IMP

I/S INTERCORPORATE MEASUREMENT PROGRAM

SPECIAL REPORT

THE BUSINESS VALUE OF INFORMATION TECHNOLOGY IN CORPORATIONS

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BUSINESS VALUE OF INFORMATION TECHNOLOGY IN CORPORATIONS

INTRODUCTION

Business value refers to the contribution of IT to corporate performance. Business value can be measured along dimensions such as corporate efficiency and effectiveness, competitiveness, product and service innovation, and customer and supplier relationships.

It is expected that different organizations operating in different environments, adopting different portfolios of IT systems, and achieving varying levels of successful diffusion of such systems will attain different dimensions of business value, and to different extents. In effect, individual firms or firms in different industries do not gain equally from IT.

In this report, we identify the range of business value impacts of IT, the extent to which they appear to be realized, and the patterns of association between IT business value and corporate characteristics.

The Intercorporate Measurement Program (IMP) 1994 survey incorporated a new section to identify the ratings of business executives regarding the business value of IT in their corporation. The new section contained 40 questions which asked executives to identify their perception of the impacts of IT actually realized in their corporation. The 40 items were designed to provide measures of 10 dimensions of business value. These include:

- Organizational effectiveness
- Organizational efficiency
- Economies of production
- New business innovation
- Customer relations
- Supplier relations
- Product and service enhancement
- Inter-organizational coordination
- Marketing support
- Competitive dynamics

Appendix A lists the questions used to measure the ten dimensions.

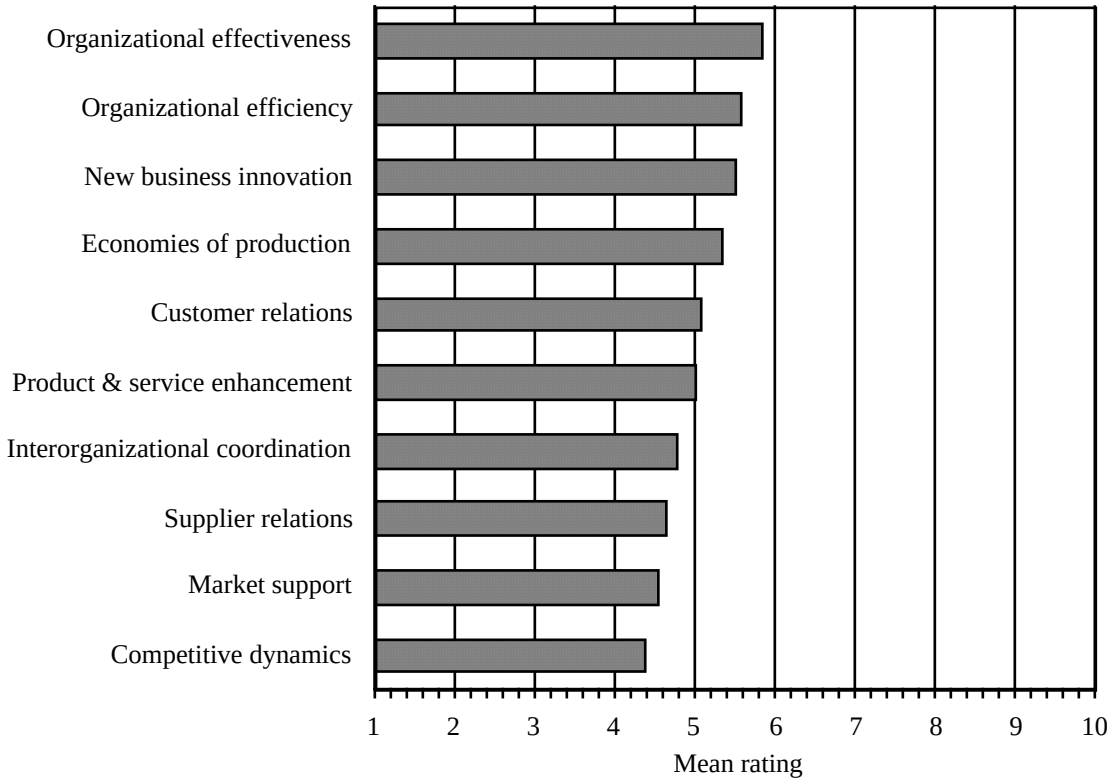
This preliminary report summarizes the responses of 155 business executives across 40 corporations. The executives were asked to indicate the extent to which each measure of business value was actually achieved in the corporation on a scale of 1 to 10, where a 1 meant "weak" and a 10 meant "strong".

