DAGOPT Optimal Technologies

Aims of the activity/of the project	DAGOPT Optimal Technologies is a spin-off of the University of Vienna. The business area of the company is optimization of complex problems/processes through mathematical modelling (from the optimization of energy production in power generation systems, to raw material purchases, investment and location decisions, up to the planning of street and canal systems), based on the scientific expertise of the University employees.
Persons responsible for the project	Ao. Univ.-Prof. DI. Dr. Hermann Schichl (University of Vienna, Faculty of Mathematics; DAGOPT) Univ.-Ass. Dr. Ferenc Domes (University of Vienna, Faculty of Mathematics; DAGOPT) Mag. Franz Haller (DAGOPT, management) O. Univ.-Prof. Dr.hc. Arnold Neumaier (University of Vienna, Faculty of Mathematics)
Cooperation partners	Industry Projects: inter alia, energy industry (AVG, EVN, Verbund, EnergieAG, Welsstrom), Österreichische Post AG (see also http://www.dagopt.com/en/service-solution/partners/) Research projects: inter alia, University of Vienna, international research partners

Project Description

In 2011, the mathematicians Hermann Schichl and Ferenc Domes founded the company DAGOPT Optimal Technologies GmbH with the aim of enabling and facilitating cooperation between science and economy in order to apply university knowledge to real-world challenges and problems.

Companies have access to ever growing volumes of data. They have to (optimally) utilize these data and optimize the consumption of resources to remain competitive. DAGOPT uses scientific expertise in mathematical modelling and data analysis to develop modelling, optimization, and software solutions. In principal, these are applicable to all economic sectors, though a special focus of the company is on the energy industry.

DAGOPT is structurally organized as a small-scale business. The founders are chairmen/owners, and they are supported by four part-time employees. Depending on current projects, further employees are hired (e.g., graduate students, postdocs).

On the one hand, DAGOPT develops specific products and model solutions, primarily on behalf of industry partners. On the other hand, research projects with a primary focus on basic research and not (yet) on the development of specific products are being realized. An example is the project “Search Engine for Mathematic and Nonlinear Network Analysis” (project runtime: October 2014 – December 2016), which was implemented in cooperation with the University of Vienna and supported by the Austrian Research Promotion Agency (FFG). The aim of the project was to develop innovative methods for optimizing complex network problems. Mathematical knowledge, available online, was ought to be made accessible for scientists with the help of a search engine. For this, mathematical structures from different disciplines have to be brought together and categorized.

This is necessary, since no consistent terminology has been established yet for mathematical structures and models across different disciplines. For example, it is possible that models from oceanography and energy industry are mathematical identical. However, currently it is impossible to make a connection between these two using an online search engine (such as Google), as a "shared language" is missing.

The idea to directly transfer scientific results into economy by means of a company emerged in 2008, as at that time cooperation between scientists and industry was almost exclusively possible through research cooperation. This poses a problem for scientists and universities, as research knowledge is mostly provided to the industry without (notable) return. In addition, the collaboration between university and industry was not legally binding. Hence, the foundation of a company appeared to be an appropriate way to build a bridge between basic research and product development, as well as to transfer technology and innovation into industry for a suitable market price.

Results/Impact

The final results of projects developed on behalf of industry partners are specific modelling, optimization and software solutions, which comply with the specific needs of the customer. For example, a forecast tool for a hydro-power plant to correctly decide if to produce or buy the required electricity in the open market lead to an increase of the return on sales by 5% (for more examples see: http://www.dagopt.com/en/service-solution/what-we-have-done/).

The impact of the products developed by DAGOPT is multifaceted. Optimization solutions developed for energy industry can help to reduce the energy consumption of the Austrian society and to decrease the cost of energy for consumers.

Within the scope of research projects, the focus is on risk and result-open research. Further, the acquired results can lead to the development of products such as the search engine for mathematics. At this, the primary aim is to explore whether specific areas – e.g., nonlinear network analysis – hold potential for further consolidation and development.

Quality assurance/Achievement of objectives

In general, research projects have to be differentiated from industry projects concerning quality assurance and achievement of objectives.

For research projects (e.g., "search engine for mathematics"), the achievement of milestones is being evidenced through interim and final reports, as well as publications in scientific journals.

For industry projects, goal attainment is being verified through an acceptance inspection by the involved corporations. This also includes the obligation for maintenance of software solutions.

Webpage/Publications

Homepage DAGOPT http://www.dagopt.com/de/home/