

32 SUSTAINING INNOVATIONS THROUGH IT-COMPETENT ORGANIZATIONS: INSIGHTS FROM PRACTICE

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The competitive landscape for most contemporary firms is characterized by intense competitive rivalry, the relentless pace of new product and market innovation, strict attention to cost advantage and customer intimacy, and the globalization of the business (Treacy and Wiersema 1995). As firms attempt to reconfigure their competencies, structures, processes, relationships, and skills to be agile and responsive to the current competitive reality, information technology is becoming one of the key levers for facilitating organizational success and growth (Goldman, Nagel, and Preiss 1995; Venkatraman 1994). In particular, the ability to sustain IT-based innovation in revitalizing and creating new products, markets, structures, processes, and relationships is being recognized as a critical organizational competence (Sambamurthy and Zmud 1994). Indeed, stories of exemplar firms and their recipes for success testify to the prominent role of their ability to sustain IT-based innovation as one of the keys to successful business performance (McKenney, Mason, and Copeland 1995). Thus, the ability to blend capabilities of existing and emerging, novel information technologies

with business opportunities and rapidly deliver innovative IT applications is a critical organizational imperative (Clark et al. 1997).

While the importance of a strong IT competence in supporting a firm's competitiveness is rarely argued, the means by which firms develop such a competence are not clearly understood. Recent theories on organizational performance, particularly the resource-based view (RBV) of the firm, observe that organizations develop pools of resources that are the basis for organizational capabilities. Specifically, firms with resources that are valuable, rare, and inimitable can realize sustainable competitive advantage (Barney 1992). RBV provides a framework for understanding the relationship between a firm's IT capabilities and its competitiveness. Ross, Beath and Goodhue (1996) identified three resources, or assets, that establish a firm's ability to apply IT as a competitive weapon: (1) a highly motivated IT staff focused on applying technologies to solve business problems; (2) a reusable IT infrastructure supporting rapid application development and cost-effective operations; and (3) a strong IT-business partnership based on mutual trust and shared goals. The researchers found that these three assets were interdependent in that they built upon one another, and the weakest of the three established limits on the impact of IT within the firm.

Currently, all three of these assets are proving to be very difficult to develop and manage. The markets for information technology products and services are in a high state of flux, with significant rates of product obsolescence, proliferation of vendors and standards, and tremendous technical complexity. As a consequence, not only are the scale of organizational investments in IT on the rise, but also these investments are risky decisions that often need to be made in the face of significant uncertainty about their business value and technical stability (Broadbent and Weill 1997). Further, the technical skills required to sustain IT innovation themselves are characterized by short shelf-lives and most of the desired skills are relatively in short-supply (Fabris 1997). Finally, more so than ever before, a strong pressure exists for building strong and vibrant relationships between the information systems and business community within the organization so that their knowledge can be effectively and rapidly blended into creating winning IT applications (Nelson and Coopridner 1996; Rockart, Earl and Ross 1996). However, motivating the key organizational constituents to actively and willingly engage in such relationships often proves to be difficult and not all organizations are likely to succeed in developing such value-building relationships (Brown and Sambamurthy 1996).

Although recent writing in the IS literature has pointed out the potential value of IT capabilities (Ross, Beath, and Goodhue 1996; Sambamurthy and Zmud 1994), further attention needs to be devoted to questions such as:

1. How do firms manage IT capabilities?
2. What are the challenges associated with managing these capabilities?
3. What are some of the successful strategies for nurturing IT capabilities?

This panel will discuss challenges and strategies associated with the management of IT skills, IT infrastructures, and IT relationships for nurturing IT-based innovation in contemporary firms. The panelists have individually examined the above issues in field settings and developed significant insights from an observation of practice. Through current research efforts, they are developing frameworks for understanding the complex management issues associated with each of the three assets.

Position Statements

Ritu Agarwal: Attracting and Retaining the IT Human Resource

Contemporary theorizing about competitive advantage argues that a firm's *human capital* – its workforce – represents a non-imitable strategic resource (Barney 1992; Pfeffer 1994). The ability of a firm to utilize IT in a strategic manner through the conceptualization and delivery of innovative IT applications is predicated on the availability of an adequately trained IT workforce. Persistent supply-demand imbalances in the IT human resource market have created considerable difficulties for firms in attracting and retaining needed competencies. Not only is there intense competition for existing talent, there is also a continual need for skill renewal and retraining as technologies and application portfolios change. In such an environment, IT leaders are increasingly called upon to discover innovative and effective ways of recruiting, retaining, and developing IT professionals.

