LOGISTIK PRAXIS

Software for LOGISTICS

Manage inventory accurately

Requirements, functionality, and service providers for Warehouse Management Systems, Enterprise Resource Planning, Transportation Management System, and Supply Chain Management

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Select software successfully

Choosing a Supply Chain Management (SCM) Software requires a detailed cost-benefit analysis. It should generally be conducted jointly by Information Technology (IT) experts and logisticians of a company.

In times of tighter budgets, the acquisition of new IT is associated with high costs and risks. SCM software's complexity is a challenge to valuing its performance because it has to optimize the whole value chain of a company.

A solid business decision, for or against a specific SCM software, therefore needs a comprehensive cost-benefit analysis. On the basis of specific scenarios ("Business Cases"), IT experts and the logistics department jointly determine forecast values for key financial metrics such as Return on Investment (ROI) and Net Present Value (NPV). An example for a specific Business Case: A life science company is planning a SCM software investment of one million euros to optimize, through the availability of higher quality data and enhanced analysis, its logistics.

A Business Case requires reliable information

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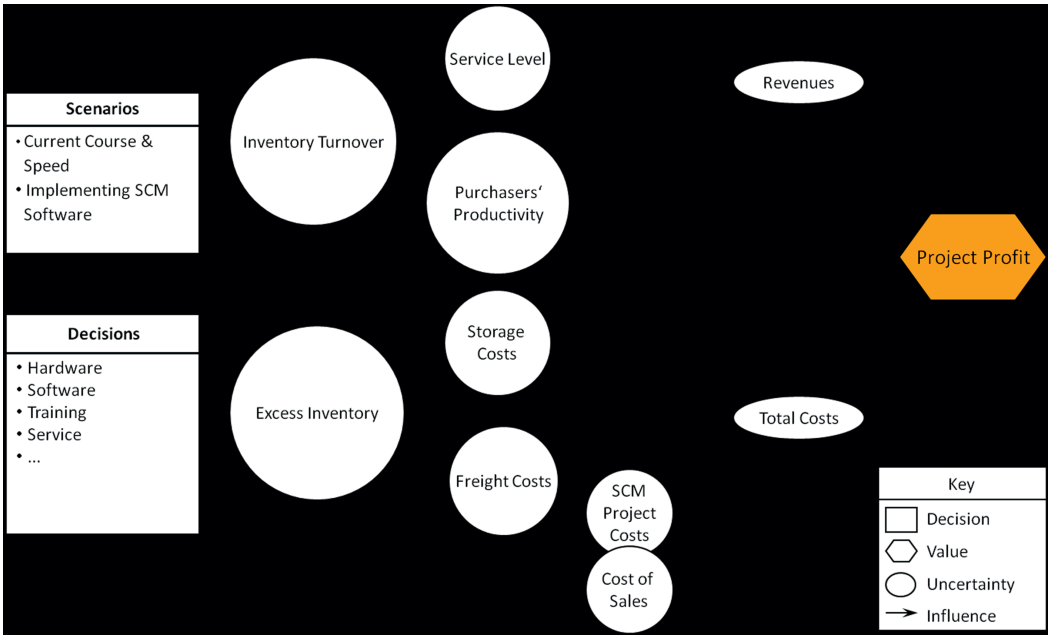
Figure 1: The Influence Matrix



The Influence Matrix reduces each project to five elements: value, scenarios, decisions, uncertainties, and influences.

By this means the service level and inventory turnover will increase, and excess inventory will be reduced.

Initial analysis

To value the impact of these changes on the profitability of the life science company, the whole project is presented graphically by the Influence Matrix (*see Figure 1*). The Influence Matrix reduces the complexity of a project into five distinct elements: value, scenarios, decisions, uncertainties, and influences.

