studying production issues in the semiconductor industry, and will share his recent work. Members of the Strategic Planning and Modeling group at Hewlett-Packard will give detailed insights into their supply chain modeling work. A session on managing the high tech supply chain will feature Alex Brown (Manugistics). Senior Executives from Solectron will share the challenges in managing the operations function of their company. Design luminaries Arnold Wasserman (The Idea Factory), Michael Barry (PointForward) and Bob Hall (PointForward) will engage in an interactive discussion of research issues in design. Ravi Kumar (University of Southern California) will host a panel of industry executives from leading vendors (Tata Consulting Services, Wipro Technologies, and Infosys) to discuss global software outsourcing. Marshall Fisher (University of Pennsylvania) and Ananth Raman (Harvard University) will present a tutorial on Rocket Science Retailing. A session on operations entrepreneurs will feature Marshall Fisher, who also is the Chairman of 4R Systems, and Vijay Mehrotra (Principal, Onward Inc.). These are but a few of the many panels we have prepared to provide insight and discussion opportunities.

Of course, we also have the usual broad array of interesting papers, including strong concentrations in Global Supply Chain Management, Operations Strategy, Service Operations Management, Mass Customization, Product and Process Design, Operations Planning and Control, and a Special Track on Innovations in Education that we know you will enjoy. Over 380 papers will be presented at this year’s conference, and over 100 will appear in the conference Proceedings.

Last, but not least, our conference is being held in San Francisco, one of the most beautiful cities in the world, near the heart of Silicon Valley – a location that is virtually synonymous with high tech. We know you will enjoy many of San Francisco's sights and activities from riding the cable car (which stops one block from the conference hotel) to visiting Alcatraz, taking in a Giants baseball game, watching the sea lions at Fisherman’s Wharf, or simply hiking the city’s wonderful hills and neighborhoods.

The next three days promise to be stimulating and fulfilling in a number of ways. We are delighted that you will be able to share them with us.

Sincerely,
Bob Hayes
President - POMS
Dear POM 2002 Attendees:

We feel privileged to have had the opportunity to plan and organize the POM 2002 conference, particularly inasmuch as it allowed us to be in touch with many of our academic friends and colleagues. The program schedule reflects both quality and variety in POM research and education, with a focus on our theme of POM in high tech. We thank the presenters for choosing POM 2002 as the forum to present their latest work and thus contributing toward the advancement of the POM discipline and practice.

Planning and organizing the conference was a team effort. We owe a debt of gratitude to the 26 track chairs who worked tirelessly to organize their individual tracks. Each of the track chairs, listed on a subsequent page, is a scholar with a passion for the topic area of his or her track. We appreciate their collective willingness to help out and recognize them for what they have delivered. We are also grateful to the others who helped us in this organizing task: Geoff Parker, New Faculty and Doctoral Consortium Chair; Hamid Noori, Sponsorship Chair; Charles Corbett, Wick Skinner Best Paper Award Chair; Roger Schmenner, Case Competition Chair; and Steven Bogard and Kevin Thurlkill of Meeting Management Consultants.

Many of our POMS colleagues were gracious and generous with their time to advise us on numerous issues that one confronts with in planning and organizing a conference. They include Frank Berdan, Amiya Chakravarty, Jim Gilbert, Sushil Gupta, Bob Hayes, Art Hill, Jack Meredith, Drew Rosen, Aleda Roth, Kalyan Singhal, Marty Starr, and Bill Youngdahl. We salute them for their commitment to building the POM Society.

Among other things, we believe POM 2002 will be remembered as an important milestone in the POMS history, in that we made the transition to a Web based process for both abstract and paper submission and conference registration. Sandie Dapoz and Chris McDivitt deserve accolades for their efforts in enabling this successful transition. We are confident that the POMS will be served well by ongoing investments in this area.

We cannot thank Becky Boudreau enough for her able administrative assistance in putting together the conference program schedule and proceedings. We simply could not have done it without her.

Finally, we would like to gratefully acknowledge the generous financial support from the Carlson School of Management. In particular, we thank John Anderson, Chair of the Operations and Management Science Department, and Lawrence Benveniste, Dean of the School, for allocating funds to support the organization of POM 2002.

We hope you enjoy the conference.

Sincerely,

Sara Beckman  Kingshuk K. Sinha
General Chair       Program Chair
Purpose: Production and Operations Management Society (POMS) is an international professional organization representing the interests of POM professionals from around the world. The purposes of the Society are:

- to extend and integrate knowledge that contributes to the improved understanding and practice of production and operations management (POM);
- to disseminate information on POM to managers, scientists, educators, students, public and private organizations, national and local governments, and the general public; and
- to promote the improvement of POM and its teaching in public and private manufacturing and service organizations throughout the world.

Future Vision: The Production and Operations Management Society (POMS) has become the “Gateway to the POM World”. The long term goal and vision for POMS is that it should become the “home” organization for all POM professionals and be recognized as such by other professional organizations, accreditation bodies, university administrators, business and industry leaders, and our own colleagues in business schools. POMS must become the repository of fundamental POM information and the most authoritative source of developments in the POM field.

To achieve this goal, POMS facilitates communication among professors and POM professionals from all over the globe. POMS provides the following multi-dimensional links which create a “virtual department” and provide avenues for sharing ideas that impact teaching, research and practice.

- **electronic links** which include POMS website ([www.poms.org](http://www.poms.org)) and e-mail to and from the POMS home office ([poms@eng.fiu.edu](mailto:poms@eng.fiu.edu)).

- **the printed word** which includes Production and Operations Management, an increasingly influential quarterly journal solely devoted to the POM field, and the newsletter - POM Chronicle.

- **face-to-face contact** at POMS-sponsored conferences both in the United States and in other countries with an opportunity to network with members of POM community from all over the world.

The Society’s approach to Production and Operations Management is problem-centered; it does not rely on particular methodologies. We are dedicated to uncovering and understanding the canon of knowledge in POM. We encourage reviews and reinterpretations of past research and the provocative idea that initiates new research. Pedagogy remains core interest of the Society; conference sessions, the website, and bulletins are evidence of this interest. The tangible benefits of the Society include:

- Receipt of the quarterly Production and Operations Management journal.
- Discounted registration fee at the POMS annual conference.
- Periodic receipt of Job Bulletin, Research Bulletin, and other e-mail announcements.
- Receipt of the POMS Chronicle newsletter.
- Continuing access to the portions of the POMS website that will be locked in the future:
  - Pedagogy area — links to course websites and syllabi at many schools; links to case collections and international groups; clearinghouse for sabbaticals and leaves around the world.
  - Membership area — find phone and e-mail addresses of other members easily.
Journal: *Production and Operations Management* is the official journal of the Society. The inaugural issue of the Journal was published in 1992. Members of POMS receive the Journal as a part of their membership benefits. The criteria for acceptance of manuscript include originality, significant contribution, readability, and organization of the manuscript. The Journal publishes high quality papers on all topics on POM. The Journal recognizes that the knowledge in POM is not restricted to a single discipline and that it covers several areas, including behavioral science, operations research, statistical analysis, decision support systems, information systems, strategic planning, economics, and engineering. The Journal has published several special issues on topics of current interest which include: Total Quality Management, Manufacturing Strategy, Capacity Constrained Planning and Scheduling, Global Operations and Technology Management, Global Supply Chain Management, Internship Projects at MIT Leaders for Manufacturing Program, Teaching POM: Visions, Topics and Pedagogies, and Service Marketing and Service Operations. Several universities cosponsor the journal. The editorial office of the journal is located at the University of Baltimore, Baltimore, Maryland, U.S.A.

Annual Conferences: POMS’ annual conferences provide a forum to POM professionals for interaction on topics of importance to the POM field. There are two conferences every year – one in U.S.A. and one in another country. The conferences include contributed papers, workshops, plenary sessions, tutorials, and panel discussions. POMS’ conferences always have a theme; are smaller but more cohesive and more intimate than many other conferences; and spend considerable time in plenary and semi-plenary sessions that serve to unite us all. The themes of some of the recent conferences include: Teaching POM: Visions, Topics, and Pedagogies (Indianapolis-1996), Integrating POM Research and Practice in the 21st Century (Miami - 1997), Reflections: The History of Thought in Operations Management (Santa Fe - 1998), Creating a New POM Architecture for the 21st Century (Charleston -1999), Expanding Boundaries of POM (San Antonio – 2000), POM Mastery in the New Millennium (Orlando – 2001), World Best Practice in POM (Australia -1996), Competitiveness and Wealth Creation – Role of POM (South Africa - 1998), Operations Management for Global Economy – Challenges and Prospects (India – 1999), POM facing the New Millennium (Spain – 2000), and Operations Management in the Internet Era (Brazil – 2001). The next two conferences will be held in San Francisco, U.S.A. in April 2002 and Bangkok, Thailand in December 2002. POMS conferences are supported by contributions from various sponsors that include universities, book and software publishers, and private businesses and industries.

Books: POMS published its first book in Technology and Operations Management Series in 1998. The book, *Global Supply Chain and Technology Management*, was edited by Hau L. Lee (Stanford University) and Shu Ming Ng (Hong Kong University of Science and Technology). This book project was financially supported by the School of Business and Management, Hong Kong University of Science and Technology, the Research Grant Council of Hong Kong, and the Stanford Global Supply Chain Management Forum. The second book, *Supply Chain Management: Innovations for Education*, edited by M. Eric Johnson and David E. Pyke (both from Dartmouth College) has been published in June 2000. This book project was financially supported by Dartmouth College.

Membership: POMS has more than 1000 members from 44 countries across the world. Non-U.S.A. members account for about 30% of all members.

Web Page: POMS' web page is maintained and supported by the CIBER grant at Indiana University, Indianapolis, Indiana, U.S.A. POMS' web page provides important links to information about research and teaching in POM, meetings and conferences, POM journals, POM job opportunities, and information about members. Web page address is www.poms.org.
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Marty Starr
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<table>
<thead>
<tr>
<th>Track/Session Chair</th>
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<td>Carrol Room</td>
<td>Cases in Operations Management</td>
<td>Jack Meredith</td>
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<td>Issues, Challenges, Techniques (1)</td>
<td>Paul Cauglin</td>
<td>Antonio Aranda-Ríos</td>
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<td>eBusiness and Supply Chain Management — A Special Issue of POMS</td>
<td>Eric Johnson</td>
<td>Dartmouth College</td>
<td>Saturday</td>
<td>4:00 - 5:30</td>
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<td>Supply Chain Evaluation</td>
<td>Ahn J. Stenger</td>
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<td>4:00 - 5:30</td>
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<td>Reverse Logistics</td>
<td>Geraldo Ferrer</td>
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<td>Supply Networks, Architecture and Contracts</td>
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<td>Stanford University</td>
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<td>University of Warwick</td>
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<td>Monday</td>
<td>2:00 - 3:30</td>
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<td>Innovation in Teaching</td>
<td>Arthur Hill</td>
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<td>Use of Computers in Operations Management Education</td>
<td>Andrew McAfee</td>
<td>Harvard University</td>
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<td>New Product Development and Engineering Education</td>
<td>Keith Goff</td>
<td>Stuttgart Institute of Management and Technology</td>
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<td>New Ideas for Teaching the Core Operations Management Course</td>
<td>Nancy Hyer</td>
<td>Vanderbilt University</td>
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<td>New Ideas for Teaching Operations</td>
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<td>Internet Enabled Operations</td>
<td>Andrew McAfee</td>
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<td>New Paradigms</td>
<td>Stephen Lawrence</td>
<td>University of Colorado</td>
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<td>New Products and Players</td>
<td>Tobias Schoenherr</td>
<td>Indiana University</td>
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<td>Stefano Ronchi</td>
<td>Politecnica di Milano, Italy</td>
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<td>Incumbent's Responses</td>
<td>David Barnes</td>
<td>Open University Business School</td>
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<td>Inventory Management</td>
<td>Rommert Dekker</td>
<td>Erasmus University</td>
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<td>Inventory Control in Case of Product Returns</td>
<td>E. A. van der Leun</td>
<td>University of Toronto</td>
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<td>Inventory in Supply Chains</td>
<td>Mustafa Kargul</td>
<td>Nanyang Technological University, Singapore</td>
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<td>Lean Supply Chains and Quick Response</td>
<td>Joe Blackburn</td>
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<td>Workforce Response to Lean Production Programs</td>
<td>Joe Thomas</td>
<td>Cornell University</td>
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<td>Techniques for Lean, Customized Manufacturing</td>
<td>Rajan Suri</td>
<td>University of Wisconsin</td>
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<td>Implementing JIT</td>
<td>Andy Mulia/Mustafa Ozbayrak</td>
<td>IMI Norgren Ltd./Brunel University</td>
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<td>Implementing the Toyota Production System in Semiconductor Manufacturing</td>
<td>Matt Verlinde</td>
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<td>SLIM — Short Cycle Time and Low Inventory in Manufacturing at Samsung Electronics Corp.</td>
<td>Robert Leachman</td>
<td>University of California, Berkeley</td>
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<td>Strategic Logistics</td>
<td>Phil Evers</td>
<td>University of Maryland</td>
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<td>IT Applications in Logistics</td>
<td>Joel D. Wisner</td>
<td>University of Nevada</td>
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<td>Elliot Robinovich</td>
<td>Arizona State University</td>
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<td>Mass Customization</td>
<td>Ralph Seelman-Eggebert</td>
<td>Fraunhofer Institute</td>
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<td>The Strategy of Mass Customization</td>
<td>Bert MacCarthy</td>
<td>University of Nottingham</td>
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<td>Customer Interaction and Product Configuration</td>
<td>Frank Piller</td>
<td>Technische Universität München, Germany</td>
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<td>Quality and Mass Customization</td>
<td>Marco Iacobacci</td>
<td>University of Zürich, Switzerland</td>
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<td>Evolved Systems and Education Methods for Mass Customization</td>
<td>Bart MacCarthy</td>
<td>University of Nottingham</td>
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<td>Case Studies</td>
<td>Johann Bremner</td>
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<td>The Future for Mass Customization</td>
<td>Carlos John</td>
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<td>Mathematical/Software Tools for Operations</td>
<td>Yihong Chang</td>
<td>Georgia Tech</td>
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<td>Operations Entrepreneurs</td>
<td>Karen Donohue</td>
<td>University of Minnesota</td>
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<td>Mathematical/Software Tools for Operations</td>
<td>Tim Baines</td>
<td>Cranfield University</td>
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<td>OM in Emerging Economies</td>
<td>Alfonso Fleury</td>
<td>Universidade de Sao Paulo</td>
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<td>Operations Flexibility</td>
<td>Manoj K. Malhotra</td>
<td>University of Southern California</td>
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<td>Benefits of Manufacturing Flexibility and its Role in Industrial Applications</td>
<td>Manoj K. Malhotra</td>
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<td>Operations Planning, Scheduling and Control</td>
<td>Vicente Vargas</td>
<td>University of San Diego</td>
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<td>Forecasting Effects of Promotional Activity and Technological Change</td>
<td>Shone Morgan</td>
<td>North Carolina A&amp;T State University</td>
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<td>Flexible and Cellular Manufacturing Systems</td>
<td>Alex Ruiz Torres</td>
<td>University of Texas at El Paso</td>
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<td>Assignment Scheduling and Lead Time Estimation</td>
<td>Nor E. Godinmire</td>
<td>Middle East Technical University</td>
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<td>Integrated Production Planning</td>
<td>L. W. Murty</td>
<td>Indian Institute of Management, India</td>
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<td>Project Management Theory and Applications</td>
<td>Robert Ash</td>
<td>Indiana University Southeast</td>
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<td>Making OM/OR a Basic Science: A European Perspective on OM Research</td>
<td>Ian G. de Kock</td>
<td>Technische Universität Eindhoven</td>
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<td>Job Shop Scheduling</td>
<td>Brian Neureuther</td>
<td>Gardner-Webb University</td>
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<td>Process Improvement and Scheduling Practice</td>
<td>M. Ali Montazer</td>
<td>University of New Haven</td>
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<td>Operations Strategy</td>
<td>Morgan Swink</td>
<td>Michigan State University</td>
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<td>Technology-Based Strategies</td>
<td>Paul M. Swaminathan</td>
<td>Auburn University</td>
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<td>Supply Chain Strategies</td>
<td>Tim Baines</td>
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<td>From Single to Multicarrier Capabilities, and Beyond</td>
<td>Morgan Swink</td>
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<td>Industrial and Organizational Structure</td>
<td>Fiorella Motta</td>
<td>University of Sao Paulo</td>
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<td>Aligning Operations and Marketing in e-Commerce</td>
<td>Ken Boyar</td>
<td>Michigan State University</td>
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<td>Elements of Operations Strategy</td>
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<td>Managing Growth and Change in Manufacturing</td>
<td>Par Ahstrom</td>
<td>Stockholm School of Economics</td>
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<td>Panel On the Practice of Operations Strategy</td>
<td>Rafael Menda/David Dils</td>
<td>McNeil Consumer Healthcare/Yandsibllt University</td>
<td>Sunday 10:00 - 11:30</td>
<td>Oregon Room</td>
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<td>Role of Information Technology in Strategy</td>
<td>Srinivas Talluri</td>
<td>Michigan State University</td>
<td>Sunday 2:00 - 3:30</td>
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<td>Panel Beyond the Balanced Scorecard —</td>
<td>Morgan Swink</td>
<td>Michigan State University</td>
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<td>Panel Supply Chain Coordination</td>
<td>Joseph G. Olinbey</td>
<td>Auburn State University</td>
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<td>Panel Development of Future Professionals —</td>
<td>Manuhaikle Rachal</td>
<td>Ohio University</td>
<td>Sunday 4:00 - 5:30</td>
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<td>Sources of Value in Operations Strategy</td>
<td>Rafael Menda</td>
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<td>Panel Modular Consortia</td>
<td>Des Doran</td>
<td>Kingston University</td>
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<td>Panel Strategic Planning in Self-Management</td>
<td>Amato Amato Nato</td>
<td>Universidade de Sao Paulo, Brazil</td>
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<td>Performance Measurement</td>
<td>Michael Bourne/Andy Neely</td>
<td>Cranfield University</td>
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<td>Product &amp; Process Design</td>
<td>Lucia Isabel Garcia-Cebrian</td>
<td>University of Zaragoza</td>
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<td>Product &amp; Process Design</td>
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<td>New Product Design Practices for Long Term</td>
<td>Dilip Chhaed</td>
<td>University of Illinois</td>
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<td>Emerald Ballroom</td>
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<td>Research on Design: What We Know and Don’t</td>
<td>Sabi Beckman</td>
<td>University of Minnesota</td>
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<td>Collaborative NPD &amp; Supplier Involvement</td>
<td>Kate McKane</td>
<td>University of Minnesota</td>
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<td>Information, Costs and Incentives in Product</td>
<td>Ali Yassine/Thomas Roemer</td>
<td>University of Minnesota</td>
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<td>NPD Education — Preparing Future Leaders for a</td>
<td>Debasish N. Mallick</td>
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<td>New Product Development Process Improvement</td>
<td>Keith Griffin</td>
<td>Stuttgart Institute of Management and Technology</td>
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<td>Panel Managing Development Factories:</td>
<td>Stefan Thunke</td>
<td>Harvard Business School</td>
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<td>Panel The Future of Learning Curve Research</td>
<td>Michael A. Lapre</td>
<td>Vanderbilt University</td>
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<td>Panel Managing NPD Program/NPD Portfolio</td>
<td>Mike Danilovic</td>
<td>Jonkoping University</td>
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<td>Technology &amp; Innovation in Product and Process</td>
<td>Einar Hartweg</td>
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<td>Purchasing and Materials Management</td>
<td>Joel Wisner</td>
<td>University of Nevada</td>
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<td>20</td>
<td>2</td>
<td>Teaching Purchasing and Materials Management</td>
<td>Sue Siferd</td>
<td>Arizona State University</td>
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<td>20</td>
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<td>Managing Supplier Quality and Supplier</td>
<td>Philip Huang</td>
<td>Virginia Tech</td>
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## Track Sessions Summary

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<th>Track/Session Chair Affiliation</th>
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<tr>
<td>21 1 Panel</td>
<td>The Changing Face of Quality Management and Six Sigma</td>
<td>Kevin Linderman</td>
<td>University of Minnesota</td>
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<td>10:00 - 11:30</td>
<td>Coit Tower Suite</td>
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<td>21 2 Panel</td>
<td>Quality Assessment</td>
<td>Charles J. Corbett</td>
<td>UCLA</td>
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<td>21 3 Panel</td>
<td>Quality Management Issues</td>
<td>Kevin Linderman</td>
<td>University of Minnesota</td>
<td>Saturday</td>
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<tr>
<td>21 4 Panel</td>
<td>Conflicts and Complementarities — Exploring the Tension between Lean Manufacturing and Six-Sigma Programs</td>
<td>Peter Ward</td>
<td>Ohio State University</td>
<td>Monday</td>
<td>10:00 - 11:30</td>
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<tr>
<td>21 5 Panel</td>
<td>Quality Control and Continuous Improvement</td>
<td>Raj Salladurai</td>
<td>Indiana University</td>
<td>Monday</td>
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### Service Operations Management

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<tr>
<td>22 1 Panel</td>
<td>High Tech Services</td>
<td>Rohit Verma</td>
<td>University of Utah</td>
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<td>22 2 Panel</td>
<td>Operations Management in Financial Services</td>
<td>Michael Pinedo</td>
<td>New York University</td>
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<td>22 3 Panel</td>
<td>Retailing Operations</td>
<td>Uday M. Apte</td>
<td>Southern Methodist University</td>
<td>Saturday</td>
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<tr>
<td>22 4 Tutorial</td>
<td>Rocket Science Retailing</td>
<td>Marshall Fisher/Ananth Raman</td>
<td>University of Pennsylvania/Harvard Business School</td>
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<tr>
<td>22 5 Panel</td>
<td>Launching the College of Service Operations</td>
<td>Paul Kleinendorfer</td>
<td>University of Pennsylvania</td>
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<td>22 6 Panel</td>
<td>Healthcare Operations</td>
<td>Sridhar Seshadri</td>
<td>New York University</td>
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<td>22 7 Panel</td>
<td>Teaching Service Operations</td>
<td>Richard Metters</td>
<td>Emory University</td>
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<td>22 8 Panel</td>
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<td>22 9 Panel</td>
<td>Service Strategies</td>
<td>Larry N. Man</td>
<td>University of Western Ontario</td>
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<td>22 10 Panel</td>
<td>Innovations in Operations Service Strategy</td>
<td>Aleda Roth</td>
<td>University of North Carolina</td>
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<td>22 11 Panel</td>
<td>Waiting Lines in Service</td>
<td>Sol Agnihotri</td>
<td>Binghamton University</td>
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<td>22 12 Panel</td>
<td>Service Quality</td>
<td>Vida Geyges</td>
<td>University of North Carolina, Greensboro</td>
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<td>22 13 Panel</td>
<td>Topics in Service Operations I</td>
<td>Donald Forer</td>
<td>International College - Naples, Florida</td>
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<td>22 14 Panel</td>
<td>Topics in Service Operations II</td>
<td>Mark M. Davis</td>
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### Special Track: Innovations in Education

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<tr>
<td>23 1 Panel</td>
<td>Creative POM Teaching</td>
<td>Marty Starr</td>
<td>Rollins College</td>
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<td>23 2 Panel</td>
<td>The Value of an Applied/Practitioner Organization</td>
<td>Normal Faull</td>
<td>University of North Carolina, Wilmington</td>
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<td>The Structure of Professional Doctorate Degrees</td>
<td>Sue Nartker/Marilyn A. Chorman</td>
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<td>Sharing Executive Education Best Practices</td>
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<td>Teaching Methods using New Technology (1)</td>
<td>Harry Rosen</td>
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<td>The Quality of Learning and Creative Teaching</td>
<td>Manojkumar Konhal</td>
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<td>International Business Programs</td>
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- Coit Tower Suite—26th Floor Room 2624
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# SUMMARY PROGRAM OUTLINE

## FRIDAY, APRIL 5TH
- **Registration Begins**: 1:00 p.m. to 6:00 p.m.
- **Doctoral and New Faculty Consortium**: 1:30 p.m. to 6:00 p.m.
- **POMS Board Meeting**: 10:30 a.m. to 11:30 a.m.
- **Workshops**: 2:00 p.m. to 3:30 p.m.  
  4:00 p.m. to 5:30 p.m.

## SATURDAY, APRIL 6TH
Exhibits will be open from 9:45 a.m. to 11:30 a.m. and again from 1:45 p.m. to 6:00 p.m.  
They will not be open during plenary presentations.

- **Coffee and Continental Breakfast**: 7:30 a.m. to 8:15 a.m.
- **Plenary Session**  
  (Strategic Issues Facing Business Schools in the 21st Century: A Dean’s Perspective)  
  8:15 a.m. to 9:45 a.m.
- **Break**: 9:45 a.m. to 10:00 a.m.
- **Parallel Sessions**: 10:00 a.m. to 11:30 a.m.
- **Plenary Lunch**  
  (New Product Design Practices for Long-Term Success)  
  11:45 a.m. to 1:45 p.m.
- **Parallel Sessions**: 2:00 p.m. to 3:30 p.m.
- **Break**: 3:30 p.m. to 4:00 p.m.
- **Parallel Sessions**: 4:00 p.m. to 5:30 p.m.
- **President’s Reception**: 6:30 p.m. to 8:30 p.m.

## SUNDAY, APRIL 7TH
Exhibits will be open from 10:00 a.m. to 12:00 p.m. and again from 1:30 p.m. to 6:00 p.m.  
They will not be open during plenary presentations.

- **Coffee and Continental Breakfast**: 7:30 a.m. to 8:15 a.m.
- **Plenary Session**  
  (The Past, Present and Future of Supply Chain Research, Hau Lee, Stanford University)  
  8:00 a.m. to 9:30 a.m.
- **Break**: 9:30 a.m. to 10:00 a.m.
- **Parallel Sessions**: 10:00 a.m. to 11:30 a.m.
- **Plenary Lunch**  
  (HP’s Portfolio Approach for Managing Procurement Risk: Nothing’s Simply Anymore, Corey Billington, Hewlett Packard)  
  12:00 p.m. to 1:30 p.m.
- **Parallel Sessions**: 2:00 p.m. to 3:30 p.m.
- **Break**: 3:30 p.m. to 4:00 p.m.
- **Parallel Sessions**: 4:00 p.m. to 5:30 p.m.
SUMMARY PROGRAM OUTLINE

MONDAY, APRIL 8TH
Exhibits will be open from 10:00 a.m. to 12:00 p.m. and 1:30 p.m. to 3:30 p.m.

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<tr>
<td>Plenary Session</td>
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<td>(Operations Strategy: Challenges of Intel's Move into Communications, David Marsing, Intel)</td>
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<tr>
<td>Break</td>
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<td>POMS Board Meeting</td>
<td>Washington Room</td>
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<td>Oregon and Nevada Rooms</td>
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FRIDAY, APRIL 5TH

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<td>Service Operations Management</td>
<td>Panel on High Tech Services</td>
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<td>Innovation in Teaching</td>
<td>New Product Development and Engineering Education</td>
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<td>Service Operations Management</td>
<td>Tutorial: Operations</td>
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<td>8:00 a.m. – 9:30 a.m.</td>
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<td>Lunch Plenary: New Product Design Practices for Long-Term Success</td>
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<td>President's Reception</td>
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Plenary Session, Saturday April 6th, 8 – 9:30 a.m., Emerald Ballroom
Strategic Issues Facing Business Schools in the 21st Century:
A Panel of Business School Deans
Chair: Robert H. Hayes, Harvard Business School

This session will begin with remarks by our four panelists, who have different perspectives on the issues facing management education in general and their institutions in particular. These include recruiting and retaining the “faculty of the future”; introducing changes in curricula and faculty to reflect the challenges posed by new technologies, internationalization, corporate competition, and distance education; and securing the resources required. The panelists will then debate some of these issues, providing time for the audience to pose questions.

Panelists

Dean Lawrence M. Benveniste,
Carlson School of Management, University of Minnesota
Dean Benveniste, the holder of the US Bancorp chair, is one of a handful of top business school deans to be recently selected as dean from the school’s internal faculty and one of the world’s foremost experts on initial public offerings. His principal areas of research are in credit scoring and valuation of sub prime loans, portfolios and securities, pricing and predicting default risk in commercial mortgages and initial public offerings of equity. He came to the Carlson School from Boston College and has also worked as a staff economist for the Board of Governors at the Federal Reserve System in Washington, D.C. His Ph.D. is in Mathematics from the University of California, Berkeley.

Dean Arnoud De Meyer
Asia Campus, INSEAD
Dean De Meyer is a leader in international R&D management and manufacturing strategy and has taken a strong leadership role in various areas at INSEAD including executive education, MBA Programme development and the Singapore campus. De Meyer has received numerous awards for his operations and technology cases, and has visited a range of universities including both Keio and Waseda Universities in Japan. His Ph.D. is from the University of Ghent.

Professor Elisabeth Pate-Cornell
Chair, Department of Management Science and Engineering
Stanford University
Professor Pate-Cornell has been chair of the Management Science and Engineering department at Stanford since it was created through the merger of three departments (Industrial Engineering and Engineering Management, Operations Research and Engineering-Economic Systems) in January 2000. Her primary interests are engineering risk analysis and risk management, decision analysis and engineering economy. She is a member of the National Academy of Engineering, the Air Force Science Advisory Board and the California Council on Science and Technology and serves as an elected member of the Stanford University Senate. She received her Ph.D. in Engineering-Economic Systems at Stanford University.
Dean Robert S. Sullivan
Kenan-Flagler Business School, University of North Carolina
Dean Sullivan is an acknowledged leader in global business education, the application of technology to learning, entrepreneurship and the commercialization of new technologies. Prior to accepting the deanship of Kenan-Flagler in 1998, Sullivan served as director of the University of Texas at Austin's IC2 Institute, a nontraditional international center for research and education on innovation, creativity, capital and commercialization, and as dean of the Graduate School of Industrial Administration at Carnegie Mellon University. During his tenure at CMU, he led a complete reengineering of the school's educational programs. His Ph.D. is in operations management from Pennsylvania State University.

If you enjoyed this plenary session, don't miss

- A follow-on conversation to this session with Norman Faull on "creative POM teaching" during which we hope to build on what we have learned in this plenary session and talk about its application to creative teaching.
  (Saturday, April 6, 10:00-11:30AM, Gold Rush A)

- The Special Track: Innovations in Education chaired by Marty Starr, which covers the structure of professional doctorate degrees, executive education best practices, teaching with new technology, international business programs, and partnerships with practitioner organizations. (For more detail, look for Special Track: Innovations in Education in the detailed program schedule.)
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<tr>
<th>TRACK</th>
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<tbody>
<tr>
<td>Cases in Operations Management</td>
<td>Publishing Case Research Remanufacturing and Reverse Logistics Global Software Outsourcing, The Case of India Dynamic Control of Supply Chains Supply Chain Configuration</td>
<td>Carmel Room Monterey Room California Room Nevada Room Sunset Suite Washington Room Emerald Room Portola Room Franciscan Suite Oregon Room Gold Rush B Interlude Lounge Nob Hill Suite Coit Tower Suite Pacific Suite Redwood Room Gold Rush A</td>
</tr>
</tbody>
</table>
New products are critical to the growth of firms in the face of ever increasing competition. Marketing, manufacturing, R&D, design, and strategic issues all affect success of new products. Increasingly, the "voice of the customer" [VOC] has served to guide their development. But since all customers do not speak with the same voice or clarity and there are internal and strategic considerations involved (e.g., how quickly new products should be improved or replaced, with what other products should they interface), marketing, manufacturing, and design professionals increasingly find it necessary to lend their skills to interpret VOC information. Members of the panel will discuss the latest methods used to discover, interpret, and guide new product development and design and to assure product manufacturability and speed to market.

Panelists

David M. Kelley  
Founder and CEO of IDEO Product Development  
Associate Professor of Mechanical Engineering, Stanford University  
David Kelley founded the firm David Kelley Design in the early 1980s, and merged with two other design firms to form IDEO in 1991. Today, IDEO is the world’s leading design consultancy specializing in product development and innovation. Kelley has been involved in the creation of diverse new products and has developed processes that have affected the practice of design globally. He is a leader in a field known as empathic design wherein the designer identifies with the user of a new product and by so doing is able to anticipate product improvements.

Jonathan Propp  
Manager - Strategic Design Processes  
Sun Microsystems  
Products often must work with other products as system components and face pressures to improve in anticipation of or in response to competition. Managing a portfolio of products has strategic implications. Early involvement of manufacturing and suppliers is essential. Mr. Propp has been a leader in designing such strategic product systems and portfolios, particularly for high tech projects, for Sun Microsystems.

Allan D. Shocker  
Visiting Professor of Marketing, College of Business  
San Francisco State University  
Prof. Shocker took early retirement from the University of Minnesota (Twin Cities) where he was Curtis L. Carlson Professor of Marketing in the Carlson School of Management. While at Minnesota he co-founded a yearlong course that brought MBA and graduate engineering students together with real companies to develop working prototypes and new product business plans. His recent research has examined the influence of product complements and substitutes on the dynamic evolution of innovation.
V. Seenu Srinivasan  
Ernest C. Arbuckle Professor of Marketing and Management Science  
Graduate School of Business, Stanford University  
Prof. Srinivasan is co-founder of a course, Integrated Design for Marketability and Manufacturing [IDMM], taken by graduate students in the MBA program and in Mechanical Engineering. The course provides an opportunity to learn skills required to create and market new products successfully. Srinavasan’s research, which focuses on conjoint analysis, new product development, market structure analysis and brand equity measurement has received many awards throughout the years.

If you enjoyed this plenary session, don’t miss:

- A follow-on conversation about research issues in design with design luminaries Arnold Wasserman, Michael Barry and Bob Hall. Although product development receives considerable attention in the academic literature, design does not. Little direct attention is given to the roles of industrial, graphic, and multimedia design in product development and firm strategy. In this session, we’ll talk with industry leaders about what is known about design and what still needs to be known.  
  (Saturday, April 6th, 2:00 – 3:30 p.m., Gold Rush A).

- The sessions and panels in the Product & Process Design Track which covers topics such as supplier collaboration, information management, NPD education, and portfolio management in product development. In particular, see the panel session moderated by Stefan Thomke of Harvard Business School on managing “development factories.”  
  (For more detail look for the Product and Process Design track in the detailed program document.)
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<tr>
<th>TRACK</th>
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<td>Environmental Management</td>
<td>Operational Aspects of Environmental Issues</td>
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<td>Global Operations</td>
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<td>Global Supply</td>
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<tr>
<td>Chain Management</td>
<td>Supply Chain Management at Hewlett Packard (PANEL)</td>
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<td>JIT/Lean Production</td>
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<td>Mass Customization</td>
<td>Lean Supply Chains and Quick Response</td>
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<td>OM in Emerging Economies Operations Strategy</td>
<td>Customer Interaction and Product Configuration</td>
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<td>Operations Planning, Scheduling and Control</td>
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<tr>
<td>Product and Process Design</td>
<td>From Sand-Cones to Cumulative Capabilities, and Beyond (PANEL)</td>
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<td>Industrial and Organizational Structure</td>
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<td>Flexible and Cellular Manufacturing Systems</td>
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<td>A Conversation with Lead Designers on Research on Design: What We Know and Don’t Know (PANEL)</td>
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<td>Quality Management and Six Sigma Service Operations</td>
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<td>Rocket Science Retailing (TUTORIAL)</td>
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# PARALLEL SESSIONS AND SPECIAL PANELS

**SATURDAY, APRIL 6TH • 4:00 P.M. – 5:30 P.M.**

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<td>Global Operations</td>
<td>Strategic Planning Issues in Global Operations</td>
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<td>Global Supply Chain Management</td>
<td>Pricing in Manufacturing and Logistics eBusiness and Supply Chain</td>
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<td>Management -- A Special Issue of POMS Supply Chain Evaluation</td>
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<td>JIT/Lean Production</td>
<td>Workforce Response to Lean Production Programs</td>
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<td>Mass Customization</td>
<td>Quality and Mass Customization</td>
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<tr>
<td>Operations Planning, Scheduling and Control Performance</td>
<td>Assignment Scheduling and Lead Time Estimation Service and Public Sector Performance Measurement</td>
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<td>Measurement</td>
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<td>Franciscan Suite</td>
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<tr>
<td>Product and Process Design</td>
<td>Information, Costs and Incentives in Product Development</td>
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<tr>
<td>Purchasing and Materials Management</td>
<td>Teaching Purchasing and Materials Management Online</td>
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<td>Quality Management and Six Sigma</td>
<td>Quality Management Issues Panel to Launch the College of Service Operations (PANEL)</td>
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<td>Service Operations Management</td>
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<tr>
<td>SPECIAL TRACK: Innovations in Education</td>
<td>The Structure of Professional Doctorate Degrees</td>
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SUNDAY, APRIL 7TH
PROGRAM OVERVIEW

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<td>8:00 a.m. – 9:30 a.m.</td>
<td>Plenary: Professor Hau Lee, Stanford University, “The Past, Present, and Future of Supply Chain Research”</td>
<td>Emerald Ballroom</td>
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<tr>
<td>9:30 a.m. – 10:00 a.m.</td>
<td>Coffee Break</td>
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</tr>
<tr>
<td>10:00 a.m. – 11:30 a.m.</td>
<td>Parallel Sessions and Special Panels</td>
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</tr>
<tr>
<td>11:30 a.m. – 12:00 p.m.</td>
<td>Break</td>
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</tr>
<tr>
<td>12:00 p.m. – 1:30 p.m.</td>
<td>Lunch Plenary: Dr. Corey Billington, Hewlett-Packard, “HP's Portfolio Approach for Managing Procurement Risk: Nothing's Simple Anymore”</td>
<td>Emerald Ballroom</td>
</tr>
<tr>
<td>1:30 p.m. – 2:00 p.m.</td>
<td>Break</td>
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<tr>
<td>2:00 p.m. – 3:30 p.m.</td>
<td>Parallel Sessions and Special Panels</td>
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<tr>
<td>3:30 p.m. – 4:00 p.m.</td>
<td>Coffee Break</td>
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<tr>
<td>4:00 p.m. – 5:30 p.m.</td>
<td>Parallel Sessions and Special Panels</td>
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</table>
Plenary Session, Sunday April 7th, 8 – 9:30 a.m., Emerald Ballroom
The Past Present and Future of Supply Chain Research
Professor Hau Lee, Stanford University

Throughout the past 15-20 years, research on supply chain management has been propelled rapidly by tight, productive interactions between industry and academia. Many new discoveries have been made by academics working closely with industry partners; others made by academics have been quickly tried, modified and improved by industry. In this session, we review this history and predict future trends in supply chain research.

Hau L. Lee
Kleiner Perkins, Mayfield, Sequoia Capital Professor of Management Science and Engineering
Professor of Operations, Information and Technology, Graduate School of Business
Stanford University

Professor Lee’s areas of specialization include supply chain management, global logistics system design, inventory planning, quality control and assurance, and manufacturing strategy. He is the founding and current Director of the Stanford Global Supply Chain Management Forum, an industry-academic consortium to advance the theory and practice of global supply chain management.

Professor Lee’s research in medical education planning for the State of West Virginia received the Health Application Section Spotlight Prize by the Operations Research Society of America. His work on multi-echelon inventory system design and control for IBM’s National Service Division was a finalist in the Edelman Application Prize Competition by the Institute of Management Science. His work on resource deployment of global manufacturing and distribution network for Apple Computer won the first prize by the Lauder Institute and the Institute of Management Science, for the Best Advances in the Theory and Practice of International Management Science.

Professor Lee obtained his B.Soc.Sc. degree in Economics and Statistics from the University of Hong Kong, his M.Sc. degree in Operational Research from the London School of Economics, and his M.S. and Ph.D. degrees in Operations Research from the Wharton School of the University of Pennsylvania.

If you enjoyed this plenary session, don’t miss

- A special presentation from Sollectron, one of the leading contract manufacturers in the computer industry. Managers from the firm will talk about evolution of the electronics manufacturing industry. (Sunday, 10:00 – 11:30 a.m., Gold Rush A)

- Managing the High-Tech Supply Chain, a presentation by Alex Brown of Manugistics, Inc. (Sunday, 10:00 – 11:30 a.m., Washington Room)

- Implementing the Toyota Production System in Semiconductor Manufacturing, a special presentation by Integral. (Sunday, 2:00 – 3:30 p.m., Gold Rush A)
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<td>Issues, Contexts, Techniques (1) Reverse Logistics Managing the High-Tech Supply Chain Supply Chain Networks and Architecture</td>
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<td>Continuous Improvement</td>
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<td>Global Supply Chain Management</td>
<td>New Ideas for Teaching the Core Operations Management Course</td>
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<td>Innovation in Teaching</td>
<td>Evolved Systems and Education Methods for Mass Customization</td>
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<td>Mass Customization</td>
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<td>Operations Strategy</td>
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<td>Product and Process Design</td>
<td>NPD Education -- Preparing Future Leaders for a Multifunctional Environment (Sara on)</td>
<td>Nob Hill Suite Pacific Suite Portola Room</td>
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<tr>
<td>Service Operations Management</td>
<td>Healthcare Operations Teaching Service Operations</td>
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<tr>
<td>SPECIAL TRACK: Innovations in Education</td>
<td>Sharing Executive Education Best Practices</td>
<td>Redwood Room</td>
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</table>
Plenary Session, Sunday April 7th, 12:00 – 1:30 p.m., Emerald Ballroom
Lunch will be served

HP’s Portfolio Approach for Managing Procurement Risk:
Nothing’s Simple Anymore
Dr. Corey Billington, Hewlett-Packard

Risk management is the art of reducing uncertainty where possible, and also of increasing the number of options for dealing with surprises that can’t be forestalled by other means. During the late 80s and all through the 90s, manufacturers such as HP were focusing major attention on reducing risk throughout their business, starting with the aspects of their business that were the most closely under their control: their own operations. In the electronics business, demand variability is often coupled with other forms of uncertainty such as demand distortion, poor visibility, and steep devaluation curves. By the later part of the 90s, HP had pretty much gathered all the low-hanging fruits of supply chain improvement – by improving the processes that were under their control – and had begun to look at what to do with uncertainties that couldn’t be directly reduced or controlled. Among these factors were procurement-related uncertainties: price fluctuations, component availability, and demand uncertainty. Rather than attempt to address these procurement issues through some sort of simple process optimization, HP’s procurement groups began to use the same strategy used by financial investors, namely, to use a "portfolio" approach that allowed them to "diversify" and spread the risk over a number of options.

Dr. Corey Billington
Vice President, Supply Chain Services
Hewlett-Packard Company

Dr. Billington leads a team of more than 1200 professionals with expertise in procurement, strategic planning, engineering, and process management. The team focuses on improving supply chain performance by innovating new business processes, providing access to a global supply base, and leveraging its expertise in electronic systems engineering. The group’s consulting teams help increase the efficiency of HP organizations by improving their procurement and business processes and strengthening their decision-making capabilities.

In the late 1980s, HP faced inventory levels mounting into the billions along with ever-increasing demands for customer service. Corey and his team developed a framework for modeling the uncertainties that degrade supply chain performance and Supply Chain Management emerged as a powerful tool enabling manufacturing professionals to model, analyze, and revamp essential business processes. The supply chain and organizational principles developed by Corey and his team are widely used at HP and have been published in a variety of periodicals including Sloan Management Review, Omega and Supply Chain Management Review, among others. Corey holds a B.S. in Engineering Management from Claremont McKenna College as well as B.S., M.S. and Ph.D. degrees from Stanford.

If you enjoyed this plenary session, don’t miss:

Presentations from HP employees provided detailed insights into their company’s supply chain management practices.
- Supply Chain Management at Hewlett-Packard (Saturday, 2:00 – 3:30 p.m., Washington Room). Yes, we know that was yesterday. We thought YOU might be reading ahead!
- Theory of Bidding by Empirical Bayesians in Sealed Bid First Price Auctions (Sunday, 2:00 – 3:30 p.m., Nevada Room)
## PARALLEL SESSIONS AND SPECIAL PANELS
**SUNDAY, APRIL 7TH • 2:00 P.M. – 3:30 P.M.**

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<td>Environmental Management</td>
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<td>Enterprise Resource Planning</td>
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<tr>
<td>Global Supply Chain Management</td>
<td>Theory of Bidding by Empirical Bayesians in Sealed Bid First Price Auctions</td>
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<td>Internet Enabled Operations: Enabling Technologies</td>
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<td>Mass Customization Operations Strategy</td>
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<td>Operations Planning, Scheduling and Control</td>
<td>Beyond the Balanced Scorecard -- What's Next in Strategic Performance Metrics (PANEL)</td>
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<td>Role of Information Technology in Strategy</td>
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<td>Performance Measurement</td>
<td>Project Management Theory and Applications</td>
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<td>Manufacturing Performance Measurement (1)</td>
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<td>Service Operations Management</td>
<td>Service Strategies Technology in Healthcare Services</td>
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<td>SPECIAL TRACK: Innovations in Education</td>
<td>Innovations in Education: Teaching Methods using New Technology (1)</td>
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<td>Enterprise Resource Planning</td>
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<td>Innovation in Teaching</td>
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<td>Techniques for Lean, Customized Manufacturing</td>
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<td>Mass Customization (PANEL)</td>
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<td>Development of Future Professionals -- Some Academic Administration &amp; strategy Issues</td>
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<td>Operations Strategy</td>
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<td>Operations Planning, Scheduling and Control</td>
<td>Making OM/OR a Basic Science: A European Perspective on OM Research</td>
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<td>Waiting Lines in Service</td>
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## MONDAY, APRIL 8TH
### PROGRAM OVERVIEW

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<td>8:00 a.m. – 9:30 a.m.</td>
<td>Plenary: David Marsing, Vice President, Intel, &quot;Operations Strategy: Challenges of Intel’s Move into Communications&quot;</td>
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<td>9:30 a.m. – 10:00 a.m.</td>
<td>Coffee Break</td>
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<td>11:30 a.m. – 12:00 p.m.</td>
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<td>12:00 p.m. – 1:30 p.m.</td>
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<td>1:30 p.m. – 2:00 p.m.</td>
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<td>2:00 p.m. – 3:30 p.m.</td>
<td>Parallel Sessions and Special Panels</td>
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Plenary Session, Monday April 8th, 8 – 9:30 a.m., Emerald Ballroom

Operations Strategy: Challenges of Intel's Move into Communications
David Marsing, Intel Corporation

Intel has been rapidly expanding its business into new sectors, most particularly the communications sector. Operations management in these new sectors differs radically from operations management in the core semiconductor business. Product, product life cycles, and manufacturing processes all differ, requiring Intel to rethink its operations strategy. In this presentation, David Marsing will share Intel's thinking about these new strategic challenges.

David B. Marsing
Vice President, Technology and Manufacturing Group
Director, Intel Communications Group Manufacturing

David B. Marsing leads Intel Communication Group's (ICG) worldwide production and manufacturing operations through both internal and external factories and is responsible for ICG's external foundry strategy. Marsing recently returned to the United States from Denmark where, as President/Managing Director of GiGA ApS and its European subsidiaries, he was instrumental in the successful integration of GiGA into Intel.

Previously, Marsing served as Vice President of Intel's Technology and Manufacturing Group and General Manager of Assembly/Test Manufacturing for five years. He has held management positions with Fab 3, Fab 9 and Fab 11 and is credited with directing the start-up and fastest ramp for the world's largest wafer fab (Fab 11). In 1991, Marsing executed the ramp of the x486 Fab 9.1 achieving world-class performance and establishing a new benchmark for all other wafer fabs. Marsing joined Intel in 1981 as a yield modeling and analysis engineer for the manufacturing yield group.

Prior to Intel, Marsing held positions as a process head at Texas Instruments and a senior researcher at the U.S. Bureau of Mines. Marsing has been a member of IEEE and has worked with the National Academy of Engineering developing the "Foundations of Manufacturing." In 1984 he was awarded an Intel Achievement Award for his work in developing a robust metal deposition process. Marsing received his Bachelor of Science degree in Physics in 1976 from the University of Oregon. He also undertook a three-year multidiscipline graduate program at the University of Oregon in solid-state physics, business and law.