The presentation will focus on the “best practices” utilized by leading firms for managing the IT human resource. These best practices were identified through a field study that included a wide range of organizational contexts in the sampling frame. The over 300 practices that surfaced were conceptually categorized into 15 practice categories: four related to recruitment and 11 related to retention (Agarwal and Ferratt 1998). A brief summary of this categorization scheme as well as key insights derived from it will be presented.

Further, there will be discussion on the need for firms to move beyond *ad hoc* practice selection to a more systemic approach where practices are bundled into specific strategies that are consistent with the firm's overall human resource strategy as well as the role of IT in the business. Four ideal type IT HR strategies will be described. These strategies are differentiated based on two underlying conceptual dimensions: the length of the relationship sought with IT professionals and assumptions about the needs of IT professionals that motivate their productive contributions and willingness to remain in a relationship. Thus, each strategy is symbolic of a specific set of IT managerial beliefs and values about the nature of human capital and represents a broad framework that IT managers can use to guide their choice of human resource practices. Strategies are operationalized through the relative emphasis placed on five distinct strategic levers: concern for the individual, concern for productivity, career development and security, compensation and benefits, and recruiting posture. The strategic levers are derived from the empirically grounded taxonomy of human resource practices for IT professionals (Agarwal and Ferratt 1998), as well as from prior research. Finally, the challenges encountered by participating firms in implementing best practices will be presented and suggestions offered for overcoming these challenges.

Jeanne Ross: Building and Managing Winning IT Infrastructures

As firms rush to enter global markets and address the challenge of global competitors, they are investing enormous sums of money in infrastructure technologies such as data networks, data warehouses, enterprise resource planning systems, and standard desktop systems. Often, they are doing so without any clear evidence that they will generate

satisfactory returns on their investments (Weill and Broadbent 1998). Rather, they are relying on an intuition that the firm's infrastructure must enable it to respond to competitors' initiatives and customers' demands. Increasingly, senior executives are recognizing that a world-class IT infrastructure is essential to cutting costs throughout the organization and increasing its adaptability to changing market demands.

The starting point for designing and implementing an effective infrastructure is the corporate strategy. This strategy must be process-oriented, not the traditional market and product-based strategy that tends to dominate corporate offices. It defines the firm's key processes for delivering goods and services to customers. The IT infrastructure is expected to mirror a firm's organizational strategy. Two important challenges confront organizations as they attempt to translate organizational strategy into IT infrastructure. First, largely as a result of enterprise-wide systems implementations, IT infrastructures are increasingly *shaping* process strategy, despite a fairly common belief that strategy ought to shape the IT infrastructure (Davenport 1998). Firms that seize the opportunities of "packaged" infrastructures without being controlled by them find that they can greatly increase organizational capabilities through software (Quinn, Baruch and Zein 1997). Second, an IT infrastructure is expected to provide a stable and robust platform for dynamic organizational processes, but rapidly changing technologies and customer demands have challenged firms' ability to develop stable and reliable infrastructures. Firms that effectively address these two challenges are, indeed, rare, and they have a resource that is both valuable and inimitable.

A small number of case studies (see, for example, McFarlan and Stoddard 1986; Mead and Linder 1987) attests to the potential strategic benefits of building an IT infrastructure that helps a firm create and respond to business opportunities. Through a series of additional case studies, it has been observed that enabling infrastructures are built incrementally around a well-designed IT architecture that emphasizes which technologies and infrastructure services will be centralized, which will be regionalized, and which will be individualized by either location or product. These architectures are a clear reflection of the firm's vision for its organizational processes—how local agents will be empowered to customize the firm's standard products and services. The presentation will describe some emerging strategies for defining an architecture and building, supporting, and leveraging an IT infrastructure that becomes a competitive resource for the firm.

V. Sambamurthy: Nurturing Intra-organizational Relationships for Innovation

Two distinct forms of relationships underlie the ability to sustain IT-based innovation: (1) IT-business relationships, which refer to the ability to blend together requisite business and IT knowledge, and (2) IT-IT relationships, which refer to the ability to blend together the knowledge and expertise of dispersed IT staff in large organizations. Firms must devote their attention toward nurturing both these forms of relationships. Key questions of interest include: How should firms nurture these relationships? What types of organizational mechanisms should they utilize to sustain these relationships? Drawing upon field research, the presentation will discuss how leading-edge firms are utilizing portfolios of coordination mechanisms to nurture both forms of relationships.

