Decision-making aid for decision makers

Globally operating companies frequently face tough decisions with regard to supplying their key markets: Which quantities should they deliver to which countries and to individual customers? Researchers from the University of Würzburg are working on models to facilitate this difficult task.

The Apple Watch is a good example of the problem: Set to be launched at the end of April, Apple must decide how many models are delivered to each country, to each region and to each store. The company's existing forecasting strategy does not predict demand with sufficient accuracy. One thing, however, is for sure: There won't be enough watches, at least in the first weeks, to meet customer demand around the world.

Whenever Apple launches a new gadget, long queues in front of stores worldwide are guaranteed. How to optimally distribute the greatly sought-after devices: that is the research subject of researchers from the University of Würzburg. (Photo: hto2008 / Flickr.com / CC BY-NC 2.0)

Which portion of watches will be shipped to Europe, the US or Asia? How many of the gadgets designated for the European market are allocated to Germany, how many to France? And how will the quantities be distributed among company-owned stores, external retail stores and online traders? Such questions and countless other aspects, ranging from customer satisfaction to profit maximisation, need to be resolved by Apple.

EUR 500,000 funding from the DFG

How companies reach optimal decisions in such processes is the new research focus of Professor Richard Pibernik, Chair of Logistics and Quantitative Methods in Business, and his colleague Konstantin Kloos. The project involves research teams of the Universities of Mannheim (Professor Moritz Fleischmann, Chair of Logistics and Supply Chain Management) and Hohenheim (Professor Herbert Meyr, Chair of Supply Chain Management). Together, the researchers are seeking to develop mathematical methods to support corporate decision-makers. The long-term objective is to equip existing software systems in companies with these new methods. The German Research Foundation (DFG) will contribute more than EUR 500,000 worth of funding for the project in the next three years.

When different interests collide

"In such cases, there are conflicting interests at multiple levels," Richard Pibernik summarises the underlying problem. Is, for example, Germany more important than France, because the country has a higher profit per unit? Or does the Paris store deserve preferential treatment, because it operates more profitably than its Augsburg-based counterpart? And which quantity must be delivered to

Presse- und Öffentlichkeitsarbeit der Universität
Sanderring 2, 97070 Würzburg
Pressesprecherin: Dr. Esther Knemeyer Pereira, Tel. (0931) 31-86002
presse@uni-wuerzburg.de www.presse.uni-wuerzburg.de

distribution partners to comply with distribution agreements? Researchers in management call this a "complex allocation problem with different goals".

Profit maximisation is only one of many objectives that have to be considered. "More and more companies are guaranteeing customers a minimum delivery capacity. So they have to stock extra quantities to be able to serve yet uncertain demand," Pibernik explains. And given the fact that demand forecasts are never perfect, the forecast uncertainty has to be included in the calculation. If additionally supply is scarce, the company might be unable to meet the promised delivery capacity for all customers, resulting in dissatisfied customers and distribution partners and frequently entailing considerable contractual penalties.

Practical applicability as a goal

To distribute the goods optimally in such a situation, the researchers of the Würzburg Department of Logistics and Quantitative Methods in Business are developing various stochastic planning approaches in collaboration with their partners. "The challenge is to make sure our solution is feasible in practice despite the complex mathematical background," Pibernik further.

After all, the practical feasibility is the main goal of the project. The plan is to build a software environment that evaluates the developed models in different scenarios to be used in real companies and to easily transfer them in new software systems and give managers concrete recommendations for actions.

Contact

Prof. Dr. Richard Pibernik, Chair of Logistics and Quantitative Methods in Business Administration,
Phone: +49 931 31-86969, richard.pibernik@uni-wuerzburg.de

Konstantin Kloos, Chair of Logistics and Quantitative Methods in Business Administration,
Phone: +49 931 31-88929, Konstantin.kloos@uni-wuerzburg.de