If you enjoyed this plenary session, don't miss

- SLIM: Short Cycle Time and Low Inventory in Manufacturing at Samsung Electronics Corporation, a special presentation by Robert Leachman, University of California, Berkeley (Monday 10 – 11:30 a.m., Gold Rush A)

- Implementing the Toyota Production System in Semiconductor Manufacturing, a special presentation by Integral. (Sunday, 2:00 – 3:30 p.m., Gold Rush A)
# PARALLEL SESSIONS AND SPECIAL PANELS
Monday, April 8th • 10:00 A.M. – 11:30 A.M.

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## PARALLEL SESSIONS AND SPECIAL PANELS
### MONDAY, APRIL 8TH • 2:00 P.M. – 3:30 P.M.

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TRACK 1: CASES IN OPERATIONS MANAGEMENT
Track Chair: Jack Meredith, Wake Forest University,
Jack.meredith@mba.wfu.edu

SESSION 1 (PANEL): PUBLISHING CASE RESEARCH
Session Chair: Ian Stuart, University of Victoria, istuart@business.uvic.ca and
David McCutcheon, University of Victoria, dmccutch@business.uvic.ca
Time & Place: Saturday, April 6, 10:00-11:30AM, Carmel Room

This workshop will describe how to conduct case research and publish the results. It includes data from the recent Special Issue on Case and Field Studies in the Journal of Operations Management that describes the kinds of criticisms made of case studies, the reasons case papers are rejected at first review, the reasons for rejection on second review, and the characteristics of successfully published papers.

SESSION 2: TECHNOLOGY/STRATEGY
Session Chair: Glen Schmidt, Georgetown University, schmidtg@msb.edu
Time & Place: Saturday, April 6, 2:00-3:30 PM, Carmel Room

Seagate – Quantum: Encroachment Strategies
Glen Schmidt, Georgetown University, schmidtg@msb.edu, and Jan Van Mieghem,
Northwestern University
This short case is very well received by students in our MBA Operations Strategy classes. The case would also fit nicely in a course on the management of technology or new product development. Using data representative of the market faced by Seagate and Quantum, the case illustrates, in a concrete way, how a new product that encroaches on the low-end of the market may initially impose little apparent threat to an existing product, selling strictly to new customers. But over time, the new product eventually takes the entire market, driving out the old product. This result is contrasted to that of high-end encroachment, using as an example, Intel’s x86 chips, which initially sell to high-end customers. Students appreciate the way the case ties together concepts from multiple disciplines. The theoretical underpinning is found in “The Impact of an Integrated Marketing and Manufacturing Innovation” M&SOM, Fall, 2000, by Glen Schmidt of Georgetown and Evan Porteus of Stanford.

Replicating the DNA of the Toyota Production System: Action Research in Health Care
Steven Spear, Harvard University, sspear@hbs.edu
In 1999, we reported that we had “decoded the DNA” of the Toyota Production System as a set of four Rules-in-Use for designing, testing-in-use, and improving complex work systems. Since 1999, we have been testing the replicability of this DNA through action research in industrial and service settings, including health care. The case studies presented in this session are representative of this work and present some of our new learnings.

Contribution of Technology to Value Creation in an Industrial Supply Corporation
Serkan B. Celtek, University of Texas-Pan American, Edinburg, TX, sceltek1@panam.edu and
Juan Carlos Cervantes, Pangaea Industrial Supply Corporation, McAllen, TX
Technology management is an integral part of operations strategy for all organizations. Furthermore, the role of technology, especially information technology, is crucial in supply chain management success. Technology facilitates supply chain activities in information recording, storing, sharing, processing, and interpreting. In this paper, technology needs of an industrial supply corporation are presented. A strategic plan for acquisition and implementation of new technology is outlined. The discussion of observed and expected outcomes on value creation and business performance is presented. The paper concludes with future challenges and implications.
Using Profits as Guiding Source in Determining Lot Size, Versus the Economic Production Lot Size Model, with Management Implications: A Case Study
Terrence J. Moran, and Marvin D. Troutt, both at the College of Business Administration, Kent State University, Tmoran@BSA3.Kent.edu
The choice of a production philosophy by a manufacturing firm is important. Cost for holding inventory and cost for missing due dates on customer orders are crucial components of overall profitability (Cochran, 1998). We analyze a case using the Economic Production Lot Size Model. This will be measured against using profits as a guiding force to determine lot size. The purpose is to expose deficiencies in the EOQ model and to demonstrate that using inventory as a guiding force in determining lot size may in fact hurt profits.

SESSION 3 (PANEL): CASES FOR TEACHING OPERATIONS MANAGEMENT
Session Chair: Ron McLachlin, University of Manitoba, mclachl@ms.umanitoba.ca
Time & Place: Saturday, April 6, 4:00-5:30PM, Carmel Room

This session will consist of a panel discussion focused on particular cases for teaching operations management. Experienced case teachers will discuss their favorite OM cases, why these are their favorites, and how they are used in the classroom. As well, the panelists have been asked to discuss promising new cases, including those that address and/or utilize new technology. This session should be of interest to experienced case teachers who wish to exchange information, as well as those who are relatively new to case teaching.

SESSION 4: ORGANIZING AND FORECASTING
Session Chair: Norman Faull, University of Cape Town, nfaull@gsb.uct.ac.za
Time & Place: Sunday, April 7, 10:00-11:30AM, Carmel Room

Atlas Copco Secoroc Case Study
Norman Faull, University of Cape Town, nfaull@gsb.uct.ac.za
The case, written in two parts, Atlas Copco Secoroc (A) and (B), describes the turnaround of a manufacturer of Secoroc rock drilling tools. Part of the international group headquartered in Sweden, the South African factory in 1999 was one of five manufacturing units left in the Secoroc group, down from 17 just a few years earlier. With a litany of problems including marginal profitability, the newly appointed young General Manager (GM) reviews his options (A case). The (B) case describes the actions taken. Armed with the most basic texts in ‘Lean Thinking’ the new GM undertakes a ‘textbook’ lean initiative.

Utility Rate Forecasting – A Case Study
Donald A. Forrer, International College in Naples Florida, dforrer@internationalcollege.edu
This case study examines errant forecasts in a utility rate study. It concentrates on four issues that led to the forecasting model producing inaccurate results: The City was installing fourteen square miles of sewer that was completed behind schedule, the City was installing irrigation systems to homes and the accounts that resulted were added at a slower than anticipated pace, the growth rate for the City was underestimated, and the City used erroneous data. The difference between revenues expected and those received resulted a shortage of approximately $3.74 million in 1993 and over $9 million in 1994.
Selection of Contracts of Service in Civil Construction
Claudia Lira, Caroline Miranda, and Adiel Almeida, carolmm@npd.ufpe.br, aalmeida@npd.ufpe.br, all at Federal University of Pernambuco

This article aims to propose a multi-attribute model which addresses the problem of choice over subcontracting in civil construction, taking into consideration the objectives of cost, quality, speed, flexibility and credibility. Contracts must be chosen based on a suitable, safe and reliable methodology as the services rendered affect the performance system of the contracting company. This correct choice of subcontractor can increase the competitive edge of the contracting company seeing as the activities undertaken by the company rendering services, are done by more specialized personnel in a way which improves the quality of service.

Working Management in the Production
Jose Araujo, USP, Brazil, jose.augusto@poll.usp.com.br

This article has the objective of presenting a proposal of work organization in graphic production, making it feasible the formation of semi-autonomous groups, utilizing the concepts of the Sociotechnical School as an alternative to the Classic Model. In this sense, the concepts that were developed out of studies conducted at the Durham coal mines on the northern region of England, in 1949, by some researchers of Tavistock Institute of Human (MARX, 1998), may be considered an attempt of reconciling productivity and better work conditions. We will present the case study of a company in the Brazil’s graphic field relating to problems of flexibility and production work organization an exploratory research was performed in order to investigate the current phenomenon within its actual context. This type of case study seeks to be a qualitative tool (LAZZARINI, 1995), with the intention of clarifying the boundaries between the Classic School and the Sociotechnical School for production work organization.

SESSION 5: CASE STUDIES –BRAZILIAN EXPERIENCES
Session Chair: Susana Pereira, University of Birmingham, sfpereira@gvmail.br
Time & Place: Sunday, April 7, 2:00-3:30PM, Carmel Room

The Relationship in the Modular Consortium: The Case of VW Trucks and Buses Production
Susana Carla Farias Pereira, University of Birmingham, sfpereira@gvmail.br
Marta Campos Maia, mmaia@gvmail.br, Luiz Carlos Dizerio, ldiseric@fgvsp.br
Mauro Sampaio, msamp@zaz.com.br

The Modular Consortium, a new concept of plant design, was established by Volkswagen in Brazil. For the operation of this plant of buses and trucks, it was selected seven suppliers. In this partnership the suppliers share the risks of the capital investment in the business. As a result the market share for trucks increased from 13% in 1996 to 28% in 2000 and for buses reached 25% in 2000. This paper analyzes the actual model, the main difficulties in the relationship with the partners, identifying the level of the relationship and the aspects related to the evolution of the system.

The Brazilian GM’s Automotive Complex of Gravataí
João Mário Csillag, São Paulo, Brasil, csillag@fgvsf.br

Recently, in November 2001, the Brazilian Gravataí Automotive Complex of GM celebrated the production of the one hundred thousandth Chevrolet Celta. This plant brought about a true revolution in how cars are made, from its concept to the direct-sale model, through its production management system. This business is considered the most successful enterprise in GM’s recent history. The aim of this case is to discuss the initial results after one year of work, the advantages and disadvantages of this type of enterprise considering GM’s focus on meeting end customer demand instantaneously.
Conquering The Market of a Commodity Through Operations Strategy
João Mário Csillag, Doutor em Administração de Empresas pela EAESP/FGV, csillag@fgvsp.br
and Susana Carla Farias Pereira, Doutoranda em Administração de Empresas na EAESP/FGV,
sfpereira@gvmail.br
Petrobras Aviation (BR/A) is a Business Unit of a subsidiary of Petrobras, one of the most important
petrol companies in the world. It has the lead position in the market of aviation fuel and the
biggest network for fuel distribution in Brazil. This case describes the strategy adopted by
BR/A to improve its participation in the segment of small airplanes. Although this segment has
a less expressive sales volume than the commercial one, it allows for higher profitability rates.
They have developed a study to decide where to invest. The main aspect considered were the
logistics for distributing aviation fuel.

Estimating the Welfare Cost of Protectionism
Luiz Antonio R. R. Scavarda do Carmo, Shell Brazil, scavarda@hotmail.com
The objective of this paper is to estimate the magnitude of the welfare cost of protectionism in
the case of the Brazilian automotive market for the year of 2000. In order to achieve its goal, a
model was developed and applied in the sub-compact vehicle segment. This segment was chosen
because it represents more than 70% of the Brazilian domestic market. The paper concludes that
protectionism concerning the chosen segment brought a welfare loss to the Brazilian community,
which here was represented by the vehicles’ consumers and producers and the Government.

The Management in Democratic and Solidary Bases
Sandra Rufino, Chair, Universidade de São Paulo - ITCP-USP, ssrufino@usp.br
Consisting as alternative of organization of work and production, the cooperatives are each time
more significantly present in the world-wide economy. Historically, cooperativism doesn’t
express only a reply to the job crisis, but it also consists in an alternative socio-economic struc-
ture, with proper values and social relations. In all sectors of Brazilian economy there have been
a significant increase in the number of cooperatives. This expansion of the cooperatives experi-
ence led to the appearance of some entities that assist the creation, formation and organization
of them and match diverse specialties in order to help the movement.

SESSION 6 (PANEL): ORGANIZING AND CONDUCTING
MULTIPLE-CASE FIELD STUDIES
Session Chair: Danny Samson, d_Samson@mbs.unimelb.edu.au, and
Norma Harrison, norma.Harrison@mq.edu.au
Time & Place: Monday, April 8, 10:00-11:30AM, Carmel Room

This workshop will review a major field study recently conducted by the speakers involving 21
separate cases. Guidelines for conducting large and smaller field studies, and lessons learned from
experience will be discussed. Topics will include structuring a field study, getting firms to buy in,
collecting data, identifying important findings, and validating the results.
TRACK 2: CONTINUOUS IMPROVEMENT TRACK
Track Chair: Paul Coughlan, University of Dublin, coughlnp@tcd.ie

SESSION 1: CONTINUOUS IMPROVEMENT: ISSUES, CONTEXTS, TECHNIQUES I
Session Chair: Paul Coughlan, University of Dublin, coughlnp@tcd.ie
Time & Place: Sunday, April 7, 10:00-11:30AM, Coit Tower Suite

If Continuous Improvement is the Solution, What is the Problem?
Gustavo A C. Guzman, Federal University of Minas Gerais, Brazil, gguzman@dep.ufmg.br
While Continuous Improvement (CI) methods/tools are well known, there seem to be significant
difficulties in applying them. That is, how to apply becomes the key issue in CI processes. Yet,
conventional engineering knowledge seems to insufficient to implement CI. This paper
contributes in addressing the above-mentioned problem by examining and reviewing the
application of a socio-technical based CI conceptual tool: Social Simulation (SS). SS is a meta-
model that assists to implement different production operations concepts considering technical,
strategic, organizational and people related issues simultaneously. It is argued that the SS method
is effective because address two key 'soft' aspects of the implementation process: learning and
change. Empirical evidence draws from an electronics industry case study.

Collaborative Improvement in the Extended Manufacturing Enterprise
Raffaella Cagliano, Politecnico di Milano, raffaella.cagliano@polimi.it, Federico Caniato,
Politecnico di Milano, federico.caniato@polimi.it, Mariano Corso, Università di Pisa,
mariano.corso@polimi.it, and Gianluca Spina, Politecnico di Milano, gianluca.spina@polimi.it
Continuous Improvement is a consolidated concept in managerial theory and practice, mainly in
the context of stand-alone companies. However, the competitive scenario requires organizational
settings based on loose company boundaries and collaborative relations among different units,
such as the Extended Manufacturing Enterprises (EME). Consequently, continuous improvement
should take place also at the inter-company level. The purpose of the paper is to present a pre-
liminary theory on Collaborative Improvement (Col), i.e. continuous improvement at the EME
level, based on the evidence from the case of a large system integrator in the aerospace industry
and four of its suppliers. Various areas for implementation of Col have emerged at both inter-
company operational level and relationship management. Specific organizational and IT requirements
were also pointed out. On the basis of these results, a preliminary Business Model of Col is proposed,
which will be further developed and tested through an Action Learning approach.

Techniques for Improving Fab Productivity
Peter Courtois, Telen USA, peterc@telen.com
The paper focuses on operations management techniques and tools available to improve both
fab-level and tool-level efficiencies by focusing on material movement automation and data
automation. At the fab-level, we will address planning and dispatching systems, inventory
management systems and other issues that affect overall fab productivity. As an example, we will
discuss important fab-level metrics, WIP management, and supply chain issues. At the tool-level,
discussions about efficiencies will address overall equipment effectiveness issues and productivity
improvement opportunities. We will focus on reducing losses in availability, efficiency and quality
through material movement automation and data automation.
Developing a Continuous Improvement Model for an Academic Department: A Customer Oriented Approach
Nael Aly, California State University, Stanislaus, naly@stan.csustan.edu
This paper discusses continuous improvement implementation in the Operations Management (OM) program at California State University, Stanislaus. In particular, it documents the processes needed to solicit input from customers and develop partnerships with suppliers. Four major internal and external customers are identified. They are Operations Management majors, Business majors, College of Business faculty and staff, and Operations Management professionals. In addition, the two major suppliers involved are Mathematics and Statistics faculty. The paper documents the details of all the above listed customers' and suppliers' processes as related to continuous improvement efforts of the Operations Management program. Results and challenges of the implementation are also discussed and analyzed.

SESSION 2: CONTINUOUS IMPROVEMENT: ISSUES, CONTEXTS, TECHNIQUES II
Session Chair: Jose Gieskes, University of Twente, The Netherlands, j.f.b.gieskes@sms.utwente.nl
Time & Place: Sunday, April 7, 2:00-3:30PM, Coit Tower Suite

Statistical Analysis of Six Sigma in Quality Management
Tsong-how Chang, University of Wisconsin-Milwaukee, thchang@uwm.edu
This paper examines the underlying concept and common practice of six-sigma quality from three related perspectives: engineering design; product and process control; and continuous improvement. An analysis of the statistical basis of the contemporary six-sigma idea will show room for improvement in itself. Through examples and illustrations, we will demonstrate some of the potential quality improvement and economic benefits to be gained by incorporating the fundamentals of statistical thinking in product/process design and control.

Collaboration and Improvement in the Extended Manufacturing Enterprise
Paul Coughlan, Louis Brennan, David Coghlan, Fiona Lombard, and Timothy McNichols, all at the School of Business Studies, Trinity College, Ireland, coughlnp@tcd.ie
Competition between extended manufacturing enterprises (EMEs) requires member-firms to act as innovative and knowledge-creating partners within complex and dynamic networks. Yet, collaboration in such networks is, in itself, not enough to trigger and sustain the levels of continuous improvement required to remain competitive. This paper will explore the concept of collaboration, drawing from a set of three case studies of operations practice and performance in three EMEs. From analysis of the cases, three forms of collaboration are evident: collaboration as a partnership between organizations, collaboration as a relationship between individuals, and collaboration as a strategic alliance between organisations. These forms are not necessarily exclusive or unrelated.

Step-by-Step Cycle Time Reduction
Marc Puich, Tefen USA, marc@tefen.com
Companies in a wide variety of industries are focusing on lean implementations to improve their overall performance. One way to begin this process is to focus on reducing cycle time. A reduced cycle time allows more flexibility, better WIP management, quicker response to customer needs, and improved quality. While every industry does have differences in where the critical cycle time killers occur, the methodology for approaching cycle time reduction is similar across all of them. We will describe here the general philosophy for cycle time reduction and a summary of where critical areas occur for different industries.
Quality Improvement in the Public Sector: Municipal Government
Henry S. Maddux III, and Victor Wayhan both at Sam Houston State University,
mgt_hsm@shsu.edu, and J. N. D. Gupta, Ball State University
While the reports of application of quality techniques in the public sector in general and
government in particular have grown tremendously in the past decade, few applications and
developments of these techniques to the unique operating environments of municipal government
have surfaced. This paper presents the foundation principles of applying continuous improvement
models within this sector. Case examples relating to city financial management and library
operations improvement are presented.

SESSION 3: CONTINUOUS IMPROVEMENT:  
ISSUES, CONTEXTS, TECHNIQUES III
Session Chair: Louis Brennan, University of Dublin, Ireland
Time & Place: Sunday, April 7, 4:00-5:30PM, Coit Tower Suite

Continuous Improvement Based on the Learning Capacity of the Organization:
The Implementation of Learning Environment Based on a Visual Guide
Cid Alledi, Universidade Federal Fluminense, cid@latec.ufg.br
According to Garvin, the improvement plans fail because the majority of the companies did not
learn the basic lesson: to improve continuously, the organizations first need to know how to
learn. The occidental managers, according to Nonaka, have difficulty to understand the Japanese
symbology and slogans as instruments to create the learning environment. The authors of this
text consider a methodology of integration of the concepts of Nonaka and Garvin to prolepsitize
the effectiveness of the implantation of the knowledge environment in the organizations.

Stimulating Different Levels of Learning in Product Innovation Processes
J.F.B. Gieskes, University of Twente, The Netherlands, j.f.b.gieskes@sms.utwente.nl
Based on empirical research (10 in-depth case studies and survey in 70 companies in 6 countries
in Europe and Australia) which was aimed at effective managerial activities and decisions in stimulating
learning behavior by individuals and teams in product innovation processes (Gieskes, 2001), In
this contribution it is argued that managerial action does not have an impact on all levels of
learning simultaneously. On the contrary, levers in general have an impact on one level of learning
and only on a (limited) number of phases of the learning process. The proposition is that effectively
stimulating learning requires a configuration of levers that is supportive of and consistent with
the (innovation and learning) strategy of an organization. A learning process consists of four
different subprocesses (acquisition/generation, distribution, storage and retrieval of knowledge).
Managerial activities and decisions can be positioned in this learning process. The observation is
that in order to effectively stimulate all the subprocesses of the learning process, it is required to
operate a configuration of different managerial activities and decisions.

Measurement of Employee Involvement in the Context of Continuous Improvement
Narender Sumukadas, University of Hartford, Sumukadas@Mail.Hartford.Edu
This paper presents the development and validation of a set of empirical scales to measure
employee involvement (EI). The items for the scales were adopted from existing instruments,
and adapted for application in the context of studying continuous improvement of operations
(CI). The scales were modified iteratively, pilot tested, and administered by mail survey
questionnaire. The scales were then tested for reliability and validity using the survey data. The
refined scales are presented in this paper, so they can be usefully applied by other researchers.
How to Reduce the Failure Costs With Quality Assurance in Softwarehouses
José Ricardo Corrêa Maia, Marcelo do Nascimento, and Fabiana Agapito Costa,
all of I-nova soluções em manufatura e manutenção industry, jose.maia@datasul.com.br
This case shows how quality assurance, balanced scorecard, quality costs management helps
continuous improvement and reduces the failure costs. Continuous improvement and quality
assurance identify the best opportunities to invest in prevention activities. The specifics objectives
are the following: (i) to identify the losses due to bad quality costs, (ii) to quantify the losses of the
bad quality costs, and (iii) to show the reduction of the failure costs after implantation of quality
assurance. The case will show the following concepts: (i) Quality assurance, inspection process,
inspection types, plans of tests and automatized tests, (ii) how the implementation of the balanced
scorecard improved the process, (iii) how the automatized tests minimized the inclusion of the
new failures in the maintenance of the programs, and (iv) how the implantation of quality costs
management measures the benefits of the quality assurance and identifies the costs, appointing
what must be improved. Reduction of the 81% in the external failure cost and 27% in the internal
failure cost, after utilization of the quality assurance and continuous improvement.
TRACK 3: ENTERPRISE RESOURCE PLANNING (ERP)
Chair: Tony Arreola-Risa, Texas A&M, a-arreola-risa@cgsb.tamu.edu

SESSION 1: ERP I
Session Chair: Jeff Stratman, DuPree College of Management, Georgia Institute of Technology, jeff.stratman@mgt.gatech.edu
Time & Place: Sunday, April 7, 2:00-3:30PM, Washington Room

A Multiple-Agent Enterprise Resource Planning Architecture
Bih-Ru Lea, and Wen-liin Yu, both at University of Louisville, brlea@louisville.edu and weny@louisville.edu
This study proposed a Multi-Agent ERP system (MAERPS) architecture that uses intelligent software agents as an alternative for ERP implementation. A software agent is a self-contained, autonomous software module that performs assigned tasks from the human user and interact/communicate with another applications and other software agents in different platforms to complete the tasks. Four types of intelligent software agents (coordinating agents, task agents, data collecting agents, and user interface agents) were examined and discussed in the proposed MAERPS architecture. The advantages of MAERPS architecture compared to traditional ERP implementation were then discussed and implications were presented.

Continuous Change Management is the Key to ERP Implementation
Jeremy Dixon-Wright and Martin Spring, both at Manchester School of Management, UMIST, martin.spring@umist.ac.uk
The paper examines the implementation of an SAP R/3 enterprise resource planning (ERP) system in the UK division of a large international cosmetics manufacturer. The objective is to understand how organizational change can be managed to achieve successful ERP implementation. The literature on ERP implementation and IS/IT implementation is reviewed. It is shown that this literature has a varying approach to the incorporation of change management issues. Some key change management models are reviewed, notably that of Burns (2001). Because the project involves a number of sites, concepts are also drawn from the literature on knowledge management in extended networks. The case study centers on the lead site in the implementation project, with data collection taking place two years into the still on-going implementation activity. Documentary evidence is reviewed and this shows that various major changes have occurred in the project plan, team composition and structure, and the change process itself. These data are complemented by in-depth interviews with various participants, including end-users, business sponsors, team leaders and external consultants.

Operational Performance Measurement in the Enterprise: Preliminary Scale Development
Jeff K. Stratman, Georgia Institute of Technology, jeff.stratman@mgt.gatech.edu, and Aleda V. Roth, UNC at Chapel Hill, rotha@bschool.unc.edu
Significant investments in integrated information technologies, such as enterprise resource planning systems, are being made without adequate metrics for assessing their success. The operational scope of these technologies suggests the need for holistic performance measurement; however, many projects are evaluated using traditional financial metrics, leading some to posit a “productivity paradox.” Recent evidence of IT-based productivity improvements in the U.S. economy contradict this proposition and highlight the need for improved measurement of enterprise-wide operational performance. We present a theoretical framework of facets of operational enterprise performance and suggest preliminary scales based on data collected from manufacturing users of ERP systems.
SESSION 2: ERP II
Session Chair: Antonio Arreola-Risa, Texas A&M, a-arreola-risa@cgsb.tamu.edu
Time & Place: Sunday, April 7, 4:00-5:30PM, Washington Room

Coordinated Planning System Configuration--A Transition from ERP to SCM: Intra-Organization Integration to Inter-Organization Integration
Diatha K. Sundar, diatha@iimb.ernet.in and L. S. Murthy, Indian Institute of Management at Bangalore

In the current business and manufacturing scenario, the paradigm is looking at ERP and SCM as complementing management tools for competitiveness rather than considering them as independent strategies and looking at them in isolation. The present study aims at operationalization of this new paradigm through the design of a “configurator” framework that integrates ERP softwares with SCM concepts. The notion of supply chain argues the need for extending the boundary for meaningful analysis to include suppliers upstream and customers downstream. One immediate implication of the extension of boundary is the need for flow of information across these various stages (suppliers and customers) besides the flow physical goods and cash. The information so shared is about the business activity (like demand pattern, inventory level, capacity available etc) and is shown to facilitate better decision-making. In this study it is argued that besides sharing mere business activity information, the supply chain members stand to gain by having a common understanding of how such information is used. In other words, each member of the supply chain is benefited by the knowledge of the decision-making process adopted by other members of the chain. Specifically, the case of operations planning is chosen. Further the planning decision considered is that of lot sizing. In a hypothetical three-stage supply chain context, the lot sizing decision adopted by each member of the chain is systematically changed and the impact on the total system cost is studied using simulation. Two cases of supply chain structure - distribution channel and manufacturing setup - are considered. It is observed that the main effects of lot sizing decision by various members of the chain are significant. The interaction effects between lot sizing decisions by various members emerged to be very important. Interestingly, the lot sizing decisions of consecutive members of the chain interact much more and the others do not as much. The results of this study - though indicative - suggest scope for further work in this direction. For instance, the impact of different cost structures, product structures, supply chain configuration etc has to be explored further. Another important area is the means of achieving coordination among the supply chain members to share the process of decision-making.

Supplier Management in an ERP-Enabled Supply Chain: Sharing Collaboration Gains
Mary Meixell, mmeixell@som.gmu.edu

The information made available by ERP systems improves supply chain performance by explicitly incorporating supplier costs and constraints into the APS production planning process. Supplier-facing collaboration of this type generates a surplus in the form of improved cost and responsiveness performance for the supply chain as a whole. This presentation describes the use of a supply chain model to better understand how suppliers are impacted when participating in a collaborative effort, and addresses the issue of distributing the gains resulting from the collaboration.

Teaching an ERP Course from an Operations Management Perspective
Antonio Arreola-Risa, Texas A&M, a-arreola-risa@cgsb.tamu.edu

This presentation describes the efforts over three years of teaching an ERP course from an Operations Management perspective. Emphasis will be on course content and lessons learned.
TRACK 4: ENVIRONMENTAL MANAGEMENT
Track Chair: Dan Guide, Duquesne University, guide@duq.edu

SESSION 1: REMANUFACTURING AND REVERSE LOGISTICS
Session Chair: Gilvan Souza, University of Maryland, gsouza@rhsmith.umd.edu
Time & Place: Saturday, April 6, 10:00-11:30AM, Monterey Room

Coordination of Throughput Times for a Remanufacturing Shop
V. Daniel R. Guide, Jr., Duquesne University, guide@duq.edu, Erwin van der Laan,
Erasmus University Rotterdam, elaan@fac.fbk.eur.nl, and Gilvan C. Souza,
University of Maryland, gsouza@rhsmith.umd.edu

We consider a basic remanufacturing shop that handles two remanufacturable products. Product
A is comprised of two components A1 and A2, whereas product B is a single entity. After
disassembly, component A1 is remanufactured at facility F1; component A2 and product B are
remanufactured at facility F1. Both remanufacturing facilities have limited capacity, and are
modeled as M/G/1 queues. First, we show that delaying a component to the shop after disassembly,
which is a common release mechanism in actual shops, never improves system performance,
measured in terms of total weighted average sojourn time (TWAST). Second, we show that the
optimal scheduling rule at facility F2 that minimizes TWAST depends on the processing time
characteristics of A1, A2, and B, and can only be found numerically, in general. Using an extensive
numerical study, we show, however, that using FCFS as a scheduling rule at facility F2 does not
result in significant deterioration in TWAST, averaging 7.5%. We also perform a simulation study
and show that a two-moment approximation for product A's average sojourn time performs
relatively well.
Design of a Mixed Assembly and Disassembly Line for Remanufacturing Operations
Gilvan C. Souza, University of Maryland, gsovza@rhsmith.umd.edu, V. Daniel R. Guide, Jr., Duquesne University, guide@duq.edu, and Michael E. Ketzenberg, Colorado State University, michael.ketzenberg@mail.biz.colostate.edu

In this paper we consider the problem of designing a mixed assembly-disassembly line for remanufacturing. That is, parts from the disassembly and repair of used products are used to build “new” products. This is a problem common to many OEM remanufacturers, such as Xerox or Kodak. We study two main configurations, under the assumption that the disassembly sequence is exactly the reverse of the assembly sequence. Under a parallel configuration, there exist two separate dedicated lines, one for assembly and one for disassembly, which are decoupled by buffers—from both disassembly operations, which have preference, as well as parts from an outside, perfectly reliable supplier. Under a mixed configuration, the same station is used for both disassembly and assembly of a specific part. The problem is studied using a GI/G/c queuing network. Due to a loss of pooling, we conclude that the parallel configuration outperforms the mixed line only when the variability of both arrivals and processing time are significantly higher for disassembly and remanufacturing than for assembly.

Reverse Logistics for Single Use Devices (SUDs) in the HealthCare Industry
Rajesh Srivastava, Florida Gulf Coast University, rssrivast@fgcu.edu,
Vaidyanathan Jayaraman, University of Miami

Many Single Use Devices (SUDs) are routinely remanufactured and reused in hospitals. This is important, since disposable products is the second largest expense in medical facilities after staffing. Many hospitals are using SUDs, primarily motivated by cost considerations, with a secondary “green” image consideration. Reverse logistics entails collecting the discarded SUDs at customer site, sorting and/or pre-cleaning products, then shipping it to the remanufacturer. The collection process may be done by the hospital, a third party reverse logistics provider, or by the remanufacturer. We examine the reverse logistics process and model it for improving collection yield and minimizing cost.

SESSION 2: OPERATIONAL ASPECTS OF ENVIRONMENTAL ISSUES
Session Chair: Larry Fredendall, Clemson University, flawren@clemson.edu
Time & Place: Saturday, April 6, 2:00-3:30 PM, Monterey Room

Firms and Environmental Certification: An Empirical Study of Spanish Firms
Gerusa Gimenez, University of Girona, gerusa.gimenez@udg.es

Environmental Management Systems (EMS) emerged in the 1990's as powerful tools that allowed firms to achieve maximum protection of the environment in the framework of sustainable development. Since then, more and more companies are moving down the road of environmental management. The aim of this paper is to describe the typologies of firms that adopt and certify EMS. We have carried out an empirical study with data from 100 Spanish companies with an ISO 14001 certificate or with the Eco-Management and Audit Scheme (EMAS). The results of the study are consistent with the going importance of EMS in Spain, and provide detailed insight into the stage of EMS implementation classified by types of firms.

A Framework for Incorporating Environmental Issues Into the Optimal Operations of Processes
Omar Romero-Hernandez, Instituto Tecnologico Autonomo De Mexico (ITAM), oromero@itam.mx

The incorporation of environmental impacts and operations management into a single frame is relatively new. Traditionally, operating conditions are defined based on technically, economic and maintenance evaluations. Apart from these evaluations, environmental impact assessments could be conducted. However, the incorporation of environmental issues and economic features into a single framework is still in its infancy. This paper presents an optimization framework for identifying optimal operating conditions, where both costs and environmental impacts can be considered. The application of this framework is illustrated with a mathematical model of wastewater treatment plants, which identifies (at various operating conditions) the most adequate process.
Examining Productivity Gains From An Environmental Management Systems
Peter Letmathe, Ruhr-Universität Bochum, Germany, Peter.Letmathe@ruhr-uni-bochum.de, and
Larry Fredendall, Department of Management, Clemson University, flawren@clemson.edu
This paper uses a series of mini-case studies to examine why and how firms which are implementing
formal Environmental Management Systems (EMS) such as ISO 14001. Very often they utilize the
knowledge gained from earlier implementations of quality management systems such as ISO
9000. We have found that firms have not involved their line employees in the design of their
EMS. Most firms have involved their quality managers in the EMS implementation efforts and
they have adopted quality management tools for use in their EMS. We examine how these tools
were adapted and the benefits gained by the firms.

SESSION 3: RISK ANALYSIS AND THE ENVIRONMENT
Session Chair: Sayonara Rocha, Federal University of Rio Grande do Norte, ssonaly@bol.com.br
Time & Place: Saturday, April 6, 4:00-5:30PM, Monterey Room

Environmental Risks Analysis: A Case Study
Sayonara Rocha, ssonaly@bol.com.br, Federal University of Rio Grande do Norte
The effectiveness of the solutions for to assure environmental quality can be affected by envi-
ronmental risks. Because of activities and services offered in gas stations, environmental impacts
produced by these activities can bring about potential and irreversible damages for the environment.
So, the objective of this work was to analyze the environmental risks in gas stations through of the
Environmental Risks Index (ERI). ERI was obtained multiplying severity, probability and duration
parameters related to environmental impact analyzed, according to Block’s methodology (1999).
The results showed that ERI more high relate supplying both underground and vehicles tanks.

Environmental Risk Management and Social Responsibility:
Problems and Perspective in the Fuel Distribution Sector
Maria Mariana Cunha Ottoni, mariana.ottoni@bol.com.br, Sérgio Marques Júnior,
sergio@ct.ufrn.br, Rubens Eugênio Barreto Ramos, rubens@ct.ufrn.br, all of the Federal
University of Rio Grande do Norte, Natal-Brazil
The paper objective was to present an approach analyzing the problems and perspectives of
adopting environmental risks management as a corporate strategy that allies the economic
imperative of production with the environmental protection and social justice to community.
Along the paper, it is analyzed the formal processes that the organizations use to identify and to
define its environmental strategies highlighting the need for explicit consideration and incor-
poration of environmental and social justice within corporate. The methodology is based on
identifying salient environmental risks in the sector of fuel distribution, economic and social
analysis of a scenario of environmental risk management and analyzing options to minimizes
environmental risks. Concluding, this article approaches the use of ISO 14001 standard as a form
to incorporate the environmental imperative in the activities of the organization.

Success Factors In Water Distribution Revenue And Commercial Management
Marco Pandolfi, University of São Paulo, Brazil, mpandolfi@usp.br
According to the Inter-American Development Bank – IADB, amongst the many issues associated
to water resource planning, policymaking and management stands the common objective of system
efficiency that reflects aspects, like: water system losses reduction, optimal water pricing, marketing
policies, effluent discharge regulation, etc. And although non-monetary aspects are to be taken
into account under a multiple objective framework, whatever the project, in order to be self-sustainable
in the long run providing means for economic and social continuous growth and development,
it must be system efficient (net benefit maximizing) or at least cost effective (cost minimizing).
In such scenery, this work intends to identify success factors that concur to the achievement of
the above stated objective strategies. The experience of one of the authors as assistant director at
the Water and Sewer Department of a major Brazilian industrial city located in the Great Sao
Paulo Metropolitan Area is used as reference.
SESSION 4: CONSUMER ATTITUDES AND THE ENVIRONMENT
Session Chair: Esmeraldo Macêdo dos Santos, Federal University of Rio Grande do Norte, esmeraldo@zipmail.com.br
Time & Place: Sunday, April 7, 2:00-3:30PM, Monterey Room

Evaluating Citizens’ Attitude on Selective Collection of Municipal Solid Waste: A Practical Application in Natal - Brazil
Esmeraldo Macêdo dos Santos, esmeraldo@zipmail.com.br,
Rose Meire P. Revoredo de Macêdo, harlmmrose@digi.com.br, José Ivam Pinheiro, ivampinheiro@yahoo.com.br, Gunther Josuá Costa, guntherbr@uol.com.br and Rubens Eugênio Barreto Ramos all at Production Engineering Program – PEP, Federal University of Rio Grande do Norte
The aim of this article is to analyze the profile of the citizens of Natal through its attitudes and perception given to the thematic of solid waste collection. An exploratory survey was used through a stratified random sample of the 410 interviews divided in the four administrative regions of the city. Cluster’s analysis statistics technique was used to establish individual groups in the similarity of its features. Preliminary findings show that the population is willing to participate of new strategies for the solid waste of Natal, as also it defends the idea to make people aware for a bigger envelvoment in the program of selective collection of the city. It is expects with this research to trace the profile of the requirements of the population related to the most important variable relation the selective collection of waste.

Esmeraldo Macedo dos Santos, esmeraldo@zipmail.com.br, José Ivam Pinheiro, Gunther Josuá Costa, Sérgio Marques Júnior, and Reidson Pereira Gouvêas, all at Production Engineering Program, Federal University of Rio Grande do Norte
The aim of present paper is to identify population’s wants and needs regarding the use of the system of management of household solid wastes of the city of Natal-RN State-Brazil. In order to achieve this goal, a stratified random sampling technique was used and 410 people were interviewed from four different administrative regions of the city. Soon after, Quality Function Deployment – QFD was applied to the public environmental management in way to supply necessary elements for decision-makers in the solution of environmental problems. Preliminary findings show that the population is willing to participate of the program of selective collection of waste, as also it defends the idea of implementation of an wide program of environmental education.

ECO Behaviors of the Citizens in the Use of Water Resources: An Evaluation in the City of the Natal - Brazil
José Ivam Pinheiro, ivampinheiro@yahoo.com.br, Esmeraldo Macêdo dos Santos, esmeraldo@zipmail.com.br, Gunther Josuá Costa, guntherbr@uol.com.br, Paulo César Formiga Ramos, and Sérgio Marques Júnior, all at Production Engineering Program, Federal University of Rio Grande do Norte
This paper aims to evaluate the environmental behavior of the population of Natal/RN regarding the use of water supply. In order to achieve this goal, a stratified random sampling technique was used and 402 people were interviewed from four different administrative regions of the city. The analysis was carried out by using a multivariate statistics technique of Analysis of Correspondence. Data from environmental behavior were compared to social, economic and demographic aspects. The results are represented through graphics which show the associations between these variables. Initial analysis have indicated that water supply can be better managed from the population and local government.
The Relationship Between Environmental Rotulagem and the Cycle of Life Products
Maria Albertina and Schnitz Bonin, mabonin@hotmail.com, Universidade do Vale do Itajai
The environmental labeling appeared when the society started to demand products that attack as minimum as possible the environment. In addition, the economy entered in a franc globalization process, demanding a social and environmental ethical positioning of the organizations before the society. The life cycle analysis of products, that consider from the necessary raw materials, until the discard of the product powder-consumption, among other aspects, is constituted in a tool of great usefulness for the environmental labeling. This last one works as a way of informing on the environmental characteristics of the products to the consumers in potential. Being like this, this article has special interest in analyzing the environmental labeling allied to the life cycle analysis of products, considering the several aspects involved in this relationship.

SESSON 5: ENVIRONMENTAL MANAGEMENT - SECTOR ANALYSIS
Session Chair: Breno Torres Santiago Nunes, Universidade Federal Do Rio Grande Do Norte, breno-nunes@bol.com.br
Time & Place: Monday, April 8, 10:00-11:30AM, Monterey Room

Environmental Impact Assessment in the Transport Industry:
A Case Study on the Use of Natural Gas to Minimize the Atmospheric Pollution
Breno Torres Santiago Nunes, breno-nunes@bol.com.br, Sérgio Marques Júnior,
Rubens Eugênio Barreto Ramos all at the Universidade Federal Do Rio Grande Do Norte,
Natal (RN) - Brazil
The transport industry spends almost 50% of the petroleum derived fuels and in the big cities, it is responsible for almost 40% of the atmospheric pollution. The natural gas appears as a new technology to minimize the atmospheric pollution because it has a low tenor of contaminant's and usually it has a complete combustion. The main objective of this study was to identify and to assessment the environmental impacts from the transport industry emissions based on cause-effect correlation matrix. The analysis was based on the ISO 14000 standards. This work can help to develop environmental policies to minimize air pollution.

Environmental Awareness in the Bakery Industry:
A Case Study on the Use of Natural Gas in Brazil
Juliana Dantas de Araújo Santos, julidantas@ig.com.br, Sérgio Marques Júnior,
sergio@ct.ufrn.br, Rubens Eugênio Barreto Ramos, rubens@ct.ufrn.br, all of the Federal University of Rio Grande do Norte, Brazil
The objective of this paper is to verify the environmental perception on the use of natural gas in the bakery industry of Natal/Brazil. The methodology of evaluation was based on a survey involving a representative number of managers of bakeries, classifying them in homogeneous groups in agreement with their characteristics of perception of environmental management. The statistical technique of cluster analysis was used, allowing three groups with different characteristics to each other to be identified. Besides the use of cluster analysis, an analysis of variance was applied, verifying the possible differences among the specific groups. The preliminary studies indicated that most of the bakeries are defined in a group, in which the environmental variable has not been considered in their decisions processes.
Ethics, Social Responsibility and Corporate Performance: Perspectives in the Petroleum Industry
Andréa do Nascimento Gomes, andreare@ig.com.br, Midiam Nascimento Gomes, Sérgio Marques Júnior, Rubens E. Barreto Ramos, all of PEP/UFRN, Natal - Brazil.
The constant changes that have occurred within the corporate scenario has indicated that the increase of the economy will only be possible if sustainable procedures are incorporated into its strategies. These include social, ethical, economical and environmental aspects. This paper presents a theoretical analysis regarding the importance of the company's social responsibility as competitive strategy to be implemented within oil companies. The aim is to demonstrate the relationship between company's social responsibility and its financial performance. In addition, the work aims to describe which programs and actions developed along with communities has reflected positively in its financial performance and corporate image, leading to social equity and environmental protection.

Aspects and Impacts Environmental Coming of the Use of the Firewood in the Industrial Sections of Bread making and Ceramic of Rio Grande do Norte
Tházia Viviane Silva da Silveira, thazia_viviane@yahoo.com.br and Pedro Hélio Gomes Teixeira, Federal University of Rio Grande do Norte State-UFRN, Natal-Brazil.
The research analyzes the firewood consumption in the head office energetic of Rio Grande do Norte, as well as the possibility to substitute it for natural gas considering the aspects and involved environmental impacts. The super valorization of the natural gas in the Brazilian energy scenery is due your advantages of environmental order and your technician-financial efficiency in the industrial sections, mainly ceramic and secondarily of bread making, whose technology is known and available in the market. The use or intensive abuse of the matter and the absence of technical support in the devastated areas, as well as the difficult regeneration of the same ones has been provoking noxious effects to the environment, altering the ecosystem.

SESSION 6 (PANEL):
ENVIRONMENTAL RISK ASSESSMENT AS AN IMPLEMENTATION DRIVER FOR NATURAL GAS PROJECTS: A CASE STUDY IN RIO GRANDE DO NORTE - BRAZIL
Session Chair: Maria Mariana Cunha Ottoni, UFRN, mariana.ottoni@bol.com.br
Time & Place: Monday, April 8, 2:00-3:30PM, Monterey Room

PANEL:
Sérgio Marques Júnior, PEP - UFRN
Rubens Eugênio Barreto Ramos, PEP - UFRN
Órgão Financiador, Agência Nacional do Petróleo – ANP

In Brazil, the natural gas is characterized as great importance input in virtue of the production capacity development and use of this energy source. In the face of the worldwide concern with the environmental protection, becomes necessary to use discerning tools for analysis of projects whose development presents solutions to the negatives environmental impacts to the society. This study has as main objective to present the environmental risks assessment importance as analyze instrument for the natural gas projects implementation, through a case study with this fuel activities use in the Rio Grande do Norte. This proposal reveals excellent for governmental bodies in the definition of criterions for approval of projects that involve environmental licensing.
TRACK 5: GLOBAL OPERATIONS
Track Chair: K. Ravi Kumar, Univ. of Southern California, rkumar@marshall.usc.edu

SESSION 1 (PANEL): GLOBAL SOFTWARE OUTSOURCING:
THE CASE OF INDIA
Session Chair: K. Ravi Kumar, University of Southern California, rkumar@marshall.usc.edu
Time & Place: Saturday, April 6, 10:00-11:30AM, California Room

PANEL:
Shyam Johari, Tata Consulting Services, shyam@usa-tcs.com
Ayan Mukerji, Wipro Technologies, ayan.mukerji@wipro.com
Basab Pradhan, Infosys Technologies, basab_pradhan@infy.com

As is well known by now, India is an emerging power in the software services industry. Exports from this industry amounted to around $8 billion in 2001 and a McKinsey/ NASSCOM report estimates it to rise to more than $50 billion by 2007.

Three of the top Indian companies are Tata Consulting Services, Infosys Technologies and Wipro Technologies. They constitute more than 20% of the total Indian software services exports and have established a worldwide reputation for service quality. Each of these companies has attained the prestigious SEI CMM- level 5, the highest level for quality.

In this session, we will have senior managers of each of these companies describe their model for operational excellence, their global business processes as well as potential operational issues that they will have to deal with in the future to sustain their growth and profitability.

We will also present a development model for technology-intensive outsource industries, such as software services, that will predict some key barriers to be overcome by the Indian software services industry if it is to maintain its growth as predicted by the McKinsey/NASSCOM report.
SESSION 2: ISSUES IN EMERGING ECONOMIES
Session Chair: Arvinder Loomba, San José State University, loomba_a@cob.sjsu.edu
Time & Place: Saturday, April 6, 2:00-3:30PM, California Room

The New Organizational Architecture: New Demands for OM in Emerging Economies
Alfonso Fleury, and Maria Tereza Fleury, both at University of Sao Paulo, Brazil,
aclfleury@usp.br and mtfleury@usp.br
Since the 1980's a whole set of changes is deeply modifying the way that firms are organized and interact with each other. They affect the organizational structure (through focusing, reengineering, outsourcing), the relationship among firms (the formation of strategic alliances, supplier chains and clusters) and include the formation of new types of enterprises (such as the manufacturing contractors) and the emergence of new players (some from Emerging Countries). The formation of that new organizational architecture creates specific demands for the Operations Management function in different types of firms. The aim of this article is to elaborate an analytical framework and an broad picture about what are the competencies and what type of knowledge has a firm to master given its position in that architecture. The conclusions are based on studies focusing on the textile, telecommunications and plastics industries in Brazil.

Strategies & Internet in the Brazilian Apparel Productive Chains
Juan Ricardo Cruz -Moreira, University of Sao Paulo, Brazil, juan.moreira@poli.usp.br
This paper aims to initiate a discussion about the use of the Internet and other information technologies in the Brazilian Apparel Productive Chains. The Internet is leading a revolution in international commerce and in the global supply chain for the last two decades. As a consequence, the relationships between both different firms, and firms with consumers, are evolving and restructuring. These changes challenge the governance structure in the contemporary Global Commodity Chains, as well as the Brazilian apparel industry. This analysis is based on the empirical research of diverse firms at different levels of the production chain (Fluery, Cruz, et al. 2001). It is also looks within the framework of Porter’s (2001) “Strategies and Internet” as well as the concepts proposed by Gereffi (2001) on “Governance and Internet”.

