

MANAGING THE IT PORTFOLIO: RETURNS FROM THE DIFFERENT IT ASSET CLASSES¹

Peter Weill, *Director*

Sinan Aral, *PhD Candidate*

MIT Sloan Center for Information Systems Research

Why Use Portfolios for IT

Just as investors address their risk and return objectives using portfolios of financial investments, firms have portfolios of information technology (IT) investments. Four different management objectives guide firms' investment in IT. Each objective results in a different IT asset class with a unique risk-return profile. Just like any other investment portfolio, the IT portfolio must be balanced to achieve alignment with the business strategy and the desired combination of short and long term payoff. This briefing builds on the IT portfolio benchmarks described in the March 2003 briefing and presents the returns from the four asset classes.

Four Management Objectives Leading to Four IT Asset Classes²

Our research found that business leaders have four different management objectives for investing in IT:

- Transactional—cut costs or increase throughput for the same cost (e.g., a trade processing system for a brokerage firm).
- Informational—provide information for any purpose including to account, manage, control, report, communicate, collaborate or analyze (e.g., a sales analysis system or reporting).
- Strategic—gain competitive advantage or position in market place (e.g., ATMs were a very successful strategic IT initiative for the innovating banks increasing market share).
- Infrastructure—base foundation of shared IT services used by multiple applications (e.g., servers, networks, laptops, customer databases). Depending on the service, infrastructure investments are made with the objective of either reducing IT costs via consolidation and/or providing a flexible base for future business initiatives.

By investing to address the four management objectives, a firm creates an IT portfolio with four asset classes (see the center of figure 1). The average firm allocates 54% of its total IT investment each year to infrastructure. Utilizing the infrastructure are the transactional systems accounting for 13% of average IT investment. The informational systems sit on top of, and use both the transactional and infrastructure systems accounting for 20% of average IT investment. Similarly, strategic systems use both the transactional and infrastructure systems and account for 13% of average investment. Just like a personal investment portfolio with cash, bonds, equities, property etc., the four IT asset classes have different historic risk return profiles.

The Returns from the Four IT Asset Classes

IT investments in the transactional asset class aim to reduce unit cost and increase productivity. Firms that invested more heavily (than their competitors) in transactional IT had superior productivity (measured by sales per dollar of assets) and lower costs. The results suggest transactional investments pay off by using IT to support or automate repetitive business processes. For example, UPS, a very successful

¹ This CISR briefing is the second in the series on IT portfolios. The previous briefing, Vol. III, No. 1C, is entitled "Managing the IT Portfolio (update circa 2003)" by the same authors, March 2003. This research draws on and extends the material on IT portfolios in "Leveraging the New Infrastructure: How market leaders capitalize on IT" by Peter Weill and Marianne Broadbent, Harvard Business School Press, 1998 with a CISR study of 147 firms in 2003. This research was made possible by the support of CISR sponsors in particular CISR Patron Microsoft Corporation and the National Science Foundation, grant number IIS-0085725.

² The total IT investment includes all centralized and decentralized IT spend (expenses and depreciated capital) both insourced and outsourced plus all people dedicated to IT services and management. The analysis based on 147 firms used data from 1999 to 2002. All results linking IT investments and performance presented in this briefing are statistically significant and controlled for industry, firm size, R&D and advertising expenditure.

but cost conscious logistics firm, provides free package tracking information on its website or integrated into its customers' ERP systems. Before on-line tracking, customer calls to its call center cost UPS around \$2 each and sometimes required two follow-on calls within UPS to locate the package - with a total cost of \$6. Each tracking query now costs UPS a few cents and during the Christmas rush period there can be 6 million tracking requests per day.³ If the firm's strategy is to use IT to cut business costs and increase productivity, weighting the IT portfolio with transactional investments more heavily than the 13% average makes sense (see the March 2003 briefing for benchmarks by industry). We estimate transactional investments have solid returns of 25–40% per dollar.