EXECUTIVES' OVERALL RATINGS OF BUSINESS VALUE

Overall, the survey shows that business value impacts are beginning to be realized in corporations. Exhibit 1 shows that the mean ratings on a 10 point scale, averaged across all business executives and aggregated across the ten dimensions of business value. The range is from 4.4 for competitive dynamics to 5.8 for organizational effectiveness. One half of the business value dimensions were rated between 4 and 5 and the other half between 5 and 6.

This is the first time such ratings of business value have ever been used and, therefore, these results provide an important baseline from which to determine future progress. The pattern of ratings provides clear support for the notion that a variety of business value impacts from IT exists. Moreover, it indicates that the executives can distinguish among these impacts.

Exhibit 1. IT Business Value Ratings By All Business Executives



But, what does the relatively low rating on the ten dimensions mean? It is too early to tell completely, but it probably means that these business value impacts are first beginning to be felt in corporations. If this is true, one would expect that the ratings would be higher in future years. However, it also is the case that the executives might become more familiar with the business value ratings and rate the ten dimensions higher in future years.

For example, we expected that CIO's would generally rate each of these dimensions higher than other executives because they are more focused and knowledgeable about such impacts. In order to test this expectation, we used a sample of CIO's ratings to calibrate the executive's ratings. As expected, we found that the CIO's rate the contribution of IT to business value higher than the executives on each dimension (See Exhibit 2 on next page).

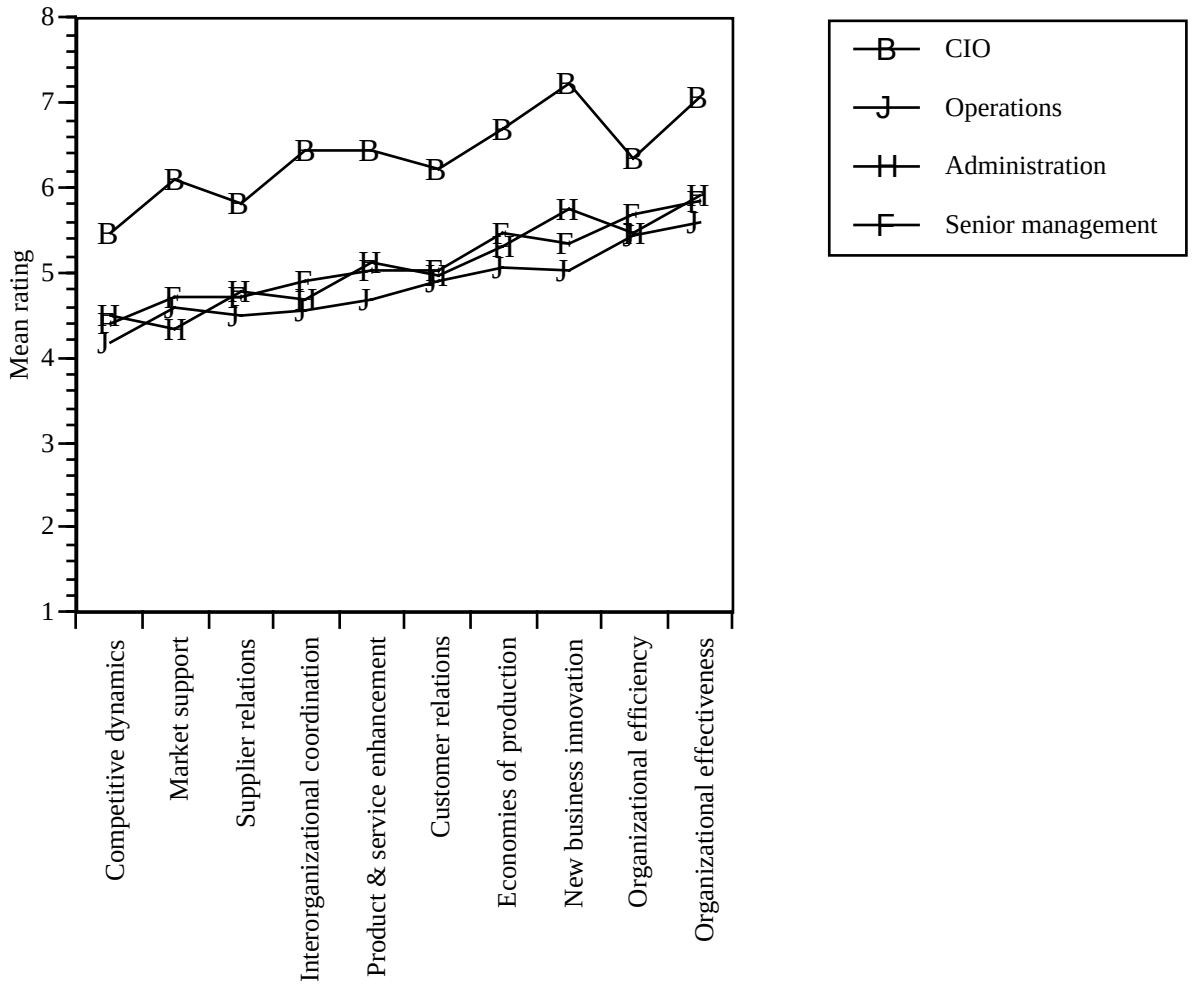
However, two features of the comparison are significant. First, the ratings are not very much higher -- about one point on a ten-point scale. Second, and this is *most* significant, the pattern of ratings for the business executives and CIOs is similar across the ten dimensions. Consequently, they can be regarded as good indicators of the areas of IT impact on business value.
Not surprisingly, the strongest impacts are in the areas of *organizational efficiency* and *effectiveness*, and *production economies.* These areas are traditionally associated with IT impacts, and are also easier to perceive than some of the other dimensions.