Using Decision Support System for Direct Shipment from a Factory to a Customer
Arvinder Loomba, and Taeho Park, both at San José State University, loomba_a@cob.sjsu.edu and park_te@cob.sjsu.edu
Manufacturers of consumer electronics require the fulfillment of customer orders on time at lower transportation costs. Distribution centers (D/C) or warehouses have been used to buffer the demand-supply gaps so that products, once stored in the D/C, are usually delivered to customers. Recently, manufacturers have attempted to reduce transportation and warehousing costs by directly shipping products from factories to customers. This paper will present a prototype decision support system (DSS) for the direct shipment to help order process personnel make a right decision in consideration of order due date, transportation costs and availability, inventory and inventory aging time at the D/C and factory, production schedule, and material availability. The DSS can be integrated into a supply chain management system that captures all necessary information for its successful implementation. A part of the entire prototype direct-shipment DSS has been implemented at a division of Samsung Electronics Company.
Do We Live in a Globalized Economy?
Luiz Antonio R. R. Scavarda do Carmo, Shell Brazil, Scavarda@hotmail.com,
Annibal Jose Scavarda, Pontificia Universidade Católica do Rio de Janeiro,
Annibal@rcp.puc-rio.br, and Paulo Cesar Motta, Pontificia Universidade Católica do Rio de Janeiro, Pcmotta@iag.puc-rio.br
The objective of this paper is to assess to which extent we live in a globalized economy. It starts
with an analysis of the interdependence and integration of countries and their evolution in the
world economy during the last 200 years, under the light of international trade and Foreign
Direct Investment (FDI). Some aspects that define globalization, like technological advances and
legal actions are discussed. Characteristics of this process are described, followed by an overview
of the expected near future. Finally, it concludes that globalization is an on-going process. Some
measures to be undertaken in the developing world are suggested.

SESSION 3: STRATEGIC AND PLANNING ISSUES IN GLOBAL OPERATIONS
Session Chair: Timothy L. Smunt, Wake Forest University, tim.smunt@mba.wfu.edu
Time & Place: Saturday, April 6, 4:00-5:30PM, California Room

Pricing and Production Planning Under Exchange Rate Uncertainty
Burak Kazaz, and Haresh Gurnani, both at University of Miami, School of Business,
bkazaz@miami.edu, and haresh@miami.edu
Global companies face the challenge of coordinating production and allocation decisions with
pricing strategies in a fluctuating exchange-rate environment. The natural sequence of decisions
requires that production plans be made prior to the selling season. Later, when the exchange rate
is realized, the company adjusts its prices influencing the demand. Our study outlines a mathemat-
cal model that provides businesses in choosing the optimal production, allocation, and pricing
decisions. Our model is a two-stage stochastic program where production decisions are made at
the first stage; based on the realized exchange rate, pricing and allocation decisions are made in
the second stage.
Postponement and Global Manufacturing Networks
Timothy L. Smunt, Wake Forest University, tim.smunt@mba.wfu.edu
A number of frameworks on global manufacturing networks have been proposed in the past. For example, Therese Flaherty and Kasra Ferdows propose networks that can be categorized by either product flows or plant function, respectively. However, in recent times, postponement strategies that seek to delay the addition of the final value-added and customer-specific production tasks have been growing in importance, and these strategies may impact a firm’s optimal global manufacturing network design. Not only does postponement provide advantages of inventory “pooling” and, thus, reduced inventory carrying costs, it also provides the potential for quicker response to changing customers’ demands. This survey-based research tests the value of different network configurations when postponement strategies are being used. Preliminary results of correlations between configuration types and manufacturing/financial performance are examined.

Manufacturing Mobility in Global Operations
Harm-Jan Steenhuis, North Carolina State University, hjsteenh@unity.ncsu.edu, and Erik J. de Bruijn, University of Twente, The Netherlands, e.j.debruijn@tdg.utwente.nl
The trend of globalization affects the organization of the manufacturing of enterprises. It offers opportunities to examine manufacturing from a global perspective and consequently to produce where it is most appropriate. However, globalization has also led to an increase in competitive pressures and companies have to look wider for opportunities to increase their competitive advantages. One competitive source for competitive advantage arises from manufacturing mobility, which is the timely transfer of technology across manufacturing sites. This paper elaborates on the important determinants of manufacturing mobility and provides a basis for additional research in this area.

Contrasting Traditions and Approaches of North American and European POM Research
Martin Spring, Manchester School of Management, martin.spring@umist.ac.uk
No abstract
TRACK 6: GLOBAL SUPPLY CHAIN MANAGEMENT
Co-Track Chairs: Eric Johnson, Dartmouth, m.eric.johnson@dartmouth.edu and Jay Swaminathan, University of North Carolina, swaminaj@bschool.unc.edu

SESSION 1: DYNAMIC CONTROL OF SUPPLY CHAINS
Session Chair: Douglas J. Morrice, The University of Texas at Austin, morrice@mail.utexas.edu
Time & Place: Saturday, April 6, 10:00-11:30AM, Nevada Room

An Agent-based Responsive Supply Chain Management System
Grace Lin, Steve Buckley, Heng Cao, Nathan Caswell, Markus Ettl, Shubir Kapoor, Anil Nigam, and Bala Ramachandran, all at IBM T.J.Watson Research Center, gracelin@us.ibm.com
We will present a Sense and Respond supply chain management framework (SaR) which integrates enterprise buy, make, and sell activities and coordinates decision making at strategic, tactical, and execution levels to achieve higher business optimization. SaR is an agent based real-time, event-driven, multi-objective system with sensing, interpreting, and intelligent decision making capabilities utilizing stochastic process control, risk management, and business intelligence.

Modeling Mixed Build-to-Order & Build-to-Stock Systems
Genaro J. Gutierrez, and Edward G. Anderson Jr., both at University of Texas, McCombs School of Business, genaro.gutierrez@bus.utexas.edu
Automotive assemblers are attempting to move to a Dell-like build-to-order model. However, while the current build-to-order and future build-to-stock models are well understood, the transition phase between them is not. We build an analytic model to examine this combined build-to-stock and build-to-order transition phase and present results.

Managing Service Supply Chains with Corrupt Information
Edward G. Anderson Jr. and Douglas J. Morrice, both at University of Texas, McCombs School of Business, morrice@mail.utexas.edu and edward.anderson@bus.utexas.edu
We investigate the dynamic behavior of service-oriented supply chains characterized by customer demand information corrupted either by mis-estimation or information systems errors. By developing a two-stage serial capacity management model with imperfect information, we find an optimal control policy that balances customer waiting costs against capacity adjustment costs. We then characterize the results of this optimal policy by investigating the potential for an increase in demand variability along the supply chain under different management priorities. In particular, we explore the tradeoffs in each stage's performance induced by myopic policies versus global optimization.

Supply Chain Management: A Comparison of Academic and Industry Priorities
Daniel R. Heiser and Lori S. Cook, both at DePaul University, dheiser@depaul.edu, lcook@depaul.edu
As a field, supply chain management is rapidly changing as a result of advances in information systems, the Internet, telecommunication networks, and the development of new managerial techniques — such as collaborative planning, forecasting and replenishment. This research compares the emphasis given to a variety of supply chain management topics by academics in North American business schools and colleges in their MBA and undergraduate programs to the importance attached to those topics by supply chain practitioners in multiple industries across North America. Findings from two empirical surveys are compared.
SESSION 2: SUPPLY CHAIN CONFIGURATION
Session Chair: Shailesh Kulkarni, University of North Texas, kulkarni@unt.edu
Time & Place: Saturday, April 6, 10:00-11:30AM, Sunset Suite

Multi-Plant Network Configuration In the Presence of Risk
Shailesh Kulkarni, University of North Texas, kulkarni@unt.edu
In this paper, we compare the benefits and costs of two alternative manufacturing network configurations when there is component commonality. We evaluate the trade-off between the decreased logistics costs and loss of risk-pooling benefits in plant networks which consolidate all component manufacturing within one plant (Product Network) as compared to those that don’t (Process Network). Through a post-optimality sensitivity analysis, we are able to determine conditions when a Product Network may be chosen over a Process Network and vice-versa. The sensitivity analysis suggests several interesting results. For example, the risk pooling benefit provided by consolidating common subassembly production under one roof is reduced when the cost of acquiring common component capacity is sufficiently low or high. Thus product plant networks are preferred when common component costs are high or low but not for intermediate values! This observation is interesting and important - it highlights that the impact of operational cost parameters on strategic decisions can often be non-intuitive. Our analysis provides a link between strategic and operational decision-making in supply chain management, in the context of multi-plant configuration.

Demand Variance Amplification Under the (R, nQ) Inventory Policy
Xiaoming Li, and V Sridharan, both at Clemson University, suhas@clemson.edu, xli@clemson.edu
Demand information in the form of orders is often distorted, leading to bullwhip effect, in supply chains. We study a two-stage supply chain with distributors and retailers where the end customer demand follows an arbitrary stationary distribution. Both use the (R, nQ) inventory policy based on installation stock. We show that inventory positions at retailers and distributors are uniformly distributed and that contrary to the assumption made by most researchers, its value can be different from R - 1, R - 2, ..., R + Q. We find demand variances are non-decreasing. They do not increase only when orders exactly equal demands in different periods at each stage.

Risk Control Strategy for Capacity Allocation and Contract Selection
H. Steve Peng, Cal State University, speng@bai.csuhayward.edu, and John A. Buzacott, York University, Canada, pbuzacott@schulich.yorku.ca
A model is proposed to help decision-makers identify the best mix among competing business opportunities and allocate resources optimally to provide balance between profitability and risk exposure. The decisions are made to maximize the possibility of meeting or exceeding a given profit target. We show that under a broad range of situations, pursuing the goal of profit maximization will generally be too risky for the manager. Our model highlights the important role of risk control and intends to make explicit the linkage between overall financial performance and the operational decisions of capacity planning, capital allocation, and contract selection.

Material Substitution in Global Supply Chain
Maomao Chen, University of Maryland, mchen@mbs.umd.edu
In this paper, we analyze how the manufacture should use the substitutable material to adjust the production plan if the suppliers of the raw material offer price discount to the manufacture. We build the global supply chain model to determine the multi-period allocation of substitutable resources. We compare the two substitution policies: full-substitution and downward (one-way) substitution in terms of the total profit. We show that the downward substitution can not be modeled using only linear programming and build the efficient integer programming model to solve this problem.
SESSION 3: SUPPLY CHAIN COORDINATION
Session Chair: Kyle Cattani, University of North Carolina, Chapel Hill, kyle_cattani@unc.edu
Time & Place: Saturday, April 6, 2:00-3:30PM, Nevada Room

Incentive Compatible Pricing Mechanisms for Service Differentiated Supply Chains
Karen Donohue, University of Minnesota, kdonohue@csm.umn.edu, Vinayak Deshpande, Purdue University, and Morris Cohen, University of Pennsylvania
Motivated by a study of the military’s logistics system, we study pricing mechanisms for supply chains characterized by multiple customer segments differentiated by their service requirement and their willingness to pay for that service. Our analysis confirms that a fixed pricing scheme can lead to incentive problems for a service differentiated supply chain. An incentive compatible scheme can be constructed by charging a price differential for customers with high service requirements. Our analysis also shows that overall supply chain costs can be minimized by using delivery guarantees.

Competition Incentives for Suppliers
Cheryl Druehl and Stefanos Zenios, both at Stanford University, Druehl Cheryl@gsb.stanford.edu, Zenios Stefanos@gsb.stanford.edu
Consider a competitive supply chain with two upstream suppliers and a retailer. The retailer carries finished goods inventory and uses a (S, S-1) base stock policy for replenishment. The two suppliers choose their capacities. The retailer incurs a holding cost and a backlogging cost, while the two suppliers incur a capacity production cost and pay a franchise fee to the retailer. The retailer moves first and specifies the franchise fee and wholesale prices. Following that, the two suppliers choose their capacity levels simultaneously and the retailer determines the base stock level. We formulate this problem as a closed queueing network and characterize its solution. We show that inventory sharing in the supply chain is not necessary to induce efficient capacity investment on the part of the suppliers.

Supply Chain Choice Among Internet Retailers
Taylor Randall, University of Utah, Nils Rudi, Rochester, Serguei Netessine, Wharton, acttr@business.utah.edu, rudi@simon.rochester.edu, netessin@wharton.upenn.edu
Failure rates of internet retailers suggest that operating an efficient supply chain using information technology is a difficult and risky task. With a sample of public companies, we analyze the supply chain strategies of internet retailers to understand why different strategies were chosen, which strategies succeed and which strategies fail.

Coordinating Pricing on Internet and Traditional Channels
Kyle Cattani, Wendell Gilland, and Jayashankar Swaminathan, all at University of North Carolina at Chapel Hill, kyle_cattani@unc.edu, wendell_gilland@unc.edu, and rmsg@unc.edu
We explore the pricing issues that arise as a new channel, such as the Internet, is introduced in the backdrop of an existing channel. We use consumer utility theory to develop the aggregate demand for the product from a traditional channel and from the Internet under different pricing scenarios. We consider a web-based entrant with no response by the traditional channel; an entrant that jointly-optimizes both channels such as might occur if a retailer with a traditional channel adds a web channel; and a web-based entrant that faces a competitive response from the traditional channel. We find that if a firm introduces the web as a second channel, it is not a good strategy to price the web channel products to match the existing channel (as appears to be common practice), or to ignore the existing channel in the determination of web prices.
SESSION 4 (PANEL): SUPPLY CHAIN MANAGEMENT AT HEWLETT-PACKARD
Time & Place: Saturday, April 6, 2:00-3:30PM, Washington Room

PANEL:
Gianpaolo Callioni - gianpaolo_callioni@hp.com
Sitki Timucin - sitki_timucin@hp.com
Robert Bliss - robert_bliss@hp.com
Scott Ellis - scott_ellis@hp.com

The Strategic Planning and Modeling group of Hewlett-Packard Company is an internal research and consulting group that helps HP businesses and business partners. We will present how the group is structured in terms of internal roles and links to academia. After briefly covering some past research work that resulted from group's collaboration with academia we will discuss the reasons that produce the gaps between the business needs and academic research. We will present some past order fulfillment innovations and performance measurements that simultaneously improved customer service, reduced inventory, and increased product sales for HP products. Interesting areas for future research and collaboration will also be discussed.

SESSION 5: SUPPLY CHAIN IMPLEMENTATION
Session Chair: Germaine H. Saad, Widener University, Germaine.H.Saad@Widener.edu
Time & Place: Saturday, April 6, 2:00-3:30PM, Sunset Suite

Overcoming Complexity and Uncertainty In supply Chain Management
Germaine H. Saad, Widener University, Germaine.H.Saad@Widener.edu
This paper introduces behavioral, economic, and information schemes to overcome complexity and uncertainty faced in highly dynamic supply chain environments; along with synthesis of these schemes. Conceptual framework and action plan are developed. Empirical examples are provided along with implementation guidelines for practice.

Evaluation Multicriteria for Implementation of Supply Chain Management
Ricardo Oliveira, Caroline Miranda, and Adiel Almeida, all of Federal University of Pernambuco, Brazil, salmeida@npd.ufpe.br
The following paper consists in a case study (in a Brazilian enterprise), employing the concepts of Multi-Criteria Decision to resolve a Supply Chain Management-SCM-related issue. The issue consists in the demonstration of those concepts' use in assisting the decision maker on the selection and favoring of the actions that make possible the implementation of the SCM, further eliminating or at least decreasing inconsistencies and incorporating uncertainties to the decision maker's judgment. We have also discussed the methodology employed to diagnose the corporation's current situation and the steps to be taken on the elaboration of the action plan.

Manufacturers and their Suppliers – When is ‘Partnership’ Applicable?
Keith Goffin, Marek Szweczykowski, Fred Lemke, all at Cranfield School of Management (UK), k.goffin@Cranfield.ac.uk, m.szweczykowski@Cranfield.ac.uk, f.lemke@Cranfield.ac.uk and Rolf Pfeiffer, Export-Akademie Baden-Württemberg (Germany)
Supplier management is a crucial task for manufacturers, as it can contribute directly to their competitiveness and many authors have recommended that manufacturers need to establish ‘partnerships’. However, manufacturers may not need close relationships with all of their suppliers, as the return on the investment of time and resources is not warranted. This paper presents the results of research in Germany that investigated the role of partnership in supplier management. The empirical study was based on 39 in-depth interviews with managers from the electronics and engineering sectors and the circumstances in which partnerships are most useful.
Relationships Management in Service Organizations
Supply Triads as Service Performance Enabler
Mihalis Giannakis, University of Warwick, UK, m.giannakis@warwick.ac.uk
The objectives of this research is to contribute to the conceptual establishment of Supply Chain Management (SCM) and to obtain insight into the applicability of the concept in service industries, by looking at the role of inter-organizational relationships that are developed with the exchanges of services and their impact on service delivery overall performance. A framework developed for the deconstruction of SCM (Giannakis, 2000) is utilized in the conceptualization of SCM in the broad service sector. The explicit assumption of the research is that the peculiar matters in the production of services do not allow a prior acceptance of the concepts and methods of analysis that were developed in the industrial sector.

SESSION 6: PRICING IN MANUFACTURING AND LOGISTICS
Session Chair: Phil Kaminsky, University of California, Berkeley, kaminsky@ieor.berkeley.edu
Time & Place: Saturday, April 6, 4:00-5:30PM, Nevada Room

Pricing/Manufacturing Decisions when Demand is a Function of Pricing in Multiple Periods
Mehmet Gumus, Hyunsoo Ahn and Phil Kaminsky, all at University of California, Berkeley
In most manufacturing decision models, demand is either considered to be known, or to be induced by pricing decisions in the period that the demand is experienced. However, in more realistic market scenarios, consumers make purchase decisions with respect to price not only in the current period, but in past and future periods as well. In this study, we model a joint manufacturing/pricing decision problem by accounting for that portion of demand realized in each period which is induced by the interaction of pricing decisions in that period and in previous periods. We first formulate a dynamic programming problem for general case, and then propose an integer programming formulation which has a matroidal constraint structure. We characterize the performance of a greedy algorithm for this formulation, and conduct extensive computational experiments to develop managerial insights.

Pricing to Smooth the Demand for Services with Limited-Flexibility Capacity
Candace Yano, University of California, Berkeley
Transportation providers often face inherently seasonal demands over short time frames such as a one-week cycle. On the other hand, their capacity to provide service is nearly constant and may be changed only to a limited extent over the short term, for example, by changing the routing of existing vehicles or changing the assignment of vehicles to routes. We investigate the problem of determining day-of-week pricing policies to optimize profit when the transportation providers customers, such as manufacturing firms or on-line or mail order retailers, have some choices about when to ship and the transportation provider has capacity with limited flexibility.

The Dynamic Price Competition of Mark-to-Order Firms with Finite Capacity
John P. Bowman and Hyun-soo Ahn, both at University of California, Berkeley
We consider the dynamic price competition of make-to-order firms. When a new order arrives, each firm quotes the price for the service without knowing the type of an order. The customer joins the queue if the price quoted is below the reservation price and the price offered by the competitor. We formulate the problem as a Markov game and analyze the structure of the equilibrium. We demonstrate the case where capacity expansion is harmful to the firm's profitability. We discuss how to quantify the value of the flexible pricing policy. Numerical study shows that the firms adopting dynamic pricing are substantially more profitable than the firms with fixed price strategy. We discuss the managerial insights obtained from this model.
Product Positioning and Pricing Under Component Commonality and Investments in Process Improvements
Sebastian H. Heese and Jayashankar M. Swaminathan, University of North Carolina, Chapel Hill, swaminaj@bschool.unc.edu
The market pressure for both product customization and shorter delivery lead times presents a considerable dilemma for many manufacturers. Component commonality can mitigate the effects of product proliferation on product and process complexity and lead to safety stock reductions by means of risk pooling. However, increased component commonality limits a firm's potential to extract price premiums through product differentiation. What factors determine the success of approaches based on common components and what environments favor commonality? We jointly model the impact of component commonality on revenues, production costs, and the effectiveness of design efforts directed at process improvements.

SESSION 7: E-BUSINESS AND SUPPLY CHAIN MANAGEMENT – A SPECIAL ISSUE OF POMS
Session Chair: M. Eric Johnson, Dartmouth College, m.eric.johnson@dartmouth.edu
Time & Place: Saturday, April 6, 4:00-5:30PM, Washington Room

e-Business and Supply Chain Management
M. Eric Johnson, Dartmouth College and Seungjin Whang, Stanford University, m.eric.johnson@dartmouth.edu, whang.jin@gsb.stanford.edu
The web is having unimaginable impact on how firms interact with each other and their customers. Stumbling blocks for supply chain integration such as high transaction costs between partners, poor information availability, and the challenges of managing complex interfaces between functional organizations are rapidly dissolving on the web. We introduce some of the research in this area.

Inventory Rationing and Shipment Flexibility Alternatives for Direct Market Firms
Kyle D. Cattani, The University Of North Carolina at Chapel Hill and Gilvan C. Souza, University of Maryland, cattani@bschool.unc.edu, gsouza@rhsmith.umd.edu
This paper investigates inventory-rationing policies that are of interest to firms operating in a direct market channel, such as e-commerce and mail order companies. We model a single product with two demand classes, where one class requests a lower order fulfillment lead time but pays a higher price (and is given higher priority) and the other class waits longer for an order but pays a lower price. We study rationing policies in which the firm either blocks or backlogs orders for the lower priority customers when inventory drops below a certain level; backlogged orders can be shipped later to the customer via a faster (more expensive) or slower (cheaper) means of transportation. We compare the performance of these rationing policies with a pure first-come-first-serve policy under various scenarios for customer response to delay: lost sales, backlog, and a combination of lost sales and backlog.

Optimization Based Order Promising for High Velocity Supply Chains
Michael O. Ball, Chien-Yu Chen, Zhen-Ying Zhao all at University of Maryland
Order promising performance has become a key differentiator in the e-business arena. The traditional Available-to-Promise (ATP) function is based on a simple monitoring of the uncommitted portion of current and planned available finished goods. In contrast, advanced, pull-based ATP, required in many make-to-order e-business environments, must directly link resources, including material and capacity, with customer orders. We describe a mixed integer-programming model for a quantity and due date quoting ATP mechanism. The model takes into account a variety of supply chain constraints, such as material compatibility and substitution preferences. We report on a several experiments using the model to investigate various system design and policy issues.
Short-Term e-Procurement Strategies vs. Long-Term Contracts
Barchi Peleg, Stanford University, barchi@stanford.edu
We determine the expected costs for the following strategies: (1) Strategic Partnership, which is based on a long-term relationship with a single supplier; (2) Online Search, which is a short-term strategy based solely on the use of the Internet to search for potential suppliers; and (3) a Combined Strategy, which is some combination of the first two strategies. We develop conditions under which each strategy dominates the others, and determine the optimal number of suppliers to contact so as to minimize total purchasing costs. A numerical study, based on real data, is used to determine the impact of online bidding processes on the expected direct purchasing costs.

Vertical Information Exchange In a Supply Chain With Duopoly Retailers
Hongtao Zhang, Hong Kong University of Science and Technology, imzhzhang@ust.hk
We consider a supply chain with one manufacturer in the upstream and two competing retailers in the downstream. The retailers sell differentiated goods and are endowed with some private demand information. The paper shows that the manufacturer's optimal strategy is independent of the type of downstream competition, Cournot or Bertrand, and that no information will be shared with the manufacturer on a voluntary basis. However, complete information sharing, which benefits all three parties, can be achieved through side payment when the retailers' information is statistically less accurate or when the leakage effect is more beneficial to the retailers.

SESSION 8: SUPPLY CHAIN EVALUATION
Session Chair: Alan J. Stenger, Penn State University, ajs@psu.edu
Time & Place: Saturday, April 6, 4:00-5:30PM, Sunset Suite

How Does a Firm know it is Really Practicing Supply Chain Management?
Alan J. Stenger, Penn State University, ajs@psu.edu
Numerous definitions exist for “Supply Chain Management,” and numerous firms purport to be practicing the concept. Yet anecdotal evidence suggests that the concept is not often applied correctly or successfully. This paper proposes a definition of supply chain management, and then defines a framework useful in identifying the degree to which firms are employing supply chain concepts. The framework consists of a set of principles that explicitly describe the initiatives required of a firm if it is to truly be practicing supply chain management. We discuss these principles in detail.

Supply Chain Performance Evaluation: A Case Study
Aravechia, Carlos H. M., and Pires, Silvio R. L., both at The Methodist University of Piracicaba and NUMA/USP, São Paulo, Brazil, aravechia@terra.com.br, srpires@unimep.br or srpires@sc.usp.br
Recently, Supply Chain Management (SCM) has attracted the attention of the academic and business environment and performance evaluation has become a constant necessity for managers. However, most traditional performance evaluation models were designed in a competitive scenario focused on isolated business units’ performance. This article aims to verify the hypothesis that the SCM competitive model implies the re-evaluation and/or the adaptation of the usual performance evaluation systems. The hypothesis verification was done through a literature review as well as a case study conducted at a representative supply chain in Brazil, operating with innovative managerial practices.

Holding the Competitive Edge Through Outsourcing
Henrik B. Christensen, hbc@di.dk, Aalborg University, Denmark and Carsten Svensson, csv@ipl.dtu.dk, Technical University of Denmark
Outsourcing - once considered a defensive tool for cost reduction - has proven to be an effective weapon within an aggressive technology, and an excellent growth strategy for a SME manufacturer. Nilpeter is a leading manufacturer within its branch, selling its equipment worldwide in competition with 3 other global players. The company has focused its attention on customisation and strategic sourcing. Customisation is carried out in order to improve the match between the expectation of the customers and the performance of the delivered solution. The article describes the process and achieved results.
Supply Chain Management Curriculum: An Assessment  
Rhonda Lummus, Iowa State University, rlummus@iastate.edu
Interest in supply chain management has steadily increased since the 1980s when companies saw the benefits of collaborative relationships within and beyond their own organization. Supply chain management is now becoming a key component of competitive strategy in a wide variety of industries. To support this trend and to provide graduates with the most marketable skills, universities must incorporate supply chain concepts into the business school curriculum. This paper presents preliminary results from a field study conducted to determine the knowledge, skills and abilities desired by industry in students graduating with a degree in supply chain management.

SESSION 9: REVERSE LOGISTICS  
Session Chair: Gerald Ferrer, University of North Carolina at Chapel Hill  
Time & Place: Sunday, April 7, 10:00-11:30AM, Nevada Room

Strategic Decentralization of Product Take-back and Price Discrimination through buyback payments.  
Canan Savaskan, Kellogg School of Management and Luk Van Wassenhove, INSEAD
The paper first examines how the allocation of product collection to retail outlets impacts their strategic behavior in the product market, and discusses the implication of this on the economic trade-offs that the manufacturer balances while choosing a centralized as opposed to a decentralized product collection system. When a centralized collection system is used, it is shown that the channel profits are driven by the cost efficiency (i.e. scale economies) in collection whereas, in decentralized reverse channels the profits result from more intense competition in the product market. Secondly, we examine how the manufacturer can use the reverse channel for coordinating pricing decisions to retail markets with different profitability. We show that the buyback payments transferred to the retailers for post-consumer goods provide a wholesale pricing flexibility to the manufacturer, which can be used to price discriminate between retailers of non-identical markets.

Life Cycle Considerations in Remanufacturing  
Pranab Majumder, Duke University and Harry Groenevelt, University of Rochester
We study the problem of an OEM considering life-cycle design issues for a remanufacturable product in the context of a diffusion model of product adoption. The OEM faces competition from small remanufacturers, has to pay for the returns and does not recover all the remanufacturable items from the customers. We establish the existence of a sub-game perfect Nash Equilibrium, and show that the remanufacturing game is myopic. This allows us to study the strategic decisions by the OEM with respect to parameters representing remanufacturability, remanufacturing costs and competition.

Pricing New and Remanufactured Products  
Geraldo Ferrer and Jayashankar Swaminathan, both at The University of North Carolina at Chapel Hill, swaminaj@bschool.unc.edu
We consider pricing decisions for a firm that makes new products in the first period and uses the returns to offer remanufactured products along with new products in the second period. We introduce the monopoly environment and show that there exists a per unit threshold savings beyond which the manufacturer does not produce new products in the second period. Next we focus our attention on the duopoly environment where an independent operator (IO) may intercept the product made by the original equipment manufacturer (OEM) and sell them in the second period. We characterize the Nash equilibrium solution into different regions and explore the effect of various parameters. Among other results, we find that, if remanufacturing is very profitable, the original-equipment manufacturer (OEM) may forego some of the first-period margin by lowering the price and offering additional units to increase the number of cores available for remanufacturing in the second period. Moreover, if the independent operator (IO) intercepts some cores at the end of the first period, its decision to remanufacture all or part of the cores is independent of the OEM decision to offer additional new products in the second period.
Drivers of Diffusion of ISO 9000 and ISO 14000: Findings from a Global Survey
Charles J. Corbett, The Anderson School at UCLA, and Jeh-Nan Pan, National Cheng Kung University, Taiwan, charles.corbett@anderson.ucla.edu, and jpan@mail.ncku.edu.tw
This paper will report on the findings obtained from a global survey of ISO 9000 and ISO 14000 certified companies in 10-15 countries. In particular, we will analyze whether ISO 9000 and ISO 14000 are indeed being pushed primarily by European customers, as is often believed. Preliminary evidence suggests that, in most participating countries, firms with high exports to Europe were indeed the first to seek ISO 9000 certification in their respective countries. This would imply that best practices, both with respect to quality and environmental management, can indeed be diffused through global supply chains.

SESSION 10: MANAGING THE HIGH-TECH SUPPLY CHAIN
Session Chair: Alex Brown, Manugistics, Inc., abrown@manu.com
Time & Place: Sunday, April 7, 10:00-11:30AM, Washington Room

Alex Brown, Manugistics, Inc., abrown@manu.com

The high-tech supply chain offers unique challenges. This session focuses on approaches and real-life examples by which high-tech manufacturers are using business process improvements and supply chain or price optimization technology to drive profit improvement.

SESSION 11: SUPPLY NETWORKS, ARCHITECTURE, AND CONTRACTS
Session Chair: Suresh P. Sethi, The University of Texas at Dallas, sethi@utdallas.edu
Time & Place: Sunday, April 7, 10:00-11:30AM, California Room

Supplier's Network Analysis and the Brazilian Automotive Industry: Opportunities and Constrains
Mario Scaomano Neto, Universidade Federal de Sao Carlos, Brazil, pmsnp@azar.com.br
There is a growing need to understand how the relations between organizations affect the strategic behavior and performance of economic actors. The aim of this paper is to analyze the new pattern of relationship between assemblers and suppliers in the Brazilian automotive industry. In order to develop this analysis, a study of two truck manufacturers and their relationships with their suppliers is being carried out. Some evidences show that the type and form of ties between organizations have a significant impact to the performance of networks.

Planning Architecture in Supply Chain Management By using Web Distributed Simulation
Agostino G. Bruzzone, Roberto Mosca, Alessandra Orsoni, and Roberto Revetria, all at DIP University of Genoa, Italy, agostino@tim.unige.it
The development of planning architecture and decision support system for supply chain management is a very critical issue due to the complexity of this environment and the great potential in industrial applications. Today the policies for Supply Chain Management are quite often very simplified due to the fact that detailed model resulted very hard to be used for analysis as well as very difficult to be keep up-to-date respect real applications. The authors are currently involved in WILD project (Web Integrated Logistics Designer) that involve the use of a federation of simulators for applying planning and scheduling systems in order to guarantee an effective supply chain management.
Purchase Contract Management with Demand Forecast Updates
Hongyan Huang, The Chinese University of Hong Kong, Suresh P. Sethi, The University of Texas at Dallas, sethi@utdallas.edu and Houmin Yan, The University of Texas at Dallas, hyan@utdallas.edu
In this paper, we study a purchase contract with a demand forecast update. The purchase contract provides the buyer an opportunity to adjust an initial commitment based on an updated demand forecast obtained at a later stage. An adjustment, if any, incurs a fixed as well as a variable cost. We formulate the buyer's problem as a dynamic programming problem. We derive explicit optimal solutions in some important special cases. In addition, we obtain the critical value of the fixed contract exercise cost, below (resp. above) which the buyer would (resp. would not) sign the contract. Our results lead to valuable insights into a better supply chain management.

Supply Chain Coordination: Impact of Price under Information Sharing
Wooseung Jang, Univ. of Missouri - Columbia, jangw@missouri.edu
Companies are increasingly using new channels to achieve supply chain flexibility. Supply chains respond rapidly and efficiently to changes in the marketplace, via closer ties with partners and the resulting information sharing process. The objective of this research is to better understand some of the complexities of supply chain management and to offer insights into improving the level of practice. Especially, we present mathematical models that address joint coordination of the supply chain, by optimizing the wholesale price under information sharing.

SESSION 12: THEORY OF BIDDING BY EMPIRICAL BAYESIANS IN SEALED BID FIRST PRICE AUCTIONS
Session Chair: Dirk Beyer, Hewlett-Packard Laboratories, dirk_beyer@hp.com
Time & Place: Sunday, April 7, 2:00-3:30PM, Nevada Room

Theory of Bidding by Empirical Bayesians in Sealed Bid First Price Auctions
Kemal Guler and Bin Zhang, both at Hewlett-Packard Laboratories, Kemal_Guler@hp.com
A typical game theoretic model of behavior in auctions formulates the strategic situation faced by bidders as a game of incomplete information. This approach postulates a world in which a few bidders each with private information on the value of the item for sale compete. The private valuations are represented by random variables. Privacy of information is then made operational by assuming that each bidder privately observes a realization of the random variable. The distribution of a bidder’s valuation is typically assumed to be common knowledge - the statement ‘(each bidder knows that )k bidder i’s private information is drawn from the distribution F(·)’ is true for all values of k. An immediate question is then how the bidders came up with this knowledge in the first place. In principle, the assumption that F(·) is common knowledge is one of convenience - all is needed to proceed is that common knowledge assumption holds at some level in an increasing hierarchy of models of the situation if not at the level of primitives usually stated (Mertens & Zamir). That is, for any game of incomplete information, there exists a large enough space of types the distribution of which is common knowledge among the players. In this paper, we drop the assumption that the distribution function F(·) is common knowledge and replace it with the assumption that the bidders have access to data that can be used to estimate F(·). Thus the belief held by a bidder based on the estimated F(·) is random. It is shown that a bidder who substitutes in his objective function the empirical analog of the unknown distribution of bids by the rivals would be maximizing a biased estimate of his true objective function. We propose a method to correct for this bias so that a bidder can select a bid to maximize an empirical objective function that is an unbiased estimate of the true objective function. The bias goes to zero as the size of the sample used to estimate the unknown distribution increases indefinitely. Thus, the typical assumption in gem theoretic formulations can be justified asymptotically. However, for finite and realistic sample sizes, the bias in the objective function distorts the bidding decisions in a systematic way. We explore the implications of using the two alternative objective functions in forming a bidding strategy and show that a bidder who uses the bias-corrected objective function proposed here bids less aggressively than a bidder who uses the biased objective function.
Component Value Analysis for Laptop Computers
Alex Zhang, Dirk Beyer and Kemal Guler, all at Hewlett-Packard Laboratories,
Alex.Zhang@hp.com
We discuss regression approaches for finding the imputed prices of components (such as processors and screen sizes) in laptop computers. We then present the observations from a practical dataset and implications for product designs and supply chain management.

Bundle Pricing under Competition
Gabriel R. Bitran, Juan-Carlos Ferrer, both at MIT Sloan, gbitran@mit.edu
Optimal bundle pricing is becoming a big issue nowadays. So far, it has been mostly analyzed from economic and marketing points of view, developing conditions under which it is profitable to bundle or not. Because very little is known about how to determine the optimal bundle's composition and price while maximizing total expected profits, we have chosen to examine the case of a high-tech company facing this problem in a highly competitive environment. In this instance, the company has to build a bundle and put it out in the market, which will be offered alongside the competitors' products. Bundles are built from a set of components depending upon certain technical constraints. We incorporate uncertainty in this problem as customers choose among competitors' bundles (not under the company's control) and the company's bundle (under its control) based upon the customers' utility maximization criterion. We present a mixed integer programming formulation, and due to its complexity, we propose an enumerative method to determine the optimal composition for the bundle and the optimal price at which it should be offered. Computational experiments are performed in order to fit current data, calibrate the model's parameters, and gain certain insights.

SESSION 13: COLLABORATION IN A SUPPLY CHAIN
Session Chair: Bedour Osman, York University, Ontario, Canada, bedourosman@yahoo.com
Time & Place: Sunday, April 7, 2:00-3:30PM, California Room

Global Supply Chains: A Model of Collaboration Strategy
Bedour Osman, York University, Ontario, Canada, bedourosman@yahoo.com
In this paper a model is proposed for determining the appropriate collaboration strategy to support the transition of a firm's supply chain from a national to an international focus. There are national dimensions and organizational dimensions that will impact global collaboration. National dimension is dependent on the political, economical, and cultural differences within the global market. The organizational dimension is dependent on the structure of the current supply chain, and the organizational capabilities. Depending on the value of these two dimensions, it is proposed that there are four major paths to globalization. Each of these paths will be explained in detail with examples from the global operations management literature.

Regional Clusters: A Case Study Among Brazilian Food Companies
Andrea Marize Rodrigues, EESC - Universidade de São Paulo, Brazil, andreiam@sc.usp.br, and
José Paulo Alves Fusco, UNIP - Universidade Paulista – Brazil, ipafusco@uol.com.br
The globalization of the markets and the increase of the competition have been imposing challenging situations for the small and medium companies, above all when they are confronted with the great corporations that, not rare, they count with larger competitive capacity. This work seeks the search of strategic alternatives through arrangements among small and medium companies, giving special attention to the articulations among firms concentrated on a same territory. Concentration in a same place can generate advantageous arrangements in terms of increment of the productive and technological capacities. Partial results of a running field research among Brasilian enterprises are presented.
An Architecture for Synchronization of Supply Chain Simulators Distributed on Network
Raffaele Iannone, Salvatore Miranda, Stefano Riemma, all of the University of Salerno, Italy, salvatore.miranda@mbox.dlima.unisa.it

The increasing tendency to deverticalization of production enterprises pushes more and more toward an organizational structure of distributed type (supply chains). This involves a growing interest in evaluating the overall performances of production chains rather than to those of the single realities. Therefore, it is necessary to implement distributed simulation tools, able to be connected to enterprise database systems and also to interact with other simulated units within the supply chain. To this purpose we propose an architecture of interactive simulators, operating in a synchronized way and distributed on LAN. Our proposal has been tested on three simulated manufacturing units, developed in SIMAN-Arena language.

Developing the Concept of Global Manufacturing Virtual Network
Yongjiang Shi, and Mike Gregory, both of The University of Cambridge, UK, ys@eng.cam.ac.uk, mfg@eng.cam.ac.uk

Manufacturing globalization and virtualization have been a dominant trend in manufacturing and operations management as many companies increasingly relies on swift collaboration with strategic and/or temporary alliances. The paper seeks to gain better understanding the theoretical and practical issues in the relevant areas. It proposes a conceptualization for Global Manufacturing Virtual Network (GMVN) and compares it with other alternative manufacturing system. It suggests that GMVN has many distinguished characteristics and therefore can be one of the most hopeful manufacturing configurations based on the cyber space and collaborative infrastructure for future dramatically changed and fragmented market environment.

SESSION 14: SUPPLY CHAIN MEASUREMENT AND COORDINATION
Session Chair: Michael E. Ketzenberg, Colorado State University, Michael.Ketzenberg@business.colostate.edu
Time & Place: Sunday, April 7, 4:00-5:30PM, Nevada Room

Evaluating Shared Inventory and Transportation Cost Benefits under Vendor Managed Inventory
Donald Warsing, Pennsylvania State University, warsing@psu.edu
Ann Maruchek, Noel Greis, both at University of North Carolina at Chapel Hill

In this research, we model a retailer-supplier inventory system to develop conditions under which a move from a traditional, order-passing system to a vendor-managed-inventory system benefits both the retailer and the supplier. The model is used to quantify the inventory- and transportation-related savings that are possible if the scope of the optimization that determines the (s,Q) policy is expanded to include both parties’ relevant costs.

On the Item Fill Rate for a Finite Horizon
Douglas Thomas, Pennsylvania State University, dthomas@psu.edu
Jiahua Chen, University of Waterloo, Dennis Lin, Smeal College of Business Administration, Penn. State University,

The item fill rate is a pervasive measure of customer service in inventory systems. The traditional expression for expected fill rate relies on several assumptions, including iid demand, no crossing of replenishment orders and an infinite horizon. In this work, we examine expected fill rate expressions for a finite horizon, and discuss conditions when this assumption should be of concern to inventory managers.
Real-Time Available-to-Promise (ATP)  
Anne G. Robinson and Robert C. Carlson both at Stanford University, agrobin@stanford.edu  
In today's economy, to maintain a competitive advantage, manufacturers must be able to satisfy customer demand despite unique specifications or schedule constraints. Thus, the critical need for accurate real-time available-to-promise (ATP) capabilities has become apparent. We describe a model for real-time availability promising in a mixed make-to-order, make-to-stock manufacturing environment. The model provides a way to overcome complexities inherent in real-time analysis. Demand management requires instantaneous decision making to reflect the needs of the customer. Concurrently, it requires intelligent resource allocation (capacity, WIP, FGI) for accepted customer orders. We expect this model's general structure can be adapted to more complex manufacturing environments.

Sharing Information to Manage Perishables  
Michael E. Ketzenberg, Colorado State University, Michael.Ketzenberg@business.colostate.edu  
Harvey M. Wagner, University of North Carolina, Chapel Hill  
We explore the value of information for inventory replenishment of a perishable product. The value of information is measured as the marginal improvement in profit contribution that facilities achieve, relative to the case without information sharing. Key assumptions of the problem include stochastic demand, lost sales, positive order lead times, and order quantity restrictions. We formulate the respective problems as Markov Decision Processes.

SESSION 15: ADVANCES IN INTEGRATED SUPPLY CHAIN MANAGEMENT  
Session Chair: Barchi Peleg, Stanford University, barchi@stanford.edu  
Time & Place: Monday, April 8, 10:00-11:30AM, Nevada Room

Semiconductor Capital Equipment Delivery – Can the risk be shared?  
Doron Myerstorf, AMCCG USA and Barchi Peleg, Stanford University, doronm@attbi.com, barchi@stanford.edu  
Many researchers have dealt separately with each of the supply chains that together represent the semiconductor industry: the equipment vendors', which focuses on building the equipment required for wafer fabrication, assembly, and test, and the IC manufacturers', which focuses on producing integrated circuits (ICs). This paper contributes to previous literature by considering the two supply chains jointly and dealing with their integration. We propose an analytical model for risk pooling that enables better performance in meeting the market demand for both the equipment vendors and the IC manufacturers.

Managing the Joint Pricing and Inventory-Control Problem of Substitute Products  
Kaijie Zhu, Stanford University, kaijie@stanford.edu  
We consider the joint pricing and inventory-control problem of substitute products. We first use a multi-period setting to study a retail monopolist that simultaneously sells two substitute products. We show how the optimal pricing and inventory-control decision depends on the starting inventory levels and the product substitution. We prove the submodularity of profit functions in inventory levels. Then we consider this problem in a supply-chain environment. We study three channel structures: one centralized system and two decentralized systems. By a comparative study, we demonstrate that the competition in the manufacturing echelon improves total market demand and system profit in decentralized systems.
How Forecast Updating Affects Performance in a Capacitated Supply Chain
Julia MiyaoKa and Warren Hausman both at Stanford University, jmiyoka@stanford.edu, hausman@stanford.edu
We consider a two-stage supply chain where the downstream stage must reserve capacity prior to making its production decision. Updated but imperfect information about demand becomes available after the capacity decision is made, but before the production decision is made. We study the effect of the forecast update on supply chain performance under various demand and cost parameters.

Channel Coordination With Manufacturer’s Returns Policies Under Stochastic Demand
Zhong Yao, City University of Hong Kong, mszyao@cityu.edu.hk
A returns policy as a coordination mechanism of supply chains has been widely studied by some academicians and practitioners. Committed by an upstream supplier to buy back unsold inventory at the end of its selling season, downstream channel members such as retailers can reduce shortage. Although MS/OR research on the strategic role and optimal design of returns policies has grown in recent years, so far there is little attention to give how the retailer’s optimal decisions are affected by demand uncertainty under competitive situations and how a supplier’s returns policy can influence these decision. Adopting the classical newsboy problem model framework, this research investigates these problems considering a marketing channel that consists of one supplier and two competing retailers, who face uncertain demand. To facilitate our analysis, this paper employs a linear demand-price model which considers the competitive factors plus a noise term that reflects the uncertain demand. Upon these setting, we can provide insights into the effect of the demand variability on the retailer’s decisions of order quantity and retail pricing. We also analyze the impacts of return policy on the retailer optimal retail price decision and reallocation of expected profits between supplier and retailers. In addition, how the competing factor influences the retailer’s decisions making response to uncertain demand and profit variability in the supply chain will be analyzed in details.

SESSION 16: ELECTRONIC SUPPLY CHAIN MANAGEMENT
Session Chair: Simon Croom, University of Warwick, UK, simon.croom@warwick.ac.uk
Time & Place: Monday, April 8, 10:00-11:30AM, California Room

Supply Chain Management in the E-Business Era
Simon Croom, and Mihalis Giamakis, both at University of Warwick, UK, Simon.croom@warwick.ac.uk, m.giannakis@warwick.ac.uk
The role of the Internet and advent of a multitude of electronic business systems and platforms has undoubtedly had a major impact of business processes. In order to examine the impact of e-business on supply chain management we conducted a major survey of supply chain strategies in UK and European organisations during 2001. It became clear that e-business concerns were dominating strategic decision makers at the very highest level in both public and private sectors. Furthermore, many of our participants recognized the significance of e-business to the management supply chains. However, one of the most disturbing findings of our study was the almost total lack of a clear ‘strategic vision’ for supply chain management evidenced by our study. Rather, undue emphasis was being placed on IT projects and system selection than on the structural and behavioral consequences of such systems on their supply chains. Using a three dimensional framework we argue that the lack of resonance between the technical and managerial dimensions of e-business is at the core of major e-system difficulties, and cite case examples to support our findings.
Adoption of Buyer-Supplier Communication Technology
Jose V. Gavidia, College of Charleston, gavidiaj@cofc.edu
This study analyzes the factors leading to the adoption of electronic data interchange (EDI) between buyers and their suppliers in international supply chains. Using survey data at the plant level from the Mexican maquiladora industry, a model of EDI adoption is empirically tested. According to this model, plant size, perceived benefits, perceived compatibility, industry, and external requirements are the main factors in the adoption decision. The study also presents statistics on perceived barriers to adoption, as well as industry differences in adoption rates. Implications are highly relevant in the management of multinational enterprises and supply chains.

The Significance of Schedule Stability in e-Enabled Supply Chains
Julian Coleman, Chin Won Khoo, Andrew Lyons and Dennis Kehoe,
The University of Liverpool, UK, dfkehoe@liv.ac.uk
The Future Supply Innovations (FUSION) research project at the University of Liverpool, has examined the role of schedule stability in the application of e-business models at a mid-volume manufacturer of luxury cars and at several of its key component and module suppliers. The premise for the study was to identify and create the necessary pre-conditions to develop a prototype of an e-enabled supply chain. The prototype was to be used to assess the feasibility of providing web-enabled delivery triggers and final assembly schedules to first and second tier suppliers upstream of the vehicle assembly plant. In this paper, the authors describe the FUSION project, suggest an operational design for the e-enablement of an automotive supply chain and explore the consequences of final assembly schedule stability on customer service and on plant and supply chain performance.

