

## Spring 2001 Research@Smith



**WELCOME** to the inaugural issue of Research@Smith, an informative look at some of the leading-edge research going on at the Robert H. Smith School of Business. Tied for sixth worldwide in research productivity by the Financial Times (2001), the Smith School is a significant contributor to the international body of business and management literature.

The Smith School's research quality and productivity reflect the expertise of a growing faculty and a cadre of talented Ph.D. students. Their research interests encompass a broad, dynamic mix of functional and netcentric economy issues. Smith's faculty includes five Academy of Management Fellows, editors of top journals, and recipients of major government and industry research grants.

- Howard Frank, Dean

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## KNOWLEDGE SHARING

### Recent books by Robert H. Smith School of Business faculty

***Understanding Global Cultures*** by **Martin Gannon**. *Thousand Oaks, Calif.: Sage Publications, second edition, 2001*. Gannon employs metaphors to develop dimensions specific to a national culture and to describe the distinctive business activities taking place within each nation. Includes a discussion of a four-stage model of cross-cultural understanding, and of business situations when culture does, and does not, matter.

***The New Super-Leadership*** by **Charles Manz** and **Henry P. Sims Jr.** *San Francisco, Calif.: Berrett-Koehler Publishers, 2001*. Smith School professor Hank Sims, with co-author Charles Manz, have pioneered the concept of self-leadership, or, leading others to lead themselves. Their new book provides managers and executives with additional insight and specific strategies for developing an innovative, highly motivated workforce able to creatively respond to the challenges of a dynamic business environment.

***The Encyclopedia of Operations Research and Management Science*** by **Saul Gass** and Carl M. Harris, co-editors. *Hingham, Mass: Kluwer Academic Publishers, second edition, 2001*. Smith School Professor Saul Gass, one of the pioneers in the field of OR, and co-editor Harris have compiled an invaluable reference source for decision makers and problem solvers in business, industry, government, and academia. Provides a comprehensive overview of the wide range of ideas, methodologies, and synergistic forces that form the decision-aiding fields of operations research and management science.

## WORKING PAPERS

**Michael C. Fu**, Sigrún Andradóttir, John S. Carson, Fred Glover, Charles R. Harrell, Yu-Chi Ho, James P. Kelly, Stephen M. Robinson. *"Integrating Optimization and Simulation: Research and Practice"*

**Oliver Kim**, Steve C. Lim, and Kenneth W. Shaw. *"The Use of Forecast Revision in Reducing Built-in Biases in Mean Analyst Forecasts"*

**Henry C. Lucas Jr.**, Wonseok Oh, Gary Simon, and Bruce Weber. *"Efficiency Metrics for e-Markets: The Impact of the New York Stock Exchange's IT Investments"*

**Vojislav Maksimovic** and **Gordon Phillips**. *"The Market for Corporate Assets: Who Engages in Mergers and Asset Sales and are there Efficiency Gains?"*

George A. Mihaila, **Louisa Raschid**, and Anthony Tomasic. *"Locating and Accessing Data Repositories with WebSemantics"*

**Venkatesh Shankar**, Amy K. Smith, and Arvind Rangaswamy. *"Customer Satisfaction and Loyalty in Online and Offline Environments"*

**Gilvan C. Souza** and Harvey M. Wagner. *"Competing on Strategic Product Introduction"*

**Deepak Somaya** and David J. Teece. *"Combining Inventions in Multi-invention Products: Organizational Choices, Patents, and Public Policy"*

## **KUDOS**

**Henry C. Lucas, Jr.**, Robert H. Smith Chair in Information Technology and professor of decision and information technologies, has been named a Fellow of the Association for Information Systems in recognition of his numerous contributions to the field of information systems.

**S. Raghavan**, assistant professor of decision and information technologies, received a U.S. patent for "Method and System to Optimize Capacity of a CDMA Cellular Communication System."

**Roland T. Rust**, the David Bruce Smith Chair in Marketing and professor of marketing, received the 2000 Gilbert A. Churchill Award for Lifetime Achievement in Marketing Research from the American Marketing Association.

**Venkatesh Shankar**, the Ralph J. Tyser Fellow in Marketing and associate professor of marketing, received the 2000 Don Lehmann Award granted by the American Marketing Association for the best dissertation-based article published in any of the AMA's journals.