Investments in the informational asset class aim to provide more and better information to manage, control, report and analyze customer needs. Firms investing more heavily in informational IT had higher quality and larger margins. Thus these firms proactively used the output of their informational investments to make better decisions often about customer needs. Over a period of 20+ years 7-Eleven Japan have built an integrated information system including point of sale devices at its 9,000+ franchise stores. Counselors visit stores weekly to help store owners use the information to choose the right range of products for their store. 7-Eleven is not only the most profitable retailer in Japan but is able to offer its demanding customers many new products while reducing average stock turnover from 25 days in 1977 to nine in 2003.⁴

Investments in strategic IT aim to gain a competitive advantage by positioning the firm in the market place for growth. Successful strategies include electronic connections providing customized services to the customer (e.g., Amazon's recommended books service) and customized products (e.g., TD Waterhouse's personalized investment analysis). Strategic IT is a high risk high return strategy with high failure rate (we estimate at 50%) but large potential upside with successful initiatives gaining a two to three year lead on the competitors. Firms with more strategic IT investments generate more revenues from modified and enhanced products indicating that these investments are effective in

increasing sales. We see no evidence for increased profits, but it is possible that the profit effect requires more than the two year lag between investment and performance captured in this study.

Investments in IT infrastructure serve multiple purposes. Some infrastructure investments aim to reduce cost through standardization and consolidation (e.g., server or data center consolidation). Other infrastructure investments provide a platform for delivering firm-wide initiatives such as a shared customer database for a single point of customer contact. Still other infrastructure investments are to enable future IT initiatives and flexibility such as modular architectures. More infrastructure capability is expected to reduce time to market for new business initiatives.

The returns from the IT infrastructure asset class reflect this complex set of objectives and present a strategic choice for senior executives. Firms that made more investments in IT infrastructure did have higher valuations and faster times to market. However, there is also a cost. Firms with more IT infrastructure investments took a short-term impact on their profitability with lower margins and return on assets in the year of the infrastructure investment. However, the stock market appears to reward long-term investments such as IT infrastructure. Thus firms that maximize their infrastructure investments have higher market valuation but lower short run margins and ROAs. After presenting this finding to a CEO in financial services his response was "that balancing act makes sense to me. We make the same tradeoffs in all our infrastructure investments such as people, buildings and research."

Our research shows that it is not only how much you spend on IT that is important but also making the right IT investments for your strategy. Understanding the return profiles of each of the four IT asset classes helps managers make more informed IT investment decisions that are linked to their strategic goals. Figure 2 compares the IT investments and portfolios of all firms with those of top performers. Top performers across all industries spend an average of 4% more on IT but have similar portfolios to the average firm. The industry differences are interesting. For example, top performers in financial services spend 10% less than the average firm, but have portfolios more weighted to infrastructure.

Just like your personal investment portfolio, an enterprise's IT portfolio must be aligned to its strategy and balanced for risk and return. Use the results in this briefing, as you would a stock broker's

³ For more information, see Ross, J.W., "United Parcel Service: Delivering Packages and e-Commerce Solutions," MIT Sloan CISR Working Paper No. 318, March 2001.

⁴ See "7-Eleven Japan: Reinventing the Retail Business Model," by Kei Nagayama and Peter Weill, MIT Sloan CISR Working Paper No. 338, January 2004.

report containing historic returns of different asset classes and the average asset class composition of high return portfolios. A firm's investment portfolio alone does not determine performance outcomes. Better returns are available by matching the type of IT investments with the firm's management

practices and competencies as in 7-Eleven Japan's use of counselors. The next briefing in the series looks at the management practices (e.g., HR capabilities) that help top performers convert their IT investments into bottom line business value.