SESSION 17: STRATEGIC SUPPLY CHAIN MANAGEMENT
Session Chair: Ines Alves de Queiroz, Forschungszentrum Informatik an der Universität Karlsruhe (FZI), Germany, queiroz@fzi.de
Time & Place: Monday, April 8, 2:00-3:30PM, California Room

How is Supply Chain Nowadays?
Ines Alves de Queiroz, Forschungszentrum Informatik an der Universität Karlsruhe (FZI), Germany, queiroz@fzi.de
Not long ago, managing the supply chain was a simple, plodding procession. Manufacturers partnered with one dancer at a time, and the twosome learned the steps together, slowly moving to the same music year in and year out. Then the Internet changed all that — dramatically. The advent of open, real-time communications among manufacturers, suppliers, distributors, and customers transformed a simple two-step into a complicated square dance, with multiple prospective partners but no one calling the steps. Linked through cyberspace, any partner in the group can take the lead, and all of the participants lend their support, creating a complicated pattern of interactions. But turning the traditional buy/make/move/store/sell cycle into an intricate electronic partnership requires more than just Internet-enabling existing systems. True e-supply chain and logistics initiatives expand the view of a company’s supply chain beyond its own four walls to include the inner workings of several tiers of suppliers, distributors, and other corporate partners, even when those partners are halfway around the world. Companies can consolidate their trading partners through e-marketplaces to lower procurement costs, extend products and services to a broader market, and enrich their portfolio of available partners. More recently, OEMs have begun to adopt a strategic partnership approach, which recognizes that increased, sustainable benefits can accrue from long-term relationships between participants in the SC (a win-win situation). All these benefits make possible to the delivery of better products and services to the customer, faster and at a lower cost.
Strategy Making in the Aerospace Sector: An Empirical Investigation

Roger Maull, University of Exeter, UK, r.s.maull@ex.ac.uk

This paper analyzes the main drivers for change in the global aerospace airframes supply chain. From a qualitative analysis of 260 interviews and a complementary quantitative survey of 100 companies we have developed a series of drivers which impact on strategy making in the airframes part of the aerospace supply chain. We have developed a method for including these drivers within a strategy-making tool for aerospace companies. We have applied this method in three companies. We will report the results of the case studies and the implications for competency development throughout the airframes supply chain.

Supply Chain Strategies Applied to the Automotive Industry

Luiz Felipe Scavarda, Fraunhofer Institute, Germany, fes@ipa.fhg.de

A new competition logic has been established where competition is based on supply chains (SCs) instead of on isolated business units. Within this new logic, companies are recognizing the importance of incorporating the SC view into their corporate strategy, thus developing SC strategies linked to their business goals. Based on Fraunhofer Institut Produktionstechnik Automatisierung's experience in many supply chain management (SCM) research projects developed in the manufacturing industry, the paper attempts through automotive case studies and literature review to highlight the main topics concerning the development of SC strategies. The importance of SCM as a promising mean of competitive advantage is also analyzed.

Managing Supply Chain in FMCG Sector: The Indian Scenario

B.S. Sahay, and Arun K. Gupta, Management Development Institute, India, bssahay@mdi.ac.in, arungm@mdi.ac.in

The Indian FMCG sector is a low-margin business where volume holds the key to success. With domestic consumption close to USD 17 billion, the FMCG sector today is one of the largest in the country and accounts for about 14.5 per cent of the GDP. In current global slowdown, increasing uncertainty in demand and supply, changing customer preferences, and shortening of product life cycle besides rigorous competition from multinational companies, this sector has been forced to reconfigure their supply chain strategy for their survival and growth. The present paper traces the development and trends of supply chain management practices followed by FMCG sector in India and suggest the ways to perfect it in order to remain competitive.
TRACK 7: INNOVATION IN TEACHING  
Track Chair: Arthur V. Hill, University of Minnesota  
ahill@csom.umn.edu

SESSION 1: USE OF COMPUTERS IN OPERATIONS MANAGEMENT EDUCATION  
Session Chair: Andrew McAfee, Harvard Business School, amcafee@hbs.edu  
Time & Place: Friday, April 5, 2:00-3:30PM, Nevada Room

To Beta or not to Beta?: The Pedagogy and Execution  
of a Web-based New Product Development Exercise  
Andrew McAfee and Alan MacCormack, both at Harvard Business School,  
amcafee@hbs.edu, amaccormack@hbs.edu  
We present the pedagogy, timeline, teaching plan, salient executional considerations, and lessons  
learned to date for a novel teaching exercise in which teams of MBA students build small, simple  
web sites. This hands-on exercise takes place over the course of a week at the end of the new  
product development module in our MBA program’s required 1st year course in Technology and  
Operations Management. It differs from its predecessors in that students build a digital product  
instead of a physical one, and have the option to submit ‘beta’ versions of their web site for peer  
review during the week. The debrief teaching plan subsumes earlier lessons around new product  
and process design, and also introduces new topics such as the value and proper use of betas and  
other prototypes, and the basics of good web page and site design. This exercise has been well  
received by students and faculty at our school, and is likely to remain part of our curriculum.

Web-age Cooperation and Collaboration in Education and Training:  
Understanding the English Divide in Macedonia and Brazil  
Sonja Markova, CSUH – USA, and Joni de Almeida Amorim, UNICAMP – BRAZIL,  
sonja_markova@yahoo.co.uk, amorimja@yahoo.com  
The electronic learning environment allows active learning through participation and dialogue  
providing multiple opportunities to shift away from a prescriptive approach to an engaging one.  
This work intends to consider how developing countries like Macedonia and Brazil can benefit  
from e-learning while developing an increased cooperation and collaboration in education and  
training through e-commerce in a global perspective. The main objective is to identify the current  
tendencies driving the usage of both e-learning and e-commerce and their interrelations with  
education and training. It also considers strategic planning issues in the context of the English  
Divide that both Brazil and Macedonia face.

Data Mining and Access to Information: Case Study of a Brazilian University Portal  
Joni de Almeida Amorim, UNICAMP, Brazil and Sonja Markova, CSUH, USA,  
amorimja@yahoo.com, sonja_markova@usa.net  
This is a case study on the university portal of University of Campinas, Brazil (UNICAMP)  
http://www.unicamp.br/. Exemplified is how some of the proposed ideas could be implemented  
to improve the access and customization of information offered by the portal. In this context,  
computer-based education techniques are of fundamental importance. It is of interest to consider  
the possibilities offered by data mining – an attempt to automatically identify patterns in huge  
amounts of data by using a wide range of techniques supporting the fundamental applications  
of classification, clustering and forecasting. This work gives special focus to data warehousing  
and considers issues of accessibility.
SESSION 2: NEW PRODUCT DEVELOPMENT AND ENGINEERING EDUCATION
Session Chair: Keith Goffin, Stuttgart Institute of Management and Technology, Germany, Goffin@uni-simt.de
Time & Place: Friday, April 5, 4:00-5:30PM, Nevada Room

Teaching Innovation and New Product Development using the “City Car” Simulation
Keith Goffin, Stuttgart Institute of Management and Technology, Germany, and Rick Mitchell, Cranfield School of Management, UK, Goffin@uni-simt.de or k.goffin@Cranfield.ac.uk
In order to bring the teaching of innovation management and new product development (NPD) to life, a new simulation exercise has been developed, based on the Lego RCX programmable brick. The exercise, which takes four hours, has been used very successfully on MBA teaching, engineering courses and in executive education. It is a particularly useful teaching tool for use with people who do not have direct experience of working on NPD. This paper will explain the teaching goals, how the simulation has been implemented (including a short video excerpt) and how it can form an integral part of courses on innovation.

The Information Technology in the Engineering Teaching - Learning Process
Marcos Paulo Monteiro and Lilian Martins da Motta Dias, marcospaulomont@zipmail.com.br, lmdias@vento.com.br
This paper intends to rescue facts from the history of the use of computers in education. It is also aimed at making some comments and some suggestions to contribute for a thinking over on the use of the general information and communication technologies and, especially, the use of the computer in the engineering teaching-learning process. The context of the use of modern information technologies should make the individuals motivated to “learn to learn”, in order to deal positively with the continuous and accelerated transformation of the knowledge basis, which, according to some scholars, doubles each four years and it will sooner double each six months. So, the only thing the future engineer will have for sure will be uncertainty.

Teaching the Creative Process in Engineering Courses
Marina Rodrigues Brochado, Marília Rosa Millan, and Sergio Luiz Noronha Nastari, Centro Federal De Educação Tecnológica Celso Suckow da Fonseca, Brazil, marinr@openlink.com.br
Educational System is important in learning process; student must be its center. Schools curricula must aim students could exercise skill creatively, transform information into knowledge and learn reasoning. Technological developments impact Brazil, changing working, production processes. This demands new professional profile. A Ministry/Brazil Engineering Courses curricula resolution is in discussion. The Technological Education Federal Center-CEFET/RJ- in Brazil is dedicated to technological courses. It aims at technical education vertical integration-secondary, graduate courses and master’s degree. Information Era demands a revolution in the education field. Author’s objective here is to propose a way to teach the creative process in CEFET/RJ engineering courses.

SESSION 3: NEW IDEAS FOR TEACHING THE CORE OPERATIONS MANAGEMENT COURSE
Session Chair: Nancy Hyer, Vanderbilt University, nancy.lea.hyer@owen.vanderbilt.edu
Time & Place: Sunday, April 7, 10:00-11:30AM, Monterey Room

Linking Operations Management to Marketing in the MBA Core
Britt M. Shirley, The University of Tampa, BMShirley@aol.com
As part of the redesign of its MBA program, the University of Tampa’s College of Business developed an eighteen-hour integrated core that links topics critical to the creation of value for customers. The core consists of twelve course modules, linked by pairs and taught during a semester. This presentation examines the linkage between “Designing and Optimizing Delivery Systems” (the operations module) and “Building Customer Value” (the marketing module). It focuses on the experiences of the professors in designing their modules, linking them together, and coordinating the transition from one to the other during the course of the semester.
Teaching Factory Management Using a Cellular Manufacturing Framework
Urban Wemmerlöv, University of Wisconsin-Madison and Nancy Hyer, Vanderbilt University, uwemmerlov@bus.wisc.edu, nancy.leya.hyer@owen.vanderbilt.edu
Manufacturing management is commonly taught by concentrating on technical matters while omitting managerial aspects. Further, the focus is often on running existing facilities where process and infrastructure design has already been done. This session outlines a comprehensive course on factory management using cells as a focal point. We first discuss course objectives and present a life-cycle model for structuring course content. This model begins with design and justification and proceeds through implementation, operation, and improvement. A second model ensures that both hard and soft sides of factory management are covered. Finally, we discuss suitable pedagogy and instructional resources.

SESSION 4: NEW IDEAS FOR TEACHING OPERATIONS
Session Chair: Steven J. Spear, Harvard University, sspear@hbs.edu
Time & Place: Sunday, April 7, 4:00-5:30PM, Crystal Room

Running and Growing the Small Company: Course Overview
Steven J. Spear, Harvard University, sspear@hbs.edu

"The true test of intelligence is not how much we know how to do, but how we behave when we don’t know what to do." — John Holt, Educator and Author

"We each spend so much time and effort trying to create value, yet so much of it gets destroyed in the hand-offs." — Hospital Chief of Surgery

"We end up spending much more time nursing the system than nursing the patient." — Nursing Manager

Managers who run and grow small companies repeatedly face two fundamental challenges. First, many managers are unable to determine what action to take or how to take that action when outside their experiential comfort zone. This is especially problematic for the small company because it must grow beyond its original niche into unexperienced, unexplored regions of markets, products, process, prices, and people that often offer the greatest gains. Therefore, to succeed, managers must display the type of intelligence to which John Holt refers in the first quote, above, a capability to master new situations rapidly, frequently, and at low cost.

The second problem is that when people are engaged in collaborative work the system as a whole of which they are part can operate at disappointing low levels. This is true even if they are individually in their comfort zones and even if each is doing his or her best to do outstanding work. For the manager of the small company this too is a critical concern. If work systems are not operating well at smaller scopes or scales, they cannot be jury-rigged to operate well under new circumstances or at larger scopes or scales necessary for sustained growth.

The second two quotes above reflect a specific example of this general predicament. Imagine you are admitted to a hospital because you need care. An illness or injury has debilitated you, and you expect that you will be cured or healed. At the very least, you expect that your suffering will be ameliorated.

You have every reason to believe that your expectations will be met. You are likely to receive care from people with extraordinary quality and quantity of education. Furthermore, it is likely that these people will be highly motivated to make you well, a point virtually guaranteed by the self-selection of people into health care related professions.
Ariel T. Cayanan and Dean Miriam E. Necesito, MapuaTech Intramuros, Philippines, atcayanan@mapua-tech.edu.ph

The Paper Based Self-Instructing Computer Integrated Manufacturing (CIM) module will be a big help to the Industrial Engineering students. It is now a fact that there is an exciting and rapidly growing area of that field in the industry. The research project will give the respondent an opportunity to develop skills in automation, basic robotics, communications, CAD/CAM and CIM that will help him/her to get a job in the industry or to get a credit at a college. Self-instructing CIM Module is indistinguishable in itself from any other sort of learning technique, though the conditions and environment surrounding the learning maybe quite different. CIM Self-Instructing Modules can:

- Accommodate directly the ways in which people learn naturally
- Open up various choices and degrees of controls to learners
- Be based on learning materials which are learner-centered
- Help learners to take credit for their learning, and develop a positive feeling of ownership of their successes.
- Help conserve human skills for the things that really need human presence and feedback.

The project will promote change in engineering education by moving towards a more relevant curriculum and a new definition of the teacher's role. With the help of the module one's expertise or skills can be multiplied into different personalities since it is self-instructing.

The individual skills and talent of our students, supplemented with right module will yield a better engineer of the future.

An Incredibly Useful Production Management Teaching Tool
Todd Schultz, Augusta State University, tschultz@aug.edu

Teaching the "micro" aspects of production management (product flow, networks of queues, production dynamics) to non-quantitative management majors is enhanced by creative use of manual simulation worksheets. Despite their simplicity, students gain an understanding of some of the more subtle aspects of micro-production: Little's Law, queuing parameters, theory of constraints analysis. The presentation will walk through how the worksheets are developed and analyzed, and describe some of the insights they can provide. Materials for class use will be distributed, including links to online web modules.

Statistical Thinking and Statistical Modeling in POM
Minnie Patel, and Tsong-how Chang, University of Wisconsin-Milwaukee, npatel@uwm.edu, thechang@uwm.edu

Discusses how statistical thinking may be integrated into the modeling of an operation to improve model validity and effectiveness. It is hypothesized that a service must not have been operated efficiently if it is not in statistical control. Such operational data are likely to be fitted well by a positively skewed distribution or a uniform distribution. Models based on these distributions are economically inefficient. To help demonstrate the effects of various service time distributions on the mean cycle time of an operation and on their effectiveness of variance reduction efforts in cycle time improvement, a simple queue will be presented. These illustrations also help point out the importance of SPC implementation in operations management together with some suggested steps for improvement.
TRACK 8: INTERNET-ENABLED OPERATIONS
Track Chair: Andrew McAfee, Harvard University
amcafee@hbs.edu

SESSION 1: NEW PARADIGMS
Session Chair: Stephen Lawrence, University of Colorado, Stephen.Lawrence@colorado.edu
Time & Place: Saturday, April 6, 2:00-3:30PM, Franciscan Suite

Operational Costing of Electronic versus Physical Books
Stephen Lawrence, University of Colorado and Lynn Silipigni Connaway, netLibrary, Inc, Stephen.Lawrence@colorado.edu, lynn@netlibrary.com
Electronic and digital publications are permeating research, public, and business libraries, but very little information or data is available regarding the relative ownership costs of digital versus physical volumes to guide acquisition policies. We report the results of a survey of research librarians that measures the operational life cycle costs of both digital and physical volumes, and that provides an estimate of the relative cost savings that digital books provide in comparison to physical books.

Professional Competences For Knowledge Management
Rosa Berto and Guilherme Ary Plonski, both at Escola Politécnica da Universidade de São Paulo, Brazil, rosamysh@usp.br, plonski2@usp.br
The competitive essence of the 21st century organizations lays on its capability of communication, interaction and acquiring intellectual capital supported by the IT. In the new organizational environment, the culture, the expectations, the relationships and the human behavior are differentiated of the effective patterns, representing challenges to the proposed model. The survey presented here focuses the new role, skills and profile of the information professionals working with knowledge management. New challenges and opportunities in information work and information business supported by the Internet and the digital networks are also discussed.

My eHobbies – An Internet – Based Start-up Company for the Students of MAPUA Tech
Miriam E. Necesito, and Milagros A. Luquingan, both at Mapua Institute of Technology, Philippines, menecesito@mapua-tech.edu.ph, maluquingan@mapua-tech.edu.ph
Given the expediency of information technology to support opportunities in the business setting, this paper probes the feasibility of establishing the first Filipino internet-based, student-operated hobby site start-up company. The site, pioneering on one-stop shop format, is designed to serve as an efficient channel for hobby materials that are typically available through conventional distribution. The study aims to inculcate entrepreneurial skills among students and refocus their energies in a productive conceptualization endeavor. Ultimately, it intends to further explore innumerable opportunities in e-Business through the deployment of full-scale intranets and extranets that automate business critical processes.

Beating the Bullwhip with IT
Andrew McAfee, Harvard Business School, amcafee@hbs.edu
Results are presented from an experiment that evaluated the comparative effectiveness of different strategies for mitigating the undesirable ‘bullwhip effect’ often observed across supply chains. The experiment uses the well-known ‘Beer Game’ simulation to elicit the bullwhip effect, and to quantify the extent to which different strategies for improving information and physical flows improve performance over a base case. Several dimensions of performance are considered and compared.
SESSION 2: ENABLING TECHNOLOGIES
Session Chair: Dennis Kehoe, University of Liverpool, UK, dfkehoe@liv.ac.uk
Time & Place: Sunday, April 7, 2:00-3:30PM, Franciscan Suite

Terminology: Building a Foundation for Interoperability in the Construction Sector
Sérgio Amorim, Lucia Peixoto, Luiz Madeira, all at Universidade Federal Fluminense, Brazil, leusn@civil.uff.br, lucia@civil.uff.br, madeira@civil.uff.br
Systems interoperability proposals have been, until now, largely based on text contents. IF, STEP, XML are languages or standards that need a consensual signification behind theirs terms. Each term can have many different meanings, depending on the context it is inserted and to include a full description for each in every document is too complicated and irksome. It would be necessary somewhat able to select the meaning respecting the context, and this would probably consume too many resources. Any text-based system must run over a terminology well accepted and perfectly understood by its users. This is one of the greatest obstacles to reach full interoperability. Not only because in any language seldom we have a dictionary specialized in the construction field which could work as an official reference, but because there are big differences when translating between languages. Distinct building cultures and organizations make hard to obtain a proper translation. One way to overpass this hindrance is to develop a reference construction terminology, including concepts description and terms interrelationship. The concepts must be associated with a conceptual map, which reflects terms associations and pertinence. The relationships established trough this conceptual map can be easily translated to any system, especially in XML schemes and data descriptions, making possible to fulfill a real interoperability. Building this terminology is the aim of a Brazilian governmental sponsored project, so called CDCON, now under course with coordination of a group of universities and participation of building contractors, suppliers associations and systems developers.

Proposal for Database Architecture to Aid a Dynamic Cooperation Network Research
João Amato Neto, University of São Paulo, Brazil, amato@usp.br
This paper intends to propose the development of computational database architecture to aid a research about dynamic cooperation network among small and medium enterprise in Brazil. The data will be provided by enterprises through electronic media, these data will be organized utilizing object orientation and database modeling using UML (Unified Modeling Language). This database aims at facilitating data search, as well as, report generation to help and make easy a posterior research using this data.

Distributed Planning and Control systems in Internet enabled Supply Chains
Zenon Michaelides, Nick Boughton, Dennis Kehoe, the University of Liverpool, UK, dfkehoe@liv.ac.uk
Creating truly integrated supply networks based on Internet technologies requires two main areas of research. The first addresses the operational issues required in order to transact as a member in a supply chain, often referred to as the business model. The second addresses the technology required for enabling the distribution of related information within supplier networks. This paper reviews the systems companies use to transact as part of a supply chain and identifies the technology required for enabling the sharing of manufacturing information over the Internet. In particular, issues relating to connectivity and on-line collaboration across supplier networks are reviewed. The trade-off between cost and security is a key factor in developing suitable applications supporting supplier networks over the Internet. A case study is presented from the aerospace supply chain sector, describing the development of an Internet enabled planning and control application.
IT Impacts On Traditional Production Process Of Scientific Publications
Rosa Berto, Escola Politécnica da Universidade de São Paulo, rosamysb@usp.br
The traditional process of communicating research amongst scientific and scholarly communities has been affected by Information Technology (IT). These changes include a new production model for the scientific publishing, its most effective and respected way of public recognition of science. The case study presented here analyzes the impact of IT on the traditional paper-based production process of scientific publishing in a Public Research Institute in Brazil. It focuses community perceptions and other visions provided by internal and external supporters.

SESSION 3: NEW PRODUCTS AND PLAYERS
Session Chair: Tobias Schoenherr, Indiana University, tschoenh@indiana.edu
Time & Place: Sunday, April 7, 4:00-5:30PM, Franciscan Suite

A Business Model for an e-Factoy
H. Michael Chung, California State University, Long Beach, hmchung@csulb.edu
The study describes a comparative study of managing the manufacturing operation of traditional factories and generates a new business model by utilizing information technologies. A chronological analysis of the earlier operations, expansion, and challenges will be included in order to gauge the impact of the information technology applications. Economic infrastructure, learning curve, portability of operation models, performance metrics, and resource constraints, etc. will be considered in constructing a conceptual framework that will guide the decision-makers. The model focuses on formulating a strategic goal for the e-factory projects, identifying and supplying both internal and external resources, and then applying the comprehensive measures to the process and the outcome of a production project.

Strategies for the Minimization of Logistics Costs Related to the New Internet-based Business Models
Alexandre Reis Graeml, Centro Federal de Educação Tecnológica do Paraná (CEFET-PR),
Pierre Jacques Ehrlich, Escola de Administração de Empresas de São Paulo (EAESP-FGV),
and Karin Sylvia Graeml, Universidade Federal de Santa Catarina (UFSC),
graeml@dainf.cefetpr.br, ehrlich@fgvsp.br, karin.graeml@mailhr.com.br
Many researchers have been dedicating their efforts to understand the ways traditional logistics can be adapted to the new requirements of the electronic commerce. But there is an issue that hasn’t received enough attention from the researchers so far: it is the virtualization of products and services in order to avoid or reduce the need of use of traditional logistics. This paper focuses on that issue, discussing some possibilities, taking into account the characteristics of products and services being traded through the Internet, the production processes involved, as well as the best suited supply chain structure and business models.
Stretching the Product to Compete in the Internet Space
Giuliano Noci, and Massimiliano Ostinelli, both at Department of Economics and Production, Politecnico di Milano, Italy, giuliano.noci@polimi.it, massimiliano.ostinelli@polimi.it
It is widely recognized that the Internet has a pervasive impact on managerial processes, since it enables new operational and strategic approaches to business issues. Unfortunately, little work has been done in the identification of a systematic approach aimed at supporting managers in the definition of the relevant dimensions allowing them to enhance customization opportunities; in this perspective, the paper suggests an approach articulated into three steps: identification of new operating solutions for differentiating a company’s products. In particular, four operational strategies have been identified: they can be described by two variables, i) changes occurred at the purchase process – in this case, the Internet technology provides a platform for improving the product’s features both through customization and customer-support tools - and ii) product role as far as concerns the satisfaction of customers’ needs – at this level, we distinguish between a “stand alone” approach, where the provided product satisfies by itself the customer needs and a “systemic approach” where the product satisfies the customers’ needs as part of a system; analysis of different operational approaches - through an empirical investigation of more interesting case studies - aimed at classifying the most prominent Internet-based vehicles whereby the above approaches can be implemented; and identification of the strengths and weaknesses of each strategy. In this respect, the authors attempt to identify in which contexts each of them can be more effectively implemented.

Developments in B2B Reverse Online Auctions:
A Study of the Changing Role of the Online Auction Provider / Intermediary
Tobias Schoenherr, Indiana University, tschoenh@indiana.edu
Business-to-Business online reverse auctions have emerged as a promising and important purchasing tool and their application can be seen in many Fortune 1000 companies. While some research has been done examining the impact on the buying company, no study looked at the changing role of the online auction provider as the area matures and buyers become more experienced. This paper fills this gap by examining the value-added services provided by the intermediary and contrasting these to the changing demands of buyers. The paper identifies sustainable and non-sustainable benefits from intermediary services and characterizes the perceived value of the online auction provider.

SESSION 4: NEW CONFIGURATIONS
Session Chair: Stefano Ronchi, Politecnico di Milano, Italy, stefano.ronchi@polimi.it or stefanor@mit.edu
Time & Place: Monday, April 8, 10:00-11:30AM, Franciscan Suite

A Simulation Study to Quantify Opportunities for E-business in a Drug Distribution System
George Dias, and Hugo Tsugunobu Yoshida Yoshizaki, both at USP – Universidade, paulus@hotmail.com, hugo@usp.br
This paper presents and quantifies some of the opportunities that an E-business tool represents to material flow effectiveness. The study was developed at a Brazilian drug distribution system. Comparative results was developed based on historical performance and the simulation of managing distribution process using an E-business solution that uses quite simple methods to coordinate the flow of materials along the distribution system. (manufacturer, wholesalers and drug retailers) Simulation results show that there is an opportunity to reduce total cost and improve service level to drugstores (and as a result to consumers) at the same time. Another important characteristic observed with the simulation results was the reduction of bullwhip effect.
The Role of the Internet in Customer-Supplier Relationships:
The Emergence of Collaborative Markets
Stefano Ronchi, Politecnico di Milano, Italy, stefano.ronchi@polimi.it or stefanor@mit.edu
In the last years relationships among firms within the supply chain are changing in order to face new threats and opportunities arisen from web-based technologies. In literature, two apparently contrasting trends are emerging: on the one hand, market mechanisms are emphasized through electronic catalogs, auctions and exchanges; on the other hand, web technologies support collaboration among partners within the supply chain. This divergence opens space for the emergence of a new typology of relationship, which can be defined as collaborative market. In such a relationship, the flexibility of new technologies allows companies collaborating in a short-term horizon. The aim of this research is to analyze and to understand what are the main implications of the Internet adoption on the relationships across the supply chain. The collaborative market model will be described. Evidence is based on 162 U.S. companies survey carried out in the period July-August 2001.

E-business Models in the Support of Demand Networks Alignment
H. Sharifi, D.F. Kehoe, N.J. Boughton, Z. Michaeides all of the University of Liverpool, UK and N.D. Burns, and S.Dani of Loughborough University, UK, d.f.kehoe@liv.ac.uk
This paper examines the application of e-business models in the support of supply chain alignment. Reference is made to a conceptual model for demand network alignment (Kehoe et al.), which uses the DNA metaphor to introduce the two main dimensions of alignment: the physical/information flow alignment and the organizational power/behavioral relationships in the form a double helix. The research identifies the relationship between two of the main components of supply chain strategic thinking and provides new insights into the relationships between the "structural" perspective and the "organizational" perspective. The conceptual model is illustrated through case studies in the machine tool and automotive sectors and illustrates the role of Internet technologies in creating new form of aligned demand networks.

Management Knowledge Through Cooperation Networks and Virtual Organizations
João Amato Neto, University of São Paulo, Brazil, amato@usp.br
This study investigates the possible ways to improve a company's performance and competitiveness through the inter-organizational arrangements and productive cooperation networks such as regional clusters, virtual organizations, cooperatives and supply chains. Furthermore, it is intended to investigate the opportunities and barriers related to knowledge generation, diffusion and management through these kinds of inter-organizational arrangements and cooperative networks, under the context of industrial restructuring and globalization process.

SESSION 5: INCUMBENTS' RESPONSES
Session Chair: David Barnes, Open University Business School, UK, d.l.barnes@open.ac.uk
Time & Place: Monday, April 8, 2:00-3:30PM, Franciscan Suite

E-Commerce in the Old Economy
David Barnes, Matthew Hinton, and Suzanne Mieczkowska, Open University Business School, UK, d.l.barnes@open.ac.uk, c.m.hinton@open.ac.uk, s.mieczkowska@open.ac.uk
What place do old economy manufacturers have in the new economy where dotcoms deliver virtual products to cybercustomers at the speed of light? This paper reports how two traditional UK manufacturers are adapting their operations to meet the challenge of the Internet era. The first, a manufacturer of industrial equipment uses a web-based order system to enable its mostly US customers to design their own bespoke products. The second, a steel manufacturer, has set up a portal with its major European competitors that enables customers to view, order and track products through the manufacturing process.
Old Economy Meets New Economy – Results of an Empirical Investigation
Axel Brassler, Technische Universität Ilmenau, axel.brassler@wirtschaft.tu-ilmenau.de
Developments in recent years have given ample evidence that the supply chains of industry have been permanently changed by the possibilities which the Internet opens up. There is a considerable need for empirical research to provide support and direction to the associated tasks of management and design. One such study has been carried out jointly with the VDMA, the German Association for the mechanical engineering industry. The research was into the impact of electronic business on the traditional transactions in the value-added chain. The paper will address the observable changes in industrial practice, thus providing a base-line for future design issues arising in this field.

Real Downstream Internet-based Supply Chain Management
Henrique Correa, EAESP São Paulo Business School, Brazil, henrique@correa.com.br
Much has been said about internet-enabled supply chain management initiatives, but few are the cases in which a whole process of development and implementation is described. The paper describes the case of General Motors Brazil and its breakthrough change in management practices regarding their downstream spare parts supply chain, showing data comparing before and after inventory and service levels along the chain. We show that 4 basic conditions are necessary for companies to adopt such improvement approaches and we also show how other industries are preparing to develop them in Brazil.

The Successful Transition from Old Operations: The Case of Atuhora.com
Francesco Sandulli, University Complutense of Madrid, Spain, sandulli@ccce.ucm.es
The Internet has the potential to change the operations activity. Several studies on the impact of Internet and Information Technologies on Operations focused on the efficiency gains and performance improvements. In our study we went one step further, studying an in-depth business case of a Terra-Lycos/Telepizza joint venture, where the Internet enabled the operations area not only providing efficiency gains, but also and primarily, opening new profitable business opportunities.
TRACK 9: INVENTORY MANAGEMENT
Track Chair: Rommert Dekker, Erasmus University
rdekker@few.eur.nl

SESSION 1: INVENTORY CONTROL FOR STYLE GOODS AND SPARE PARTS
Session Chair: Rommert Dekker, Erasmus University, rdekker@few.eur.nl
Time & Place: Saturday, April 6, 10:00-11:30AM, Washington Room

The News Vendor Problem With Resalable Returns
Ruud Teunter, and Julien Mostard, both of Erasmus University Rotterdam
We analyze a newsvendor problem with resalable returns. A single order is placed before the selling season starts. Purchased items may be returned by the customer (full refund) within a certain time interval. Returned items are resalable. Items remaining at the end of the season are salvaged. All demands not met directly are lost. The objective is to find the optimal order quantity given the demand distribution, the probability that a sold item is returned, and all relevant revenues and costs. This study is motivated by a case study at one of the largest catalogue/internet mail order companies in the Netherlands.

Inventory Control of Style Goods with Commercial Returns
Julien Mostard, René de Koster, Ruud Teunter, Rommert Dekker, and Harold Krikke
Erasmus University Rotterdam, The Netherlands
Because customers have the legal right to return products, a lot of companies receive large amounts of returns, up to 75% of deliveries. In the case of seasonal products, this significantly complicates inventory control. Starting from a newsboy framework, we analyze two approaches to incorporating returns, one being using a fixed return rate and the other using a return probability. Moreover, the distribution-free approach will be applied to both cases, thus yielding four different optimal ordering rules. Using real data provided by a large mail order company, we will then compare the performance of these rules and also compare them to the ordering rule currently being used by the company.

Spare Parts Inventory Control With SAP R/3: A Case Study
Rommert Dekker and Anne Rijneveld, both at Erasmus University Rotterdam, rdekker@few.eur.nl
In this presentation we discuss the use of the materials management module of SAP R/3 for spare parts inventory control at a refinery. We first list the methods SAP provides, both with respect to lot sizing, reorder points and forecasting. Next we describe the problems faced by the warehouse management after an initial implementation of SAP. We also give a characterization of the spare parts inventory control at the refinery. Therefore we present the results of our study to optimize the use of SAP, especially to select the right tools for the right product groups. The study included a simulation of the various methods on real demand data of the last three years. We highlight some spectacular shortcomings of SAP. Finally, we evaluate the general appropriateness of SAP for spare parts control and state both its strengths and weakness. Afterwards, we identify some research issues.
SESSION 2: INVENTORY CONTROL IN CASE OF PRODUCT RETURNS
Session Chair: E. A. van der Laan, Erasmus University Rotterdam
Time & Place: Saturday, April 6, 2:00-3:30PM, Redwood Room

An Overview of Inventory Control Models for Product Returns
R. Dekker, E. A. van der Laan, M. Fleischmann, all of Erasmus University Rotterdam, and
K. Inderfurth, University of Magdeburg, Germany, rdekker@few.eur.nl
In this presentation we list all cases where products return to their original manufacturer / supplier and have an effect on inventory control. Next we give an overview and classification of inventory models that have been developed for these cases. We summarize main results and we outline research directions.

Inventory Management with Product Returns: The Impact of (Mis)information (Part 1)
E.A. van der Laan and M.P. de Brito, Erasmus University Rotterdam
There is few literature relating the forecasting of product returns, inventory management and information issues. Among those, authors have considered steady state environments, known return probabilities or specific cases where the most-informed method leads to the best forecast. However, in non-stationary environments or environments in which observations are prone to error, information may mislead the prognosis. In this presentation, we elaborate on the impact of such (mis)information.

Inventory Management with Product Returns: The Impact of (Mis)information (Part 2)
M.P. de Brito and E.A. van der Laan, Erasmus University Rotterdam
Abstract: idem

SESSION 3 - INVENTORIES IN SUPPLY CHAINS
Session Chair: Mustafa Karakul, University of Toronto, karakul@rotman.utoronto.ca
Time & Place: Monday, April 8, 10:00-11:30AM, Portola Room

Evaluation of Unidirectional Lateral Transshipment
Sven Axsater, Lund University, Sweden, Sven.Axsater@iml.lth.se
One interpretation of the model considered is an inventory system consisting of several local warehouses, which normally replenish from an outside supplier. In case of a stockout an emergency lateral transshipment from another warehouse may be possible. However, such transshipments are only allowed in one direction. Another interpretation is substitution in an inventory system. We then instead consider different items in a single warehouse. When a demand for a low quality item cannot be met directly, the item can be replaced by another high quality item. We provide a simple and efficient approximate technique for policy evaluation in such systems.
The Value of SKU Rationalization in Practice
(The Pooling Effect Under Sub-optimal Inventory Policies and Non-Normal Demand)
Alfaro Tango, José A., University Carlos III de Madrid, Spain, jaalfaro@emp.uc3m.es and
Charles Corbett, UCLA, charles.corbett@anderson.ucla.edu
We examine the effect of non-optimal inventory policies and the effect of non-normally distributed
demand on the value of pooling. The value of pooling may be negative when the inventory policy
in use is suboptimal. Using Monte Carlo simulation, we find that the value of pooling varies
relatively little across distributions, but that it varies significantly with concentration of uncer-
tainty. We use real demand data to analyze the benefits of pooling with a high number of SKUs.
We find that pooling is beneficial and robust to suboptimal policies.

A Periodic Review Inventory System with Delayed Delivery
Joong Son, University of California, Riverside, joong.son@ucr.edu
This paper analyzes a periodic review inventory model with delayed delivery in multi-echelon
supply chain. We propose pricing and replenishment policies for stakeholders in which the
wholesaler, faced with a possible stock-out situation, offers price discount to induce retailers to
accept delayed delivery until the start of the wholesaler’s subsequent replenishment cycle.
Retailers who decline price discount offer will be replenished immediately if there are enough
stocks on-hand at the wholesaler. Otherwise, the wholesaler fills retailers’ orders through emergency
outsourcing at a premium price. We derive analytical as well as empirical results and provide
managerial insights for the proposed scheme.

Optimal Introduction of a Substitutable Product
Mustafa Karakul, University of Toronto, karakul@rotman.utoronto.ca
We consider the introduction of a new product, which can also be used as a substitute to a
well-established existing product. It is assumed that the price and the demand of the existing
product are known. Our objective is to maximize the profit while making optimal combined
pricing and ordering decisions for these substitutable products. This study extends both the
newsboy problem with pricing, and the inventory management of substitutable products. We
show that there is at most one local maximum.
SESSION 4 - INVENTORIES IN MRP AND KANBAN SYSTEMS
Session Chair: Rajesh Piplani, Nanyang Technological University, Singapore,
mpipi@ntu.edu.sg
Time & Place: Monday, April 8, 2:00-3:30PM, Portola Room

The Value of Forecasting in MRP Systems
Robert Fildes, and Brian Kingsman, Lancaster University, UK, R.Fildes@Lancaster.ac.uk
This paper simulates the effect of demand uncertainty and forecast error on the total costs of manufacturing in alternative MRP manufacturing systems. Various lot-sizing rules are used to determine the trade-off curves between service level and unit cost. The results show the effect of demand uncertainty on unit cost for a given service level is a non-linear increasing function of the variance of the data. A critical question in manufacturing systems is the effect of forecast error. We show that improving the accuracy of the forecasting system leads to substantial improvements in unit costs.

A Comparison of the Economic Production Lot Size Model To Kanban With Management Implications
Terrence J. Moran, Kent State University, tmoran@bsa3.kent.edu
The choice of a production philosophy by a manufacturing firm is important. Cost for holding inventory and cost for missing due dates on customer orders are crucial components of overall profitability (Cochran, 1998). We analyze the Economic Production Lot Size Model and compare it to Kanban. The purpose is to expose deficiencies in the Kanban model and to demonstrate that using inventory as a guiding force in determining lot size may in fact hurt profits.

A Simulation Based Study of Information Exchange Mechanisms for Multi-echelon Supply Chain
David Ng, Rajesh Piplani, and S. Viswanathan, of Nanyang Technological University, Singapore, gundam1066@hotmail.com, mrrpipiplani@ntu.edu.sg, asviswa@ntu.edu.sg
There has been growing realization that information visibility across the supply chain can lead to better inventory management. In this study, we evaluate the impact of information exchange on the inventory performance of a decentralized supply chain. We consider a 4-echelon inventory system. The demand from the end-consumer arises at the most down-stream echelon. For the other echelons, the demand arises from the orders released by the immediate down stream echelon. Each echelon manages their inventory independently under a rolling horizon MRP framework. We study through simulation the effect of three different information exchange mechanisms on the entire system.
TRACK 10: JIT MANUFACTURING/LEAN PRODUCTION
Track Chair: Joseph Blackburn, Vanderbilt University
joe.Blackburn@own.vanderbilt.edu

SESSION 1: LEAN SUPPLY CHAINS AND QUICK RESPONSE
Session Chair: Joseph Blackburn, Vanderbilt University,
joe.Blackburn@own.vanderbilt.edu
Time & Place: Saturday, April 6, 10:00-11:30AM, Portola Room

From Vertical Integration to Virtual Assembly - Key Strategic Challenges for PC Assemblers
Steve Brown, University of Bath, UK, S.E.Brown@bath.ac.uk
In the past the computer industry had corporations such as IBM, NCR, DEC, NEC and Wang who competed against each other as huge, vertically integrated enterprises. This approach - one of vertical integration - has been replaced by a range of outsourcing strategies. As a result, a new group of 'contract manufacturers' has emerged in the PC industry. In our research we will provide evidence of firms that have outsourced manufacturing/assembly activities but are now suffering in key areas such as HI, innovation and quality. We provide insight into the reasons why these firms struggle to manage the relationships with these recently emerged group of assemblers.

Quick Response (QR) for Hong Kong Clothing Suppliers: A Total System Approach
KF Au and N.Y. Chan, Institute of Textiles and Clothing, The Hong Kong Polytechnic University, Hong Kong, kfa.uk@inet.polyu.edu.hk
Facing with cost-factor competition from global low cost producers, HK clothing firms should practice a total QR system in order to sustain their competitiveness. Nowadays, the fashion market is confronted with increasingly shorter product life cycle (PLC) and fast changing consumer taste. The adoption of total QR together with product designing and development and quality improvement would enhance the competitive edge of HK as a global clothing supplier. The operation of the system would commence with overseas clothing buyers placing their orders. Raw materials sourcing then takes the lead followed by a series of merchandising activities in connection with orders follow up. The next segment relates to production lead-time reduction as well as the competing strategies related to the manufacturing processes and product development. The third segment is to examine ways on how delivery and logistical improvements of products for speedy delivery of merchandise to customers. With proper execution, the ultimate achievement is the accomplishment of the QR demanded lead-time delivery unchallenged by low cost clothing producers. It is with the development and adoption of this total QR system approach that HK is able to maintain its market share in developed countries.

Linking Global Supply Chains with the Internet
Robert N. Mefford, University of San Francisco, mefford@usfca.edu
As firms expand their global supply networks while attempting to become leaner and more agile, the need for improved communication and coordination becomes imperative. In this paper the ways in which global firms are using the Internet to achieve these objectives are examined. There are several ways in which the Internet can facilitate the movement toward a leaner and more responsive global supply chain and these are discussed. Examples are provided of how firms have employed the Internet in their global supply chains. Constraints and obstacles to implementation of Web-linked supply chains are also considered.
Limits of Just-in-Time: A Methodology for Evaluating the Effects of Changing Response Time
Joseph D. Blackburn, Vanderbilt University, Joe_Blackburn@owen.vanderbilt.edu
Although the benefits of Just-in-Time manufacturing have been widely documented, many of its practices have not been universally accepted. Some manufacturers are actively compressing cycle times in the supply chain while others within the same industry are making strategic decisions that embody slower response, accompanied by increased pipeline inventory. This paper outlines a methodology for valuing time in make-to-stock manufacturing to help clarify the costs and benefits of changing the speed of response. This methodology is used to establish conditions under which slower response and longer supply lines can offer competitive advantages.

SESSION 2: WORKFORCE RESPONSE TO LEAN PRODUCTION PROGRAMS
Session Chair: L. Joseph Thomas, Cornell University, ljt3@cornell.edu
Time & Place: Saturday, April 6, 4:00-5:30PM, Portola Room

Worker Responses to “Lean” Approaches: Review and Synthesis
John Boudreau, John McClain, and Joseph Thomas, all at Cornell University, ljt3@cornell.edu and Wallace Hopp, Northwestern University

JIT and Lean approaches have a rich behavioral context. OR models of these systems utilize simplistic assumptions about human behavior because there is no clear alternative. We discuss recent and ongoing research on how people respond to work characteristics such as low inventory and team-based organization. Work performance is related to “Capability, Opportunity, and Motivation.” OR models deal with Opportunity (e.g. blocking or starving). We look at the interaction of opportunity and motivation. Does the work situation affect Motivation, to mitigate the effects of lower Opportunity? We will present research questions and anecdotal industrial experience.

A Large Scale Empirical Study of the Effects of Lean Production Practices on Worker Job Stress
Robert F Conti, Bryant College and University of Cambridge, UK, rconti@bryant.edu or rfc21@eng.cam.ac.uk
Lean production has become the competitive standard in many industries. It can, however, be very stressful for workers. Almost all research to date has been single-site case studies, usually in automotive assembly, with no systematic measurement of worker responses to specific practices. As a result, little guidance is provided to manufacturing managers. A two-year empirical study of 1000 production worker responses to specific lean practices is underway at the University of Cambridge and the Manchester School of Management. The paper will review the hypotheses and research design and describe the experiences to date of the research team at survey sites.

Internal Plant Environment and Just-in-Time Manufacturing
Ron McLachlin, University of Manitoba, Canada, mclachl@ms.umanitoba.ca
This paper considers the implementation of just-in-time manufacturing in relation to aspects of the internal plant environment. A case-based research methodology was employed using data from six plants, each which claimed to be engaged in just-in-time approaches to manufacturing. The data were both qualitative and quantitative, obtained mainly via interviews and questionnaires. The results support propositions that a more complete implementation of just-in-time manufacturing is associated with a clan-like plant culture (comprised of low power distance, collectivism, and cultural congruence), with employee influence over day-to-day work, and with good employee-management relations. The best and worst JIT plants highlight these results.
SESSION 3: TECHNIQUES FOR LEAN, CUSTOMIZED MANUFACTURING
Session Chair: Rajan Suri or Ananth Krishnamurthy, University of Wisconsin,
suri@engr.wisc.edu, akrishna@cae.wisc.edu
Time & Place: Sunday, April 7, 4:00-5:30PM, Gold Rush A

Experiences With Implementing POLCA (A New Push-Pull Material Control Strategy)
at Several Factories
Rajan Suri and Ananth Krishnamurthy, both at University of Wisconsin-Madison,
suri@engr.wisc.edu, akrishna@cae.wisc.edu
Companies are struggling with how to apply Lean manufacturing to environments with low-volume,
high-mix, or custom-engineered products where the Lean concepts of flow, takt time, and pull
(kanban), have serious shortcomings. In such situations, POLCA (Paired-cell Overlapping Loops
of Cards with Authorization) a hybrid push-pull material control system, can be effective in
ensuring low work-in-process and short lead times. Developed as part of the new Quick Response
Manufacturing (QRM) strategy, POLCA has recently been implemented at several factories. We
explain the main features of POLCA, and present case studies of its implementation at factories
in the electronics and metal-cutting industries.

Technological Innovation in the Organization and Administration of the
Production Make to Order: The Case of an Assembly Line of Customized Products
Sergio De Gusmao, Universidade Federal Fluminense, Brazil, slagusmao@nuteclnet.com.br
This paper presents the results of a project of lean production an assembly line of customized
products, in a factory that produces make to order industrial machines used in the furnitures
industry. This factory is located in the city of Caxias do Sul, Brasil, a family company of medium
load and that, in search of larger productivity and competitiveness, tried to innovate the organiza-
tion of the production adopting innovative concepts as Lean Production, Kanban System and
Total Quality. The results of the research were obtained through a longitudinal study, that it
included a period of 4 years, showing, through several acting indicators, as it was the evolution
of the factory performance after adoption of those techniques.

A Study on TPS-QAS When Utilizing Inline-Online SQC - Key to New JIT at Toyota
Kakuro Amasaka, Aoyama Gakuin University, Japan, kakuro_amasaka@ise.aoyama.ac.jp or
amasakaha@hn.catv.ne.jp
Recently, the author has worked out a new management principle named New JIT based on
TQM-S (Total Quality Management by utilizing Science SQC) to strengthen the quality manage-
ment strategy. By implementing Inline-Online SQC, an integrated network system that utilizes
Information Technology (IT) and Statistic Quality Control (SQC), the next-generation, scientific
process control TPS-QAS (TPS-Quality Assurance System) is proposed. This paper verifies the
effectiveness of the proposed system as the key to New JIT at Toyota. In cases of application, we
take up examples for systematic development of quality assurance technologies to test the validity
of TPS-QAS as a new production system at Toyota.

Applying a TOC Strategy to Setup Reduction
Bernardo Villarreal, Raul Reyes and Christian Sahagun all at Universidad de Monterrey,
bvillarreal@udem.edu.mx
Setup reduction has been one of the main programs to improve a firm's performance in terms of
response time and flexibility. The selection and sequence of setup reduction projects takes im-
por-ance in a multi-product, multi-machine environment with limited resources. This paper
describes a Theory of Constraints (TOC) based approach to deal with the previous situation.
Results of its application to decrease setup times in a machining department of a Mexican company
are provided.
SESSION 4: IMPLEMENTING JIT
Session Chair: Andy Mudie or Mustafa Ozbayrak, Brunel University, Middlesex,
andym@norgren.co.uk, emstmmo@brunel.ac.uk
Time & Place: Monday, April 8, 10:00-11:30AM, Washington Room

Transforming Traditional Systems into Lean Systems
Andy Mudie, IMI Norgren Ltd, England and Mustafa Ozbayrak, Brunel University,
Middlesex, UK, andym@norgren.co.uk, emstmmo@brunel.ac.uk
This paper presents a detailed lean manufacturing and TAKT time assembly cells model that
allows cell installations within any company. The current available literature explores organizational change and the benefits of lean thinking, but lacks any clear practical starting points for
the transition from mass or batch to lean. This paper highlights the problems associated with
assembly cells yet the model, a 10-point plan with diagrammatic representation, provides clear
guidance for management, at any level, to install a TAKT time cell and show the massive operational improvements that can be gained. This paper offers the ‘missing instruction manual’ to allow manufacturing companies to make the first steps towards lean ideologies and
head towards world-class manufacturing.