However, another strong area of impact is *new business innovation* which has not traditionally been associated with IT impacts. In contrast with images in the popular IT press, the business executives did not feel that IT played a relatively weak role in such areas as competitive dynamics, market support, supplier relations and inter-organizational coordination.

RATINGS BY DIFFERENT TYPES OF EXECUTIVES

In order to better understand these results, the business executives were classified according to their area of responsibility. This examination showed that the respondent set included executives who identified themselves as being in senior management (CEO, COO, President, Vice President), operations (production, engineering), or administration (including human resources and finance). Exhibit 2 shows executives in administrative functions tended to rate IT slightly higher than the other business executives. However, it also shows that there is a remarkable consistency in the pattern of responses across the 10 dimensions of business value for all these groups.

Exhibit 2. IT Business Value Ratings By Type of Executive



BUSINESS VALUE RATINGS BY EXECUTIVES IN DIFFERENT INDUSTRIES

While there is little difference in the ratings of IT business value by type of executive, there is considerable difference in the ratings of executives in different industries. Exhibit 3 shows that executives in service corporations consistently rated the business value of IT much higher than those in manufacturing firms. In fact, along each dimension of business value, the difference is statistically significant at the 10% level, or better. Moreover, a number of differences in the pattern of responses between the two groups of executives are also evident. Manufacturing firms have achieved their strongest IT impacts in the traditional areas of efficiency and effectiveness and economies of production, though the extent to which these impacts are realized appears to be relatively weak. In contrast, service firm executives, indicated that IT has played a strong role in these

Exhibit 3. IT Business Value Ratings By Executives in Service and Manufacturing Firms

areas. In addition, IT has contributed to new business innovation, product and service enhancements, and improved customer relationships.

The weakest impacts for both groups have been in the areas of support for sophisticated pricing strategies and manipulating competitive dynamics. This finding seems at odds with the "strategic information systems" literature, and possibly serves as an indication that such strongly "competitive" dimensions of business value are difficult to achieve and sustain across a large set of firms, or over time.

