

MANAGING THE IT-ENABLED INNOVATION PORTFOLIO¹

George Westerman, *Research Scientist,*
MIT Sloan Center for Information Systems Research

The increasing importance of information technology to business, coupled with the accelerating pace of industry change, has created an opportunity for CIOs to change the nature of their contribution—helping the business to innovate, not just automate. After interviewing five firms known to be innovative, including eBay, Google, and Intuit, we structured a set of interviews with IT leaders in 22 firms whose units had responsibility for innovation. We identified four different innovation processes, each with a different profile of risks and returns. To IT-enable innovation, CIOs should build a balanced portfolio of the innovation processes aligned with the firm's structure, governance processes, and culture.

A Portfolio of Innovation Processes

Innovation is the process of adding value to the enterprise by adopting or improving a product, process or service. Innovation processes can be characterized by two dimensions: innovation goal and locus of control.

Innovation goal is the degree to which the innovation process investigates concepts that are radically new to the business. Business platform enhancement processes incrementally improve or extend the organization's existing technical and process capabilities including infrastructure, applications, skills, and business processes. They identify and implement well-defined solutions to well-defined problems and opportunities. Because business platform enhancement projects have predictable outcomes aligned with pressing organizational needs, operational managers understand their relevance. Greenfield exploration processes investigate uncertain future opportunities—such as emerging technologies or new ways of doing business—that most managers would not see as immediately relevant. Explorations iteratively clarify and shape opportunities into something that can benefit the business. They rarely

create near-term solutions and often generate results different from what was expected. Explorations can generate breakthrough business or technical capabilities. They also identify valuable enhancement ideas that business platform enhancement processes would not have considered.

The second dimension, *locus of control*, describes who makes key decisions (but not necessarily who funds processes) and thus whose priorities dominate the process. In a centralized innovation process, a central group decides what projects will be performed by the organization. The prioritization process typically focuses on enterprise-level concerns such as standards, broad enterprise applicability, reliability, and efficiency. Decentralized processes are originated by local business units or teams to benefit parts of the organization. These processes typically emphasize local priorities such as customized functionality, customer intimacy, and speed of implementation.

Four Innovation Processes

The two dimensions define a framework of four different innovation processes (see Figure 1). Each process has different risks, success rates, and types of returns. The framework characterizes business innovation in general; we focus on how it applies to IT.

Traditional improvements are centralized incremental improvements or extensions to existing technology and process capabilities. Examples include improving workflow technologies in a customer service unit or extending a large consulting firm's banking-related tools and processes to the insurance market. Traditional improvement processes typically look much like standard IT governance and implementation processes. Business cases are prioritized on the same criteria as other projects, including architecture fit, enterprise strategic alignment, and ROI, and projects are implemented in the same way as other projects.

Directed experimentation applies centralized control to greenfield exploration. ExxonMobil's IT Technology Advancement System (IT-TAS) investigates emerging technologies, determines which vendors' products best fit the firm's priorities and technical environment, and often identifies a set of pilot applications. The process aims to lead business demand

¹ The research team included MIT Sloan 2008 MBA students Garrett Dodge, Abhinav Khushraj, and Glenn Wilson. Jeanne Ross, Peter Weill, and Stephanie Woerner of MIT Sloan CISR gave valuable advice on this briefing.

or even stimulate business demand for useful new technologies, such as when IT-TAS vetted PC tablet solutions and found willing users in a prototype application for downstream sales representatives. The IT unit in Brazil's ABN AMRO Banco Real chooses a specific set of greenfield business ideas to investigate each year. Successful solutions, such as a portable kiosk to shorten customer wait time in branches, can be implemented by business units when desired.

Edge enhancement processes are well-defined improvements or extensions to existing technology and process capabilities conducted by individuals or business units outside the control of enterprise-level governance processes. When an employment services firm decided to investigate mobile technologies, it learned two geographic units had already added mobile extensions to the existing technology engine. When a hotel and gaming firm started investigating RFID solutions to improve internal service processes, it found one property had already improved processes in the bar area by replacing ID cards with RFID tokens. In both cases, local units benefited from early adoption of platform enhancements and the enterprise could learn from local experience when implementing enterprise solutions.

Local explorations are decentralized investigations into greenfield opportunities that may be relevant to part of the organization. Employees in Intel IT's 12 Innovation Centers investigate new technological opportunities that the rest of the organization might not address due to their long-term or speculative nature. Although the innovators receive some corporate IT funding, they have full autonomy over the opportunities they pursue. Some projects have generated breakthroughs such as a WiMax car for rural areas in Russia, while others generate valuable enhancement concepts. When investigating the utility of an RFID glove, Intel IT innovators found manufacturing technicians often skipped a step in a maintenance process. They also identified an opportunity to replace multiple systems and screens with a single handheld device. Intel's decentralized innovators sustain themselves and improve success rates by obtaining co-investment from those who benefit from each exploration.²

Implementing a Portfolio of Innovation Processes

The innovation processes represent four very different approaches to identifying and implementing innovations. Like investment classes in a financial

portfolio, each innovation process has a different profile of risks and returns. The percentages in Figure 1 show each quadrant's success rate in delivering measurable business value. Enhancement processes succeed more often than greenfield because their investigations are more incremental and aligned with current organizational needs. Decentralized processes succeed more often than centralized ones because of their more limited scope and independence from competing organizational priorities. However, risks and returns go well beyond each quadrant's success rate. Additional return considerations include the types of solutions created (enhancement vs. breakthrough), scope (enterprise vs. local), and value generated (cost savings vs. revenue enhancements). Additional risks include cost of each failure and the extent of risk from introducing technological or process complexity.

