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Evaluating R&D projects and portfolios

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The *4th Annual Conference on Evaluating R&D Projects* (Brussels, Belgium, 21–22 November 2001; organized by Vision in Business) focused on how new compounds, technologies, partnership options and merger and aquisition (M&A) deals can be valued, and what the potential impacts these can have on the entire project portfolio of a company.

Background

R&D industries are characterized by high uncertainty and the pressure to innovate. This provides the motivation for the use of sophisticated tools to evaluate uncertainties associated with projects, as well as providing a framework to help management choose the best projects for their portfolio. It is not surprising that in the pharmaceutical and biotechnology industries, the importance of valuation for R&D projects is increasing.

These days the main question is not whether proper and rigorous valuation should be done, but how to do it: What is the right process? What is the right method? What is the right tool? There are several possible approaches to address these questions and many of them were highlighted at this conference. One of the common themes in the presentations was the emphasis placed on the fact that because of the special nature of R&D, some of the traditional valuation techniques might not always be appropriate for R&D projects. Another common theme was the recurring reference to the strong but sensitive relationship between strategy and valuation.

The following review is only intended to cover some of the key points from a few representative presentations.

Valuation models and approaches

Traditional portfolio evaluation models often rely on qualitative and semiquantitative tools such as two-dimensional matrices, as pointed out by Joachim M. Greuel (Bioscience Valuation BSV GmbH, Grainau, Germany). These matrices often illustrate parameters such as business strength and industry attractiveness. However, research shows that the use of such methods does not correlate well with shareholder value creation. Therefore, new quantitative methods have been developed that investigate directly how much value an R&D portfolio is likely to add to a firm. These methods can calculate expected portfolio net present values (NPVs) by using, for example, Monte Carlo simulations. The speaker suggested that one such solution is to plot the portfolio NPVs against the expected investments and against the portfolio risks (measured as the standard deviation of the NPV distribution), to identify portfolios that are both cost-efficient and risk-efficient. Based on this analysis portfolios can be selected that offer the highest expected return for the investment and the lowest risk.

Gary Johnson from Inpharmation (Henley on Thames, UK) suggested that rather than viewing valuation techniques as competitors and trying to choose between them, one should view techniques as complements and combine them. This is for two reasons: first, all valuation tools eliminate valuable information (for example, a single NPV value does not reveal anything on the pattern of cash flows). Second, all valuation tools (like all other models) are 'wrong' and the most consistent finding of all from forecasting research is that combining several models is almost always more accurate than using any single model. However, as Johnson suggested, if you are going to combine several tools, you have to keep each one crisp and simple; in his opinion many people, especially 'experts', have terrible trouble with this!

R&D portfolio valuation and the key steps of the portfolio review process were discussed by Lorant Porkolab (Valuation and Strategy, PricewaterhouseCoopers, London, UK). Porkolab pointed out that many pharmaceutical projects have some level of interdependency that also have implications on the overall risk of the portfolio and the allocation of resources they share. He noted that this is rarely, if ever, considered quantitatively.

Porkolab then described an approach based on real options valuation that can be used to assess both individual project risk and the risk associated with the correlation between projects. He emphasized the importance of developing a comprehensive portfolio management tool that incorporates all the relevant constraints (e.g. on various resources at different time steps), financial metrics (e.g. risk), corporate targets (e.g. regarding the balances or preferences between different therapeutic areas), and objectives (e.g. return on investment or expected NPV). He suggested the use of 0-1 integer programs (i.e. using constrained optimization) from operations research for modelling. Porkolab concluded by highlighting some of the underlying modelling and computational difficulties, and how these were addressed in their implementation.

Implementing portfolio management processes

The transition of pharma research from 'excellence in science' to 'excellence in

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drug development' was the subject of the presentation by Gianni Gromo (Metabolic and Vascular Diseases, F. Hoffmann-La Roche, Basel, Switzerland), who shared with the audience his experience at Roche of implementing a portfolio management process to support the company's new research strategy. Gromo said that the process of change was driven primarily by Roche's commitment to organic growth in research and the company's belief that the future of the pharmaceutical industry will depend on its ability to serve society, as well as its shareholders, by creating a continuous stream of affordable, innovative medicines.

