JOMSA Japanese Operations Management and Strategy Association

The 2nd International Symposium on Operations Management and Strategy 2012 (ISOMS 2012)

Global Operations and Strategy in the 2010s

Dates: November 10-11, 2012
Conference Venue: Aoyama Gakuin University, Aoyama Campus
4-4-25 Shibuya, Shibuya-ku, Tokyo 150-8366, Japan
Classrooms 17306, 17307, 17308, 17310, 17311 at University Building 17, 3rd floor
Honda Memorial International Conference Hall at University Building 17, 6th floor

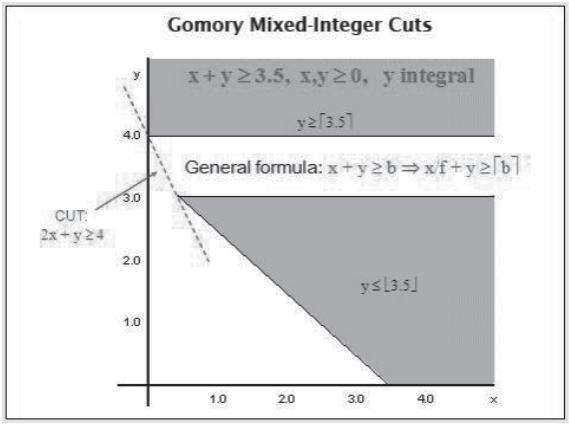
Japanese Operations Management and Strategy Association

Gurobi Optimizer 新バージョン 5.0 リリース

最適化ソリューションに無限の可能性

今まで、大規模な問題、複雑な問題で、数々の最適化ソフトウェアを試してみたが、解を得るのに時間がかかる、また、解を得られなかったあなたに朗報です。第三者機関が実施したベンチマークサイトで、世界最高速を常に記録している LP、QP、MIP ソルバーの Gurobi Optimizer 新バージョン 5.0 がリリースされました。バージョン 5.0 では、先進の二次錐計画法 (SOCP) を使用した二次制約問題 (QCP) および混合整数二次制約問題 (MIQCP) をサポートし、また、MATLAB およびオープンソースでフリーソフトウェアの統計解析向けプログラミング言語である R とのインターフェースも新たに提供します。また、更なる高速性も実現しています。

MATLAB は The MathWorks, Inc. の登録商標です。



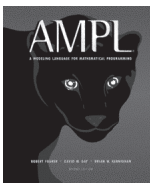
Gurobi Optimizer は米国 Gurobi Optimization Inc. の開発製品です。

究極のスケーラビリティー
最強のモデリング言語 AMPL

AMPL は、離散および連続変数における線形および非線形最適化問題のための包括的でパワフルな代数モデリング言語です。ベル研究所で開発された AMPL は、コンピュータが適切なソルバーとのコミュニケーションを管理している間、ユーザーが、共通表記法やよく知られている概念を使うことで、最適化モデルを明確に表し、そして解決法を調べます。AMPL のスピードやコントロールオプションが、繰り返し実行のための特に能率的選択を導き出し、AMPL の柔軟性と便利さが、迅速なプロトタイプ作成およびモデル開発を理想的に支援します。

AMPL に対応した下記の非線形ソルバーの販売を開始しました。

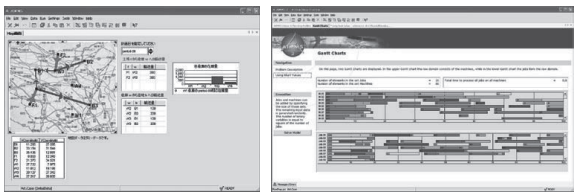
KNITRO、MINOS、CONOPT、SNOPT



AMPL は米国 AMPL Optimization LLC の開発製品です。

応用開発モデリングツール AIMMS
スムーズな開発を支援

AIMMS は、オペレーションズ リサーチを基盤にする最適化アプリケーションおよびプランニング アプリケーション構築のための応用開発環境を提供します。AIMMS は、エネルギー、サプライチェーン マネジメント（SCM）、生産計画、ロジスティックス、植林計画、リスク管理、収益管理、資産管理などの幅広い産業分野において、ワールドワイドで活躍するリーディング カンパニーの意思決定支援のため、広く採用されています。



AIMMS はオランダ Paragon Decision Technology B.V. の開発製品です。
AIMMS はオランダ Paragon Decision Technology B.V. の登録商標です。

Gurobi Optimizer/AIMMS/AMPL 製品無償トレーニング

オクトーバー・スカイでは、ご購入を検討されているお客様を対象に、半日ハンズオン・トレーニングを実施しています。トレーニングに関しては、下記 Web サイトを参照してください。

URL: http://www.octobersky.jp/support/training.html

お問い合わせ： info@octobersky.jp

<お問い合わせ先>

株式会社オクトーバー・スカイ

〒183-0056 東京都府中市寿町 1-8-1 寿町 KY ビル 3F

TEL : 042-207-3020 / FAX : 042-207-3022

URL : http://www.octobersky.jp　E-mail : info@octobersky.jp

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ISOMS 2012

Global Operations and Strategy in the 2010s

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Registration: Friday, November 9, 17:30-19:30 at Ivy Hall
Saturday, November 10, 8:30-17:30 at University Building 17, 3rd floor
Sunday, November 11, 8:30-11:30 at University Building 17, 3rd floor

Access to the Venue: http://www.aoyama.ac.jp/en/outline/aoyama_campus.html#access_map

Campus Map: http://www.aoyama.ac.jp/en/outline/aoyama_campus.html#campus_map

Japanese Operations Management and Strategy Association
Aoyama Gakuin University

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見えるようにする。磨き上げる。

書道家 高橋卓也君が書いた『図研』です。
その高橋君が図研を書いた時にイメージしたのが、
『図 見えるようにする』・『研 磨き上げる』ということ。
まさに、図研のITは、モノづくりにおける多様な情報を可視化・共有化し、
効率的な設計・製造を実現、モノづくりの仕組みを最適化します。

モノづくり 環境の激変

品質・機能偏重型のモノづくりから、〈現地ニーズに即した製品〉を〈適正なコスト〉で〈スピーディに投入〉するモノづくりへのシフトには、ITによるグローバル分業も視野に入れた仕組みの最適化が不可欠です。

ITで「見えるようにする」

「何をつくるか」に時間的・資金的・人的リソースを注入し、「どうつくるか」という製造プロセスを徹底的に効率化する。それを支援することこそ、図研のモノづくりITの役割です。

ITで「磨き上げる」

図研の先端ITは、モノづくりの設計から製造に至るあらゆるプロセスを最適化。グローバル競争で戦い抜くためのモノづくりの仕組みを磨き上げます。

世界中の多様な企業の技術要求に応えてきた図研。
世界最先端のITソリューションで、日本のモノづくりを支え続けます。

書道家
高橋卓也くん

1999年2月宮城県栗原郡（現栗原市）生まれ、岩手県盛岡市在住。3歳でモントリオール国際芸術祭・書道の部グランプリ受賞。今年5月開催の「東北六魂祭」では題字を手がけ、6月開催の「リオ+20」においても東北復興をアピールするイベントのテーマワードを任され、見事に大役を果たした。

株式会社 図研 プリサイト事業部　www.presight.jp

センター南ビル　〒224-8580　横浜市都筑区茅ケ崎中央32-11　TEL 045-942-2273
関 西 支 社　〒530-0003　大阪市北区堂島1-6-20（堂島アバンザ）　TEL 06-6343-1141
名古屋支社　〒460-0003　名古屋市中区錦1-11-11（名古屋インターシティ）　TEL 052-222-3131

ヒューリンクスの生産管理に役立つソフトウェア

大規模データを扱うプロフェッショナルのための統合データ解析ツール

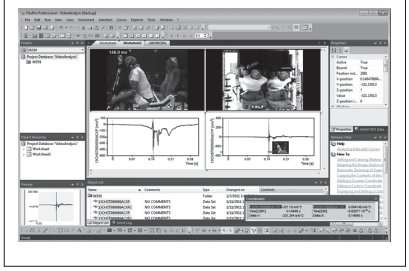
FlexPro

ボタンひとつで簡単にグラフ化、データ解析

フレックスプロ　日本語版

FlexPro は、コンピュータ上で様々なデータをグラフ化、解析、資料化するためのアプリケーションソフトウェアです。Excel などの一般的なソフトウェアを始め、測定機器、データ収集ソフトウェアから数値データを読み込み、グラフ化、解析することができます。特に2GBを超えるような大容量データの解析、資料化を行う場合に非常に有効となります。

新機能　**映像／音声の再生との連動**



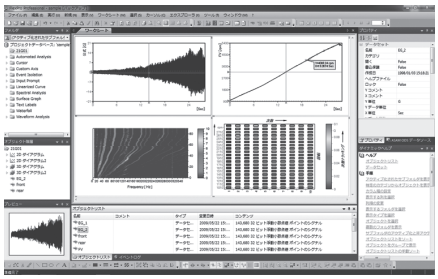
FlexPro の特徴

■ **最高水準の使いやすさ**
計測データを解析する際は、生産性、パフォーマンス、双方向性を考慮した洗練された機能を活用できます。

■ **プレゼンテーションも解析もボタンをクリックするだけ**
解析を実行する場合、既存のデータから新規データを作成するだけでなく、生データで構成されたネットワークを構築し、それを元にして直接レポートを作成できます。

■ **各種測定データをアプリケーションで一元管理**
どのメーカーの計測機器を使っても、どの測定装置やデータ収集ソフトウェアを使っても、FlexPro なら測定データを極めて簡単に管理することができます。

■ **インポート / エクスポート用の豊富なフィルタ**
既にお使いのシステムと FlexPro をシームレスに統合することができます。



▲メインウィンドウのワークシートに示されたデータ解析例

オプション解析モジュール

- スペクトル解析モジュール
- 統計解析モジュール
- デジタルフィルタモジュール
- 人体振動解析モジュール
- カウントプロシージャモジュール
- 次数トラッキングモジュール
- 音響解析モジュール
- ASAM ODS データインポート

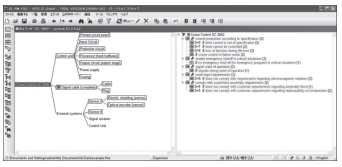
WEISANG　開発元：Weisang GmbH

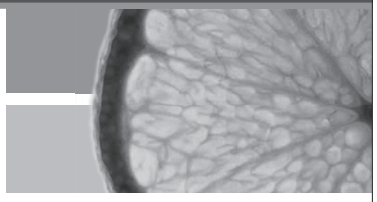
故障モード影響度解析（FMEA）

APIS IQ シリーズ

エイピスアイキュー　日本語版もあります（PRO シリーズ）

FMEA やリスク管理で使うソフトウェアです。





■ 製品の詳しい情報はこちらの URL をご覧下さい　http://www.hulinks.co.jp/netscience/software/APIS_IQ/

※本製品は輸入販売代行で、テクニカルサポート、コンサルティングは行うことはできません。

APIS Informationstechnologien GmbH　開発元：APIS Informationstechnologien GmbH

HULINKS　**株式会社ヒューリンクス**

Link to the

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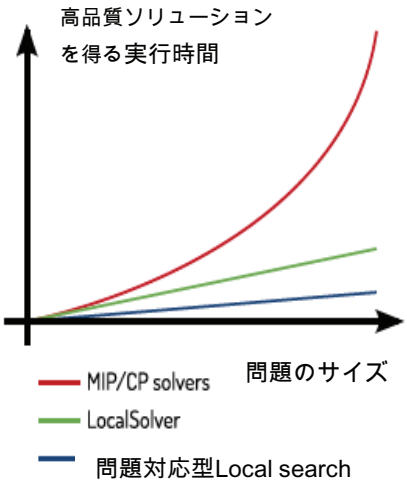
LocalSolver
mathematical programming by local search

史上初　ローカルサーチ法による 次世代-数理計画法システム



LocalSolverは、最適化計算分野における一流の専門家による５年間のR＆Dプロジェクトにより完成した、フランス発の次世代-数理計画法システムです。
LocalSolverはローカルサーチ技術をベースとして、使いやすいモデリング言語と実行環境を備えており、大規模組合せ最適化問題をユーザがモデルを純粋に定義するだけで、複雑なチューニングをしなくても、数秒から数分で高品質な解を得ることができます。

- 非線形0-1計画問題をも解くことが可能
- 目標計画法としても利用可能
- 1000万の意思決定変数まで実行可能
- 革新的なモデリング言語
- C++、Java、.NETで簡単に利用できるAPIs
- 問題に忠実なモデリングと実行環境

Localsolverはビジネスおよび産業で生じる大規模な実世界の組み合わせ最適化問題を解くのに特に最適です。従来のツリー探索を基にした手法では、このような数千万の変数を伴う問題を解くことは現実的には不可能でした（MIPまたはCP）。

短時間で高品質ソリューションを提供

Thanks to LocalSolver, our Siemens project team could record dramatic improvements on a very combinatorial problem, for which the best available mathematical programming solvers could hardly find a solution in several hours

Denis Montaut
Chairman & CEO of Eurodecision

車両投入計画（Renault）
ルノー社はLocalSolverを使用し従来では現実的に利用できなかった車両投入順序計画を数分で最適に近い解を見つけ出しています。

機械の配置転換（Google Challenge）
グーグル社の問題で、LocalSolverは5分間で100マシーンに10.000工程の割り当てを最適化する解をみつけることができました。LocalSolverは80チームの国際競争で、たった1日でモデリングから最適化実行までを実現できたとして認められた唯一のソルバーです。

- 非線形割当て：車両投入計画、頻度割当て
- パッキング＆カバーリング：メディアプランニング、機械スケジューリング、グラフ分割等
- 設備配置：ロジスティック　クラスタリング、通信網の最適化
- 人員スケジューリング、グループプランニング、看護師スケジューリング等

LocalSolverについてのお問い合わせ

MSI株式会社（日本配給元）
〒261-7102千葉市美浜区中瀬2-6 WBGマリブウエスト2階
Tel:043-297-8841 Fax:043-297-8836、Eメール：localsolver@msi-jp.com
Web-site：www.msi-jp.com/localsolver/

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経営企画・事業企画スタッフ向けに新たなアプローチを

納得できるまで企画の検討はできていますか？今の仕組みで出来ることに満足されておられますか。

CorePlanner SCM 版で出来ること

■リソース計画業務への情報支援

短時間で多くの企画案を評価

フォーカス市場

売上
利益計画

対応企画案

- フォーカス市場・顧客・技術・製品の選択と優先付け
- 開発投資計画（設計リソースの戦略的配備）
- 拠点・ロジスティクス戦略、設備投資計画、保有在庫水準方針
- 新製品開発・立ち上げスケジュールのオーソライズ

