

# *Financial modelling code*



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For a full list of supporting organisations, please visit our [Financial modelling code webpage](#).

## *Foreword*



Financial modelling is carried out by many chartered accountants and other professionals, and drives decision-making throughout the business world. Models from the simple to the complex can be found in businesses of every size and in every industry.

There are various courses, standards and guides available that explain how to build models, each with their own ideas about what the appearance, layout and functionality of a model should be. While there is much consensus among these methodologies, for both procurers and practitioners there is no universally accepted set of agreed principles for how to carry out financial modelling. Most existing methodologies were developed with particular sectors or practices in mind; hence, they are frequently detail-oriented and not accepted very widely.

ICAEW has created this *Financial modelling code* to provide essential guidance to standard-setters, procurers and modellers on good practice. The guidance is principles-based, high-level and broadly accepted. It was formed from a review of seven methodologies and input from over a dozen financial modelling organisations.

I commend the work of the Excel Community in creating this guidance, and recommend it to anyone involved in the production or use of financial models.

A handwritten signature in black ink that reads "Michael Izza". The signature is fluid and cursive.

Michael Izza  
Chief Executive Officer, ICAEW

# *Introduction*

Spreadsheet financial models are ubiquitous in the business world, and decisions of all sizes are made on the basis of their results. However, many spreadsheet users are self-taught or have picked up bad habits along the way. Improper practice, such as a lack of review and oversight, impacts the world economy; thus, we have created this guidance to support best practice in the sector. Following good practice should result in a model that is robust, understandable and less likely to contain errors.

Building on our earlier guide, the *Twenty principles for good spreadsheet practice*, this *Financial modelling code* sets out our guidance on what we see as the universal tenets of best practice in the field.

In preparing this Code, we compared and analysed seven organisations' modelling standards or methodologies, and took input from over a dozen modelling and professional services organisations. This document describes the principles that underpin successful financial modelling and which were agreed upon after much discussion and debate.

A list of contributors to the Code can be found at [icaew.com/financialmodelling](http://icaew.com/financialmodelling).

The Code is not intended to be a tick-box compliance tool; rather it is a framework for anyone looking to set an organisational standard for how modelling is done. It can be used to inform a conversation about financial modelling and the decisions made in designing a model. Any finance professional looking to do their own modelling or any business looking to procure financial modelling support can use the Code to steer their efforts.

This Code should be read in concert with the IT Faculty's *Twenty principles for good spreadsheet practice* a summary of which is included inside the back cover. Specific cross-references to the Principles are identified where appropriate.

Each section of the Code addresses a particular element of constructing a model and explains its goals. First, we consider the function of the model as a whole, and the importance of designing its layout to optimise the user experience. Next, we highlight the critical nature of consistency and clarity, before discussing some more specific elements of model construction.

No one way of building a model is right for every situation. Thus, a variety of techniques are presented in each section. Approaches that differ from those listed may be preferable in different contexts. This is deliberate and the reader should be aware that these alternatives may not always be mutually compatible.

In each section we present specific recommendations (✔), which include several options, representing generally suitable and widely adopted approaches. We also provide some examples of discouraged approaches (✘), which should be avoided unless a strong case can be made for a specific circumstance.

With these principles, as with anything else, a degree of common sense should be applied. If a recommended approach is followed to the extreme, it can create a negative outcome.

ICAEW's Corporate Finance Faculty has also produced a longer and more detailed publication, entitled *Best Practice Guideline: Financial Modelling*, which conforms to this Code and explains how to carry out financial modelling in a corporate finance transaction context.

# *Model definition and purpose*

In this section we define the model as referred to in this Code, and outline the essential aims and key features of a good model.

## UNDERSTAND THE SCOPE OF A FINANCIAL MODEL

### **Definition** *Financial model*

A time-based set of financial calculations within a spreadsheet workbook which aims to create a financial forecast based on one or more input set of variables.

