



**Kühne Foundation Endowed Chair of Logistics Management
Kühne Institute of Logistics Management**

**Activity Report 2012
September 1, 2011 – August 31, 2012**



From left to right:
Sebastian Theißen, Linda Stein, Robert Hein, Prof. Dr. Spinler, Matthias Winkenbach, Andrei Neboian

**WHU – Otto Beisheim School of Management
Kühne Foundation Endowed Chair of Logistics Management
Kühne Institute of Logistics Management
Burgplatz 2
D- 56179 Vallendar**

**Fon: +49 (0) 261 6509 – 430
Fax: +49 (0) 261 6509 – 439**

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Preface

This report covers the period from September 2011 to August 2012. In this time span, the chair's team continued to produce exciting research results which were published in a broad range of high-quality journals, to offer attractive lectures related to logistics and supply chain management and demonstrate impact in practice.

In March 2012, the Kühne Institute of Logistics Management was inaugurated at WHU. The institute bundles the activities by my chair and the ones of my colleague Prof. Carl Marcus Wallenburg and further strengthens the external recognition of the logistics research carried out at WHU. Prof. Wallenburg and I serve as co-directors of the institute.



As far as teaching is concerned, the following lectures are offered in the Bachelor of Science Program at the WHU: a popular real options analysis class, a seminar on the quickly evolving topic of multi-modal logistics as well as a literature seminar which introduces students to quantitative research in supply chain management. In the Master's program, this is followed by the logistics and supply chain management course and an advanced course on real options, which, with a different focus, has proven successful in the MBA curriculum, too. In the part-time MBA program, a joint course with my colleague Prof. Wallenburg on supply chain management was developed. Last, a doctoral seminar on supply chain management is taught, again with an emphasis on quantitative methods in logistics research. Quite a number of international students groups visiting from, among other places, Philadelphia, Michigan and Perth, were introduced to the specifics of European operations and supply chain management and the challenges as well as opportunities that come along with concerns about sustainability. Two courses on transportation and distribution management are well received at the Kühne Logistics University.

In terms of research, publications in top-ranked journals such as Decision Sciences and EJOR indicate the quality of the results obtained. The topics range from the optimal design of maintenance contracts to capacity reservation methods in the air cargo business. A fair amount of research is dedicated to the issue of sustainability. An ongoing research relationship with INSEAD and La Poste is – subsequent to the successful completion of the electric vehicle project – dedicated to explore opportunities arising from urban delivery constraints and requirements. This research provided the background for a Master's thesis which I advised within the (KLU) Master's program. Sebastian Sass managed to come up with relevant guidelines for industry and policy making to enhance the usefulness of city logistics concepts in Hamburg. The research on humanitarian logistics, pursued primarily by Andreas Kretschmer, has led to an encompassing framework for school feeding projects which helps to transition programs to a more sustainable set-up. It is expected that this framework will prove helpful in guiding program design and performance measurement for organizations such as the World Food Program (WFP) and Partnership for Child Development (PCD). A companion paper has been developed with practitioners from various Non-Governmental Organizations (NGOs) which focuses on the process view of school feeding.

Two projects and related research publications made it to the finals of internationally acclaimed competitions. The electric vehicle project was a finalist at the Daniel H. Wagner Prize on Excellence in Operations Research Practice, awarded by INFORMS. The sustainable school feeding paper was a finalist in the College of Humanitarian Logistics Best Paper Award, offered by POMS. The fact that Andrei Neboian's dissertation is a finalist in the prestigious George B. Dantzig Dissertation award, given by INFORMS to the best dissertation in OR and Management Science which is innovative and relevant to practice, demonstrates the quality of the doctoral students and the success of efforts made at the chair of logistics management to pursue research which has profound practical implications.

I would like to thank the entire team at the chair for their dedication and energy they bring to their work and for the delightful atmosphere they help to create. This is the basis for the good work that is being done here.

On a sad note, I have to report that my mentor and friend Prof. Paul R. Kleindorfer passed away on August 24, 2012. He fought bravely against ALS and right through the end he found the energy to provide inputs for research and support for his doctoral students. His dedication, his many interests, his humor and his humanity make him to me and to those who knew him simply unforgettable. I will cherish the memories of working with Paul.

The multitude of research and teaching activities would not have been possible without the ongoing and generous support of the Kühne Foundation. My wholehearted thanks go to Prof. Dr. h.c. Klaus-Michael Kühne and to the managing director of the foundation, Mr. Martin Willhaus. Not only is the financial support greatly appreciated, but also the tireless efforts which Mr. Willhaus makes to provide contacts with practitioners within and beyond Kühne & Nagel. The Kühne Foundation's credo to make logistics research relevant to practice is thus supported in an excellent manner.

This report is meant to provide an overview of the chair's activities. We all look forward to new exciting logistics research and teaching.

Vallendar, October 2012



Univ. Prof. Dr. Stefan Spinler

Note: All activities related to the issue of sustainability have been marked by a symbol.



Team

Head of Chair

Univ.-Prof. Dr. Stefan Spinler
fon: +49 (0) 261 6509 – 430
stefan.spinler@whu.edu



Assistant

Linda Stein
fon: +49 (0) 261 6509 – 431
linda.stein@whu.edu



Research Assistants

Dipl.-Ing. oec. Robert Hein
fon: +49 (0) 261 6509 – 433
robert.hein@whu.edu



Dipl.-Ing. Andrei Neboian
fon: +49 (0) 261 6509 – 432
andrei.neboian@whu.edu



Dipl.-Wirt.-Ing. Sebastian Theißen
fon: +49 (0) 261 6509 – 434
sebastian.theissen@whu.edu



Matthias Winkenbach, M.Sc.
fon: +49 (0) 261 6509 – 435
matthias.winkenbach@whu.edu



