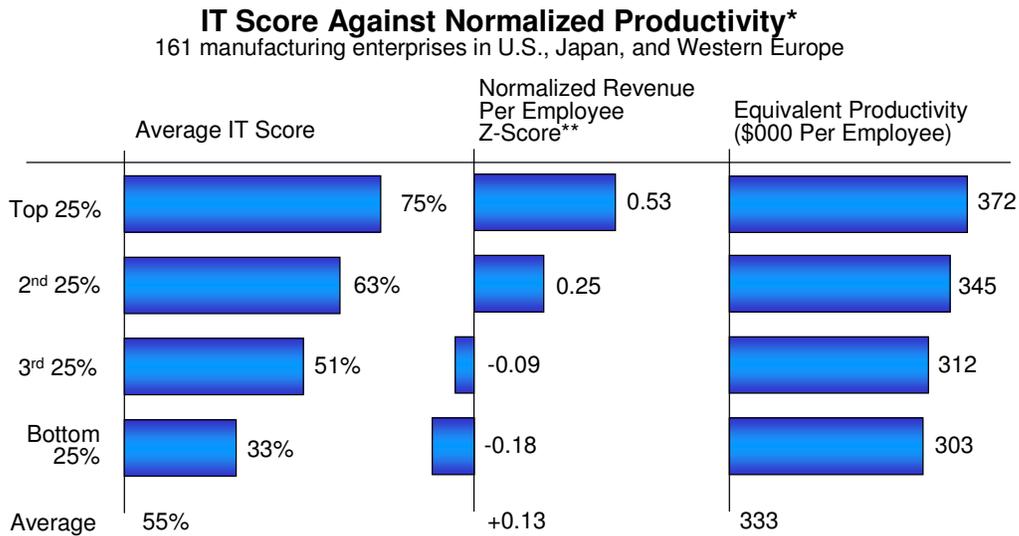
Beyond the core relationship between IT capability and business performance, we sought to understand *how* superior IT confers its benefits to commercial organizations. We analyzed two types of intermediate variables: worker productivity, and insight and control.



Strong IT Drives Productivity

We found a solid connection between IT capability and productivity (see Figure 8). In our sample, average productivity of the top quartile of firms was \$372,000 per employee, while the average productivity of the firms that scored in the bottom quartile in IT score was \$303,000. This represents a productivity advantage of nearly 23 percent for IT leaders over IT laggards.

Figure 8. IT Capability and Normalized Productivity



*Statistically significant to the 97 percent level⁹

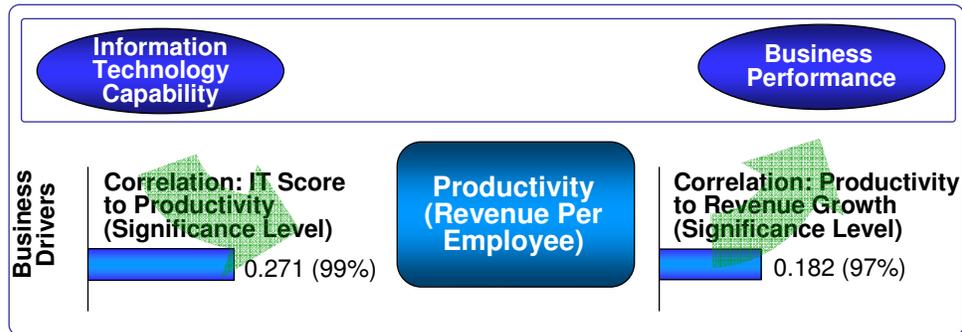
**Revenue per employee for individual firms are normalized against mean and standard deviation for all firms in their sector.