The value is generally a corporate objective, in this case to increase profit. To maximize this value, at least two scenarios must be compared: Current Course & Speed and the project of implementing the software. Each scenario requires decisions, for example regarding hardware, software, and training costs. These decisions are controllable. They differ from the uncertainties, which are uncontrollable. The last ones take up the most space in the Influence Matrix. The influences, as last elements of the diagram, clarify the interaction between the distinct elements.

The Influence Matrix should be read from right to left, hence starting from the value. The profit depends on the revenues as well as the costs. In this case, the software, on the basis of an increased service level and stock turnover, will have a positive influence on the revenue. The general costs rely on the productivity of the purchasers, the storage and freight costs, and SCM project costs as well as the excess inventory.

These uncertainties are even more numerous on the left side, here they are omitted for simplification. In the example, the service level will be influenced by stock-outs and penalties; the purchasers' productivity will be influenced by the number of employees and the increase of their productivity in percent.

The data base

Once all single components of the SCM Software project have been named, all financial metrics are calculated and based on them a decision is made for or against the IT project. The required tool is called financial model, which is strongly based on the Influence Matrix. The interactions of the Influence Matrix are converted into simple formulas. The quality of a financial model depends firstly on the structure and secondly on the quality of the data input. Both factors are equally important. In our example, the experts of the company evaluate the project on a three year basis (2009–2011). As no complete information about the future is available, some data is assessed by interviewing experts. Nevertheless, annual reports and profit & loss statements deliver many important company-specific data points. They can be supplemented with market studies and reports by industry analysts.

In most cases, the amount of data available is larger than assumed at the beginning of the project. However, they remain estimates – and for good reasons. Point estimates are in fact certainly wrong, while estimates are approximately correct.

Projections and estimates

In practice, one uses so-called interval estimates. The experts of the company are requested to give an interval, with an expected 80-percent probability. They give a minimum, a most likely, and a maximum value for each named uncertainty.

The more qualified and therefore usually also more senior the experts are, the better. An interview should take between fifteen and forty-five minutes. With project sizes of multi-million euros those minutes are well invested.

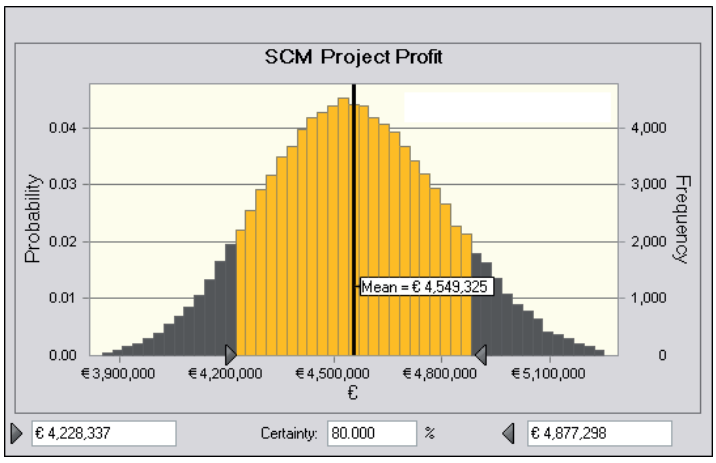
The three interval values are used in the financial model to calculate the profits of the two scenarios (Current Course & Speed and possible future situation) between the years 2009–2011. The financial ratios are determined on the basis of the most likely value. The ROI of the SCM software project in the project example is 435 percent, the NPV is € 3,605,935 and the payback period is 0.69 years.

Statistical Validation

To confirm the results of the financial model statistically, an additional risk and sensitivity analysis is conducted. This analysis is performed with the use of the simulation software Oracle© Crystal Ball, based on the existing financial model. The forecasts are validated with 100,000 trials. Based on this analysis, the life science company decision makers know with what certainty they can expect how much profit.

