

# PARTNERING FOR GLOBAL TECHNOLOGY MANAGEMENT

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Chair: Toshihide Ibaraki, Kyoto University, Dept. of App. Math. & Physics, Grad. Sch. of Eng., Kyoto, 606-8501, Japan, [ibaraki@kuamp.kyoto-u.ac.jp](mailto:ibaraki@kuamp.kyoto-u.ac.jp)

1) **Roundtable Extensions of Pseudo-Boolean Functions**, *Endre Boros*, Rutgers University, RUTCOR, 640 Bartholomew Rd., Piscataway, NJ 08854, [boros@rutcor.rutgers.edu](mailto:boros@rutcor.rutgers.edu), *Isabella Lari, Bruno Simeone, Giovanni Storchi*

Most combinatorial optimization problems can also be modeled as the minimization of a pseudo-Boolean function over the binary  $n$ -vectors. Such a function can still be extended over the entire cube  $U = \{0,1\}^n$  in several ways. "Roundable" functions form a special family of extensions, which suit approximation techniques particularly well.

2) **Some Basic Concepts of Pseudo-Boolean Function Theory**, *Stephan Foldes*, Rutgers University, RUTCOR, 640 Bartholomew Rd., Piscataway, NJ 08854, *Peter L. Hammer*

Some basic concepts of the theory of Boolean functions can be extended to pseudo-Boolean functions, i.e., to real-valued functions on binary variables. We discuss the concepts of implicants, implicata, prime implicants, prime implicata, disjunctive normal forms, conjunctive normal forms and duality and present algorithmic procedures of the consensus/resolution type for the pseudo-Boolean case.

3) **Equivalent Representations of a Set Function with Applications to Game Theory & Multicriteria Decision Making**, *Jean-Luc Marichal*, University of Liege, Dept. of Mgmt., FEGSS, Blvd. du Rectorat 7-B31, Liege, B-4000, Belgium, [jl.marichal@ulg.ac.be](mailto:jl.marichal@ulg.ac.be), *Michel Grabisch, Marc Roubens*

We introduce 4 alternative representations of a set function: the Mobius transformation, the co-Mobius transformation and interactions between elements of any subset of a given set as extensions of Shapley & Banzhaf values. The links between the 5 equivalent representations of a set function are emphasized through the use of the multilinear extension of pseudo-Boolean functions.

SC11 **Rethinking Conventional Models in New Product Development**

Sponsor: Technology Management  
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Chair: Durward K. Sobek, II, Montana State University, Dept. of MIE, Bozeman, MT 59717-3800, [dsobek@ie.montana.edu](mailto:dsobek@ie.montana.edu)

1) **Business Cycles/Downsizing Engineering Staffs: Example of Stochastic Staffing Problem with Learning Effects & Non-Stationary Requirements**, *Edward Anderson*, University of Texas, Dept. of Mgmt., CBA 4.202, Austin, TX 78712, [edanderson@mail.utexas.edu](mailto:edanderson@mail.utexas.edu)

Managing a firm's knowledge resources under business cycles is vital but not well understood. Using the example of managing automotive engineers (who typically require years of mentoring) under business cycles, we develop an optimal dynamic programming policy for managing knowledge resources with long lead times under uncertain, non-stationary requirements.

2) **withdrawn - author request of 9/1**, *Marco Iansiti*, Harvard Business School, Morgan Hall T69, Soldiers Field Park, Boston, MA 02163, [miansiti@hbs.edu](mailto:miansiti@hbs.edu), *Alan MacCormack, Jonathan West*

3) **Effective Transnational Concurrent Product Development Practices**, *Paul D. Collins*, University of Washington, 22011 26th Ave. SE, Bothell, WA 98021-4900, [collins@u.washington.edu](mailto:collins@u.washington.edu), *Frank M. Hull*

Little is known about how to effectively implement concurrent practices in transnational product development teams. Based on findings from a recent field research project on concurrent practices in Britain, France, Germany and the US, we show which practices work best in different kinds of transnational product development teams.

4) **An Investigation into Best Practice Usage of Quality Function Deployment in the US & Japan**, *John J. Cristiano*, 1072 Greenhills Dr., Ann Arbor, MI 48105, [jjcrist@engin.umich.edu](mailto:jjcrist@engin.umich.edu), *Jeffrey K. Liker*

We report on the results of a large-scale survey of companies using QFD, both in the US and Japan. Hypotheses of perceived cross-cultural differences in terms of internal motivation, management support, methodology employed and the resulting impact on products and processes are explored.

