

5 DECISION MAKING

Making choices:

Using decision analysis to chart courses of action over time

(This extension material accompanies the text on p. 643 of your book.)

Decision trees can be used to aid decisions concerning the **development and launch of new products**. The decisions of interest might be whether or not to proceed with the development, or how and when to launch the product, and uncontrollable events might be the results of market research surveys, the outcome of patent searches or competitors' activities.

Project portfolio management takes an overview of the whole of an organisation's projects. It is concerned with which are affordable, how the organisation's resources can best be allocated to competing projects and the order in which they can be executed.

Whilst net present value (see Chapter BM4, Time and money) can be used to compare competing projects, it does not take into account the inter-dependency of projects, time sequencing or shared resources. Decision trees can be used to prioritise and sequence projects and to take into account events outside the decision maker's control.

A similar construct to a decision tree can be used to value the price of **financial options**. In finance an *option* is a contract giving the holder the right, but not the obligation, to buy a financial asset at a particular price at a specified future date. The purchaser pays a value *now* for having this future opportunity. The *binomial options pricing model* is a way of valuing the option. Broadly speaking, it is based on a tree diagram which, from left to right, represents the passage of time. Each node represents the price of the asset at a particular time and two branches from it represent the price going up in value, or down during the next time period.

Energy exploration companies spend vast amounts on speculative exploration. The result may be a huge profit or a loss. They need to make decisions about where, whether and how to extract oil and gas. For instance, should land be bought, should seismic tests be run prior to drilling, what type of equipment should be used? This lends itself to using decision trees. Industry specialists can be employed to decide on appropriate probabilities and payoffs for the model.

Decision trees are used by lawyers for **litigation cases**. The tree represents the flow of a case through the legal system and considers the basis for settlement negotiation and possible awards for damages. The key decision is usually whether to take the case to trial, to accept settlement or to do something 'in between'. The tree is also considered a useful visual tool for communicating possible strategies and outcomes to clients.