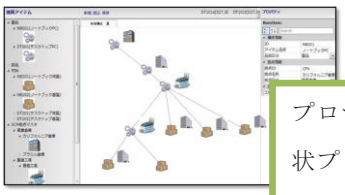
計画ルール・プロセスの評価・見直し
サプライヤ評価・見直し

CorePlanner SCM 版の特徴

■プロセスエディタ機能で企画案を作成

プロセスエディタを利用することで、容易に企画案が作成でき、そのサプライチェーンでのキャッシュフローや損益を確認することが出来ます。

【現状プロセス】

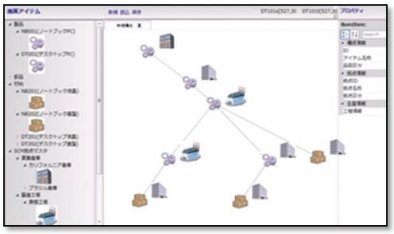


プロセスエディタ上で現状プロセスに施策項目を与え、企画案を作成

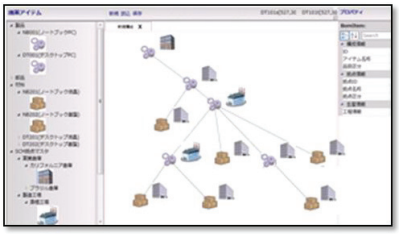
施策項目

生産比率変更・外注/自製化・生産拠点変更/統廃合・物流拠点変更/統廃合・サプライヤ先・在庫（数,拠点）・生産能力・輸送ルート/手段・人員変更・関税/為替・単価　等々…

【企画案１】
[施策] 単価変更・生産能力変更等



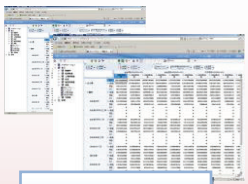
【企画案２】[施策] 新製品追加・仕入部品変更・為替条件変更等



出力結果

次の企画案作成へ

評価
選択



TM1利用

■営業キャッシュフロー
■製品グループ別損益
■製品別損益
■拠点別損益（各工場）　等で評価

実行

企画案毎に

教育研究支援企業（株）三恵社

少部数テキスト出版
少部数出版システム

出版2000タイトルを超える実績。

全国の先生方より多様な教材のご依頼をいただいて16年が経過いたしました。数多くのテキスト出版、製作のお手伝いを積み重ねノウハウを持たせていただきました。平成8年にスタートしたこのシステムは、「講義内容に沿ったテキスト・副教材が、低価格で発行出来る。」「効率的な授業運営に役立つ。」と、ご好評をいただいております。

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ISOMS2012
Symposium Program

	ISOMS 2012 Time Table: Friday, November 9, 2012
17:30-19:30	Registration at IVY Hall
18:00-20:00	Welcome Reception at IVY Hall

	ISOMS 2012 Time Table: Saturday, November 10, 2012
8:30-17:30	Registration at University Building17, 3rd floor
9:00-10:10	Opening and Plenary Session 1 at Honda Memorial International Conference Hall (University Building17, 6th floor)
10:10-10:30	Break
10:30-12:00	Parallel Sessions 1 at Classroom 17306, 17307, and 17310 (University Building17, 3rd floor)
12:00-13:00	Lunch Time
13:00-14:00	Plenary Session2 at Honda Memorial International Conference Hall (University Building17, 6th floor)
14:00-14:30	Break
14:30-15:30	Plenary Session3 at Honda Memorial International Conference Hall (University Building17, 6th floor)
15:30-16:00	Break
16:00-17:30	Parallel Sessions 2 at Classroom 17306, 17307, and 17310 (University Building17, 3rd floor)
18:00-20:00	Dinner Party at IVY Hall

	ISOMS 2012 Time Table: Sunday, November 11, 2012
8:30-11:30	Registration at University Building17, 3rd Floor
9:00-10:30	Parallel Sessions 3 at Classroom 17306, 17307, and 17308 (University Building17, 3rd floor)
10:30-11:00	Break
11:00-12:30	Parallel Sessions 4 at Classroom 17306, 17307, and 17308 (University Building17, 3rd floor)

Greetings

Welcome to the 2nd International Symposium on Operations Management and Strategy!

Organizing Committee Chair
Kakuro Amasaka, Aoyama Gakuin University

The Japanese Operations Management and Strategy Association (JOMSA) will hold the 2nd International Symposium on Operations Management and Strategy in November, 2012, in Tokyo under the theme of the symposium, “Global Operations and Strategy in the 2010s”.

The theme is to reexamine the basic construct of operations management and to contribute to the firm, environment, and society through the efficient and effective management of operations in product development, procurement, production, distribution, and sales.

The symposium will provide an international forum for researchers and practitioners to exchange innovative ideas on contemporary issues of operations management and strategy as well as their related topics.

We sincerely hope that many researchers, educators, professional people and members of the business community will participate in this symposium.
We look forward to seeing you in Tokyo.

The Journal of Japanese Operations Management and Strategy

The mission of the Journal of Japanese Operations Management and Strategy (JOMS) is to serve as the primal research journal in operations management in Japan. The journal publishes academic research into the problems and concerns of managers who design and manage the product and process in manufacturing and service industries. It covers all the operations related issues such as the effective and efficient management in product development, procurement, production, distribution and marketing, manufacturing/operations strategy, decision makings in global operation, supply chain management, and service sciences among others. The journal welcomes the submission of rigorous and scientific research papers using any research paradigm such as social science, case study, and mathematical modeling.

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ISOMS2012 – Symposium Session Schedule

	ISOMS 2012: Saturday, November 10, 2012		
9:00-10:10	**Opening** at Honda Memorial International Conference Hall (University Building 17, The 6th floor) **Plenary Session 1** **Masaharu Ota** (Osaka City University, Professor) **"Innovation Management: To Study from the View Point of Operations Management"**		
10:10-10:30	**Break** (Classroom 17309,17311, University Building 17,The 3rd floor)		
	Parallel Session 1(Univ. Building 17, The 3rd floor)		
10:30-12:00	**Classroom 17310**	**Classroom 17306**	**Classroom 17307**
	A1 Session: **Enterprise Systems & Operations Planning** Chair: Hajime Mizuyama (Aoyama Gakuin University)	**B1 Session:** **Marketing & Service Innovation** Chair: Pham Thi Lien (Vietnam National University)	**C1 Session:** **Environment & Risk Management** Chair: Satoshi Kumagai (Aoyama Gakuin University)
	A1-1 A Batch-up Dating Central Market Maker with Gaussian Forecast Distribution for Prediction Market System using VIPS for Demand Forecasting Hajime Mizuyama (Aoyama Gakuin University)	B1-1 Marketing Budgets and Marketing Effects Yun K. Huang (Takming University of Science and Technology) Wen I. Yang (Takming University of Science and Technology)	C1-1 Assessing Handicraft Villages' OVOP Implementation Capacity: Case Study of a Silk Village in Vietnam Nguyen A. Thu (Vietnam National University) Nguyen T. Huyen (Vietnam National University) Vo T. Thai (Vietnam National University)
	A1-2 Applying Sensitivity Analysis on Investment Decision Factors of Municipal Solid Waste Operational System Anchalee Supithak (Thai-Nichi Institute of Technology)	B1-2 Researching Customer Satisfaction and Loyalty to Boost Marketing Effectiveness: Look at Japan's Auto Dealerships Hirotaka Okutomi (Aoyama Gakuin University) Kakuro Amasaka (Aoyama Gakuin University)	C1-2 Networked Narratives: Understanding Internet Book Reviews in Online Communities Yun K. Huang (Takming University of Science and Technology) Wen I. Yang (Takming University of Science and Technology)
	A1-3 Creating the A-NIBNS Nonlife Insurance Business Navigation System Masahiro Nakamura (Aoyama Gakuin University) Akinori Ishikawa (Aoyama Gakuin University) Kakuro Amasaka (Aoyama Gakuin University)	B1-3 On Some Issues in Realization of Service Innovation Strategy into Operation Ryo Sato (Yokohama National University)	C1-3 Empirical Study on Transferability of Kaizen Practices in Vietnamese Manufacturing Companies Phan Chi. Anh (Vietnam National University Hanoi) Yoshiki Matsui (Yokohama National University)
	A1-4 Economic Lot-size Scheduling Problem with Batch Shipment Policy Yu-Cheng Hsiao (Takming University of Science and Technology) Shoue-Yu Huang (Takming University of Science and Technology) Tai Y. Lin (Takming University of Science and Technology)	B1-4 An Association between Service Quality and Customer Satisfaction: A Vietnamese Context Thi Lien Pham (Vietnam National University) Hue Minh Nguyen (Vietnam National University)	C1-4 Japanese Environmental Policy Priority Index : A Method of Environmental Accounting for Measuring Corporate Environmental Performance. Satoshi Kumagai (Aoyama Gakuin University)
12:00-13:00	**Lunch Time** (Classroom 17309,17311, University Building 17,The 3rd floor)		

13:00-14:00	Honda Memorial International Conference Hall (University Building 17, The 6th floor) **Plenary Session 2** **Hau L. Lee** (Stanford University, Professor) **"Socially Responsible Supply Chain Management"**		
14:00-14:30	**Break** (Classroom 17309,17311, University Building 17,The 3rd floor)		
14:30-15:30	Honda Memorial International Conference Hall (University Building 17, The 6th floor) **Plenary Session 3** **Takatoshi Ohkubo** (3M Japan Group, Chief Process Officer) **"3M Innovation Process"**		
15:30-16:00	**Break** (Classroom 17309,17311, University Building 17,The 3rd floor)		
	Parallel Session 2 (Univ. Building 17, The 3rd floor)		
16:00-17:30	**Classroom 17310**	**Classroom 17306**	**Classroom 17307**
	A2 Session: **Logistics&Lead-time Management** Chair: Toshiyuki Matsumoto (Aoyama Gakuin University)	**B2 Session:** **Technology Management & Advertising** Chair: Noritomo Ouchi (Aoyama Gakuin University)	**C2 Session:** **Operations Management & Simulation** Chair: Hisamoto Hiyoshi (Aoyama Gakuin University)
	A2-1 Emergency Recovery Production in the Japanese Automotive Industry: Long-Term Lessons from the 1997 Aisin Seiki Kariya Factory Fire Carmen M. Perez (Yokohama National University)	B2-1 The Influence of National Culture and Advertising Market Size on the Prevalence of Celebrity Endorsement Strategies in Advertising a Multi- country Study Carolus L. C. Praet (Otaru University of Commerce)	C2-1 Pedestrian Movement Model Allowing for Variable Buffer Size Hisamoto Hiyoshi (Aoyama Gakuin University) Mai Ishii (NTT Data Corporation)
	A2-2 Considering Non-hierarchical Connections in an AHP Model Szabolcs Duleba (College of Nyíregyháza) Kei Ogiwara (Akita Prefectural University) Mitsuhiro Hoshino (Akita Prefectural University) Tsutomu Mishina (Akita Prefectural University)	B2-2 System Dynamics Modeling for Analyzing the Impact of Utilization of External Knowledge and Product Functionality on Firm's Profit Noritomo Ouchi (Aoyama Gakuin University)	C2-2 High Precision CAE Analysis of Automotive Transaxle Oil Seal Leakage Yasuaki Nozawa (Aoyama Gakuin University) Takahiro Ito (Aoyama Gakuin University) Kakuro Amasaka (Aoyama Gakuin University)
	A2-3 Under Customer Switching: Transshipment or Emergency Order Policy? Yi Liao (Southwestern University of Finance and Economics) Liu Yunhua (Southwestern University of Finance and Economics)	B2-3 International Comparison on the Relationship between Quality Management and Innovation Performance Jing Zeng (Yokohama National University) Anh C. Phan (University of Economics and Business - Vietnam National University) Yoshiki Matsui (Yokohama National University)	C2-3 A Comparison of Community Pharmacies in a Japanese Chain on the Relative Impact of Core and Auxiliary Elements on Service Evaluation Hajime Itoh (Otaru University of Commerce) Carolus L. C. Praet (Otaru University of Commerce) Hidehiko Sakurai (Hokkaido Pharmaceutical University)
	A2-4 A Basic Research on LT Seven Tools and Total Lead-time Reduction Kazuto Ohata (Keio University) Toshiyuki Matsumoto (Aoyama Gakuin University) Takashi Kanazawa (Keio University)	B2-4 Attention-grabbing Train Car Advertisements Motoi Ogura (Aoyama Gakuin University) Takayuki Hachiya (Aoyama Gakuin University) Kakuro Amasaka (Aoyama Gakuin University)	C2-4 Research on Disaster Relief Operations for the Great East Japan Earthquake Mine Kabata (Tokyo Metropolitan University) Yasutaka Kainuma (Tokyo Metropolitan University)
18:00-20:00	**Dinner Party** at IVY Hall		

	ISOMS 2012: Sunday, November 11, 2012		
	Parallel Session 3 (Univ. Building 17, The 3rd floor)		
	Classroom 17306	**Classroom 17307**	**Classroom 17308**
9:00-10:30	**A3 Session:** **Supply Chain Management** Chair: Osam Sato (Tokyo Keizai University)	**B3 Session:** **New Product & Project Management** Chair: Hideaki Kitanaka (Takushoku University)	**C3 Session:** **Risk & Manufacturing Management** Chair: Hisashi Kurata (University of Tsukuba)
	A3-1 Adaptive Collaboration Strategy in Down-stream Supply Chain Focused on Forecasting Demand Over Product Life Cycle Masayasu Nagashima (Sorbonne Graduate Business School) Michiya Morita (Gakushuin University)	B3-1 An Analysis of Key Determinant Factors for New Product Development Performance: A Multi Group Analysis across Three Industries Hideaki Kitanaka (Takushoku University) Yoshiki Matsui (Yokohama National University) Osam Sato (Tokyo Keizai University)	C3-1 Constructing a Scoring Support Approach Model for Classical Ballet Combining Motion Capture and Statistics Kazuma Yanagisawa (Aoyama Gakuin University) Kanako Hara (Aoyama Gakuin University) Daiki Sato (Aoyama Gakuin University) Kakuro Amasaka (Aoyama Gakuin University)
	A3-2 Perception of Supplier Relations Managers from Perspectives of Behavioral Purchasing and Supply Management Masakazu Sugiura (Waseda University)	B3-2 Designing Vehicle Form Based on Subjective Customer Impressions Koichiro Yazaki (Aoyama Gakuin University) Hiroki Takimoto (Aoyama Gakuin University) Kakuro Amasaka (Aoyama Gakuin University)	C3-2 Extending Conditional Value at Risk to Markov Decision Processes: An Application to Oil Markets Fernando Oliveira (ESSEC Business School) Frederic Murphy (Temple University)
	A3-3 Genetic Algorithm for Determination of Partial Joint Ordering Inventory Replenishment Policy in One- warehouse and Multi-retailer System Wisut Supithak (Kasetsart University) Apisit Wiwatyotinchai (Kasetsart University)	B3-3 An Automotive Exterior Design Approach Model: The Relationship Between Form and Body Color Qualities Maiko Muto (Aoyama Gakuin University) Shohei Takebuchi (Aoyama Gakuin University) Kakuro Amasaka (Aoyama Gakuin University)	C3-3 How Does Retailers' Promotion Affect the Performance of Inventory Pooling? Hisashi Kurata (University of Tsukuba) Masatoshi Tanaka (Matsumoto University)
	A3-4 Mass Customization: Linking Supply Chain Integration to Operational Capabilities Osam Sato (Tokyo Keizai University) Yoshiki Matsui (Yokohama National University) Tomoaki Shimada (Kobe University) Hideaki Kitanaka (Takushoku University) Yutaka Ueda (Seikei University)	B3-4 Who Benefits in Distribution Channel from Manufacturer Return Policies Considering Risk Aversion? Shota Ohmura (Kobe University) Hirofumi Matsuo (Kobe University)	C3-4 Applying a Highly Precise CAE Technology Component Model: Automotive Bolt-loosening Mechanism Takehiro Onodera (Aoyama Gakuin University) Takahito Kozaki (Aoyama Gakuin University) Kakuro Amasaka (Aoyama Gakuin University)
10:30-11:00	**Break (**Classroom 17309,17311, University Building 17,The 3rd floor)		