While improved productivity is often viewed as an end goal, in our model of IT's impact on firm performance, we treated productivity as an intermediate business driver of a higher level of business performance. As can be seen in Figure 9, our data shows a correlation between IT score

⁹ In a regression with normalized revenue per employee a function of IT score and Firm size, and with controls for country, the t-stat of the coefficients on the IT score was significant at the 97 percent level.

and productivity of 0.271¹⁰ (with statistical significance of 99.8 percent¹¹), and a correlation between productivity and revenue growth of 0.182 (with 97 percent statistical confidence). As the IT capability score increased, the productivity score also increased. There is a similar positive correlation between productivity and revenue growth.

Figure 9. Normalized Productivity as a Business Driver



The relationships depicted in Figure 9 are quite striking. They show one of the major mechanisms by which firms can achieve better business performance from well-implemented IT systems: giving their employees tools that let them get more done. In section III.c. below, we explore which specific IT functions are particularly strong drivers of productivity.

Strong IT Also Drives Superior Insight and Control

In addition to exploring IT's impact on productivity, we also investigated the relationship between IT capability and the capacity of managers to gain the information they need to run their business. Specifically, we sought to explore the hypothesis that companies with better IT have better control of key business levers and better insight into their business.

Accordingly, we measured and analyzed four variables:

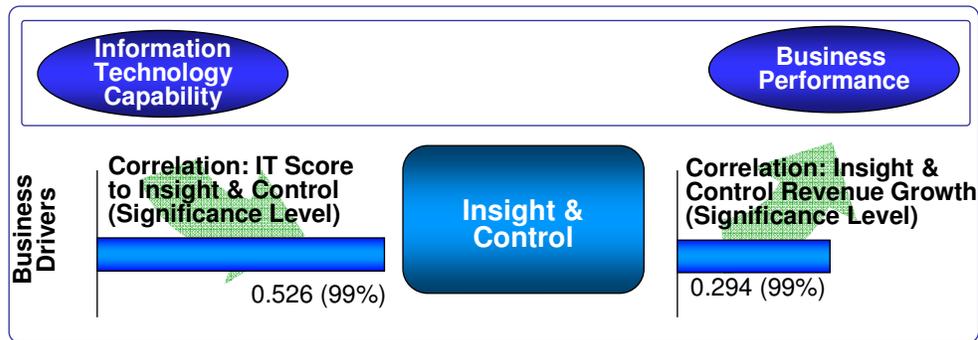
- Price control - How well a firm's management controls its net price after discounting.
- Partner influence - How precisely a firm influences the focus and operations of its business partners.
- Insight into product and product line profitability - How well the firm managers know product and product line profitability.
- Insight into customer profitability - How accurately management knows customer segment and individual customer profitability.

¹⁰ Correlation is a numeric measure of the strength of the linear relationship between two variables. A correlation of 1.0 means that when one variable changes, the other changes by exactly the same proportion. In this research we looked for correlations of greater than 0.15, with statistical significance of over 95 percent, to indicate the presence of a meaningful relationship.

¹¹ Statistical significance is an estimate of the probability that the calculated correlation is different from zero. Significance measures the level of confidence one can have that there is a positive relationship between the two variables. Statistical confidence above 95 percent is considered high (a one in 20 chance that the calculated correlation between the two variables is spurious). Statistical confidence above 99 percent is considered very high (a one in 100 chance that the actual correlation is zero).

Our results show that enterprises with better IT scores have superior insight into and control over their business. Correlation between IT capability and an aggregate variable, created by adding together all four individual control and insight variables, is 0.526 and is statistically significant to the 99.9 percent level. (See Figure 10.) This supports a hypothesis that relatively better IT systems provide executives with more insight and control over their business.