## The Quest for Global Dominance

Research by Anil K. Gupta

FUELED BY RAPID ADVANCES IN TECHNOLOGY AND THE OPENING OF NEW MARKETS IN COUNTRIES AROUND THE WORLD, GLOBALIZATION IS ONE OF THE MOST COMPELLING STRATEGIC ISSUES FACING ORGANIZATIONS TODAY. ACHIEVING AND SUSTAINING GLOBAL DOMINANCE MUST BE VIEWED AS A NEVER-ENDING QUEST, STATES ANIL K. GUPTA, PROFESSOR OF STRATEGIC MANAGEMENT AT THE ROBERT H. SMITH SCHOOL OF BUSINESS. "THE COMPANIES THAT WILL EMERGE AND REMAIN AS GLOBAL LEADERS ARE THE ONES WHO WILL REINVENT THE RULES OF THE GLOBAL GAME."

Gupta and Vijay Govindarajan, currently professor of global business at the Tuck School of Business, Dartmouth College, have studied the strategic management of diversified global firms for more than two decades. "From the beginning, our belief has been that, in most large firms, the bulk of the value creation happens at the level of business units or subsidiaries rather than the parent," Gupta states. "Thus, we regarded understanding strategic business unit level phenomena as central to understanding how and why large firms behave the way they do and how they might be managed more effectively."

In the '90s, Gupta and Govindarajan shifted their focus from analyzing corporate diversification to the subject of globalization. "Again, we chose to take the perspective that, within global firms, value is created predominantly at the level of subsidiaries rather than corporate headquarters," Gupta says. "Accordingly, we focused our attention primarily on issues such as knowledge creation and knowledge sharing across subsidiaries and the challenges that the corporate center faces in creating and governing a differential network of subsidiaries."

Over the last 10 years, the professors have studied more than 100 global corporations using a variety of research methods including in-depth discussions with several hundred executives. Their research has been enriched by their individual and joint consulting activities, in which they have advised dozens of companies in their efforts to review, redesign, and recreate their global strategies and organizations.

The result of a decade of scholarship is their forthcoming book, *The Quest for Global Dominance*, which provides a comprehensive guide for executives leading organizations in the competitive global marketplace. They write, "Our central

premise is that, in the emerging era, every industry must be considered a global industry and every business a knowledge business."

Gupta and Govindarajan identify and focus on four tasks essential for any company to emerge and stay as the globally dominant player within its industry.

- **Executives must ensure that their company leads the industry in identifying market opportunities worldwide and in pursuing these opportunities by establishing a presence in all key markets.**

"In some cases, these opportunities entail creating a new industry as illustrated by Yahoo!, which pioneered the Internet portal market in many parts of Asia and Europe," write Gupta and Govindarajan. "In other cases, these opportunities might require transforming an existing industry as illustrated by Wal-Mart which is changing the rules of the retailing industry in every corner of the world."

- **Executives must work relentlessly to convert global presence into global competitive advantage.**

"Presence in the strategically important markets gives you the right to play the game," the authors note. "However, it says nothing about whether and how you will actually win the game. Doing so requires identifying and exploiting the opportunities for value creation that global presence offers. As the case of Nokia vs. Motorola and others illustrate, once competitors have achieved near parity in global presence, the battle shifts to how smart they are at transforming such presence into global competitive advantage."

- **Executives must cultivate a global mindset.**

"They must view cultural and geographic diversity as opportunities to exploit and be prepared to adopt successful practices and good ideas wherever they come from. In today's global market for goods, services, capital, technology, and talent, an ethnocentric mindset can be a serious handicap," advise the authors.

- **Executives must constantly strive to reinvent the rules of the global game.**

"The rules of the global game," Gupta and Govindarajan assert, "are captured in answers to three perennial questions: who are our target customers, what value do we want to deliver to these customers, and how will we create this value?"

The authors identify three arenas that offer companies opportunity to reinvent the rules of the global game: redesigning the end-to-end value chain architecture; reinventing the concept of customer value; and redefining the customer base.

The opportunity for innovation related to end-to-end value chain architecture, "lies in redesigning not only the set of activities comprising the value chain but also the interfaces across the activities, both internal and external to the enterprise." They illustrate successful innovation in this arena with a case study of Dell Computer, which reinvented the rules of selling personal computers with its innovative "direct" model, boosting it to first place in the competitive PC industry.

In the second arena, reinventing the customer value proposition, Gupta and Govindarajan write, "Opportunity lies in turning from the selling of discrete products and services to selling a comprehensive customer solution whereby the customer is offered an integrated bundle of products and services to address a generic underlying need." They describe Tetra Pak, originally a Swedish milk carton manufacturer, which transformed itself into the dominant player in the global liquid industry by developing and delivering comprehensive systems that integrated processing, packaging, and distribution.