THE DIMENSIONS OF IT BUSINESS VALUE

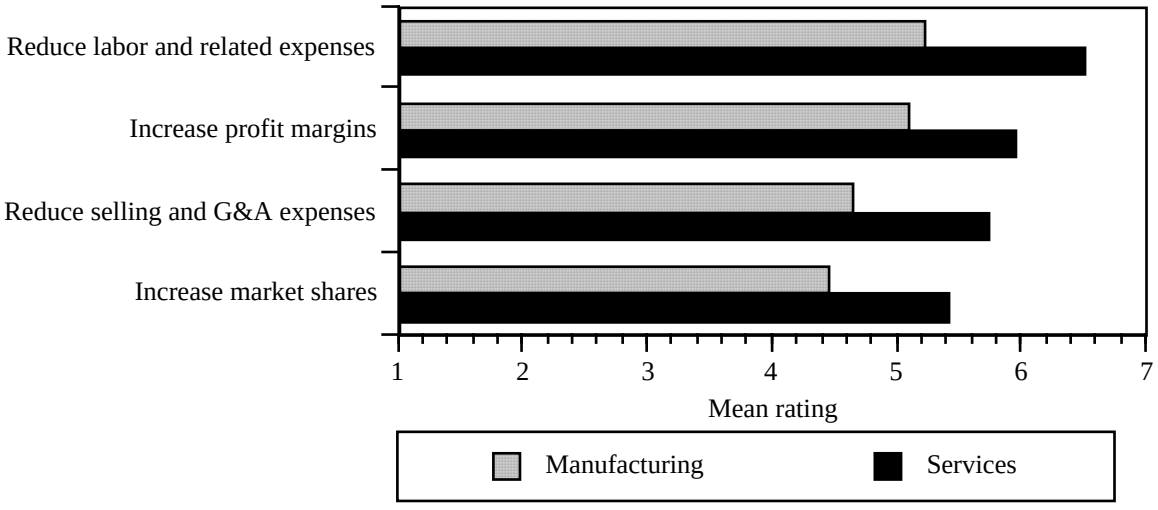
Additional differences can be seen by examining the mean responses to the individual items used to create some of the ten aggregate dimensions described above. Four dimensions that received the strongest ratings by the executives are examined:

- Internal organizational efficiency
- Internal organization effectiveness
- Business innovation
- Economies of production

Organizational Efficiency

Organizational efficiency refers to the potential impact of IT on costs through reduced labor or G&A expenses, which help to increase profit margins. Indeed, the business executives rated IT quite strong in achieving improved profit margins and reduced labor expense, the latter being particularly important in service firms (see Exhibit 4). IT support