Figure 1: Returns from the Four Asset Classes in the IT Portfolio

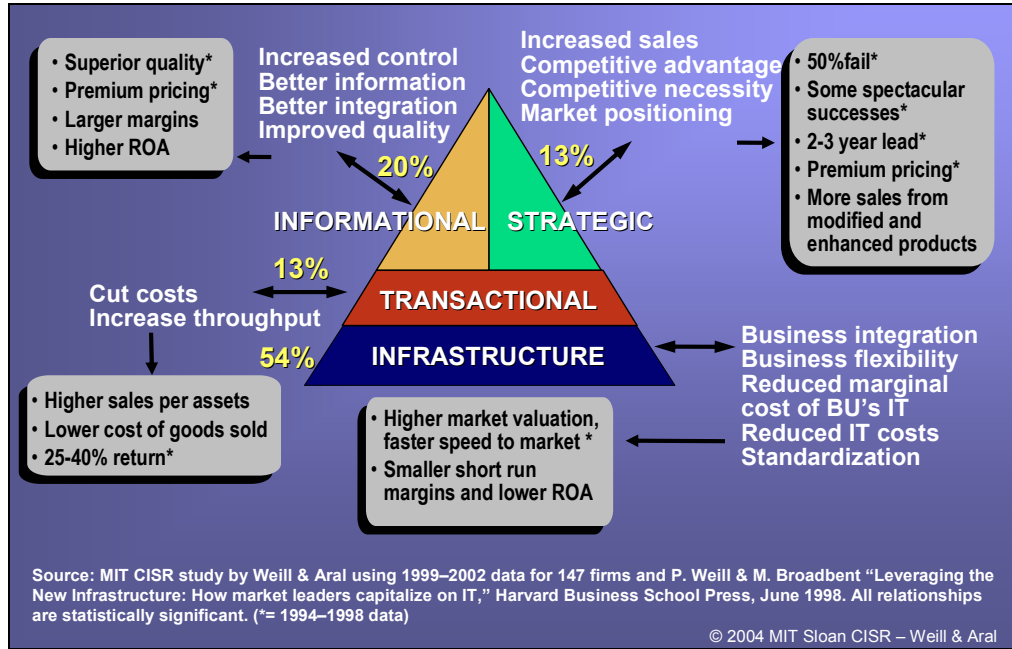
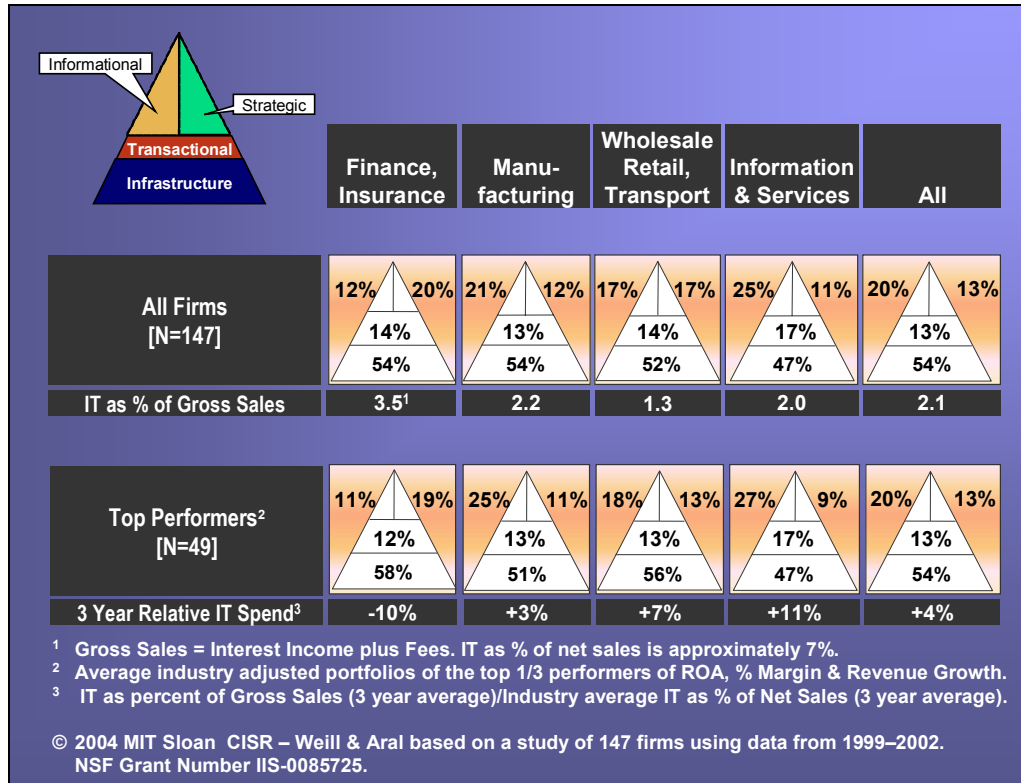