External Doctoral Students

Dipl.-Kff. Judith Berndroth
judith.berndroth@whu.edu



Dipl.-Kff. Doreen Diehl
doreen.diehl@whu.edu



Dipl.-Kfm. Daniel Girardet
daniel.girardet@whu.edu



Katharina Grobleben, MBL
katharina.grobleben@whu.edu



Dipl.-Wirt.-Ing. Benjamin Gürtler
benjamin.guertler@whu.edu



Dipl.-Kfm. Sebastian Huber
sebastian.huber@whu.edu



Dipl.-Kfm. Andreas Kretschmer
andreas.kretschmer@whu.edu



Silke Malina, MBA
silke.malina@whu.edu



Dipl.-Wirt.- Ing. Johannes Teutsch
johannes.teutsch@whu.edu



Dipl.-Kfm. Alexander König
alexander.koenig@whu.edu



Dipl.-Ing. oec. Benjamin Punge
benjamin.punge@whu.edu



Team

Professor Dr. Stefan Spinler
Head of Chair

fon: +49 (0) 261 6509 – 430
eMail: stefan.spinler@whu.edu



Professor Stefan Spinler holds the Kühne Foundation Endowed Chair of Logistics Management at WHU - Otto Beisheim School of Management. He received a master's degree in electrical engineering from Friedrich-Alexander University in Erlangen, with research stays at University College London and Bell Labs (USA). In 1997, he was awarded the diploma in electrical engineering. Subsequently, he joined Infineon Technologies with responsibilities in process integration, quality, and supply chain management. From October 1999 to August 2002, Prof. Spinler was a doctoral student in the department of Production Management and taught at WHU and Leipzig Graduate School of Management (HHL). His research on options on capacity has been presented at international conferences and leading US business schools. Moreover, his research was awarded a number of prizes, most notably the Management Science Strategic Innovation Award (from EURO) as well as the GOR dissertation award. Upon the completion of his doctoral studies, Prof. Spinler spent a year as a lecturer at the Wharton School, where he taught classes in the MBA and PhD programs and developed a real options class for executives. He continues teaching as a guest professor this latter class in Wharton's Executive Masters of Technology Management. He has been invited to teach the real options class at MIT as a guest professor in their Leaders for Manufacturing Program. He was awarded the best guest lecturer award twice at HHL. His postdoctoral degree (Habilitation) covered aspects of market-based supply chain coordination and was completed in September 2008. In January 2009, Prof. Spinler was appointed to the Chair of Logistics Management at WHU, which is sponsored by the Kühne Foundation. In 2011, a research team consisting of Paul Kleindorfer, Andrei Neboian, Alain Roset and Stefan Spinler was a finalist in the Daniel H. Wagner Prize for Excellence in Operations Research.

Linda Stein
Assistant

fon: +49 (0) 261 6509 – 431
eMail: linda.stein@whu.edu



Since the appointment of the Chair of Logistics Management by Prof. Spinler in 2009, Linda Stein has been the chair's secretary. She is returning to the WHU after a two years of maternity leave, where she was previously employed as Personal Assistant to Prof. Frenkel at the Chair of Macroeconomics and International Economics.

Team

Dipl.-Ing. oec. Robert Hein
Research Assistant

fon: +49 (0) 261 6509 – 433
eMail: robert.hein@whu.edu



Robert Hein (born 1983) studied industrial engineering and management at the University of Technology in Hamburg-Harburg, majoring in logistics and production technology. In the course of his studies he completed numerous internships, inter alia at Porsche and Roland Berger Strategy Consultants. Within the context of his diploma thesis he developed and implemented measures for production relocation and process optimization in cooperation with a large supplier of retail information systems in Munich. Mr. Hein supports the Chair of Logistics Management as a research assistant and doctoral student since October 2009 and focuses his research on sustainability issues, in particular reuse and remanufacturing.

Dipl.-Ing. Andrei Neboian
Research Assistant

fon: +49 (0) 261 6509 – 432
eMail: andrei.neboian@whu.edu



Andrei Neboian (born 1982) studied Electrical Engineering at the Vienna University of Technology. He graduated in January 2007 with a major in Automation Engineering. The main focus of his diploma thesis was signal and data processing of lightning electromagnetic pulses (LEMP), accomplished in cooperation with Austrian Lightning Detection and Information System (ALDIS). Before graduation, Mr. Neboian worked as an intern for several research institutes at the Vienna University of Technology – his work focus was on semiconductor and fundamentals research. From August 2007 till April 2009, Mr. Neboian worked as a consultant for The Boston Consulting Group where he worked with international clients in different industries, such as banking (including investment banking), private equity, construction materials, telecommunications and power distribution in Europe and Middle East. In March 2009, Mr. Neboian joined the chair of Logistics Management at the WHU in Vallendar as a research assistant and a Ph.D. student. His research topics are sustainability and real options valuation.

Team

Dipl.-Wirt.-Ing. Sebastian Theißen
Research Assistant

fon: +49 (0) 261 6509 – 434
eMail: sebastian.theissen@whu.edu



Sebastian Theißen (born 1982) has been a doctoral student and research assistant at the Chair of Logistics Management (Otto Beisheim School of Management) since May 2010. His research field deals with supply chain management and sustainability, especially CO₂ emissions management strategies. During his studies in mechanical engineering and business administration at the RWTH University (Degree: Dipl.-Wirt.-Ing. approx. equivalent to M.Sc. in mechanical engineering and business administration) he completed internships at the Robert Bosch GmbH and the Koch Businessnetwork Consulting AG. The diploma thesis dealt with outsourcing analyses and was conducted in collaboration with an OEM.

Matthias Winkenbach, M.Sc.
Research Assistant

fon: +49 (0) 261 6509 – 435
eMail: matthias.winkenbach@whu.edu



Matthias Winkenbach (born 1986) studied Business at WHU – Otto Beisheim School of Management in Vallendar, Germany, from 2006 to 2011 when he received his Master's degree. He graduated with majors in Finance and Economics. The main focus of his Bachelor Thesis written at the Chair of Production Management at WHU was the evaluation of supply chain flexibility using a real options approach. In his Master Thesis written at the Chair of Monetary Economics at WHU, Mr. Winkenbach focused on the relation between monetary policy and asset prices. During his studies, Mr. Winkenbach spent two semesters abroad at HEC Montréal, Canada, and NYU Leonard N. Stern School of Business, New York City, USA. In the course of his studies, Mr. Winkenbach worked as an intern for several large and medium-sized companies both in Germany and abroad. For example, he worked on a consulting project for a leading global automotive group with McKinsey & Company in the United States, with Deutsche Telekom AG in the field of strategy development in Bonn, Germany, and with Volkswagen AG in the field of product development and component localization in Port Elizabeth, South Africa. In July 2011, Mr. Winkenbach joined the Chair of Logistics Management at WHU as a research assistant and Ph.D. student. He is involved in a cooperation project with INSEAD and La Poste in the field of Urban and Green Logistics. The latter are also his major research topics.

Team

Dipl.-Kffr. Judith Berndroth

External Doctoral Student

eMail: judith.berndroth@whu.edu



Judith Berndroth (born 1980) obtained her bachelors (BA) at the Berufsakademie Berlin and her masters of business administration (MBA) from the Steinbeishochschule Berlin. In parallel to her studies, she has been working for the corporation Deutsche Post DHL since 2000. From 2005 onwards, she led various projects as program manager in the field of supply chain management at DHL Express. In 2009, she took the position of a senior expert with deputy responsibility for the head of staff at the CEO office at DHL Express headquarters. She led, for instance, the population and analysis of the DHL Express' balanced scorecard as well as the global competitive intelligence platform with the analysis of market competitive data and its quarterly presentation to the DHL Express Board of Management. Since August 2012, Judith has been working as Operations Manager at Amazon Fulfilment Center. She expects to have her doctoral project on "Sustainability in Supply Chain Management – the Case of Deutsche Post DHL" completed by the first quarter of 2013.