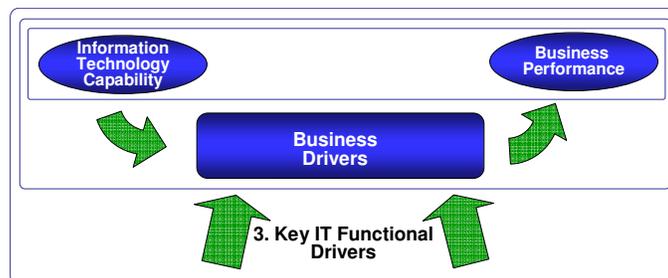
Figure 10. Core IT Scenarios and Business Performance



We also analyzed the relationship between this aggregate “insight and control” variable and revenue growth. A correlation of 0.294 with statistical significance of 99.8 percent exists between these two variables. (Again, see Figure 10.) This supports the hypothesis that firms with better insight and control over their businesses grow faster than their competitors. This finding validates what we believe is a key mechanism by which IT confers business advantage: implemented correctly, software provides managers with the tools they need to have better insight into and control over key dimensions of their business. This insight and control translates to quantifiable business advantages.

III.c. Understanding the Impact of Individual IT Functions On Business Drivers

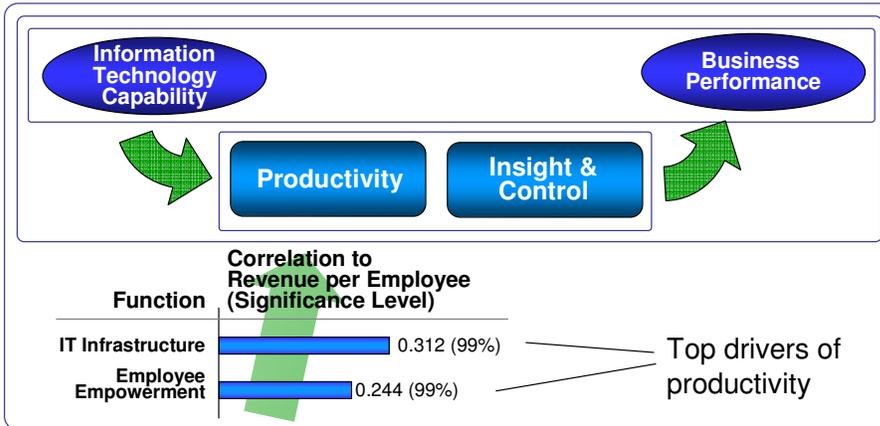
Having established the importance of productivity and insight and control as key IT-related business performance drivers, we then turned to the third of our research objectives: understanding which of the seven individual functional IT systems (for example, Customer Relationships and Support, Operations and Financial Control, Employee Empowerment, and IT Infrastructure) had the biggest impact on these performance drivers.



While all functions were positively correlated with these business drivers, the IT functions that had the biggest impact on employee productivity were IT infrastructure and employee empowerment. While one would expect employee empowerment - which includes information access, mobility, collaboration applications, and project management systems - to affect productivity, it is noteworthy that in this sample of companies, software infrastructure played an even more

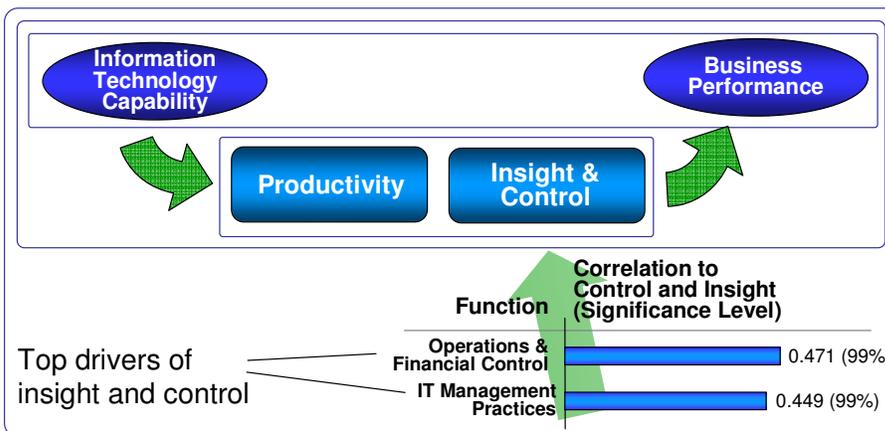
important role in enhancing worker productivity. This finding highlights the critical role that a robust infrastructure plays within an organization (see Figure 11). An optimized combination of access, security, maintenance, backup/recovery, and messaging systems was the biggest driver of superior revenue per employee.

