Operations Research uses advanced mathematics and analytical procedures to make more informed decisions, for instance, for the “traveling salesman problem”: In what order must the sales representative travel to a given number of cities when starting and returning to the same place so that he travels the shortest distance possible? Even with just 15 cities, 43.6 billion possibilities would have to be calculated to determine the shortest route.

Even within a single city, of say 250,000 inhabitants, you may wish, for example, to target potential customers under the age of 40, with an income above 2800 euros. This kind of constraints increase the amount of computation involved.

If you are not just talking about one business trip, but hundreds of them and new cities are always being added to the route, then not even super computers would be able to compute all options.

Fuzzy Logic (or fuzzy set theory) imitates the way in which humans model, conclude, and communicate. We rarely use terms that are simply true or false. Whether someone is “large”, depends firstly on the context and secondly, there are many “in-between sizes” between large and small, ranging from “fairly small” to “medium” to “quite large”. When analyzing complex situations and weighing up many different alternatives, fuzzy logic leads to better decisions than those that would be produced when reverting to binary logic, where there is only “large” and “small” or “yes” and “no”.

INFO
There is virtually no other term used more frequently in software marketing than “optimization”. As likely as not, it appears in 99 percent of all product descriptions either as a noun or in a verb form. In 99 percent of such marketing texts, however, we’re talking about the colloquial meaning of optimization in the sense of “designing as well as possible”. In a business environment this usually means that a software optimizes processes by lowering costs, accelerating processes or increasing output quality.

In rare cases, it is about optimization in the narrower sense: (rapidly) finding the right solutions under complex constraints and with an endless number of possibilities (such as which forklift truck should go to loading ramp A and not loading ramp B and under what conditions) or the calculation of ideal value distributions or the trade-off of dependent variables such as how many products should be stored in the warehouse so that deliveries can be made quickly enough with the minimum capital commitment).

INTELLIGENT OPTIMIZATION

All INFORM solutions have one thing in common: they optimize decisions or trade-offs in the area in which they are implemented.

- They make decisions concerning the optimum use of transport resources in companies, at airports, in hospitals and in other organizations where transport is necessary, so that resources can be used as economically as possible whilst adhering to schedules.
- They find an optimum trade-off between the level of service, stock and capital tied up in warehouses.
- They manage the progression of production orders in connection with machine capacity and delivery dates.
- They recognize potential cases of fraud in behavioral patterns of credit card use.

To avoid confusion between simple process optimization and decision or trade-off optimization, in these cases we are talking about “intelligent optimization”.

EXAMPLE OF SIMPLY AND INTELLIGENTLY OPTIMIZED TRANSPORT

The fundamental difference between a simple and an intelligent optimizing solution is shown by the (simplified) view of a transport scenario, for instance, for the construction materials trade. A simple optimizing software solution assists with fleet scheduling in so far as the logistics coordinators can see on the display where and when truck capacities are available, as well as what deliveries are pending on which dates to enable them to compile the trips. In addition, IT-based communication with the drivers and warehouse staff speeds up the process by transmitting loading or trip plans directly to the screen in the driver’s cab.

This scenario benefits from all the advantages of optimization through a more efficient, though fundamentally unaltered process. The benefits include more complete information, simplified and accelerated yard management tasks and less paperwork, which leads to faster communication.

However, this transport solution does not offer any support at all in arranging loads, routes and delivery points, in order to optimize the routes covered, the utilization of resources and on-time deliveries combined – that is, to make the process more effective. When it’s a question of sending a hundred or more trucks to customers every day, no logistics coordinator can draw up a delivery schedule from the endless number of combinations that is capable of getting deliveries to all customers on time using the least number of vehicles and covering the shortest distance. Only intelligent optimizing software can provide this type of support, which relies on operation research and fuzzy logic processes. And when the software is working in real time, it is also capable of devising ideal plans in the event of interruptions and keeping the whole outbound logistics process on the right track.

Intelligent optimization software is capable of adding much more value to large scale business process than simple optimizing software.

When assessing software, it is always necessary to ask which “optimization methods” it uses. If the answer is intelligent optimization, the return on investment is radically higher than with simple optimization.

This type of intelligent optimization is one of INFORM’s core competencies and is the link between the different INFORM business areas, which focus on different industries or company divisions.