Concepts and Tools of Lean Manufacturing
Gregory Lanides, Telen USA, glanides@tecen.com
Many of the concepts and tools of Lean Manufacturing have been around for over 30 years, and
Lean Manufacturing as an official corporate initiative has been around since the 1980’s and the
Toyota Production System. Although traditional manufacturers such as the automobile or airline
industry have adopted these Lean practices ubiquitously, life science and high-tech manufacturers
have not, and some have even been adverse to Lean. One of the key factors to a successful Lean
implementation is proper execution. Without a proper assessment of existing operations, sound
project management, or Lean expertise, companies will turn this into just another management
fad that failed. And while companies may understand the various elements of Lean, it is important
that they address and implement them in the proper order. This paper will give a brief history of
Lean, review its four main elements, outline the steps for implementation, review some common
pitfalls in implementation, and show how to sustain the effort.

Productivity Gains in Construction, through the Simplification of Processes Inherent to a
Network of Supply: A Case Study of the Lean Production Concepts use with one Possibility
of Operational and Strategic Adjustment.
Mauro Campos do Nascimento, and José Rodrigues de Farias Filho, both at
Federal Fluminense University (UFF), mcnuff@uif.ufl.br, rodrigues@uif.ufl.br
The objective of this work is to encourage the discussion about the improvement of the two
major supply network processes of construction industry: material acquisition and service
contraction. The improvement within limits of the elimination or reduction of the number of
activities and or stages than the value added to the process, and of the activity optimization of
conversion. The detailed study and the application of these lean production tools in the
construction industry can become one of the paths to be persecuted in the minimization of the
existent losses in the industry, due to the inexorable peculiarities.
Tomorrow's Winner-Just – in – Time (philosophy of seeking excellence)
D.R.Somashekar, and Rajeshwar.S. Kadadevarmutt, both at Siddaganga Institute of
1 Technology, India and Pradeep G.S., B.E. In Industrial Engg & Mgt., India,
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Just In Time (JIT) is a system of lean production used mainly in repetitive manufacturing in
which goods move through the system and tasks are completed just in time to maintain the schedule.
JIT systems require very little inventory because successive operations are closely coordinated.

The ultimate goals of JIT are:
1. Eliminate disruptions which have negative influence on the system by upsetting the
   smooth flow of products through the systems and they should be eliminated.
2. Make the system flexible i.e., robust enough to handle a mix of products, often on a daily
   basis and to handle changes in the level of output while still maintaining balancing and
   throughput speed.
3. Reduce the setup times and lead times, prolong a process without adding any value to the
   product moreover a long setup times are long lead times negatively impact the flexibility
   of the system.
4. Minimize inventory, is an ideal resources, taking up space and adding cost to the system.
5. Eliminate waste, waster represents unproductive resources, eliminating waste can free up
   resources and enhance production.

Key benefits of JIT/LEAN systems are:
1. Reduced inventory levels.
2. High quality.
3. Flexibility.
4. Reduced lead times increased productivity and equipment utilization.
Reduced amount of scrap and rework and reduced space requirements.

SESSION 5: IMPLEMENTING THE TOYOTA PRODUCTION
SYSTEM IN SEMICONDUCTOR MANUFACTURING
Session Chair: Matt Verlinden, Integral, Inc., MVerlinden@integral-inc.com
Time & Place: Sunday, April 7, 2:00-3:30PM, Gold Rush A

The semiconductor industry is changing rapidly in many ways. In recent years, one of the big
changes that it has undergone is to undertake the implementation of the Toyota Production System
to manage semiconductor manufacturing. This presentation focuses on that transition and the
challenges and opportunities it presents.

Presented Matt Verlinden is an Associate Director at Integral, Inc. a consultancy founded by
Professors Kim Clark and Steven Wheelwright of the Harvard Business School. Integral’s focus is to
commercialize the work and research of thought leaders from around the world in the area of innovation
and strategy. He holds a MBA from the MIT Sloan School of Management, where his thesis work
focused on technology strategy in a manufacturing environment. He received a research grant from
MIT during his MBA studies to research the effect of radical versus incremental innovation in
manufacturing under the guidance of Professor Rebecca Henderson. Prior to joining Integral,
Mr. Verlinden worked with Professors Steven Wheelwright and Professor Clayton Christensen at the
Harvard Business School, focusing on technology strategy. He has had several years industry experience
in the semiconductor and pharmaceutical industry. His most current work has focused on the effect
of product modularity on vertical integration and firm competence in the semiconductor industry.
Recently, he co-authored “Skate to Where the Money Will Be” in the November 2001 issue of
Harvard Business Review.
SESSION 6: SLIM – SHORT CYCLE TIME AND LOW INVENTORY IN MANUFACTURING AT SAMSUNG ELECTRONICS CORP.
Session Chair: Robert C. Leachman, University of California, Berkeley,
leachman@ieor.berkeley.edu
Time & Place: Monday, April 8, 10:00 – 11:30AM, Gold Rush A

SLIM is a set of methodologies and scheduling applications for managing cycle time in semiconductor manufacturing. SLIM includes methodology for calculating target cycle times and target WIP levels for individual manufacturing steps, heuristic algorithms for factory floor scheduling, and optimization-based capacity analysis. Over the period 1996-1999, SLIM was implemented in all semiconductor-manufacturing facilities of Samsung Electronics Corp., Ltd. The manufacturing cycle times to fabricate dynamic random access memory devices were reduced from more than 80 days to less than 30. Considering the decline of DRAM selling prices, SLIM enabled SEC to capture an additional US $1 billion in sales revenues compared to the revenue it would have realized had cycle times not been reduced.

The SLIM project was a finalist in the 2001 Franz Edelman Award Competition. Co-authors of this work are Dr. Jeenyoung Kang and Dr. Vincent Lin.
TRACK 11: LOGISTICS AND DISTRIBUTION
Track Chair: Phil Evers, University of Maryland
pevers@rhsmith.umd.edu

SESSION 1: STRATEGIC LOGISTICS
Session Chair: Joel D. Wisner, University of Nevada at Las Vegas, wisner@ccmail.nevada.edu
Time & Place: Monday, April 8, 10:00-11:30AM, Oregon Room

The Impact of Supply Chain Management on Transportation and Logistics Activities
Joel D. Wisner, University of Nevada at Las Vegas, wisner@ccmail.nevada.edu
This research presents the results of a large multinational survey seeking to compare various in-bound and out-bound transportation and logistics activities among firms practicing SCM and those that are not practicing SCM. The survey collected 527 responses from firms in the US and Europe. Of these, 350 stated they practiced SCM, while 177 said they did not. The data collected from these responses will be discussed at the conference.

Quality in Reverse: Getting Reverse Logistics Right
Susan Engelkemeyer and Paul Mulligan, Babson College, mulligan@babson.edu
Reverse Logistics is not a new phenomenon. Goods producing companies have long provided, or contracted for, reverse logistics services in order to facilitate returns, support recycling and ensure proper disposal of hazardous materials. The majority of these transactions occur in B2B marketplaces. Recent losses in electronic commerce notwithstanding, the expansion of B2C e-commerce creates significant demand for broader-based, more robust reverse logistics systems. These systems must be capable of supporting the high volume, small lot size demands of the B2C marketplace. This paper examines internal and outsourced reverse logistic models with specific focus on the application of traditional quality measures.

Co-distribution in Rural Areas: A Study of Pajala, A Village in the North of Sweden
Charlotte Hageback, Luleå University of Technology, charlotte.hageback@ies.luth.se
Approximately twenty transport-suppliers transport goods each week to companies in Pajala. Each transport-supplier mostly transports goods one to three times a week. Companies in Pajala should have the opportunity to send goods any day they want to send. The solution is co-distribution. Co-distribution means that different transportation-suppliers transport their goods in only one truck that goes to/from Pajala. A study has been performed in Pajala to investigate if co-distribution has any benefits in rural areas. A collection of data has been carried out mainly through questionnaires but also with interviews.

The Developing Role of Third Party Logistics Providers in Logistics Systems and Their Impact on Logistics Performance
Otto Jockel, Cranfield School of Management, O.Jockel@cranfield.ac.uk
Economic integration, technological change, the globalization of businesses and the adoption of new management principles has led to a re-evaluation of the attitude towards vertical integration, and increased outsourcing of logistical activities to Third Party Logistics providers. This paper is based on the results of face-to-face interviews with 50 European shippers and 35 leading European Third Party Logistics (TPL) providers that has recently been undertaken by Cranfield University as leading partner of a research consortium on behalf of the European Commission. The study explores the skills and resources that are deployed into the design, implementation and operational processes of logistics systems in 4 different industries and their influence on logistics performance. With a particular focus on Third Party resources and skills and pro-active behaviour a link is made to the developing contribution of TPL providers to logistics performance. The study reveals a growing strategic importance of Third Party Logistics services and the importance of the early involvement Third Party Logistics providers to achieve a better logistics performance. Furthermore the study verifies the use of concepts rooted in Resources Based Theory and Organizational Theory to examine the outcome of logistics processes.
SESSION 2: IT APPLICATIONS IN LOGISTICS
Session Chair: Elliot Rabinovich, Arizona State University, Elliot.Rabinovich@asu.edu
Time & Place: Monday, April 8, 2:00-3:30PM, Oregon Room

Aspects of Logistic in The Electronic Commerce Business-To-Consumer in Brazil
Erico Marques, Fundação Getulio Vargas, emarques@gvmail.br
Electronic Commerce (EC) is a reality in the national and international scenario, otherwise it
needs to transpose some challenges. One important challenge for the success of the EC is the
logistic. The logistic in EC is not confined to the product distribution; it is present in many business
process. The main objective of this research is to analyze the participation and the impact of the
logistic in many business process in EC environment, more specifically in the Business-to-
Consumer Electronic Commerce on Brazilian Book store. The paper will analyze characteristics,
aspects and obstacles of the logistic in the EC.

Internet Retailing: Supply-Chain Transaction and Distribution Efficiency
Elliot Rabinovich, Arizona State University, Elliot.Rabinovich@asu.edu
Internet retailing has fundamentally altered the mechanisms underlying buyer-seller exchanges.
This paper studies the efficiency impact of these variations on two supply-chain-management
areas: transactions and product distribution. A theoretical framework of the effect of end consumers'
Internet purchases on transaction efficiency and product-distribution efficiency is developed and
applied to several industry cases. This study reveals that Internet-enabled transaction efficiencies
stem from supply-chain sourcing policies and are moderated by product attributes and supply
chain processes. On the other hand, it reveals that distribution efficiencies develop from inventory
postponement and order decoupling policies and are moderated by product characteristics and
supply-chain structures.

Developing a Forecasting Model for an Electrical Distributor
Mick Mancuso and Edie Schmidt, both at Purdue, mgmancuso@tech.purdue.edu,
ekschmidt@tech.purdue.edu
The Manufacturing sector has taken the initiative for developing strong product and material
forecasting systems. Unfortunately, these same techniques are not always the best solution for
distributors. Distributors rushing to use the latest state-of-the-art computers to manage their
inventory are often the companies with the most problems with inventory. This paper describes
a forecasting project for an electrical distributor. The distributor is consolidating warehouse locations
(into a centralized warehouse and an over-the-counter sales location) and wants to forecast
which items should be held at each location, and how much of the items should be held at each
location. This paper describes the development of a forecasting model for the distributor, which
will then be used as input to their SAP system.
TRACK 12: MASS CUSTOMIZATION
Track Chair: Ralph Seelmann-Eggebert, Fraunhofer Institute
seelmann@iff.fhg.de
Co-Chair: Bart MacCarthy, University of Nottingham
bart.maccarthy@nottingham.ac.uk

SESSION 1: THE STRATEGY OF MASS CUSTOMIZATION
Session Chair: Frank Piller
Time & Place: Saturday, April 6, 10:00-11:30AM, Emerald Room

Moving into Mass Customization
M. Schenk, and R. Seelmann-Eggebert, both at Fraunhofer Institut IFF Magdeburg, Germany,
seelmann@iff.fhg.de
Introduced by Joseph Pine in 1993, the marketing strategy of mass customization has rapidly become obligatory for the strategic development of many enterprises. Nevertheless mass customization is still not yet a world wide standard. The reason for this can be seen in the complexity of implementing mass customization in actual existing mass or serial production. Pioneering examples often focus on newly founded enterprises or exclusively on production lines already set up. Since every product, every form of production and every logistics systems have evolved individually no standard solution is or can be offered for implementation in an existing production or joint production line. Thus questions such as which product, which feature and how many features should or could be individualized, remain. The implications of the implementation of such a strategy reflect themselves in all the parts of the company and consequently in the entire Supply Chain. Therefore the manufacturing site needs to be redesigned in order to face the new challenges. The transport times have to be reduced within and between production lines. Producing lot size 1 implies a need for high flexibility of the machinery, therefore an increased investment which must be thoroughly planned. Also the workers must be able to respond promptly to specific demands, hence resulting in a stronger need for special education programs and tools. Flexibility in the manufacturing site is therefore the only solution for the challenges risen by mass customization. The change towards mass customization has been effected recurring to modern multimedia applications such as the Internet. Individual users and business partners can satisfy their particular needs in the Internet. When compared to the classic approach of mass production, this new development gives rise to additional challenges: the interconnectivity between worldwide electronic data interchange and the actual production and transportation of parts and goods.

Standardizing Customization
José Mário de Carvalho Júnior, Muri Linhas de Montagem, Porto Alegre/RS, Brazil and
Ely Laureano Paiva, Universidade do Vale do Rio dos Sinos - UNISINOS, zemario@muri.com.br, elpaiva@mercado.unisinos.br
The articles on customization usually analyze how to improve flexibility and customization for high volume products. In this article, we study the capability creation for make-to-order companies – the ability to develop a quick response based on a modular design concept for low volume products. Based on an extensive array of modular design articles, we present a case study with a practical application of this proposal. We describe the steps related to the change in the company’s manufacturing strategy followed by the whole functions’ adaptation – including supply, engineering, assembly and sales.
Mass Customization Operations Modes
Philip Brabazon, Bart MacCarthy, Jo Bramham, all at the University of Nottingham, bart.maccarthy@nottingham.ac.uk, philip.brabazon@nottingham.ac.uk, johanna.bramham@nottingham.ac.uk
This paper presents the development and details of a set of mass customization operations modes. Using enhanced business process modelling techniques, a generic mass customization system is described and the core process are defined. The core processes are expected to be common to mass customization enterprises, but the interactions between core processes are dependent on the way in which an enterprise customizes for its customers. Each alternative is a mode. A set of five archetype modes are presented and cross-referenced to other taxonomies of mass customization found in the literature. For manufacturing enterprises, the modes provide insight into the organizational demands of mass customization in terms of processes and linkages between core processes. The description of the modes is a step on the way to specifying performance indicators and standards for functions and support systems (e.g. information systems).

SESSION 2: CUSTOMER INTERACTION AND PRODUCT CONFIGURATION
Session Chair: Mauro Iacobacci
Time & Place: Saturday, April 6, 2:00-3:00PM, Emerald Room

An Application of Mass Customization Modes:
Mapping the Information Flows Associated With Customized Orders
Jo Bramham, Bart MacCarthy, Philip Brabazon, all at the University of Nottingham, bart.maccarthy@nottingham.ac.uk, philip.brabazon@nottingham.ac.uk, johanna.bramham@nottingham.ac.uk
A range of mass customization (MC) systems have evolved using different approaches for unique information (per order) and generic product family architecture rules (pre-engineered) [Tseng].
The concept of a generic MC template or ‘mode’ is put forward. A mode is a configuration of six core business processes - order co-ordination, product development & design, recipe making, order fulfillment management, order fulfillment and post order interaction. The triggering of core processes on different timescales generates instances of modes. Information mapping techniques are applied to an organization’s processes for responding to customization requests. The application of the method highlights different types of enablers and constraints to increases in volume and product variety.

Software Components for Customized Electronic Customer Interaction
Bernd Weiser, Susanne Robra-Bissantz, and Freimut Bodendorf, all at Friedrich-Alexander-University Erlangen-Nuremberg, weiser@wi2.wiso.uni-erlangen.de, robra@wi2.wiso.uni-erlangen.de, bodendorf@wi2.wiso.uni-erlangen.de
Mass Customization requires suppliers to address their customers individually and efficiently. A modular approach for conducting individual interactions via electronic media is presented. It is based on standardized interaction modules, consisting of reusable software components with defined interfaces which support specific types of interaction. They combine conceptual interaction patterns (e.g. proposing help to hesitating customers) with technical solutions (e.g. pop-up-windows on the company’s website, e-mail, SMS). The modules are classified by specific categories to allow automated selection according to situation, purpose of communication, and technological environment. By analyzing customers’ reactions future selections can be improved. Corresponding prototypes are currently implemented.
Mass Customization Configuration Tool
Carlos Jahn, Flender AG, Germany and R. Seelmann-Eggebett, Fraunhofer Institut IFF
Magdeburg, Germany, seelmann@iff.fhg.de
The rising requirements of delivery's speed and flexibility demand that the producing enterprises
in increasing masses consistently exhaust all potential to the lowering of order processing time and
expenditure along the process chain. After the traditional beginnings to the restriction of
manufacturing areas moves the order preliminary process increasing in the focus of improvement
efforts orientated to process in the enterprises. The e-business offers promising starting points to
optimize the order logistics in which the commercial and technical order preliminary processing
time is lowered substantially and the expenditure of work is clearly reduced. In the available con-
tribution the potential is represented by an e-application on the “Sell Side” of supported order
management. Besides it is specified from the logistic principles totality, general, market orientation
and economic efficiency to resulting demands for an e-business-solution to the optimized order
logistic. At the example of the strategic commercial unity couplings of the A. Friedr. Flender GmbH
are concretized the potential and demands and an alternative solution are shown. Central success
factors are identified to be first the order transmission via internet and second the product configuration.
Among other things it is presented as a core element the e-business-solution the specially programmed
configurator of products for couplings which is designed for the application under SAP R/3.

SESSION 3: QUALITY AND MASS CUSTOMIZATION
Session Chair: Bart MacCarthy
Time & Place: Saturday, April 6, 4:00-5:30PM, Emerald Room

Methodology for Testing Mass Customisation Strategies by Simulations
Aruna de Alwis, Oxford University, Great Britian, dealwis@robots.ox.ac.uk
Mass Customisation (MC) comprises the set of strategies employed by companies to provide
products and services for individual customers at mass production prices and lead times. Five MC
strategies have been defined in the literature (Mchunu, de Alwis et al. 2001). This paper describes
the methodology for testing these strategies with different phases of simulation modelling and
case studies. Input data required and the research questions from the simulations are described in
the paper. Particular emphasis is given to the analysis of inventory strategy, lead-time and
costs, in order to identify the best MC strategy given the organizational characteristics.

Best Practices for Customization Planning - An Implementation Framework
Ashok Kochhar, and Amanda Davies, Aston University, UK, A.K.Kochhar@aston.ac.uk
In an age of mass customization, rapid changes in customer demands present constant challenges
to manufacturing companies. Questions are raised regarding the superiority of individual best
practices. Many companies experience disappointing results from the implementation of best
practices. This disappointment is often due to a lack of basic infrastructure for many best practices
and a failure to acknowledge trade-offs. While certain best practices have significant positive
effect on performance, they may have predecessor practices, which should be in place to achieve
the objectives. Based on field research, this paper illustrates the complex issues by considering
the dependency relationships between best practices associated with customization planning.
Process Quality Control for Mass Customization
Steffen Fröhlich, and Ralph Seelmann-Eggebert, both at Fraunhofer Institut IFF Magdeburg, Germany, seelmann@iff.fhg.de
Mass customization as an innovating process is starting to gain the support of all the fast moving companies. The need to provide each customer with a product that satisfies his exact specifications leads the companies into new and more challenging business approaches. Different to the classic approaches of mass and serial production, mass customization sooner or later implies lot size 1 in the production process, i.e. no possibility for defaults in products. The way of perceiving the production process needs to be oriented towards quality and further on into the product and/or the process. Aiming product quality results in an improvement of the process to support such a demand. Therefore the process quality is the key to effective production lines, namely in mass customization structures. In order to guarantee a speedy and stable process, the product and the information should arrive simultaneously, which does not necessarily happen in classic process structures where the information flow and the material flow are separate. By using devices included in the product that contain information about it this problem can be overcome. Dynamic devices allow to read/write, alter or expand the information enclosed in the product. Among these one can find the transponders, which have been developed to cope with the need of zero defaults conciliated with a wish to customize each product. They allow the inclusion of high amounts of information concerning the manufacturing process, such as the people involved in it and dates of the several production phases. This allows to detect defaults in an early stage and, therefore, to quickly identify and correct the failure. The introduction of customer’s data in the product is value adding and individualizes the product. Another advantage, when compared to more classic identification devices, is the security of the data, since the access to the information depends of the person using the system. Thus transponders guarantee an automated quality control, which hastens the production process.

SESSION 4: EVOLVED SYSTEMS AND EDUCATION
METHODS FOR MASS CUSTOMIZATION
Session Chair: Johanna Bramham
Time & Place: Sunday, April 7, 10:00-11:30AM, Emerald Room

Applications of Mass Customization - A Systematization of Mass Customization Based Business Models
Frank T. Piller, Technische Universität München, Germany, piller@ws.tum.de
While Mass Customization has already been discussed in the literature for more than two decades, increased practical implementation of this strategy can been found in business only within the last years. This time lag may be explained by the fact that only since few years sufficient technologies exist to handle the information flows connected with mass customization. However, the existing examples – and failures – of mass customizers in different branches of industry demonstrate that there is no single “best-way” to introduce mass customization principles. Based on an exploratory study of more than 200 international mass customizers, we present different approaches to structure business strategies for mass customization and personalization. Our objective is to demonstrate which distinctive factors differentiate mass customization concepts. Possible factors are the degree of interaction required between the customer and the producer/supplier, the degree of digitizability of the different processes of the value chain, the starting point of customization, the point of customer integration or the degree of modularity. Based on different combinations between these factors, we demonstrate some generic business strategies for different kinds of mass customization products, services or fulfillment processes. For all approaches, case studies from successful mass customizers are presented and discussed.
EVONETICS – A New Scientific Approach to Mass Customization
Doerte Hartmann, Klaus Steilmann Institute, doerte_hartmann@ksi.steilmann.com
There are many new challenges for mass customization, like the integration of innovation and new functions, the need for content and service to make expensive investigations profitable or the effects of technological revolutions, i.e. biotechnology or nanotechnology. These and other challenges can best be managed through a general understanding about the evolution of networks – a new scientific approach we called EVONETICS. This contributions gives an introduction about the theoretical basics of EVONETICS and shows the impacts for the development of new mass customization networks, that are concentrated on innovations, the interlinking of product, content and service and efficient customer integration.

The Mass Customization and The Electronic Learning
Sonja Markova, California State University, Hayward and Joni de Almeida Amorim,
University of Campinas, Brazil, sonja_markova@yahoo.co.uk, amorimja@yahoo.com
Mass customisation is a new paradigm based on creating variety and customisation through flexibility and quick responsiveness. It refers, in general, to the customisation and personalization of products and services for individual customers at a mass production price. Electronic learning means the use of information and communication technologies, including the Internet, to learn and teach. It is a way of becoming literate, involving new mechanisms for communication: computer networks, multimedia, content portals, search engines, electronic libraries, distance learning, and web-enabled classrooms. This work considers the potential advantages of the usage of mass customization concepts in electronic learning.

Efficient Logistics for Individualized Standard Applications – ELISA-
The World’s First Business Game for Mass Customization
R. Seelmann-Eggebert, and R. Wojanowski, both of Fraunhofer Institute IFF Magdeburg,
Germany, seelmann@iff.fhg.de
Experience is the best teacher. Particularly in logistics Experiences are often a bitter pill however. If years of experience are to be passed on in a matter of days — in very real processes yet without risk — interactive company simulations in the form of manual business games are the alternative. More and more companies are using business games as an interactive learning platform for employee schooling and continuing education or as a kick-off event for logistics projects. Business games can fill employees with enthusiasm for processes of improvement. Since methods of resolution can no longer be imposed (forced) but must be devised themselves, acceptance of changes and readiness to actively support them instead of passively tolerate them is increasing. Thus the management strategy of Mass Customization has made it its task to produce customized products at the price of a mass-produced products. In order to meet this demand, the entire logistical chain must be consistently oriented toward customer demand. Internet and e-commerce already make it possible today for CRM (Customer Relationship Management) to efficiently customize the front end, that is, direct customer contact. In light of new manufacturing technologies such Rapid Manufacturing and the use of neuronal networks the challenge to production engineering also appears solvable. The logistics for the back end looks different. Until today, control concepts, which support and optimize customize manufacturing, have hardly been able to establish themselves. The problem is less the wide variety of possible ideas and concepts than it is the communication of their effectiveness. The manual business game ELISA is the first company simulation worldwide, which devotes itself to the problem of putting Mass Customization into practice related to logistics. Seminar participants personally experience here where the problems of MC are, what their causes are and what solutions could look like. This essay explains the development of the business game ELISA. In the process, it emphasizes the importance of the parameter settings, which are carried out with the help of a computer simulation. Furthermore first practical experiences are presented, which were gained at a business game workshop at the 3rd German MC Conference.
SESSION 5: CASE STUDIES
Session Chair: Carlos Jahn
Time & Place: Sunday, April 7, 2:00-3:30PM, Emerald Room

JIT Approach to Mass Customization: A Case Study
Carmo, University of Sao Leopoldo, Brazil
Mass customization is one of the main challenges to operations management, as it needs to deliver a wide variety of products keeping inventories and costs under control. Besides that, customers are always demanding smaller delivery times, that can not be satisfied with final products inventories, due to large number of different items. One approach to this problem could be a product and plant design were the concepts of mass customization and postponement are combined with modular product design, the implementation of cellular manufacturing and Kanban production control, to aloud JIT delivery of final products with minimal inventories and productivity increase. This case study was conducted at Vanbro, a submersible pumps small manufacturer located in Brazil. The company has a wide variety of submersible pumps: more than 150, combining variables as wheel diameter (4" or 6"), pressure required and available electric power. Besides that, customers are always demanding the smallest delivery times possible, sometimes less then 3 hours, as they run out of water when a pump breaks.

Steering Technology for High-End Product Creation Processes: A Case Study
Hr. Jacobacci, and Hr. Weissmann, both of University of Zürich, Switzerland
The early integration of customers in the product development process has inherent inefficiencies, barriers, and rigidities, which are caused by communication and competence limits. This problem typically appears in the domain of operations in product customization processes. Advances in IT, such as the Internet, or CAD/CAM, can be used to overcome these drawbacks. We introduce the concept of digital direct manufacturing (DDM), which is based upon such IT tools and is designed to provide viable solutions. We illustrate our approach with a case study in the field of jewelry part making.

Implementation of Logistic Systems for Mass Customization
Art St. Onge
No abstract

SESSION 6 (PANEL): THE FUTURE FOR MASS CUSTOMIZATION
Panel Moderator/Session Chair: Ralph Seelmann-Eggebert, Fraunhofer Institute, seelmann@iff.fhg.de
Time & Place: Sunday, April 7, 4:00-5:30AM, Emerald Room

PANEL
Bart MacCarthy
Frank Piller
Paul Zipkin
Art St. Onge
TRACK 13: MATHEMATICAL/SOFTWARE TOOLS FOR OPERATIONS
Track Chair: Yihlong Chang, Georgia Tech
yihlong.chang@mgt.gatech.edu

SESSION 1: OPERATIONS ENTREPRENEURS
Session Chair: Karen Donohue, University of Minnesota, kdonohue@csom.umn.edu
Time & Place: Saturday, April 6, 10:00-11:30AM, Portola Room

Improving Contact Center Operations
Vijay Mehrotra, Principal, Onward Inc., Mountain View, CA, vijay@onwardinc.com
Contact centers are an exploding industry where a huge percentage of the cost is in labor hours. Effectively managing these costs while maintaining Quality of Service (QoS) is a difficult challenge, even more so because more and more of these centers are dealing with email, web chat, and other types of contacts in addition to inbound phone calls. This session provides a framework for putting the pieces together (technology, people, and processes) to route the right contacts to the right people across the right medium to achieve the right service levels — cost effectively.

Making Supplier –Retailer Collaboration a Reality
More rational coordinated planning between retailers and their suppliers has become a hot topic, both in academia and in industry, where consultants and B2B exchanges are advocating Coordinated Forecasting, Planning and Replenishment (CFAR). Unfortunately, the reality has so far not matched the potential on this high stakes issue, with few if any documented success stories. This talk will describe the successful supply chain coordination efforts of two leading firms – Linens ‘N Things, a $1.5 billion retailer of home textiles, house wares and home accessories, and one of their key suppliers, American Pacific, a leading supplier of fashion home furnishings to major specialty and department store retailers – using as a platform supply chain planning software provided by 4R Systems. I will be joined by Greg Block, CEO of American Pacific and Jeff Kaufman, Senior VP for Supply Chain Management of Linens ‘N Things.

SESSION 2: MATHEMATICAL/SOFTWARE TOOLS FOR OPERATIONS
Session Chair: Tim Baines, Cranfield University, UK, t.s.baines@cranfield.ac.uk
Time & Place: Sunday, April 7, 10:00-11:30AM, Franciscan Suite

Human Performance Modeling as an Aid to Manufacturing System Design
Tim Baines, Cranfield University, UK, t.s.baines@cranfield.ac.uk
Once the factory worker was considered to be a necessary evil, soon to be replaced by robotics and automation. Today, many manufacturers appreciate that people in direct productive roles can provide important flexibility and responsiveness, and so significantly contribute to business success. The challenge is no longer to design people out of the factory, but to design factory environments that help to get the best performance from people. This paper describes research that has set out to help to achieve this by expanding the capabilities of simulation modeling tools currently used by practitioners.
Characteristics and Tables of the Doubly Truncated Normal Distribution
Arvid C. Johnson, Dominican University, and Nick T. Thomopoulos, Illinois Institute of Technology, ajohnson@email.dom.edu, thomop@stuart.iit.edu
Truncated normal distributions have found utility in various fields – including production and operations management. Work to date has focused primarily on estimation of the original (non-truncated) population parameters based upon truncated or censored samples rather than on the characteristics of the truncated distributions themselves. This paper presents selected reference tables of the cumulative distribution function of the doubly-truncated normal distribution – developed using Microsoft Excel’s Visual Basic for Applications environment. In the process of developing these tables, the characteristic parameters of these distributions are summarized in terms of the standard normal distribution, and it is noted that the truncation points do not uniquely determine the coefficient of variation.

Statistical Tests for Confirming and Extending Theory: Uses and Abuses
Gyula Vastag, Indiana University, and John G. Wacker, Iowa State University, gvastag@ipui.edu, wacker@iastate.edu
The purpose of this paper is to provide guidelines for using statistical methods in OM in general and to correct some of the common misconceptions and misinterpretations related to empirical theory-building in particular. This paper is not about the intricate mathematical details of the available statistical procedures, rather it analyzes the epistemic (theoretical) limitations of the use of statistics, and the intended and conflicting uses of empirical tests of significance that proved to be of minor importance for building theories. This paper argues for a mixed methodology approach, a combination of knowledge derived from case studies and small samples with that of from large-scale surveys.

Maintenance Strategy for Array Radar Transmission
Karin de Smidt-Destombes, TNO Physics and Electronics Laboratory, desmidt@fel.tno.nl
Research has been done in order to find a maintenance strategy with minimum cost for the most crucial part of an active phased array radar used for transmitting and receiving signals. This part consists of several thousands of identical elements, a given percentage of which may fail before the transmit-and-receive function fails. Since repair/ replacement of these elements is not easy, the maintenance activities have to be limited. The research question is: after how many element failures should maintenance be initiated and how many elements should be restored in order to achieve minimum cost?
TRACK 14: OM IN EMERGING ECONOMIES
Track Chair: Afonso Fleury, Universidade Sao Paulo, acfleury@usp.br

SESSION 1: OM IN EMERGING ECONOMIES
Session Chair: Afonso Fleury, Universidade Sao Paulo, acfleury@usp.br
Time & Place: Saturday, April 6, 2:00-3:30PM, Nob Hill Suite

The New Organizational Architecture: New Demands for OM in Emerging Economies
Afonso Fleury and Maria Tereza Fleury, both at University of Sao Paulo, Brazil, acfleury@usp.br, mtfleury@usp.br
Since the 1980's a whole set of changes is deeply modifying the way that firms are organized and interact with each other. They affect the organizational structure (through focusing, reengineering, outsourcing), the relationship among firms (the formation of strategic alliances, supplier chains and clusters) and include the formation of new types of enterprises (such as the manufacturing contractors) and the emergence of new players (some from Emerging Countries). The formation of that new organizational architecture creates specific demands for the Operations Management function in different types of firms. The aim of this article is to elaborate an analytical framework and an broad picture about what are the competencies and what type of knowledge has a firm to master given its position in that architecture. The conclusions are based on studies focusing on the textile, telecommunications and plastics industries in Brazil.

Supplier's Role in Product Development:
A Comparison of the Traditional Exchange and the Web-based Exchange
Stella Y. Hua, Oregon State University, huas@bus.oregon.edu
Literature on suppliers' role in the product development process focuses on traditional trading exchanges. As firms and their suppliers move towards web-based exchanges, it is necessary to reexamine suppliers' role in the product development process. In this paper, we compare supplier involvement in product design in two different exchange environments. In addition, we explore product and technological factors that can influence the level of web-based exchanges between firms and their suppliers. A conceptual model was developed and tested using the data collected in the automobile industry. The results highlight the changing role of suppliers in web-based exchanges.

The Management in Democratic and Solidary Bases: Dilemmas and Challenges
Sandra Rufino, Universidade de São Paulo - ITCP-USP, ssrufino@usp.br
The self-management firm in the base of cooperative principles could or should obligated rethinking the methods and productive process to attempt establish also in relation to processes, democratic forms that consider and are in accord to administrative frameworks and policies of cooperatives. More knowledge about the difficulties in this scope could appoint many important and no doubt necessary courses for reflection of this theme. Meanwhile, the solutions for this claim is not replied satisfactory, and yet are in development stage.
Generation and Diffusion of Knowledge in the SME’s Networks:
A Study of the Brazilian Electronic Industry
Maria Elena Leon Olave, University of São Paulo, Brazil, melena@usp.br
The new competitive landscape is characterized by continuous technological advancements, rapid changes in how knowledge is transmitted as well as the increase of the new organization forms such as production cooperation networks. This paper aims to identify the different knowledge sources used within SME’s networks in the Brazilian Electronic Industry. Case Study analysis was the principal means used to examine field data. This research identifies knowledge sources within SME’s networks: Technological Sources as customers, specialized publications, production employees; Personal Sources as competitors, research centers, universities and technical colleges; Impersonal Sources as industrial fairs, sectorial associations, newspapers.

New Strategies and Internet Use in the Brazilian Apparel Productive Chains
Juan Ricardo Cruz-Moreira, Universidad de Sao Paulo, juan.moreira@poli.usp.br or ricardoc@soc.duke.edu
This paper aims to analyze the use of the Internet in the Brazilian Apparel Productive Chains. This work is based on the empirical research on 30 companies, both Brazilian and international, acting in Brazil. This research was done using the methodology approach of “Global Commodity Chains” and “Governance and Internet” (Gereffi, 1994, 2001). It also uses the Porter’s concepts on “Strategies and Internet” (2001). As a result, it shows the strategies and trends for the use of the Internet in the Brazilian apparel industry against the new competitive environment, and also the position and governance of the leading companies.
TRACK 15: OPERATIONS FLEXIBILITY
Track Chair: Manoj K. Malhotra, University of South Carolina
malhotra@moore.sc.edu

SESSION 1: BENEFITS OF MANUFACTURING FLEXIBILITY
AND ITS ROLE IN INDUSTRIAL APPLICATIONS
Session Chair: Manoj K. Malhotra, University of South Carolina, malhotra@moore.sc.edu
Time & Place: Monday, April 8, 10:00-11:30AM, Franciscan Suite

Dimensions of Manufacturing Flexibility and its Perception by Small Manufacturers in a Developing Country
Paulo Dalcol, Pontifical Catholic University of Rio de Janeiro, Brazil, prtd@rdr.puc-rio.br
Manufacturing flexibility has been an important and critical source of competitive advantage to the firms. The interest to enhance the knowledge about flexibility has increased during the two last decades, and it was noted that small enterprises have been poorly involved in researches about this subject. Thus, based on a field work involving five small enterprises in Brazil, some patterns related to competitive environment, to management priorities and to the importance of ten manufacturing flexibility dimensions are identified and show the managers’ perspective about these questions in the manufacturing flexibility context.

Auditing Manufacturing Response Capabilities
Duncan McFarlane, A Shaw, Y Chang, and J Matson, all at the University of Cambridge, UK, dcm@eng.cam.ac.uk, as2@eng.cam.ac.uk, ysc26@eng.cam.ac.uk, ljm@eng.cam.ac.uk
This paper firstly reports on a responsiveness-auditing tool that has been developed and refined over the last four years and used within a range of industries. The audit provides a framework for examining the ability of a production operation to respond to current external and internal production disruptions or response needs. It has been developed to help manufacturing companies assess and improve their ability to respond to those influences on operational performance, which they cannot readily control.

Cellular Manufacturing Implementation In the Garment/Apparel Industry
Serge Carrier, University du Quèbec à Montréal, Canada, carrier.serge@uqam.ca
With the expansion of global trade, the North American garment/apparel industry stands to be confronted with an ever increasing challenge in the coming years: competing against producers enjoying cost advantages. Cellular manufacturing has been presented as one of the avenues to reposition the local industry on a quick response / quality axis. Yet is this an option only available to large companies who can afford the technology and transition costs? In this article we shall describe an implementation process that has been applied, with success and at minimal costs, in over twenty small to medium-sized companies in three different countries.

A Flexible Manufacturing Systems for Color Gemstone
Kiran J. Desai, Fogelman College of Business & Economics, kdesai@memphis.edu
Use of gemstone in our society/life is as old as our civilization. The fundamental decision regarding size and shape of a stone (based on rough stone size and shape) is still left to human judgment. Here we have developed mathematical algorithms with use of computers, robotics and digital camera to replace the human element in deciding the size and shape of the stone to be made but also bring in economic decision-making (trade of between shapes as well as size) in determining the size and shape, and do this with least cost and increase in productivity.
Manufacturing Flexibility and the Product-Process Matrix
Manoj K. Malhotra, University of South Carolina, Lori L. Koste, Grand Valley State University, Malhotra@moore.sc.edu, Kostel@gvsu.edu
This study examines flexibility with respect to the Product-Process matrix, whereby flexibility is measured as a complex multi-faceted construct that possesses both a dimensional as well as an elemental aspect. These elements address two distinct factors of flexibility – scope and achievability. We develop propositions that recognize this complex nature of flexibility, and posit its relationships with the Product-Process (P-P) matrix. These propositions and relationships are tested by analyzing data obtained via a mail survey of 158 manufacturing plants representing a diverse set of industries located throughout the U.S. Results based on Analysis of Variance (ANOVA) reveal that as expected, differences exist across process types at both the dimensional and factor level of flexibility. Finally, an attempt is made to provide a unified view of manufacturing flexibility and its linkage to other decisions within the firm.
TRACK 16: OPERATIONS PLANNING, SCHEDULING AND CONTROL
Track Chair: Vicente Vargas, University of San Diego
vavargas@sandiego.edu

SESSION 1: FORECASTING EFFECTS OF PROMOTIONAL ACTIVITY AND TECHNOLOGICAL CHANGE
Session Chair: Shona Morgan, North Carolina A&T State University, smorgan@ncat.edu
Time & Place: Saturday, April 6, 10:00-11:30AM, Interlude Lounge

Forecasting Demand Fluctuations Due to Promotional Activities:
A Case in the Fresh Food Industry
Federico Caniato, Matteo Kalchschmidt, Stefano Ronchi, Roberto Verganti, Giulio Zotteri,
all at Politecnico di Milano, matteo.kalchschmidt@polimi.it
Today, in many industries companies are facing a more and more uncertain demand, while at the same time the competitive environment forces them to decrease their inventory. This problem is critical in the fresh food industry, where the very short products’ shelf life prevents firms from keeping stocks and where the intense customer promotional activity generates highly irregular demand. This paper presents a method for forecasting demand developed in co-operation with the Italian fresh food division of a large multinational firm. The approach, based on the analysis of the sources of demand variability, shows how information on promotional activities can be used to improve forecasting accuracy. The method has been tested, using real demand data provided by the firm, and compared to the company’s actual performance.

Stability in Projects: Managerial Perceptions
Stephen Swartz, AF Institute of Technology and Yigit Sen, Stephen.Swartz@afit.edu
This research investigates the manager’s perceptions of the importance of stability to overall project outcomes. Stability was defined as the ability of project schedules to absorb disruption. Managers at various levels in the programs managed by a major developer of aviation systems were surveyed for their perceptions of “Importance” and “Usefulness” for a host of project management performance measures, including. The classical measures of Cost, Schedule, Performance as well as Earned Value and some proposed measures of Stability. The assessment is based on the importance and usefulness of both the general attributes of management for the activities in a specific program, and the specific measures being employed by the managers. In this research, the scope is limited to the management of relatively complex, large-scale projects involving the design, development and delivery of aircraft and support systems. Results indicated that the newer measures of Stability and Earned Value were well received and had both importance and usefulness to the managers. Stability was perceived to be as important as more common measures in many cases. Perceptions differed between programs depending on their size; and between managers depending on their level of authority. This was pronounced with regard to the newly introduced Stability concept.

Incorporation of Dealer Placement in Forecasting Furniture Demand
Shona Morgan, North Carolina A&T State University, smorgan@ncat.edu
The furniture production process is complex. Effective planning is critical to both the furniture manufacturer and retailer as competition continues to increase. We make improvements to an existing integrated forecasting method of finite product life cycles to support demand activated furniture manufacturing. Specifically, we test various upper bound strategies on the forecast model and examine how showroom placement impacts demand and the forecast model for a suite of furniture. Results from the experimentation are presented and a recommendation is made.
SESSION 2: FLEXIBLE AND CELLULAR MANUFACTURING SYSTEMS

Session Chair: Alex Ruiz Torres, University of Texas at El Paso, aruiztor@utep.edu
Time & Place: Saturday, April 6, 2:00-3:30PM, Interlude Lounge

A Comparison of Optimal Flexible Manufacturing System Performance Using Differing Objective Criteria
Robby Thomas, Elmhurst College, rthomas@elmhurst.edu
The optimization of the complex Flexible Manufacturing System set-up problem includes decisions on part-mix, machine grouping, production ratios, resource allocation and loading. This study examines the effects of using various objective criteria, including an inventory cost criterion, in optimizing the set-up problem. The models used to facilitate the study include intractable quadratic programming problems with continuous and binary variables, and time consuming mixed integer programming problems. Constraint propagation and generate and test strategies are used to facilitate stable solutions to the above problems. The generated solutions are compared and recommendations are made for the appropriate use of each objective criterion.

Expert System for Assembly Line - Group Technology - Batch Sequence - Dependent Set-up Time
Yousef A.Y. Al-Turki, King Abdulaziz City for Science & Technology, Saudi Arabia, alturky@kacst.edu.sa
This study carried out several tasks. First, it investigates the effect of set-up times and its frequency, and batch size on production by simulating a real manufacturing industry that produces automobile lead acid batteries. Secondly, develop and present heuristic algorithm for product sequencing based on minimum setup time. Thirdly, make the analysis of selecting general programming language such as Fortran vs. object oriented expert system. Finally, object oriented expert system model and its feature is presented in detail.

Scheduling Constant Travel-time Robotic Cells: Throughput Maximization
Milind Dawande, Chelliahv Sriskandarajah, Suresh P. Sethi, all at The University of Texas at Dallas, milind@utdallas.edu
We consider the problem of scheduling operations in bufferless robotic cells that produce identical parts. The objective is to find a cyclic sequence of robot moves that minimizes the long-run average time to produce a part, or equivalently, maximizes the throughput rate. We analyze 1-unit cycles for a class of robotic cells called constant travel-time robotic cells. We obtain a polynomial time algorithm for finding an optimal 1-unit cycle. Moreover, we complete a structural analysis of the class of 1-unit cycles, and gain some insights that have proved valuable in our ongoing efforts to study multi-unit cyclic solutions.

Scheduling In Flexible Cellular Manufacturing Systems With Resource Flexibility And Demand Variability
Alex Ruiz Torres, University of Texas at El Paso and Farzad Mahmoodi, Clarkson University, aruiztor@utep.edu
This paper examines two types of flexibility in a cellular manufacturing environment; the ability of manufacturing cells to change family assignment, therefore flexible cells, and the ability of workers to move between cells, changing the product capacity of each cell. The paper considers variables related to the setup time for cell changeover, the variability of demand for the product families, and the level of worker flexibility in terms of the minimum and maximum number of workers that a cell can include. Three approaches are investigated in the allocation of cells to families, strict cells where each cell is assigned one family and changes are not allowed, therefore not flexible, flexible cells where family assignments change as required by the overall family load, and hybrid cells where some of the cells are strict and the rest are flexible.
SESSION 3: ASSIGNMENT SCHEDULING AND LEAD TIME ESTIMATION
Session Chair: Nur E. Ozdemirel, Middle East Technical University, nurevin@ie.metu.edu.tr
Time & Place: Saturday, April 6, 4:00-5:30PM, Crystal Room

Demand Allocation in Multiple-Product, Multiple-Facility Make-to-Stock Production Systems
Mohsen Elhafi, University of California, Riverside and Saifallah Benjaafar, University of Minnesota, mohsen.elhafi@ucr.edu
In this paper, we consider the problem of allocating workload to M facilities. The workload arises from exogenous demands of N product types. The production system can be thought of as a system of M heterogeneous servers serving N customer types. Demands are assumed to arrive according to independent Poisson processes. Processing times are assumed to be exponentially distributed and independent of product types. The objective is to determine a demand allocation among the M facilities so as to minimize the expected total cost. The latter consists of inventory carrying costs, backordering costs, and production costs. We formulate the problem as a nonlinear optimization problem. We study several special cases of the problem and provide managerial insights based on their optimal solution.

Optimization Methods for Spacecraft Support with Visibility Clash
Sanjay Kumar, The University of Texas at Dallas, Tapan P. Bagchi, Indian Institute of Technology Kanpur, Chelliah Sriskantharanajah, The University of Texas at Dallas, chelliah@utdallas.edu
This paper addresses the optimal allotment of ground station support time to low orbit (LEO) spacecraft with clashing visibilities. Orbiting once every 100 or so minutes at a 800 km height, LEOs now form a critical infrastructure for natural resource management, rescue, crop yield estimation, flood control, communication, and space research and travel support. In this problem support times for spacecraft must be determined so as to maximize total profit to the enterprise while subject to a multitude of constraints. The problem is NP-complete. This paper exploits the unique structure of the problem, in particular the nature of its constraints, to devise appropriate optimization methodologies.

Makespan Estimation in Batch Process Industries When Processing Times are Uncertain
Cristina V. Ivanescu, Jan C. Fransoo, J. and Will M. Bertrand all at Technische Universiteit Eindhoven, C.V.Ivanescu@tm.tue.nl
We propose a regression-based model to estimate the makespan of a set of jobs in a batch process shop. We extend earlier work which was based on deterministic processing times by considering Erlang-distributed processing times in our model. This regression-based model is further used to support aggregate decision making such as customer order acceptance. The performances of three order acceptance policies are compared by means of simulation experiments. The results indicate that the differences in performance between the regression based policy and the scheduling policy are not very large, specifically in situations with high variety in the job mix.

Manufacturing Lead Times Estimation Using Data Mining
Atakan Ozturk, Nur E. Ozdemirel, and Sinan Kayaligil, all at Middle East Technical University, nurevin@ie.metu.edu.tr
Although huge amounts of shop floor data can be collected in today’s automated systems, manufacturing lead-time estimation is still a problem because we lack a method of extracting lead-time information from the data. We propose to use data mining for this purpose. Using decision trees and rule induction, we try to find rules that can establish a relationship between the shop/job attributes and the resulting actual lead times in different shop types. Newly arriving jobs can then be assigned lead times (or due dates) by using these rules. Results can also be used in devising order release rules.
Scheduling the No-Wait Two-Stage Flowshop With Missing Operations and Sequence Dependent Batch Setups
Jatinder N. D. Gupta, Ball State University, and Henry S. Maddux III, Sam Houston State University, jgupta@bsu.edu, mgt.hsm@shsu.edu
We consider the no-wait two-stage flowshop-scheduling problem characterized by sequence dependent setup times and batches of jobs. Batches are a set of identical jobs that share an initial setup that depends on the family of jobs preceding it. In addition, some jobs may exit the system after the first stage as intermediate products. This scheduling problem occurs often in the process industries. We discuss the computational complexity of this no-wait flowshop and present some heuristics for its solution.