Specifically, firms appear to be using six major types of coordination mechanisms: integrator roles, groups, processes, informal relationships, human resources practices, and IT-based systems. Each one of these types of mechanisms includes several varieties. For instance, firms appear to be using account managers, divisional information officers, and client liaisons as distinctly different types of integrator roles. Similarly, executive councils, divisional steering councils, IT management councils, IT standing teams, and IT task forces are some of the different groups being used in practice.

The effectiveness of these individual coordination mechanisms appears to be influenced by the prevailing organizational context. In particular, the presentation will identify the existing IT governance mode as an important factor. Governance mode refers to the patterns of allocation of authority for significant IT activities. Research illustrates that firms with centralized, decentralized, or federal governance modes utilize distinctly different types of coordination mechanisms. Further, the individual coordination mechanisms have been found to be effective in nurturing different IT capabilities. In particular, two-way strategic alignment, partnering, and learning have been identified as three key capabilities facilitated by the different coordination mechanisms. After discussing the individual coordination mechanisms, the presentation will also discuss how firms are constructing portfolios out of combinations of the six different types of coordination mechanisms. The presentation will discuss the logic underlying the design and use of these portfolios of coordination mechanisms. Through examples from specific firms, the presentation will offer a framework for thinking about the use of coordination mechanisms for nurturing relationships.

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About the Panelists

Ritu Agarwal is associate professor of MIS in the College of Business at Florida State University. Prior to joining FSU she served on the faculty at the University of Dayton and at New York University. She has recently completed a two year research project sponsored by the Advanced Practices Council of the Society for Information Management where she and Thomas W. Ferratt (University of Dayton) have studied practices and strategies used by leading firms for managing their IT human resource. Other current research projects include field-based studies investigating mechanisms for fostering IT innovation among technology users, processes related to individual acceptance of new technologies, training and development of information systems professionals, and information technology diffusion. Her publications have appeared or are forthcoming in journals such as *Information Systems Research*, *Communications of the ACM*, *Decision Sciences*, *IEEE Transactions*, and *Journal of Management*

Information Systems. She is an officer of ACM's Special Interest Group on Computer Personnel Research (SIGCPR), and serves as an associate editor for *MIS Quarterly* and the *International Journal of Human Computer Studies*.

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Jeanne W. Ross is principal research scientist at MIT's Center for Information Systems Research where she lectures, conducts research, and organizes executive education courses on IT management practices. Her research focuses on the management of the IT unit, particularly on the management of the IT infrastructure and on changes in management demanded by new technologies and new organizational forms. Much of her work involves development of case studies that describe the human, technology, and IS-business relationship resources of firms that have successfully implemented technology-based changes. Her current research focuses on the management of technology infrastructures that enable organizational transformations and on the discussion of IT value between IT and business management. Dr. Ross has served on the faculty at Worcester Polytechnic Institute and St. Norbert College.

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V. Sambamurthy is associate professor of MIS at Florida State University. His current research interests are focused on the building of capabilities and organization designs for extraction of information technology (IT) value. Some of the issues recently examined by him include the process by which contemporary firms envision, mobilize attention toward, and justify organizational funding for visionary IT applications; the IT management capabilities and competencies for success with business use of IT; and the design of IS organizations to build value-added relationships with senior management and business management and lateral relationships among the dispersed IS workforce. In addition, he has also examined issues related to the CIO and top management teams in nurturing organizational success with information technology use. Most of his work has been conducted in Fortune 500 firms and has been funded by the Financial Executives Research Foundation and the Advanced Practices Council (APC) of the Society for Information Management International (SIM). In addition to presenting his work in academic journals and conferences, Dr. Sambamurthy has also presented his ideas to CIOs and senior IS executives at the APC and SIM meetings. One of his recent writings, describing the design and implementation of a change-ready IS organization at Bell Atlantic Inc., was awarded a second prize in the SIM 1996 practitioner-researcher interchange competition. Currently, he is an associate editor on the board of *MIS Quarterly* and also on the editorial board of the *Journal of Market-focused Management*. He has been active in managing and participating in the conference programs for Decision Sciences, ICIS, and the OCIS division of the Academy of Management.

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