Dipl.-Kffr. Doreen Diehl

External Doctoral Student

eMail: doreen.diehl@whu.edu



Doreen Diehl (born 1981) studied business administration at HHL - Handelshochschule Leipzig (Dipl.-Kffr.), Colorado State University-Pueblo (M.B.A.), HELP University College Kuala Lumpur (exchange semester) and the University of Mainz (pre-diploma) focusing on marketing and operations management. Her diploma thesis about flexible contracts in the consumer goods industry was written in cooperation with Henkel, Metro and Dr. Oetker. Mrs. Diehl interned in various companies in the automotive, aviation and consulting industry. After graduating in 2005 she started at Henkel in the internal audit department working on projects in the areas of sales, purchasing and supply chain management in Europe, the U.S., Asia and South Africa. Afterwards she was senior consultant at Ernst & Young's advisory practice with focus on the chemical and retail industry. In January 2009 Mrs. Diehl joined the chair of Logistics Management at the WHU in Vallendar researching in the area of supply chain risk management in cooperation with Henkel. Since 2011 she has been working as project manager at Bayer's inhouse consulting department in the supply chain management practice.

Team

Dipl.-Kfm. Daniel Girardet

External Doctoral Student

eMail: daniel.girardet@whu.edu



Daniel Girardet (born 1982) studied business administration at the Handelshochschule Leipzig (HHL), Sasin Graduate School of Management in Bangkok and the University of Würzburg (pre-diploma). He graduated with majors in marketing and production management in September 2007. He wrote his diploma thesis about the challenges of revenue management systems given the rapid growth of low cost carriers in cooperation with Lufthansa. Daniel completed various internships during his studies in various fields such as basic chemicals, media, high tech and consulting. After graduating he joined McKinsey & Co., Inc. with projects in Europe, Asia and the USA. The focus of his projects was on the distribution of consumer goods and the optimization of logistic costs for consumer electronics companies. Since July 2010, Daniel has been an external PhD candidate at the chair of logistics management at the WHU Vallendar. His PhD-thesis is concerned with different hedging techniques of CO2 emissions for airlines.

Katharina Grobleben, MBL

External Doctoral Student

eMail: katharina.grobleben@whu.edu



Katharina Grobleben (born 1985) graduated with a Bachelor of Science degree in international business from the Copenhagen Business School. She wrote her bachelor's thesis in collaboration with Kühne+Nagel on performance measurement systems in logistics. Subsequently, she joined and graduated from the Master in Law and Business program of the Bucerius Law School and WHU. Among other internships and working placements, she had joined the Institute for Ship Operation, Simulation and Shipping at the Technical University of Hamburg-Harburg. Since September 2009 Katharina Grobleben has been an external doctoral student at the Chair for Logistics Management at WHU – Otto Beisheim School of Management in Vallendar. Her research interest is centered around sustainable logistics and multi-modal transportation.

Team

Dipl.-Wirt.-Ing. Benjamin Gürtler
External Doctoral Student

eMail: benjamin.guertler@whu.edu



Mr. Benjamin Guertler (born 1985) studied industrial engineering and management at the university of applied sciences in Esslingen. He finished his studies in August 2008, specializing in production management. His diploma thesis provides an approach for holistic performance monitoring of suppliers and was written in cooperation with the MBtech Consulting GmbH. Among others, Mr. Guertler has worked at Behr Industry GmbH & Co. KG within development and at Robert Bosch GmbH within sales. Between October 2008 and June 2011, Mr. Guertler worked as Consultant at the MBtech Consulting GmbH within Purchasing and Supply Chain Management. He supported the implementation of supplier management and supplier risk management at major companies in automotive industry and engineering. Furthermore, Mr. Guertler was responsible for the consulting approaches within supply risk management. In July 2011, Mr. Guertler took over a new responsibility at the parent company, MBtech Group GmbH Co. KGaA, as Representative of the President and the CFO. Since July 2009, Mr. Guertler has supported the chair of logistics management at the WHU in Vallendar, focusing on supply risk management

Dipl.-Kfm. Sebastian Huber
External Doctoral Student

eMail: sebastian.huber@whu.edu



Sebastian Huber (born 1979) received a diploma in business administration of HHL – Leipzig Graduate School of Management and an MBA of University of Southern Colorado, Pueblo, CO. As a project manager at Roland Berger Strategy Consultants GmbH he collected extensive experience in international marketing and sales projects focusing on the topic of pricing. As a functional expert he had the opportunity to work in various industries from automotive to financial services and the chemical industry. The focus of his research is the pricing of repair and maintenance contracts for technical investment goods.

Team

Dipl.-Kfm. Andreas Kretschmer

External Doctoral Student

eMail: andreas.kretschmer@whu.edu



Andreas Kretschmer (born 1981) studied business administration at the Leipzig Graduate School of Management (HHL) and completed a semester abroad at the Hong Kong University of Science and Technology. He wrote his diploma thesis on logistics costs in the automotive industry in cooperation with Invest in Germany. After graduating in 2007 he worked as a management consultant with The Boston Consulting Group on projects in the aviation industry and consumer goods industry. Since January 2010, Mr. Kretschmer has studied as an external PhD student at the Department of Logistics Management. His research focuses on supply chain management at humanitarian organizations.

Silke Malina, MBA

External Doctoral Student

eMail: silke.malina@whu.edu



Silke Malina (born 1972) studied economics at the European-Business-College in Wuerzburg and finished with a Bachelor of Commerce at the Hogeschool van Utrecht (NL). In 2007 she obtained her Master of Business Administration (MBA) from the University of Surrey (UK). Her master thesis was about "Lean Management and its Effectiveness in Organizations". During her studies she made several traineeships in the consumer and investment goods industry, e. g. at the subsidiary of Michael Weing AG in Singapore. Mrs. Malina works for Bosch Rexroth AG. Initially, she worked several years in controlling and currently she is responsible for various international projects in logistics. In January 2011, Mrs. Malina joined the chair of Logistics Management at the WHU in Vallendar as an external doctoral student. Her research topic is the management of supply chain complexity.

Team

Dipl.-Wirt.-Ing. Johannes Teutsch

External Doctoral Student

eMail: johannes.teutsch@whu.edu



Mr. Johannes Teutsch (born 1982) studied business and engineering at the University of Karlsruhe focused on production and logistics. His diploma thesis (“Economic analysis of an intermodal transportation network”) was developed in the context of the research project “LogoTakt”. He gained practical experience in the automotive industry and in the consultant sector. Currently, Mr. Teutsch is working as a process planner at Dr. Ing. h.c. Porsche AG. Since April 2010 Mr. Teutsch has been an external doctoral student at the Chair of Logistics Management at WHU Vallendar. He is examining the interaction of Supply Chain Risks and Lean Production.

