

# Valuation model for research projects at Gambro

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*This article is based on a master thesis written at the Department of Industrial Management, Lund University, Faculty of Engineering, in 2008. The study was conducted at the dialysis company Gambro. The purpose of the thesis was to describe the procedure followed when prioritizing projects within the research department in Lund, and to develop a model for strategic and financial valuation of research projects.*

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## INTRODUCTION

Correct valuation of investments is a complex issue that is of great interest for companies and investors. Both parts are looking to maximize their profits, but the time horizon may differ and companies often have the interests of several stakeholders to consider. For companies it is also an important strategic factor. A fair valuation simplifies the choices that are involved in developing a business and technology strategy; the markets and the technologies which the company is to pursue. [1] [2]

There is a great deal of theory available regarding the valuation of capital investments, but the majority concerns investments with low uncertainty. Theory in this field includes classic capital budgeting methods such as Net Present Value (NPV), Payback time (PB) and Internal Rate of Return (IRR). [2]

When performing a valuation of investments characterized by a great deal of uncertainty or flexibility, the theory is vaguer and more difficult to apply. However; it is still of great interest for companies to value uncertain investments, especially for companies within research intensive businesses. [2]

Gambro is a company in the med-tech industry that develops and sells products for dialysis treatments. These products incorporate several different research fields including software and hardware engineering, chemistry and biology. The market is characterized by strict regulation and the need of deep medical knowledge makes the barriers of entry relatively high. The investments Gambro are executing in projects for developing technologies and products are belongs to either the research or the development portfolio. Projects in the research portfolio have greater uncertainty and are of a more explorative character than the projects in the

developing portfolio. Because of this, it is more difficult to value a research project than a development project.

## PROBLEM DEFINITION

Gambro has built its success on a unique front edge competence. As a result, the company was able to operate without any direct competitors for a relatively long time. Several of Gambro's business areas have now reached a maturity phase. This has resulted in a tougher environment for Gambro, where it is of great importance for the company to control and direct its product and technology development, and to operate according to a well defined strategy and long term goals.

The master thesis originates from Gambro's need of an objective, systematic method for comparison between research projects, financially as well as strategically, in order to improve the quality of prioritization decisions. There is also a need for a reasonable estimation of the total value of the research portfolio, an estimation that can be used as an indication for potential future investors.

Gambro has been using different valuation models in the past, but these have been better suited for development projects concerning products relatively close to launch date. Research projects are often of a more explorative character and might not be commercialized in a lucid future. Because of that, models only considering the financial aspects of projects can be difficult to apply on research projects. The outcomes are often vague and do not reflect the entire value of the project. The consequence has been that no systematic procedure has been used when making decisions about which research projects to prioritize. The financial aspects have often been excluded as no appropriate valuation model has been accessible.

## PURPOSE

The purpose of the study was to describe the procedure followed when prioritizing projects within the research department in Lund, and to develop a model for strategic and financial valuation of research projects.

## METHODOLOGY

Several different approaches were pursued during different stages of the study.

To achieve the descriptive part of the purpose; to describe the procedure Gambro uses when prioritizing research projects, an inductive approach was used. Empiric was collected at the company and conclusions were made from this information.

To fulfill the explorative purpose; to develop a model for strategic and financial valuation of research projects, a deductive approach was used at first. Existing theory was studied to evaluate its suitability in relation to the purpose. When developing the model, an abductive approach was used, as theory was varied with empiric in an iterative process. The deductive hypothesis, that the model reflects the value of Gambro's research portfolio, was then tested by evaluating real research projects in the model.

The information used in the study mainly consisted of personal interviews, within and outside of the company, and printed sources as literature, articles and internal documents. The interviews were unstructured and non-standardized, as the study was of qualitative character and the purpose with the interviews was to gather as thoroughly information within the area of subject as possible. In order to reassure its objectivity, the selected literature and articles used in the study were all published by well known authors,

## THEORETICAL FRAMEWORK

Management of R&D covers a wide range of issues. These include the different levels of strategic decisions internally in R&D and how these interact with the overall business strategy of the company. It also concerns how to manage issues concerning innovation and intellectual assets. [1]

Technology strategy defines how new products and technologies are to be acquired, if they are to be bought on the market or if they are to be developed internally. [1]

Portfolio strategy defines how to ration resources among projects in order to find the correct balance between short sighted business needs and long term growth. [1]

Project strategy manages the optimization of each individual project. Decisions includes technical solutions, commercialization and launch dates. [1]

Innovation is an elusive concept that is difficult to control and manage. A common measure for a company's level of innovation is the amount of patents and other intellectual assets the company generates. Patents and intellectual assets are complex to value since it is difficult to know the function of the asset in advance. One product can consist of a number of assets thus making it complicated to distinguish the value of an individual asset. [3]