	Parallel Session 4 (Univ. Building 17, The 3rd floor)		
	Classroom 17306	**Classroom 17307**	**Classroom 17308**
11:00-12:30	**A4 Session:** **Operations Strategy & Supply Chain Strategy** Chair: Michiya Morita (Gakushuin University)	**B4 Session:** **Business Process Innovation & Practice** Chair: Junichi Tomita (Toyo University)	**C4 Session:** **Corporate Operation & Quality Management** Chair: Hirohisa Sakai (Toyota Motor Corporation)
	A4-1 Operation Strategies for Ensuring Supply Chain Resilience Yu Cui (Osaka City University) Masaharu Ota (Osaka City University)	B4-1 Disruptive Process Innovation Mechanism in the Casting Industry: The Case of Kimura Chuzosho Co., Ltd. Junichi Tomita (Toyo University) Tomofumi Takamatsu (Aoyama Gakuin University)	C4-1 Quality-Creating Management and Communication State: A Case Study of a Small and Medium-Sized Manufacturer in Japan Atsuko Ebine (Surugadai University)
	A4-2 Design of a Global Closed-Loop Supply Chain Network Takahiro Karakama (Tokyo Metropolitan University) Yasutaka Kainuma (Tokyo Metropolitan University)	B4-2 A Bicycle Design Model Based on Young Women's Fashion Combined with CAD and Statistics Kaori Koizumi (Aoyama Gakuin University) Shinji Kawahara (Aoyama Gakuin University) Yuki Kizu (Aoyama Gakuin University) Kakuro Amasaka (Aoyama Gakuin University)	C4-2 A Study on the Extension of the Corporate Household: A Case Study of TABIO in Japan Hiroshi Koga (Kansai University)
	A4-3 Supply Chain Strategies, Orientations, Capabilities, and Approaches in Sri Lankan Apparel Demand Chains Mahendra N Gunawardhana (Tokyo Institute of Technology) Sadami Suzuki (Tokyo Institute of Technology) Takao Enkawa (Tokyo Institute of Technology)	B4-3 Implementation of Overall Equipment Effectiveness (OEE) to improve General Performance of Progressive: Bundling and Modular Manufacturing Systems in A Garment Manufacturing Industry Russel R. Timothy (National Institute of Fashion Technology) Prerna Gautam (National Institute of Fashion Technology) Shweta Iyer (National Institute of Fashion Technology)	C4-3 Developing A Highly Higher-cycled Product Design CAE Model: The Evolution of Automotive Product Design and CAE Kakuro Amasaka (Aoyama Gakuin University) Yasuaki Nozawa (Aoyama Gakuin University) Takehiro Onodera (Aoyama Gakuin University)
	A4-4 Alignment of Supply Chain Strategy and Business Strategy Michiya Morita (Gakushuin University) Masayasu Nagashima (Sorbonne Graduate Business School)	B4-4 Constructing a Business Process Network System "A-BPKNS-NPD" Takayuki Iida (Aoyama Gakuin University) Ryosuke Mihara (Aoyama Gakuin University) Kakuro Amasaka (Aoyama Gakuin University)	C4-4 How to Build a Linkage between High Quality Assurance Production System and Production Support Hirohisa Sakai (Toyota Motor Corporation) Kakuro Amasaka (Aoyama Gakuin University)
	ISOMS 2012 Closing		

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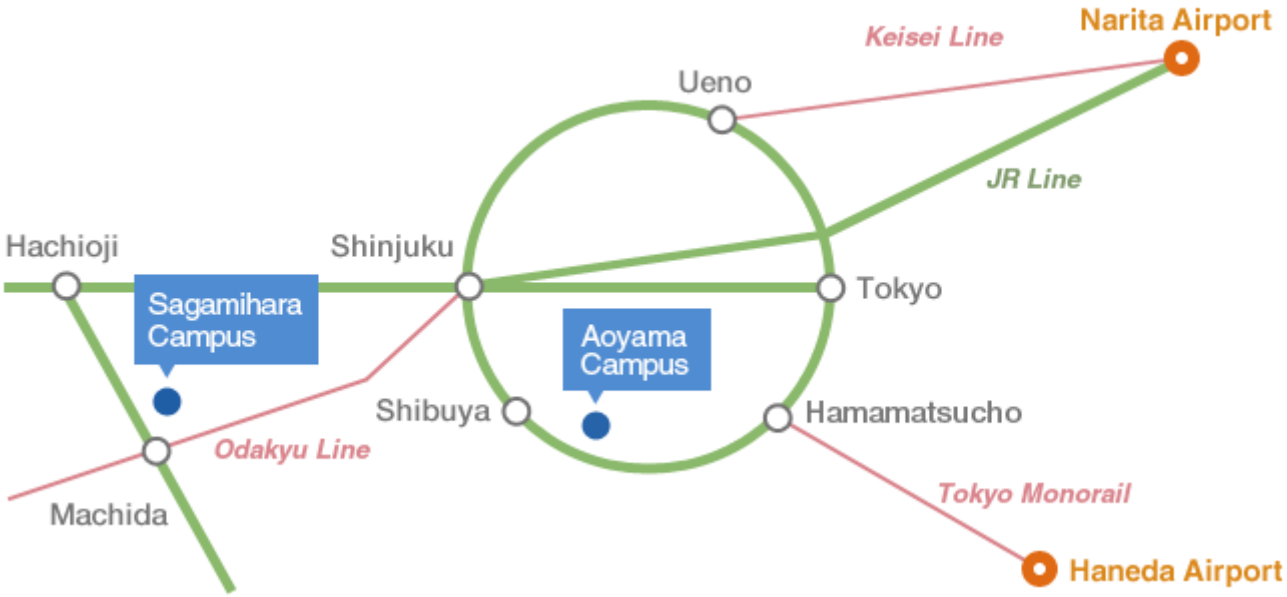
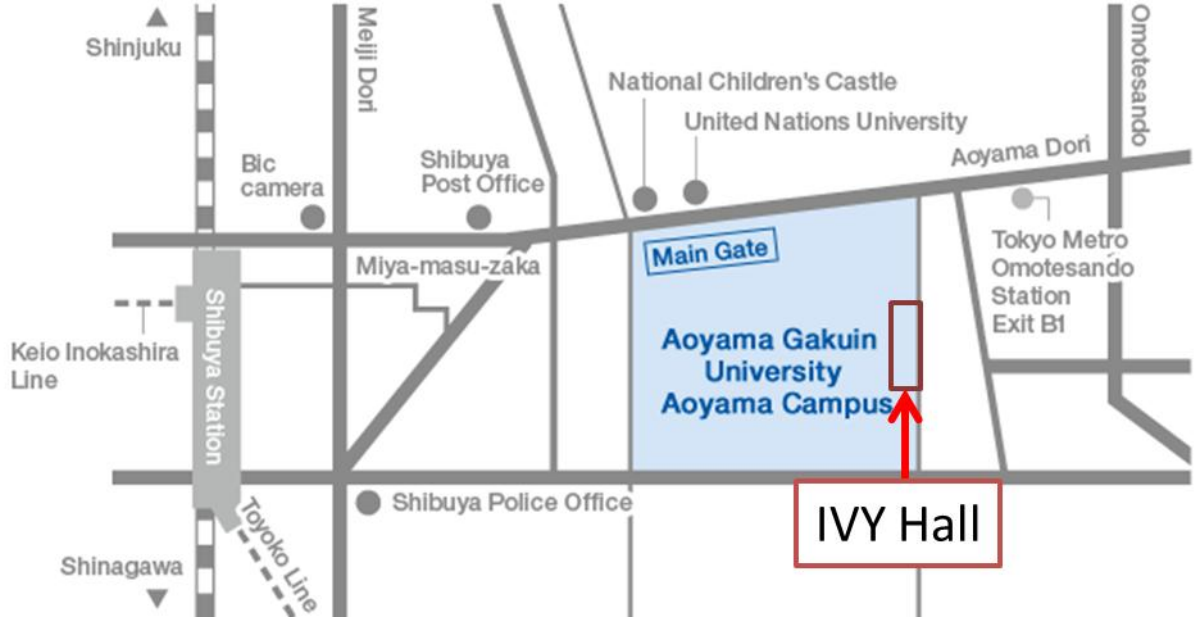
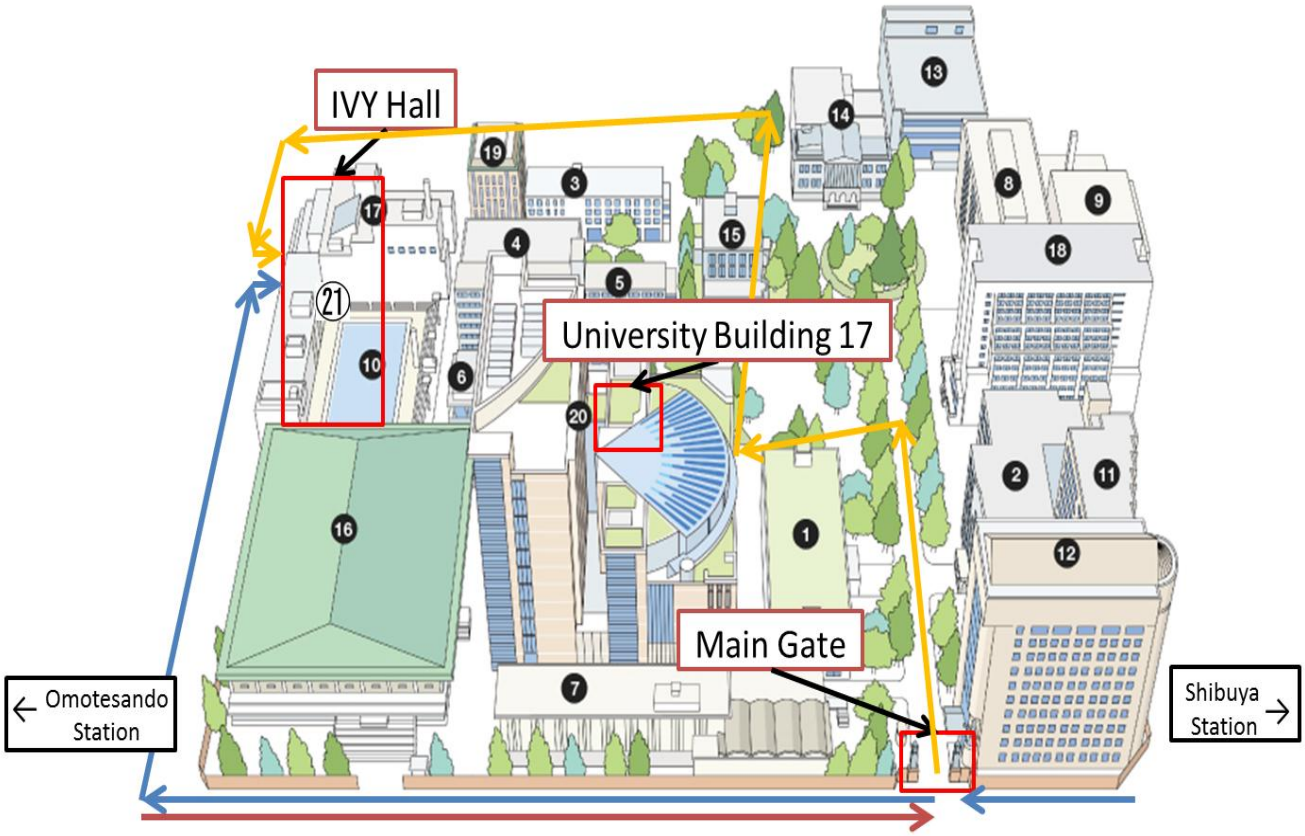




Campus Map

Aoyama Campus Map



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7. University Building 7
8. University Building 8
9. University Building 9
10. University Building 10
11. University Building 11
12. Research Institute Building (University Building 14)
13. University Library
14. Majima Memorial Hall
15. Corporate Headquarters (Berry Hall)
16. Aoyama Gakuin Memorial Hall (University Gymnasium)
17. Wesley Hall
18. Goucher Memorial Hall (University Building 15)
19. University Building 16
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21. IVY Hall

Layout of University Building 17

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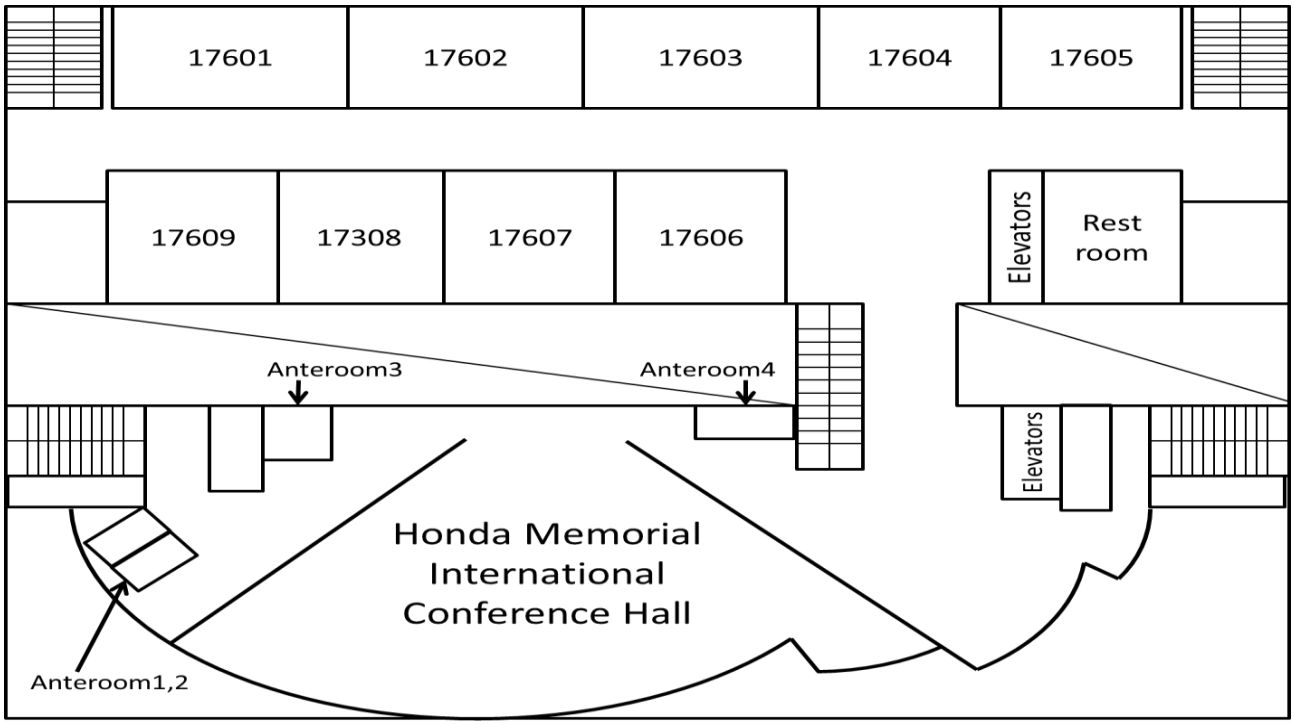