SESSION 4: INTEGRATED PRODUCTION PLANNING
Session Chair: L. S. Murty, Indian Institute of Management, India, lsmurty@iimb.ernet.in
Time & Place: Sunday, April 7, 10:00-11:30AM, Interlude Lounge

Improving Operations with Advanced Planning & Scheduling (APS) Software
Herbert Blake, Jr., California State University, Sacramento, blakeh@csum.edu
Advanced Planning and Scheduling (APS) software programs are designed to synchronize demand management, customer forecasts and orders, with production constraints such as materials and capacity. APS software is to provide a real-time optimized plan to meet these demand needs and supply constraints within the firm and its supply chain. This paper reviews the structure and basics APS software and then discusses how using this software can assist manufacturing firms and their supply chain partners. Examples of applications are given to illustrate the methods and results of using APS software to improve manufacturing operations.

Can You Start with MRP and Arrive at a SCP Model?
David Woodruff, UC Davis, and Stefan Voss, TU Braunschweig, dlwoodruff@ucdavis.edu, stefan.voss@TU-BU.de
We demonstrate by construction that we can begin with mrp and MRP II and end up with a useful basis for a planning model. In some sense, we must begin with MRP II because the requirements constraints and capacity constraints are a representation of physical reality. In order to produce a useful model, we add extensions and ultimately arrive at models that bear little resemblance to mrp and certainly solutions for the optimization problems cannot be obtained using mrp or MRP II processing or logic. In that sense, we agree with those who suggest that we should abandon mrp completely. However, we have show that it can be the basis for developing and understanding models that are much more useful.

Combined Make-to-Order and Make-to-Stock in a Capacitated Food Production System
Chetan A. Soman, Dirk P. van Donk, and Gerard J.C. Gaalman, all at the University of Groningen, The Netherlands, d.p.van.donk@bkz.rug.nl
The research into multi-product production/inventory control systems has mainly assumed one of the two strategies: Make-to-Order (MTO) or Make-to-Stock (MTS). In practice, however, food-processing companies cater to an increasing variety of products with varying logistical demands and production characteristics to different market segments and so they are moving to more MTO-production. As a consequence they operate under a hybrid MTO/MTS strategy. A comprehensive hierarchical planning framework incorporating specific food characteristics and Decoupling Point considerations that covers the main production management decisions is proposed.
Interactions Among Production Planning Decisions
L. S. Murty, Indian Institute of Management, India, lsmurty@iimbernet.in
Traditionally the different phases of operations planning have been treated as separate problems. Though there have been some studies that consider integrated models and investigate possible interactions among these various phases, the extent of integration did not exceed two levels. This study considers a job shop with MRP framework to analyze the main effects of and interaction effects among planning decisions – lot sizing, offsetting and dispatching – with tardiness, inventory and total cost as performance criteria. Lot-sizing decision has the strongest influence on all the performance criteria, though the degree of influence varies with performance criterion. Among the interactions, the one between lot-sizing and offsetting decisions is the strongest. Thus, it appears that, at least for the type of problems studied here, lot sizing is the most important decision and lot-sizing-offsetting decisions should be made jointly.

SESSION 5: PROJECT MANAGEMENT THEORY AND APPLICATIONS
Session Chair: Robert Ash, Indiana University Southeast, bobash@ius.edu
Time & Place: Sunday, April 7, 2:00-3:30PM, Interlude Lounge

Determining Feeding Buffers to Limit Risk of Interference with Critical Chain
Jaume Ribera, and Marc Sachon, both at University of Navarra, Spain, ribera@iesc.edu, msachon@iesc.edu
Goldratt’s Critical Chain rescues some concepts from old PERT methods and complements them with some new ones. Some papers criticize the use of feeding buffers only for those chains directly feeding the critical chain, and the rough rules to determine the buffers’ size. In this paper we present a new approach to address these issues, by managing the free float of activities that are not on the critical chain of a project network, focusing on non-critical paths with significant probabilities of interfering with the critical chain and determining the feeding buffers’ size needed to limit the risk of interference.

Critical Chain: A Case Study in a Brazilian Automotive Part Supplier
Joao Mario Csillag, EAESP/FGV - Brazil, csillag@fgvsp.br
This article deals with the issue of Project Management. Initially, the literature review shows that regardless of all evolution, the problems with finishing a project by the deadline with the desired characteristics while keeping costs within the budget still happening. The Theory of Constraints was found to be very useful in the reduction of these flaws; a methodology is proposed to eliminate them. Finally, an exploration research was made in a Brazilian company that applies the Critical Chain’s methodology showing the results get.

Project Management Systems for Telecom Business
Marcelo Talmasky, Motorola Inc., marcelo.talmasky@motorola.com
This paper is about how a system production tool can improve the planning and control of a non-linear production business such as telecom infrastructure deployment projects. Telecom business presents characteristics such as fast technology changes, global suppliers & customers and very demand consumers that makes it extremely different from other linear production businesses. This requires a production system based on a schedule where all modules (Production Planning & Control, Accounts Payable, Accounts Receivable etc.) are linked to tasks performed instead of production processes. Considering the differences between linear and non-linear system productions, this paper presents a model for a telecom business system. This model is centered into a project schedule where all tasks have their financial and operational link attached.
Preemption or Non-preemption in Multi-project Scheduling

Robert Ash, Indiana University Southeast, bobash@ius.edu

This research compares serial project scheduling to parallel, multi-project scheduling, with and without personnel sharing across project activities, where projects arrive dynamically. The three performance criteria for the simulation experiments are: mean project set flow time, mean resource utilization, and mean project duration delay. The results demonstrate that the best approach is to initiate parallel projects to the point that resources are constrained but preemption is not allowed. In addition, the results demonstrate that performing multi-projects with preemption may be a significant source for the scope creep problems.

SESSION 6: MAKING OM/OR A BASIC SCIENCE:
AN EUROPEAN PERSPECTIVE ON OM RESEARCH

Session Chair: Ton G. de Kok, Technische Universiteit Eindhoven, A.G.d.KOK@TM.TUE.NL
Time & Place: Sunday, April 7, 4:00-5:30PM, Monterey Room

In the last decades, the OM body of knowledge has benefited considerably from OR research. In virtually all “Introduction to Operations Management”-books several chapters are dedicated to the basics of LP, queuing theory and inventory theory and their application to OM practices. On the other hand the OM problems discussed and OM concepts proposed seem to have only a rather loose link to these basics of OR. In parallel OR research has made significant progress in terms of modelling and analysis of OM problems, typically in terms of relaxing problem constraints, increasing structural complexity, etc., thereby seemingly getting closer to real-life problems. Yet it seems that such research does not lead to the obvious next step of validating the models in order to test whether insides gained really hold or even more strict, whether the pre-supposed predictive power of the model is confirmed by empirical measurements. In this presentation we advocate the development of so-called model-driven empirical research. The main idea is to develop a similar research methodology as commonly used in physics, i.e., experimental (empirical) findings ask for theoretical models and theoretical models stimulate the development of experiments that validate the theories. With this in mind we give an informal assessment of European OM research in terms of methodology and its relation to the proposed methodological framework. The presentation ends with a number of provocative statements for discussion.

SESSION 7: JOB SHOP SCHEDULING

Session Chair: Brian Neureuther, Gardner-Webb University, bneureuther@gardner-webb.edu
Time & Place: Monday, April 8, 10:00-11:30AM, Interlude Lounge

The Impact of Lot-Sizing on Cycle Times in the n-Job, m-Machine Job Shop with Both Discrete and Batch Processing

Brian Neureuther, Gardner-Webb University, and George Kenyon, Compaq Computers Corp., bneureuther@gardner-webb.edu, george.kenyon@compaq.com

A key element of the semiconductor industry's historic productivity growth of twenty-five to thirty percent of annual cost per function reductions has been its continued improvements in overall equipment effectiveness. In order for the industry to meet its future goals it must find methods of continually improving its overall equipment effectiveness. This study assess the impact that lot size has the operational variable of cycle-time and its influence overall equipment effectiveness.
Tabu Search Approach for a Bicriteria Single Machine Scheduling Problem
Tuncay Bekiroglu, Meral Azizoglu both at Middle East Technical University, Turkey,
Murat Koksalan, Suna Kondakci Koksalan, both at Middle East Technical University,
Turkey and Purdue University, kondakcis@mgmt.purdue.edu
In this paper, we propose a tabu search approach for the problem of minimizing flowtime and
number of tardy jobs in a single machine environment. We evaluate the performance of the
approach by comparing it with the optimal solution for some artificially created problems. We
report computational experience for problems with 100 jobs. We also evaluate the sensitivity of
the approach to changing tabu search parameters; window size and distance window.

SESSION 8: PROCESS IMPROVEMENT AND SCHEDULING PRACTICE
Session Chair: M. Ali Montazer, University of New Haven, Montazer@charger.newhaven.edu
Time & Place: Monday, April 8, 2:00-3:30PM, Interlude Lounge

An Exploratory Study of Scheduling Practices in Alternative Manufacturing Environments
Christopher Craighead, University of North Carolina at Charlotte and R. Lawrence LaForge,
Clemson University, cw craigh@email.uncc.edu
Despite the popularity of scheduling software packages in the manufacturing sector and the
abundance of literature within this area, there is a need for information regarding the actual
practices, benefits and perceptions of these systems. Drawing from 165 responses to a written
survey, the current study explores relationships between facility demographics, system type (i.e.,
standalone commercial package, module of commercial ERP system, etc.), system capabilities,
system use, supporting technologies, competitive priorities and reported benefits. The study's
intent is not only to discover the relationships but also to formulate them as a basis for future
theoretical and empirical studies.

Improving Throughput of a Nickel Plating Process
M. Ali Montazer, University of New Haven, Montazer@charger.newhaven.edu
A simulation-based study to improve the nickel-plating line at a Connecticut hardware producing
company was conducted. The objective of this study was to determine whether the current plating
line could be reconfigured through software control so that the line throughput would be
increased. The plant produces on the average 75,000 cigarette lighters and about 45,000 power
outlets per day. Several of the individual components that make up a unit or assembly require
nickel plating. The primary purpose of the plating is to protect against rust but the esthetics is
also valued as the clean shine obtained as the result of the plating adds to esthetics value of parts.
The plating line operates three shifts, five days a week. The line is always processing products
with the exception of short downtime intervals for maintenance purposes. Aside from the regular
weekly schedule, a forth shift takes over and produces during the weekend. The results as well as
the ARENA simulation model of the process will be presented and discussed.
Collaborative Planning in a Volatile Environment: Making Theory Work
Ton G. de Kok, Technische Universiteit Eindhoven, A.G.d.KOK@TM.TUE.NL
In this presentation, we report about a case study in a high-tech, highly volatile business environment concerning the development and implementation of collaborative planning (CP) with respect to organizational procedures and IT tool support. We discuss the business situation, the relationship between the two companies involved and the supply chain structure under consideration. We describe the basics of the theoretical Supply Chain Planning (SCP) concept used, called Modified Base Stock Policies and some major theoretical findings in relation to its effectiveness as compared with commonly used SCP concepts based on LP. These findings motivated the companies to support the development of a IT support tool to be used in the weekly CP sessions. We discuss some of the technical and organizational issues that emerged during the two-year implementation process. From that we postulate some generic statements about operational Collaborative Planning.

The Lot Size Ordering Problem Using the Wagner-Whitin Model: A Spreadsheet Version
Juan J. Gonzalez, The University of Texas at San Antonio, jgonzalez@utsa.edu
This paper presents a convenient and practical approach to using the Wagner-Whitin Algorithm in a spreadsheet format. This approach uses the special structure of the model and formulates the lot sizing decision problem as a transshipment network and expresses it in the format of an assignment model. The assignment algorithm has been regarded as an effective tool (polynomial time complexity) for solving LP problems with special structures.
Paul M. Swamidass, Auburn University, swamidas@auburn.edu
Fifteen US manufacturing plants of various sizes and different industries were visited during the 1998-2000 period for in-depth investigation of their manufacturing technology use policies and strategies. The findings show that market growth and the continuous improvement philosophy have a significant impact on the technology strategy of US manufacturers (NSF sponsored investigation—SBR 9619054).

A Framework to Analyze Technology Strategy
Denise Rieg, and Alceu Gomes Alves Filho, both at Universidade Federal de Sao Carlos, riegsc@yahoo.com, alceu.power.ufscar.br
This paper discusses the concept of technology strategy. Some concepts proposed in the literature are analyzed and compared. From an examination of them it was possible to devise some similarities and some differences between them and considered its main contributions. These different contributions were combined into an overall and somewhat complex concept. This new concept has the advantage of providing a systematic view of technology strategy, including technology acquisition and application processes, firm's capacities and technical changes. A framework was built from this overall concept and it can be used as a starting point to identify and analyze technology strategies implemented by firms.

Developing a Strategy of Maintenance in a New Industrial Factory
Daniel Gasper, I.S.P.C., damgasper@demgi.estv.ipv.pt
In this presentation we describe the strategic approach of maintenance in a new factory of pharmaceutical industry with an old structure and organisation. Some equipment became of the old factory. The modern maintenance manager have in the “market” several tools and techniques: preventive maintenance (PM); predictive maintenance (PdM); Total Productive Maintenance (TPM); Reliability Centred Maintenance (RCM); all of which promise the best results but rarely achieve their full potential. All of these are valuable but need to do an profound diagnostic to achieve the best tools and techniques to put in practice. A strategic approach to maintenance must be concerned with the mix of technology and practice and a management and control aspects.

Strategic Management- What’s Missing
Donald (Don) E. White, Cal Poly University, dwhite@calpoly.edu
This paper presents an approach called Strategic Management By Projects (SMBP) that enables a high-velocity "execution-oriented paradigm" that links and tightly integrates the strategic plan with its implementation. As a result, the approach creates the desired sustainable competitive advantage. The SMBP model involves: (1) the critical integrative links, (2) the strategic portfolio of programs and projects, and (3) a project implementation approach that is highly integrative and seeks to maximize the throughput velocity of the strategic portfolio. The paper covers the essential elements of the SMBP process, along with actual case highlights to illustrate the application of key points. In addition, a research project currently underway with several companies will be discussed. The research will explore, validate, and modify early findings. Preliminary results will be presented at the conference. Overall, SMBP has already proven to be a successful process for bridging the firm’s strategic vision/implementation gap, and thereby improving and sustaining the firm’s competitive advantage in a rapidly changing environment.
SESSION 2: SUPPLY CHAIN STRATEGIES
Session Chair: Tim Baines, Cranfield University, UK, t.s.baines@cranfield.ac.uk
Time & Place: Saturday, April 6, 10:00-11:30AM, Oregon Room

Supply Chain Strategies for Competitive Manufacture
Tim Baines, Cranfield University, UK, t.s.baines@cranfield.ac.uk
Few people would argue that there is one single solution to the design of a manufacturing supply chain. Relatively recent concepts such as strategic outsourcing and partnership sourcing are extremely valuable to some manufacturing organisations. This paper presents the findings of a comprehensive survey of manufacturing sourcing practices in the UK. This study has set out to understand current and intended practices that manufacturing companies have with their key suppliers, and also the decision processes and circumstances that have caused these relationships to occur.

Manufacturing Strategies – Congruence Within a Supply Chain
Mats Winroth, and Mike Danilovic, Jönköping University, Sweden, mats.winroth@ing.hj.se, mike.danilovic@ing.hj.se
It is extremely important that companies, working together in a system manufacturer/sub supplier relationship, agree on which strategic factors to prioritize. A mismatch could make the cooperation less successful than if they agree on the competitive priorities. A tool for evaluating the congruence between the manufacturing strategies and the existing manufacturing system has been described by Miltenburg (1995). Säfsten and Winroth (2001) developed this tool further. The purpose of this paper is to one example of using this tool for a supply chain, i.e. for a system manufacturer and his sub suppliers.

Inter-organizational Resources and Competitive Advantage in the Context of Supply Chain
Danny C. K. Ho, K. F. Au, and Edward W. Newton, all at The Hong Kong Polytechnic University, Kowloon, Hong Kong, dannyho.itc@polyu.edu.hk, tcauki@inet.polyu.edu.hk, tcnetwork@inet.polyu.edu.hk
This paper aims to examine how idiosyncratic resources and business processes that span firm boundaries may provide strategic supply chain alliances a source of inter-organizational competitive advantage. It presents an overview of supply chain management as well as a three-level view of economic organization, including the resources, processes, and product levels. Building on a relational view of competitive advantage and a knowledge view of the firm, it is argued that the key to understand the strategic importance of integrated business processes rests on the idiosyncratic interfirm property- and knowledge-based resources invested and applied by allied supply chain members.

SESSION 3 (PANEL): FROM SAND-CONES TO CUMULATIVE CAPABILITIES, AND BEYOND
Session Chair: Morgan Swink, Michigan State University, swinkm@msu.edu
Time & Place: Saturday, April 6, 2:00-3:30PM, Gold Rush B

PANEL:
Christen Karlsson, Stockholm School of Economics
Arnoud de Meyer, INSEAD
Ram Narasimhan, Michigan State University
Aleda Roth, University of North Carolina
This session features a premiere set of panelists who will discuss their views on “progression theory,” i.e., theory addressing the growth of manufacturing plants toward higher and higher levels of performance. Each panelist will briefly convey his/her own conceptualization of progression theory, thus setting the stage for a discussion of the following questions:
What are the greatest opportunities in this area of research? What are the greatest obstacles to our own “progression” in the development of better theory in this area? How do we overcome them?
SESSION 4: INDUSTRIAL AND ORGANIZATIONAL STRUCTURE
Session Chair: Flavia Motta, University of São Paulo, Brazil, fgmotta@yahoo.com
Time & Place: Saturday, April 6, 2:00-3:30PM, Oregon Room

The Industrial Policy as a Strategic Drive for Companies: The Case of Brazil
João Amato Neto, University of São Paulo-Brazil, amato@usp.br
The aim of this paper is to present and discuss the constraints and possibilities of establishing some strategic goals for specific industrial sector in Brazilian industry. For the past decades the Brazilian Government tried to stimulate some specific industries such as the computer manufacturing, electronic components and others in the area of informatics, establishing markets restraints. But it didn’t succeed because the national manufacturers were not competitive in the international markets. Recently the issue of industrial policy has been brought to discussion. In this sense decision makers in both sides, government and private companies are motivated to discuss it thoroughly.

Promoting Cooperation to Enhance the Competitiveness in a High-Tech Cluster -
The Initiative of Entrepreneurs
Flavia Motta, University of São Paulo, Brazil, fgmotta@yahoo.com
This work presents the case of the high technology cluster promotion of São Carlos, Brazil; the initiative to improve the company’s competitiveness is bases on the cooperation promotion. The difference of this case with the majority of the initiatives is that the idea of the cooperation promotion appeared among the entrepreneurial without the direct interference of a external institution, or government. The objectives of this project are: to develop the brand “São Carlos technology” and to increase the cooperation among companies. The project also has the purpose of improve productive and organizational capacity of the companies. To fulfill this, a common process for quality and certifications will be developed. With this SMEs will be compatible to develop joint works, and thus the network can answer adequately to the new businesses. This project was conceived, and is being developed for two companies, and counts with the support of the local government, institutions, and others four companies who are interested in integrating the project. This is an initial phase of implantation.

Organizational Knowledge Management in the Operations Value Chain:
An Empirical Investigation
Ely Laureano Paiva, Universidade do Vale do Rio dos Sinos, Brazil, elpaiva@mercado.unisinos.br
This paper analyzes how two central aspects are related in the operations value-chain: organizational knowledge and operations strategy. Based on a previous qualitative study, we analyze the role of three different types of knowledge throughout the operations value chain: strategic knowledge, coordination-related knowledge and problem solving knowledge. The research methodology is a survey and the sample is from food, machines and electronics industries located in Brazil. We present the first results based on the data from 60 companies.

What’s an Organizational Structure Got to do With Anything?
Karen Glendinning, Center for Context, Kglendinning@centerforcontext.com
Structure has always directed human action! From the pyramids to the high rises, the shape and distance of structure has caused mankind to act in ways sometimes foreign to his own thinking. The church and the military have counted on structure to maintain order and humanity over time. Corporations sometimes cling to structure as to the order of the universe, rarely changing, for fear chaos and waste will accompany the difficulty of change.
SESSION 5 (PANEL): ALIGNING OPERATIONS AND MARKETING IN E-COMMERCE APPLICATIONS
Session Chair: Ken Boyer, Michigan State University, boyerk@msu.edu
Time & Place: Saturday, April 6, 4:00-5:30PM, Gold Rush B

PANEL:
Brian Gardiner, America Fresh
Craig Froehle, University of Cincinnati
Roger Hallowell, Harvard Business School

This panel examines the need to align operations and marketing in E-commerce applications. Two perspectives on the criticality of alignment are provided. First, the mismatch between the challenges of delivering groceries to customers following Internet ordering and the marketing of these services as low cost is discussed. The strategies of unsuccessful Internet grocers such as Webvan and Home Grocer will be compared with the strategies of companies that continue to thrive in this new business model. In particular, the strategies of Tesco (Britain’s largest supermarket with $450 million of Internet orders placed and delivered in 200), Albertson’s (the 2nd largest U.S. supermarket and only successful e-tailer) and America Fresh (a small, customized exchange between organic growers and restaurants in the San Francisco area) will be contrasted. Brian Gardiner, president and founder, America Fresh, will discuss the goals, strategies and experiences of this unique B2B enterprise.

The second perspective to be examined involves the design of back-office service operations in an E-commerce setting. The multi-channel customer contact centers that are becoming prevalent represent a new level of complexity in managing back-office service operations. However, these environments also represent a new opportunity for understanding customer behavior, information flows, and operational trade-offs in high-tech customer service situations. We examine the theoretic implications associated with online customer service centers and review empirical insights gained from industry applications.

SESSION 6: ELEMENTS OF OPERATIONS STRATEGY
Session Chair: Tim Baines, Cranfield University, UK, t.s.baines@cranfield.ac.uk
Time & Place: Saturday, April 6, 4:00-5:30PM, Oregon Room

Distinctive Manufacturing Competence or Core Competence: Which is More Relevant to Non-Corporate Organizations?
Ran Bhamra, and Tim Baines, both at Cranfield University, UK, r.bhamra@cranfield.ac.uk, t.s.baines@cranfield.ac.uk

This paper addresses the issues of what core competencies mean in the light of the earlier existing concept of distinctive manufacturing competencies (or manufacturing competencies). The apparent parallels between these two concepts are highlighted and considered. The results of empirical research conducted via a survey of UK non-corporate organizations is presented and then analyzed. The results from the investigation lead directly to conclusions about the relevance of these competency concepts to non-corporate, non-multinational organizations.

Evaluation of Plant Focus Strategies
Abdullah Dasci, University of Montreal, Vedat Velter, McGill University, Canada, dasci@crt.umontreal.ca, velter@management.mcgill.ca

The concept of plant focus has a central place in manufacturing strategy. A firm can limit the number and variety of operations at a factory's production lines to increase the productivity and lower the costs. In this paper, we develop an analytical modeling framework to analyze several plant focus decisions as a part of firms' multi-plant manufacturing strategies. The framework is based on a facility design model that uses continuous functions in representing spatial distribution of parameters and decision variables. The advantage of this modeling approach over more common mixed integer approach is the ability to derive intuitive closed form solutions with less data. The closed form solution is then used to analyze several renowned (product and market) focus strategies. The analysis has provided several insights into more sophisticated plant focus decisions and the impact of different technologies on these decisions.
Competitive Criteria of Production: An Exploratory Study of These Concepts in the Building Industry
José de Paula Barros Neto, DEECC/UFC, Jaime Evaldo Fensterseifer, PPGA/UFRGS, Carlos Torres Formoso, NORIE/UFRGS, R. Coronel Jucá
Competitive priorities are objectives that a company should seek vigorously with the intention of increasing its competitiveness and consequently its participation in the market and its profitability. The main competitive priorities found in the literature are: cost, quality, delivery performance, flexibility, capacity for innovation and services. Each of these priorities has its respective explanations, as their definitions are generic and inclusive. However, due to the characteristics of the building construction sector, it is necessary to adapt these concepts. Thus, the objective of this article is to analyze the content of the competitive priorities in the building industry, considering the peculiarities of this productive sector. It is worth emphasizing that the competitive priorities were analyzed and developed using semi-structured interviews with specialists in the area of construction management and the application of concepts in small building construction companies in the state of Rio Grande do Sul/Brazil.

Operations Strategy in Japanese Manufacturing Firm
Yoshiki Matsui, Yokohama National University, ymatsui@ynu.ac.jp
We suggest nine reliable and valid measurement scales characterizing the operations strategy for Japanese manufacturing firms. Using these scales, we empirically examine inter-industry and inter-class differences in manufacturing strategy and its relationship with operations management practices and competitive performance. There are no major differences in the characteristics of operations strategy among three industries we investigated. World-class manufacturers have more sophisticated operations strategy than randomly sampled manufacturing plants. Manufacturing strategy depends on certain organizational settings, human resource management practices, just-in-time production, quality management practices, production information systems as well as technology development, and predominantly determines the competitive performance of the firms.

SESSION 7: MANAGING GROWTH AND CHANGE IN MANUFACTURING
Session Chair: Par Åhlström, Stockholm School of Economics, par.ahlstrom@ihhs.se
Time & Place: Sunday, April 7, 10:00-11:30AM, Gold Rush B

Modes of Manufacturing Improvement
Par Åhlström, and Anders Richtrnér, both at Stockholm School of Economics, par.ahlstrom@ihhs.se, anders.richtner@ihhs.se
Sustainable manufacturing improvement is becoming a prerequisite for long-term competitive success. The key is developing a long-term improvement path - rather than gleaning quick hits from different fads. The paper focuses on different approaches to manufacturing improvement. Based on a sample of twelve in-depth case studies of European manufacturing companies, three general approaches to manufacturing improvement are identified. One approach is to undertake isolated initiatives in different areas. Another approach is to undertake a large-scale improvement program, which subsequently fails. Finally, there are those companies, which makes manufacturing an ongoing process. The reasons behind these three approaches and their consequences for long-term performance improvement are investigated.

Ask ‘How?’ Five Times
Norman Faull, University of Cape Town, nfaull@gsb.uct.ac.za
The case, written in two parts, Atlas Copco Secoroc (A) and (B), describes the turnaround of a manufacturer of Secoroc rock drilling tools. Part of the international group headquartered in Sweden, the South African factory in 1999 was one of five manufacturing units left in the Secoroc group, down from 17 just a few years earlier. With a litany of problems including marginal profitability, the newly appointed young General Manager (GM) reviews his options (A case). The (B) case describes the actions taken. Armed with the most basic texts in ‘Lean Thinking’ the new GM undertakes a ‘textbook’ lean initiative.
The Tenuous Dynamic Relationship Between Financial and Non-Financial Aspects of Manufacturing Operations: The Case of the Aerospace Industry
Peter McKenzie, and Shekhar Jayanthi, at the Colorado School of Mines, pmckenzi@mines.edu, sjayanth@mines.edu

Manufacturing firms are facing a “competitive gridlock” despite the implementation of strategic organizational and technological changes. We examine the implementation of an organizational change, Just-In-Time manufacturing within a plant in the aerospace industry targeted at improving the operational performance. Building on organizational learning theory, we consider the relationship between financial and non-financial aspects of the manufacturing process as one of balancing the dynamic tension between short-term and long-term activities within the manufacturing plant. Our empirical analysis shows that the relationship between financial and non-financial aspects is more severe, as the tension between current and future demands of the marketplace increases.

Changes in Operations Strategy in Pig Production: Application on Pig Fattening Phase
Rodolfo De Castro, University of Girona, rudi.castro@udg.es

Pig production has been following mainly a strategy of cost minimisation. This has been more emphasized in the fattening phase where biological investigation has been focused on improving the growth performance and feed conversion. In recent years it has been observed changes around this phase, which have affected to its strategies. The main objective of this contribution is to present these changes caused by the pig production environment, concretely in the pig-fattening phase. From research projects supported by empirical data and literature, it is demonstrated different aspects, which lead to a strategy whose objective is focused on customer requirements. As conclusion, the pig-fattening phase has moved from a MTS production system to a MTO where the customer influence is greater than before.

SESSION 8 (PANEL): ON THE PRACTICE OF OPERATIONS STRATEGY FORMULATION
Session Co-chairs: Rafael Menda, McNeil Consumer Healthcare, Rmenda@mccus.jnj.com and David Dilts, Vanderbilt University, David.Dilts@owen.vanderbilt.edu
Time & Place: Sunday, April 7, 10:00-11:30AM, Oregon Room

As researchers we concern ourselves with the tasks of generating and validating knowledge. As teachers we strive for disseminating that knowledge to tomorrow’s business managers. And as industry practitioners we continually seek out tested, effective and practical tools to use in our jobs so that we can improve the competitiveness of our firms. The objective of this panel is to provide a forum for operations strategy practitioners to discuss strategy formulation challenges they face in their companies and establish a dialogue with academics in the field. The session will consist of short presentations by industry representatives who engage in strategy formulation in their organizations. The focus of the presentations will be typical problems those managers face in their quest for establishing a meaningful and coherent operations strategy. The floor will then be opened for comments from academics to explore opportunities for collaboration.

SESSION 9: ROLE OF INFORMATION TECHNOLOGY IN STRATEGY
Session Chair: Srinivas Talluri, Michigan State University, talluri@msu.edu
Time & Place: Sunday, April 7, 2:00-3:30PM, Gold Rush B

Contribution of Technology to Value Creation in an Industrial Supply Corporation
Serkan B. Celtek, University of Texas-Pan American, Juan Carlos Cervantes, Pangaia Industrial Supply Corporation, sceltek1@panam.edu

Technology management is an integral part of operations strategy for all organizations. Furthermore, the role of technology, especially information technology, is crucial in supply chain management success. Technology facilitates supply chain activities in information recording, storing, sharing, processing, and interpreting. In this paper, technology needs of an industrial supply corporation are presented. A strategic plan for acquisition and implementation of new technology is outlined. The discussion of observed and expected outcomes on value creation and business performance is presented. The paper concludes with future challenges and implications.
A Preliminary Report on Factors Affecting On-line Auctions

Rhonda Hensley, North Carolina A&T State University, hensleyr@ncat.edu

Understanding why people choose to use on-line technologies is important because the use of on-line activities is expected to continue growing in the future. A number of empirical surveys measuring the general usage of on-line services and characteristics of users, for instance gender, race, and age, have been reported. This study focuses on developing an instrument to identify factors leading to on-line purchasing and in the initial stage focuses on a segment of the general population: young, well-educated adults. Two types of on-line purchases have been identified: direct purchase from a storefront operation and purchase of products from on-line auctions.

The Impact of Operations Strategy on Internet Purchasing Utilization: An Empirical Examination

Kenneth K. Boyer, and Srinivas Talluri both at Michigan State University, boyerk@msu.edu, talluri@msu.edu and John R. Olson, DePaul University, jolson@wpdpost.depaul.edu

Many of the problems companies experienced with Internet operations can be attributed to a lack of fundamental frameworks, principles and guidelines to help direct the decision making processes in this dynamic business environment. While there has been a great deal of media coverage of the numerous Internet startups, there has been very little carefully designed, academic research that would lead to the derivation and empirical validation of fundamental principles (Amit and Zott, 2001). The current study seeks to address this gap by examining the combination of strategy and operational decision making for one leading Internet retailer of office supplies. We examine the operational level strategies of 416 online customers of a leading office supplies retailer with over $1 billion in Internet sales via a mail survey. Our findings identify three distinct operational strategies employed by companies utilizing the Internet for purchasing office supplies. Further analysis indicates that companies with more clearly defined, explicit strategies are linked with improved transactional performance. More importantly, within strategic group analysis identifies different strategic levers or operational tactics for improving performance. In summary, we provide empirical evidence of the strategy-execution-performance relationship that provides valuable guidance to managers seeking insights regarding effective strategic approaches. We also provide a set of reliable, valid scales for assessing E-commerce strategy and execution that are generalizable and appropriate for a wide range of applications.

SESSION 10 (PANEL): BEYOND THE BALANCED SCORECARD - WHAT'S NEXT IN STRATEGIC PERFORMANCE METRICS?

Session Chair: Morgan Swink, Michigan State University, swinkm@msu.edu
Time & Place: Sunday, April 7, 2:00-3:30PM, Oregon Room

PANEL:
Robert Hayes, Harvard Business School
Steven Melnyk, Michigan State University
Andy Neely, Cranfield University
Nigel Slack, University of Warwick

This panel session is dedicated to a discussion of where OM research should be headed with regard to strategic performance measurement. Researchers in the distant and recent past have offered frameworks such as the Strategic Profit Model and the Balanced Scorecard to guide the development of performance metrics, but implementations of these systems at operational levels have achieved only limited success. A panel of distinguished performance measurement researchers will offer their views on the challenges and opportunities in performance measurement research, specifically with regard to its potential impacts on operations strategy development and deployment.
SESSION 11: SUPPLY CHAIN COORDINATION
Session Chair: Joseph G. Ormsby, Stephen F. Austin State University, jormsby@sfasu.edu
Time & Place: Sunday, April 7, 4:00-5:30PM, Gold Rush B

New Approach to Supply Chain Management
Riurik Skomorokhov, Bauman Moscow State Technical University, skomorokhov@mtu-net.ru
In conditions of low and mid-volume machine building manufacturing main goal of supply chain management is providing on time and maximum fast delivering all end items to final consumers. To achieve the goal main producer (which manufactures main parts of end items, assembles and tests them) should determine most exactly manufacturing dates for all end items for all the manufacturing stages, and obtain minimum possible common manufacturing lead time of the items. Effective solving the problem demands quite different scheduling and such scheduling can be important tool for improving coordination in supply chain and essential element of manufacturing and supply chain strategies.

Redesigning the Value Chain to a Push-Pull Format: Optimizing the Supply Chain
Joyce M. Hoffman, and Joseph G. Ormsby, Stephen F. Austin State University, Texas, jhoffman@sfasu.edu, jormsby@sfasu.edu
Redesigning the value chain to meet the dynamics of the supply chain and gain a competitive advantage is the focus of this paper. A framework is proposed and discussed through a case-based study that illustrates the decision process and validates the assumptions a firm needs to emphasize strategic options. The value-chain under scrutiny is of a replacement repair parts division of a traditional, non-innovative heavy industry organization. The critical competitive factor for this case is speed of response. The resulting framework emphasizes and recommends a push-pull that allows a firm faced with time constraints to respond to competitive. The competitive component will be specific to the organization as will be the hybrid format. Redesigning the value chain to reach the firm's competitive potential means achieving a balance between supply and demand within the supply chain.

Choice of Warranty Cost Charge-Back Mechanisms to Minimize Cost Across the Value Chain
Canan Savaskan, Kellogg School of Management, r-savaskan@kellogg.nwu.edu
In this paper, we examine the use of warranty charge-backs to suppliers to minimize total cost (product cost plus warranty cost) across the value chain. Using the principal-agent framework, we compare different warranty cost sharing mechanisms (i.e. fixed share rate, incentive system and supplier responsible rate) taking into consideration the uncertainty in responsibility determination process.
Benefits of Partnering in Project Management by Capacity Planning
Rico Wojanowski, and Michael Schenk, Fraunhofer Institute IFF, Germany, wojanowski@iff.fhg.de

The complexity of many capital goods, e.g. in plant construction, shipbuilding or large-scale construction projects has already led at an early stage to a specialization in sub-tasks to be carried out. In itself positive, this trend of concentrating on core competencies brings about a multi-staged process for the awarding of contracts however. Since an individual service must be performed on the level of subcontractors as well, the cycle of inquiry-bid-award is reused for every subproject. Thus it is indeed guaranteed that a price-efficient overall offer to the end customer is drawn up, yet the disadvantages of this approach are enormous. Numerous communication relationships must be linked anew in every project in order to deal with the necessary information processes. Mistrust, planning uncertainty and sub optimization can lead to misunderstandings and project delays. Not least, subsequent claims for planning errors cause additional considerable extra project costs. With the concept of cooperation, all this will be avoided or at least reduced. Collaboration is possible between the contractor of the overall project (general contractor) and the specialized subcontractors of the subprojects. In the meantime this concept is being successfully tested in extremely different industries. Nevertheless, barriers to acceptance, which call the benefit of the cooperation into question, can be noticed again and again. Until now, models of argumentation have been lacking, with which it is possible to provide objective reasons for the benefit of the cooperation. For that reason, in the following, a model for capacity preplanning is developed, which makes a comparison between cooperation and competition possible for the early bid phase.

SESSION 12: DEVELOPMENT OF FUTURE PROFESSIONALS—
SOME ACADEMIC ADMINISTRATION & STRATEGY ISSUES
Session Chair: Manjulika Koshal, Ohio University, Athens, koshal@ohio.edu
Time & Place: Sunday, April 7, 4:00-5:30PM, Oregon Room

Integrated Approach to Graduate and Non-Credit Programs
Kahandas Nandola, and Ashok Gupta, both at Ohio University, Athens, nandola@ohiou.edu, gupta@ohio.edu
"Future of Professionals—Some Academic Administration and Strategy Issues"

In recent years a major development in American business has been the active integration of functional areas to create a unified and systematic approach to serve customers. This harmonized approach later found its way into business education, especially MBA programs across the country. However, when a business looks at a university as a supplier of continuing education in degree, non-degree and training programs, it often finds that business schools treat each type of activity as individual silos, making it difficult for the corporate customer to have one unified source of supply. One consequence is the loss of opportunity for augmented revenue streams that would be there with cross selling and package deals. This paper explores these ideas.

Production and Operations Management Discipline in European Business Schools
Marvin E. González, Instituto de Empresa, Spain, and Gioconda Quesada,
University of Toledo, Marvin.Gonzalez@ie.edu
This study examines the performance in different areas of Production and Operations Management Departments in European Business Schools. A previous selection process provides us a list of the most important business schools of Europe. Using this previous list and the information provided by an international survey a ranking based on the Production and Operations Management discipline will be provided. We are using several criteria for this ranking, such as; graduate programs, research in course, research centers, publications, faculty development, alumni performance, and so on. We pretend to give an idea of the position of the most productive in research and academic programs in the European Business Schools more specifically in the Operations Management Discipline. We are in the designing stage of the study.
Student Evaluations of Teaching—Faculty and Students
Ashok Gupta, Ohio University, gupta@ohio.edu
An exploratory study based on a survey was undertaken at Ohio University (OU) to compare differences between faculty and student perceptions of SET. The questionnaire examined perceptions of students and professors on the criteria students use to rate professors, the relationship between course requirements/grades and students’ ratings. If the faculty make significant changes to course content based on student evaluations then how are these ratings used by faculty? The results of this survey suggest that faculty and students have entirely different perceptions of all aspects of SET.

“Women Administrators and the Glass Ceiling Syndrome”
Manjulika Koshal, Rajinder K. Koshal, and Ashok K. Gupta, all at Ohio University, koshal@ohio.edu
This study intends to test the results of some of the previous studies that were based on mail questionnaires on women managers in India, Hong-Kong and Malaysia. Based on personal interviews of male and female executives of Hong-Kong, this study attempts to analyze some of the following issues. In spite of the growing number of women in the middle managerial rank why women are not promoted to the highest ranks? When promoted, why women are not accepted in the “boys circle”? What causes it? Deep down how male managers feels about a woman boss? Are “equity and reward” existing on paper? To what extent women are responsible for this? This study sheds light on many unanswered questions.

SESSION 13: SOURCES OF VALUE IN OPERATIONS STRATEGY FORMULATION
Session Chair: Rafael Menda, McNeil Consumer Healthcare, rmenda@mccus.jnj.com
Time & Place: Monday, April 8, 10:00-11:30AM, Gold Rush B

Creating and Appropriating Value: The Case of Aerospace Systems Integrators
Billy Chen, Yongjiang Shi, and Mike J Gregory, all at Cambridge University, UK, bchc2@eng.cam.ac.uk, ys@eng.cam.ac.uk, mg@gp.cam.ac.uk
This paper investigates the role of the systems integrator in the aerospace industry and illustrates a dramatic shift in the way value is created and appropriated in the new manufacturing environment. Case evidence is presented which links insights from current operational practices and value-based strategies to theories on systems, integration, value creation and appropriation. A strategic framework is proposed and validated based on these findings. Finally, implications for management are discussed.

Formulation Strategies for Small and Medium Enterprises:
A Case Study in the Restaurants Industry
Renato Gonzalez de Medeiros, and José Rodrigues de Farias Filho, Federal Fluminense University (UFF), rodrigues@civil.uff.br, rodrigues@civil.uff.br
What is intended with this paper is to test the application of a methodology of strategies formulation that could be used as a weapon in this fight for the survival of the smaller ones. This methodology was applied in a small company of the foodservice sector. The result of this task was the elaboration of some strategical proposals for this business that aims to guarantee ways so that this can reach a better competitive position to front its competitors. However, the most significant result was the conscience that this methodology, representing the figure of the strategical planning inside of small companies.
Selection of Indicators in Urban Planning and Management Using Multi-criteria Methodology
Guillermo Ney Caprário, Felipe Reis Graeml, José Fernando Lewinger, and Rolf Hermann Erdmann, all at Universidade Federal de Santa Catarina - UFSC, Brazil, gnc2010@lycos.com, graeml@terra.com.br, jllew@terra.com.br, erdmann@ce.ufsc.br
The selection of performance indicators with a view to aid the decision making process involved in the prioritization of municipal investments aimed at improving living standards of the local population must take into consideration myriad variables and points of view. This paper presents a multi-criteria methodology application that assists in the structuring and selection of such indicators.

Do Managers Really Know How Their Firms’ Products Qualify And Win Orders?
A Process and Its Results.
Rafael Mendes, McNeil Consumer Healthcare, rmenda@mccus.inj.com
The task of identifying a firm’s competitive criteria is an important part of manufacturing strategy formulation process. Meaningful and coherent operations strategies can only be developed if those factors are determined for each one of the company’s markets or product lines, and their relative importance is agreed on by all functional managers. As part of a multiple case study examining how operations managers can facilitate this task, this paper focuses on the nature and degree of cross-functional agreement on those factors. The results show that significant disparities exist in the way functional managers within a firm segment their markets and perceive the qualifying and order-winning criteria for each of those segments.

SESSION 14: MODULAR CONSORTIA
Session Chair: Des Doran, Kingston University, d.doran@kingston.ac.uk
Time & Place: Monday, April 8, 2:00-3:30PM, Gold Rush A

Some Thoughts on Supply Chain Strategy
Des Doran, Kingston University, d.doran@kingston.ac.uk
The emergence of the modular paradigm within the automotive sector is calling into question the traditional roles adopted by key players within the supply chain. This paper explores the implications that modularization is having upon the strategic positioning of a number of automotive suppliers within an emerging modular supply chain and finds that strategic repositioning is not necessarily confined to high value-adding first-tier suppliers. Indeed, the transfer of value-adding activities from key first-tier suppliers to second and third-tier suppliers has led to such suppliers rethinking their roles within traditional supply chains and reconfiguring their resources to compete within a modular context. The paper presents two concepts designed to understand the need for new strategic direction and also demonstrates that for suppliers to succeed within the emerging modular environment the operations function must be at stage three or four of the Hayes and Wheelwright model (1984) and must be able to provide flexible resources that can continually develop new order winners and provide strategic thinking and support for the organization as a whole.

The Relationship in the Modular Consortium: The Case of VW Trucks and Buses Production
Susana Carla Farias Pereira, University of Birmingham, Marta Camposmoaia,
Luiz Carlos Di Serio, Mauro Sampaio, sfperreira@gmail.br
The Modular Consortium, a new concept of plant design, was established by Volkswagen in Brazil. For the operation of this plant of buses and trucks, it was selected seven suppliers. In this partnership the suppliers share the risks of the capital investment in the business. As a result the market share for trucks increased from 13% in 1996 to 28% in 2000 and for buses reached 25% in 2000. This paper analyzes the actual model, the main difficulties in the relationship with the partners, identifying the level of the relationship and the aspects related to the evolution of the system.
Supply Strategies in the Automobile Modular Production
Mauro Zilbovicu, Universidade de São Paulo, Brazil, mzilbovicu@usp.br
The paper studies the purchasing practices used by a car assembly company in both a modular
and a conventional plant. It discusses how the car assembler’s choices affect the components
production. The supply system presented in the modular case was designed simultaneously with
the product and the assembly process, aiming at major costs reduction. Such a target leads to a
variety of strategies in which assembler and suppliers (both tier 1 and tier 2) play different roles
either on production, product development and also management of suppliers. Besides out-
sourcing, namely the main factor of variance, modularity is also relevant for assemblers, as a way
to reduce cost, and especially for a few suppliers who add value as full integrators.

Clustering of Knowledge-based Firms In Brazil
Marly Monteiro de Carvalho, University of Sao Paulo, Brazil, marlymc@usp.br
Knowledge-based firms are playing a fundamental role to the economic development of regions
and countries. The ability of compete and co-operate simultaneously characterizes this kind of
firms and allows the phenomenon of clustering, that has been emphasized as a source of competitive
advantage specially for small companies. In order to investigate these points, a exploratory study
has been performed to find the main characteristics and kind of relationship found in a Brazilian
knowledge-based cluster located in region of São Paulo state, where a partnership among firms
and public university is specially strong.

SESSION 15 (PANEL): STRATEGIC PLANNING IN
SELF-MANAGEMENT ORGANIZATION
Amato Amato Neto, Universidade de São Paulo, Brazil, amato@usp.br
Time & Place: Monday, April 8, 2:00-3:30PM, Gold Rush B

The Strategic Planning has the objective of setting performance lines of direction in several areas,
amiming at giving to the company competitive advantages. Traditionally, this planning is made by the
top management. However, even though this approach is already consolidated, it's not compatible
with self-management organizations which join equality, collective decision and democratic
management to its principles, characterizing a horizontal management. The control and access to
the flows of information taking have broad and not- hierarchical character. Thus it's necessary that
Strategic Planning both respects the necessities and contingencies of the market, and keeps the
participatory principles that guide them.
TRACK 18: PERFORMANCE MEASUREMENT
Co-Track Chairs: Michael Bourne, m.bourne@cranfield.ac.uk, and Andy Neely a.neely@cranfield.ac.uk, both at Cranfield University

SESSION 1: SERVICE AND PUBLIC SECTOR PERFORMANCE MEASUREMENT
Session Chair: Lucia Isabel Garcia-Cebrian, University of Zaragoza, Spain, lgarcia@posta.unizar.es
Time & Place: Saturday, April 6, 4:00-5:30PM, Franciscan Suite

Selection of Indicators in Urban Planning and Management Using Multi-criteria Methodology
Guillermo Ney Caprário, Felipe Reis Graenl, José Fernando Lewinger, Rolf Hermann Erdmann, all at Universidade Federal de Santa Catarina - UFSC, Brazil, gnc2010@lycos.com
The selection of performance indicators with a view to aid the decision making process involved in the prioritization of municipal investments aimed at improving living standards of the local population must take into consideration myriad variables and points of view. This paper presents a multi-criteria methodology application that assists in the structuring and selection of such indicators.

Performance Measurement in Mining Operations
Ranjan Ghosh, Indian Institute of Management-Calcutta, India, ranjan@iimcal.ac.in
This paper describes the application of two different techniques, Benchmarking and Data Envelopment Analysis, for assessing the relative efficiency of coal and iron ore mines based on empirical data pertaining to their past performance. Several performance parameters or benchmarking 'metrics' have been developed for evaluating the performance of mining operations. Data has been analyzed for comparing the processes and performance metrics of various mines with their benchmarking partners. The output-oriented DEA model was used to find the relative efficiency of various mines. A comparison was made of the results obtained by using these two different approaches.