Capital budgeting is the process where companies decide how to invest the resources. There are a number of different methods available to evaluate investments such as Net Present Value and Internal Rate of Return. These methods are commonly used and well known among companies in a wide range of industries. [2]

Real Options is a method used to capture and value the flexibility and uncertainty in investments. The theoretical framework to value real options is derived from the theory used to value financial options. Although the theory has been available for several decades it is not frequently practiced in the industry due to its complexity and often ambiguous results. [4]

## CONCLUSIONS AND RESULTS

The research department at Gambro is currently not following any systematic process while prioritizing projects. The resources have been distributed among projects according to discussions among the scientists working at the research department. The company has recently gone through structural changes and, due to this, no clearly communicated business- and technology strategy has been available. This has negatively affected the research work. Gambro has now developed a business- and technology strategy, which hopefully can be used as a support for the research department while making decisions about resource and project prioritizations.

The explorative study resulted in a model for strategic and financial valuation of research projects. The model is meant to be used as a systematical process and basis of discussion when making project prioritizations.

#### DEVELOPMENT OF THE MODEL

The developed model is meant to be used as an internal device for evaluation and comparison of projects. The model should not be seen as a complete strategic tool for Gambro since it does not considerate impact from the external world.

Previous research has shown difficulties in certifying the relevance of quantitative valuation of research projects. With that in mind, the model was constructed to focus mainly on the strategic aspects of research projects. The quantitative aspects are considered in a financial estimate.

#### Qualitative aspects

Theory concerning innovation and strategy was used when developing the qualitative part of the model. Factors that were considered suitable for Gambro's activities, for example level of innovation and value for patients, were sorted out and adjusted to fit Gambro's needs. The factors were then incorporated in to the model.

Once the model started to take shape it was

presented to representatives from the research department of Gambro. The suitability of every factor was thoroughly discussed and the representatives were also asked to give an overall judgment, and suggestions to improvements, of the model.

Once a complete list of qualitative factors was created the factors were separated in to three main divisions; "Value for Gambro", "Value for Customer", and "Doability".

#### Financial estimate

To evaluate the project financially a number of capital budgeting methods are used; Net Present Value (NPV), Payback time and a profitability index calculated as the quota between NPV and the total cost of the project. The profitability index is a metric that is more suitable for comparing projects than NPV.

To derive these metrics the user has to enter certain data regarding the project, one being the time plan for the project. This includes the time lengths the project will be located in the research and the development portfolio, and the time length the product or technology will be available on the market. Thereafter, the costs and revenues associated with the different phases are estimated and entered into the model. When the project is in the R&D phase the costs mainly consist of