Dipl.-Kfm. Alexander König

External Doctoral Student

eMail: alexander.koenig@whu.edu



Alexander König (born 1984) studied from 2004 until 2008 Business Administration at the WHU - Otto Beisheim School of Management in Vallendar, Germany. He spent his semesters abroad at Queen’s University in Kingston, Canada and at Universidad Adolfo Ibáñez in Viña del Mar, Chile. His advanced studies were focused on Production Management, Controlling, as well as Technology and Innovation Management. He wrote his master thesis about Six Sigma in the German healthcare sector at the chair of production management at WHU. During his studies Mr. König pursued several internships, amongst others with Porsche Consulting and Booz & Company. After his studies he joined Booz & Company and worked for clients in the fields of financial services, pharma, IT Services and the manufacturing industry. His main project activities were around strategy development, supply chain management, sourcing, as well as risk and project management. In January 2012, Mr. König joined the chair of Logistics Management at WHU as external doctoral student. His research topic is Supply Chain Risk Management of Logistics Service Providers.

Team

Dipl.-Ing. oec. Benjamin Punge

External Doctoral Student

eMail: benjamin.punge@whu.edu



Benjamin Punge (born 1983) studied Industrial Engineering and Management at the University of Technology Hamburg-Harburg and the University of Hamburg with majors in logistics and chemical engineering. In his diploma thesis, which he conducted in cooperation with Airbus Germany, he analyzed the supplier risk management in the Supply Chain for the cabin interior of the wide body aircraft A380. During his studies Benjamin completed internships in the automotive industry and in the finance controlling department of Bayer Materialscience in Shanghai, China. He also worked as PA for a member of the German parliament and as assistant to the CEO of a trading company in Hamburg. After the completion of his studies in 2009, Benjamin was hired by EADS for the groups' management development program and worked as a project manager for Airbus España in Madrid, Spain and Eurocopter Deutschland in Donauwoerth, Germany before starting in his current position in the Aerostructure Procurement for Airbus Operations in Toulouse, France where he is now responsible for different international sourcing projects. In January 2012 Benjamin joined the chair of Logistics management at the WHU in Vallendar as an external Ph.D. Student. His research topic is Supply Chain Risk Management and Supplier Selection in the aerospace industry.

Kühne Institute of Logistics Management

Logistics has become a key enabler in today's global trade. And while today's value creation networks exploit to the extent possible local business advantages, the challenges that come with these dispersed structures have grown substantially over the last ten years. Recognizing this trend, the WHU – Otto Beisheim School of Management founded the Kuehne Institute for Logistics Management, which comprises two endowed Chairs (Prof. Dr. Stefan Spinler and Prof. Dr. Carl Marcus Wallenburg) and currently 20 PhD students. The institute was inaugurated in March 2012.

Our objectives are to generate new insights for the management of logistics and to disseminate this state-of-the-art knowledge into the research and business community.

To this end, we conduct high quality and internationally visible research, which is analytical, conceptual, or empirical in nature. Further, we provide specialized courses and lectures at various educational levels (BSc, MSc, MBA, Executive Education) and organize conferences for the business community and students in the area of logistics and supply chain management.

Current research projects are dedicated to the following areas:

- Management of logistics services
- Management of vertical and horizontal cooperation
- Logistics and supply chain controlling
- Sustainability in supply chains
- Risk management in supply chains
- Real options based supply chain modeling



Teaching

Lectures in the context of Logistics- and Supply Chain Management were offered in the Bachelor-, Master-, FTMBA-, PTMBA, and Doctoral-Program.

Courses BSc-Program

Real Options Analysis

This course deals with investment decisions as they arise in the context of international production and logistics networks, R&D projects and raw materials exploitation. The traditional discounted cash flow method is unable to account for the value of managerial flexibility. Real options, which aims at translating much of the methodology established for financial options valuation to real investment projects, allows to properly capture the value of flexibility. Several case studies exemplify the steps that need to be undertaken to perform a full-fledged real options valuation.

Seminar Multi-Modal Logistics Platforms

This seminar is meant to familiarize students with multi-modal logistics platforms. Among the objectives of this course is getting acquainted with the different modes of transportation and their proper coordination. Furthermore, students will learn why many of the EU funded projects related to multi-modal logistics have been blessed with mixed success thus far.



Literature Seminar SCM 2

The purpose of this seminar is to provide examples of state-of-the-art quantitative research in supply chain management. Students are expected to be able to fully understand technically challenging papers and relate the papers' findings to practical management challenges. The outputs of this seminar comprise a seminar paper and a presentation which includes a short Q&A session.

Courses MSc-Program

Real Options Models and Applications

Based on the introductory course in the bachelor's program, this course extends previous models and provides a thorough theoretical basis. Several case studies allow the students to understand the implications of real options in practical circumstances and the need for advanced modeling techniques.

Integrated Logistics and Supply Chain Management

In this course, the key pillars of supply chain management are studied. The levers which companies have to support their supply chain strategy are inventory and transportation management, network design and information management. Case studies allow the students to understand the challenges associated with greening the supply chain and with proper hedging of supply chain risks induced by, for instance, natural disasters.



Teaching

Transportation Management – held by Guest Lecturer Dr. Jürgen Ringbeck, Booz & Company GmbH

Transportation is one of the fastest growing global industries. Travel and logistics are the major backbone of our global business and a core element of private life. The objective of this course is to give a comprehensive introduction into the challenges and best-practices of management and principles of global industry players like passenger airlines or logistics companies. Such management best-practice includes a deeper understanding of the underlying industry dynamics, and the outline of superior strategies as well as commercial and operational management methods of selected industry segments. The course will also highlight some specific management approaches which illustrate a way to a long-term sustainable industry.

Course FTMBA-Program

Real Options Analysis

This course deals with investment decisions as they arise in the context of international production and logistics networks, R&D projects and raw materials exploitation. The traditional discounted cash flow method is unable to account for the value of managerial flexibility. Real options, which aims at translating much of the methodology established for financial options valuation to real investment projects, allows to properly capture the value of flexibility. Several case studies exemplify the steps that need to be undertaken to perform a full-fledged real options valuation. In the MBA program this type of course is particularly meaningful as most participants have already project management experience and thus have been exposed to the shortcomings of traditional NPV analysis.

Course PTMBA-Program

Logistics and Supply Chain Management

This course is devoted to the analysis of supply chains with a focus on practical aspects as is appropriate for the audience. More specifically, students learn about techniques to make supply chains eco-efficient and resilient to risks.



Course Doctoral-Program

Research Seminar in Supply Chain Management

The purpose of this seminar is to expose students to the most recent advances in management science and operations research. The methods presented are key building blocks of the participants' dissertations.

Teaching

Guest Lectures

The close contact with decision makers in the industry ensures the practical relevance and the relevance of management research and teaching. For this reason, regular guest speakers are involved in the different lectures.

MSc-Lecture “Transportation Management”

Carsten Spohr, Member of the Executive Board of Deutsche Lufthansa AG, CEO Lufthansa German Airlines: Lufthansa and the challenges of the airline industry

KLU-MSc-Lecture “Transportation Management and Distribution Systems”

Dr. Joerg Biesemann, Director Logistics Automotive Asia/Pacific, Continental Automotive: Supply chain management in the Chinese automotive sector.

