1 **Introduction**

In organisations, from self-employed sole traders through to major multinational companies, new projects, strategies or business plans require a financial or commercial evaluation. The analysis is produced by the creation of a business model in a spreadsheet. Unfortunately, great business ideas do not always receive the support they deserve. The business models that provide the commercial justification are often poorly structured and, in some cases, simply inaccurate. The result is a misleading view of financial strength. This book provides a guide to the development of business models that is relevant to all sizes of organisation and business modelling situations. It examines all the common aspects of a business model, such as forecasting the size of a market, capital investment and working capital through to developing an income statement, a balance sheet and valuation. The later chapters of the book show how a few basic macros (programming routines) can turn a simple spreadsheet into an impressive business application.

HOW MODELS SUPPORT DECISION-MAKING

Models can be used to help with all kinds of business decisions. In today's complex and fast-moving business environment, firms may have a wide variety of strategic and operational choices. A business model helps managers to explore complex choices, using sets of assumptions to represent alternative future operating environments. It also helps to develop a clearer understanding of the inherent pattern of relationships between the assumptions and the likely outcomes. In the end, it is the judgment of the decision-makers that is crucial, but a well-designed model can make the exercise of that judgment easier. A model can help with all three stages of decision-making: analysis, choice and implementation.

Analysis

A business model will become a virtual reality representation of how a real business opportunity will develop. To enable this virtual world to be as realistic as possible, it needs to be logically constructed from a set of assumptions that covers each influencing factor. These factors include both the business environment (for example, inflation, potential customers and taxes) and the organisation (for example, product prices, staff numbers and product volumes).

Often it is only during the process of building the model that it becomes possible to understand some of the complexities of the project and how different attributes and external factors relate to each other. The success of any business modelling project depends on getting the various assumptions and relationships (or at least the most significant ones) as accurate as possible. Careful and critical analysis of which attributes and factors require modelling and how they link or may link to each other is fundamental. It may be establishing the relationship between price and sales, or it may involve facts that are harder to identify, such as the effect of weather patterns or changes in fashion.

Choice

To understand the real potential of a business opportunity, a business model should be constructed in a way that will allow the impact of alternative assumptions and scenarios to be explored. Through the flexing of assumptions (for example, an increase or decrease in the growth of customer numbers) and the methodical examination of alternatives (for example, making or buying in a component) the range of potential outcomes is revealed. Identifying the extent of this range of possible outcomes enables the model user to understand the potential risks and rewards of the whole business opportunity. Ultimately, those charged with granting the approval or rejection of a business opportunity can do so in the full light of the likely financial risks that lie ahead.

Implementation

If the model has been built with sufficient detail, such that it shows each of the revenues and costs over the life of the project, it can become the template for the project's budget. Variances in the actual results achieved against those predicted by the model will help provide early warnings of unforeseen problems as well as enabling the project's success to be measured. The lessons learnt from such monitoring should also help in planning the remainder of the project as well as improving the decision-making process for future projects.

SPREADSHEETS

This book focuses on building business models using spreadsheets. There is widespread access to and familiarity with spreadsheet software among business people throughout the world. The examples and illustrations are based on Microsoft Excel, although users of other spreadsheet products will be able to achieve much of the same functionality.

Those who have been modelling for many years will have moved through VisiCalc and Lotus and will have been using Microsoft Excel for the past decade or so. As these packages evolved they initially focused on creating more functions, then on more presentational features and recently on the user interface.

At the time of writing the latest release is Excel 2010 (version 14). This is the version that is used throughout the book. Some readers may still be operating in Excel 2007 (version 12) or Excel 2003 (version 11). Everything covered in the book can be applied in both these earlier versions, although the ribbon menus introduced in Excel 2007 will make the screen shots look different for those still using Excel 2003, and sparklines (explained in Chapter 10) are only available in Excel 2010.