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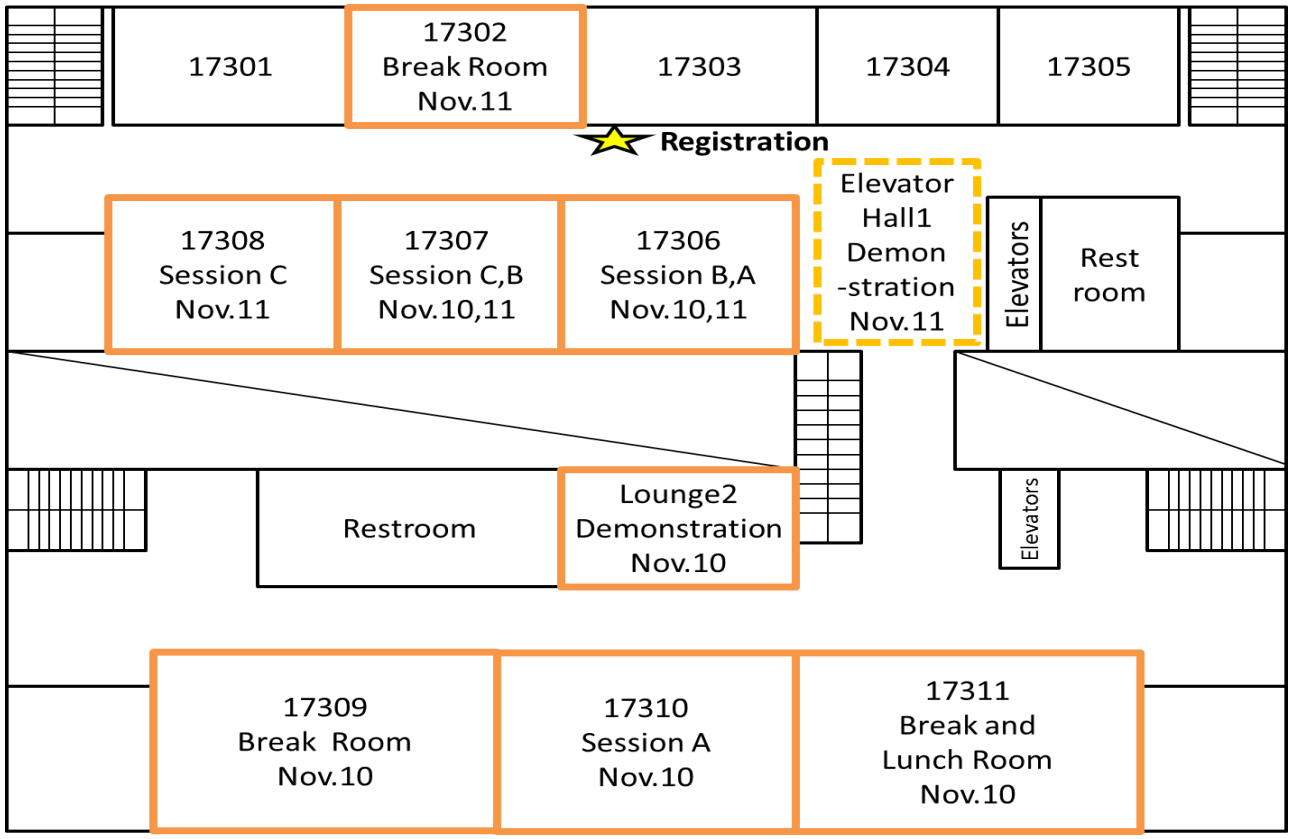

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Plenary Session

Honda Memorial International Conference Hall

Saturday, November 10, 2012, 9:00-10:10
Innovation Management;
To Study from the view point of Operations Management
Osaka City University
Professor Masaharu Ota

Our book entitled as “Innovation Management; To Construct Systematic Value Creative Process” is just published. The content of book is the results of our research work in this decade with my colleagues in Japan, Taiwan, Australia, and US. We have studied Innovation Management from the view point of Operations Management which means studying effective methods or methodologies for Innovation Management, not only case studies or conceptual works. The book presents Innovation Capability to generate Innovation, useful models of Innovation Process, Visualized methods of Comprehensive Innovation Process, Concepts of Support and Cooperation for Innovation Activities, Innovation Community and Network to lead Innovation, Global Innovation Strategies, Strategies for Intellectual Property, and New Management Philosophy for Innovation. In this special lecture, especially, the framework for product and process innovation, innovation capability to construct the innovative company, the characteristics of innovation capability of Japanese excellent companies and the innovation process for systematic innovation are presented. Our study is a trial to study innovation management from the view point of Operations Management and also a challenge to construct value creation process to accordance with recent managerial circumstances. I hope the lecture will be a trigger to proceed with innovation study and discussion with you.

Saturday, November 10, 2012, 13:00-14:00
Socially Responsible Supply Chain Management
Stanford University
Professor Hau L. Lee

The globalization of the world's economy has resulted in developing and emerging economies increasingly be parts of the global supply chain. While we extract values, such as the supply of raw materials and cheap labor from such economies, we should also contribute to the social well-being of the people in underdeveloped economies. Operations and innovation management can play a role in creating supply chains that can support the basic needs of such economies, sustaining the strength of such economies as part of the supply chain, and having supply chains that can enable the development of higher values and new businesses for the entrepreneurs there. This talk will discuss how our field can make such contributions.

Saturday, November 10, 2012, 14:30-15:30
3M Innovation Process
3M Japan Group
Chief Process Officer Takatoshi Ohkubo

In today's fast-paced, pressure-packed business climate, many companies take a very short-term approach to the new product development pipeline. Because innovation does not occur on a set timeline, 3M takes a different path – thanks in large part to the principles that former CEO, William L. McKnight instilled in the company. McKnight believed in the imperatives of hiring the right people, tolerating mistakes and giving employees freedom to explore in order to foster a culture of innovation. 3M has put the McKnight Principles into practice by encouraging employees to dedicate a significant portion of their time to projects and research that go beyond their core responsibilities. Although it may take years for such innovative "tinkering" to bear fruit, the results of 3M's storied 15 Percent Time are truly remarkable. Consequently 3M has 55,000+ products in 35+ business units, organized into six businesses (Consumer & Office, Display & Graphics, Electro & Communications, Health Care, Industrial & Transportation, Safety, Security & Protection Service) and 43,000+ issues and pending patents based on 3M's 46 technology platforms, R&D investment with ~6% to sales, connecting to customers in ~200 countries, operations in 67 countries, 85 laboratories with ~10,000 technical employees, 30 customer technical centers and 200+ factories.

The 2nd International Symposium on Operations Management and Strategy

Abstracts

■Saturday, November 10, 2012, 10:30 am - 12:00 pm

■A1 Session (Classroom17310): Enterprise Systems & Operations Planning

Chair: Hajime Mizuyama (Aoyama Gakuin University)

A1-1 **(Paper ID 02-024)**

A Batch-up Dating Central Market Maker with Gaussian Forecast Distribution for Prediction Market System using VIPS for Demand Forecasting

Hajime Mizuyama, Aoyama Gakuin University

This paper provides an intra-company prediction market system as a collective-knowledge-based demand forecasting tool. The system uses the variable-interval prediction security (VIPS) as the prediction security to be traded in the market and is controlled by a newly introduced computerized central market maker (CMM). The CMM has a Gaussian forecast distribution and updates the distribution in a batch basis through an inventory-based updating logic according to the transactions of VIPS in the market. It is confirmed first by agent-based simulation and then through laboratory experiments that the proposed system functions properly as a subjective forecasting tool.

Keywords: Collective Knowledge; Collective Intelligence Prediction Markets

A1-2 **(Paper ID 02-042)**

Applying Sensitivity Analysis on Investment Decision Factors of Municipal Solid Waste Operational System

Anchalee Supithak, Thai-Nichi Institute of Technology

This research is about applying operations research techniques in analyzing municipal solid waste management system of a suburban area in Thailand and performing sensitivity analysis on investment decision factors involving Integrated Municipal Solid Waste (MSW) Management. The integrated MSW management technologies in this research involve recycling, sanitary landfill, composting, and incineration. The technology investment decision factors comprising of NPV, IRR, and B/C ratio values are measured for various levels of recycle percentage, operating cost and returning revenue. The effect of operating cost, returning revenue, and recycle rate on such investment decisions of NPV, IRR, and B/C are analyzed by running the experimental design with two-way analysis of variance method. According to Minitab analysis, at 0.05 significant level, the results shown significance difference in changing of operation cost and various MSW systems; consisting of fertilization, incineration and sanitary landfill, on NPV, IRR and B/C values, since P-values are less than 0.05. However, at 0.025 significant level, IRR values are not significant difference from the variation of operational costs, since P-value is 0.027. For Factorial analysis of returning revenue levels and various MSW systems, we conclude that there is significant difference on NPV, IRR and B/C values from variation of returning revenue levels and MSW systems since P-values are less than 0.025 significant level. On the other hand, MSW systems and recycle rate levels do not affect IRR values at 0.025 significant level, since P-values is 0.098 and 0.023, respectively. In addition, there is significant different in changing recycle rates and MSW system on NPV and B/C values at significant level of 0.05. Based on evidence, we conclude that the critical factors affecting on investment of MSW system decisions are operational cost, return revenue, and selecting MSW system.

Keywords: Municipal Solid Waste Management; Sensitivity Analysis; Two-way Analysis of Variance

A1-3 **(Paper ID 02-003)**

Creating the A-NIBNS Nonlife Insurance Business Navigation System
Masahiro Nakamura, Aoyama Gakuin University
Akinori Ishikawa, Aoyama Gakuin University
Kakuro Amasaka, Aoyama Gakuin University

In this study, the authors teamed up with nonlife insurance companies and agencies to create a business approach method that made it possible to reform insurance-related business activities from a policyholder perspective. A detailed operational method was then put together as A-NIPNS, or Amalab's Nonlife Insurance Business Navigation System. The system is comprised of four parts: (1) a networking system for sharing information within nonlife insurance companies and with agencies, (2) a customer handling evaluation system, (3) a business information sharing system used to link nonlife insurance companies and agencies, and (4) a complaint utilization system for policyholders. After putting together the system, the authors implemented a trial operation using Nonlife Insurance Company A and Nonlife Insurance Agency B in order to check its effectiveness.
Keywords: Nonlife Insurance; Policyholder; A-NIBNS

A1-4 **(Paper ID 02-013)**

Economic Lot-size Scheduling Problem with Batch Shipment Policy
Yu-Cheng Hsiao, Takming University of Science and Technology
Shoue-Yu Huang, Takming University of Science and Technology
Tai Y. Lin, Takming University of Science and Technology

This study addresses the economic lot-size scheduling problem with batch-shipment policy (ELBSP). A supplier uses a single facility to manufacture multiple products and equally sized batches are then delivered by the supplier to buyers over an infinite planning horizon. The common replenishment cycle (CRC) policy is utilized to obtain a feasible production schedule easily. The replenishment cycle division (RCD) and recursive tightening (RT) methods are developed. Two theorems are verified to ensure that the ELBSP solution with the CRC policy using the RCD and RT methods reaches the global optimum. This solution is the upper bound of the ELBSP without the CRC policy.
Keywords: ELBSP; CRC

■B1 Session (Classroom 17306): Marketing & Service Innovation

Chair: Pham Thi Lien (Vietnam National University)

B1-1 **(Paper ID 02-015)**

Marketing Budgets and Marketing Effects
Yun K. Huang, Takming University of Science and Technology
Wen I. Yang, Takming University of Science and Technology

In the past, companies mostly relied on traditional media, such as TV, newspapers, magazines, radio and billboards to market products or services. However, the increasing penetration of the Internet and the advancement of network technologies have promoted more and more companies begin to resort to online advertisements in order to attract a large number of consumers in the cyberspace, as well as to enhance the profile and sales of products. According to IDC (International Data Corporation), the total spending on online advertisements was $65.2 billion USD worldwide in 2008, accounting for 10% of the total advertising budgets. Meanwhile, IDC also forecasts that online advertisement spending will reach $10.66 billion USD in 2011, with an average growth rate of 15~20% (Science & Technology Policy Research & Information Center, 2008). These figures indicate that online advertising is a trend for products or service marketing under the booming development of the Internet. Different from traditional media, online advertisements are not restricted by time or space. Hence, it is possible to focus on the mass market, as well as the specific market segments. Online advertising can be interactive; in other words, online advertisements make it possible for consumers to purchase or experience products at any given time. Consumers can also share their

own experiences, opinions and knowledge with community peers, or make recommendations to others. This is the electronic word-of-mouth communication, which is also the sharing of opinions and experience regarding products and services on the Internet (Hennig-Thurau et al. 2004). According to a survey on online consumers' behavior in Taiwan by Market Intelligence Center (2007), 48.2% of Internet users are influenced by online advertisements for their purchases of products/services. The survey also indicates that approximately 80.5% of the Internet population in Taiwan would browse comments posted on blogs or community websites before making any purchases. About 74% of the Internet population states that these comments have influences on their purchase intentions. These findings suggest that online advertising has influence on the B2C market. Also, some incentives offered by online advertisements have encouraged word-of-mouth communication and enhanced marketing benefits. Although traditional media advertising seems to decline, studies show that they do not conflict with promotions over other media. This is because different media create different advertising effects due to their various communication characteristics. These effects generate different levels of influences on product sales (Dertouzos & Garber 2006; Vakratsas & Ma 2005). Keller and Fay (2009) suggested that the stimulus, support and encouragement of advertising can enhance the number of consumers engaged in word-of-mouth recommendations by 20%. In sum, traditional media, online advertisements and electronic word-of-mouth have their respective roles and significances in product marketing. They are complementary, thus, the allocation of the budgets is an important issue. This paper finds that there are a lack of studies on the allocation of marketing budgets and marketing benefits of traditional media, online advertisement and electronic word-of-mouth. Therefore, it aims to conduct in-depth interviews with different companies in Taiwan. The findings will serve as a reference to companies and Internet operators in Taiwan and other countries in marketing budgetary management and applications.

