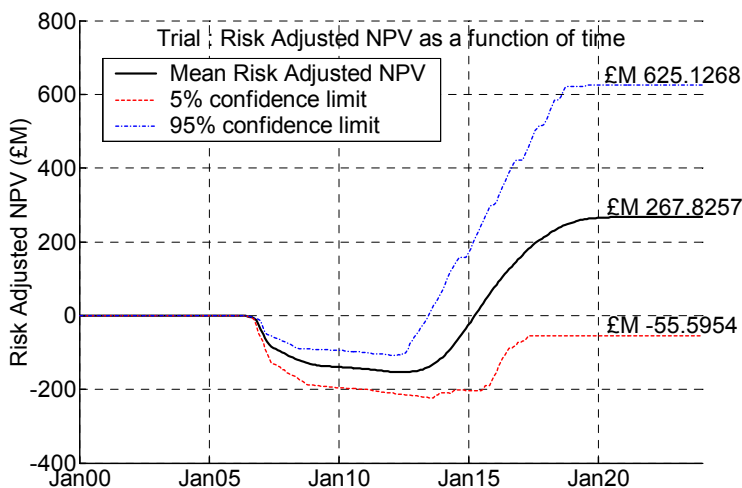


## Decision Analysis, Portfolio Management and Roadmap Development Introduction

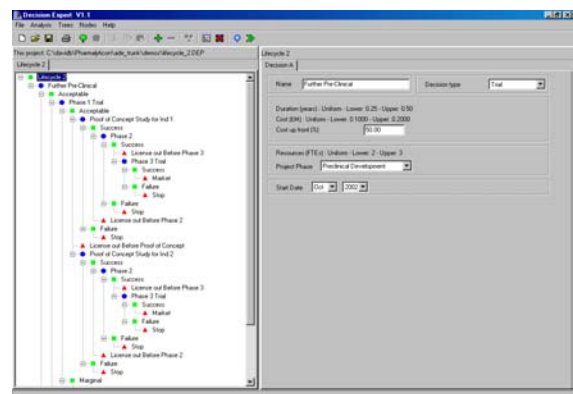


Commercial success relies on making the right decisions. Complex information may be available, but with no obvious interpretation. Tessella provides custom-made processes and tools that bring structure and clarity. Our decision network approach gives the decision makers critical insight into the data.

Tessella has provided such solutions to a range of clients, particularly in the pharmaceutical industry.



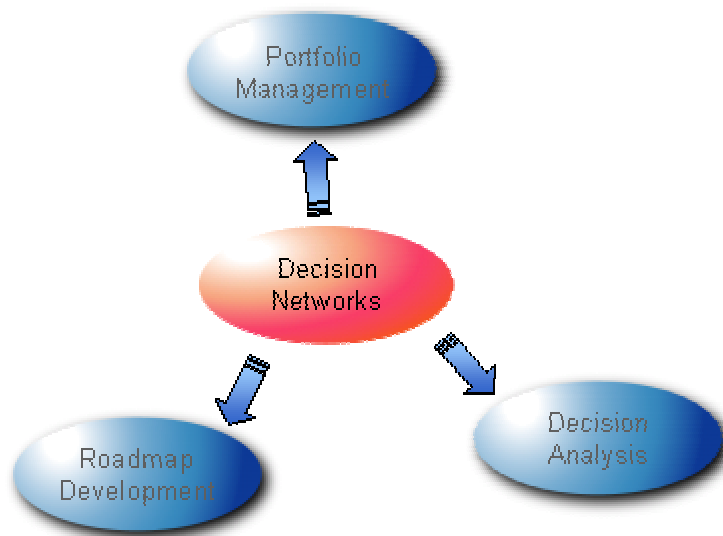
Quantifying confidence intervals for return on investment can be vital