Greenfield processes can generate breakthroughs while enhancement processes typically generate lower-value incremental returns. But breakthroughs are relatively rare and another output of greenfield processes—creative concepts for business platform enhancement projects—are often not valued by managers because they are not yet fully functional systems. Centralized processes can be more resource-efficient than decentralized because they avoid duplicative or lower-potential projects. But their filters can reject important locally-valuable innovations or breakthrough solutions in areas not aligned with current enterprise priorities. Decentralized processes identify creative local solutions but can increase technical and business complexity or require rework to make solutions enterprise-ready. Although decentralized processes often create revenue-increasing innovations, they can miss valuable opportunities to improve efficiency by standardizing across units.

How Can IT Leaders Foster Innovation?

Traditional improvement processes cannot generate the full variety of innovation required by today's firms. IT leaders should help their organizations rethink their processes for IT-enabled innovation, considering all four innovation processes described here. After reviewing Figure 1 we suggest weighting investments in the four different innovation processes depending on organizational structure, governance processes, and culture. Although single-business or highly centralized firms may not wish to foster decentralized processes, they can decentralize idea generation for centralized processes. More complex or less-centralized firms should implement edge enhancement processes to implement solutions that benefit local units and may later help the enterprise as a whole. Firms in high-growth or

² For more on Intel's IT innovation process, see G. Westerman and M. Curley, "Building IT-Enabled Innovation Capabilities at Intel," forthcoming, *MISQ Executive*.

highly competitive industries should invest some resources in directed experimentation or local exploration processes. Directed experimentation is typically less difficult to “sell” in large organizations because it is better controlled. But local explorations are more likely to generate true breakthroughs because they are free from centralized alignment and standardization filters.

India’s Tata Consultancy Services (TCS), whose global growth strategy requires frequent innovation and strong process efficiencies, has implemented all four innovation processes. TCS weights its innovation investments toward processes centrally controlled by the CTO’s office but expects business units to conduct some edge enhancement projects and a few local explorations. In keeping with its decentralized structure and culture, Intel has implemented all four innovation processes in a more decentralized way than TCS. It started by innovating within IT and is now diffusing capabilities to help business units innovate more effectively. Exxon-Mobil, whose business model is built on strong process efficiencies and standards coupled with technical leadership, added directed experimentation through its IT-TAS process but does not foster decentralized innovation approaches. Meanwhile Xcel Energy built a directed experimentation group called Utility Innovations but also created

conferences and innovation centers to share decentralized innovations and start identifying and energizing employees who can build a more innovative culture in the firm.

IT leaders should adjust architecture and governance processes to accept the differences among the four processes. Governance processes can provide slack resources and some autonomy to decentralized innovators or allocate a percentage of innovation resources to greenfield innovation processes. Governance processes can also actively work to integrate the outcomes of greenfield innovations into existing business process platforms. In firms wishing to foster decentralized innovation, architects should refrain from preventing local changes and instead provide a standard platform which local innovators can extend and then share their solutions with others. Architects should also, like ExxonMobil, conduct directed experimentation with emerging technologies to ensure the architecture is ready for new technologies when demanded by the business. Finally, IT performance measurement processes should acknowledge the different risks and returns of the different innovation processes so they are measured not only on success rates (as in Figure 1) but also on measures such as breakthroughs, creative inputs to other processes, and business value generated.

Figure 1: Portfolio of Innovation Processes

Locus of Control	De-centralized <small>Local activities for local needs</small>	<p>EDGE ENHANCEMENTS Diverse pockets of creativity independently enhancing existing capabilities</p> <p>Examples: Local LOB initiatives; independent developer efforts</p> <p style="text-align: right;">58%</p>	<p>LOCAL EXPLORATION Independent investigations into radically new technological or business opportunities</p> <p>Examples: LOB or independent labs; LOB new technology groups</p> <p style="text-align: right;">34%</p>
	Centralized <small>Enterprise-focused activities</small>	<p>TRADITIONAL IMPROVEMENTS Enterprise-aligned enhancement of existing capabilities</p> <p>Examples: Standard IT investment and application development processes</p> <p style="text-align: right;">45%</p>	<p>DIRECTED EXPERIMENTATION Investigations into radically new opportunities aligned with enterprise priorities</p> <p>Examples: Corporate R&D labs; IT advanced technology groups; corporate IT experiments</p> <p style="text-align: right;">21%</p>
		<p>Business Platform Enhancement: Improving or extending existing technical and process capabilities</p>	<p>Greenfield Exploration: Investigating opportunities outside of existing technical and process capabilities</p>
Innovation Goal			

Note: Percentages in each quadrant represent average responses among 155 CIOs to the question “Of every 10 projects in this category, approximately how many result in measurable business value?” Numbers were converted to percentages for clarity.

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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://mitsloan.mit.cisr>

Peter Weill, Director	pweill@mit.edu
Chris Foglia, Center Manager	cfoglia@mit.edu
Jeanne Ross, Principal Res. Scientist	jross@mit.edu
George Westerman, Res. Scientist	georgew@mit.edu
Nils Fonstad, Research Scientist	nilsfonstad@mit.edu
Stephanie Woerner, Res. Scientist	woerner@mit.edu
Jack Rockart, Sr. Lecturer Emeritus	jrockart@mit.edu
Chuck Gibson, Sr. Lecturer	cgibson@mit.edu
David Fitzgerald, Asst. to the Director	dfitz@mit.edu
Tea Huot, Administrative Assistant	thuot@mit.edu

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