

FULL ABSTRACTS FOR THE SHORT PRESENTATIONS

Learning from errors: analysis of a painstaking OR project at Bouygue

Thierry Benoist, LocalSolver, France

It is natural to present your successes more readily than your failures. Nevertheless, these are often rich in learning and are worth sharing. We will present the difficulties we encountered during a project to implement software tools to help the management of the formwork material on construction sites. The addressed optimization problems cover the calculation of the minimum material needed for a construction site, the plan of rotation of the formworks, the planning of the use of the formworks under exclusion and precedence constraints. Without omitting to describe the optimization problems in question, we will pay particular attention to identifying the choices that have led to a dissatisfaction of our client. In doing so, we will draw up a list of some good practices relating to the modeling of the problem, the contracting of the relationship, the planning of the project, and the choices of IT architecture. Finally, we will see how these pitfalls were avoided on another project of similar scale, which was a complete success. In summary, the purpose of this presentation is that the audience of this industrial session puts into practice the maxim of Confucius: "The wise man learns from his mistakes, the wiser man learns from the mistakes of others."

Harder than it looks: how do we really measure project benefits

Pim van 't Hof, ORTEC, Netherlands

By implementing ORTEC's vehicle routing software in 2004 and 2005, Coca-Cola Enterprises Inc. realized an annual cost savings of \$45 million as well as major improvements in customer service. It also earned the two companies, together with Tilburg University, a place among the 2007 Franz Edelman Award finalists. In 2012, a team consisting of TNT Express, ORTEC and Tilburg University was awarded this prestigious award for their collaborative, supply chain-wide optimization efforts that resulted in more than €207 million in savings and benefits for TNT Express between 2008 and 2011. According to the INFORMS website, cumulative benefits from Franz Edelman Award finalist projects have topped the \$250 billion mark since the award's inception in 1972.

Sentences like the ones above work well in press releases, on websites, at birthday parties, and -I hope- in an abstract for a presentation at the EWG-POR workshop on measuring the impacts of OR projects. However, obtaining figures like the ones mentioned above is often very difficult. For example, if we want to measure the impact of implementing optimization software at a customer, which KPIs should we measure? How do we get a good baseline to compare the new solution to? What savings can be attributed to the software? How can we determine the monetary value of things like improved customer satisfaction and prevention of lost sales?

In this talk, ORTEC will share some of its successes and challenges in measuring the impact of their OR projects.

Influencing government: assessing the success of OR in the UK Government

Howard Turner, Government Operational Research Service, UK

The paper relates to the UK Government Operational Research Service and various approaches which have been considered to assessing impact there. A constant repeated demand for its services has led to analyst numbers growing from under 100 to over 700 over the past 25 years. It has generally been found that a combined qualitative approach to demonstrating impact which takes in reducing uncertainty, resolving problems of major concern and supporting learning of key customers has more prospects of success than looking to specific cost savings.

Leveraging OR Techniques for Smarter Field Operations

Anne Liret, Principal Research Professional, BT, France/UK

BT is continually investing in making the Digital Britain vision a reality by creating a faster, more flexible network and associated Internet services. To support this investment and large scale network infrastructure programmes, such as the Broadband UK, BT requires an efficient, responsive mobile field service operation. BT's 23K field engineers in United Kingdom serve geographically dispersed and diverse customers including ISPs and end users. The deployment of our engineers has significant impact on delivering customer experience, travel and CO2 emissions. The question is how can we send the right engineer with the right skill to the right location to deliver the right service? Addressing this challenge will lead to (i) reduction in CO2 emissions, (ii) improve engineer utilisation, and (iii) customer experience through improvement in engineer productivity. To address the aforementioned challenges, BT Research exploited OR techniques such as simulation, resource planning and scheduling in developing two systems for (i) resource planning, and (ii) resource scheduling and allocation. These systems are in operational use have underpinned improvements in service delivery and operational efficiencies.

OR and Society: how systems thinking is improving child protection

David C. Lane, Henley Business School, UK

This talk concerns the innovative use of a blend of systems thinking ideas in the 'Munro Review of Child Protection', a high-profile examination of child protection activities in England, conducted for the Department for Education. We go 'behind the scenes' to describe the OR methodologies and processes employed. The circumstances that led to the Review are outlined. Three specific contributions that systems thinking made to the Review are then described. First, the systems-based analysis and visualisation of how a 'compliance culture' had grown up. Second the creation of a large, complex systems map of current operations and the effects of past policies on them. Third, how the map gave shape to the range of issues the Review addressed and acted as an organising framework for the systemically coherent set of recommendations made. The talk closes with an outline of the main implementation steps taken so far to create a child protection system with the critically reflective properties of a learning organisation, and methodological reflections on the benefits of systems thinking to support organisational analysis.