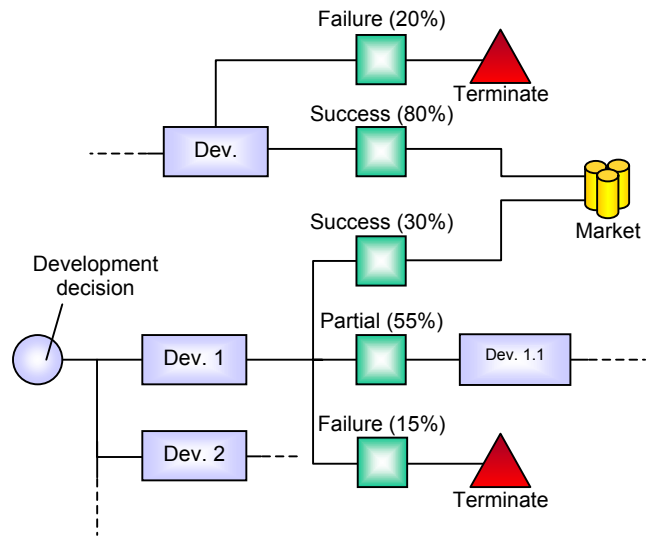
A portfolio analysis tool

The approach is highly flexible, completely customizable and applicable to a wide range of problems.

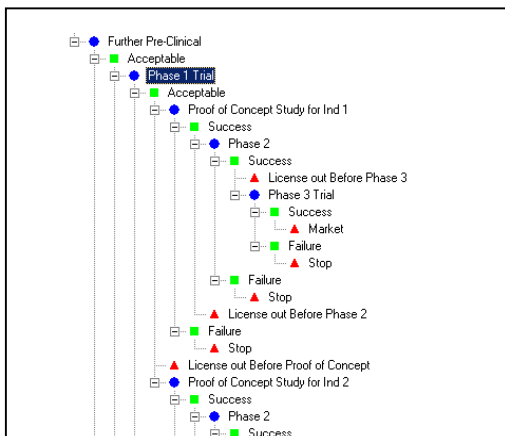
## Decision Networks



- The basic concept involves a 'tree' or 'network' of nodes representing:
  - Branch points such as decisions or probabilistic outcomes
  - Elements with fixed durations, costs and/or returns
  - Termination points
- Different paths through the network represent different future outcomes and decisions