Keywords: Traditional Media; Online Advertisement; Electronic Word-of-Mouth

B1-2 **(Paper ID 02-012)**

Researching Customer Satisfaction and Loyalty to Boost Marketing Effectiveness: Look at Japan's Auto Dealerships

Hirotaka Okutomi, Aoyama Gakuin University
Kakuro Amasaka, Aoyama Gakuin University

The authors proceed with Researching Customer Satisfaction and Loyalty to Boost Marketing Effectiveness. This study looks to statistics as it focuses on customer satisfaction as a way of boosting marketing effectiveness, clarifying the key factors that comprise customer loyalty, and help improve the marketing strategy.

Keywords: Marketing; Customer Satisfaction; Customer Loyalty

B1-3 **(Paper ID 02-041)**

On Some Issues in Realization of Service Innovation Strategy into Operation

Ryo Sato, Yokohama National University

As a methodology for service innovation strategy, we have propsed the soft innovation architecture (soft IA, for short). Also, the resource-based view (Barney, 2002) was incorporated in soft IA (Kawai et al., 2012). In this paper, we consider how the result of soft IA can be realized into business operation. Since the innovation architecture represents a strategy, it defines certain business area and the direction of the activities in a firm. The innovation architecture of service of a firm certainly designs the components with their relationship. The hierarchical structure of innovation architecture consists of those components such as innovation target, service and products, functions, service infrastructure and organization, technology of products and production process, and application knowledge. Though the components in those levels in architecture show what are important and required for the innovation target, there is no explicit method for realization of those components. The concept such as activity systems by Porter (1998) is too simple to analyze the advantage and properties of operations of business process. So, we need more detailed model of process at a level of BOM (bill of materials), list of operations and work centers, which are commonly used in planning (of production of tangible products). Also, we need the concept of activity

interaction diagram and state transition mechanism for analysis of dynamic properties that is concerned in the Little's law. This research is to try to figure out possible and necessary issues for realization of service innovation with its business process.
Keywords: Business Process; Innovation Architecture

B1-4 **(Paper ID 02-045)**

An Association between Service Quality and Customer Satisfaction: A Vietnamese Context
Thi Lien Pham, Vietnam National University
Hue Minh Nguyen, Vietnam National University

Service quality and its relationship with customer satisfaction have received considerable academic and businesses attention in recent years. But the nature of the association between these two constructs is not well-explained in the literature. This study used SERVPERF model as proposed by Cronin & Taylor (1992) to assess perceived service quality at a Vietnamese organization, and then study the relationship between service quality and customer satisfaction on the organization service's quality. Based on results of customers survey, the study indentified three components-; RELI-ASS (the ability to perform the promised service dependably and accurately and knowledge and courtesy of employees and their ability to convey trust and confidence), RESPONSIVENESS (the willingness or readiness of employees to help customers and provide services), and EMPATHY (individualized cares and attentions that the firm provides to its customers) – which explain customers' perceived service quality. The relationship between these service quality components and customer satisfaction is also investigated through regression analysis. It is found that these three components of service quality have positive relationship with customer satisfaction in which RESPONSIVENESS has the most significant impact on customer satisfaction level. The results showed that 64% of the variance in customer satisfaction can be explained by these three variables In addition, based on these findings, the study also gives some suggestions for Vietnamese organizations to further improve service quality and customer satisfaction level.
Keywords: Service Quality; Customer Satisfaction; SERVPERF Model

■C1 Session (Classroom 17307): Environment & Risk Management

Chair: Satoshi Kumagai (Aoyama Gakuin University)

C1-1 **(Paper ID 02-043)**

Assessing Handicraft Villages' OVOP Implementation Capacity: Case Study of a Silk Village in Vietnam
Nguyen A. Thu, Vietnam National University
Nguyen T. Huyen, Vietnam National University
Vo T. Thai, Vietnam National University

OVOP (One Village One Product) movement originated in Japan has been proved to be an effective model of rural development worldwide, especially in Asian nations. This study, by reviewing regional development theories and international experiences, has discovered a strong link between the key successful factors of OVOP in many typical countries and Porter's national advantage theory. Based upon this finding, a theoretical framework used to assess the OVOP implementation capacity has been developed, including six main groups of factors: local capacity, handicraft village's strategy, structure and competitors, demand conditions, related and supporting industries, government, and chances. A case study has been carried out by using this framework to assess the OVOP implementation capacity of Van Phuc silk village in Hanoi, Vietnam. The results contribute a crucial evidence for further application of the framework to assess the capacity of other traditional villages to adopt OVOP movement.
Keywords: OVOP; Porter's National Advantage Theory; Implementation Capacity

C1-2 **(Paper ID 02-014)**

Networked Narratives:
Understanding Internet Book Reviews in Online Communities
Yun K. Huang, Takming University of Science and Technology
Wen I. Yang, Takming University of Science and Technology

This exploratory study investigated word-of-mouth communication behavior and other phenomena that occurred among bloggers writing book testimonials and their community readers in order to develop a method and strategy for enhancing word-of-mouth communication about books. Design/methodology/approach – This study conducted a netnographic investigation to explore the word-of-mouth and interactions about new books among bloggers and community readers. Netnography is a qualitative approach for exploring the information exchange among online community members. Findings – Findings indicate that personality traits, testimonials, and responses of community readers to bloggers will influence the effect of word-of-mouth related to books. Exposure to testimonials with commercial characteristics will not necessarily hinder the word-of-mouth about books. Originality/value – The role of online communities in marketing communication and their effects are valued by businesses. These results shed light on the communication behavior of bloggers and their community of readers, thereby understanding how word-of-mouth affects the promotion of books then make relevant recommendations for management. Practical implications – These results may provide a reference for publishers or related businesses that sell books or products via blogs during the planning of their marketing strategies.
Keywords: Blog; Internet Book Reviews; Internet Marketing; Online Communities; Online Consumer Behavior; Word-of-Mouth

C1-3 **(Paper ID 02-039)**

Empirical Study on Transferability of Kaizen Practices in Vietnamese Manufacturing Companies
Phan Chi. Anh, Vietnam National University Hanoi
Yoshiki Matsui, Yokohama National University

This study investigates the link between Kaizen practices and different culture dimensions in Vietnamese manufacturing companies. Statistical techniques such as ANOVA and path analysis are applied to analyze the data are collected from 124 Vietnamese manufacturing companies through a questionnaire survey during 2011-2012. The results of statistical analysis indicate that such culture dimensions as uncertainty avoidance, in group collectivism, humane orientation significantly relate to Kaizen practices. This study suggests that there is not a universal model for successful Kaizen implementation. Kaizen practices should be adapted to the local culture; in order have the highest probability of success.
Keywords: Kaizen; Culture; Manufacturing

C1-4 **(Paper ID 02-032)**

Japanese Environmental Policy Priority Index :
A Method of Environmental Accounting for Measuring Corporate Environmental Performance
Satoshi Kumagai, Aoyama Gakuin University

The environmental accounting guideline by the Japanese Ministry of Environment recommends the calculation of single-score environmental indicator. It is useful not only for environmental management within the company but also for effective communication with the outside stakeholders by environmental reporting. JEPIX 2003 (Environmental Policy Priorities Index for Japan 2003) was developed based on the Swiss EcoScarcity method. It converts emission data of multiple substances to a single-score indicator, assessing the distance to target of each substance emission – the environmental policy versus actual environmental situation based on the mass flow data. The amount of difference between actual national flows of environmentally harmful substance and national environmental regulations target value (e.g. GHG reduction target in Kyoto Protocol) is regarded as weighting factor of the substance, called EcoFactor. Some advanced Japanese

Companies has employed JEPIX 2003, as a single score indicator to show their environmental performance in environmental reports. Since the development of JEPIX 2003, environmental regulation as well as available inventory data has changed. Responding to those changes and needs of industry, JEPIX 2010 has been developed, using the most resent Japanese inventory data and legislation target. JEPIX is very responsive to the change of political target and/or the reduction effort states. For example, CO2 EcoFactor value has changed dramatically due to economic recession, reduction efforts, and/or regulation changes. Also, new legislation target was imposed in some categories of environmental harmful substances. EcoFacors have changed accordingly. Comparison of the two sets of EcoFactors (JEPIX 2003 and 2010) and Japanese national ecobalances, which are obtained from the EcoFactors and national inventory data, show the overview the Japanese environmental policies and the changes of their priority. In JEPIX 2010, there are diversified identified categories of environmental aspect, including GHG, ODS, SOX, NOX, particles/dust, dioxins, VOC, total Nitrogen, total Phosphorous, COD, BOD, waste material. JEPIX 2010 covers more than 2000 substances. In order to facilitate and expand the use of JEPIX, JEPIX calculation sheet has been developed for distribution.

Keywords: Environmental Performance; JEPIX; Environmental Accounting

■Saturday, November 10, 2012, 4:00 pm - 5:30 pm

■A2 Session (Classroom17310): Logistics＆Lead-time Management

Chair: Toshiyuki Matsumoto (Aoyama Gakuin University)

A2-1 **(Paper ID 02-047)**

Emergency Recovery Production in the Japanese Automotive Industry: Long-Term Lessons from the 1997 Aisin Seiki Kariya factory fire

Carmen M. Perez, Yokohama National University

The objective of this research is to analyze the long-term lessons from the Aisin Seiki Kariya factory fire in 1997. The case is analyzed as two embedded cases studies: proportioning valves and tandem master cylinders production recovery effort. The acceleration factor of the in-house production in the created provisional line of both components was different. Long -term analysis shows what was learned as consequence of the fire. After a deep analysis of long term information and two visits to Aisin Seiki Kariya factory it could not be said that suggestions to avoid a further similar situations were exactly followed. The big lesson lies in the weigh of the benefits of single sourcing, plants concentration and strong alliances with supplier's combination and its risks.

Keywords: Emergency Recovery; Long-term Lessons; Automotive Industry

A2-2 **(Paper ID 02-026)**

Considering Non-hierarchical Connections in an AHP Model

Szabolcs Duleba, College of Nyíregyháza
Kei Ogiwara, Akita Prefectural University
Mitsuhiro Hoshino, Akita Prefectural University
Tsutomu Mishina, Akita Prefectural University

Analytic Hierarch Process (AHP) assumes that only hierarchical connections exist amongst structural elements of decisions. In general practical settings, it is common to consider other coexisting non-hierarchical linkages and Analytic Network Process (ANP) is recommended in multi-criteria decision making (MCDM) literature. However, ANP is generally a very complex process which requires a lot of efforts from the decision makers. Therefore, in case the structure is dominantly hierarchical, it is advisable to emphasize the original hierarchy and consider other linkages as extra information. In this paper, we first introduce a fundamental AHP structure which has been evaluated by decision makers. This AHP ranking is then amended by allowing for additional non-hierarchical connections of structural elements. By employing this modified procedure, different rankings have transpired based on the influence of each element on the others.

The model has been tested in a public transport system development problem.
Keywords: AHP; Non-hierarchical Connections; ISM; Public Transport

A2-3 **(Paper ID 02-002)**

Under Customer Switching: Transshipment or Emergency Order Policy?
Yi Liao, Southwestern University of Finance and Economics
Liu Yunhua, Southwestern University of Finance and Economics

In the retail industry, short product life cycle and increasing globalization require a well planned inventory strategy. Poor planning can result either in lost sales opportunities or in expensive inventory write-offs. When out-of-stock happens, emergency order from suppliers and lateral transshipment among retailers after demand realization lessen the impact of demand uncertainty and thus improve customer service. Although a large body of research studies inventory transshipment issue and emergency order policy, a common phenomenon often neglected is that not all customers are willing to wait for transshipments or emergency order arrangements. Customers who cannot acquire the desired products may search at other retailers by themselves. We consider the inventory replenishment decision when customer request and customer switching behavior occur, for two retailers who are under centralized control. We not only prove the optimal replenishment decision under each policy does exist, but also find that emergency order policy dominates transshipment approach in supply chain's overall profit under certain conditions. Through numerical studies, we examine the impact of customer switching and shipping request on the profitability, as well as the optimal replenishment inventory level.
Keywords: Transshipment; Emergency Order; Inventory

A2-4 **(Paper ID 02-020)**

A Basic Research on LT Seven Tools and Total Lead-time Reduction
Kazuto Ohata, Keio University
Toshiyuki Matsumoto, Aoyama Gakuin University
Takashi Kanazawa, Keio University

When considering profitability improvement in manufacturing industries, the working assets decreasing of inventory and the lead-time reduction is normally taken as issues. It is the reason of not quite advanced enough in those inventory decrease and lead-time reduction that two of "working capital decreasing" and "lead-time reduction" are used as no wondering improving objective even those two meanings are different. And so, by referring the financial target (capital assets decrease) and the operational target (lead-time reduction), lead-time reducing improvement are considered from viewpoint of the accumulative graph consisted from flow and stock. An approach is discussed which attains the financial target of stock as "result" measured by financial gain and loss by measuring and improving the flow as "reason" measured as objective of person in charge. This paper is corresponded in position to a basic research of TLR (Total Lead-time Reduction) that is the lead-time reducing improvement approach based on management cycle. The Objective of this paper is to propose the LT seven tools as viewpoint of lead-time reduction by focusing attention to flow (LT reduction) and Stock (inventory reduction), and to review the applicability of the LT seven tools by applying tools to actual cases. The LT seven tools such as whole chain viewpoint (SCM), straight flow (Flow), parallel flow (Lean), stop push (Non-Push), seek pull (Pull), smaller step (LOT) and neglect wait (Step-less) is proposed as a viewpoint of lead-time reducing improvement. Improving projects were conducted as lead-time and inventory reducing improvement for actual three cases to investigate the effectiveness of the LT seven tools. The validity of the LT seven tools was verified as effective tools for reducing lead-time and inventory. Now, the project of defining and operating the process of spreading TLR, which is the target of this research, by applying the LT seven tools that is based on PDCA cycle.
Keywords: Lead-time; Inventory; Accumulative Graph

■B2 Session (Classroom17306): Technology Management & Advertising

Chair: Noritomo Ouchi (Aoyama Gakuin University)

B2-1 **(Paper ID 02-038)**

The Influence of National Culture and Advertising Market Size on the Prevalence of Celebrity Endorsement Strategies in Advertising a Multi- country Study

Carolus L. C. Praet, Otaru University of Commerce

This study seeks to contribute to the body of knowledge about how advertising and culture are interrelated by focusing on the use of the celebrity endorsement advertising strategy. It attempts to uncover structural drivers behind the use of this strategy across national markets. The study empirically tests hypotheses linking Hofstede's dimensions of national culture to the strategy. In addition, it investigates the validity of macroeconomic variables as alternative explanations for cross-market differences in the prevalence of celebrity endorsement strategies.