Andreas Bunnemann, European Overland Transportation, Kühne & Nagel: Managing transportation in a European network.

NetloP-Seminar of the Kühne-Foundation

For the NetloP-Seminar, which is very successfully run by Mr. Martin Willhaus, we provide content for the introductory week in Schindellegi and the final part of this seminar in Vallendar. In Schindellegi, we focus on the challenges associated with sustainability and green logistics. The first day of the seminar in Vallendar, co-organized by Prof. Wallenburg and Prof. Spinler, is devoted to the issue of information technology and novel uses in industry. Moreover, a field trip to BASF allowed the students to grasp the enormous complexity of chemical production and associated logistics.



Kühne Logistics University, Hamburg

MSc in Global Logistics Management

Transportation Management and Distribution Systems

The objectives of this course are twofold: first, to familiarize students with concepts of transportation planning, management and deployment. Second, to provide students with insights into distribution networks and their management. These objectives will be achieved through a combination of case studies, theoretical concepts from business and economics and guest lectures by experienced industrial managers. A number of case studies and guest speakers provided additional insights into the intricacies of transportation and distribution management.

Research

Our research activities focus on the topics sustainable logistics, risk management and humanitarian logistics.

Sustainability is a key concern for today's and even more so for tomorrow's businesses. Together with INSEAD and La Poste we continued our joint research on sustainability matters related to postal delivery. Matthias Winkenbach has developed a quantitative model for the optimal deployment of different types of vehicles (bikes, vans, pedestrians) for urban deliveries. The model results help to understand what the impact of time windows on the optimal network structure is. A key requirement during the model development, which was performed in close collaboration with Alain Roset and Bernard Lemarié (both of La Poste), was the need to be able to apply the model to practical circumstances.



A holistic view on supply chain risk management to date does not exist in either the academic literature or business practice. To close this gap, a number of research projects have been defined to develop quantitative models for supply chain risk and thus provide optimal hedging opportunities for firms.

The topic area of humanitarian logistics is an emerging field which on the one hand benefits greatly from knowledge developed for commercial logistics, but on the other hand also requires fresh approaches given, for instance, the limited information often available or the project-based financing due to donor requirements. Andreas Kretschmer has collaborated with the WFP and the PCD to thoroughly understand the context of school feeding initiatives in a broad range of settings. To date, supply chain aspects have often been neglected in the design of school feeding projects. With the framework developed by Andreas Kretschmer and his advisors Luk Van Wassenhove and Stefan Spinler, key supply chain characteristics can be incorporated into the delivery model, thus increasing both efficiency and effectiveness of this kind of humanitarian aid.

Research

Main Focus - Sustainability

“Fleet renewal with electric vehicles”, Andrei Neboian

In this work, we develop three distinct replacement models for La Poste, the French postal operator, considering fully electric vehicles (EVs) and internal combustion engine vehicles (ICVs). We design a strategy to acquire new and salvage old vehicles in the face of technological evolution and, more recently, sustainability concerns, while pursuing the primary objective of minimizing total fleet costs, subject to cost uncertainty and managerial flexibility. The model has been used by la Poste in their purchasing decision of 10,000 electric vehicles.



“Optimal Infrastructure Design for Increased Sustainability in the Provision of Urban Logistics Services”, Matthias Winkenbach

Due to trends and developments such as the ongoing urbanization and the sustained boom in e-commerce, we can observe a continuous increase in the amount and fragmentation of demand for urban goods transportation. Thus, tighter coordination and consolidation of individual consignments is a requirement for a sustainable development of urban transport. At the same time, postal operators are currently facing significant threats to their long-term profitability. Given the deterioration of their revenue base from established business models e.g. due to electronic substitution, they have to find ways to broaden their product and customer portfolio to compensate for these losses. Moving into the field of urban logistics services as an overarching consolidator of inbound and outbound item flows may in fact be an attractive strategic option for them, offering both additional revenues for the company and welfare improvements for the society as a whole. This dissertation project aims at developing optimization and simulation tools to quantitatively evaluate the potential strategic moves of postal operators when moving into the domain of urban logistics services. It shall support their decision making in designing an optimal transportation infrastructure and fleet for the centralized consolidation of urban freight flows.



Research

“Theorising institutional processes and strategies with bearing on sustainability: A case study of Chinese, US and German climate policy and of green supply chain management in a global logistics company”, Judith Berndroth

The dissertation project explores change processes that evoke new rules, practices and structures (institutionalization). The research builds a bridge between institutionalization of sustainability in the broader field of social, political, and economic changes and in the organizational field. It gives attention to governments and companies instituting a course of sustainable development. For this purpose, the dissertation project investigates the temporal dynamics of institutionalization and the strategic responses to the collision of economic and institutional determinants. It develops an integrative framework how different types of power affect the institutionalization process. Moreover, it enhances our understanding on what strategy a company follows when green activities will not pay off economically, but due to social beliefs are a must for modern organizations. The work shows how both in combination, institutional and economic determinants play a decisive role in the strategic approach. A qualitative case study method is used to gain new theoretical insights in addition to drawing on practical contributions in the fields of sustainability and supply chain management. In a first step, the research starts with an investigation on the macro level of climate change governance prior to examining the organisational level at Deutsche Post DHL.



“Reuse and Remanufacturing”, Robert Hein

Due to increasing environmental concerns and dwindling resources, sustainability-related issues receive more and more recognition in industrial applications. Within his dissertation project, Mr. Hein focuses on two ways to reduce raw material consumption and waste generation, i.e. reuse and remanufacturing. The first topic is based on a concrete application and investigates whether it is technologically feasible and economically reasonable to reuse the batteries of electric vehicles, which are replaced eventually to guarantee a certain driving range, for stationary energy storage applications. The corresponding article, which has been published in the International Journal of Technological Forecasting and Social Change, finds that even if the technological challenges may be overcome, the economic benefits are not compelling. The second and third articles, which focus on remanufacturing issues, take a more general approach. A remanufacturer faces the question at which price to buy which used products, how much to improve their quality by remanufacturing, and at which price to resell the remanufactured products. Supply of used products and demand of remanufactured products are dependent on the corresponding prices and qualities. While the second article assumes quality-dependent remanufacturing costs, the third article considers a quality-dependent remanufacturing yield. Analytical models are developed to maximize the remanufacturer's profit by making the optimal quality and pricing decisions.