The third arena for creating global competitive advantage, redefining the customer base, rests primarily "in discovering and serving a previously hidden but very large market," the authors state. Canon's identification and exploitation of a new market segment for copiers-individuals and small companies-helped it develop technological, financial, and organizational capabilities that it used two decades later to launch a challenge against Xerox in every segment of the copier industry.

A critical element in these corporate strategies is the use of information technologies, especially the Internet, to power knowledge creation and knowledge sharing. The "digital revolution" will continue to transform organizations and affect global competitiveness, Gupta and Govindarajan write. "In such an environment, you have no choice but to become 'netcentric,' that is, to utilize the full power of the Internet and other networking technologies to reinvent every aspect of the company's internal and external operations. As illustrated by the ongoing digitization of companies as diverse as Cisco, Ford, and General Electric, this applies to almost every company in every industry."

*Vijay Govindarajan and Anil K. Gupta, **The Quest for Global Dominance.**  
San Francisco: Jossey-Bass Publishers, Forthcoming 2001.*

## The Impact of Scalable Supply Chain Infrastructures

### Research by

Michael Ball, Sandor Boyson, Louiqa Raschid, and V. Sambamurthy

"FOR MOST ORGANIZATIONS, THE MOST CRITICAL ISSUE IN SUPPLY CHAIN MANAGEMENT IS HARNESSING THE POWER OF SUPPLY CHAIN INFRASTRUCTURES (SCIs) TO IMPROVE DAY-TO-DAY DECISION MAKING," STATES MICHAEL BALL, DIRECTOR OF RESEARCH AT THE SMITH SCHOOL OF BUSINESS. "TO FACILITATE THIS PROCESS, WE ARE ENGAGED IN DEVELOPING APPROPRIATE DECISION SUPPORT TOOLS AND MODELS AND DETERMINING HOW ORGANIZATIONS SHOULD ADAPT THEIR STRUCTURES AND MANAGEMENT STRATEGIES TO BEST TAKE ADVANTAGE OF SCIs."

Ball and several of his colleagues are studying issues related to the potential of SCIs in a three-year, \$945,237 study funded by the National Science Foundation, "Scalable Supply Chain Infrastructures: Models and Analysis." In addition to Ball, the Orkand Corporation Professor of Management Science at Smith, the group includes Sandor Boyson, co-director of Smith's [Supply Chain Management Center](#); V. Sambamurthy, associate professor of information systems, an expert on the strategic use of IT by organizations; and Louiqa Raschid, associate professor of information systems, who holds a joint appointment with the [University of Maryland Institute for Advanced Computer Studies](#).

"Improving real-time managerial decision making (DM) in the supply chain has not received much attention in the past," Ball says. "Researchers in the fields of management science and operations management have generally concentrated on longer term DM models." His preliminary discussions with executives at IBM, Maxstore (a disk drive manufacturer), Agilent, and other companies helped direct the Smith researchers' focus on the use of SCIs to facilitate shorter-term decision making.

In the first year of the NSF-funded study, faculty and graduate students designed and installed the SCI test-bed architecture, which consists of components for enterprise resource planning (ERP), supply chain management (SCM), simulation, collaboration, middleware, and visualization. The test-bed is designed to be a general-purpose tool, able to support supply chain experiments in different business scenarios and different configurations.

"By computing and evaluating metrics gathered in these simulations, we can judge the performance of supply chain software, decision models, and human decision making," Ball states. "In this way we hope to investigate issues at the interface between organizational structure, management policies, and technology infrastructure."

The researchers have also begun to explore the use of SCIs in matching supply chain capabilities-from procurement to manufacturing to distribution-with customer demand. They initiated development of an advanced available-to-promise (ATP) system that integrates push-based and pull-based ATP models to balance planning and execution. These models have been incorporated into the test-bed to evaluate their impact under different business scenarios. The Smith faculty is now building on this work, jointly with researchers at the university's A. James Clark School of Engineering, to develop a DM model that uses an agent-based system which monitors price changes over the Internet and feeds this information into the SCI to support better supply chain management.

In addition, the researchers are developing technology to improve the scalability of SCIs. "Generally speaking, SCIs do not scale well both at the small end and the large end, i.e., they tend to be prohibitively expensive for small companies and have quality-of-service problems for very large global supply chains," Ball notes. The research team is adapting techniques developed by Professor Raschid for query processing over wide area (Internet-like) networks to efficiently process large volumes of orders over global supply chains.