*Decision networks represent possible future paths*

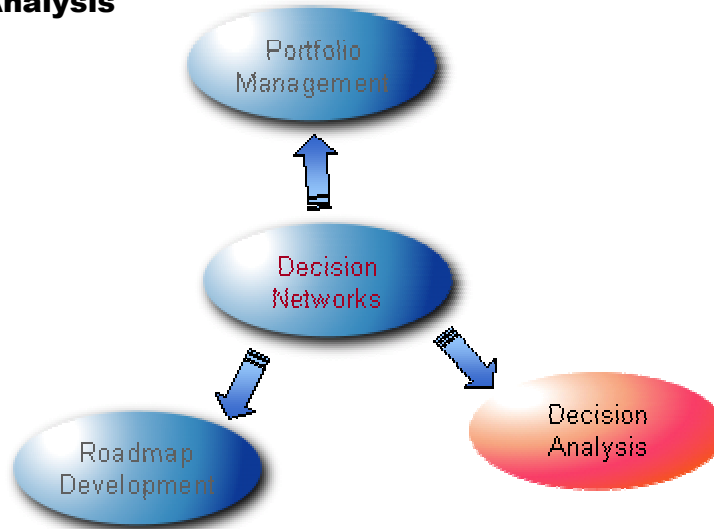


*Decision trees can represent project options*

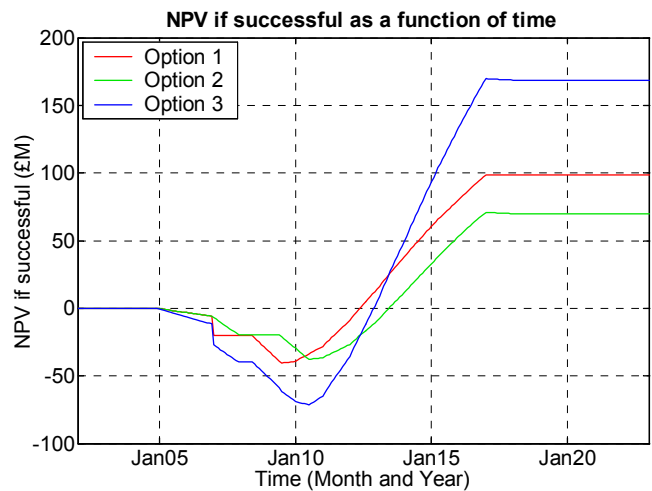
- The approach is very general
- Structure is customized to the client's needs
- Our algorithmic 'cores' perform complex analyses such as:
  - Examination of all possible outcomes
  - Expected probabilistic results
  - Sensitivity and Monte-Carlo analyses

- Our approach focuses on:
  - **Structure:** rigorous information structures and unambiguous definitions
  - **Inputs:** assessing and supporting the information gathering process
  - **Outputs:** determining the insights that will support decision makers
  - **Analysis:** providing tools where necessary to perform the analyses

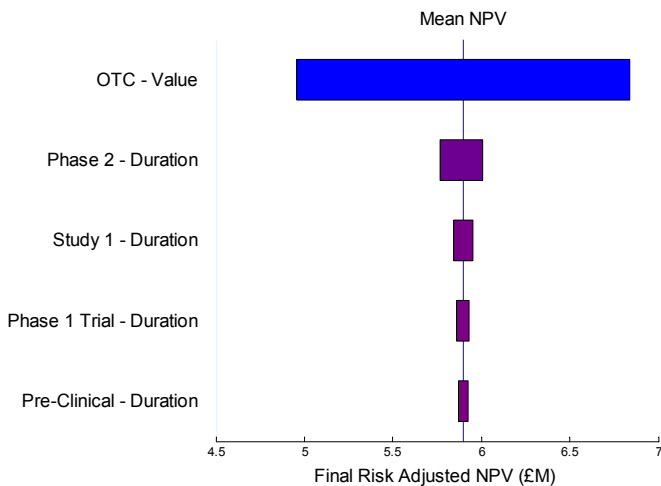
## Decision Analysis



- Decision networks allow **detailed** and **quantitative trade-off** of decisions such as:
  - Whether or not to out-license
  - Whether to delay a product launch
  - Inclusion of an additional phase
- The impacts are **visualized** with **clarity**