Exhibit 4 Organizational Efficiency

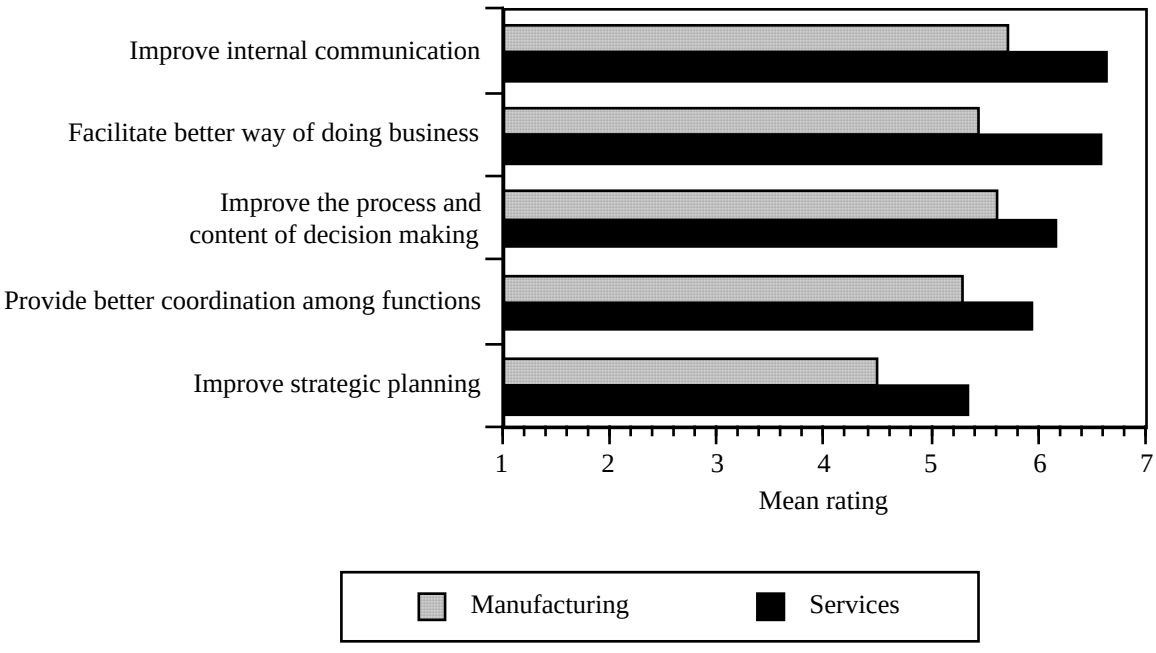


for increased market share was lowest in both manufacturing and service firms, which again appears to be at odds with the expectations of IT being an important strategic weapon.

Organizational Effectiveness

Organizational effectiveness refers to the potential impact of IT on the improved functioning of the firm as an organization in areas such as decisionmaking, communication, coordination, planning and business processes. Exhibit 5 shows that the business executives rate IT's impact quite strong in the areas of communication, business process (re-design) and decision-making. Interestingly, the impact of IT to support strategic planning ranks lowest amongst the five items.

Exhibit 5. Organizational Effectiveness

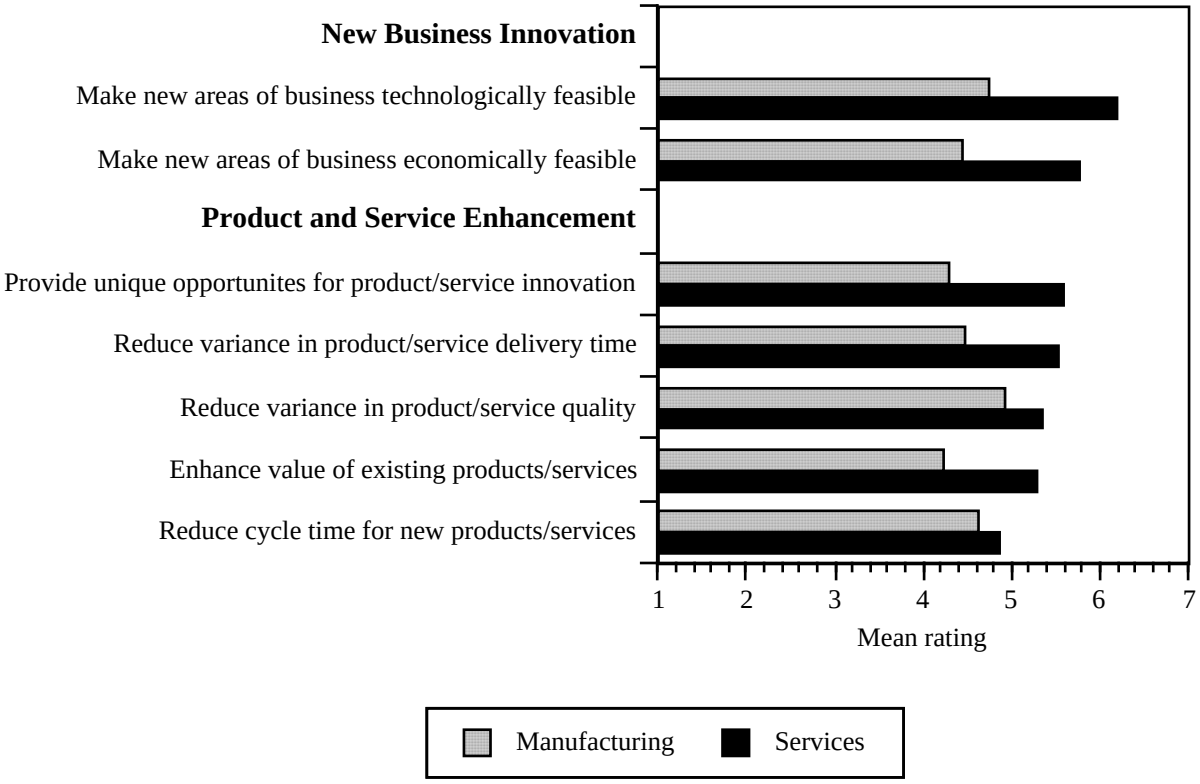


Business Innovation

Business innovation refers to the potential impact of IT on a firm's ability to introduce new products and services quickly, and to improve their quality, value and delivery time to customers. Exhibit 6 shows that the business innovation aspect of IT business value has been realized in service firms through the technology's ability to make new areas of business feasible by reducing technological barriers, and reducing economic barriers through improved economies of scale. The differences between service and manufacturing firms are widest on this item. IT is an important tool for innovation among service firms, but appears to have contributed little to the innovation efforts of manufacturing firms.