Improving Efficiency and Service Quality by Using Free Disposal Hull (FDH) Models.
An Application to a Fast-Food Restaurants Chain in Spain
Víctor Gimenez, and Josep-Lluís Martinez, Universidad Autónoma de Barcelona, Spain, Victor.Gimenez@uab.es, joseplluis.martinez@uab.es
In this paper our purpose is double. Firstly, we define a Free Disposal Hull (FDH) model in order to evaluate the efficiency and service quality of several decision-making units. The model is defined by using a non-radial graph efficiency measure. Both constant and variables returns to scale are considered, which leads us to quantify the scale inefficiency in these models. Secondly, we apply the model to the fast-food sector in Spain. The results are very useful to managers in order to improve the restaurants efficiency and their service quality since reachable inputs reductions, outputs and quality increases are quantified as a result of a benchmarking process.

Efficiency in Professional Soccer Teams of Spanish League
Lucia Isabel Garcia-Cebrian, University of Zaragoza, Spain, lgarcia@posta.unizar.es
In Spain, professional soccer teams have, in their great majority, the legal Society configuration of Sport Joint-Stock Companies. They are, therefore, organizations that can be studied from the optics of the economic analysis and using the analysis tools provided by this discipline. Taking this departure point, in this paper we try to measure the efficiency of the Spanish soccer teams in the Championship of Professional League of First Division. In the first part of the paper, we will make a previous analysis of which are the productive factors and the product of the units studied. In the second part of the paper the Data Envelopment Analysis will be applied to the data corresponding to the productive factors and the results of the Spanish teams of professional soccer in the league.
SESSION 2: ANALYZING ORGANIZATIONAL PERFORMANCE
Session Chair: Andy Neely, Cranfield University, a.neely@cranfield.ac.uk
Time & Place: Sunday, April 7, 10:00-11:30AM, Sunset Suite

Benchmarking European Logistics Centres
René B.M. de Koster, Rotterdam School of Management, Erasmus University Rotterdam, rkoster@fbk.eur.nl

During the last twenty years many multi-national (mainly American and Japanese) companies have started up European logistics operations from warehouses in The Netherlands. The current number of EL operations is estimated by the HIDC (Holland International Distribution Council) at about 670 in The Netherlands and about 1100 in total in Europe. This number is still growing rapidly, although there is a shift from the larger to smaller companies. Also, more operations are outsourced to logistics service providers. The role of the original ELCs has changed as well. Many started with storage and distribution operations, but since then, call-centres, European head-quarters and service organisations have been added. In the course of 2000/2001 we have carried out a survey among these ELCs, with respect to different aspects (flows, operations, management, performance, location factors). In this presentation I will focus on performance benchmarking of these ELCs, using DEA. In this, a comparison will be made between Asian and American ELCs, different sectors and between self-operated and outsourced operations. Some conclusions are that public ELCs are more efficient than dedicated ELCs. However, they also appear to have less complex operations. Furthermore, Asian ELCs apply more quality methods but do not have a better quality than American ELCs, while American companies are more flexible.

Measuring E-Business Performance
Bernard Marr, and Andy Neely, both at Cranfield University, UK, bernard.marr@cranfield.ac.uk

The latest data suggest that over 50% of the largest US firms had adopted a measurement framework, such as the Balanced Scorecard, by the end of 2000. Many of these firms will also have adopted supporting software applications – one of the so-called balanced scorecard reporting packages. There are over 25 such software packages on the market today. The vendors for each of them claim that their package helps organizations to manage better their measurement systems. They support the capture and collation of data. They provide analysis and visualization capabilities. But how do companies know which of the 25 plus packages that are on the market are right for their organization? Getting the decision wrong could mean that the entire balanced scorecard project could fail. The aim of this paper is to introduce a framework that helps organizations in their selection process. Data collected in 28 cases has been used to develop the Balanced Scorecard Software Classification Framework. The paper provides some general literature background on performance measurement and how it has evolved from a financially biased approach to a balanced approach, that is more in tune with today's complex business environment. The paper discusses the benefits of using software applications. Then it presents a classification model that aids organizations to broadly distinguish between the three major software approaches: Balanced Scorecard Applications, Business Intelligence Applications and Integrated Performance Measurement Suites. Furthermore the paper introduces the Decision Framework that guides companies through the process of identifying which software package best meets their needs.
Content Issues of HR-Related Performance Measurement:  
A Total Quality Management Approach  
Ebrahim Soltani, J. Gennard, R. van der Meer, T. Williams, all at the  
University of Strathclyde, Glasgow, UK, ebrahim@mansci.strath.ac.uk  
This study presents a literature survey designed to discuss the value that can result from using a combination of system and person factors when measuring employee performance in quality-focused organisations. This exploration of the content of appraisal begins with a brief overview of the 'hard' aspect i.e., statistical approach, and 'soft' aspect i.e., people-based approach of quality management. Next, effectiveness of performance evaluation through the frame of TQM perspective is explained, followed by an examination of the individualized-based and system-oriented performance evaluation. The remainder of this article examines the content of a quality-focused appraisal with regard to performance dimensions: input (trait-based measures), process (behaviour-based measures), and output (results-based measures). The results of the literature survey suggest that different elements of content of appraisal can enhance or inhibit the effectiveness of HR-related performance measurement in a quality organizational environment. In addition, the study concludes that HR-related performance is a function of both system and person factors. Thus, an inclusive assessment of all the factors that influence employee performance may better fit with a TQM context. Finally, implications of the findings for measurement of actual contribution of employees in implementing TQM programmes are considered.

SESSION 3: MANUFACTURING PERFORMANCE MEASUREMENT 1  
Session Chair: Mike Bourne, Cranfield University, m.bourne@cranfield.ac.uk  
Time & Place: Sunday, April 7, 2:00-3:30PM, Sunset Suite  
Critical Analysis of Manufacturing Performance Measurement Models  
Fernando Piero Laugen, Paulino G. Francischini, both at Polytechnic School - USP,  
laugen@fgvsp.br, pgfranci@usp.br  
Evaluation measures of manufacturing operation should facilitate manufacture strategy structuring in terms of measuring its competitive level, supporting decisions and smoothing operation planning, programming and control. A number of different models have been proposed for assessing performance indicators. Still, difficulties persist in understanding the similarities and differences among them. The objective of this article is to present the state of art in performance measurement in a relatively concise manner. A classification of the performance measurement models is proposed.

Plant Level Performance Measurement in Mexico, Canada and the USA:  
A Multinational Case Study  
Vidyaranya B. Gargeya, University of North Carolina at Greensboro, vbgargey@uncg.edu  
There has been very little work reported on what specific performance measures are used at the plant and department level at manufacturing facilities, who collects them, how they are computed, and for what purposes the measures are used. This paper, using a multi-plant case study of a multinational firm (that manufactures encapsulated products for the pharmaceutical industry), addresses those issues. Results from three plants in the U.S.A., Canada, and Mexico show that managers use only a few measures; also, many of the measures are not common across the departments. A few propositions and suggestions for future research are made in the paper.

Total Asset Utilization for Customer/Product Rationalization  
Stephen Lawrence, University of Colorado and Jeffrey Luftig, University of Colorado,  
stephen.lawrence@colorado.edu, jeffrey.luftig@colorado.edu  
We introduce a novel Total Asset Utilization (TAU) metric that works to maximize profitability across an entire organization by analyzing and improving productivity on a horizontally integrated basis. TAU measures the degree to which an asset, such as a plant, production line, or piece of equipment, is being employed in profitable activity. In turn, Customer and Product Rationalization (CPR) uses TAU metrics to further improve profitability by assessing and improving the portfolio mix of a firm's products and customers. Case study examples demonstrate the effectiveness of these models in improving profitability.
Process Overall Efficiency (POE)
Gregory Lanides, Telen USA, glanides@telen.com
Measuring results is by no means a new management phenomenon. However, with multiple information systems and numerous metrics to measure, managers can easily be overloaded with data. The key is to make performance reports visually simple to understand yet comprehensive enough so that it measures your critical success factors. Most companies are not that good at either. Managers get details that they don’t really need to know, and reports are so full of data and numbers that managers can lose sight of what is really important. And since each department typically gives their own information, determining how the business as a whole is doing can be very difficult. One way to help avoid this confusion is a measurement that is an offshoot from the OEE (Overall Equipment Effectiveness) measurement, the POE (Process Overall Efficiency) measurement. POE can also be viewed as a small-scale balanced scorecard.

SESSION 4: MANUFACTURING PERFORMANCE MEASUREMENT II
Session Chair: Mike Bourne, Cranfield University, m.bourne@cranfield.ac.uk
Time & Place: Sunday, April 7, 4:00-5:30PM, Sunset Suite

Developing A Set of Measures for Responsiveness – A Survey of the Food industry in Thailand
Duangpun Kritchanchai, Mahidol University, Thailand and Bart MacCarthy, University of Nottingham, UK, egdk@mahidol.ac.th, Bart.MacCarthy@Nottingham.ac.uk
Agility is now a key competitive factor in industry. Responsiveness is a significant component of an agile system. In the authors’ previous research (Kritchanchai and MacCarthy, 1999), the meaning of responsiveness has been investigated. It was found that different industries interpret responsiveness in different ways and hence it is difficult to establish a universal way for measuring responsiveness. Four groups of industries have been identified with respect to responsiveness characteristics - Off-the-shelf, Safety stock, Assembler and Customiser. Here we focus on one industrial sector within the Off-the-shelf class – the food industry in Thailand - to study responsiveness in depth. A survey has been conducted investigating critical areas for performance measurement with respect to responsiveness. A more precise set of critical areas for responsiveness has been obtained. The results highlight the importance of forecasting, workforce capacity planning and inventory management in this sector. A framework for developing a set of measures for responsiveness for this sector is presented.

Application of Fuzzy Least Absolute Deviation Regression to Productivity Measurement
He Yanqun, and Minglu Wu, both at City University of Hong Kong, mshaya@cityu.edu.hk, mmsminglu@cityu.edu.hk
Few techniques of productivity measurement take into account the fuzzy characteristics of input and output data, which is quite common in measuring productivity, especially for service sectors. This paper aims at introducing fuzzy regression techniques to productivity measurement. In the paper, a fuzzy least absolute deviation (LAD) model is developed. It is then applied to productivity measurement model as an illustration.

The Impact of Performance Measurement Practices on Performance: A pilot study
Mike Bourne, m.bourne@cranfield.ac.uk, and Mike Kennerley, m.kennerley@cranfield.ac.uk,
Cranfield School of Management
Balanced performance measurement frameworks such as the Balanced Scorecard (Kaplan & Norton, 1992) are becoming ubiquitous with high levels of take up by industry both in the USA and UK. However, there are few studies of the impact of performance measurement on performance (Lingle & Schiemann, 1996 excepted). This paper will present a prescriptive framework developed by the Centre for Business Performance of how it is believed that performance measurement practices lead to better performance planning and management and better business performance. It will then go onto describe the initial finding from the testing of this framework within the regions and branches of a single company. The pilot study made paired comparisons between the performance measurement practices used in high performing regions and branches and average performing regions and branches, to try and create an initial understanding of the main factors which make the difference.
TRACK 19: PRODUCT & PROCESS DESIGN
Co-Track Chairs: Dilip Chhajed, University of Illinois, chhajed@cba.uiuc.edu
and
Debasish N. Mallick, University of Minnesota, dmallick@csom.umn.edu

SESSION 1 (PLENARY PANEL): NEW PRODUCT DESIGN
PRACTICES FOR LONG-TERM SUCCESS
Panel Chair: Allan Shocker, San Francisco State University, ashocker@sfsu.edu
Time & Place: Saturday, April 6, 11:45AM-1:45PM, Emerald Room

PANEL:
Sara L. Beckman, University of California at Berkeley
David M. Kelley, Stanford University
Jonathan Propp, Sun Microsystems
V. Senu Srinivasan, Stanford University

SESSION 2 (PANEL): RESEARCH ON DESIGN – WHAT WE KNOW AND DON’T KNOW
Panel Chair: Sara L. Beckman, Haas School of Business, University of California, Berkeley,
beckman@haas.berkeley.edu
Time & Place: Saturday, April 6, 2:00 – 3:30 PM, Gold Rush A

PANEL:
Michael Barry, Founder, PointForward
Bob Hall, Founder, PointForward
Arnold Wasserman, The Idea Factory

Although there is a lot published on new product development in the academic literature, very little research has been done by academics in business schools about the role of design. Vish Krishnan and Karl Ulrich point out this deficit in their review article “Product Development Decisions: A Review of the Literature” published in Management Science in January 2001. This panel will address this deficit by attempting to surface critical research issues in design. On the panel are three leaders in design.

Michael Barry is a founder of Point Forward with over two decades of experience providing strategic innovation at the critical early stages of the product development process. Michael has a wide range of expertise from engineering to design to cultural studies with which he has restructured the research and innovation process, provided strategic project management, and designed over 80 products, including computers from mainframes to handhelds, consumer packaged goods, and entertainment and communication products. He is also an Assistant Professor at the Stanford University School of Engineering. Michael received his BS in Mechanical Engineering and his MS in Product Design from Stanford University School of Engineering.

Robert Hall, IDSA, PE, is a founder of Point Forward with a technology background who directs the creative work on major projects across a wide range of markets. These include personal and household care, software, healthcare, and mobile communications. Bob’s 26 years of product innovation and technology application experience have given him wide exposure to all aspects of product strategy and development from innovation process and concept development to R&D management and international manufacturing. He has received numerous awards and patents ranging from household products and industrial controls to medical devices and magnetic storage.
Arnold S. Wasserman is founder of heu-ris-tic, a design management consultancy specializing in Innovation Strategy for corporations in the United States, Europe and Asia. He has held the positions of Vice President of Corporate Industrial Design/Human Factors at NCR, Xerox and Unisys Corporation. He has also been Dean of Pratt Institute’s School of Design; Senior Fellow for Design Strategy at IDEO, a product development consultancy; and Director of Design for the Raymond Loewy design office in Paris. Wasserman wrote the section on “Industrial Design” for the 1996 edition of Collier’s Encyclopedia. He has received numerous international awards for his designs of business equipment and consumer products. In 1992, IDSA (Industrial Designers Society of America) presented him with its Bronze Apple Award for organizing the first national conference on universal design. In 1996, Carnegie Mellon University presented him with its Distinguished Alumnus Award. Wasserman served as Chairman of the jury for Business Week’s 1992 Industrial Design Excellence Awards competition. Wasserman holds a Bachelor of Arts degree in industrial design from Carnegie Mellon University and a Master of Arts degree in design history and theory from the University of Chicago.

SESSION 3: COLLABORATIVE NPD & SUPPLIER INVOLVEMENT
Session Chair: Kate McKone, Babson College, kmckone@babson.edu
Time & Place: Saturday, April 6, 10:00-11:30AM, Nob Hill Suite

**Change Intensity and Firm-Supplier Innovation:**
An Empirical Investigation of the PC Industry
Stella Y. Hua, Oregon State University, and Urban Wemmerlov,
University of Wisconsin-Madison, huas@bus.orst.edu, uwemmerlov@bus.wisc.edu
This paper provides new insights into product development by focusing on successive generations of products in the personal computer industry. A research model was developed to include external factors deemed to be critical to the development of successive product generations. Using that model, and data collected in the PC industry, we explored the relationship between the rate of supplier innovation and the rate of firm product changes. The analysis confirms that innovation in the PC industry is partly driven by suppliers. In addition, the results demonstrate the role of firm-supplier relationships and market competitiveness in the innovation process.

**A NPI Model: A Contract Manufacturer’s Role in Designing the Supply Chain**
Kate McKone, Babson College, kmckone@babson.edu, and Paul Tumolo,
Solectron Corporation, USA
A growing number of OEMs are concentrating on product design and marketing and outsourcing their product manufacturing to large volume electronic manufacturing service (EMS) providers. With this transition, it is essential that supply chain optimization be not overlooked in an effort to concentrate on core competencies, reduce production costs, and improve time to market velocity. In this paper, we explore the nature of the relationship between Solectron, the world largest EMS provider and its customers. We find the product development services that Solectron provides help to improve the product design and the supply chain effectiveness.

**Modularity as a Principle of Organizational Design**
Steven Spear, Harvard University, sspear@hbs.edu
Complex systems are designed, tested, and improved through collaborative work because no individual has the cognitive capacity to manage the design process single-handedly. This is true for complex technical devices and complex work systems, i.e., the organization itself that is engaged in collaborative design, production, or delivery. We present rules for managing organizations (i.e., complex systems) that generate the benefits of modularity normally associated with managing large-scale, complex technical system design. We show that organizational and technical systems present common challenges (i.e., tension between local and global optimization) that can be addressed with common design principles.
Information Technology and New Products Development
Fernando Jose Barbin Laurindo, University of Sao Paulo, fjlau@usp.br
There is a general belief that emphasis in new product development (NPD) is an important issue only in companies playing in dynamic environment. Nevertheless, in Brazil, it is also important to investigate NPD in traditional industries. This paper discusses the role of IT in NPD in Brazilian building materials industry. Companies in this industry adopt two different competitive strategies in order to face foreign competitors: cost leadership strategy and differentiation approach. The hypothesis are that NPD is becoming vital to the second approach, supported by the increasing dissemination of IT in NPD process.

SESSION 4: INFORMATION, COSTS AND INCENTIVES IN PRODUCT DEVELOPMENT
Session Chairs: Ali Yassine & Thomas Roemer, Massachusetts Institute of Technology, yassine@mit.edu, troemer@mit.edu
Time & Place: Saturday, April 6, 4:00-5:30PM, Nob Hill Suite

Identifying Common Modules for Collaborative R&D
Katja Holta, Massachusetts Institute of Technology, holta@mit.edu
The increasing interdependence of technologies in R&D requires knowledge from different disciplines. Collaboration is a good way of acquiring this knowledge. This study introduces a way to ease the task definition of collaborative projects through a systematic method for identifying common modules for technology-based joint development.

Modularity Unbundled: A Method to Assess Cost Implications of Product Architecture Differences
Sebastian Fixson, Massachusetts Institute of Technology, fixson@mit.edu
While conceptually powerful, 'modularity' has been found difficult to operationalize. We propose a framework to unbundle the multiple characteristics typically subsumed under 'modularity' and to measure them comparatively. Using process-based cost models we link the individual differences to cost effects in the value chain. An example from the auto industry is used to demonstrate the method.

Product and Process Modularity, External Economies of Scale, and Outsourcing Decisions in the Supply Chain
Jovan Grahovac and Geoffrey Parker, Tulane University, jovan.grahovac@tulane.edu
This research introduces product and process design variables of modularity, relevance, and development cost into the analysis of vertical integration and industry structure. The key insight is that vertically integrated firms' strong incentives to invest can lead to a prisoner's dilemma problem when both development cost and relevance of a product/process module are high. This effect can be sufficiently strong to overcome the markup of a single monopolist or an equally concentrated industry upstream even if this industry cannot achieve advantages of scale by serving additional markets. Hence the model suggests a useful role for double margins associated with outsourcing in controlling the fixed development costs that firms incur. Unexpectedly, and contrary to view that firms should focus on their core competencies and outsource nonessential parts of their business, the model implies that modules of low relevance might profitably be kept in house if the upstream suppliers are equally or more concentrated than the downstream industry. On the other hand, retaining highly relevant modules in house may be infeasible if the fixed/development costs are sufficiently high. Finally, the model clarifies relative impacts of modularity, relevance, development costs, and external economies of scale on firm profits.
Information Hiding in Product Development: The Design Churn Effect
Ali Yassine, Dan Braha, Steven Eppinger, Daniel Whitney, all at
Massachusetts Institute of Technology, yassine@mit.edu and Nitin Joglekar, Boston University
Execution of a complex product development project is facilitated through its decomposition into an interrelated set of localized development tasks. When a local task is completed, its output is integrated through an iterative cycle of system-wide integration activities. Integration is often accompanied by inadvertent information hiding due to the asynchronous information exchanges. We show that information hiding leads to persistent recurrence of problems (termed as the design churn effect) such that progress oscillates between being on schedule and falling behind. The oscillatory nature of the PD process confounds progress measurement and makes it difficult to judge whether the project is on schedule or slipping. We develop a dynamic model of work transformation to derive conditions under which churn is observed as an unintended consequence of information hiding due to local and system task decomposition. We illustrate these conditions with a case example from an automotive development project and discuss strategies to mitigate design churn.

Managing Risk through Iteration
Darian Unger, Massachusetts Institute of Technology, unger@mit.edu
This research identifies principles of risk and iteration inherent in product development and explains how different PD processes manage risk through iteration. It explains current research on PD decision criteria and concludes by proposing a framework to help companies better select PD processes.

Product Co-Development in the Automotive Specialty Equipment Market
Maxime Phomma, Thomas Roemer, Ali Yassine, Massachusetts Institute of Technology, troemer@mit.edu
Motivated by how much automotive customization is performed by aftermarket suppliers (a $25B industry), we are studying to what extent OEMs and aftermarket suppliers (AMS) should cooperate. In particular, we are interested in determining what type of design information OEMs should release to AMSs at what time. The principal trade-off here is that AMSs, on the one hand, may add significant brand awareness to OEMs and increase sales, while, on the other hand, directly cut into the revenue stream of OEMs.

SESSION 5: NPD EDUCATION – PREPARING FUTURE LEADERS FOR A MULTIFUNCTIONAL ENVIRONMENT
Session Chair: Debasish N. Mallick, University of Minnesota, dmallick@csom.umn.edu
Time & Place: Sunday, April 7, 10:00-11:30AM, Nob Hill Suite

Managing the New Product Development Process: Design Theory and Methods
Sara L. Beckman, University of California-Berkeley, beckman@haas.berkeley.edu
This course aims to develop the interdisciplinary skills required for successful product development in today's competitive marketplace. Engineering and Business students form product development teams to step through the new product development process in detail, learning about the available tools and techniques to execute each process step along the way. Each student brings his or her own disciplinary perspective to the team, and must synthesize that perspective with those of the others in the group. Students depart understanding processes, tools, techniques and organizational structures that support new product development practice.

Managing New Process and Product Development
John E. Ettlie, College of Business, Rochester Institute of Technology, JEEBBU@rit.edu
The goal of the course is to develop leading-edge skills and provide new information on managing technological innovation—that is, new products, new processes and new information technology from the manager's perspective.
New Product Design and Business Development
Debasish N. Mallick, University of Minnesota, dmallick@csom.umn.edu
We describe an experiential approach to teaching new product design and business development in a year-long course that combines intensive project work with classroom education to help students generalize from their own projects to a wider universe of product design and business development phenomena. Engineering and business students work in teams on “real” product development projects sponsored by business organizations to design prototype products and develop business plans for their commercialization. In an interactive setting, students learn about the new product development process, project management, information sharing and collaboration.

Product Design and Development
Thomas Roemer, Massachusetts Institute of Technology, troemer@MIT.EDU
Product Design & Development is an interdisciplinary course with students from engineering design, manufacturing, management, and industrial design. Through lectures, readings, case studies, product examples, and hands-on exercises the students learn about the product development process, including product planning, customer needs analysis, concept development and testing, financial analysis, design for manufacturing, intellectual property, and project management. Central to the class is the development of new products by student teams. Projects begin with a design brief in the form of a perceived market opportunity. The teams then explore the market, benchmark competitive products, develop numerous concepts, create working models, select a concept, build a production-intent alpha prototype, test the product with customers, and evaluate the business potential.

Managing Product Development
Stefan Thomke, Harvard Business School, sthomke@hbs.edu
The course focuses on conceiving, designing, and developing new products and services and examines the full range of activities needed, including understanding customer needs; creating innovative product or service concepts; managing experimentation and prototyping; and development strategy. The issues cut across functional boundaries, examining problems in areas ranging from design to marketing, and from manufacturing to strategic planning. The centerpiece of the course is a real project in which student teams conceptualize and design a new product or service, some of them with outside sponsors. All student teams present their work at the annual Design Fair, which is open to the Harvard Community and invited outside visitors.

SESSION 6: NEW PRODUCT DEVELOPMENT PROCESS IMPROVEMENT
Session Chair: Keith Goffin, Stuttgart Institute of Management and Technology, k.goffin@Cranfield.ac.uk
Time & Place: Sunday, April 7, 2:00-3:30PM, Nob Hill Suite

Learning from R&D Projects – the Value of Post-Project Reviews
Ursula Koners, Cranfield School of Management, UK and Keith Goffin, Stuttgart Institute of Management and Technology (SIMT - Germany), k.goffin@Cranfield.ac.uk
In today’s increasingly competitive environment, the new product development (NPD) process is a key focus for manufacturing companies. However, the literature shows that several studies have found that few companies try to capture the lessons learned from each NPD project. This is a missed opportunity as R&D departments have much they can learn from previous projects. This paper establishers where there are gaps in the knowledge of post-project reviews in the R&D context. It covers the research design of a study of post-project reviews and the results of a pilot study, which have implications for both researchers and managers.

Product Development Performance And Its Relationship To Business Success
Debasish N. Mallick, University of Minnesota, dmallick@csom.umn.edu
We explore the challenges in measuring product development performance. Using a database of 38 product development projects we study the relationship among the metrics used for measuring product development performance and explore how these metrics are related to business success.
Approach for Development Process Activities Execution and Autonomous Multifunctional Teamwork as Determinants of New Product Performance
Beatriz Minguela-Rata, and Antonio Rodríguez-Duarte, Universidad Complutense de Madrid, Spain and Daniel Arias-Aranda, Universidad de Granada, Spain, minguela@cecc.ucm.es
This paper studies the influence of autonomous multifunctional teamwork for new product development and approaches for process activities execution (sequential approach versus overlapped approach) on new product success (development time, development cost, and product quality). A linear regression model was used to test all hypotheses. Such analysis is performed on a sample of firms in Spain. Results seem to indicate that both autonomous multifunctional teams and execution of activities under an overlapping approach is related positively with shorter development times and higher product quality.

Managing Projects under Uncertainty
Arnoud De Meyer, Christoph Loch, Michael Pich, all at INSEAD, arnoud.de.meyer@insead.edu
We argue that the management style of a project needs to be adapted to the type of project uncertainty: variation, foreseen uncertainty, unforeseen uncertainty, and turbulence (chaos). Widely used project tools are network planning techniques (such as PERT, Critical Path Methods, Gantt Charts) and risk management (risk identification, prevention, contingency planning). These techniques help us to cope with the management of complexity in a project and may also help to address the issue of foreseeable uncertainty. We develop a categorization of types of uncertainty based on a literature survey and the in depth analysis of 16 case studies. We also analyze how the type of uncertainty influences the management of a project, e.g. the style of the project manager, the way relationships are managed, planning and control is executed, and information collected and processed.

SESSION 7 (PANEL): MANAGING “DEVELOPMENT FACTORIES”: INTEGRATING PRODUCTION, OPERATIONS AND PRODUCT DEVELOPMENT PERSPECTIVES
Panel Chair: Stefan Thomke, Harvard Business School, sthomke@hbs.edu
Time & Place: Sunday, April 7, 4:00-5:30PM, Nob Hill Suite

PANEL:
Takahiro Fujimoto, University of Tokyo/ Harvard Business School
Jürgen Mihm, Otto Beisheim Graduate School for Mgmt., Juergen_Mihm@mckinsey.com
Christian Terwiesch, University of Pennsylvania, terwiesch@wharton.upenn.edu
Stefan Thomke, Harvard Business School, sthomke@hbs.edu
While the development of new products usually involves outputs with varying degrees of novelty, many problem-solving routines and processes (such as engineering, prototyping and testing) are much more “factory-like” as they require standardization, repetition, and low variability. Thus, it is not surprising that Toyota’s development system has been influenced by its well-known production system and vice versa. In this invited session, speakers will present research findings that focus on the production/operations/product development interface and hopefully lead to new and exciting projects that integrate these perspectives.

SESSION 8 (PANEL): THE FUTURE OF LEARNING CURVE RESEARCH
Panel Chair: Michael A. Lapré, Vanderbilt University, michael.lapre@owen.vanderbilt.edu
Time & Place: Monday, April 8, 10:00-11:30AM, Nob Hill Suite

PANEL:
Nile Hatch, Brigham Young University, nile@byu.edu
Michael Lapré, Vanderbilt University, michael.lapre@owen.vanderbilt.edu
David Nembhard, University of Wisconsin-Madison, nembhard@engr.wisc.edu
Christian Terwiesch, University of Pennsylvania, terwiesch@wharton.upenn.edu
The learning curve phenomenon is widely known. Yet, organizations continue to show considerable variation in learning rates. The panel will discuss recent major contributions to the field of learning curve research, particularly in the areas of “understanding differences in learning rates” and “what can organizations do to accelerate learning curves,” and identify important areas for future research.
SESSION 9: MANAGING NPD PROGRAM/ NPD PORTFOLIO MANAGEMENT
Session Chair: Mike Danilovic, Jönköping University, Mike.Danilovic@ing.hj.se
Time & Place: Monday, April 8, 2:00-3:30PM, Nob Hill Suite

Managing Complexity in Multi-Project Environment
Mike Danilovic, Jönköping University, Sweden and Bengt Sandkull, Malmö University, Sweden, Mike.Danilovic@ing.hj.se, Bengt.Sandkull@lut.mah.se
Many approaches or tools in the field of project management have so far focused only on a single project at a time while companies actually are facing a complex situation demanding for coordination of people and integration of tasks in many different dimensions that creates a web-alike multi-level structure that may be characterized as multi-project environment. This paper will show how a participational approach using Dependence Structure Matrix (DSM) as process enabling tool can be used to manage complex situations, such as multi-project environment, in order to create integrative structures of tasks and allowing people to participate in the analysis and in the design process of the project and product development process. Results of this analysis shows Who, What, Where, When and Why coordination and integration need to take place in a complex multi-project environment in different levels in organizations.

Promotion of Innovation in SME’s. The Experience in the Textile Sector
Jaume Ribera, University of Navarra, Eugeni Tarre, and Xavier Ferras, both at Generalitat de Catalunya, ribera@iese.edu, etarre@cidem.gencat.es, xferras@cidem.gencat.es
The paper describes the efforts undertaken by the Ministry of Industry in Catalonia, Spain, to foster innovation best practices in the regions SME’s. The program ran over several years and included, among other activities, the identification and development of university innovation technical centers, the creation of a guideline to perform a self-assessment of innovation capabilities, an the development of a guide to manage innovation projects. Initial pilot studies performed in the textile industry showed great acceptance of the tools and an important impact on the behavior of companies.

A Control Structure for Time-Paced New Product Development Projects
K.E. van Oorschot, J.W.M. Bertrand, and C.G. Rutte, all of Eindhoven University of Technology, k.e.v.oorschot@tm.tue.nl
Effectively controlling time-paced new product development (NPD) projects requires a consideration of characteristics of both the process of product development and of the human behavior of people involved in product development. Taking these characteristics into account, it is explained why time slack in project plans might work counter-effective as a control mechanism. Instead, controlling time-paced NPD projects by controlling workload of engineers seems to be more appropriate. A control structure based on the characteristics mentioned above is presented here. This control structure is strongly inspired by results of an in-depth empirical study at a company in the semi-conductor industry.

Contribution of Geometrical Volume for Investment in Planning Process
Ma Luisa Garcia-Romeu, University of Girona, mluisa.gromen@adg.es
This contribution presents the route definition problem depending on technologic traits. This is focused on the use of CAPP (Computer Aided Process Planning) systems and the convenience of grouping operations in order to facilitate the problem. Using a relation of precedence in operations is faster to generate routes. The objective is defining links of precedence between groups of machining operations in order to reduce alternatives. Besides, it allows to calculate and study only the mechanically feasible routes. From a representative types of mechanical parts it is presented a finite number of alternatives routes. The methodology is based on Graph Theory and consists of classifying the involved operations into groups of precedence. From results, applying this grouping before generating routes, it is possible reduce the computation time considerably.
SESSION 10: TECHNOLOGY & INNOVATION IN PRODUCT & PROCESS DESIGN
Session Chair: Elmar Hartweg, Aachen University of Technology, Germany,
hw@fir.rwth-aachen.de
Time & Place: Monday, April 8, 2:00-3:30PM, Nevada Room

Integrating Organizational Innovation in Process Theory Model:
Case Studies as Research Strategy
Cécile Machat, University of Nice, France, icsmachat@yahoo.fr
Since the 1960s, innovation has become a major theme of research and a great preoccupation for managers. According to Brown and Eisenhardt (1995) innovation research can be divided into two main streams. Firstly, the economics-oriented tradition which focuses on the evolution of particular technology over time, firm size and market structure related to technological innovation, costs and risks of development, returns of research and development, differences in the patterns of innovation across sectors and countries and evaluation of public research policy. Secondly, the organization-oriented tradition which examines the organizational characteristics of the innovative organizations and the processes by which new products are created.

The Graphic Industry and the Impact of New Technologies
Silvana Luzia Tambosi, Kátia Rosana Fernandes Marques, and Felipe Reis Graemi, all at ASSELVI, cmarques@gvmail.br
The purpose of this work is to evaluate the impact of new technologies and the course of this area. The manufacturing of photolith in graphic industry is a slow process and sometimes the quality fails.

Design and Development of Virtual Production-Islands
Elmar Hartweg, Aachen University of Technology, Germany, hw@fir.rwth-aachen.de
To overcome the negative consequences of a taylor-oriented organization many companies require a conversation of thinking in business processes into practice suitable organization concepts. In this context “virtual production islands” can be considered as an appropriate approach, which both open up success potentials and support a continuous improvement. The formation of this concept causes many problems in practice. At the Research Institute for Rationalization (FIR) at Aachen University a guideline has been developed, that aims to process the design and development of virtual production islands.

An Exploratory Study of Innovation Management Practices in the Service Sector
Adegoke Oke, Cranfield University, a.oke@cranfield.ac.uk
In spite of the increasing importance of the service sector in many western economies, the issue of innovation management in this sector has received little attention from researchers. This is probably due to the complex nature of service innovation, with products that are mostly intangible (as opposed to tangible manufactured products). For instance, while tangible products may be offered with or without customer service elements, nearly all service products involve close interaction with customers. The paper reports the results of a survey of companies in the financial services sector in the UK. The paper identifies the types and differences in the innovation management practices of companies operating in this sector. The research revealed that certain innovation management practices are specific to relatively high performing companies in the sector. The paper also identifies the barriers to innovation management in service companies.
TRACK 20: PURCHASING AND MATERIALS MANAGEMENT
Track Chair: Joel Wisner, University of Nevada at Las Vegas
wisnerj@ccmail.nevada.edu

SESSION 1 (PANEL): TEACHING PURCHASING AND MATERIALS MANAGEMENT ONLINE
Panel Chair: Sue Siferd, Arizona State University, Sue.Siferd@asu.edu
Time & Place: Saturday, April 6, 4:00-5:30PM, Gold Rush A

The ASU Online MBA Program
Sue Siferd, Arizona State University, Sue.Siferd@asu.edu
The ASU Online MBA was created in order to distribute the Arizona State University MBA experience in Supply Chain Management to corporate partners on an international scale. The normal parameters of a course delivered on the campus at a fixed time and location to students from heterogeneous backgrounds had to be discarded. A new set of objectives was created with respect to delivery, place, time, incoming student experiences, student-faculty relationships and outcomes. ASU's experience over the past two years in creating and operating the Online MBA with selected corporate partners will be shared.

SESSION 2: MANAGING SUPPLIER QUALITY AND SUPPLIER DEVELOPMENT
Session Chair: Philip Huang, Virginia Tech, phhuang@vt.edu
Time & Place: Monday, April 8, 10:00-11:30AM, Sunset Suite

Managing Supplier Quality with an Integrated Analytical Hierarchy Process,
Philip Huang, Virginia Tech, phhuang@vt.edu
Managing suppliers is an important but difficult task. The first step in maintaining supplier quality is to reward business to the right suppliers. However, the large number of factors that need to be considered complicates this decision. Moreover, some of these factors can be measured objectively but others cannot. None of the selection procedures suggested in the literature provides an adequate integration of the two different types of factors. This research develops a simple and yet powerful procedure for evaluating and selecting potential suppliers. This procedure extends the analytic hierarchy process and can be easily modified for group decision-making.

TQM Purchasing and Performance: A Structural Model Analysis,
Cristobal Sanchez, and Jose Joaquin Garcia Clavel, Universidad de Murcia, Spain Angel Rafael Martinez Lorente, Universidad Politécnica de Cartagena, cristosr@um.es, jgarvel@um.es, angel.martinez@upct.es
In this exploratory analysis, a model is developed and tested to determine whether the use of TQM purchasing/supplier relationships increases purchasing quality performance. Specifically, TQM purchasing-related factors influencing internal and external purchasing quality performance were identified from the literature and a purchasing quality management model was developed and then tested using structural equations. Survey data were collected from 307 Spanish purchasing executives in a wide range of industries. The findings from this study indicate the existence of strong positive relationships between implementation of cooperative purchasing/supplier relationships and purchasing quality performance.
The Supplier Development Process: A Structural Model Analysis, Cristobal Sanchez, Universidad de Murcia, Spain, cristosr@um.es
An empirical analysis of the supplier development process in the firm is presented. This study uses data collected from high level purchasing executives representing a large cross industry sample of 307 Spanish firms. The data analysis is rigorous. Correlation analysis, exploratory factor analysis and structural equation modelling is performed. Scales are developed to measure each construct and are shown to be reliable. Based on the findings of this study, purchasing top management commitment is a key element that guides all the stages of the supplier development process. Additionally supplier development activities have a positive impact on purchasing performance.

SESSION 3: SUPPLIER FORECAST SHARING, INTERNET SOURCING, AND FINDING SCARCE MATERIALS
Session Chair: Justin Ren, University of Pennsylvania, justinren@wharton.upenn.edu
Time & Place: Monday, April 8, 2:00-3:30PM, Sunset Suite

Measuring Costs and Benefits from Forecast Sharing in the Case of Customized Production Equipment
Morris A. Cohen, Teck H. Ho, Justin Z. Ren, justinren@wharton.upenn.edu, and Christian Terwiesch, University of Pennsylvania,
We consider the order fulfillment process of a supplier producing a customized capital good, such as in defense systems. As common in these industries, prior to receiving a firm purchase order from the customer, the supplier receives a series of shared forecasts, or ‘soft orders’. Facing a stochastic internal manufacturing lead-time, the supplier must decide at what time to begin the fulfillment of the order. This decision requires a trade-off between starting too early, leading to potential holding or cancellation cost, and the cost of starting too late, leading to potential loss of goodwill. We collect detailed data for a supplier-buyer dyad in the semiconductor equipment supply chain. Under the assumption that the supplier acts rationally, we are able to estimate the corresponding cost parameters based on the observed data. Our estimation results reveal that the supplier perceives the cost of cancellation to be four times higher and the holding costs to be two times higher than the delay cost. In other words, the supplier is very conservative when commencing the order fulfillment, which negates the effectiveness of the overall forecast sharing mechanism.

Source Paso Del Norte: Can an Internet-Enabled Regional Sourcing Program Work?
Adriano Solis, The University of Texas at El Paso, solis@utep.edu and John C. Fields, The Greater El Paso Chamber of Commerce, john.fields@elpaso.org
The Greater El Paso Chamber of Commerce (http://www.elpaso.org) was recently awarded a grant by the Small Business Administration for a new initiative. The “Source Paso del Norte” project seeks to develop and implement, using the Chamber’s Internet portal, a regional business-to-business sourcing program linking buyers with suppliers in the Paso del Norte region. The initiative aims to benefit small local suppliers by building inroads into purchasing/procurement programs of organizations in the region. This paper reports on an ongoing investigation of operational concerns and issues, including identification of potential problems, in the development and implementation of the envisioned Internet-enabled sourcing program.

Obsolescence in Electronics: Predictive and Reactive Strategies
Stephen Swartz, John E. Bell, and Michael J. Gravier, Air Force Institute of Technology, stephen.swartz@afit.edu
The problem of obsolescence in the aviation industry makes itself known through the difficulty of finding repair sources and components for avionics systems used by older aircraft. The issue has been termed “Diminishing Manufacturing Sources and Material Shortages” (DMSMS) by the Department of Defense. While the effects of DMSMS are primarily causing problems in military systems today, the principles and issues are beginning to be felt in other industries and applications. The primary research questions involve how to predict and reduce the impact of DMSMS. Two main issues with DMSMS are presented as a result of this research: first, an analysis is presented of a single aircraft component, and then the results of a larger scale study are provided.
TRACK 21: QUALITY MANAGEMENT AND SIX SIGMA
Co-Track Chairs: Roger Schroeder, University of Minnesota,
rschroeder@csom.umn.edu and
Kevin Linderman, University of Minnesota, klinderman@csom.umn.edu

SESSION 1 (PANEL): THE CHANGING FACE OF QUALITY
Panel Chair:
Time & Place: Saturday, April 6, 10:00-11:30AM, Coit Tower Suite

PANEL:
Steven A. Melnyk, Michigan State University
James T. Tighe, Jim Tighe & Associates, Mill Valley, CA
Muhammad Afzal, Eaton Corporation, Galesburg, MI
Douglas M. Stewart, Michigan State University

In this panel discussion, we bring together quality experts in the areas of the environmental-quality interface, Six Sigma, and the Malcolm Baldrige Award. These experts will explore the following topics:

- What is the changing shape of quality?
- What factors are shaping quality now and into the future?
- What are the new developments now shaping quality (with specific attention on environmental quality, Six Sigma, and the Malcolm Baldrige Award)?
- What are the impacts of these changes in quality on the practice, teaching and research of Operations management?
- Where is quality going in the future and why?

These and other questions will be addressed by means of a mixture of presentation, panel discussion and question and answer. The people involved in this panel represent a mixture of practitioner skill and academia. Each is a qualified expert in their specific aspect of quality.

SESSION 2: QUALITY ASSESSMENT
Session Chair: Charles J. Corbett, UCLA, charles.corbett@anderson.ucla.edu
Time & Place: Saturday, April 6, 2:00-3:30PM, Coit Tower Suite

The Financial Impact of ISO 9000 Certification: An Empirical Analysis
Charles J. Corbett, UCLA, David A. Kirsch, University of Maryland, and
Maria José Montes, Universidad Carlos III, Madrid, charles.corbett@anderson.ucla.edu,
dkirsch@rhsmith.umd.edu, mmontes@emp.uc3m.es

Over 300,000 companies worldwide have adopted the ISO 9000 quality management systems standards. Anecdotal evidence suggests that firms adopt the standards in order to achieve quality or productivity improvements, or in response to pressure from customers. Other argue that the standard can be seen as a signal of good management. In this paper, we track financial performance of all ISO 9000 certified firms in the US, and use various one-stage and two-stage methods to test which of the three interpretations of ISO 9000 (internal benefits, market benefits, or signal of good management) are supported by the data.

Effects of the ISO 9000 Certification on the Firm's Performance: A Vision From the Market
Micaela Martínez Costa, and Angel Rafael Martínez Lorente, Universidad politécnica de Cartagena, micaela.martinez@upct.es

Companies interpret the registration as the way to obtain sustainable competitive advantages, but do the market interpret the same thing? This paper analyzes the stock price performance of a sample of Spanish companies certified by AENOR. The methodology of Event studies is applied to investigate if the market interprets the registration of a company as a signal of its better future performance. After applying parametric and non-parametric tests, we do not find clear evidence to affirm stock market values positively ISO 9000 registration. According to these results and since the certification is not free, organizations should consider carefully the benefits of registration.
The Firm’s Value Creation by Way of the EFQM Model
Javier García-Bernal, University of Zaragoza, Spain, jgbernal@posta.unizar.es
This article analyzes the business management of the companies from one region of Spain (Aragón) that have been presented for the Award for Business Excellence in Aragón. The sample is made up of 34 companies. The score that was given by independent experts for each one of the criteria contemplated by the EFQM Model of Excellence is known for each one of the companies. The main objective is to determine to what extent the model criteria contribute value to the company, whereby the value is measured according the evolution of the results variable. The statistical treatment of the data suggests the existence of four significantly different groups according to the management of each one of the criteria considered in the model (excluding the results variable, which is used as a control variable). The results obtained show that integral management brings with it the creation of a greater value than in those cases in which preferential treatment is given to certain aspects of management in detriment to others.

SESSION 3: QUALITY MANAGEMENT ISSUES
Session Chair: Kevin Linderman, University of Minnesota, klinderman@csom.umn.edu
Time & Place: Saturday, April 6, 4:00-5:30PM, Coil Tower Suite

Knowledge: The Missing Link in Quality Management
Kevin Linderman, Roger Schroeder, and Adrian Choo, all at the University of Minnesota, klinderman@csom.umn.edu, rschroeder@csom.umn.edu, achoo@csom.umn.edu
Several quality thought leaders have considered the role of knowledge in quality management practices. However, various thought leaders in the quality field diverge considerably when contemplating knowledge. We review these diverse perspectives and then propose an integrated view of quality and knowledge using Nonaka’s theory of knowledge creation. The knowledge perspective also provides insight into what it means to effectively deploy quality practices. Previous empirical research noted the importance of effective deployment, but provided little insight into what effective deployment means. This provides a deeper understanding of why some organizations are more successful at deploying quality management than others.

Linking Poka-Yoke to Human Error Mechanisms
Douglas M. Stewart, Michigan State University, dmstew@msu.edu
Poka-yoke constitute an important tool for quality, specifically for controlling human error. Unfortunately, besides brainstorming trial-and-error, there is little firm design guidance on how to develop such devices. This paper reports on a study to link specific types of poka-yoke devices with the underlying cognitive error mechanisms that each was intended to prevent. The result is a design approach that is based on the root cause of the quality failure. Identifying the observed human error mechanism allows us to direct our design efforts towards particular forms of poka-yoke that have been shown to be effective for these errors.

Evaluation Model of Freight Transportation Service Quality: A Case Study
Rogério Carnevali Nery, University of São Paulo, rogerionery@terra.com.br
Transportation companies can achieve quality service, however, it is the customer who is supposed to be in charge of evaluating the quality of such services. Such customer perception enables him to visualize the superiority of a service in relation to another. The customer satisfaction cannot be conceived in a gap. The actions and the market behavior regarding the customer satisfaction can be critical to turn a transportation company successful while customers’ dissatisfaction can be the cause for of loss and damages in the transportation market. In this sense, the following questions have to be taken seriously: What are the expectations and the real perception of road freight transportation services? And what is the discrepancy regarding service expectation and perception? In order to answer such questions, a case study based on the use of a tool called SERVQUAL, developed by Valerie Zeithaml, A. Parasuraman and Leonard M. Berry to measure the quality of services of road freight transportation, is proposed in this paper.
Competitiveness Measurement of Taiwan's Trucking Industry
Tung-Chen Huang, Shu-Te University, tjhuang@mail.stu.edu.tw
Demand for trucking services is directly linked to economic activity. It is important to measure the competitiveness of Taiwan's trucking industry in world markets. A surprising dearth of high quality research on the overall competitiveness of the Taiwan's trucking service industry limits the ability of the industry to address critical issues. This research focus on the measurement of overall competitiveness of Taiwan's trucking service industry from the research perspectives of industrial relations and regulation, business systems, business strategy, technology, and human resources so that the Taiwan trucking industry can benefit from this study and enhance its competitiveness.

A Monitoring Application: Using Charts for Comparing the Dispersion of Heterogeneous Performance Measures
Philip Huang, Virginia Tech, phhuang@vt.edu
When faced with the problem of comparing the variability amongst heterogeneous indicators of performance that have different units of measurement, managers can intuitively gauge each measure's dispersion. However, to reveal abnormal situations, users should employ a control chart. The purpose of this research is to construct a new type of control chart that uses the coefficient of variation (CVP). In the literature of statistics, the non-central t-distribution was identified as the sampling distribution of the coefficient of variation. We have extended their findings to the development of the control charts using the coefficient of variation as the control variable.

SESSION 4 (PANEL): CONFLICTS AND COMPLEMENTARITIES: EXPLORING THE TENSION BETWEEN LEAN MANUFACTURING AND SIX-SIGMA PROGRAMS
Panel Chair: Peter Ward, Ohio State University, ward.1@osu.edu
Time & Place: Monday, April 8, 10:00-11:30AM, Coit Tower Suite

In recent years a number of top manufacturing organizations have embraced lean manufacturing or six-sigma programs. These companies often report outstanding results and are cited as exemplars of high performance. More recently, a number of these companies (e.g., Ford) have attempted to implement both programs. Although high (six-sigma) quality and lean manufacturing are intertwined, conflicts have been reported when these programs meet in practice. This panel will discuss the experience of practitioners who have managed where both programs are in place and in the light of what research has suggested about the performance effects of quality and lean programs.
SESSION 5: QUALITY CONTROL AND CONTINUOUS IMPROVEMENT
Session Chair: Raj Selladurai, Indiana University, rsellad@iun.edu
Time & Place: Monday, April 8, 2:00-3:30PM, Coite Tower Suite

Kaizen: Is it Alive Today in Production Management?
Raj Selladurai, Indiana University, rsellad@iun.edu
The concept of kaizen, as the Japanese call it, refers to continuous improvement in products and processes. It was first developed here in the United States but has been implemented and popularized more effectively by the Japanese that today this method is often associated with Japanese management and cited as a major difference between American and Japanese management. This paper explores the concept of kaizen and its implications for today’s business especially manufacturing. The argument may be made that not only is kaizen very much alive today but in fact it is absolutely an essential prerequisite for successful production management.

