http://www.labnews.co.uk/laboratory_article.php/4898/5/making-the-case

Making the case

The advantages of automating laboratories are numerous, yet the ROI (return of investment) of such a project is not as obvious. A business case that combines economical and technical laboratory know-how offers an objective financial evaluation says Johannes Ritter

ADVANTAGES that derive from automating laboratories are linked to the laboratory's specific processes and results, but all of them have an economical dimension. Improving quality, ensuring the repeatability of results, reducing error rates, and optimising procedures can also reduce cost. Although that sounds obvious in general, it is not when it comes to evaluating a specific and costly project.

Take the example of an international biotechnical company that wants to automate the laboratories in one of their European business units. The project is welcomed on many levels, it has been agreed that it is necessary, but the decision to launch the project is still to be made. The question of who is actually going to pay for the project has left the project on hold. Automating laboratories goes to the heart of how a biotechnical company is run. At first it is clearly an IT project, but as it heavily influences the laboratory's workflow and work routines of so many employees it is not clearly attributed to one department's responsibility. So who is going to pay for the automation project and whose benefit will it be? What is the benefit in financial values and how can it be quantified?

The concrete and up-to-date business case for this international biotechnical company's business unit is answering these questions with respect to the underlying business case method and its practical results. The starting point of the case was this state of wavering due the fuzzy responsibilities and the inability to quantify the benefit of the project precisely. Therefore the first step is to get everyone affected by the project involved. A business case that is tailor-made for the specific problems of each laboratory is developed together with the management and selected laboratory personnel of the business unit. That procedure ensures the vital combination of economical and laboratory-specific know how in order to evaluate the economical results of the automation project correctly. The other positive side effect is consensus on the project. As various employees will offer important information they get to know the project better and it alleviates the impression the project would be imposed on them.

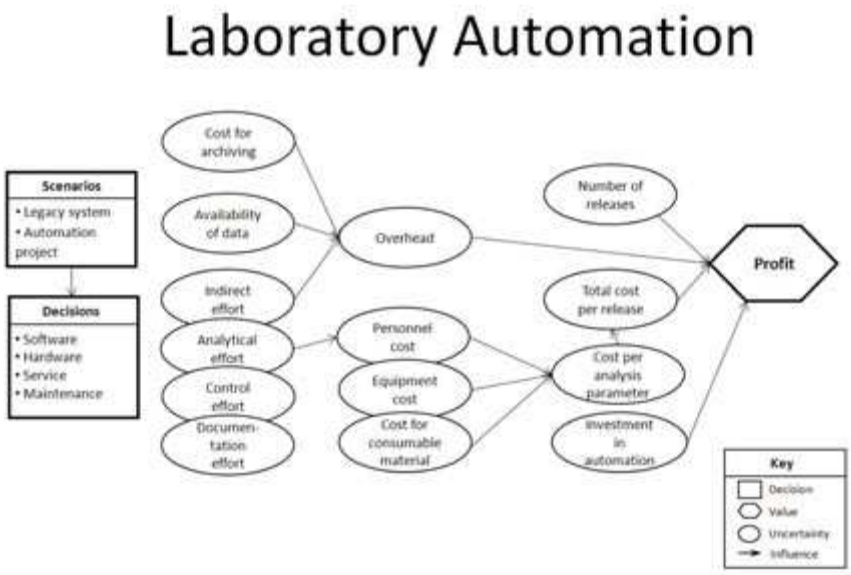

Figure 1: Influence Matrix on automation project

For a project size of £586,000 such a business case was built within two weeks. The investment is to be seen alongside an overall benefit of £4,023,574 over the time span of three years - the ROI is therefore 587%. The potential for cost reduction is thereby clearly quantified. These numbers are the result of three steps: building an influence matrix, a financial model, and running a risk and sensitivity analysis. Building an influence matrix helps to visualise and define the project, it structures the complexity of the project so that it can be captured within the financial model. A financial model is scrutinised for validity by running a risk and sensitivity analysis. The final result and the essential risk factors can therefore be stated with statistical validity.

The influence matrix visualises the entire project on one PowerPoint slide (Figure 1). It captures the complexity of the project with all elements and their interrelations relevant for a substantial quantification. In the matrix, technical and economical parameters are set in relation to each other so that the first step of their necessary translation is achieved. Translating technical into economical parameters is the prerequisite of successfully quantifying possible cost reductions due to automating laboratory specific procedures. So that the influence matrix can be adapted to any project, it works with four main categories in order to reduce complexity. These categories are scenarios, decisions, uncertainties, and values. There are at least two scenarios in every business case.