This finding is also consistent with the executives' rating for product/service enhancement and innovation. Again, amongst executives in manufacturing firms, IT is perceived to have had little impact on products and services, while the pattern at service firms is obviously much stronger.

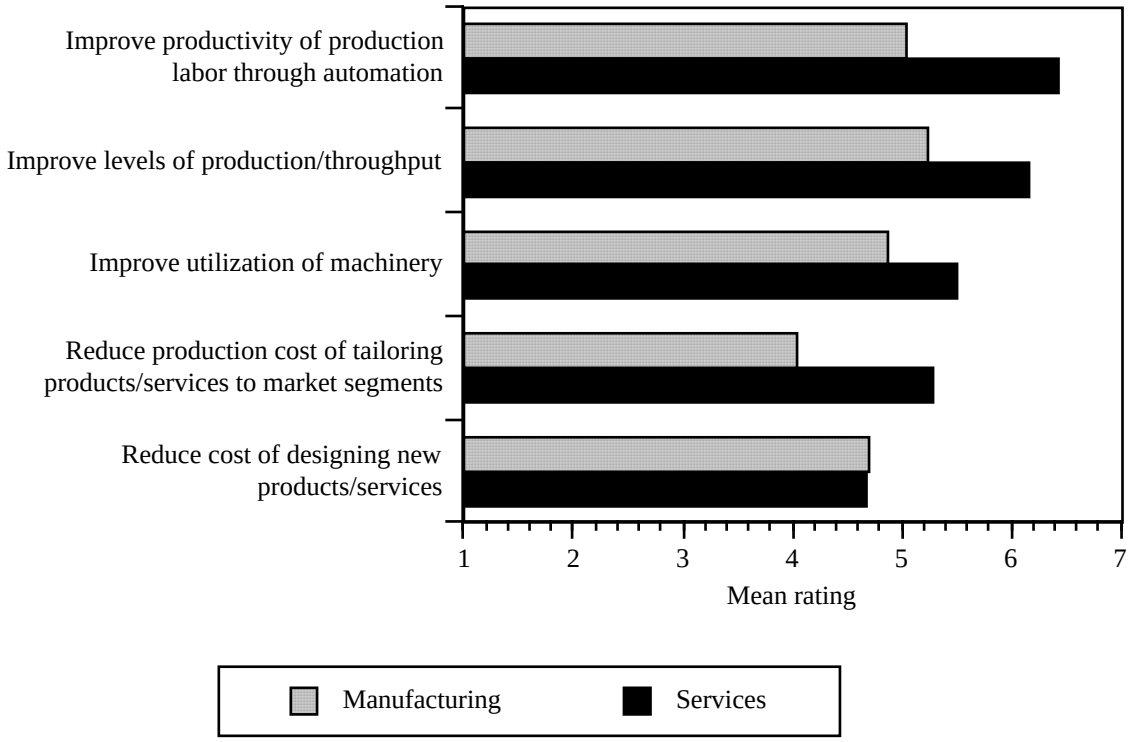
Exhibit 6. Business Innovation



Economies of Production

Economies of production refers to the potential impact of IT in helping to achieve economies in the production processes of firms through the reduction of design labor and customization costs, through improved production output, and through improved utilization of physical and human resources. The business executives indicate that production economics have been enhanced primarily through IT's contribution to improved labor productivity and production levels within service firms (see Exhibit 7). IT appears to have had little impact on design activities in either industry.

Exhibit 7. Economies of Production



CONCLUSION

The overall conclusions from these findings are five:

- Business executives are clearly able to distinguish among the various impacts of IT on business value in their firms, and are remarkably consistent in their ratings across different types of executives.

- Business executives tend to rate the business value of IT lower than might be expected given the frequent anecdotal evidence of payoffs found in the business press. However, this is not surprising given the differential diffusion of many of these higher payoff, strategic applications among individual firms and industries.