Research

“CO₂ reduction within FMCG supply chains through collaboration”, Sebastian Theißen

CO₂ reduction has emerged as a key challenge for companies in the fast-moving consumer goods industry; currently, this sector ranks among the ten largest sources of CO₂ emissions worldwide. In particular, manufacturers are now looking beyond their corporate boundaries to find new ways to reduce emissions along the supply chain. To close the gap between what we know and what we need to know to help firms initiate an effective collaboration approach to reduce CO₂ emissions, this quasi-cumulative dissertation examines the following issues in three successive papers:

First, we examine factors that influence a manufacturing organization's readiness to engage in a collaborative CO₂ reduction management (CCRM) approach. The research methodology applied in this paper is a multiple case study approach that relies on the relational view theory. Second, we analyze what similarities and difficulties may arise when introducing a CCRM approach between manufacturers and its suppliers. For that purpose we contrast suppliers with the findings gained from the manufacturer study to understand their needs thereby taking a dyadic perspective on CCRM. Third, we introduce a decision methodology that allows manufacturing firms to evaluate which supplier is the most suitable partner for the implementation of a CCRM approach. The evaluation and selection is performed using the analytic network process (ANP), a decision-making technique that allows practitioners to solve complex decision structures. By applying this framework to a leading manufacturer in the FMCG sector, we demonstrate the practicability of the model and show its potential to aid managerial decision-making.



“CO₂-Hedging for airlines”, Daniel Girardet

Airlines with flights to and from Europe have been subjected to the EU's Emission Trading Scheme (ETS) since the start of 2012. In addition to the existing risks of variation in input factors such as kerosene and currencies, the fluctuating price of CO₂ is an additional risk factor for airlines. The dissertation project aims to analyze various non-financial hedging techniques against the risks of the ETS. One of the techniques could be the ability of airlines to pass on price changes of CO₂ on to customers with a surcharges. However, price increases induce demand reactions and therefore the optimal surcharge has to be strike a balance between these two effects. An additional technique could be biofuels, which are credited with zero emission in the ETS. The adoption of biofuels, however, is dependent on actual CO₂ costs, which are a result of the CO₂ price, actual amount of CO₂ emissions and the free allocation. Lastly, new and more efficient airplanes reduce the cost exposure of airlines. Their financial evaluation is influenced by the actual CO₂ costs, which affects both present values and the pricing of purchase options. The mentioned hedging techniques are analyzed based on real data from the airline industry and discussed extensively with partners from the industry as well as relevant academic institutions.



Research

Main Focus – Green Logistics

“Decision models in green logistics – An extended economic optimization model for mode choice selection and analysis of transportation chains in the European consumer goods industry”, Katharina Grobleben

Macroeconomic concerns drive political efforts towards a modal shift in European freight transport. Nonetheless only mediocre success has been achieved so far. From three different perspectives intermodal freight transport (IFT) is studied to identify bottlenecks impeding a modal shift. First, the analysis of transport modelling in freight transportation with particular focus on the specificities of IFT is embedded in a review of the novel research field of IFT and concluded with a three-pronged research agenda. Second, a single-item inventory-theoretic model is proposed, which compares three transport options considering transport relevant and service-alternative criteria. In a multi-site European based case study approach, the model is empirically tested with the objective to identify levies to increase cost competitiveness of IFT. In the third part, the scarce acceptance of the “Guidelines on funding for the construction, extension and reactivation of private railway sidings”, which could mitigate the issue of costly short legs and thereby increase access to and usage of intermodal railway transportation in Germany, is analyzed in a game-theoretical approach. As a hold-up problem may impede a large-scale modal shift towards railway transportation, the influence and potential of currently existing and alternative legislative parameters towards a modal shift are studied in a sensitivity analysis. Lastly, the influence of public funding schemes on the public social welfare effect are examined.



Main Focus – Risk Management

“Supply Chain Risk Management“, Doreen Diehl

The research project has the goal to develop and test a holistic supply chain risk management framework. In recent years, supply chains have become more efficient and leaner but also more vulnerable by reducing buffer inventories and redundancies. The increased number of natural catastrophes, terrorist attacks as well as the high economic volatility put further pressure on the supply chain. In academia it was shown that supply chain glitches are penalized by the capital market and lead to deteriorating operational and share performance. It is therefore crucial for companies to have an effective supply chain risk management program in place. The existing elements of risk identification, assessment and aggregation, mitigation and monitoring are adapted to the special requirements of the supply chain. The cooperation with a leading consumer goods company allows the research project to identify the critical elements and risks of a complex global supply chain as well as using company specific data to analyze risk mitigation strategies and their implications. Contribution to the literature will be a holistic analysis of supply chain risks, their qualitative and quantitative assessment as well as their relationships.

Research

“Supply Risk Management – New directions to Supply Risk Identification and Monitoring”, Benjamin Gürtler

Increasing product and service complexity, outsourcing and globalization lead to complex and dynamic supply networks. Within supply networks, interrelationships and mutual connections of supply risks often create additional challenges for risk monitoring. During normal operation, interrelationships of risks largely remain hidden until the occurrence of a specific risk. To increase the effectiveness of risk monitoring, their understanding is important. In the first step of this research, the interrelationships between supply risks are quantified and supply risks are categorized according to their role within the system. We follow a network oriented approach as defined by system theory. Empirical data gained from expert interviews show the relevance of our framework as early indicator for supply risks. This is particularly relevant for companies that exhibit a high degree of interconnectedness with their suppliers caused by high product complexity as is the case in the automotive industry. In the second step, the sensitivity of supply risks is analyzed based on their frequency distributions, in order to investigate the reliability of supplier ranking methods. Finally, we link interrelationships and probability distribution functions and derive recommendations and levers to improve early identification of supply risk and to increase the efficiency of monitoring and ranking methods.

“Supply Chain Risk Management and Lean Production“, Johannes Teutsch

In the context of the arising globalization, there are two essential trends for the industrial production sector existing: First, the supply chains and, as a result, the links between customers and suppliers become more and more complex and difficult to manage. As a consequence, the risks of the supply chain and the risk management process are important influence factors for the success of a company. Second, the production systems are optimized by Lean tools and the waste in production systems is eliminated. These trends influence the supplier-customer relationship: There are dependencies between production systems, the risks in supply chains and the consequences of incidents. The dependency is more and more important for the success of a company. So there are fundamental questions which have to be answered: How do Supply Chain Risks and Lean Production Systems interact? What types of links between Lean Production elements and Supply Chain Risks are existing and essential? What implies the decision for a Lean Production System for Supply Chain Risks? The goal of the dissertation project is to find answers for the questions above.

Research

“Management of Supply Chain Complexity: A Study in the Drive and Control Industry”, Silke Malina

Supply chains are more and more challenged by increasing complexity caused through product variety, processes and structures. This raises the question how firms manage supply chain complexity and remain competitive. To answer this question it is essential to research the drivers of complexity and to develop a framework of how to control and manage structural as well as dynamic impacts. Firms may use complexity to differentiate from others, if they apply appropriate measures to control the supply chain. A case study is provided to conduct the analysis qualitatively and quantitatively. The contribution to academic literature is the limited research of supply chain complexity to date. Based on the results practical recommendations for managerial decisions are developed.