To ensure that the model will meet the user's needs, it is imperative that the user first understands the nature of a financial model. Although this guidance applies to financial models built in spreadsheet packages such as Microsoft Excel, many of its lessons are appropriate for other kinds of spreadsheets, or models built in other software.



**Identify if a spreadsheet is the right solution, or if another medium should be used.**

### PRINCIPLE #5

Before starting, satisfy yourself that a spreadsheet is the appropriate tool for the job.

## DETERMINE THE GOALS OF YOUR MODEL

All models should have a clear purpose and defined output. It should be evident to all users what can and cannot be derived from its use. The model should also remain serviceable indefinitely as it may need to be updated by multiple users over an extended period of time.

Gaining insight into the range of possible outcomes also makes it possible to ascertain the risk and potential of the financial forecast. The aim of the builder should be to provide 'an engine' through which alternative scenarios and sensitivities can be passed.



**Design the model carefully before constructing it, taking into consideration the various possible outcomes.**

**Build flexibly in a single spreadsheet to enable efficient development and evaluation, and to avoid version control risks presented by multiple workbooks.**

**Ensure the model's longevity.**

For example, choose a structure and formulas that would allow the user to extend the review period simply by copy-pasting.

### PRINCIPLE #8

Design for longevity.

## Layout and structure

The way a model is laid out directly affects how easy it is to comprehend, and how likely the user is to use it correctly and efficiently. Good structure can save users time in understanding the model, freeing them to spend more time on the decisions the model is built to support.

### PLAN AND ASSESS THE WORKBOOK LAYOUT

Models should be laid out in such a way that users can understand the flow of logic, and modify it as appropriate. Specifically, models should consist of clear and logical sections arranged in an orderly fashion, and should be structured so users can easily find the components that are relevant to them. Logic should also flow consistently from inputs to calculations to outputs. This consistency will help users understand the logic flows of similar items.

#### PRINCIPLE #10

Separate and clearly identify inputs, workings and outputs.



#### Choose a structure that is appropriate for the circumstances.

For example, a model could either contain a single input worksheet, or multiple worksheets if it were deemed necessary to split between time-based and non-time-based inputs.

#### Segregate inputs (assumptions), calculations and outputs (results), either by using separate worksheets, or demarcated sections on the same worksheet.

#### Use caution when mixing inputs with outputs, as this can inhibit understanding of the model's conclusions.

#### Split calculations into functional sections.

For example, use separate calculation worksheets such as timing, construction, operations, financing and tax.

#### Include one or more dashboards summarising important outputs that answer the questions the model was built for.

Dashboards, if used, may include key inputs; although this contradicts the generally advocated practice of keeping inputs together, it is acceptable if the input is very clearly identified.

#### Use identically structured worksheets for each business unit, and highlight any required differences for the user.

#### Set up your model to read like a book: with logic flowing from top to bottom within each worksheet, and from left to right both within each worksheet and across sheets within a workbook.

#### Display time periods horizontally.

#### If a model must be spread across multiple workbooks, make it clear and obvious which values are linked to and from other workbooks.

For example, host all such links in a 'landing page' contained in the model.



#### Avoid referencing cells in one workbook from another (this includes any reference, including formulas, defined names and charts).

### MAKE NAVIGATION SIMPLE

Users should be able to navigate easily around a model. Good workbook layout can support navigation.



**Include an intuitive directory and navigation system, including such elements as a table of contents, a diagram of the model's logic flow and clickable hyperlinks.**

**Use frozen panes to help orient the user and keep key labelling in view.**

### MAKE INPUTS EASY TO FIND

Users should be able to find and manipulate inputs in the model with minimal effort. The model should also prevent incompatible assumptions from being entered inadvertently where inputs are related to one another. For example, if an allocation table should sum to 100%, the final number in the allocation should be computed from the sum of other allocations. While many of the following recommendations suggest segregated input worksheets or sections, these are not necessarily composed exclusively of inputs - a common example is a dashboard worksheet, which may both contain inputs and present results.