Figure 11. IT Functional Drivers of Productivity



The strongest impact on the insight and control variable score came from the operations and finance IT functions (see Figure 12). This also supports intuition; one would expect operational systems to be critical to insight into product and customer profitability, as well as to controlling costs and influencing business partners. Specifically, our research showed that firms with better financial and operations systems - such as systems that support order management, asset and inventory control, forecasting, and reporting - had significantly better insight into customer and product profitability, better control over product pricing, and more influence over their business partners.

Figure 12. IT Functional Drivers of Insight and Control

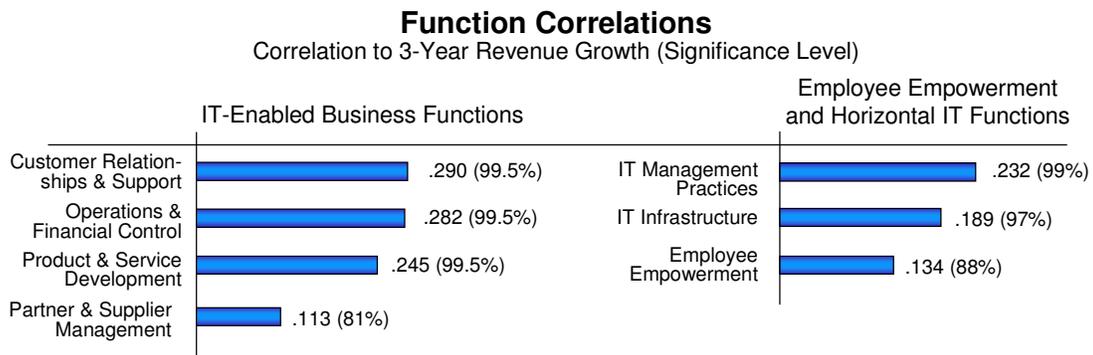


III.d. Direct IT Function Contribution to Revenue Growth

In addition to testing our conceptual model (as discussed in sections III.b. and III.c. above), we also found it valuable to look at the direct correlations between the business and “horizontal” IT functions and business performance.

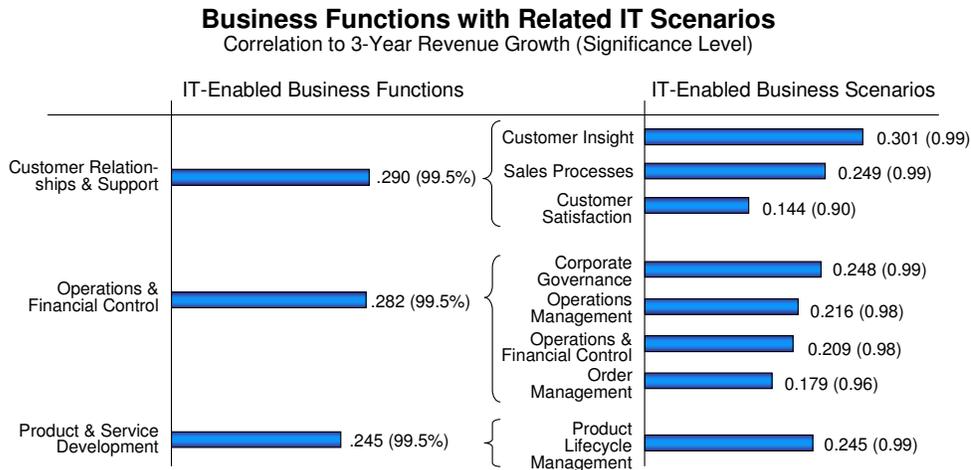
All IT functional areas were found to have a positive correlation with growth (see Figure 13). The strongest contributor among the IT-enabled business functions was customer relationships and support, with operations and financial controls contributing to nearly the same degree. IT management and IT infrastructure were the key contributors among the core IT functions.

