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GUEST EDITORIAL

New research perspectives on mobility, organizations, systems and technologies

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The speed of technological innovation is nowhere more prominent today than in the creation and application of new information technologies that support mobility and collaboration. Wireless communication, hand-held computing devices, radio frequency identification (RFID), and collaborative and mobile commerce enable new business models and support new business processes that lower firm costs, improve product quality and enhance firm performance. Technologies that emphasize mobility can lead to the repositioning or relocation of economic activity and organizational decision-making within the firm or across multiple organizations. Continuing innovation in these technologies can lead to organizational changes that range from improvement of day-to-day operations to providing advanced capabilities for deploying next-generation technologies. Other means, as well, permit senior managers to adapt to increasingly uncertain business environments in a relatively low cost, but high functionality way—through improved mechanism designs and incentive schemes, better alignment between IT infrastructure and support and critical functional areas of business, and strategically sharing relevant operational information. The world, viewed from this perspective of technological evolution, is truly a wondrous place for management scientists, organizational theorists, economists, and IS and electronic commerce researchers to explore.

In this special issue of *Information Technology and Management*, we have brought together six articles that were first presented at the 2004 INFORMS Conference on Information Systems and Technology (CIST). The theme of the conference was ''Mobility, Organizations, Systems and Technologies (MOST),'' which was chosen in harmony with some of the observations that we have just made about the technological transformation towards mobility, collaboration, pervasiveness and penetration, as well as innovation in managerial approaches to process design and strategic decision-making. We invited authors to consider having their papers competitively reviewed for possible publication in the journal, following INFORMS CIST. Our approach involved developmental reviewing, which emphasized the provision of constructive comments as well as challenging ones. Most of the papers went through two or three rounds of review after the conference, and were extensively edited so that they would achieve a common level of high quality. The special issue editors offer these papers to the community with hopes that *ITM* readers will benefit from their coverage of these issues, as well as motivate them to deepen the research dialogue.

The special issue begins with its theme piece, by John Curtin and Frederick J. Riggins of the University of Minnesota, and Robert J. Kauffman of Arizona State University, ''Making the 'MOST' out of RFID Technology: A Research Agenda for the Study of the Adoption, Usage and Impact of RFID.'' The authors provide an extensive survey of the research to date on RFID technology, and lay out an agenda for further research that emphasizes the need to

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better understand how RFID technology should be: developed, adopted, and deployed within organizations; used, supported, and adapted within and across organizations; and, evaluated in terms of its impacts on individuals, business processes, organizations and markets. RFID exemplifies the kind of technology that involves elements of *mobility* and pervasive presence, combined with the potential transformation of *organizational systems* through *technology*—what we identify with our use of the acronym, MOST. The authors further remind us that RFID has the capacity to dramatically change the capabilities of the organization to acquire a huge amount of data about the location and properties of any entity that can be physically tagged and wirelessly scanned.

The second article is by June Cheng, Hong Kong Polytechnic University, and Barrie R. Nault, University of Calgary, who contributed ''Internet Channel Entry: Retail Coverage and Entry-Cost Advantage.'' The central theme of the article involves the strategic analysis of an *entry timing game* with one or two traditional bricks-and-mortar firms (incumbents) and a newly-entering seller (a new entrant) in the Internet channel. The Internet supports channel mobility for consumers, making it necessary for traditional and electronic retailers to more carefully think through the manner in which they orchestrate their participation in the different channels. The authors model the incentives that exist for whether an incumbent should preempt the new entrant by entering the Internet channel, maintain its position in the physical channel, or enter the Internet channel and join the new entrant. The authors use a *Salop circle game-theoretic model*, and examine optimal entry timing policy under different assumptions about market entry costs, transportation costs of goods to the consumers, and the extent of the resulting market coverage. One interesting result that the authors report is that under similar entry costs, a traditional bricks-and-mortar firm will be first to enter the Internet channel—not the new digital entrant. A differentiating consideration occurs when the market is not already covered by the bricks-and-mortar incumbents, which leads to first entry by the new entrant. However, when the market is covered already by the incumbents, then the cost advantage of the new entrant must be substantially greater.