Figure 2: Top Performer's Portfolios are Somewhat Different



CISR MISSION

CISR was founded in 1974 and has a strong track record of practice based research on the management of information technology. As we enter the twenty-first century, CISR's mission is to perform practical empirical research on how firms generate business value from IT. CISR disseminates this research via electronic research briefings, working papers, research workshops and executive education. Recent and current research topics include:

2003 PROJECTS

- Business Models and IT Investments
- Governing IT for Different Performance Goals
- Assessing Architecture Outcomes
- Infrastructure as Variable Cost
- Managing IT Related Risks

2004 PROJECTS

- Assessing the Performance of Alternative Business Models
- Managing the Next Wave of Outsourcing
- Managing IT Architecture for Business Value
- Measuring IT-driven Risk
- Exploring the Role of the IT Unit in Leading IT-enabled Change

Since July 2000, CISR has been directed by Peter Weill, formerly of the Melbourne Business School. Drs. Jeanne Ross, George Westerman and Nils Fonstad are full time CISR researchers. CISR is co-located with MIT Sloan's Center for e-Business and Center for Coordination Science to facilitate collaboration between faculty and researchers.

CISR is funded in part by Research Patrons and Sponsors and we gratefully acknowledge the support and contributions of its current Research Patrons and Sponsors.

**CISR RESEARCH PATRONS**

BT Group
 DiamondCluster International, Inc.
 Gartner
 Hewlett-Packard Company
 IBM Corporation
 Microsoft Corporation

CISR SPONSORS

Aetna Inc.
 Allmerica Financial Corp.
 Allstate Insurance Co.
 AstraZeneca Pharmaceuticals, LP
 Banknorth, NA
 Biogen Idec, Inc.
 Campbell Soup Company
 Celanese
 Det Norske Veritas (Norway)
 EMC²
 The Gillette Company
 The Guardian Life Insurance Company of America
 Intel Corporation
 International Finance Corp.
 Merrill Lynch & Co., Inc.
 MetLife
 Mohegan Sun
 Motorola, Inc.
 National Kidney Foundation, Singapore
 Nomura Research Institute, Ltd.
 PFPC, Inc.
 Qwest Communications
 Raytheon Company
 State Street Corporation
 TRW Automotive, Inc

CONTACT INFORMATION

Center for Information Systems Research
 MIT Sloan School of Management
 3 Cambridge Center, NE20-336
 Cambridge, MA 02142
 Telephone: 617/253-2348
 Facsimile: 617/253-4424
<http://web.mit.edu/cisr/www>

Peter Weill, Director	pweill@mit.edu
David Fitzgerald, Asst. to the Director	dfitz@mit.edu
Jeanne Ross, Principal Res. Scientist	jross@mit.edu
George Westerman, Res. Scientist	georgew@mit.edu
Jack Rockart, Sr. Lecturer Emeritus	jrockart@mit.edu
Chuck Gibson, Sr. Lecturer	cgibson@mit.edu
Chris Foglia, Center Manager	cfoglia@mit.edu
Julie Coiro, Admin. Assistant	julieh@mit.edu