Design/Methodology

Television commercials were recorded in 25 countries between February 2001 and December 2003. For each country, two native judges coded the sample commercials. For all countries, interjudge reliability was satisfactory. The total sample retained for analysis was 6359 commercials. For each of the 25 countries in the sample, a country-level measure of the use of celebrities was constructed. This measure was used as the dependent variable in multiple regression analyses. As independent variables, four of Hofstede's cultural dimension country scores were used. Two control variables were included in the multiple regressions: a GNI per capita dummy variable, and an advertising market size dummy variable.

Findings

Results show a wide disparity in the prevalence of celebrity endorsement strategies in markets across the world. Multiple regression analysis reveals a negative relationship between Hofstede's individualism dimension and use of the celebrity endorsement strategy across national markets (β = -.568, p = .001). In addition, the size of a nation's advertising market offers an additional explanation of cross-national differences in the use of this strategy (β = .458, p = .004). The model explains about 52% of the variance in the data (adjusted R2 : .522). Finally, strategic implications of the findings, limitations, and directions for future research are suggested.

Keywords: Advertising Strategy; Celebrity Endorsement; National Culture Background/Purpose

B2-2 **(Paper ID 02-036)**

System Dynamics Modeling for Analyzing the Impact of Utilization of External Knowledge and Product Functionality on Firm's Profit

Noritomo Ouchi, Aoyama Gakuin University

While huge R&D investment has become crucial burden for firm's management of technology (MOT), improvement of R&D productivity has become crucial for firms. Existing works have focused on the Management of Technology (MOT) primarily within supplier without taking any substantial feedback-loop from the market side. However, in these days, creating new functionality by means of incorporating user's demands in the market is more significant. Creating new functionality induces the increase of the number of users, and the new users create more functionality. By the increase of demand, firms produce more products and gain the experience and knowledge which lead to the cost reduction and the increase of functionality development. As a result, the number of new users increases moreover. In this way, firm's activities are based on complex system which has many feedback loops. In this complex system, it is required for firms to inspire not only own market but also external market. In addition, internalizing external knowledge and product functionality is attracting attention in R&D strategy. The purpose of this study is to clarify the impact of inspiring the external market and internalizing external knowledge and product functionality on firm's profit. In this analysis, system dynamics is used for simulation. System dynamics is a methodology for understanding complex problems where there underlies dynamic behavior affected by a certain set of feedback mechanisms. The four constituents of system dynamics are (i) closed boundary, (ii)

feedback loops, which can be negative or positive, (iii) stocks or flows (levels and rates) and (iv) observed conditions within the system (Forrester, 1976). The model consists of two product markets (e.g., PC and Printer). The each product focuses on six areas - 1) research and development, 2) production and delivery, 3) finance, 4) organizational experience and knowledge, 5) product functionality and 6) market. Some of the model formulations are draw upon established system dynamics models (Forrester, 1961; Sterman, 2000; Rydzak, 2006). The system dynamics model is built using modeling software "Vensim". In our model, the organizational knowledge consists of organizational own knowledge and spillover knowledge (e.g., Griliches, 1979). Spillover knowledge is a product of spillover pool and assimilation capacity. Assimilation capacity is the ability to recognize the value of external information, assimilate it and apply it to commercial ends (Watanabe et al, 2003). In this model, it is assumed that spillover pool is knowledge of firms in external market.

In order to increase organizational knowledge, it is required for a firm to increase assimilation capacity. Thus, assimilation capacity (AC) is a representative parameter which indicates the firm's ability of internalizing external knowledge. Therefore, in our simulation, this parameter was used as the indicator of internalizing external knowledge. Furthermore, in our model, it is assumed that product functionality increases as a new projects R&D is completed. Average functionality increase per R&D project completion is increased by firm's knowledge, since the firm, which has high knowledge, can create more product functionality by using its knowledge. In addition, product functionality is affected by that of external product. For example, the high-quality PC can increase printers' product functionality for customer. The efficiency of increasing product functionality from that of external product depends on its elasticity. Therefore, in our simulation, this elasticity, external product functionality elasticity of own product functionality (EEP), was used as the indicator of internalizing of external functionality. Similarly, the attractive printer such as a high-quality full-color printer increases PCs product functionality for customer. The efficiency of increasing product functionality of external product also depends on its elasticity. That is, the ability of inspiring external market can be indicated by this elasticity, product functionality elasticity of external market (PEE). In order to compare the impact of inspiring the external market and internalizing external knowledge and product functionality on firm's profit, the 4 scenarios, from S1 to S4, were used. Parameter AC (assimilation capacity) and EEP (external product functionality elasticity of own product functionality) represent the ability of internalizing external knowledge and product functionality. Parameter PEE (product functionality elasticity of external market) represents the ability of inspiring external market. S1, S2, S3 and S4 represent (the ability to internalize the external knowledge and product functionality, the ability to inspire the external market) as (Low, Low) (Low, High) (High, Low) and (High, High). Our simulation results demonstrate periodic profit of S4 is much higher than that of other scenarios. That is, if a firm can inspire external market and internalize external knowledge and functionality simultaneously, a firm can accomplish conspicuous performance. There is not much difference between S1 and S2. This implies that a firm cannot make a profit only by inspiring external market without the ability to internalize external knowledge and product functionality. The ability to assimilate external knowledge is decisive for a firm's profit. Our simulation results show the decreasing speed of sales price of S4 is slower than those of other scenarios. Many researchers have pointed out that many Japanese firms cannot make a profit because of the rapid decreasing of sales price (Nobeoka et al., 2006). Our simulation results suggest that creation of attractive products by effective utilization of spillover effect and making use of external product's functionality leads to increase the sales price (i.e., slowing down the decreasing speed of sales price). Taking the relationship between PC and the printer as an analogy, introducing the attractive printer which can maximize the PCs functionality in the market leads to expand the PC market. However, in order to make a profit, it is required that a firm assimilates the spillover effect and develops a printer which can take advantage of PC product functionality. A firm cannot make a profit without these abilities, even if it can produce a high-quality product for PC users. In light of the understanding of the shifting trend in the innovation spot from the supplier's domain to the user's domain in the market, the simulation to analyze the impact of inspiring external market and internalizing external knowledge and functinality on a firm's profit was conducted by means of system dynamics. We clarify that a firm can dramatically increase its profit by synchronizing its ability of inspiring external market and internalizing external knowledge and functionality. Furthermore we provide the following significant suggestions supporting to firm's MOT in new paradigm: (i) effective utilization of external

market is essential for functionality development, (ii) in addition to the development of attractive products, particular efforts should focus on the assimilation of external knowledge and effective utilization of complement products' functionality, and (iii) virtuous cycle between inspiring the external market, and internalize external knowledge and functionality in a synchronizing way should be constructed. It is important for firms to construct a virtuous cycle between providing attractive products, which inspire the external market, and assimilating external technologies, in order to maintain the high profitability. If they will be able to construct this cycle, the market will expand co-evolutionally and firms will be able to maintain a high profitability.
Keywords: System Dynamics; External Knowledge; Product Functionality

B2-3 **(Paper ID 02-034)**

International Comparison on the Relationship between Quality Management and Innovation Performance

Jing Zeng, Yokohama National University
Anh C. Phan, University of Economics and Business - Vietnam National University
Yoshiki Matsui, Yokohama National University

This empirical study conducts an international comparison on the relationship between total quality management (TQM) practices and innovation performance. Eleven TQM practices and two indicators of innovation performance were examined and their relationships were compared across five industrialized countries (Germany, Italy, Japan, Korea, and the United States). The results indicate the positive relationship between TQM practices and Speed of New Product Introduction, but mixed result for the relationship between TQM practices and Product Innovativeness. In addition, the way in which TQM practices affect innovation is significantly different across countries. These findings suggest that TQM-innovation relationship is dependent on the specific indictor of innovation performance and is cultural specific.
Keywords: International Comparison; TQM; Innovation Performance

B2-4 **(Paper ID 02-009)**

Attention-grabbing Train Car Advertisements

Motoi Ogura, Aoyama Gakuin University
Takayuki Hachiya, Aoyama Gakuin University
Kakuro Amasaka, Aoyama Gakuin University

Younger people have changed the way they access information in recent years, increasing the number of opportunities to take advantage of transit advertising. Train car advertising in particular boasts a high contact rate and extended length of contact. This study seeks to understand the correlations between passenger information and riding conditions when it comes to train car advertising (hanging posters, above-window posters, and sticker ads) in order to discover the ideal way to advertise inside passenger trains. Specifically, the study first tries to find the correlations among three factors: (1) whether or not passengers pay attention to train car advertisements, (2) basic passenger information (age and gender), and (3) riding conditions (riding time, average number of trips, etc.). Once data on riding conditions is collected, it is then grouped using a cluster analysis and Quantification Theory Type III in order to establish the relationship of the data to passenger attention towards train advertisements once again. Then, in order to conduct an in-depth analysis, a Categorical Automatic Interaction Detector (CAID) analysis is done on each group, setting whether passengers pay attention to train advertisements as the objective variable and basic passenger information as the explanatory variable. The results of the CAID analysis are then used to study the format of existing and future train car advertisements.
Keywords: Train Car Advertisements; AIDA Model; CAID Analysis

■C2 Session (Classroom17310): Operations Management & Simulation

Chair: Hisamoto Hiyoshi (Aoyama Gakuin University)

C2-1 **(Paper ID 02-037)**

Pedestrian Movement Model Allowing for Variable Buffer Size

Hisamoto Hiyoshi, Aoyama Gakuin University
Mai Ishii, NTT Data Corporation

Nowadays services and entertainment are growing to be important industries. When people get together into a service/entertainment facility or large-scale retail store, we encounter severe problems involved with pedestrians, such as heavy pedestrian traffic, safety of pedestrians, and smooth evacuation in disasters. To tackle these problems, we have to know pedestrian behaviors from both macroscopic and microscopic viewpoints. In the authors' previous work, a microscopic pedestrian movement model was proposed. The proposed model is based on the Voronoi diagram, which is a partition of the pedestrian space into regions owned by pedestrians; each region is the set of the points, from which the owner is the nearest among all the pedestrians. In the proposed model, time is discretized, and in each time step, each pedestrian moves to the point nearest to his/her destination in his/her region. In this work, we extend the previous model so that we can handle variable buffer size of each pedestrian when his/her speed changes. Moreover, we examine the effectiveness of the extended model by showing the simulation results from real-world examples.
Keywords: Pedestrian Movement Model; Simulation; Voronoi Diagram

C2-2 **(Paper ID 02-007)**

High Precision CAE Analysis of Automotive Transaxle Oil Seal Leakage

Yasuaki Nozawa, Aoyama Gakuin University
Takahiro Ito, Aoyama Gakuin University
Kakuro Amasaka, Aoyama Gakuin University

In recent years, manufacturers have been looking to numerical simulations in the form of computer-aided engineering (CAE) as a way to reform their product design processes in a way that shortens development times for product designs and results in major quality improvements. In this research, the viewpoint is to grasp the dynamic behavior of the technical problem by using experiments as the empirical approach and the numerical simulation. More specifically, technical problems where the structure of the problem is unknown are a cause for concern in the automotive manufacturing industry. One such problem is an automotive transaxle oil seal leakage problem, which the authors solved using a "problem identification – visualization experiments – logical reasoning – CAE analysis – design" process. The contribution of studies employing CAE has been significant in terms of achieving a form of development design that emphasizes predictive evaluation.
Keywords: Oil Seal; Optimized Design Using High Quality Assurance CAE; Digital Engineering

C2-3 **(Paper ID 02-040)**

A Comparison of Community Pharmacies in a Japanese Chain on the Relative Impact of Core and Auxiliary Elements on Service Evaluation

Hajime Itoh, Otaru University of Commerce
Carolus L. C. Praet, Otaru University of Commerce
Hidehiko Sakurai, Hokkaido Pharmaceutical University

This empirical study investigated the structure of factors that influence customer satisfaction and service quality in a Japanese chain of pharmacies providing a high level of expert service. The study merges insights from the SERVQUAL stream of research, conceptualizations of core and auxiliary service dimensions of the Nordic school, and Kano et al. (1984)'s concepts of "must-be" and "attractive" quality. In the sample pharmacies, only "courtesy" and "explanation of medication" constituted "attractive" quality, whereas customer evaluation of the other service elements was moderated by store type. Finally, we suggest managerial and theoretical implications of the findings.
Keywords: Service Marketing; Customer Satisfaction; Kano Model

C2-4 **(Paper ID 02-022)**

Research on Disaster Relief Operations for the Great East Japan Earthquake

Mine Kabata, Tokyo Metropolitan University
Yasutaka Kainuma, Tokyo Metropolitan University

The Great East Japan Earthquake attacked the North-Eastern Parts of Japan on March 11 in 2011. A shortage of relief supplies for a lot of affected people just after the occurrence of disaster caused to the expansion of the loss of lives. Then one of the most important issues in Disaster Relief Operations (DROs) to deliver relief supplies is an approach of Supply Chain Management (SCM). There are some researches about SCM for DROs so far, but there are very few papers found in literature which investigate the situation of damaged infrastructures and lack of information about the demand of relief supplies at the time of occurrence of disaster. So, we examined how disaster relief operations of the Great East Japan Earthquake are performed in terms of the principles which were required for the design of SCM for DROs applying the Quantification Method 3, and we discussed the DROs for the earthquake were appropriate or not.
Keywords: Humanitarian Supply Chain Management; Disaster Relief Operations (DROs); The Great East Japan Earthquake; Quantification Method 3

■Sunday, November 11, 2012, 9:00 am - 10:30 am

■A3 Session (Classroom17306): Supply Chain Management

Chair: Osam Sato (Tokyo Keizai University)

A3-1 **(Paper ID 02-027)**

Adaptive Collaboration Strategy in Down-stream Supply Chain Focused on Forecasting Demand Over Product Life Cycle

Masayasu Nagashima, Sorbonne Graduate Business School
Michiya Morita, Gakushuin University

Demand uncertainty is definitely one of the most critical factors in supply chain management. In coping with the uncertainty, the firm should improve the quality of data in forecasting demand. Such improvement is only possible through effective collaborative relationships and activities with down-stream supply chain partners. Our study explores such collaborative relationships and activities. Our research intends to integrate product attributes, product life cycle and retailer choice into a framework to generate comprehensive down-stream supply chain collaboration strategies. The improvement of demand forecasting, we believe, should be posited in such a framework.
Keywords: Supply Chain Collaboration; Product Life Cycle; Demand Forecasting Uncertainty

A3-2 **(Paper ID 02-029)**

Perception of Supplier Relations Managers from Perspectives of Behavioral Purchasing and Supply Management

Masakazu Sugiura, Waseda University

The purpose of this research is to analyze how members in the purchasing and procurement departments (Supplier Relations Managers, abbreviated as SRM) of manufacturing industry in Japan recognize their business environment and themselves from perspectives of behavioral purchasing and supply management. From the results of participative observation, developed was hypothesis that there are substantial cognitive differences between the two categories, i.e. “Direct SRM” who contact and negotiate with suppliers as buyers and “Indirect SRM” who support buyers from technical and administrative perspectives. In order to prove the hypothesis, three surveys regarding the perception of members were conducted. In the first survey, responses for ten questions indicated statistically significant differences ($p<0.05$) or some differences ($p<0.10$) between Direct SRM (n=21) and Indirect SRM (n=25). The second survey clarified that there are cognitive difference among the two groups regarding responses to all ten proceeding results. Responses to additional

questions also showed that the different perspectives depended on their degree of exposure to external environment. The third survey covered 44 Direct SRMs in various companies. It was found that they saw increasing difficulties in their jobs. Such perceptions had positive Pearson's correlation with their perception on acknowledgement within organizations. Factor analysis resulted in three factors, i.e. (1) situation of Direct SRMs such as competency and difficulty of Direct SRM's job, (2) situation of suppliers such as general situation of globalization, and increased negotiation power of suppliers, and (3) recognition of Direct SRMs within the firm. To conclude, Direct SRM believes that they are "special" within the organization in that they are connecting themselves to the external environment, acting as buffers to soften impact from outside environment. In other words, their degree of exposure to such dynamics brought significant differences in various aspects of cognitions on their environment and themselves.