SC12 **Technology Management: A Brazilian Perspective**

Sponsor: Technology Management/Management of Productivity & Technology  
Sponsored Session

Chair: Sergio Takahashi, Universidade de Sao Paulo, Fac. de Economia Admin., Campus de Ribeirao Preto, Sao Paulo, 14040-900, Brazil, [setakaha@davinci.fearp.usp.br](mailto:setakaha@davinci.fearp.usp.br)

1) **Integrated Analysis of the Product Development Process: A Perspective of Innovation**, *Sergio Takahashi*, Universidade de Sao Paulo, Fac. de Economia Admin., Campus de Ribeirao Preto, Sao Paulo, 14040-900, Brazil, [setakaha@davinci.fearp.usp.br](mailto:setakaha@davinci.fearp.usp.br)

We begin with a review of the product development process literature with attention given to 3 components of the process: competencies, process integration and organization. Case studies of innovations in 3 global automotive enterprises are analyzed. We conclude with a discussion of a product development innovation model.

2) **Manufacturing Strategies & Advanced Manufacturing Technologies: An Integrated Application in the Product Development Process**, *Vania Passarini Takahashi*, Universidade de Sao Paulo, Fac. de Economia Admin., Campus de Ribeirao Preto, Sao Paulo, 14040-900, Brazil

The relationship between manufacturing strategies and AMTs in the product development process is presented. The relationship is examined in global manufacturing enterprises and the result is a strategic decision model to aid adoption of advanced manufacturing technologies.

3) **Management Adoption of New Information Technologies in a Firm**, *Fernando C. de Almeida*, Universidade de Sao Paulo, R. Humberg 1953, Sao Paulo, 01258-020, Brazil, [falmeida@usp.br](mailto:falmeida@usp.br)

In the dynamic environment of IT, many development opportunities may emerge. How to decide whether to invest in a new technology becomes a key issue. The research tries to explore variables that may be important in the management of IT in a firm.

4) **Globalization & Information Technology's Impact in the Brazilian Supermarket Sector**, *Flavia Angeli Ghisi*, Universidade de Sao Paulo, Fac. de Economia Admin., Contabeis Av Bandeirantes 3900, Ribeirao Preto, 14040-900, Brazil, [ghisi@davinci.fearp.usp.br](mailto:ghisi@davinci.fearp.usp.br)

Globalization is creating competitive disadvantages for countries with emerging industries and technological capabilities. This study analyzes the Brazilian food products industry and applies a statistical methodology to evaluate the competitiveness of the industry.

SC13 **Knowledge & Organizations**

Sponsor: Organization Science  
Sponsored Session

Chair: To be announced

1) **College on Organization Science Subconference: Knowledge & Organizations**

SC14 **Vehicle Routing**

Contributed Session

Chair: Vania Campos, Military Institute of Engineering, Praca Gen Tiburcio, 80-DE/2-Urca, Rio de Janeiro, 22290-270, Brazil, [d2vania@epq.ime.br](mailto:d2vania@epq.ime.br)

1) **Routing of Railway Carriages**, *Peter J. S. Brucker*, University of Osnabrueck, Albrechtstr.28, Osnabrueck, D-49069, Germany, [peter@mathematik.uni-osnabrueck.de](mailto:peter@mathematik.uni-osnabrueck.de), *Johann Hurink, Thomas Rolfes*

A passenger train is composed of different types of carriages. To route the carriages of a set of regular trains, an integer multi-commodity flow problem with fixed cost objective function is formulated. We apply SA with restarts to solve this problem. Computational results are reported.

2) **A Heuristic Dynamic Programming Approach for the Vehicle Routing Problem with Stochastic Demands**, *Nicola Secomandi*, University of Houston, DISC Room 260A, Coll. of Bus., 4800 Calhoun St., Houston, TX 77204-6282, [nick@bau.cba.uh.edu](mailto:nick@bau.cba.uh.edu)

A version of the vehicle routing problem where customers' demands are uncertain is considered. A state space decomposition and a heuristic dynamic programming algorithm that exploits this structure are proposed.

3) **An Algorithm for Detecting K-Optimal Independent Paths**, *Vania Campos*, Military Institute of Engineering, Praca Gen Tiburcio, 80-DE/2-Urca, Rio de Janeiro, 22290-270, Brazil, [d2vania@epq.ime.br](mailto:d2vania@epq.ime.br)