Figure 13. Business Functions and Business Performance



A look at detailed IT scenarios (see Figure 14) shows the impact of IT at a more granular level. Customer insight and enhanced sales processes are the two key scenarios contributing to the impact of the customer relationships and support function. The customer insight scenario involves systems that enable customer profiling, lead generation, and up-selling. The sales processes scenario encompasses automated systems to ensure optimized electronic purchasing, marketing and account management, and sales pipeline management.

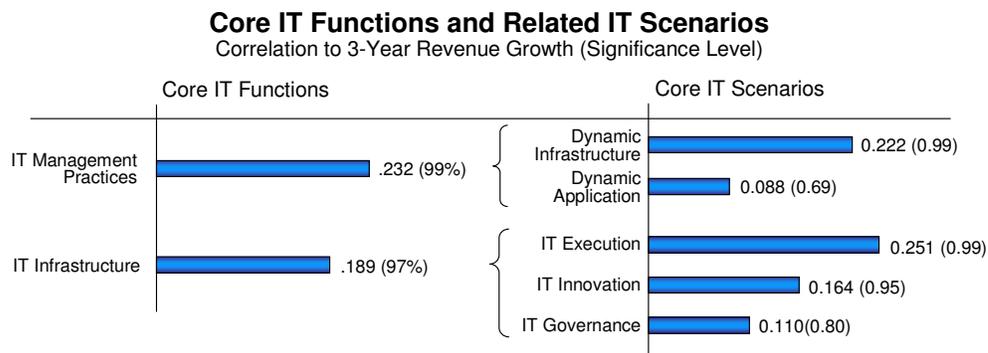
Figure 14. Business Functions with Related IT Scenarios



All scenarios in the operations and financial control area showed significant correlations with revenue growth (again, see Figure 14.) The operational visibility financial controls scenario includes systems that provide complete insight about finances, visibility across enterprise operations, and support for forecasting and reporting. The total order management scenario includes operational applications related to the “cash-to-cash cycle” and to providing visibility and management through integration of orders, production assets, inventory, client forecasts, and finance. The operations and production management scenario refers to systems for getting optimal use from production assets and for reducing inventory costs.

Within the core IT functions (see Figure 15), dynamic infrastructure and IT execution are the scenarios with the highest significant correlations to revenue growth. A dynamic infrastructure means having an optimized combination of access, security, maintenance, backup/recovery, and messaging systems. IT execution capability is the ability for the IT organization to develop and manage detailed project plans that include cost, resource requirements, business impact, and success metrics.

Figure 15. Core IT Functions with Related IT Scenarios



These relationships reinforce an overarching theme that emerged from our research: gaining business advantage from IT requires a strong focus on core infrastructure. IT infrastructure provides a key foundation that enables high worker productivity and is one of the key IT drivers of revenue growth.