**Place each item in the section where it intuitively belongs.**

For example, group together all inputs relating to a loan.

**Distinguish input cells from other cell types using a defined cell fill colour and/or a cell border, not just a defined font colour.**

**Put all inputs on designated input worksheets.**

**Create labelled sections for inputs.**



**Don't identify input cells solely by text-based tag or label.**



## *User interface and transparency*

A model is not a static object, but one which the end user will interact with and manipulate. Creating a model that is easy to use and understand is not simple, but can be done with appropriate care and attention.

### INCLUDE USER GUIDANCE

Although models should be built to require minimal external explanation, appropriate guidance to help facilitate understanding and proper use should be included. This should also include any key assumptions made in calculations (eg, 'all cash flows occur at the end of the appropriate period').



**Include in the model a worksheet dedicated to being a user guide.**

**Embed a separate user guide document in the workbook.**

**Add contextual user guidance throughout the model where appropriate.**



**Don't store documentation in a separate file or email that may become separated from the model itself.**

### AVOID DUPLICATION

Creating multiple input locations can lead to a user mistakenly not updating the input everywhere it is required. Likewise, if a calculation has been performed once already, then referring to the original calculation cell instead of recalculating reduces complexity and the possibility of error.



**Create a unique location for each input value, and structure all calculations that need the value to refer to that single input location, either directly or through an appropriate sequence of references.**

#### PRINCIPLE #7

Include an 'About' or 'Welcome' worksheet to document the spreadsheet.

#### PRINCIPLE #15

Perform a calculation once and then refer back to that calculation.



### IDENTIFY AND SEPARATE FORECAST OR DUMMY DATA

Models are frequently built to operate on a 'rolling basis', with forecast or budget numbers steadily replaced by actuals. If this is done haphazardly, forecast numbers can easily be left in place by accident. Similarly, models are sometimes built with made-up dummy data to help test calculations before the actual data is available. Accidentally leaving fictitious data in the final model can cause serious errors.



**Create separate entry areas for forecast and actual numbers, with formulas that select which data is currently in use.**

**Identify dummy data clearly with formatting or labelling.**



**Don't overwrite forecast data with actuals on a rolling basis.**

### DON'T HIDE THINGS

All aspects of a model should be visible and easily accessible. Hidden rows are easily missed, can be confusing and are easy to change or delete inadvertently. An exception to this rule is the hiding of empty columns to the right and below the used range, which can be done to aid workbook navigation.



**Group and collapse rows and columns that the user may wish to exclude to aid readability.**



**Don't hide intermediate calculations or areas of technical or supporting detail.**

**Don't hide items using white text colour or a non-displaying text format.**

**Don't use hidden worksheets.**

# Consistency

Financial models are frequently complicated. Ensuring consistency can reduce complexity by tying sections of the model together into chunks, which makes the end user experience smoother. Components that perform similar tasks should be as similar as possible. This applies at all levels, including but not limited to formula selection, sets of calculations, and input and output sections.

## USE CONSISTENT FORMULAS

### **Definition** *Cell anchoring*

Creating formulas with references that do not move when copied and pasted to other cells. Accomplished with \$ markers and/or named ranges in most spreadsheet packages.

### PRINCIPLE #12

Be consistent in the use of formulas.

Keeping adjacent formulas identical makes it easier to review a model, and reduces the chance that an error will occur through copy-pasting over an inconsistent formula. This simplifies the review process as each block of formulas only needs to be inspected once.



**Make formulas strictly consistent across formula blocks, so the formula can be copied and pasted across the block.**

**Use cell anchoring to create any variations that may be required.**

**Wherever possible, keep formulas consistent across any secondary dimensions, such as groups of products and timelines.**

Very occasionally the first cell in a timeline may be different, but only where strict consistency would reduce clarity, and when clearly marked.