An Alternative Scheme of Box Plot Control Chart for Statistical Process Control
Jose Antonio Peixoto, CEFET/RJ - Centro Federal de Educação Tecnológica, jpeixoto@montreal.com.br
This paper introduces an alternative scheme of box plot control chart enhancing interactivity of information for Statistical Process Control (SPC). Suggested modification in box plot display and statistic computation enables to present measures of position, variability and outliers sample by sample, and moreover to plot control limits and specification more efficiently at the same graphic panel for a long term run. These features, comparatively to conventional Shewhart’s Scheme for continuous variable control chart, have some practical advantages, which are explained in terms of Characteristic Curves of Operation (CCO’s) sensitivity and using an example of application.
TRACK 22: SERVICE OPERATIONS MANAGEMENT
Track Chair: Uday Apte, Southern Methodist University
uapte@mail.cox.smu.edu

SESSION 1 (PANEL): HIGH TECH SERVICES
Panel Chair: Rohit Verma, University of Utah
Time & Place: Friday, April 5, 2:00-3:30PM, Oregon Room

PANEL
Art Hill, University of Minnesota
Gregory Heim, Boston College
Craig Froehle, University of Cincinnati
Don Wardell, University of Utah
John Goodale, Ball State University
Scott Sampson, Brigham Young University

SESSION 2: OPERATIONS MANAGEMENT IN FINANCIAL SERVICES
Michael Pinedo, New York University, mpinedo@stern.nyu.edu,
Time & Place: Friday, April 5, 4:00-5:30PM, Oregon Room

During the last two decades operations have become an important area of study in financial services. In this talk we give an overview of applications of operations management in financial services. These applications include productivity measurement and quality control, front offices (distribution channels) and back offices, as well as the analysis of operational risk.

SESSION 3: RETAILING OPERATIONS
Session Chair: Uday M. Apte, Southern Methodist University, uapte@mail.cox.smu.edu
Time & Place: Saturday, April 6, 10:00-11:30AM, Pacific Suite

Managing Inventory for e-Commerce Retailers Through Proactive Demand Management
Uday M. Apte, Southern Methodist University, and S. Viswanathan, Nanyang Technological University, Singapore, uapte@mail.cox.smu.edu, ASVISWA@ntu.edu.sg

The web-based buying process requires the buyer to navigate through a series of web pages. Hence, as compared to a traditional retailer, the e-Commerce retailer is able to exercise a much greater influence over the demand levels for its products. This allows an e-Commerce retailer to proactively dampen the demand for a product when the on-hand inventory level is lower relative to the sales rate, and thereby reduce stockout costs and improve the overall profit. In this paper we present deterministic inventory models for e-Commerce retailers exercising proactive demand management, illustrate the benefits of managing inventory with proactive demand, and provide managerial insights by defining conditions under which the proactive demand management approach can be beneficially used.

High Speed Fashion Retailing: The Lessons from Zara and Mango
Nelson M. Fraiman, and Medini Singh, both at Columbia Business School, nmm1@columbia.edu, ms2149@columbia.edu

Two Spanish clothing chains—Zara and Mango—have revolutionized global fashion retailing by their fast design cycles, quick replenishments and innovative use of information technology to track and respond to evolving fashion trends. In a business where shortages of hot items, as well as markdowns on not-so-hot products, keep profits in check, Zara and Mango have each devised a unique success formula. Zara, through its vertical integration and Mango through its clever logistics and distribution, send items to their stores several times a week, just as they are needed.
Product & Process Complementarities in E-Business:
An Empirical Analysis of Electronic Food Retailers
Gregory R. Heim, Boston College and Kingshuk K. Sinha, University of Minnesota,
heimgr@bc.edu, ksinha@csom.umn.edu
We propose a product-process matrix for e-business. Using the matrix as our conceptual framework,
we will empirically examine the complementarities between e-products and e-processes and their
impact on online customer satisfaction. We will discuss the implications of the results for
product-process integration in e-business.

Every House a Warehouse: An Inventory-Theoretic Model of Retail Shopping Behavior
Edward Fox, Southern Methodist University, Richard Metters, Emory University, and
John Semple, Southern Methodist University, efox@mail.cox.smu.edu,
Richard_Metters@bus.emory.edu, jsemple@mail.cox.smu.edu
We model the store choice problem where items come from one of two store formats: a retail
store with low unit prices but a high fixed cost; and a convenience store with high unit prices but
a low fixed cost. Assuming a stochastic inter-purchase interval, we derive the optimal purchase
policy. Among other things, our model predicts the existence of a “first-order stockpiling effect,”
i.e., an investment in excess inventory based solely on price expectation instead of price variation
(the prevailing belief). This discovery and other model predictions are overwhelmingly supported
by statistical tests conducted on IRI panel data.

SESSION 4 (TUTORIAL): ROCKET SCIENCE RETAILING
Marshall Fisher, University of Pennsylvania, and Ananth Raman,
Harvard Business School, Boston
Time & Place: Saturday, April 6, 2:00-3:30PM, Pacific Suite
Retailing is a big industry. In the U.S., retail business represents 40% of the economy and is the
largest employer. Retail supply chain management is still more art than science, but this is changing
rapidly as retailers begin to apply analytic models to the huge volume of data they are collecting on
consumer purchases and preferences. This industry-wide movement resembles the transformation of
Wall Street that occurred in the 1970s when physicists and other “rocket scientists” applied their
analysis skills to investment decisions. The rocket science retailing movement will create enormous
opportunities for our profession. To better understand these opportunities, we have been working
with 32 leading retailers to assess their progress towards rocket science retailing and to accelerate that
progress through selected research projects with the retailers. We will describe findings from this
work, including: how do retail supply chains function; what decisions arise in retail supply chain
management that lend themselves to analysis; a synopsis of prior research on selected topics including
managing short life cycle products to manage life cycle profits, merchandise testing and store level
assortment planning and what are the exciting future research frontiers.

SESSION 5 (PANEL): LAUNCHING THE COLLEGE OF SERVICE OPERATIONS
Panel Chair: Paul Kleindorfer, University of Pennsylvania
Time & Place: Saturday, April 6, 4:00-5:30PM, Pacific Suite

PANEL
Aleda Roth, University of North Carolina
Richard Chase, University of Southern California
Uday Apte, Southern Methodist University
Nelson Frazier, Columbia University
This purpose of this session is to discuss the POMS initiative to launch the "College of Service
Operations." Panelists will present their thoughts on (1) the opportunities and challenges present in
conducting research and teaching in the increasingly important area of service operations, and (2)
the important role that the proposed college can play in serving the needs of the POMS members
interested in working this area.
SESSION 6: HEALTHCARE OPERATIONS
Session Chair: Sridhar Seshadr, New York University, seshadr@stern.nyu.edu
Time & Place: Sunday, April 7, 10:00-11:30AM, Pacific Suite

Resource Planning and Demand Allocation in Dispensing Networks
Xiuli Chao, North Carolina State University, Michael Pinedo, and Sridhar Seshadr, both at New York University, xchao@unity.ncsu.edu, mpinedo@stern.nyu.edu, seshadr@stern.nyu.edu
We address the problem of joint capacity planning and assignment of customers in a large-scale, dispensing pharmacy network that caters to home-delivery and mail-service programs. In this network, customers may have their prescriptions, for chronic, maintenance medications, dispensed directly by pharmacies and delivered through the mail. In this talk, we primarily focus on the class of joint capacity planning and resource allocation problems in which customers view waiting times as one of their major concerns. We propose a methodology for optimal planning and demand allocation in this network that incorporates customer reaction.

Statistical Process Control (SPC) in the Admission/Discharging Process: A Hospital Example
Joseph G. Ormsby, and Joyce M. Hoffman, both at Stephen F. Austin State University, jormsby@sfasu.edu
This paper documents the development of an admissions/discharge plan for a local hospital and the use of process control charts to monitor the time required to timely discharge/admit patients. The admissions/discharge plan is thoroughly studied to determine the problems with the current process and a new plan is developed to eliminate current problems. Additionally, after implementing the new procedures, data from hospital records document how the new system is effectively improving the admissions/discharging operation.

Scheduling Elective Surgical Cases in Specific Operating Rooms to Maximize the Efficiency of Use of Operating Room Time
Rodney Traub, North Dakota State University, rodney.traub@ndsu.nodak.edu
Selecting the day of surgery is a joint decision by the surgeon and patient. However, the process for assigning this surgery to an operating room (OR) will impact OR efficiency. Ideally, a surgery would be scheduled into that service's allocated OR time. However, scheduling operations into a different service's OR time can improve OR efficiency and reduce overall costs. We describe various methods for assigning surgeries to OR's and show how these impact the efficiency of the operating room. The guidelines we present are verified through the use of data from a number of hospitals.
SESSION 7: TEACHING SERVICE OPERATIONS
Session Chair: Richard Metters, Emory University, richard.metters@bus.emory.edu
Time & Place: Sunday, April 7, 10:00-11:30AM, Portola Room

Teaching quantitative service operations
Richard Metters, Emory University

Environmental Strategy in Services
Steve Walton, Emory University

The Experience Economy
Madeline Pullman, Colorado State University

Project Management in Services
Michael Ketzenberg, Colorado State University

SESSION 8: TECHNOLOGY IN HEALTHCARE SERVICES
Session Chair: Sridhar Seshadri, New York University, sseshadr@stern.nyu.edu
Time & Place: Sunday, April 7, 2:00-3:30PM, Pacific Suite

Managing Medical Equipment:
An Analysis of the Outcomes of Applying Appropriate Programs
Leila Gomes, Pontificia Universidade Católica do Rio de Janeiro, focus@openlink.com.br
Clinical Engineering activities have increasingly helped the management of medical equipment in hospital units. Through its programs these units can administrate the technological resources since its acquisition to its scrapping, using all of its capacity. The aim of this study is to present the results of the application of MME programs in two selected hospitals units in Brazil, since the growth of the technological resources complexity imposes an efficient management due to the sophisticated combination of various components and mechanisms that need control, revision and periodic preventive maintenance.

Open Access, Electronic Medical Records and Patient Satisfaction: Is Automation Better?
Diane H. Parente, Mary Beth Pinto, and Joseph Barber all at Penn State, Erie, dhp3@psu.edu
Much has been written in the services operations literature on perceived waiting time and its influence on customer satisfaction. In the health care field, in particular, a number of studies have pointed to the role that perceived waiting time plays in satisfaction. Electronic Medical Records (EMR) are purported to affect the efficiency as well as the effectiveness of the appointment process. In this study, we collected real-time data pre- and post-EMR implementation, analyzed patient cycle time issues and the impact on patient satisfaction. Based on our findings, a number of implications for the management of services operations and automation are proposed.

Healthcare Information Systems: Analysis of Healthcare Software Products
Kimberlee Snyder, Winona State University, ksnyder@winona.edu
The need to manage the medical information explosion in healthcare delivery requires that information technology be optimized in diagnosing diseases, planning and administering treatment, and monitoring patient outcomes, services and costs. Over 400 software products from over 200 companies were gathered through Internet research. This paper will focus on providing a meaningful comparison and evaluation of the software products analyzed, in three major categories: Business Functions, Laboratory Data, and Collaboration Capability. The results presented will indicate to what extent the healthcare software providers are addressing specific parameters set forth by the World Health Organization for healthcare information system.
SESSION 9: SERVICE STRATEGIES
Session Chair: Larry Menor, University of Western Ontario, lmenor@ivey.uwo.ca
Time & Place: Sunday, April 7, 2:00-3:30PM, Portola Room

Strategic Service Realization: Chokhi Dhani- A Case Study
Nimit Chowdhary, Instituto Tecnológico y de Estudios Superiores de Monterrey, Mexico and
Ashish Pareek, Maharshi Dayanand and Saraswati University, India,
nimitchowdhary@hotmail.com, aspar78@hotmail.com
Ephemeral and Experiential nature of services have rendered it more challenging for managers to identify their own service products. The problem is compounded by the presence of the customer who expects a vivid total service experience during the entire length of his encounter with the service environments. A service package is thus an aggregate of tangibles and intangibles provided in a service context. Further this service package needs to be realized into a strategically focused service concept or design. Chokhi Dhani, at Jaipur (INDIA), is the first five star ethnic resort of India. Setup as a traditional Rajasthani village, the resort offers an exotic “eatitude” experience. This case in point analyzes how different elements of service offer and its context have been intertwined to offer a strategically consistent service product. It is important that the service offer design synchronizes with the strategic vision of the company.

The Effects of Severity of Failure and Loyalty of Customer on Service Recovery Strategies
Christopher W. Craighead, University of North Carolina, Charlotte, cwcraighead@email.uncc.edu, Kirk R. Karwan, University of South Carolina, and Janis L. Miller, Clemson University
Despite the best efforts of providers, occasional service failures are inevitable. However, a failure does not have to result in permanent negative consequences if an effective service recovery is made. This study focuses on characteristics of the customer and the severity of the failure, and presents a two-by-two matrix to describe four types of situations that can be faced by providers during a service failure. Empirically derived results show that effective recovery strategies and supporting activities should vary, based on the location of the failure within the matrix.

An Empirical Examination of New Service Development Strategies
Larry Menor, University of Western Ontario, lmenor@ivey.uwo.ca
New service development (NSD) remains among the least studied and understood topics in the service operations literature. Specifically lacking is an understanding of the resources and capabilities that are the basis of successful NSD strategies. Contrary to the belief that new services happen as a result of intuition, flair, and luck, this research examines the systematic configuration of operational NSD strategies. Using a sample of retail banks—a type of service commonly studied in NSD research—we empirically derive and profile a taxonomy of NSD strategies and examine their impact on NSD performance.

Process Integration in Multi-type Services Where the Contact between Server and Customer is High and Repetitive
Scott Metlen, University of Idaho, metlen@uidaho.edu
The purpose of this article is to empirically explore elements of the service profit chain concept as presented by Heskett et al (1997). Links between facets of process integration, facets of employee satisfaction, employee effectiveness, and customer satisfaction are explored using structural equation analysis. Analysis of data collected in the skilled nursing home industry of Utah indicate that not all facets of process integration are positively and or significantly correlated to employee satisfaction, not all facets of employee satisfaction are positively and or significantly correlated with employee effectiveness, and that employee effectiveness is positively and significantly correlated with customer satisfaction.
SESSION 10: INNOVATIONS IN OPERATIONS SERVICE STRATEGY

Session Chair: Aleda Roth, University of North Carolina at Chapel Hill
Time & Place: Sunday, April 7, 4:00-5:30PM, Pacific Suite

Bridging the Last Mile – Making Internet Ordering of Groceries Work
Ken Boyer, Michigan State University
This study will present a case-study based comparison of three leading Internet retailers of food products: Albertson's (the second largest supermarket chain in the U.S. with 2,500 stores, 220,000 employees and $37.5 billion in annual sales), Tesco and Schwans (A company that delivers $1.5 billion in frozen products to consumers' homes). Each of these businesses has successful Internet ordering and delivery systems in place. We will assess the degree of consensus between their operations and marketing strategies and evaluate the resulting operational decisions to develop a profile of the keys to success in this new and challenging market.

The Disappearing Difference Between Front-Office and Back-Office Operations
Craig M. Froehle, University of Cincinnati and Aleda V. Roth, The University of North Carolina at Chapel Hill
Traditionally, service operations have been characterized by the differentiation between front-office, or customer-facing, operations and back-office operations, which are often run more like manufacturing. With the growing prevalence of information technology, self-service, and other innovations, the customer is being brought further and further into the service operation. As processes become more transparent and automated, and the service package becomes more dependent upon the customer's input, the proper design of the service (process, experience, etc.) becomes ever more critical. We examine how these trends are affecting the service sector and the risks and opportunities associated with the changing paradigm.

Designing and Managing Experience Services
Madeleine (Mellie) Pullman, Colorado State University
In today's economic environment, customers are faced with an enormous amount of service offerings both in the physical locations and through other channels such as the Internet. With this glut of information, attention has become the scarce resource and organizations must "battle for the eyeballs." Not only is it difficult for the service provider to get the customer's attention for their offering, but keeping their attention can be even more challenging. Generally, those companies that can grab the attention and hold it will be winners. A merely satisfied customer is still likely to shop around, the next time he or she needs to buy a service, for a better price or more convenient offering. A loyal customer is more likely to make a point of coming back to a specific supplier, and moreover, is likely to recommend the service to others. Thus, it becomes imperative to look at ways to create a loyal customer rather than just a satisfied customer. Providers must transform a vanilla "me too" service into a memorable event that the customer will want to repeat again and will want to recount to all their friends. In other words, companies must create or stage an "experience." Not only should the experience be memorable, it should also be designed to increase customer loyalty by letting customers build on their encounters with the provider through time. Generally defined, an experience occurs when a customer has any sensation or knowledge acquisition resulting from some level of interaction with different elements of a context created by a service provider. Successful experiences are those that the customer finds unique, memorable and sustainable over time, would want to repeat and build upon, and enthusiastically promotes via word of mouth. But experiences are inherently emotional and personal, so we must acknowledge that there are many factors beyond the control of management (personal interpretation of a situation based on cultural background, prior experience, mood, sensation seeking personality traits, and many other factors). Thus, the service designer is designing for experience as is the manager facilitating an environment for experience. In this paper, we first describe the key dimensions within management control during experience creation; specifically, engagement, context, and time. Second, we discuss what it takes to create and manage such an experience. Finally, we highlight several new business concepts that are successful experience models.
An Imprecise Data Envelopment Analysis Framework for the Analysis of Retail Banking Strategies
Pedro Oliveira, Aleda V. Roth, David Rubin, and Wendell Gilland,
The University of North Carolina at Chapel Hill
How can the competitive capabilities of the banking industry be increased through resource-based operations strategy? Imprecise Data Envelopment Analysis, using ordinal scales of operations constructs for evaluating the relative efficiencies of banks' strategies, is used. Banks are modeled as input-output systems considering knowledge, technological leadership and market acuity as inputs, and service quality, delivery, flexibility, cost and pretax ratio of earnings as outputs. We show that banks that foster intellectual capital tend to be more efficient, provide evidence on the importance of knowledge-based assets for agility, and confirm that successful banks derive their competitive edge from a deep understanding of a few highly developed knowledge and service based core competencies.

SESSION 11: WAITING LINES IN SERVICES
Session Chair: Sal Agnihotri, Binghamton University, agni@binghamton.edu
Time & Place: Sunday, April 7, 4:00-5:30PM, Portola Room

A Simulation Study of Cross-Training in Field Service Systems
Sal Agnihotri, Binghamton University, Ajay Mishra and Donald Simmons, agni@binghamton.edu
When the job types are heterogeneous requiring multiple skills, cross-training workers increases worker flexibility as well as service costs. We study a field service system with three job types to decide on three cross-training factors: fraction of servers cross-trained, number of secondary skills imparted, and efficiency in secondary skills. We develop an index to measure cross-training. Using simulation and a queuing framework, we study the role of the three factors and their interactions in a variety of situations with varying server utilization, number of servers, probability of server-job mismatch, and travel times.

Effects of Individual Characteristics, Service Design Characteristics, and Criticality of Service on Perception of Waiting Time
Mirjeta Beqiri, and Suresh Tadisina, both at Southern Illinois University, mirsa@siu.edu, suresht@cba.siu.edu
This study presents a broad conceptual model that identifies individual characteristics, service design characteristics, and criticality of service, affecting perception of waiting time, and attempts to empirically test some of these effects. Furthermore, the impact of perception of waiting time on perceived service quality is examined. More specifically, the impact of individual characteristics such as personality types (Type A vs. Type B), age, gender, and income; service design characteristics such as fairness of waiting system, level of distraction, and level of uncertainty (manipulated by providing explanations and/or estimated waiting time); as well as the potentially moderating effect of the criticality of service, on the perception of waiting time, will be examined. Additionally, we expect to find that as perceived waiting time increases, perceived service quality decreases. The study is expected to offer some suggestions to service managers on how to better manage perceived waiting time, and, consequently, impact perceived service quality.
Modeling and Managing the Percentage of Satisfied Customers in Hidden and Revealed Waiting Line Systems

Chester Chambers, Southern Methodist University, and Panagiotis Kouvelis, Washington University, cchamber@mail.cox.smu.edu

In this paper, we present models of waiting line systems that explicitly incorporate customers' expectations of the waiting time upon arrival to the queue. We focus upon system performance which we define as the percentage of customers who are satisfied. A satisfied customer is defined as one that waits less than (s)he originally expected. We discuss two different cases of the customers' expectations setting process. Cases in which customers set expectations without being able to observe the state of the system are referred to as "Hidden Queues." Cases in which customers set expectations after observing the state of the system are referred to as "Revealed Queues." We extensively study both "Hidden" and "Revealed M G 1" queues for different service time distributions and for various distributions of customers' expectations of waiting time. Explicit formulas are proposed for the percentage of satisfied customers as functions of various system factors (utilization, service time distribution parameters, etc.) Our analysis is then extended to "Hidden" and "Revealed" multiserver queueing systems. Our results point out interesting properties of "hidden" and "revealed" queueing systems. The new perspective this paper brings to the modeling of waiting line systems allows us to rethink and suggest ways to enhance the effectiveness of various managerial options in improving the service quality of waiting line systems.

SESSION 12: SERVICE QUALITY

Session Chair: Vidya Gargeya, University of North Carolina at Greensboro, vbgargey@uncg.edu
Time & Place: Sunday, April 7, 4:00-5:30PM, Carmel Room

On Benchmarking the Quality of Services

Henry Aigbedo, Oakland University, haigbedo@oakland.edu

The service sector has continued to play a significant role in the economy of the U.S and those of some other developed countries. Although parts of the service sector have experienced productivity growth in recent years, it is still not comparable to the manufacturing sector. Similarly, measurement of the quality of service outputs has not been as successful as that of manufacturing outputs. This paper examines the importance of benchmarking services and provides a useful framework by which service organizations can benchmark the quality of their services relative to those of world-class organizations.

Defining Quality and Measuring Performance in a Sales and Service Organization

Vidyaranya B. Gargeya, University of North Carolina at Greensboro, vbgargey@uncg.edu and Timothy R. Horkey, Delmac Machinery Group, Greensboro, thorkey@delmac.com

This paper presents the findings of a survey of managers and employees regarding service quality and performance measurement at a sales and service organization. A total of 29 employees were polled at a woodworking machinery sales and service organization used for this case study. This firm represents Italian machinery manufacturers in the U.S. market and is also responsible for after-sales parts and service support. The paper concludes with a summary of observations and recommendations for the specific organization studied; the findings could be applied to other sales and service organizations. Suggestions for further research are also provided.
Public Process Realignment: A Tool for Quality Management
Maria Helena Theiss, Jerusa Carla Volani, Felipe Reis Graemi, all at the Faculdades Integradas do Vale do Itajai, Brazil, jetheiss@yahoo.com.br, jcvolani@terra.com.br, graemi@eps.ufsc.br
Public agencies need increasingly to adjust their work processes to the new trends in information technology. By studying municipal work processes, it is possible to review an agency’s competence and activities and ensure the excellence of goods and services offered to customers, thus reducing the waiting time, optimizing the use of resources and decreasing costs. This paper deals with the quality of public services rendered to citizens and describes how governmental bodies are treated under the recently enacted Constitutional Amendments, which have been forcing many areas of the public sector to shift priorities and reorganize. Rapid changes are required at the municipal level as one factors in the scope and complexity involved in its everyday routine, which entails the managing of myriad resources, the provision of service to the community and the promotion of local development.

Service Quality Improvement: Reducing Wait in a Hospital Pharmacy
Willard Price, University of the Pacific, wprice@uop.edu
This research began as a field study for Operations Management graduate students conducting a queuing analysis of waiting behavior at a hospital pharmacy. At the same time, graduate students in a Quality/Productivity course were examining “back room” operations, conducting process analysis and cycle time measurements and identifying causes of excessive patient wait and reneging. A second queuing analysis was completed after backroom improvements were recommended, even though the Pharmacy hesitated to accept all recommended changes. The rationality of this resistance is also argued. The paper documents the service process, describes acceptance and resistance to design changes and presents the resulting impact on waiting and reneging. A major reengineering of the pharmacy system is also generated to achieve “breakthrough” improvements in time cost and quality, in essence to get “faster, better and cheaper”.

Six Sigma in Banking: Some Reflections
Roger Maull, University of Exeter, r.s.maull@ex.ac.uk
This paper will provide a detailed case study of the application of six sigma techniques in a major UK bank. The product that was analyzed was the personal loan delivery process. We will show how we modeled the process and the data that was collected. We will propose a simple 5-stage approach for data collection and analysis. We will highlight many of the problems faced in calculating a sigma score where the CTQ’s are difficult to determine. We conclude with some implications for service marketing.
SESSION 13: TOPICS IN SERVICE OPERATIONS I
Session Chair: Donald A. Forrer, International College – Naples Florida, dforrer@internationalcollege.edu
Time & Place: Monday, April 8, 10:00-11:30AM, Pacific Suite

The Impact of the Information Technology in Service Competitiveness in Brazil
Marques Érico, Fundação Getulio, emarques@gymail.br
The use of IT as a tool for process integration is already well known in the business community, as noticed by the extensive use of ERP’s in the last years. Nowadays, this integration is moving to a second stage out of the boundaries of the companies. The main goal of this research is to evaluate the applications of IT in the integration of enterprises or networks in services companies in Brazil as competitiveness differentiation. The contributions of this research are mainly related to the applications and impact of IT in order to improve and to create new services.

Influence of National Industrial Politics in Small and Medium Size Industries on Region of Sao Paulo (Brazil)
Alexandra Eugenia Arellano Guerrero, and Reinaldo Pacheco da Costa, Universidade de São Paulo, EPUSP, Faculdade de Engenharia de Produção, aeugeria@usp.br, rpacosta@usp.br
The purpose of this article is to discuss the true influence of industrial politics of govern in small and medium size industries, under the productivity and innovation context and analyze some particular aspects of the brazilian context, specially in the region of São Paulo (one of the most industrialized state of Brazil). Besides this, the intention is to point out some possible import aspects what not has been contemplate in current national industrial policies and, finally, to propose some regional public policies that could insert and benefit best this sector.

Employee Retention in the Quick Service Industry
Donald A. Forrer, International College – Naples Florida and Gordon Guerrieri, Owner, Taco Bell Franchise(s), dforrer@internationalcollege.edu
This research explores a key dimension of effective leadership. The Quick service industry for years has focused on keeping their workforce in fear of shortages that surmount to lost profits and possible loss of market share. Quick service companies can retain their most desirable employees by recognizing their contributions to the organization. Recognition is an effective leadership tool that involves motivating employees, involves the acknowledgement of efforts and creativity and willingness of employees to exert extra effort. This research focuses on the retention challenges facing today’s quick service organizations.

Integration in Promoting Gains of Quality and Competitiveness
Annibal Jose Scavarda, Pontificia Universidade Católica do Rio de Janeiro, Annibal@rdc.puc-rio.br, Leonardo Junqueira, Lustral, Pontificia Universidade Católica do Rio de Janeiro, jil@rdc.puc-rio.br, Arthur V. Hill, University of Minnesota, ahill@cson.umn.edu
Application of supply chain management concepts has dramatically improved cost, quality, and competitiveness for many manufacturers, distributors, and retailers. In this paper, we argue that supply chain concepts can be adapted and applied to improving cost, quality, and competitiveness for service firms as well. The proposed exploratory empirical research will focus on the tourism package chain and will be based on primary and secondary data.
SESSION 14: TOPICS IN SERVICE OPERATIONS II
Session Chair: Mark M. Davis, Bentley College, Boston, Massachusetts, mdavis@lnmta.bentley.edu
Time & Place: Monday, April 8, 2:00-3:30PM, Pacific Suite

Environmental Awareness in the Bakery Industry:
A Case Study on the Use of Natural Gas in Brazil
Juliana Dantas de Araújo Santos, Sérgio Marques Júnior, and
Rubens Eugênio Barreto Ramos, all at Federal University of Rio Grande do Norte,
julidantas@ig.com.br, sergio@ct.ufrn.br, rubens@ct.ufrn.br

The objective of this paper is to verify the environmental perception on the use of natural gas in the bakery industry of Natal/Brazil. The methodology of evaluation was based on a survey involving a representative number of managers of bakeries, classifying them in homogeneous groups in agreement with their characteristics of perception of environmental management. The statistical technique of cluster analysis was used, allowing three groups with different characteristics to each other to be identified. Besides the use of cluster analysis, an analysis of variance was applied, verifying the possible differences among the specific groups. The preliminary studies indicated that most of the bakeries are defined in a group, in which the environmental variable has not been considered in their decisions processes.
Forecast Aggregation in Service Operations
Gaylord May, Wake Forest University, jgmay@mthsc.wfu.edu
Forecast aggregation is a frequently used technique in service forecasting. Aggregate or cumulative forecasts are generally more accurate than the lower level, component forecasts that comprise them. Component forecasts, however, provide a level of detail not offered by the aggregate. It is important to utilize both types of forecasts. This paper will present a goal-programming model, which simultaneously generates forecasts for the aggregate and the lower level components. Data from an actual service firm will be used to illustrate and test the proposed model against standard techniques for hierarchical forecasting.

Operational Risk Management in Aviation Flight Safety
Stephen M. Swartz, and Capt Park D. Ashley, AF Inst of Tech, Stephen.Swartz@afit.edu
The purpose of this research was to investigate the effects of Operational Risk Management (ORM) program, as implemented by the United States Army in 1987. While naïve analysis suggests that serious mishaps declined after the implementation of ORM, a time-series analysis indicates that the case to be made is not so clear. Indeed, while “before” and “after” statistics support significantly lower rates after implementing ORM, stronger evidence suggests that an already decreasing trend was actually halted. Several lessons can be learned from these results, and can be extended into a broader perspective. First, while intuitively appealing in theory, the effects of the ORM initiative had several unintended consequences above and beyond the primary objective sought. These unintended consequences are inherent in any major organizational effort that seeks to change the focus of elements within that organization. Second, from an organizational perspective, it is proposed that difficulties arise when setting out to measure the success of any “Process Improvement Initiative.” Confounds and issues confronted in the course of the research are presented in a general setting for evaluating future initiatives.
SPECIAL TRACK 23: INNOVATIONS IN EDUCATION
Track Chair: Martin Starr, Rollins College, mstarr@rollins.edu

SESSION 1: CREATIVE POM TEACHING
Session Chair: Norman Faull, University of Cape Town, nfsull@gsb2.uct.ac.za
Time & Place: Saturday, April 6, 10:00-11:30AM, Gold Rush A

Do you think you could be a more creative teacher? Regarding my own teaching, I know I could be. But I think I need your help. I know I do. This session seeks to get us sharing about a whole lot of things. Ideas for games, for approaches to case teaching, use of ‘things’ (ours is a physical subject after all), simulations, assignments, the Internet, when a guest speaker really works, visits, absorbing lecturing (is that the ultimate oxymoron?), and more. The session is also about asking questions. Do you have the same approach to teaching a core as to teaching an elective? If so, how does your approach differ? If not, why? Are we teaching content or process, or both? Do I see myself as ‘educating’ or ‘training’? Am I on a ‘character formation’ mission as part of my teaching? Do I teach or facilitate? If I am not learning, am I teaching? How influenced is my teaching by the assessment process - me of the students, the students of me? Perhaps you could prepare for the session by (a) bringing along a course outline to make things concrete, and (b) asking: What are the things that really work for you in your teaching? What do you struggle with? Think of someone you really admire as a teacher. What is it that makes them special? What is it that makes you special as a teacher? We invite you to come and share your creative teaching ideas.

SESSION 2 (PANEL): THE VALUE OF AN APPLIED/ PRACTITIONER ORGANIZATION PARTNERING WITH HIGHER EDUCATION:
THE APICS EXAMPLE
Session Chair: Drew Rosen, UNC, Drew@ec.rr.com and
Rhonda Lummus, Iowa State University, Rhummus@iastate.edu
Time & Place: Saturday, April 6, 10:00-11:30AM, Redwood Room

PANEL:
Drew Rosen, University of North Carolina at Wilmington, Drew@ec.rr.com
Rhonda Lummus, Iowa State University, Rhummus@iastate.edu

APICS the long-standing premier provider of education to manufacturing and resource management professionals has considerable resources and opportunities for the academic sector. The role of higher education is changing; applied aspects of business are rapidly replacing theory in many courses and programs. With this shift in pedagogy, it is now time to strengthen the ties between APICS and academia. This session will be of an interactive nature between the presenters and the audience participants centering on the synergies between APICS and POMS in exploring the numerous resources available through APICS and POMS to support research, teaching, and other areas such as Academic in Residence Programs and joint educational programs.
SESSION 3: THE STRUCTURE OF PROFESSIONAL DOCTORATE DEGREES
Session Co-Chairs: Sue Nartker, Administrative Director, san2@po.cwru.edu and Marilyn Chorman, Assistant Director, EDM Program, mac29@po.cwru.edu, both at Case Western Reserve University (CWRU)
Time & Place: Saturday, April 6, 4:00-5:30PM, Redwood Room

The Structure of Professional Doctorate Degrees at Case Western Reserve University
Marilyn A. Chorman, Case Western Reserve University, mac29@po.cwru.edu and Sue A. Nartker, Case Western Reserve University, san2@po.cwru.edu
The Executive Doctor of Management (EDM) Program at the Weatherhead School of Management, Case Western Reserve University, is one of a number of relatively new doctoral degrees for advanced professionals. The EDM Program is a 54-semester credit hour program of study over a three-year period. It requires a prior master's degree and a minimum of 15 years of work experience. The format of the Program involves six intensive residencies each semester (every three weeks), with email communication between faculty, students, and administration between residencies. The curriculum consists of 24 hours of substantive seminars, 24 hours of research methods and projects, and six hours of independent study. This presentation describes the program's audience, its global, interdisciplinary curriculum, and the implications of the concept of a practitioner-scholar.

PhD Program in Management at Claremont Graduate University - Part 1
Paul Gray, Claremont Graduate University, paul.gray@cgu.edu
For over 25 years, Claremont Graduate University has offered a PhD in its Executive Management Program. This program is offered part-time for fully employed students who either have at least one supervisor working for them or are entrepreneurs. The program was designed by Peter Drucker in response to EMBA's wanting to continue after their degree. The degree requires 72 units, (24 management and 12 research methodology), a publishable paper, prelims, and dissertation proposal and defense. The program is offered cafeteria style rather than lock step. Students are able to tackle dissertation topics that are not generally available to conventional students.

Latin-American PhD at the Freeman Business School
Amiya K. Chakravarty, Tulane University, akg@tulane.edu
The total value chain, in preparing a PhD candidate for knowledge creation, commences from candidate selection and ends in his/her placement. Between these extremities there exist a large number of technical and/or business processes that contribute to a program’s competitiveness. Institutions may compete based on the quality of these processes and/or the reengineering of the value chain into new “business” models (niche players). One such model integrates the two extremities of the value chain (selection and placement) into a single process, which may thereby significantly impact its quality and viability. The business model must therefore be positioned strategically in terms of factors such as knowledge-dissemination, culture-variations, knowledge-transfer channels, intermediaries, global coordination, market opportunities, and value creation capabilities at the home-institution.

The Doctor of Professional Studies (DPS) Degree at Pace University
John P. Dory, Pace University, dory@pace.edu
The Doctor of Professional Studies (DPS) was founded in 1972 with the help of Peter Drucker. Its mission is to enable successful business managers and professionals to expand, conceptualize, generalize, and communicate their experience so they can be effective in senior line or staff managerial positions or consulting engagements. The program curriculum maintains a delicate balance between developing breadth and depth of understanding while focusing on theory and methodology applicable to contemporary business issues. Qualified applicants must have a masters degree and at least ten years of experience. Candidates complete 57 academic credits, including integrative seminars, courses in two concentrations, and a dissertation, while advancing their full-time professional careers. Until autumn 2002 all courses were conducted in a traditional evening seminar format.
SESSION 4: SHARING EXECUTIVE EDUCATION BEST PRACTICES
Session Co-Chairs: Marilyn Chorman, Assistant Director, EDM Program, mac29@po.cwru.edu, and Sue Nartker, Administrative Director, san2@po.cwru.edu, both at Case Western Reserve University (CWRU)
Time & Place: Sunday, April 7, 10:00-11:30AM, Redwood Room

Sharing Executive Education Best Practices
Marilyn A. Chorman, Case Western Reserve University, mac29@po.cwru.edu, and
Sue A. Nartker, Case Western Reserve University, san2@po.cwru.edu
The residency format of the EDM program (students meet in Cleveland every three weeks) requires that students, faculty, and administrators supplement face-to-face sessions with frequent email communications. Recruitment activity includes thorough inquiry follow-up and candidate screening via telephone and email assisting in obtaining qualified candidates worldwide. Exceeding service expectations includes responding to the needs of the students, who are global executives with significant management experience, as well as internal clients, such as faculty and staff, University-wide. This presentation emphasizes the importance of communication management. It also examines operational systems that have been successful.

The Alliance for Innovative Manufacturing (AIM) Education Program at Stanford
Robert C. Carlson, Stanford University, r.c.carlson@stanford.edu
At Stanford, the primary contribution of the Alliance for Innovative Manufacturing (AIM) to manufacturing education is that of creating and sustaining a vibrant intellectual community of students, faculty, staff, alumni, and industry professionals passionate about the making of real things that improve people's lives. Both the School of Engineering and the Graduate School of Business are involved in the educational effort known as the Certificate Program, which is a centerpiece of AIM. This program will be described in some detail with respect to the participants and the modes of delivery, which include in-class, off-site via TV signal, and on-line.

PhD Program in Management at Claremont Graduate University - Part 2
Paul Gray, Claremont Graduate University, paul.gray@cgu.edu
The nuts and bolts of the Claremont Graduate University's part-time PhD programs for professionals in Management, Information Systems, and Education. All three programs stress the management aspects of their field and are financed through students paying full tuition, and enroll students local to Southern California. The role of specialized personnel to recruit and advise students, a joint program with Cal State University, the use of 7 week half-courses in management, and student ability to absorb large amounts of material because of their maturity are discussed.

The Doctor of Professional Studies (DPS) Degree at Pace University
John P. Dory, Pace University, dory@pace.edu
In autumn 2002, the Doctor of Professional Studies program adopts an innovative format that will enhance and intensify the educational experience by employing advanced technology to move seminar discussion beyond the classroom while reducing commutation to campus. Doctoral seminars will be conducted both in high tech classrooms on monthly, day-long, Executive Fridays and in supplemented by frequent participation in threaded discussions over the internet. The faculty and students will be challenged to effectively use this format and technology. Prior experience in the Lubin School's Executive MBA program, the new e.MBA@PACE, and other technologically enhanced programs will provide experience to meet this challenge. In addition, the admission process is being revised to assure that otherwise qualified applicants also have appropriate technology skills and learning styles.
SESSION 5: TEACHING METHODS USING NEW TECHNOLOGY I
Session Chair: Harry Rosen, Baruch College, CUNY, harry_rosen@baruch.cuny.edu
Time & Place: Sunday, April 7, 2:00-3:30PM, Redwood Room

The Vertical Campus: Special Innovations in Teaching Low-Tech To High-Tech: Planning A Massive Transition, And Making It Happen
Harry M. Rosen, Baruch College, CUNY, harry_rosen@baruch.cuny.edu
During the summer of 2001 the Zicklin School of Business at Baruch College of the City University of New York, moved into a new, $300 million complex, known as the Vertical Campus. The joy of brand new, amphitheatrue classrooms, and sparkling offices was obvious. The process of determining appropriate classroom technology, arranging technical support, and developing a process for implementation, was not. The sheer size of the operation framed the basic challenge, because the Zicklin School employs 195 full-time faculty members, and over 100 adjunct faculty in a typical semester. The first phase of the planning process was a substantial effort to develop benchmarks for all aspects of the classroom environment. Everything from small seminar rooms, to 400-seat auditoria had to be included, across all business disciplines. Many of the classrooms would also be used by faculty in the Arts and Sciences, including everything from Music Appreciation to Anthropology. Benchmarks were also sought for other issues. For one thing, some faculty will be required to teach in older buildings that lack cutting edge technology, requiring some measure of flexibility. For another, technical support was vital, both to encourage faculty to get “up-to-speed”, and to maintain a high level of confidence in the system. Furthermore, today’s cutting edge is tomorrow’s old hat. So capacity to look forward was also important. The paper will describe the dimensionality imposed on the above challenges, followed by a description of our efforts to determine appropriate benchmarks. The apparent absence of potentially helpful benchmarks will also be discussed. The paper will conclude with, what we believe to be are important “lessons learned”.

Decision Room History and Future
Paul Gray, Claremont Graduate University, paul.gray@cgu.edu
Decision rooms are classrooms instrumented with a terminal at each desk on a LAN, a public screen visible to all, e-communications among participants, TV and Internet connections, and specialized software to facilitate group interaction. The first decision rooms (1980-90+), called group decision support systems, were built as research facilities to study potential improvements in decision making through computer support. In recent years these rooms also became powerful teaching tools. For example, the recently introduced SMIL protocol permits simultaneous video and text to reinforce learning.

Developing a Management System for an Educational Technology Conferencing Facility
Glenn G. Shephard, San Jose State University, shephard_g@sjsu.edu
This paper describes the experience of introducing new educational technology (in the form of a recently installed PictureTel Concord 4500-based videoconferencing facility) into the San Jose State University College of Business and the process of developing effective management planning and control of said technology for the ongoing benefit of the students, faculty and staff of the university. The new facility is currently being used to enable delivery of the Graduate Transportation Management Program’s distance learning curriculum to a thinly spread student population of adult career-oriented working transportation professionals across the State of California and beyond.

Developing and Managing Online Courses: eLearning Platforms
Stephen Shugart, eCollege, Denver, www.ecollege.com, stephens@ecollege.com
This discussion will be an overview of teaching issues in the online environment, noting the differences between teaching face-to-face and teaching online, the qualities of teachers who thrive in the online teaching environment, and best practices in teaching online. Also, the structure of online courses and processes for working with faculty developing content will be briefly addressed.
SESSION 6: TEACHING METHODS USING NEW TECHNOLOGY II
Session Chair: Harry Rosen, Baruch College, CUNY, harry_rosen@baruch.cuny.edu
Time & Place: Sunday, April 7, 4:00-5:30PM, Redwood Room

Teaching Methods Using New Technology – Case Western Reserve University
Marilyn A. Chorman, Case Western Reserve University, mac29@po.cwru.edu, and
Sue A. Nartker, Case Western Reserve University, san2@po.cwru.edu
Market inquiries signal a potential for a non-degree program based on the EDM curriculum. This presentation describes “Leadership in a Changing World: Culture, Politics, Economics,” which will launch its inaugural program in August 2002. Discussions will occur on-line in an asynchronous format for a two-month period between two residency sessions in four modules, team-taught in order to achieve an active, critical, and interdisciplinary approach that offers the best opportunity for new ideas, creative approaches, and dynamic learning. Each module consists of four days for reading and preparation of materials, four days of sub-group on-line discussions, moderated by a group member, two days for preparation and posting of moderator summary and analysis of the sub-group discussion, and two days for faculty members’ preparation and posting of comments on the sub-group discussion and postings. Each faculty member will have approximately six hours of contact time during the first residency and approximately four hours of teaching time in the second residency, which will occur at the end of the program.

Internet and CD-ROM/DVD Learning Capabilities - Part I and Part II
Carrie Duvall, Carrie@planetdigital.com and David Beatriz, Dave@planetdigital.com, both of Planet Digital, Inc.
Presentation will encapsulate the current environment considering but not limited to the acceptance and adoption of online learning methods, relevant statistics and opinions. An explanation of the basic online learning tools will be covered in the Media Defined section, followed by costs comparisons, security and privacy issues, staffing requirement versus outsourcing (brief), development time, and project risks. To summarize, a review of the challenges and advantages to the new learning tools will be outlined.

Knowledge Networks and Intellectual Property: Teaching, Learning and Owning:
Martin K. Starr, Rollins College, mstarr@rollins.edu
Schools have thrived on library power for many years. New technology has opened potentials to a much greater breadth of knowledge materials. Cases in particular are enhanced by Internet searches. By integrating all related concepts, and by determining who are the custodians of special knowledge (expert systems) rates of gathering relevance increase markedly. Also, individuals can custom-tailor their databases to match their learning profiles. The relevance of tacit and explicit knowledge surfaces rapidly. This is especially true when the knowledge system is used for asynchronous (distance) learning.

SESSION 7: THE QUALITY OF LEARNING AND CREATIVE TEACHING
Session Chair: Manjulika Koshal, Ohio University, koshal@ohio.edu
Time & Place: Monday, April 8, 10:00-11:30AM, Redwood Room

Students’ Academic Performance: An Interaction of Inputs
From the Students, Schools, and Voters
Manjulika Koshal, koshal@ohio.edu, Rajindar K. Koshal, and Ashok K. Gupta, all of Ohio University
This study proposes and tests a model affecting students’ academic performance. The simultaneous-equations model is estimated by using data for 576 Ohio school districts. We postulate that students' academic performance depends on the interaction of key factors associated with students, the schools, and the voters. Academic performance of students is measured by the percentage of total number of students passing all four parts of the proficiency test. Our analysis suggests that an increased expenditure on education would improve the academic performance of the students.
However, money alone is not sufficient. The model incorporates variables such as the background of parents of the students, attendance rate, social and economic marital status of parents, expenditure per pupil that voters are willing to invest, proportion of school expenditure from local sources, and quality of teachers.

**Teaching and Faculty Evaluation: A Review**
Rajindar K. Kosal, kosalr@ohio.edu, Manjulika Kosal, both of Ohio University
This paper, first, examines students’ perceptions about a good teacher and second, analyzes academic administrators’ viewpoints of good teaching. Next, the question, why teaching evaluations are needed is examined. This paper lists a number of reasons why there is faculty resistance to teaching evaluations. The authors review various methods for teaching evaluation and provide a number of relevant variables that are important or valid and effective for teaching evaluation. Finally, the authors provide insight into teaching evaluation and its use and misuse by administrators.

**Miami Coral Park Senior High - Engineering Magnet: A Successful Partnership Between The Miami Dade County Public Schools And Florida International University**
Gustavo Roig, Florida International University, gus@eng.fiu.edu, William Machado, Miami Coral Park Senior High, Niki Reaves, Miami Coral Park Senior High, and Beatriz Oria, Florida International University
Miami Dade County Public Schools in collaboration with Florida International University have created an Engineering Magnet Program that serves students from ninth to twelfth grade; this program has been in existence for the last fifteen years. This presentation will focus on how to create a solid successful partnership in additional to the establishment of the historical data of the program.

**SESSION 8 (PANEL): INTERNATIONAL BUSINESS PROGRAMS**
Session Chair: Sushil Gupta, Florida International University, guptask@eng.fiu.edu
Time & Place: Monday, April 8, 2:00-3:30PM, Redwood Room

**PANEL:**
Sushil Gupta, Florida International University, guptask@eng.fiu.edu
Tomislav Mandakovic, Florida International University, mandakov@fiu.edu
Lalit M. Johri, Asian Institute of Technology, Bangkok, Thailand, ljonjiri@ait.ac.th

This panel will discuss the issues that relate to globalization of management education. There are many universities in the U. S. A. and other countries that have started developing and offering management programs at the international level. These programs are both degree granting programs and executive development programs. This panel will focus on the development, design, promotion and delivery of these programs at the international levels. Some of the success factors include: flexibility, cost, quality, curriculum and delivery. Dr. Mandakovic will focus on Latin America, Dr. Johri will focus on Asia and Europe and Dr. Gupta will cover the North American perspective.
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