Keywords: Buyer; Product Life Cycle; Supplier Relations; Cognitive Difference

A3-3 **(Paper ID 02-044)**

Genetic Algorithm for Determination of Partial Joint Ordering Inventory Replenishment Policy in One- warehouse and Multi-retailer System

Wisut Supithak, Kasetsart University
Apisit Wiwatyotinchai, Kasetsart University

The research considers the determination of inventory replenishment policy in the system of one warehouse and multiple retailers locating at different locations. In the study, each retailer has its own demand, ordering cost, and holding cost rates. The case of identical vehicle with limited capacity is assumed. The objective is to determine the proper ordering quantity, time between order, and transportation path of each retailer in such a way that the total cost consisting of ordering cost, holding cost, and transportation cost of overall system has been reduced. The concept of partial joint ordering policy is introduced in the study. According to the policy, retailers are divided into different clusters. Those retailers belong to the same cluster are delivered together which, therefore, forms a delivery route. The genetic algorithm with the insertion of nearest neighborhood and EOI with storage space limitation methods is proposed to determine the good solution to the problem in a reasonable amount of time. In order to evaluate the performance of the proposed method, the solution yielded form the GA is compared to those solutions obtained from the individual, jointed, and mixed ordering policies. The study result shows that, at all level of factors being considered which are number of retailers, holding cost, and ordering cost, the proposed GA yields better solution than the others.

Keywords: Joint Replenishment Policy; Inventory; Genetic Algorithm

A3-4 **(Paper ID 02-031)**

Mass Customization: Linking Supply Chain Integration to Operational Capabilities

Osam Sato, Tokyo Keizai University
Yoshiki Matsui, Yokohama National University
Tomoaki Shimada, Kobe University
Hideaki Kitanaka, Takushoku University
Yutaka Ueda, Seikei University

By establishing and operating efficient supply chain integration (SCI), a plant can create operational capabilities to market competition over rival companies. SCI is a source for operational competitiveness to a plant. SCI consists of three dimensions; internal, supplier, and customer integration. Operational capabilities include four aspects; i.e. delivery, cost, quality and flexibility. Based on the understanding, many researchers have conducted and published their research results. However, many have failed to find the effect statistically and empirically. Their results are not consistent. Especially effect of supply chain integration to operational performance has been a missing link for researchers. Sato et al. (2012) found that introduction of product configuration system could be a link of supply chain integration and cost and quality capabilities. However they failed to find the relationship for delivery and flexibility. On the base of literature review, we hypothesized that mass customization played a role connecting supply chain integration to delivery and flexibility performance, but not cost nor quality. We applied our data to the hypotheses and

proposed model. The data had collected from 231 plants in eight industrialized countries by an international research team that we belong. We found supportive statistical results with SEM. Supplier integration have significant relationship to mass customization and mass customization in turn to delivery and flexibility performance of a plant. This article reports the results of our empirical study. Theoretical and practical implications are discussed in conclusion.
Keywords: Supply Chain Integration; Mass Customization; Operational Performance

■B3 Session (Classroom17307): New Product & Project Management

Chair: Hideaki Kitanaka (Takushoku University)

B3-1 **(Paper ID 02-033)**

An Analysis of Key Determinant Factors for New Product Development Performance: A Multi Group Analysis across Three Industries

Hideaki Kitanaka, Takushoku University
Yoshiki Matsui, Yokohama National University
Osam Sato, Tokyo Keizai University

The purpose of this paper is to identify key determinant factors for firms' new product development (NPD) performance. NPD is one of the most significant activities for firms to survive and a well-organized coordination among several players/resources is necessary to realize favorable NPD performances. From prior related studies, we have identified three factors for NPD performance: external resources involvement, internal resources involvement, and quickness in NPD activities.
Using structural equation modeling (SEM) approach and a mail survey data targeted on three industries obtained from an international research project conducted during 2005 and 2006, we have developed a model that describes the relationship between key factors and firms' NPD performance. Out suggested model not only well described the relationships between key factors and new product development performance, but also suggested several significant managerial implications. One of our major findings was that external resource involvement is important for NPD performance but internal resource involvement and quickness in NPD activities were not so important for NPD performance. We further examined the proposed model using multi group analysis (MGA) to see whether the model will hold across the targeted three industries: electronics, machinery, and automotive industries. Under configural invariance assumption, we compared estimated parameters for each factor across the three industries. We considered differences of each industry's nature are attributed to parameters' differences in the model. Further discussion of managerial implications will be fully developed in the full paper and such discussion is important for firms looking for a way to acquire new product development capabilities because it will help us to deeply understand the relationships of key factors and NPD performance.
Keywords: New Product Development; Structural Equation Modeling; Multi Group Analysis

B3-2 **(Paper ID 02-005)**

Designing Vehicle Form Based on Subjective Customer Impressions
Koichiro Yazaki, Aoyama Gakuin University
Hiroki Takimoto, Aoyama Gakuin University
Kakuro Amasaka, Aoyama Gakuin University

Automotive body styling is determined by two key design elements: profile and form. In recent years, the authors have been able to quantify profile designs that embody consumer preferences and verify the effectiveness of these efforts. This study focuses on form, quantifying parameters like roundness and angularity in order to identify the relationship of these qualities to customer preferences. In order fully understand the relationship between form as a whole (which consists of front, side, and rear elements) and consumer preference, 3D-CAD software and statistics are used to quantify form. An eye-tracking camera is then used to analyze line of sight and establish a cause-and-effect relationship between form and where customers focus their attention and the desired insights are obtained.
Keywords: Automotive; Designing Vehicle Form; 3D-CAD

B3-3 **(Paper ID 02-008)**

An Automotive Exterior Design Approach Model: The Relationship Between Form and Body Color Qualities
Maiko Muto, Aoyama Gakuin University
Shohei Takebuchi, Aoyama Gakuin University
Kakuro Amasaka, Aoyama Gakuin University

This study creates a new Vehicle Exterior Design Approach Method. Form and body color qualities are objectified (quantified) in order to grasp unspoken subjective customer impressions (preferences). Related cause-and-effect relationships are then clarified. This is done with the help of statistics, which are used to identify the main elements that younger buyers are looking for in automotive body colors. Next, a survey is conducted using painted panels to find out what color elements generate subjective customer impressions. A line-of-sight analysis and 3D-CAD software are used to assign numerical values to form and color, while research-oriented CAD models and biometric devices are used to quantify the impact that form and color have on subjective customer impressions. The insights gained from this are then used to understand the relationship between survey data assessing subjective impressions and qualities of form and body color. The resulting knowledge is then applied to optimally match form and body color in a way that customers find attractive. The desired results are obtained.
Keywords: Vehicle Exterior Design Approach Model; Form and Body Color

B3-4 **(Paper ID 02-030)**

Who Benefits in Distribution Channel from Manufacturer Return Policies Considering Risk Aversion?
Shota Ohmura, Kobe University
Hirofumi Matsuo, Kobe University

The wholesale price contract is the most standard way in distribution channel transaction. If the transaction between a manufacturer and a retailer takes place, then the manufacturer does not take any inventory risk associated with demand uncertainty. A risk-averse retailer may procure only a small amount of stock to avoid excessive overstocking costs. In this case, a risk-averse manufacturer might introduce return polices to induce a larger order size by shifting the retailer's inventory risk to himself. Tsay (2002) shows that such an introduction of return policies are always in conflict in terms of which party of the manufacturer and retailer can benefit. In this paper, we show using the same model that there exist cases where the both parties can benefit or lose at the same time. For instance, if the both parties have relatively high risk aversion with some mild conditions, then the introduction of return policies can indeed benefit the both. Similarly, if they both have relatively low risk aversion, then they will be better off by not applying return policies. Recognizing that return policies can be a mutually beneficial mechanism is important particularly when they proclaim

themselves as trusted partners. Also it is important to know under what conditions return policies can be mutually advantages or disadvantageous.
We use the news vendor model to formulate the one-period inventory management problem under demand uncertainty, and apply the mean standard deviation value function to represent risk attitude. We show that there exists a threshold value of risk-aversion beyond which the equilibrium behavior of retailer changes under no return policies. That is, as the magnitude of risk-aversion increases continuously, the equilibrium order size changes discontinuously at the threshold. In that sense, there are the low risk-aversion phase and high risk-aversion phase. We also derive the same phase change for the manufacturer under return policies. Consequently, the risk-aversion phases of retailer and manufacturer must be considered to properly evaluate the introduction of return policies over the wholesale price contract.
Keywords: Return Policies; Risk Aversion; Supply Chain Coordination

■C3 Session (Classroom17308): Risk & Manufacturing Management

Chair: Hisashi Kurata (University of Tsukuba)

C3-1 **(Paper ID 02-011)**

Constructing a Scoring Support Approach Model for Classical Ballet Combining Motion Capture and Statistics
Kazuma Yanagisawa, Aoyama Gakuin University
Kanako Hara, Aoyama Gakuin University
Daiki Sato, Aoyama Gakuin University
Kakuro Amasaka, Aoyama Gakuin University

The classical ballet scoring that is done by judges is not guided by a clear set of scoring criteria. Instead, each judge relies on his or her personal experience (standards of judgment) to produce a subjective score. The interval between the static and dynamic elements that make up each movement in classical ballet are complicated and instantaneous—and because it is tacitly understood that judges score according to the element of movement that they are focusing on, there can be significant variation in scoring results. It is for this reason that judges could use an objective and rational scoring support tool to help them score ballet performances. In response to this need, the authors employed motion capture and statistics to construct a rational classical ballet scoring support approach model. Specifically, the authors looked at performance elements like the grand plié and cambré, then broke down the individual elements of movement that make up each of the varied positions based on the basic positions that comprise barre training (i). Next, the authors used motion capture to calculate positioning information for each movement factor included in body angle, smoothness, and other components of the main positions. Each movement element was then examined to determine its level of impact on overall score (ii). The insights obtained from this process were used to create a statistical model of the causal relationships that determine by what standard scores on individual elements affect the total score—in other words, to define the standards affecting the relative weight of each score (iii).
Keywords: Classical Ballet; Motion Capture Statistics

C3-2 **(Paper ID 02-017)**

Extending Conditional Value at Risk to Markov Decision Processes: An Application to Oil Markets
Fernando Oliveira, ESSEC Business School
Frederic Murphy, Temple University

Conditional value at risk has been successful at capturing risk aversion in single-period models. However, if one optimizes with a single threshold for all states in a multi-period model, this objective lacks time consistency and fails under the principle of optimality in Markov decision processes. We reinterpret CVaR by showing that the threshold choice should be considered a policy where state consistency is a more important feature. We provide a non-convex nonlinear programming

formulation and an algorithm that finds the optimal solution(s) for a given probability of being above the threshold. The algorithm also solves for the set of solutions that trades off the choice of threshold and the probability of being above the threshold. We illustrate how this formalization of CVaR in Markov decision processes can be used in managing a strategic petroleum reserve.
Keywords: Risk Management; CVaR; Markov Decision Processes

C3-3 **(Paper ID 02-018)**

How Does Retailers' Promotion Affect the Performance of Inventory Pooling?
Hisashi Kurata, University of Tsukuba
Masatoshi Tanaka, Matsumoto University

Risk pooling, the application of a statistical fact that the variance of aggregated random data is smaller than the sum of the variances of non-aggregated random data, is a commonly used technique to cope with uncertainty in a supply chain. Assuming a supply chain of a supplier and multiple retailers, we considered a situation where each retailer offers a hit-or-miss type of promotion to its local market and where orders that a supplier receives are influenced by such promotion. We then explored how retailers' promotion influences the performance of the supplier's inventory risk pooling. We confirm that, although including a promotional effect, inventory pooling can reduce order variability and that promotion will change the selection of who should keep inventory—the supplier or the retailers. Furthermore, we examined the effect of processed data on risk pooling. We find that usage of processed data, such as a mean of orders instead of individual order sizes, leads to the supplier's underestimation of order variability. This paper proposes several managerial implications derived from the proposed model of inventory pooling under a promotional effect.
Keywords: Inventory Pooling; Information Sharing

C3-4 **(Paper ID 02-010)**

Applying a Highly Precise CAE Technology Component Model: Automotive Bolt-loosening Mechanism
Takehiro Onodera, Aoyama Gakuin University
Takahito Kozaki, Aoyama Gakuin University
Kakuro Amasaka, Aoyama Gakuin University

In this study, the authors apply their highly precise CAE technology component model in order to explain the bolt loosening mechanism in automotive parts that are secured with nuts and bolts—a problem that plagues manufacturers. This was accomplished by first visualizing the situation during prototype testing and then using CAE to accurately describe the problem. Specifically, three types of bolted pieces, each with a different pitch, were subjected to a prototype test in order to visualize their dynamic behavior along with changes in the amount of axial force applied to the bolted parts. The study verified that uneven stress on nut-bearing surfaces in particular was a primary cause of loosening on parts secured with nuts and bolts.
Keywords: CAE; Technology Component Model; Nut-bearing Surface

■Sunday, November 11, 2012, 11:00 am - 12:30 pm

■A4 Session (Classroom17306):
Operations Strategy & Supply Chain Strategy
Chair: Michiya Morita (Gakushuin University)

A4-1 **(Paper ID 02-048)**

Operation Strategies for Ensuring Supply Chain Resilience
Yu Cui, Osaka City University
Masaharu Ota, Osaka City University