**Make any inconsistent formulas, if used for a good reason, immediately apparent to anyone looking at the area (eg, by using prominent formatting or notes).**

## USE CONSISTENT PLACEMENT

If multiple timelines exist in a model it must be clear which timeline relates to each value in a model. A single column should only contain values relating to a given time period and be used consistently to represent that time period across any relevant worksheets sharing that timeline.

**PRINCIPLE #11**

Be consistent in structure.



**Include only one timeline on each worksheet.**

**Display the primary timeline in a frozen pane, and place any secondary or tertiary timelines near each of the values to which they relate so they can be viewed together without scrolling.**

**Present any distinction clearly when multiple timelines are included in one axis (eg, a change of periodicity from monthly periods to semi-annual periods), and keep formulas consistent along that axis.**

**Ensure that secondary dimensions in core model sections appear in a consistent order and level of detail.**

For example, if the model individually considers a number of business units, order them consistently and fix their definitions.



**Don't create timelines at different levels of detail on each worksheet, or ones that do not line up across worksheets.**

**Don't use 'variegated' timelines in the calculation worksheets, where the timeline series calculations are interrupted by periodic subtotals.**

## Clarity

Financial models must communicate complex financial information to its user. Prioritising clarity can help avoid confusion and keep the model as unambiguous as possible.

### USE CLEAR FORMATTING

Formatting should be clear and consistent. It should be easy to understand the purpose of each value in a model. Appropriate number formats help the user separate different kinds of data from one another.

Similarly, rounding values in the model for presentation keeps the data neat and easy to read. The most common mistake in this area is to show too many decimal places, which can both distract users from more important information and overstate the level of precision achieved.

It is sometimes reasonable to compromise on formatting for technical reasons. For instance, significant amounts of conditional formatting can cause performance issues, and so should generally be used sparingly.

Formatting for formatting's sake is unnecessary and formats do not automatically communicate their meanings to the user. When formatting carries a meaning that a user must understand to use the model safely, this meaning must be explained clearly in an obvious location within the model.



**Use Excel Styles to apply consistent formatting.**

**Use meaningful number formats.**

For example, values that represent dates should appear visually as dates, and percentages as percentages.

**Ensure that the number of significant figures displayed is appropriate to the calculation being performed.**

**Use conditional formatting to highlight anomalies and values of interest.**

**Apply conditional formatting in modest quantities and use simple conditional formatting rules.**

For example, when a worksheet is used as a data storage table, it may be sensible to minimise formatting within the table to reduce the file size

**Include a formatting key in the model to explain the meaning of styles and/or formats.**



**Don't add formats ad hoc as the model is worked on.**

**Don't leave all cells in the Excel default format.**

### USE CLEAR AND MEANINGFUL LABELS

Labels are essential to ensure the end user's understanding of what is presented, and should be applied to all data, calculations and outputs.



**Ensure that all data, calculations and outputs are labelled visibly, with the labels placed nearby.**

**Label each row to the left in a frozen pane that remains visible as the user scrolls around the workbook.**

**Use a 'tree' to structure multiple label layers, with subsequent columns used for each layer.**

**Maintain a balance between label length and precision.**

### USE CLEAR UNITS

For every value in a model, it should be clear what units of measurement are employed so the user can easily comprehend the information presented. This includes but is not limited to currency (including whether in real or nominal terms), factors (tens, hundreds, thousands and millions), percentage rates (including whether they are annual or matching model periods), and other units such as tonnes, litres, etc.

Units should be precise enough to mitigate the risk of mixing scales, such as inadvertently multiplying a price per tonne by a value measured in thousands of tonnes.



**Label each value or set of values with the unit that applies to them.**

For example, include units for each item in suitable places as determined by context, such as part of the data label or in a dedicated units range.

**Use a specified base unit, and label all values that use alternative units.**

### USE A CLEAR SIGN CONVENTION

The meaning of a positive or negative value sign for each value in a model must be made clear.



**Specify and use a simple and comprehensive sign convention, and label any inconsistencies.**

For example, a model can identify assets, revenues and cash inflows as positive, and liabilities, expenses and cash outflows as negative; or it could apply a 'normally positive' rule, where all inputs are positive by default.