“Supply Chain Risk Management of Logistics Service Providers”, Alexander König

The increased risk for disruptions of supply chains (e.g. by natural disasters, terrorist attack) has been further intensified by trends in supply chain management (SCM) including outsourcing and partnering, globalization, single sourcing and inventory reduction. However, this traditional focus of SCM to optimize cost, time and quality has been extended by the task to make the supply chain resilient, resulting in the new domain of supply chain risk management (SCRM). SCRM is relatively new and still in its infancy, although risk management in other fields, e.g. finance, has been implemented in companies longer ago. With the before described trend of outsourcing, logistics service providers (LSPs) have an increasingly important role in most supply chains, providing not only transportation and warehousing, but also other services such packaging and reverse logistics. Thus the question arises how LSPs are managing risks and use SCRM to avoid or minimize disruptions in today's supply chains. We will investigate if LSPs can act as risk managers in supply chains and thus lead to a higher performance of the entire supply chains by using different methodologies such as literature review, case studies and application of other relevant business theories to this question.

“Supply Chain Risk Management in the Aerospace Industry”, Benjamin Punge

Modern aircraft manufacturing relies on a global web of suppliers whose number can be more than 10,000. To assure timely delivery of new airplanes, supply chain risk management is of primary importance for OEMs. The goal of this dissertation is to build a model relying on the notion of complex adaptive systems to represent the interdependencies among the various tiers of suppliers and to simulate appropriate hedging strategies.

Research

Main Focus - Contract design and evaluation

“Pricing of full service repair and maintenance contracts”, Sebastian Huber

Full service repair and maintenance contracts have become increasingly popular, especially in conjunction with leasing contracts for technical devices. Such contracts transfer the operating risks partially or completely to the service provider: customers pay one flat fee for all repair services required over the equipment lifetime, instead of paying volatile, variable costs for individual repairs as need arises. In the service portfolio of the service provider, full service repair contracts compete with existing, on call service relationships priced on the basis of time and materials used. Based on risk aversion and mean variance utility theory, the choice behaviour of a heterogenous customer group drives the pricing of the service contracts. While simple in their essence, guaranteed service times in combination with multiple service priorities and multiple service points require advanced queuing models. Learning effects based on adapted repair strategies or optimized maintenance schedules create an expectation of lower full service prices with customers. Forecasting the cost of contracts based on stochastic cost and failure distributions is crucial for the service provider to balance the product portfolio. Competition under time and materials service further influences the profitability of the service product portfolio. By internalizing the decision of customers to leave the service provider based on the number of experienced failures and based on the experienced repair times the effect can be included into the pricing of the contracts. The dissertation aims at creating analytic and simulative models to capture the complexity of the pricing situation in a single period and multi-period pricing situation.








Main Focus - Humanitarian Logistics

“Supply Chain Management at Humanitarian Organizations - The Case of School Feeding”, Andreas Kretschmer

Supply chains are central for the success of humanitarian interventions run by international organizations such as the World Food Programme (WFP). In the area of development aid logistics school feeding is an established intervention with multiple objectives including education, nutrition, and value transfer. Recently the focus shifted to develop sustainable local programs and supply chains. In this research the critical factors of school feeding supply chains that are relevant for program sustainability are examined. A framework of critical factors based on multiple sources of input is proposed. Furthermore, case study research and modeling of selected sub-issues are used to gain more insights on the proposed critical factors.





Research

Working papers

- J. Berndroth, S. Spinler: Understanding the temporal dynamics of institutional power mechanism: Case of the climate politics from China, the US and Germany. Submitted to *Sustainability Accounting, Management and Policy Journal*. 
- J. Berndroth, S. Spinler: Institutionalization and Power Management with Bearing on Green Supply Chains: Case in a Global Logistics Company. Submitted to *Organization & Environment*. 
- J. Berndroth, S. Spinler: Strategic responses to institutional pressures and economic potential: Case of eco-friendly operations in a global logistics company. Submitted to *Special Issue of Business and Society on Corporate Sustainability – Off to Pastures New or Back to the Roots?* 
- D. Girardet, S. Spinler: Does the aviation ETS promote biofuel usage? An assessment of the EU-aviation-ETS for costs of carbon and its implication for the usage of biofuels. Submitted to *Transportation Research Part A: Policy and Practice*. 
- D. Girardet, S. Spinler: Does the aviation ETS influence the financial evaluation of new airplanes? An assessment of present values and purchase options. Submitted to *Transportation Research Part D: Transport and Environment*. 
- S. Theißen, S. Spinler: Decision making in environmental-based supplier selection: an ANP modeling approach. Submitted to the *European Journal of Operational Research*. 
- S. Theißen, S. Spinler, A. Huchzermeier: CO₂ reduction within FMCG supply chains through collaboration: a manufacturer's perspective. Submitted to the *Journal of Supply Chain Management* (under review). 

Research

Publications

- D. Girardet, S. Spinler (2012): Surcharge management of kerosene and CO2 costs for airlines under the EU's emission trading. Forthcoming in *Journal of Air Transport Management*. 
- R. Hein, P. R. Kleindorfer, S. Spinler (2012): Valuation of electric vehicle batteries in vehicle-to-grid and battery-to-grid systems. Forthcoming in *International Journal of Technological Forecasting and Social Change*. 
- R. Hellermann, A. Huchzermeier, S. Spinler (2012): Options contracts with overbooking in the air cargo industry. Forthcoming in *Decision Sciences Journal*.
- S. Huber, S. Spinler (2012): Pricing of full-service repair contracts. *European Journal of Operational Research*, Vol. 222, 113-121.
- P. Kleindorfer, A. Neboian, A. Roset, S. Spinler (2012): Fleet renewal with electric vehicles at La Poste. Forthcoming in *Interfaces*. 
- S. Spinler, M. Winkenbach: City-Logistik für das 21. Jahrhundert. *Internationales Verkehrswesen* (64) 3, May /June, 2012. 

Examinations

Co-advisor for dissertations

- Bernhard, Rainer:
“Hybridisierung kommunaler Fuhrparks“
Advisor: Prof. Huchzermeier
- Difrancesco, Rita Maria:
“Quality of Returned Products in Closed-Loop Supply Chains with Secondary Markets”
Advisor: Prof. Huchzermeier
- Häntsch, Marius:
“Strategic Capacity Planning under Risk in the Automotive Industry”
Advisor: Prof. Huchzermeier
- Heilmann, Lucas:
“Einsatz von ökonomischen Nutzenrechnungen im technischen Vertrieb und Marketing“
Advisor: Prof. Jensen
- Jankowski, Kathrin:
“Identifying impacts on buyer's risk identification and perception: Bridging micro and macro approaches”
Advisor: Prof. Wallenburg
- Singh, Maurizio:
“The logistics organization of young Internet retailers – an examination of its development in the early stages of the company”
Advisor: Prof. Wallenburg
- Zhao, Lima:
“On The Interaction between Operational Flexibility and Financial Hedging in Global Sourcing”
Advisor: Prof. Huchzermeier

