

# Pricing & Revenue Management

Jochen Gönsch and Claudius Steinhardt, Augsburg

The 6<sup>th</sup> meeting of the working group “Pricing & Revenue Management” (formerly “Revenue Management & Dynamic Pricing”) took place on February 13<sup>th</sup> 2009 in Grünwald/Munich. The organizers would like to thank Dr. Henrik Imhof, Head of Yield Management and Pricing at Sixt AG, for the invitation.

Of the 50 participants at the meeting, about half were from industry and half from the academic world. Their diverse backgrounds reflect the importance of pricing and yield management for various application fields. Among other participants, there were representatives from airlines, the hotel industry, revenue management and pricing consulting companies, IT service providers, and major car rental companies.

Dr. Henrik Imhof and Prof. Dr. Robert Klein welcomed the participants and gave a brief overview of the program. This included eight interesting talks presenting – besides new academic research – the work of corporate research departments as well as the challenges and opportunities arising from pricing and revenue management on a more operational level.

In the first talk, entitled *revenue management with flexible capacity*, Dr. Imhof described typical challenges in car rental revenue management compared to the well-known ones of the airline industry. In particular, capacity is far more flexible in car rental, as cars can – to a certain extent – be acquired on demand. He proposed a dynamic programming approach to revenue management that would incorporate the possibility to dynamically adjust capacity. Other typical issues, like spiral-down effects, or the problem of several brokers subject to different incentives selling the same set of resources, were also discussed.

*Airline network revenue management using multi-stage stochastic optimization* was presented by Prof. Dr. Werner Römis, Humboldt University Berlin. He developed approximations based on scenario trees and Lagrange decomposition to attain control mechanisms for revenue management.

From an operational perspective, Gunter Büchner and Thomas Dionisius, Deutsche Lufthansa AG, reported on the issues that arise in practice from a major full service carrier’s capacity control. In their talk on *forecasting accuracy in stormy times*, they focused on typical factors that influence forecasts, like events, holidays, flight tables, and competition, which make hands-off forecasting impossible. They specially emphasized the need to incorporate macroeconomic data in forecasting systems, as it can empirically be shown that flight demand and business revenues correlate significantly with certain of the (global) economy’s parameters.

In his talk on *combinatorial procurement auctions*, Prof. Dr. Martin Bichler, Munich University of Technology, gave an extensive overview of this innovative field of revenue management. He discussed the relevant game-theoretic results, different combinatorial auction formats and mechanisms, the basic mathematical models with which to determine an auction’s winners, as well as linear and nonlinear prices. Furthermore, he presented laboratory experiments’ results regarding different auction formats’ efficiency under realistic conditions.

Natascha Mägdefessel, Lufthansa Systems AG, presented work on *price elasticity and revenue management*. This research was motivated by the increasing price competition in the airline industry. First, the total market demand is determined using unconstraining techniques and various data sources like MIDT, ATPCo, PaxIIS, and Revenue Accounting data. Second, the various competitors’ market shares are calculated by a logit choice model, taking attributes like schedule quality and price into account. An evaluation of several markets connecting Switzerland with Germany showed the model’s high quality.



Martin Friedemann, Deutsche Lufthansa AG, reported on the *usage of competitor information in revenue management*. He motivated his talk by discussing the growing price transparency and sensitivity in the passenger airline industry, which are making the incorporation of competitors’ behavior indispensable. He showed how to identify relevant competitors, how to obtain competitor information (e.g., by means of web crawlers), and how to use this.

In his talk on *performance measurement for airline network revenue management*, Christian Temath, University of Paderborn, presented results from a simulation study investigating the performance of revenue management activities. He especially focused on the model’s robustness in respect of unconstraining errors. Furthermore, he proposed extensions incorporating network information as well as buy-downs.

The last talk of the meeting was given by André Hintsches and Kai Wittek, Braunschweig University of Technology, who

reported on *revenue management in steel manufacturing with imprecise forecast*. They investigated several bid-price control approaches, like randomized linear programming with periodical resolving and self-adjusting bid-prices, comparing them to a first-come-first-serve policy in a setting with forecast errors.

Afterwards, all the participants expressed their satisfaction with this working group meeting. They had enjoyed the exciting, high quality presentations that had stimulated interesting discussions. The schedule had therefore also included extra time after each presentation and numerous coffee breaks. In addition, the evening before the meeting, the traditional informal get-together provided a good possibility to network and to talk to former colleagues.

The meeting's success would not have been possible without the contribution of the speakers as well as the extraordinary support and engagement of Sixt AG, where people from multiple departments worked together to provide a perfect environment for the meeting.

All interested "Pricing & Revenue Management" enthusiasts are invited to attend the forthcoming meetings of the group. The next meeting is scheduled for January 29, 2010. Thanks to the courtesy of Deutsche Lufthansa AG, it will take place at LSG Sky Chefs in Frankfurt, next to the international airport. For the latest news, please send an email with your contact data to [ag@revenue-management.info](mailto:ag@revenue-management.info).