*The financial impacts of project decisions can be compared*

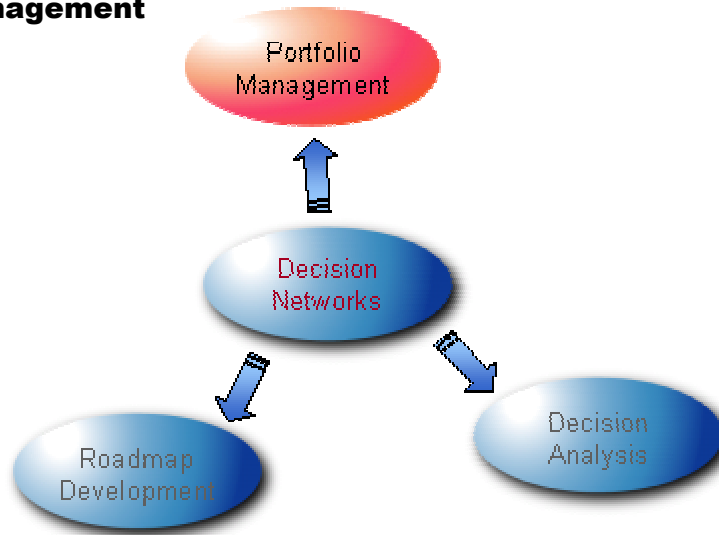


*Sensitivity analyses allow identification of the critical parameters*

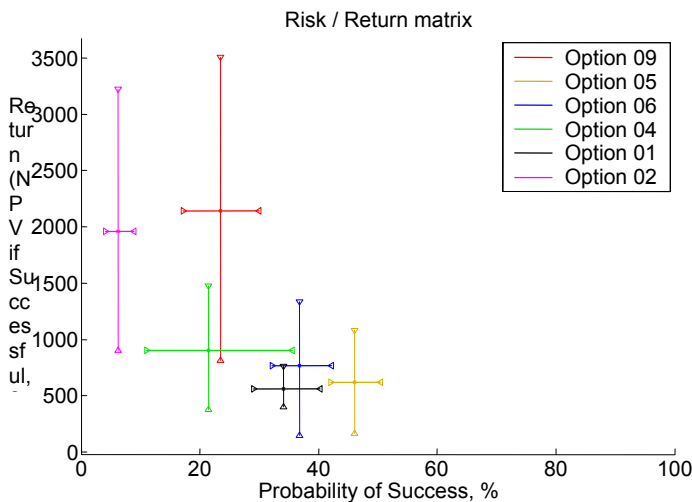
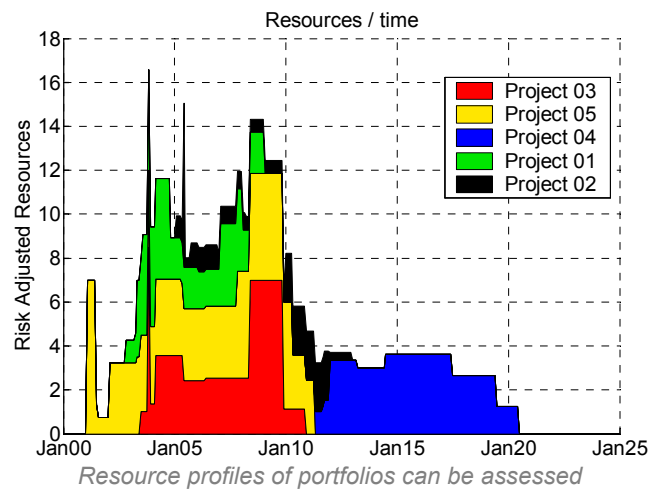
- **Uncertainties** are specified on input information
- **Resulting** uncertainty on output results is rigorously **calculated**
- This allows assessment of:
  - **Confidence** in the result
  - The **critical areas** of uncertain inputs

- Different **options** can be examined in three ways:
  - **Separate** decision networks can be used to represent contrasting options
  - Decision point **branches** within a network can represent options
  - **'What-if'** analyses can specify alterations to individual parameters

# Portfolio Management



- Tessella has aided **strategic selection of portfolios** in the pharmaceutical industry
- Our involvement covers:
  - The portfolio management **process**
  - **Information** gathering mechanisms
  - Necessary software **tools**
  - **Integration** with existing systems