Examinations

Bachelor Theses

- Betzin, Tim Sabastian:
"Analysis of Flexibility Systems and Supplier Selection – A Study Focusing on Small and Medium-Sized Enterprises in the European Clothing Industry"
- Rausch, Alexander:
"Supply Chain Management Herausforderungen und Best Practices in Einzelhandelsunternehmen"
- Renner, Philipp Wolfgang:
"Anforderungen an die Supply Chain durch zunehmende Produktdifferenzierung"
- Scherer, Lucas Oswin:
"Analyse der Wertschöpfungskette einer Dose Maggi Ravioli in Tomatensauce mit dem Schwerpunkt auf Nachhaltigkeit"
- Winkler, Daniel:
"Contracts in the A – Parts Spare Parts Purchasing"

Master Theses

- Rehn, Nils:
"Aktuelle Herausforderungen für das Revenue Managements im Luftfahrtsektor durch die Preisstrukturen von Low Cost Carriern"
- Winselmann, Kai Philipp:
"Models for Reliability and Robustness in Facility Location Problems under Uncertainty"

Activities for WHU

Group Speaker of the Supply Chain Management-Group

The group includes professors Arnd Huchzermeier, Lutz Kaufmann, Carl Marcus Wallenburg, Stefan Spinler and Assistant Professor Matthias Ehrgott. The Speaker of the Group has a coordinating role with respect to teaching and to extend the faculty in the group.

Representative of the WHU “Nachhaltigkeit der BUGA” (Sustainability of BUGA)

One of the most attractive features of the national garden fair (BUGA) held in Koblenz in 2011 was the cable car connecting the city of Koblenz and the castle Ehrenbreitstein. Thus, an important question arises as to how sustainable this new means of transport is going to be. This issue was addressed by the chair in a contribution to the third volume of a documentation of the BUGA. In this volume, all universities located in Koblenz and surroundings provide their view on the sustainability of the BUGA. The article on the cable car illustrates a system dynamics model of cable car usage and identifies key levers to make the operation profitable and thus sustainable in the longer term.



Campus for Supply Chain Management

The 2012 Campus for Supply Chain Management was dedicated to the issue of supply chain risk management, a particularly timely topic given the significant ramifications of recent disasters such as the Japanese tsunami. The students' team that organized the event, which is mainly for national and international students, did an excellent job in getting aboard relevant companies, practitioners and academics. Well known guest speakers such as Dr. Froschmayer (Dachser), Dr. Krings (Douglas Perfumes) and Dr. Weidinger (Siemens) contributed their view on risk management in the supply chain. In a panel discussion, where Prof. Sindong Zhang (Tongji, Shanghai) was a welcome guest, risks were considered from different perspectives on industries but also mentalities.

The next issue of the Campus is currently being planned. The discussions next year will focus on the topic “Collaboration and communication in modern supply chains”.



I would like to take the opportunity to thank Mr. Martin Willhaus, Managing Director of the Kühne Foundation, for his efforts to make this event a success. He continues to provide invaluable support for the students organizing the event to get in touch with industry leaders and thus fosters the exchange between academia and (logistics) industry.

Activities for the scientific community

Conference papers

- INFORMS Annual Meeting, Charlotte, NC / USA, November 11 – 16, 2011
"Fleet Renewal with electric vehicles at La Poste"
Neboian, Andrei and Stefan Spinler 
- 17th International Working Seminar on Production Economics, Innsbruck, Austria, February 20 - 24, 2012
"Remanufacturing with variable quality levels"
Hein, Robert and Stefan Spinler 
- Conference on Health and Humanitarian Logistics, Hamburg, Germany, March 21 - 23, 2012
Poster presentation: "Supply Chain Management at Humanitarian Organizations: The Case of School Feeding"
Kretschmer Andreas
- 7th bi-annual conference on "The Economics of the Postal Sector in the Digital World", Toulouse, France, March 22 – 23, 2012
"A Mixed Integer Linear Programming Model For Solving Large-Scale Integrated Location-Routing Problems For Urban Logistics Applications at Groupe La Poste"
Winkenbach Matthias 
- POMS Conference, Chicago, IL / USA, April 20 -23, 2012
Humanitarian Operations and Crisis Management track, Finalist best paper award, "Supply Chain Management at Humanitarian Organizations: A Structuring Framework for Sustainable School Feeding"
Kretschmer, Andreas and Stefan Spinler
- POMS Conference, Chicago, IL / USA, April 20 -23, 2012
"Option to breach a leasing contract in a fleet replacement problem with electric vehicles"
Neboian, Andrei and Stefan Spinler 
- Production & Operations Management World Conference 2012, Amsterdam, The Netherlands, July 1 – 5, 2012
"Solving Large-Scale Integrated Location-Routing Problems For Urban Logistics Applications at Groupe La Poste"
Winkenbach, Matthias and Stefan Spinler 
Prof. Spinler organized the session on Urban Logistics

Activities for the scientific community

- 25th EURO Conference, Vilnius, Lithuania, July 8 – 11, 2012
“Solving Large-Scale Integrated Location-Routing Problems For Urban Logistics Applications at Groupe La Poste”
Winkenbach, Matthias 
- Research colloquium of the Bauhaus für Luftfahrt, Munich, Germany, July 20, 2012
“Does the ETS for airlines influence the adoption of biofuels? - An impact assessment”
Girardet, Daniel 

Conference participations

- Linking school feeding with agriculture development: Technical meeting on school feeding programmes linked to small holder farmer production, London, UK
September 27 - 29, 2011
Kretschmer, Andreas
- Herbsttagung der Wissenschaftlichen Kommission für Produktionswirtschaft - Complexity Management in Production and Logistics, Nuremberg, Germany
November 11 – 12, 2011
Malina, Silke
- LogiChem, Antwerp, Belgium
April 17 – 19, 2012
Diehl, Doreen
- 15th International PhD Candidates Workshop at KLU, Hamburg, Germany
June 13, 2012
König, Alexander and Winkenbach, Matthias
- 6th International Scientific Symposium on Logistics, Hamburg, Germany
June 13 – 14, 2012
König, Alexander

Activities for the scientific community

Memberships

- BVL, Bundesverband für Logistik (German Logistics Association)
 - DHV, Deutscher Hochschulverband (Association of German Universities)
 - GOR, Gesellschaft für Operations Research (German Operational Research Society)
 - INFORMS, Institute for Operations Research and Management Science (USA)
 - POMS, Production and Operations Management Society
 - VHB, Verband der Hochschullehrer für Betriebswirtschaft (German Association of Business Professors)
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Referee activities

Prof. Spinler regularly acts as a reviewer for the following journals:

- Management Science
 - Operations Research
 - European Journal of Operational Research
 - International Journal of Production Economics
 - Production and Operations Management Journal
 - Journal of Cleaner Production
-

Teaching at other universities

Prof. Stefan Spinler:

- The Wharton School, University of Pennsylvania:
Lecture: Real Options Analysis in the Executive Master's of Technology Management Program