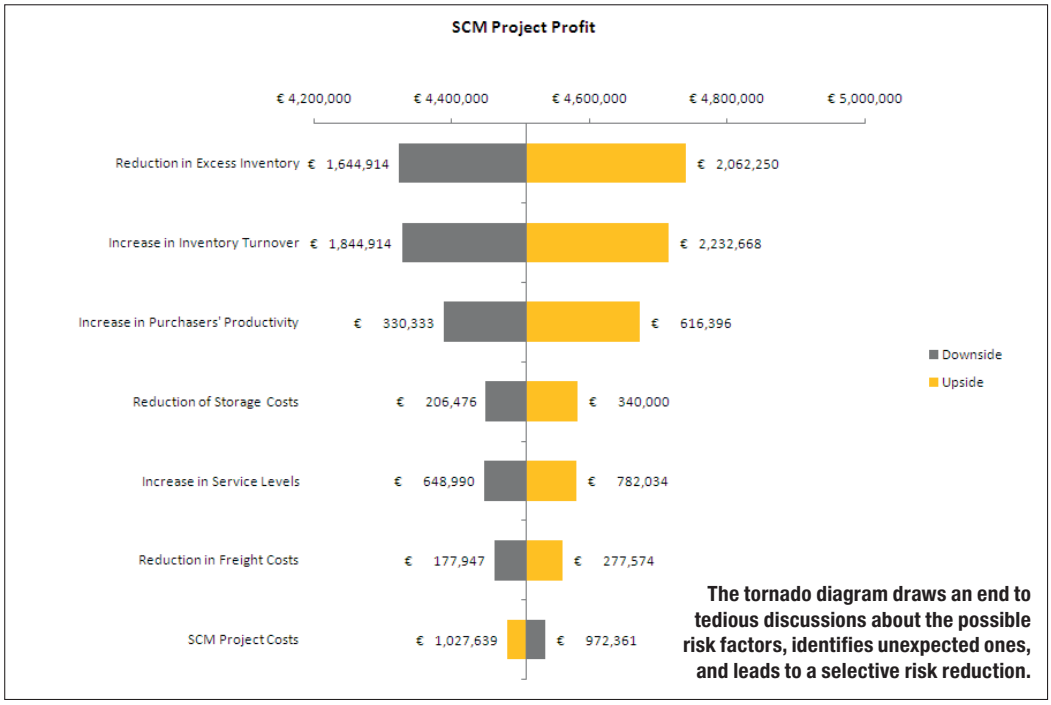
The first step of the risk and sensitivity analysis is a so-called Monte Carlo simulation. It answers the question, with which likelihood the expected profit will occur. In the example, the simulation model shows that the profit has an 80 percent probability to be between € 42,283 and

Figure 2: The Monte-Carlo Simulation



Solid statistical results delivered by Monte-Carlo simulation.

Figure 3: The Tornado Diagram



€ 48,773 (*see Figure 2*). The most likely value calculated in the financial model is € 4.35 million. The average of the interval estimates comes to € 4,549,325.

The question of how the project can achieve the projected values as accurately as possible is answered in the next step, the sensitivity analysis. The sensitivity analysis' tool is the "tornado diagram". It prioritizes the risk factors according to their impact on the end result. The tornado diagram draws an end to tedious discussions about the possible risk factors and engages the process of a successful risk reduction.

In this case shows the biggest risk factor is excess inventory (*see Figure 3*). The central line represents the calculated most likely value, of € 4.35 million, for the profit. A successful reduction of the excess inventory by € 2,062,250 will increase the profit to € 4,632,250. If the excess inventory is only reduced by € 1,644,914 profit will sink to € 4,214,914.

The two other major risk factors are the increase of inventory turnover and the increase of the purchasers' productivity. If the purchasing agents improve their productivity with the new software to € 616,396 the profit will increase to € 4,566,396. If the productivity improvement is only € 330,333 they will fall short of expectations.

Conclusion: A Business Case which links project-specific knowledge of logisticians and IT experts in an Influence Matrix, then quantifies the whole in a financial model and validates it by a risk and sensitivity analysis, provides reliable information for decision-making for or against a project. In the case of the life science company the decision was in favor of the SCM software project because of the clearly positive figures.

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