The main questions Gromo said the company faced were regarding its research portfolio: How to implement the new strategy? How to move from local to global portfolio management? How to enhance productivity and achieve operational excellence? He went on to describe the measures they had taken to address these questions, including the creation of a 'single language' for all research sites by introducing common standards and definitions for drug discovery. He also emphasized the importance of the new global IT systems and networks that enabled the company to use global databases, improve their information and knowledge sharing, increase transparency and avoid duplication of research. Finally, Gromo mentioned that in managing any research portfolio, the 'people issues' should not be ignored or forgotten, because the overall success of the strategy highly depends on establishing and communicating the common goals.

Trends and expectations in the pharma and biotech industry

There were several speakers including Dimitri Dimitriou (DyoDelta Biosciences, London, UK), Alain Parthoens (BBL–ING Group, Brussels, Belgium), and Brian Roche (Wood Mackenzie, London, UK) who talked extensively about recent trends in M&A activities and various different partnership options between biotech and pharma companies.

One of the most salient comments related to R&D project and portfolio valuation, was that it is important (in addition to assessing the value itself) to identify the area(s) where the deal is adding value – whether it is filling a gap in the pipeline, providing access to a new technology, or reducing some of the technical or commercial uncertainties. The future is pointing to more consolidation, particularly in the biotech sector, whereas pharmaceutical companies are becoming more competitive on licensing deals.

Kenneth Watson (Yamanouchi Europe, Leiderdorp, The Netherlands) began his talk with the observation that the pharmaceutical industry is under a great deal of pressure. More than 30 current blockbuster drugs will be off patent by 2003 (e.g. Prozac™, Claritin™, Losec™) and as a result the pharma industry as a whole needs 70–100 new 'US$350 million products' per year to sustain an average industry growth of 10%. However the worldwide R&D productivity is declining and mergers cannot compensate for this. Watson also shared his view on pharmacogenomics and whether it can 'solve all of our problems'. Here, the main uncertainty is associated with the genetic segmentation of the population, but this can be effectively off-set by the significantly reduced risk in the traditional R&D process afforded by pharmacogenomics.

Watson believes that by using a pharmacogenomic approach, the number of drug targets will strongly increase, the market potential of new drugs is likely to decrease and 'drugs will look for patients rather than vice versa'. In today's complex R&D process, the importance of early assessment of risk, value and innovation, along with project prioritization is greater than ever.

Final thoughts

The conference ended with an informal discussion on decision and risk-modelling tools for R&D portfolio management, where various questions were raised and suggested valuation approaches were contrasted. There seemed to be some confusion and disagreement among the speakers and delegates regarding the terminology of 'real option valuation'. Some felt that the term includes only financial options pricing techniques (such as the famous Black-Scholes formula and its extensions), while others argued that it should be interpreted in a broader sense. I strongly believe that the term should be used for any method that aims to incorporate into asset or project valuation both the key underlying uncertainties and future decisions, where the latter ones might (and typically do) depend on the outcomes of the former ones. The most common implementation of this method uses decision trees and combines them with the appropriate discounted cash flow (DCF) models. Other speakers prefer to refer to this or similar types of techniques as 'Augmented NPV'.

In summary, the conference was highly informative and provided a good overview of the currently known best methodologies and tools for valuing R&D projects and portfolios. It also went beyond the traditional framework of valuation and addressed related issues such as R&D strategy, risk assessment, port folio analysis, process implementation, and management. Clearly there are robust and sophisticated techniques available to value R&D projects, but there is always room for improvement. The main doubt regarding the applicability of these methods (which could be sensed from the delegates' questions) still lies in the quality of data used in the models. Hence, one of the main challenges is to develop better methods and processes for data collection, which could then establish stronger belief and confidence by practitioners in the usefulness of quantitative and analytical valuation tools in R&D.