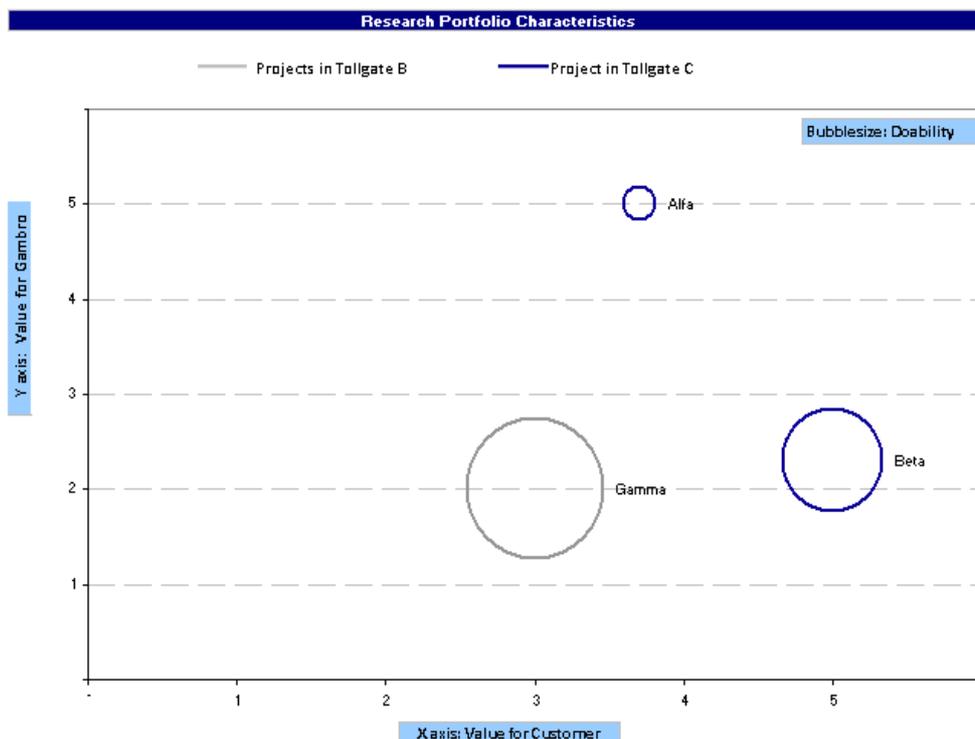


Figure 1. Qualitative aspects compared

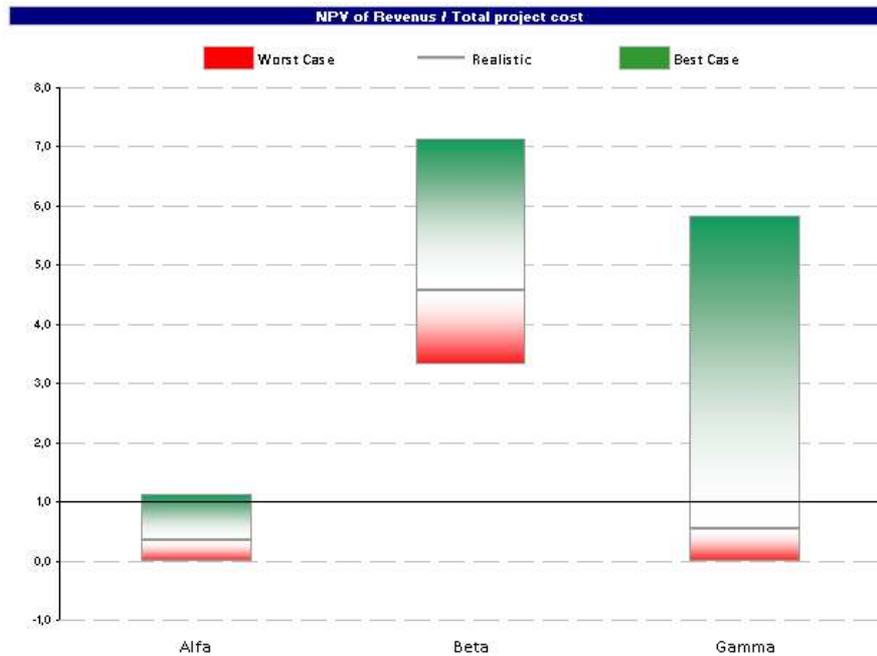


Figure 2. Profitability index

personnel costs, investments and external costs such as consultants. Once the technology or product is on the market the profit is estimated by considering the sales volume, sales price, manufacturing costs and the overhead costs for sales & administration. Based on these inputs the project's EBITDA and cash flow are estimated. To capture the uncertainty, the user is given the choice to work with worst and best case scenarios.

Since many of Gambro's projects are improvements of already existing products, the cannibalization effect needs to be considered for a fair valuation. This is incorporated into the model by giving the user the possibility to specify the manufacturing cost, the sales price and the percentage of cannibalization for the product concerned.

Real Options was not used in the model since the framework was considered too complex and time consuming for Gambro's needs. The derived results are also often hard to interpret.

#### ADAPTION & EVALUATION OF THE MODEL

A great amount of effort was put into making the model as user-friendly and intuitive as possible.

To test the model, five real projects with different characteristics were entered into the model. When evaluating the projects, it became apparent that it was imperative that the users have a cohesive

understanding of the qualitative parameters in order to give fair judgments.

When grading the qualitative parameters, rewarding discussions arose. The scientists considered these to be educational and helpful for aligning the research department's view on the projects. The model was considered to capture the value of the projects without being too time consuming or detailed.

A main issue when evaluating research projects with the model is that the project have to connect to a technology or product, for which it is possible to estimate volumes, sales price and manufacturing costs. To do this reasonable it is necessary for the users to have knowledge of trends of technology and customers. This is however a concern for all models available.

#### RECOMMENDATIONS

The recommendation for Gambro is to consistently use the model for evaluating research projects. This will hopefully result in an improved process for project prioritization and an improved quality of the decisions made.

With a technology strategy available, the next step for Gambro could be to match the research portfolio with the technology strategy to match and find technology gaps. It would also be interesting to let the marketing department do an evaluation of the

research projects using the developed model. This would give an indication to whether the departments perceive the exterior world in the same manner.

#### REFERENCES

- [1] Matheson, D. & Matheson J. (1998) *The Smart Organization*, Harvard Business School Press, Boston
  
- [2] Berk, J. & DeMarzo, P. (2007), *Corporate Finance*, Pearson Education, Upper Saddle River
  
- [3] Tidd, J., Bessant, J. & Pavitt, K. (2005), *Managing Innovation*, Wiley & Sons Inc, New York
  
- [4] Damodaran, A. (2006), *The Promise and Peril of Real Options*, NYU Working Paper, Juli