**"By computing and evaluating metrics gathered in these simulations, we can judge the performance of supply chain software, decision models, and human decision making"**

Exploring the critical role of the Internet in improving supply chain performance is another facet of the Smith study. "Anecdotal evidence reported in the practitioner and academic literature suggests that the Internet, as a distribution channel tool, has positive effects in transaction and product distribution operations in the supply chain," Ball says. "Our ongoing experiments are aimed at providing theoretical and empirical validity to these claims by studying transaction and product distribution efficiencies for supply chains associated with companies that support Internet-based purchases by end consumers."

*For additional information on the ongoing SSCI study, log onto*  
[www.rhsmith.umd.edu/scmc](http://www.rhsmith.umd.edu/scmc).

## Related Factors Predict New Venture Growth

### Research by

J. Robert Baum, Edwin A. Locke and Ken G. Smith

OBSERVERS TRYING TO PREDICT NEW VENTURE GROWTH IN ENTREPRENEURIAL COMPANIES SHOULDN'T FOCUS TOO NARROWLY, ADVISE THREE SCHOLARS AT THE SMITH SCHOOL OF BUSINESS. J. ROBERT BAUM, EDWIN A. LOCKE, AND KEN G. SMITH HAVE FOUND THAT THE MEASUREMENT OF FIVE SEPARATE DOMAINS ACHIEVES THE BEST PREDICTIONS OF VENTURE GROWTH. THESE DOMAINS ARE PERSONALITY TRAITS, COMPETENCIES, MOTIVATION, COMPETITIVE STRATEGIES, AND BUSINESS ENVIRONMENTAL FACTORS.

Furthermore, the research team writes in an article scheduled for publication in the *Academy of Management Journal*: "Individual, organizational, and environmental research domains predict venture growth better when the web of complex indirect relationships among them is included than when only multiple simultaneous direct effects are studied."

Baum is director of academic programs in the Smith School's [Department of Entrepreneurship](#), Locke holds the Dean's Chair in Motivation and Leadership, and Smith is the Tyser Professor of Business Strategy.

For years, researchers have explored the why and how of new venture growth. Primarily, these studies have been performed in isolated research domains. For example, some of the studies have focused exclusively on psychology, others on strategic management, and still others on economics.

But, say the Smith School team, these different studies share at least one characteristic: they offer incomplete looks at the complexity of new venture growth.

"Our goal was to bring all of the previous research streams together in one place," says Baum. "When all domains of research are considered, we have a better explanation of new venture growth than can be yielded by the study of any one domain alone."

Drawing on strategic management, organizational behavior, and entrepreneurship models, the Smith School team has defined predictors of venture growth more completely. They used data from 1993 and 1995 questionnaires sent to CEOs in a single industry, firms that manufacture and install architectural woodwork. "We studied a single industry to avoid confounding by industry type," Smith points

out.

Only responses from CEOs who were active owner/managers, had at least two employees, and whose businesses were two- to eight-years old were included in the study.

To determine the level of venture growth, the team relied on three measures: average annual percentage of sales growth, average annual percentage of employment growth, and average annual percentage of profit growth over the two-year period.

What the researchers found was a set of factors that cause new venture growth both directly and indirectly. "Motivation, including growth goals, beliefs in one's self efficacy, and vision, contributed to firm growth directly, as did specific industry skills and competitive strategy," explains Locke. "In the industry we studied, the best-performing firms differentiated themselves from competitors by emphasizing high quality and innovation."

In contrast, traits such as tenacity, proactivity, and passion for the work affected firm performance only indirectly, that is, through their effects on the development of competencies, motivation, and the development of effective strategies. Similarly, general competencies-such as organizational skills-work through more specific competencies, motivation, and strategies.

**"Even personal traits and specific competency domains, which do not contribute to venture growth when studied in isolation, affect venture growth through their effects on more direct performance links."**

Particularly surprising was the finding that the business environment had a relatively low impact on venture growth, when controlling for the other dimensions. This indicates, the researchers say, that CEOs of small firms may have more control of their company's growth than some theories suggest.

When the total effect of direct and indirect predictors is considered, all have an impact on venture growth. Therefore, conclude the researchers, venture growth cannot be adequately explained from a single perspective. Even personal traits and specific competency domains, which do not contribute to venture growth when studied in isolation, affect venture growth through their effects on more direct performance links.

"The study suggests that entrepreneurs should recognize that multiple personal dimensions affect success," the researchers write. "Thus, they must

replace, through partnering or hiring, those personal dimensions they lack.

"Our results are important because they begin to untangle the multifaceted process by which entrepreneurs affect competitive strategy and performance."

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DEAN

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