**Use the same conventions throughout the model, even in different parts.**

**Label each row with its convention next to the values.**



**Don't use pure accounting convention (ie, positive for debits and negative for credits).**

### USE EASILY UNDERSTANDABLE WORKSHEET NAMES

Many models extend over a large number of worksheets. Using simple and understandable worksheet names will help users navigate between worksheets and understand formulas that contain cross-sheet references.



**Use clear and concise names for each worksheet, as opposed to non-descriptive names like Sheet1, Sheet2, etc.**

**Use abbreviated names for each worksheet with a clear explanation in an obvious location within the model.**

**Colour-code or label worksheets according to their functional purpose in the model, or business unit.**

For example, include yellow fill and/or an L\_ prefix for input worksheets.



**Don't use mathematical operators in worksheet names, as these can cause issues with formula comprehension.**

### USE CLEAR RANGE NAMES WHERE APPROPRIATE

Range names can be useful to define areas of data for use in calculations; however, some model developers look to minimise the use of range names in formulas. Either approach can be effective; however, if range names are used they should be meaningful and easy to differentiate.



**Use range names with care, and make them clear and meaningful.**

For example, call a senior debt interest rate input cell `SnrIntRate1`, not `SNR1`.

**Use defined names for Visual Basic for Applications (VBA) cell and range references to avoid damaging the integrity of the code when adding or removing cells later on.**

**Use consistent range names for related items.**

### DOCUMENT VBA CODE CLEARLY

Elsewhere in this document, we advocate using VBA and similar program code sparingly. VBA code, when used, requires a higher level of technical knowledge to follow and understand than general spreadsheet content. It is easy for coding to become a black box, leaving users unable to verify or modify how the code works. Hence, it is important for all VBA code to be well documented, and such documentation kept up-to-date.



**Name VBA elements such as cell ranges, variables and functions clearly and meaningfully to aid a reviewer's comprehension.**

For example, use `'LoanRepayPeriod'` instead of `'LRP'` or `'Var1'`.

**Place a description of each procedure in a consistent location near the top of each procedure.**

**Use in-line comments to explain and label the code directly alongside the code itself.**



**Don't use user-defined functions within the cells of the workbook.**



## Error reduction

Errors are clearly undesirable in any financial model. Yet, mistakes are natural and unavoidable. In this section we look at key ways to prevent errors or reduce their likelihood, and to detect them when they occur.

### REVIEW AND TEST YOUR MODELS

Models are often large and complex. Even an expert builder can make errors of logic, typos and so on. Hence, it is important that a model be subjected to an appropriate level of testing and review.

#### PRINCIPLE #18

Rigorously test the workbook.



Consider carefully the possibility and impact of model errors and design, and implement a review and testing regime consistent with the risk presented.

Create expectations as to how a model's results should vary with changes in inputs, apply these input changes to the model and compare the outputs with the expectations.

Operate a system of peer review (eg, by a colleague or even a professional audit) if the model's impact is particularly significant.

### INCLUDE CHECKS

#### Definition Check

A visible indicator that an input or output falls outside of expected parameters or does not produce the expected result.

#### PRINCIPLE #19

Build in checks, controls and alerts from the outset and during the course of spreadsheet design.

Checks are intended to make it clear and obvious to the user when there is a failure in the tested logic. Models can also include other checks that indicate business issues with the model's outputs - such as breach of covenants or making losses - but which aren't indicative of an error in the model's function. Sometimes called alerts, these kinds of checks are also beneficial and the approaches below can be applied equally to them.



Consider checks in the construction of every section of a model.

Include an equality check for each set of values that are calculated separately but ought to be equal, such as a balance worksheet check or an alert that a required input has been left blank.

Include a tolerance in checks to allow for very small acceptable variations, such as Excel rounding errors.

Apply conditional formatting to checks in order to catch the user's attention.