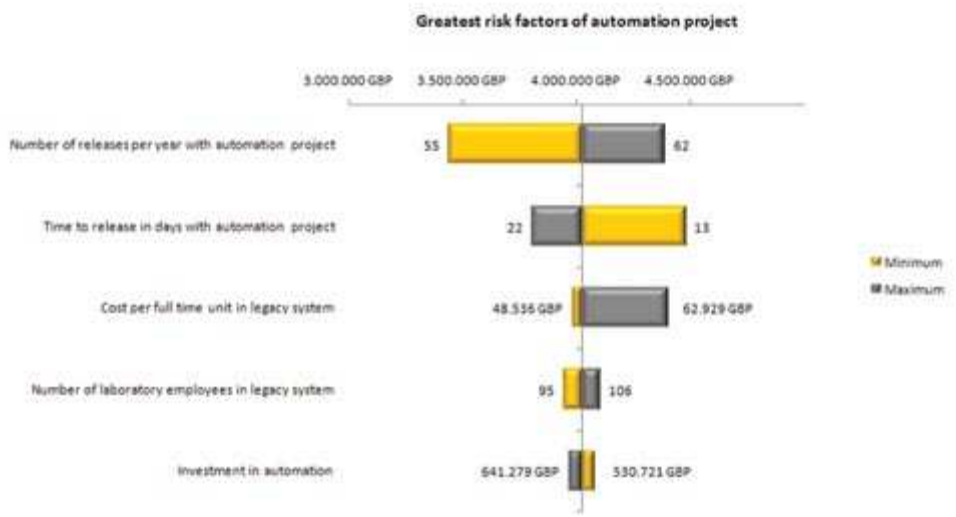

Figure 2: Monte Carlo Simulation shows probability of final result

The first one is the scenario of keeping the current system. It considers the cost that is to be expected if no automation project is launched - this scenario is compared with the automated scenario. Decisions are everything that can be controlled - the type of software and hardware, the service, and maintenance. Uncertainties on the other hand are everything that cannot be controlled - the number of releases, cost per analysis parameter, personnel cost, equipment cost, analytical effort, and documentation effort. The value is the parameter that is supposed to be calculated with the business case analysis and is chosen with reference to the company's objectives.

The financial model quantifies each element and its structure builds on the influence matrix. The correct structure is as important as the quality of the data. When it comes to data a biotechnical company is certainly in no shortage, but the business case is to evaluate the future results of a project that has not even been launched. As such some data cannot be found and needs to be collected by interviewing subject matter experts - employees of the company who know the operational procedures, the technical conditions, and other requirements best. These interviews not only provide high quality data, but also enhance the acceptance of the project by creating consensus. The experts name a minimum, a most likely, and a maximum value for each uncertainty - helpful in order to forecast a narrower range. This procedure means each uncertainty included in the influence matrix is assigned a numerical value - The interrelation of these values is captured in formulas within the financial model with which the expected profit can now be calculated.

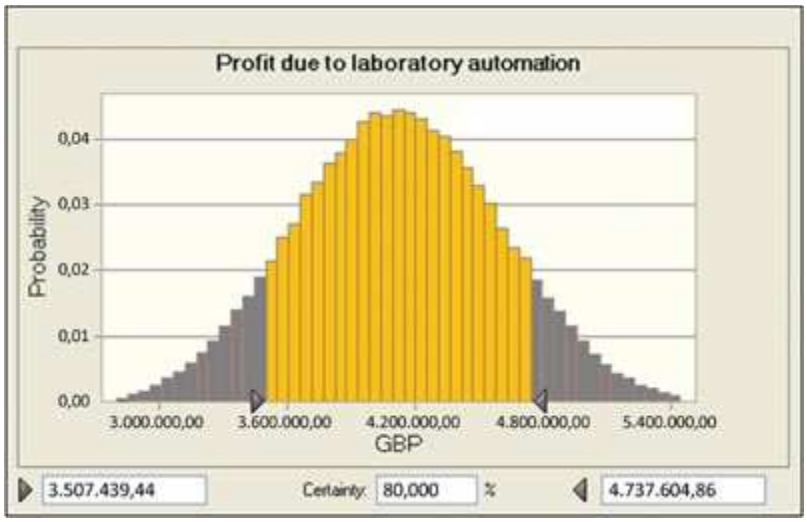

Figure 3: Tornado chart identifies risk factors

Even after the calculation of the profit the business case is not finished. The data was collected in ranges and the financial model leaves us with the results for the minimum, the most likely, and the maximum value. The question that is left open after having completed the financial model is how probable the result is - a question answered with a Monte Carlo simulation. The simulation answers the question with the necessary statistic validity and makes the following statement possible: with a 80% probability the profit is between £3,507,439 and £4,737,604 (Figure 2). This range of results is caused by the various input factors that let the final result deviate from the most probable result of £4,023,574. A tornado chart is the second tool within the risk and sensitivity analysis that shows which risk factors have the biggest influence on the final result. The knowledge of the risk factors is an important prerequisite in order to reach the result of £4,023,574 profit as closely as possible. The tornado chart quantifies the influence of each risk factor on the final result individually and shows by how much they influence the final result positively or negatively. In this project the highest risk factor was number of releases per year, followed by the time to release. The investment cost for the automation project on the other hand causes only minor variations (Figure 3).

The business case for the automation project in the biotechnical company's business unit was decisively economical decision tool that answered more than just the financial questions of launching the project or not. Providing an answer to what the benefit will be in financial terms created clarity for all those affected by the project. This lack of clarity had led to indecisiveness so that the project was on hold despite the intention to launch it seemed to be clear. This method also provides information that goes beyond mere economical interest. With numeral values such as 20% less documentation effort and 25% more analytical effort there is much more information available. A business case is an economically motivated tool that answers a diversity of qualitative questions concerning laboratory techniques at the same time.