- The current ratings are remarkably consistent in the areas of IT impact on business value, and provide a valuable benchmark for assessing future progress.

- Business executives currently rate IT impacts highest in the areas of organizational efficiency and effectiveness and production efficiency. They rate the competitive impacts lower.

- Business executives in service firms perceive the business value of IT to be much stronger than in manufacturing firms. In addition, while the executives rate IT business value in the traditional areas of efficiency improvements and costs reduction, the role of IT in business innovation appears to be very strong among service firms. It would appear, therefore, that service firms are making better use of contemporary IT than their manufacturing counterparts.

Some of this difference between services and manufacturing firms might be due to a greater range of opportunities for the application of IT within the service sector. Indeed, the dominance of information processing and knowledge work within the service sector invites greater investment in the expectation of such opportunities. However, the results suggest that there are a number of areas where IT is being under-utilized by manufacturing firms.

A final implication is evident from the findings. Much of the recent empirical research which has claimed high returns from IT investments was conducted using samples that were dominated by manufacturing firms. The results here seem to suggest that the payoffs from computerization within the service sector are significantly higher.

APPENDIX

TEN DIMENSIONS OF BUSINESS VALUE

Organizational Effectiveness
- Improve the process and content of decision making
- Improve internal communication within your corporation
- Provide better coordination among functional areas in your corporation
- Improve strategic planning
- Facilitate the implementation of new processes that constitute a better way of doing business

Organizational Efficiency
- Increase your corporation's profit margins
- Increase your corporation's market shares
- Reduce your corporation's labor and related expenses
- Reduce your corporation's selling and general administrative expenses

New Business Innovation
- Make new areas of business technologically feasible for your corporation
- Make new areas of business economically feasible for your corporation, as a result of improved economies of scale

Economies of Production
- Reduce the cost of designing new products/ services
- Improve levels of production or throughput
- Reduce the production cost of tailoring products/services to market segments
- Improve the productivity of production labor through automation
- Improve the utilization of machinery

Customer Relations
- Allow your corporation to provide administrative support (such as billing, collection, inventory, management, etc.) to customers)
- Provide on-line access of your corporation's products/services database to customers
- Position customers to rely increasingly on your corporations' electronic support systems (e.g., order entry terminals, order tracking)

Product & Service Enhancement
- Provide your corporation with unique opportunities for product and service innovation
- Reduce the cycle time for development of new products/services
- Reduce variance and uncertainty in product/ service quality
- Reduce variance and uncertainty in product/ service delivery time
- Become part of existing products/ services to enhance their value

Inter-organizational Coordination
- Help to enlarge your geographic market area
- Help your corporation coordinate closely with its customers and suppliers

Supplier Relations
- Help your corporation gain leverage over its suppliers
- Reduce your suppliers' transaction costs by making it easier for them to handle orders
- Reduce uncertainty and variance in lead times for suppliers
- Enhance the ability of your corporation to monitor the quality of products and services received from suppliers

Market Support
- Play an important role in identifying market trends
- Assist your corporation in serving new market segments
- Enhance sales forecast accuracy
- Track market response to discounts
- Track market response to promotional or introductory pricing
- Facilitate targeted response to competitors' pricing strategies

Competitive Dynamics
- Delay competitor entry into new products/ services because of the investments now required in complex software and hardware in your industry
- Support your corporation in making a first strike against your competitors (i.e., offer a new product/service that your competitors cannot immediately match)
- Help your corporation to provide substitute products/services for your competitor's products/services
- Make it easier to capture distribution channels and thereby increase the cost and difficult for competitors to enter a new or existing market segment

About this Report

This special report is from the I/S Intercorporate Measurement Program's 1994 Annual Executive's Survey. Corporations interested in obtaining a copy of the report, participating in the next survey, or joining the select group of corporations that are Sponsors of IMP are invited to contact:

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About IMP

The Intercorporate Measurement Program (IMP) is a sponsored research program conducted by CSC Consulting and the Center for Research on Information Technology and Organizations (CRITO) at the University of California, Irvine. Its purpose is to further the state of the art of I/S performance measurement and to improve I/S performance in practice. IMP conducts annual surveys of management practice and I/S performance in corporations. It feeds back the knowledge gained to survey participants, to IMP sponsors, and to CSC Consulting clients through publications, workshops, and client programs.

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