Truck and container loading for RENAULT logistics platforms *Alain Nguyen, Renault, France*

RENAULT's European international logistics platforms (ILN) are supplied daily by trucks of parts and have to ship weekly several hundred containers to overseas car plants. We dealt with 2 optimization issues for these platforms: (1) Container loading problem and (2) Truck loading problem

Container loading problem Every week, all the customer packages are to be loaded into a minimal number of containers under various loading constraints. We first develop an in-house tool, which showed some limitations. Our tool was less performant than ILN experts in terms of container filling rate. Then we organized a challenge with 17 competing academic research teams and re-implemented the algorithm of the winner team, based on MIP and meta-heuristics.

The new algorithm matches ILN experts performance and allows them to make reliable loading simulations with deliveries forecasts. The optimization tool also enables ILN planners to negotiate with customers for better container filling rate thanks to anticipated deliveries or more compatible packages.

Strong involvement and availability of ILN experts was critical for the success of the tool.

Truck loading problem We optimize the assignment of parts deliveries to already pre-planned trucks to maximize the trucks filling rate, while minimizing the number of trips to each supplier. The optimization tool reduced the number of trucks by 20% thanks to the cancellation of unused pre-planned trucks. The tool results also challenge the parts suppliers, whose low quality service level is an obstacle to the optimization.

Will it fly? Measuring the OR impact in the airline industry

Per Sjögren, Björn Thalén, Jeppesen (a Boeing Company), Sweden

Jeppesen has a wide range of planning products with almost all of the big airlines as customers. Even though the airline industry is very mature when it comes to OR research and attitude, measuring the impact still remains a challenge due to a numerous different practical and psychological reasons. In this talk we will present some of these challenges as well as how Jeppesen together with the airlines have found solutions to some of the challenges.

Beyond the bottom line: successes (and failures) in producing a full valorization of impacts

Matteo Pozzi, Optit, Italy

Most OR projects are normally driven by efficiency as the main driver. Yet, the story goes beyond the basic question of “how much have I saved?”.

We will present, through a quick selection of practical applications of OR to various businesses, how the economic assessment may fail to capture the full value of OR projects, suggesting adoption of a wider perspective to impact measurement. At the same time, we will also provide some examples of how response to the basic question may not always be as straightforward as one might think...

The Future of Industrial Optimization *Dr. Olli Bräysy, Weoptit, Finland*

We shall present several recently finished and ongoing projects to large industry customers and analyze the key lessons learned from them. It is already commonly known that fixing and putting data together for optimization is still often a bigger challenge than the optimization itself, especially if one wants to alter the original problem setup to increase accuracy and to reduce uncertainty. Another important key trend is considering larger optimization entities instead of manually split logical sub entities, causing huge efficiency losses. Third good example of recent developments is applying machine learning technologies either directly or via special guiding functions to solve the optimization problems. Even though this path is still in its initial stage, the findings are promising. We shall analyze the above topics based on our experience in real-life industrial projects and current R&D developments and summarize our conclusions as well as reviews of the future directions.

OR & Analytics @ Air Liquide *Jean André, Air Liquide, France*

Over the years, Air Liquide’s activities in OR and analytics have broadened from advanced process control to optimization and data science. As focus evolves from operational excellence (e.g., efficiency, reliability) to support business growth (including sales, marketing, and finance), the need for broadening expertise continues with a focus on statistics and financial economics.

In R&D, we have valuable opportunities to work among and across different business lines and operational entities, with whom close proximity is essential to the successful application of OR and analytics to benefit our customers and business.

One very successful way to have a strong impact of OR application on operations is to be fully integrated into a digital transformation program. Air Liquide’s “Smart and Innovative Operations” (SIO) program integrates digital tools to analyze operating data from our production plants, exemplified at our new remote operation and optimization centers in Lyon, France and Kuala Lumpur in Malaysia. Deployed globally, the SIO program focuses on automating and centralizing operations, optimizing the performance of each site and anticipating malfunctions. Consistent, fundamental model templates facilitate the deployment of SIO applications in optimization and data analytics. Thanks to this integration between data and optimisation, Key Performance Indicators are directly monitored and compared to previous situations to assess the benefits of optimization applications. We have built a core optimization engine in AIMMS that includes model templates for unit operations (e.g., compression, distillation, liquefaction) for users to combine into a “digital twin” of their particular plant or pipeline network. This core engine is a unique approach to scale up the impact of OR applications and ensure a sustainable and maintainable solution generating benefits over the long term.