IV. Further Discussion

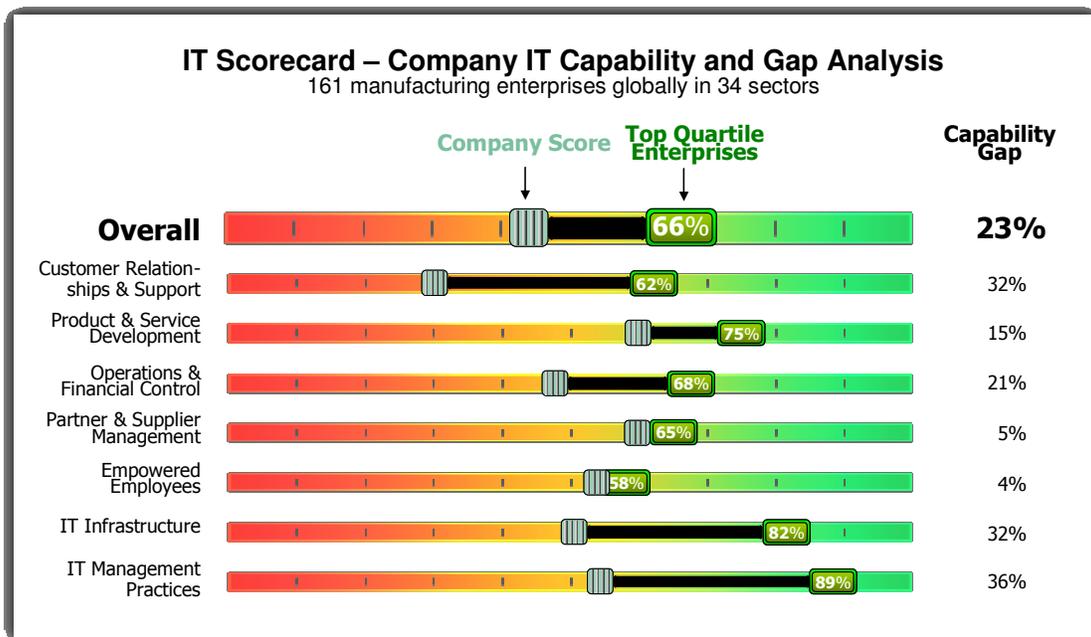
IV.a. Practical Application of the Study Findings

The methodology employed to conduct the study yields several insights and potential tools. These tools can help executives:

1. **Measure their organization's IT capability and IT management ability.** We have developed a detailed framework for measuring the level of IT used in support of mission-critical business functions and infrastructure, as well as IT management metrics. This can be useful for both internal assessment and for evaluating IT services providers.
2. **Measure IT capability gaps.** The extensive data underlying the study can allow individual companies to compare their IT scores to peer groups and best practices.
3. **Develop a plan for closing gaps and driving improved business performance.** Tying IT capabilities to business performance helps provide an objective means for prioritizing business process improvement and IT initiatives. By gaining an understanding of the specific areas in which their company's IT capability is lacking, as well as understanding which capabilities have the greatest impact on business performance, executives can create a rational plan for improving IT capability for the greatest return on investment (ROI).

Figure 16 shows an example of the performance of an actual company in our study against the top quartile of performers in its sector, building materials.

Figure 16. IT Scorecard Helps Prioritize IT Initiatives



If you are interested in benchmarking your organization, contact Keystone Strategy, Inc. at ITScore@key-inc.com

IV.b. Addressing the Gaps

This research also offers direction for executives seeking to prioritize among their companies' gaps in IT capability. To illustrate, consider the following distinct cases:

Case 1: If your company shows a significant gap in operations and finance systems, this is likely hindering the ability of managers to obtain the insight and control over the business that others in your industry sector exercise (see section III.c. on pages 13-14) regarding control over pricing and influence over suppliers and business partners.

Case 2: If your company shows a significant gap in IT infrastructure, employees are likely to be less productive than those at peer companies (see section III.c. on pages 13-14). Our research shows that superior IT infrastructure is critical to employee productivity.

Case 3: If your company shows gaps across the board in IT capabilities, the single highest value action you can take is to raise the level of customer-facing systems. As discussed in section III.d. on page 15-16 (see Figure 13), the single highest correlation between an IT function and business performance is customer relationships and support. Our data suggests that focusing on this single function offers the most direct path to improved business performance.

Our analysis provides a unique opportunity for setting IT priorities based on specific IT gaps compared to peers, as well as a data-driven assessment of the impact of those gaps on business performance. The three cases above are meant to illustrate potential prescriptive uses but are not an exhaustive list of such uses; there are additional secondary and tertiary relationships which we are in the process of analyzing. Rather, the work as presented illustrates that through careful analysis of a broad set of comparable companies, it is possible to understand how specific gaps in IT systems impact a firm and further identify the potential benefits of addressing the gaps.