## INCLUDE A MASTER CHECK

A master check tests whether any checks in the model are in breach and alerts the user if any are.



**Build a dedicated check summary section (this may be a standalone worksheet or a section within a worksheet).**

**Display the result of the master check in the frozen pane on all worksheets so that it is clearly visible in all areas of the model.**

## CONSIDER INCLUDING RESTRICTIONS

### PRINCIPLE #20

Protect parts of the workbook that are not supposed to be changed by users.

#### **Definition** *Restriction*

A mechanism that controls the entry of inputs to prevent invalid or inconsistent data from being entered.

Allowing inputs to be varied without limit might increase model flexibility, but it also increases the potential for incorrect, internally inconsistent or unreasonable inputs to be chosen by accident or through a misunderstanding. Placing controls on possible inputs can help a user use the model appropriately.



**Use data validation to reduce the chance of invalid data being entered, either as a control or with dropdown menus.**

**Create additional checks and alert messages that warn the user if inappropriate data has been entered.**

**Include contextual guidance that instructs the user about appropriate input data alongside the location of the input.**

**Protect sensitive worksheets or ranges with a password.**



**Don't use data validation excessively as this makes the model harder to use.**

**Don't use data validation with a generic error message and no guidance as to what data is permitted.**

## Calculation techniques

Financial models necessarily include many formulas and other calculations. Those calculations should, like the model itself, be error-resistant and comprehensible. This section outlines the key principles to keep in mind when building calculations.

### MINIMISE CALCULATION COMPLEXITY

Models are often large files and can be slow to calculate. Similarly, cells with dense computations are difficult to review and more likely to contain errors. Where possible, formulas should be built to optimise file size and calculation speed, and should be simple to read, comprehend and review.

Complexity should be minimised appropriately to the circumstances. While hard rules are sometimes used by modellers, (eg, 'no more than five operands in any cell', 'no line breaks' or 'no formulas longer than your thumb'), some computations are easier to follow when these rules are broken.

#### PRINCIPLE #13

Keep formulas short and simple.



**Break complex calculations into multiple stages.**

**Split multi-stage calculations across multiple rows.**

**Carry out timing and logic calculations separately from the data that they relate to, usually using the following 'flags': '1' / '0' or 'TRUE'/'FALSE'.**

**Carry out calculations that scale a value (eg, scaling a monthly figure to match a quarterly timeline) separately from the calculation of the base value.**



**Don't leave calculations set to manual as users may not realise that outputs are not live.**

### BUILD TRACEABLE REFERENCES

References should be included in a way that helps users understand formula logic. Reviewing a formula is considerably easier when the inputs to the formula can be inspected without moving away from the formula cell itself. It is generally preferable for each occurrence to refer directly to the ultimate precedent.



**Reference nearby cells (ie, cells close to those containing the formulas) so that it is possible to see the formula, the result and the referenced cells on one screen at the same time.**

**Use single-step references that create local references ('call ups' or 'imports') within a given worksheet for other formulas that perform calculations on that worksheet.**

This makes references in the calculating formulas easier to read, and makes it unnecessary to provide worksheet qualifiers (such as 'Sheet1').



**Don't create unnecessary chains of references, such as those that flow through multiple locations without any calculations performed.**

**Don't include cross-sheet references within calculations.**

**Don't use array formulas.**

## AVOID HARDCODING

### **Definition** *Hardcoding*

Fixed values embedded into a formula, such as a tax rate entered as 20% within a formula.

The use of hardcoding in formulas depends on context and requires judgement. It can be acceptable in low-risk cases such as the number of months in a year or hours in a day (eg, using a hardcoded 24 to convert between hours and days). However, hardcoding should never be used for values that could foreseeably change during the life of the model (eg, using 24 to increment a staff count). It should also be avoided for values whose meaning would not be completely clear to the most basic user of the model without a label. For example, while the conversion factor between feet and metres will always be 3.28084, if this value is not separated and labelled, its purpose would not be immediately obvious to a model user.