The scholarship of Resilience has been analyzed over 3 decades and it is a multidimensional and multidisciplinary concept which is researched cross multiple disciplines such as psychology, ecosystems and economics. However, the study of Supply Chain Resilience has been paid attention only recent years and most of them are remaining on the arguments of the conceptual validity and lack of practical measures. In this paper, first of all, we follow previous researches related to the theme through organizing and analyzing topics of Emergency, Supply Chain Risk, and Resilient Supply Chain sequentially and systematically. With the review and understanding on the related concepts of Supply Chain Resilience, we conclude a suite of fundamental and common key points in order to establish Resilient Supply Chain. Furthermore, we derived a feasible conceptual framework concurrently so that it would be clearer how to achieve Supply Chain Resilience basically. And then, we focus on the manufacturing industries of Japan and several other counties during the March 11 earthquake in Japan and Thailand floods in October, 2011 to compare their supply chains' resilience and their responses afterwards. By means of analysis on the differences, we summarized two typical supply chains in terms of their sourcing and producing operations especially in the manufacturing industries of Japan and other several counties which are Modular Supply Chain and Integral Supply Chain. Moreover, based on the features of two typical supply chains, we deduced two contrary operation strategies, the one attaining the ultimate in compatibility with further decentralization and the one building capability in the black box perspective with portable production engineering, to apply to the appropriate establishment of supply chain resilience. In addition, we suggest that most Japanese companies would be applicable to the latter operation strategy to achieve and/or improve their supply chain resilience. However, for the accomplishment of it, it is necessary to convince all key suppliers to conduct the same strategy as well and the philosophy of process innovation should be reflected on the production engineering thoroughly. At last, on the basis of the essential capabilities and appropriate operation strategies as we mentioned above, we proposed a comprehensive decision-making model in order to guide a suite of more explicit methodologies for achieving SCR.
Keywords: Supply Chain Resilience; Operation Strategy; Emergency

A4-2 **(Paper ID 02-023)**

Design of a Global Closed-Loop Supply Chain Network
Takahiro Karakama, Tokyo Metropolitan University
Yasutaka Kainuma, Tokyo Metropolitan University

A Closed-Loop Supply Chain (CLSC) is the supply chain which is integrated with a process flow of disposal, collection, reuse, and remanufacturing. Nowadays, the CLSC attracts attention as one way to construct the Recycling-Based Society. Furthermore, because of the rapid internationalization of business environment, the CLSC becomes to require the introduction of a global viewpoint. In this research, we develop a Global Closed-Loop Supply Chain Network (GCLSCN) model by multinational firm which has 4 kinds of subsidiaries: supplier, assembly factory, retailer, and remanufacturing factory and deploys the CLSCN through four countries. In this model, the firm manufactures the consumer goods and sells them among four countries. And the firm collects end-of-use products from each country and implements decomposition and check of them. After reusable parts are extracted from the end-of-use products, they are reused for assembly of consumer

goods and they are re-circulated in the markets.
On the developing the GCLSCN for multinational firm, it is the essential problem how many products should be manufactured or remanufactured in each country, and how much profit should be share between each country. To solve the problem is not easy because the business environment depends on each country, for example, the manufacturing and remanufacturing cost and the corporation tax rate are not the same. In this research, we consider corporation tax and define sum of the net income after tax of each subsidiary as the objective function. We attempt to optimize the traffic volume between each subsidiary, the transportation cost allocation, and the transfer price, i.e., internal price of the firm for maximization of the objective function. This optimization problem cannot be solved by analytical way. So we use genetic algorism to solve this problem. In addition, we carry out the computational simulations in order to investigate the impact of parameters which are included in the objective function. As a result of the simulations, we can verify the efficiency of the proposed model.
Keywords: Global Closed-Loop Supply Chain Network Transfer Price; Net Income after Tax

A4-3 **(Paper ID 02-021)**

Supply Chain Strategies, Orientations, Capabilities, and Approaches in Sri Lankan Apparel Demand Chains

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Supply chain management (SCM) tries to seek ways to optimize production, inventory and distribution to meet the rapidly changing demand. Three major answers of this approach are, 'mass production (MP)', 'quick response (QR)', and 'mass customization (MC)'. Apparel sector in general is important to be researched mainly due to the variety it has, rapid changes of the sector, and its globally distributed supply chains (SCs). As a result of rapid outsourcing within the apparel industry, almost all garment vendors happen to cater to a diverse range of customers who are practicing different supply-demand chain strategies. With this diversity these upstream supply chain members have to align and establish different approaches to the diverse demand chains even within one company. Our case company, located in Sri Lanka caters to six different global retailers practicing the three supply chain strategies mentioned above. Dependency of Sri Lanka's economy on apparel exports is high as this sector accounts for more than 40% of total exports of the country. Logistics Scorecard (LSC) originated and practiced in Japan has been utilized to explore the six demand chains with 121 supply chain professionals' responses. The in-depth case study in one particular company helps to obtain deeper insights as it eliminates the impact of macro factors such as ownership, firm size, etc. This research explores how these different demand chains approach to satisfy the needs demanded by the strategy which the demand chain has adopted. Exploration covers how supply chain's orientation for management, capabilities developed, and tactical approaches differ with the three strategies to meet diverse customer demands. The research provides insights on synergies and practical differences among the three strategies. Further, the results imply that the organizations with a diverse customer profile has to consider the basics of these strategies and align their different demand chains accordingly as they differ even within one company.
Keywords: Mass Production, Mass Customization, Quick Response

A4-4 **(Paper ID 02-019)**

Alignment of Supply Chain Strategy and Business Strategy

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Looking back to the history of remarkable upheavals of firms, we can recognize the value propositions of those firms have been accepted by the markets and more important, certain ingenious renovations of the firms' value creation processes, especially, of supply chain processes have accompanied the propositions to those upheavals. Toyota is a good example. The value propositions of fuel efficiency and high quality have been boosted by the JIT discipline. We explore the relationship between business and supply chain strategies. We will emphasize the importance of

consistent alignment of those two strategies and propose hypothetically a framework to secure the alignment. Our approach is case based as well as theory based.
Keywords: Supply Chain Strategy; Business Strategy; Linkage of Strategies

■B4 Session (Classroom17307): Business Process Innovation & Practice

Chair: Junichi Tomita (Toyo University)

B4-1 **(Paper ID 02-028)**

Disruptive Process Innovation Mechanism in the Casting Industry: The Case of Kimura Chuzosho Co., Ltd.

Junichi Tomita, Toyo University
Tomofumi Takamatsu, Aoyama Gakuin University

This research aims to clarify the disruptive process innovation mechanism by a case analysis of full mold casting(FMC) in the casting industry. FMC was a process innovation which was installed of press mold for automobile instead of cavity mold casting(CMC) since late 1960s. At first, many firms got licenses of FMC from licensers, but most of them didn't stop to use it a few years later. On the other hand, Kimura Chuzosho Co., Ltd.(Kimura) continued to use FMC, then its market share grew up. And Kimura also entered the casting metal market for machine tools. In particular FMC was said to difficult to make the casting metal for mass production, but Kimura could overcome the problems and grew its market share. Why could only Kimura realize the disruptive process innovation? And why the rivals had been behind Kimura? We try to analyze the reasons from a path dependent view. The key factors for success of Kimura are as follows. First, Kimura made a choice of FMC, but stopped CMC. Second, Kimura established their sustainable competitive advantage by continuing to develop FMC technologies and to invest their plants. And the key factors for being left behind of Kimura's rivals are as follows. First, most of them adopted strategy of both FMC and CMC, as a result, they fell into "core rigidity" (Leonard-Barton, 1995) of their organizations. Second, they also had common illusions of S-curve that FMC couldn't get ahead of CMC. Finally, we try to lead strategic implications for firms to avoid failure from the case analysis.
Keywords: Disruptive Innovation; Process Innovation; Path Dependency

B4-2 **(Paper ID 02-016)**

A Bicycle Design Model Based on Young Women's Fashion Combined with CAD and Statistics

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In past eras, where buyers were looking primarily for functionality, product designers could focus on the concept of "getting a product out"—meaning simply building a product with minimum functionality and knowing it would sell. This study aimed to set up a "Bicycle Design Approach Model based on Young Women's Fashion combined with CAD and Statistics" that would resolve some of the issues that bicycle designers face, creating a bicycle design that reflected the preferences of women in their 20s with a "girly" fashion style.
Keywords: Bicycle Design Approach Model; Young Women's Fashion; CAD and Statistics

B4-3 **(Paper ID 02-004)**

Implementation of Overall Equipment Effectiveness (OEE) to improve General Performance of Progressive: Bundling and Modular Manufacturing Systems in a Garment Manufacturing Industry

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In any manufacturing industry data from different operations and machines is recorded, and a number of important production parameters are evaluated, but these analyses rarely consider the overall effectiveness and added value of the factory as a whole. One method that does look at the added value of the entire installation is the overall equipment effectiveness (OEE). OEE was first described as a central component of the Total Productive Maintenance (TPM) methodology- in Seiichi Nakajima's book 'TPM tenkai' (1982, JIPM Tokyo).

OEE is a performance metric to calculate the Machine availability, Performance Efficiency and Rate of Quality and are defined as :

- Availability = (Operating time – Downtime) / Total Operating Time
- Performance = Total output/potential output
- Quality = Good output/total output

The OEE is the product of the above three parameters, expressed as a percentage. This percentage offers the foundation for improvement by allowing the efficiency to be measured against other factory metrics including "world-class" benchmarks.

Overall Equipment Effectiveness (OEE) can be used to save companies from making inappropriate purchases, and help them focus on improving the performance of machinery and plant equipment they already own. OEE is used to find the areas of improvement to provide the greatest return on asset.

An OEE solution can enable manufacturers to achieve world-class status. More specifically, it can provide benefits in the following key areas:

- Equipment: Reduced equipment downtime and its better management
- Personnel: Labor efficiencies with increased productivity by improving visibility into operations and empowering operators
- Process: Increased productivity by identifying bottlenecks
- Quality: Increased rate of quality, reduced scrap

Though some research have been conducted in measuring OEE in garment manufacturing factories as part of TPM, measuring and comparing OEE values in two distinctive manufacturing setups have not been done so far. This paper would discuss the research findings of measuring and comparing the OEE values in two types of production systems, viz. progressive bundling and modular garment manufacturing factories in Bangalore, India and Srilanka respectively.

Keywords: OEE; TPM; Losses in Garment Manufacturing Factory; Plant Maintenance

B4-4 **(Paper ID 02-006)**

Constructing a Business Process Network System "A-BPKNS-NPD"

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Ryosuke Mihara, Aoyama Gakuin University
Kakuro Amasaka, Aoyama Gakuin University

The authors came up with A-BPNS-NPD (Amasaka laboratory's Business Process Network System for New Product Developments), a business process network system that supports improvements in the way businesses approach new product development. Specifically, it is a core system with four components, each of which is designed to clarify the unspoken business processes companies use in

new product development. The first component is a support system for visualizing business processes. The second is a support system for better planning. The third is a support system for work progress management, which includes a support system for passing on knowhow and for expansion and growth. The fourth component is a new product development business process approach model to help companies systematically put the other components into action. The A-BPNS developed by the authors was verified at manufacturing companies and the desired results were obtained.
Keywords: Business Process; New Product Developments; A-BPNS-NPD

■C4 Session (Classroom17308): Corporate Operation & Quality Management

Chair: Hirohisa Sakai (Toyota Motor Corporation)

C4-1 **(Paper ID 02-035)**

Quality-Creating Management and Communication State: A Case Study of A Small and Medium-Sized Manufacturer in Japan

Atsuko Ebine, Surugadai University

This is a longitudinal case study of a manufacturer whose code name is LCX to analyze a relation between the state of quality-creating management and the state of intra-organizational communication at small and medium-sized manufacturers in Japan. LCX manufactures high-precision plastic parts employed their own technology. Before this case study, the questionnaires and interviews were carried out on 11 plants including LCX both in 2009 and in 2010. The data show that LCX has the distinctive feature of intra-organizational communication state and the communication activity level is much higher than the others. The president of LCX was interviewed and all their publicly available information was carefully surveyed. LCX is working on the improvement of operations systems of quality-creating activities with quality management system (QMS) on the basis of the guidelines on ISO 9001 and ISO 14001. With these guidelines, they have endeavored to realize the best practices since 2002. Three factors in this successful improvement are found. (1) Their organizational system was reconstructed so that the arrangements of job specification for workers were completed. (2) Employees unconventionally have created the manual to fit their own use by themselves, so that this improvement facilitates their completing works. (3) Employees have received the systematic training and education to improve their skills. Then the information circulation became smoother and more effective over the whole plant. The traceability for the troubles of product quality was improving. This case study and the prior investigations suggest that the introduction of QMS not always bring high performance to a plant, but the state of quality-creating management as the result of its effective operations is essential. Thus the observation of intra-organizational communication state at a plant may indicate a possible diagnostics on quality-creating management.
Keywords: Intra-organizational Communication State; Quality-creating Management; Small and Medium-sized Manufacturer

C4-2 **(Paper ID 02-046)**

A Study on the Extension of the Corporate Household: A Case Study of TABIO in Japan

Hiroshi Koga, Kansai University

In this paper, we discussed the TABIO of Japanese companies to deploy effective supply chain management, to introduce the approach of "the quality of the information" in there. In particular, the attention of the keywords used household and business context, as an example of information quality initiatives in Japan, pick up a company called TABIO. The company is a company engaged in the Retail and wholesale of hosiery. From the company's case, to consider the context of use is clear that there is a need to pay attention to institutional factors other than organizational information systems, and, over that household can be considered a variety of dimension became.
Keywords: Information Quality; Corporate Household; Context of use

C4-3 **(Paper ID 02-001)**

Developing a Higher-cycled Product Design CAE Model: THE Evolution of Automotive Product Design and CAE

Kakuro Amasaka, Aoyama Gakuin University
Takehiro Onodera, Aoyama Gakuin University
Yasuaki Nozawa, Aoyama Gakuin University

To help corporations survive amidst worldwide quality competition, the authors have focused on the strategic development of a Higher-Cycled Product Design CAE Model employing a Highly Reliable CAE Analysis Technology Component Model. Their efforts are part of principle-based research aimed at evolving product design and CAE development processes to ensure better quality assurance. To satisfy the requirements of developing and producing high quality products while also reducing costs and shortening development times, the effectiveness of this model was verified by successfully applying it to the technological problems of loosening bolts and other product design bottlenecks at auto manufacturers.

Keywords: Product Design and CAE; Higher-cycled Product Design CAE Model; Highly Reliable CAE Analysis Technology Component Model

C4-4 **(Paper ID 02-025)**

How to Build a Linkage between High Quality Assurance Production System and Production Support Automated System

Hirohisa Sakai, Toyota Motor Corporation
Kakuro Amasaka, Aoyama Gakuin University

In order to follow up the production volume for some disaster, Japanese manufacturing industry needs to develop and rebuilt “global production” that is to strengthen QCD, quality, cost and delivery. The keys to fulfill this need are automated facility, human skills to operate the facility (production operator), and production systems incorporated with production data systems to activate those facility and human systems according to each overseas plant condition. Therefore we have created the systems: -Ensuring the necessity of building new production system for global production, -Eliminating ambiguity among the processes from production planning, production preparation, production, to process control, and -Formalizing and building the linkage among the processes. This report is to reveal the effectiveness for the above-specified objectives of the newly created systems. Especially the highly accurate robot production system has been tested and confirmed at Toyota Motor Corporation, one of leading companies.

Keywords: Global Production; Highly Reliable Production Systems; Linkage

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