The middle article of the special issue probes issues in supply chain management involving *incentive contracts* and *mechanism design* to optimize the holding of inventories across supply chain partners. Yuliang Oliver Yao of Lehigh University, Yan Dong of the University of Minnesota, and Martin Dresner of the University of Maryland, in ''Analyzing Information-Enabled Stockout Management under Vendor Managed Inventory,'' point out that technologies like RFID fundamentally shift the degree of information availability and permit dynamic monitoring and limit inventory order quantities. They examine the case of vendor-managed inventory (VMI), and explore the extent to which manufacturers can use payments as an incentive for a retailer to make its best efforts to convert lost sales stockouts into backorders for the sales items. The authors develop their theoretical approach using game-theoretic modeling and numerical simulation, which shows the sensitivity of the managerial policies they promote to lost sales penalty costs and the imposed limits on manufacturer's inventory held by the retailer. Managing backorders this way helps the manufacturer to achieve greater market share. The authors find that the incentives to the retailer should be the highest when the retailer works with the most restrictive policy on holding manufacturer's inventory. They also show that incentive payments will be higher in a highly competitive market, when the penalty costs for lost sales are high.

''Information Technology and Autonomy-Control Duality,'' by Ali Tafti of the University of Michigan, Sunil Mithas of the University of Maryland, and M. S. Krishan of the University of Michigan, explores how human resources practices are transformed through the application of IT. The authors seek to determine how practices which promote worker autonomy, connectedness, trust, flexibility in work processes, and other facilitating HR practices fit with *facilitating IT practices*, including employee information sharing, distance work, and autonomy. They also contrast these practices with the old-line practices in HR of monitoring people and performance using IT—called *monitoring IT practices*. Through a process of argumentation and theory development, and their use of several mini-cases, the authors show why facilitating HR and IT practices go hand-in-hand, and that the complementarities between them lead to enhanced worker performance. They draw similar conclusions using *complementarity theory* about the complementarities of traditional HR and monitoring IT practices relative to worker performance. Although the results of this exploratory study are based on a relatively small number of senior executive interviews, just four organizational mini-cases, and an additional five years of business periodicals, the arguments the authors offer are compelling and shed new light on the role of IT in HR practices, and what they does to make workers more effective. The authors finish their article with a discussion of the characteristics of their new *theory of HR-IT alignment*, and how complementarity theory can be used to guide managerial decision-making relative to employee and organizational performance.

The penultimate article in this special issue explores the issue of *collaborative product commerce* (CPC), which occurs when firms share product information to support advances and efficiencies in cross-organizational product design, development and management. In ''Toward a

Theory to Study the Use of Collaborative Product Commerce for Product Development,'' Indranil Bardhan of the University of Texas at Dallas discusses and analyzes recent innovations in the ways that such interorganizational collaboration occurs, and leverages insights from *adaptive structuration theory* to characterize CPC in terms of the structure that it brings to interorganizational relationships centered on product development. He also takes advantage of prior findings related to *media richness theory* to understand how CPC-related support can enhance the richness of information exchange, and support both higher levels of usage and greater effectiveness in collaborative product design. Although the author's recognition of the processes involved in CPC are important in their own right, the main results of this research are developed through a cross-sectional survey of 36 firms that have implemented various forms of CPC solutions. Bardhan reports that, consistent with the adaptive structure theory-based predictions, different levels of use of CPC solutions occur in different parts of the *product development life cycle*.

The final article reflects research that was conducted in association with the Digital Intelligent Storage Technology Consortium, an industry group of leading storage media and solution firms, which participate in the Digital Technology Center of the University of Minnesota. Gedas Adomavicius, Jesse C. Bockstedt and Alok Gupta of the University of Minnesota, and Robert J. Kauffman of Arizona State University contributed ''Technology Roles and Paths of Influence in an Ecosystem Model of Technology Evolution.'' The main contribution of the work is to suggest a theoretical perspective and means of analysis for technology evolution, when the technologies are viewed as existing in a *technology ecosystem* or dynamically changing market environment that has a number of interrelated technologies. Through analyses of wireless network technologies and digital music marketplace transformation, the authors explore three contrasting roles that result in these interactions, which the authors call *paths of influence*. Depending upon the function they serve, technologies can be viewed as (1) *components*, which can be used to construct technology products; or (2) *products and applications*, which may experience transforming market demand and organization use; or finally (3) *support and infrastructure*, which also may evolve over time and create the impetus for components, and products and applications to evolve.

The co-editors appreciate the cooperation of the authors and the reviewers, both of the special issue papers and the earlier works presented at the 2004 INFORMS Conference on IS and Technology. We also benefited from the encouragement of Varghese Jacob, co-editor of *Information Technology and Management*, whose efforts with the journal have helped to create increasing interest in INFORMS CIST as a conference of choice for bringing first results in new research to the attention of a growing community.