**Include as inputs all values that could possibly change in the lifetime of the model.**

**Include a worksheet containing defined values for unalterable constants whose meaning would not be immediately obvious in a formula, such as scaling between units.**



**Don't include the fixed values used in formulas as inputs.**

For example, using separate, defined inputs for the values 1 and 0 can make models less transparent in formulas where their use and meaning would otherwise be obvious (eg, as indicators of TRUE and FALSE in an IF test).

**Don't hardcode constants into formulas.**

### PRINCIPLE #14

Never embed in a formula anything that might change or need to be changed.

## AVOID CIRCULAR REFERENCES

**Definition** *Circular references*

A formula that uses its own result as an input.

Unintentional circular references are usually a sign of an incorrectly made formula, and spreadsheet packages will warn the user if one is made. Making use of intentional circularity turns off these warnings, and can lead to errors going unnoticed. Circular calculations are also opaque to review and often unnecessary.



**Disable the 'Enable iterative calculations' setting.**

**Resolve circularities with logic (eg, algebraically).**

**Make simplifying assumptions to avoid circular logic.**

**Manage any cases requiring self-reference with Goal Seek or a copy-paste macro, and include clear signposting that current values may not be live, such as with a check or alert message.**

## AVOID UNNECESSARY ROUNDING

Excessive rounding during calculations can compromise accuracy unnecessarily. For most calculated amounts, rounding is often unnecessary or misleading.



**Leave figures in calculations unrounded, and only round final outputs, documenting where rounding has taken place.**

**Round numbers only through presentation.**

For example, choose a format that shows only two decimal places.



**Don't make 'balancing' calculations to ensure that lists of unrounded figures reach a desired target.**

**Don't use the 'Precision as displayed' setting to round figures automatically to match their formatted presentation.**

### USE VBA AND MACROS SPARINGLY

VBA and equivalent programming code in packages other than Excel are powerful but largely opaque tools. VBA should be seen as a weapon of last resort in designing a financial model.

It may be sensible to use VBA within the logic flow in exceptional circumstances, such as when a calculation cannot be done otherwise, a significant time reduction can be achieved or using VBA makes the logic clearer. VBA may also reasonably be used to automate specific repetitive model tasks such as printing all worksheets of a large workbook, or testing different scenarios through a formula-driven model.



**Use native Excel functionality, not VBA, to perform all calculations that affect results.**

## ICAEW THOUGHT LEADERSHIP

ICAEW is required by its Royal Charter to advance the theory and practice of accountancy in all its aspects and we do this through papers published in our ICAEW Thought Leadership series. Some papers are more practical in nature and aimed at helping members do their work, others consider how law and standards might develop for the future professional.

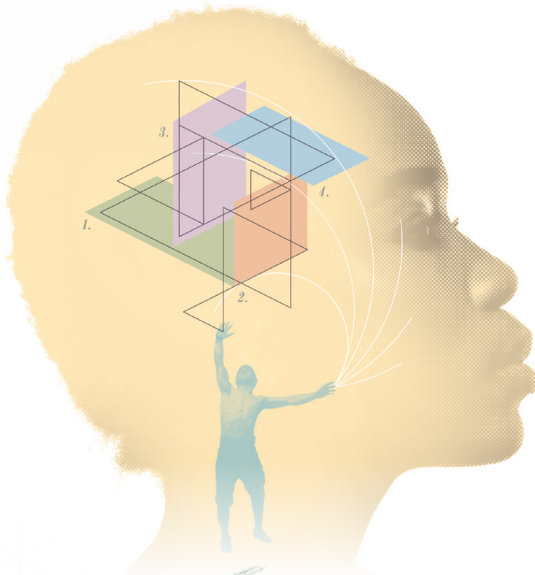


### ***Twenty principles for good spreadsheet practice***

#### SHARING BEST PRACTICE

A high-level set of guidelines for spreadsheet users of all levels. Developed with input from many top experts, the Twenty Principles are well tested as the essential tenets for reducing spreadsheet risk.