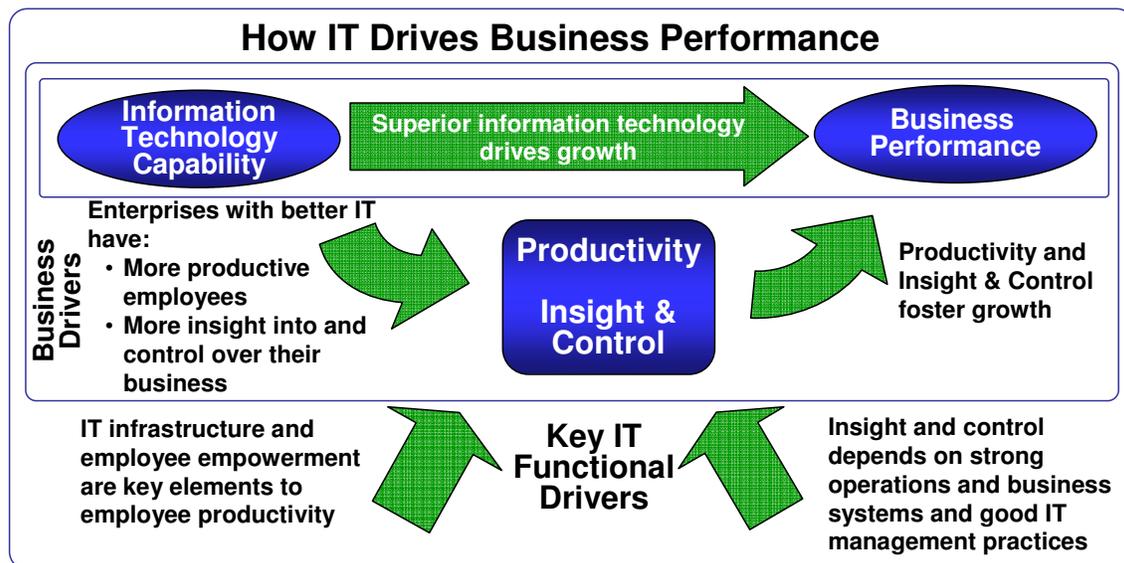
Conclusions

This study's primary focus was on investigating the possible correlation between IT capability and business performance. It demonstrates a statistically strong relationship between IT capability and three-year revenue growth. While there has been much serious debate about the relationship between IT and business performance, our method of scoring IT capability - based on assessing how well IT supports executives, managers, and information workers and how well IT enables key business processes - makes clear that IT plays a critical role in the top line growth of the firm. Although this research was conducted with product companies, similar research we conducted in the summer of 2005 with mid-sized services firms shows the same core relationship of IT capability to revenue growth.

Two further layers of analysis illustrate the supporting dynamics of the linkage between software-enabled business processes and business performance (see Figure 17). Specifically, we have demonstrated with an extremely high level of statistical significance that firms with superior software enjoy significantly higher worker productivity and have better insight and control over key levers in their business. These results are particularly valuable because they help provide a picture of *how* superior IT confers its advantages to a business. The analysis provides strong evidence that good IT systems allow employees to do more, and do it more effectively, through better knowledge of and control over their business.

Digging one layer deeper, our analysis of which individual IT functions are the drivers of higher productivity and better insight and control reinforces the key role of a stable and robust IT infrastructure, as well as a well-implemented system to support operations. Firms with superior productivity have built their advantage through a focus on IT fundamentals, especially a superior software infrastructure. Better insight and control rests on superior operational and financial systems.

Figure 17. Dynamic Conceptual Model with Summary Findings



Appendix

Appendix 1. Short Scenario Descriptions