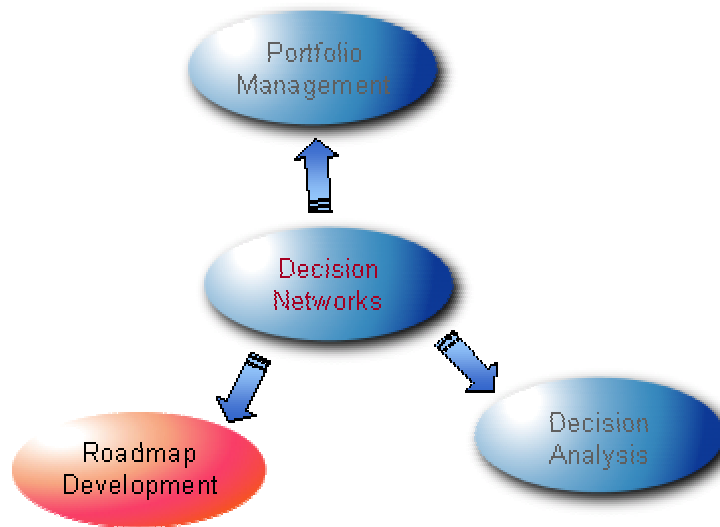


*Uncertainties on project metrics must be assessed*

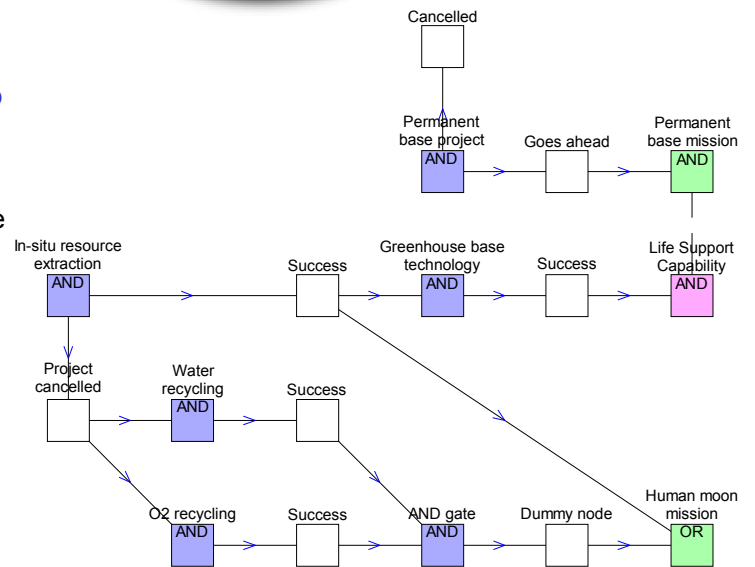
- Users can **optimize** the entire **portfolio** and the project **strategies** together
- Some advanced **features** include:
  - Automated **optimization** of portfolios
  - **Sensitivity** analyses to identify those parameters that most affect the result
  - Assessment of portfolio **balance**, **resource** allocation and **pipelines**

- **Clients** include UCB, Chiron and Merck

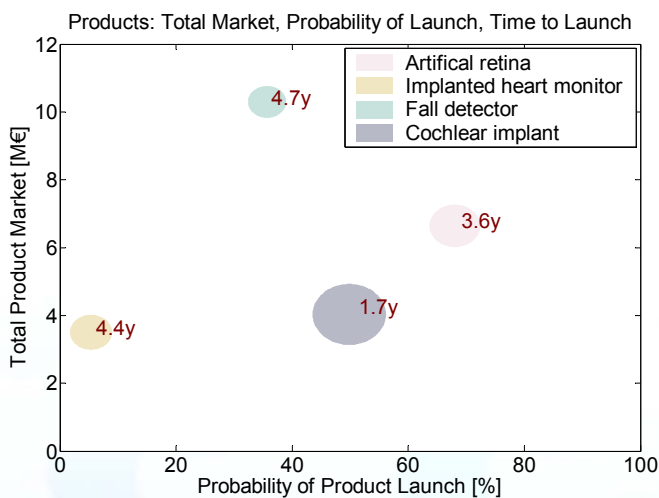
## Roadmap Development



- ❑ The concept is directly applicable to roadmap development
- ❑ Developments and pre-requisites generally form a network naturally
- ❑ Costs, durations, probabilities and returns are attached
- ❑ 'Returns' are often qualitative:
  - Prestige
  - Applicability to overall goals
  - Benefit to external considerations



Part of a typical Space Exploration Technology roadmap



Example Risk / Return / Time to Launch result for products in a medical devices roadmap

- ❑ Our approach allows insights such as:
  - Risk vs. return on investment
  - Expected results (including probabilities of failure) vs. best-case results
  - Optimization of resource allocation over time
  - Quantified uncertainty on risks, returns, timescales etc

- ❑ Clients include the European Space Agency

HEAD OFFICE

Tessella Support Services plc

3 Vineyard Chambers • Abingdon • Oxfordshire • OX14 3PX • England.

Telephone: +44 (0)1235 555511 • Facsimile +44 (0)1235 553301 • E-mail: info@tessella.com

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