[icaew.com/excel20principles](https://www.icaew.com/excel20principles)



### ***Spreadsheet competency framework***

#### STANDARDISING EXCEL SKILLS

'Proficient in Microsoft Excel' - what does it mean? Our simple system of four levels defines a common standard for classifying spreadsheet users and their skills, minimising risk and optimising efficiency.

[icaew.com/spreadsheetcompetency](https://www.icaew.com/spreadsheetcompetency)



### ***Financial modelling code***

#### GET MODELLING RIGHT

A new, high-level guide to best practice in the field of financial modelling, built from seven modelling methodologies and with input from more than twenty modelling organisations.

[icaew.com/financialmodelling](https://www.icaew.com/financialmodelling)



# *Twenty principles for good spreadsheet practice*

The guidance in this document is based on ICAEW's *Twenty principles for good spreadsheet practice* (see below). The Principles are a high-level set of guidance for achieving good practice in any spreadsheet environment.

<b>PRINCIPLE #1</b>	Determine what role spreadsheets play in your business, and plan your spreadsheet standards and processes accordingly.
<b>PRINCIPLE #2</b>	Adopt a standard for your organisation and stick to it.
<b>PRINCIPLE #3</b>	Ensure that everyone involved in the creation or use of spreadsheets has an appropriate level of knowledge and competence.
<b>PRINCIPLE #4</b>	Work collaboratively, share ownership, peer review.
<b>PRINCIPLE #5</b>	Before starting, satisfy yourself that a spreadsheet is the appropriate tool for the job.
<b>PRINCIPLE #6</b>	Identify the audience. If a spreadsheet is intended to be understood and used by others, the design should facilitate this.
<b>PRINCIPLE #7</b>	Include an 'About' or 'Welcome' worksheet to document the spreadsheet.
<b>PRINCIPLE #8</b>	Design for longevity.
<b>PRINCIPLE #9</b>	Focus on the required outputs.
<b>PRINCIPLE #10</b>	Separate and clearly identify inputs, workings and outputs.
<b>PRINCIPLE #11</b>	Be consistent in structure.
<b>PRINCIPLE #12</b>	Be consistent in the use of formulas.
<b>PRINCIPLE #13</b>	Keep formulas short and simple.
<b>PRINCIPLE #14</b>	Never embed in a formula anything that might change or need to be changed.
<b>PRINCIPLE #15</b>	Perform a calculation once and then refer back to that calculation.
<b>PRINCIPLE #16</b>	Avoid using advanced features where simpler features could achieve the same result.
<b>PRINCIPLE #17</b>	Have a system of backup and version control, which should be applied consistently within an organisation.
<b>PRINCIPLE #18</b>	Rigorously test the workbook.
<b>PRINCIPLE #19</b>	Build in checks, controls and alerts from the outset and during the course of spreadsheet design.
<b>PRINCIPLE #20</b>	Protect parts of the workbook that are not supposed to be changed by users.

Refer to [icaew.com/excel20principles](https://www.icaew.com/excel20principles) for more details.

Excel is one of the most popular end-user tools in the accountant's portfolio. Spreadsheets enable us to quickly and flexibly perform analysis that otherwise would be difficult or time-consuming; however, there is a tendency to place undue trust in them. ICAEW's Excel Community provides a 'one-stop shop' for accountants who want to use Excel better and understand and minimise spreadsheet risk.

For more information about the Excel Community, please visit [icaew.com/excel](http://icaew.com/excel)

For more information about the IT Faculty, please visit [icaew.com/itfac](http://icaew.com/itfac)

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## ICAEW

Chartered Accountants' Hall  
Moorgate Place  
London  
EC2R 6EA  
UK

T +44 (0)20 7920 8100

E [itfac@icaew.com](mailto:itfac@icaew.com)

[icaew.com/itfac](http://icaew.com/itfac)

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