Some of the main changes are as follows:

2003 to 2007

- Significant change to the user interface, removing the flexible series of toolbars and introducing fixed ribbon menus

- Much improved graphs and other presentational features, from colour palettes to better conditional formatting
- Greater size to a sheet from 65,000 rows by 256 columns to over 1m rows by 16,000 columns
- Enhanced interfaces if linking spreadsheets with external data sources

2007 to 2010
- Little visible change to the user interface; mainly small tweaks and improvements that will largely be unnoticed by many users
- Addition of sparklines to create tiny graphs of data in one cell
- Enhanced data analysis using splitters for those processing bulk data using pivot tables and sorting features

The continual development of spreadsheet packages over the past 20 years has made the feasibility of modelling complex projects open to all managers, but in practice there is wide variation in the ability of managers to build robust models. Growing evidence suggests that large numbers of spreadsheet models contain serious errors in their construction. John Sterman, a professor of management at the Massachusetts Institute of Technology (MIT), has commented that "as a result of the introduction of the spreadsheet the average quality of financial models has plummeted and many models are not only useless but downright harmful to decision-makers". Few spreadsheet builders and users are aware of this comment, and fewer still are aware of the simple but powerful techniques covered in this book that can be used to reduce the sources of error.

Anyone involved in business modelling should have firmly in mind the principal advantages and disadvantages of using spreadsheets to construct business models as detailed in Chart 1.1.

Chart 1.1 **Advantages and disadvantages of using spreadsheets**

Advantages	*Disadvantages*
Widely accessible and installed on computers as a standard package in most companies	Wide range of abilities among users; some novices operate in an unstructured and detrimental manner
There are many operators in an organisation thus reducing the need for new product training	The majority of the package's power and functionality is not known about or used by operators
Easily changed to meet the evolution of situations	A lack of standard structure in construction leads to amateurish evolution and poor version control
Has become a standard format for downloading the output from most accounting packages	Weak annotation by developers makes it difficult for new users to understand the structure of an existing spreadsheet
Incorporates a wide variety of mathematical and statistical functions for analysing and evaluating data	Errors can easily be made and lie undetected in cell co-ordinates that are difficult to identify
Passwords can be used to protect user access and preserve the logic. This helps ensure robustness of use	Considerable duplication of effort, with many spreadsheets being started from a blank sheet when much of a requirement pre-exists elsewhere in an organisation
Considerable formatting and graphical functionality for impressive presentation	Pride in detail that adds aesthetics rather than enhanced decision support
	Spreadsheets do not easily handle text if more than a few sentences are required

THIS BOOK

This book is intended principally as a practical guide aimed at those with little experience of business modelling as well as experienced practitioners seeking to hone their skills and add clarity of structure. It combines financial and business analysis with software techniques and an awareness of corporate politics. Its principles apply equally to straightforward business projects as they do to mergers and acquisitions. Although each sector has its own characteristics and set of relationships between assumptions, the process for understanding risk, sensitivity and key determinants of success are virtually identical.

Chapters 2 and 3 explain a range of tools, techniques, shortcuts and functions that will enhance the efficiency of model development in Excel.

Chapter 4 provides an overview of the business modelling process with each stage being explored in more detail throughout the rest of the book. Chapters 5–7 explore planning and scenarios to develop appropriate scope for the model structure. Scenario planning is a powerful technique for developing "the story" that explains the results of the business model.

Chapter 8 examines the process for constructing the model, and Chapters 9 and 10 explain the fundamental principles of good spreadsheet design and the presentation of results.

Chapters 11–16 provide detailed examples of spreadsheet solutions that address the elements common to nearly all business models. The remaining chapters include testing and debugging, as well as helping you to use the model as part of your decision-making process and showing you how to add the finishing touches that turn a basic spreadsheet into an impressive business application.

Throughout the book financial principles are explained as well as the modelling techniques to apply them in building a project or business evaluation. For a more detailed exposition of the financial principles see *The Economist Guide to Financial Management*.[1]

Conventions
In this book, several conventions are used to display data.

- ◪ Range names (see Chapter 5) are shown in italics, though in Excel they will appear as normal text.
- ◪ Functions, such as CONCATENATE, are in capital letters to distinguish them from other text.
- ◪ Within functions, commas are used to separate attributes. In some countries these can be ; (semicolon) or . (full stop). Please check by clicking on the Insert Function button *fx* in the formula bar. In the "Insert Function" box select the function "SUM". Below the Function category list it will show SUM(number1,number2...) with the appropriate punctuation symbol as the separator.
- ◪ Numbers within a formula are shown without commas as thousand separators and no superfluous decimal places. Negative numbers have a preceding − (minus) sign.

◪ Numbers for an output or for printing are shown with commas as thousand separators and a fixed number of decimal places. Negative numbers are in brackets.

Note

1   John Tennent, *The Economist Guide to Financial Management*, Profile Books, 2008.