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Financial Modelling and Forecasting Training

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About The Knowledge Academy

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Course Syllabus

- **Module 1:** Financial Modelling Overview
- **Module 2:** Short Primer in the Accounting of Financial Statements
- **Module 3:** Financial Statement Modelling
- **Module 4:** Forecasting Performance
- **Module 5:** Business Valuation

Module

01



Financial Modelling Overview

1

What is Financial Modelling?

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Excel as a Tool of Modelling: Capabilities and Limitations

What is Financial Modelling?

Financial modeling is the process of creating a mathematical representation or a financial simulation of a real-world financial situation or a business.

- *Financial modelling is the process of creating a comprehensive representation of a company's income and expenses in a spreadsheet format.*
- *This enables the calculation of the potential effects of future events or decisions.*
- *Company executives rely on financial models for various purposes, with financial analysts primarily utilising them to evaluate and predict the impact of upcoming events or executive choices on the company's stock performance.*

financial tools, techniques, and software to forecast the financial performance of a company, project, or investment

financial modelling is to make informed financial decisions, assess potential risks and rewards, and evaluate the financial implications of different scenarios

[Business Valuation](#)

[Investment Analysis](#)

[Budgeting and Forecasting](#)

[Mergers and Acquisitions \(M&A\):](#)

[Project Finance](#)

Business Valuation: Financial models are used to estimate the value of a company or an asset, considering factors like cash flows, growth prospects, and risk.

Income Statement: A financial model typically includes forecasting a company's revenues, cost of goods sold (COGS), gross profit, operating expenses, and net income over a specific period.

What is Financial Modelling?

Balance Sheet: The model also considers the company's assets, liabilities, and shareholders' equity, projecting how they change over time.

(Continued)

Cash Flow Statement: Financial models analyze the inflows and outflows of cash to estimate a company's liquidity and cash flow trends

➤ ***The key components of financial modelling typically include:***

Assumptions

Historical Data ✓

Forecasting

Financial Statements

Sensitivity Analysis

Debt and Equity Financing:
Companies may use financial models to evaluate the impact of different financing options on their capital structure and overall financial health.

Sensitivity Analysis: Models can be tested under different scenarios to evaluate how changes in variables or assumptions impact financial outcomes.

Valuation: Financial models are used to estimate the value of a company or an asset, employing various valuation techniques like discounted cash flow (DCF) analysis or comparable company analysis (comps).

Capital Budgeting: Financial models are used to assess the feasibility of investment projects and determine their potential return on investment (ROI).

Risk Assessment: Models can help assess the financial risks associated with different business decisions or investment opportunities.

Tax Rates: Assumptions about corporate tax rates and tax laws are necessary for accurately calculating a company's tax expenses.

Working Capital: Financial models often require assumptions about the company's working capital, including accounts receivable, accounts payable, and inventory turnover rates.

What is Financial Modelling?

Market Trends: Assumptions regarding broader market trends and economic conditions play a significant role in financial modelling. These may include factors like GDP growth, unemployment rates, and industry-specific trends.

Inflation Rate: The inflation rate assumption is necessary to adjust cash flows and financial values for changes in purchasing power over time.

1. Assumptions

- Identifying and documenting the assumptions that drive the model, such as revenue growth rates, cost structures, interest rates, and market trends.

Interest Rates: Assumptions about interest rates are crucial, especially when dealing with financial models related to debt financing, loans, or interest-sensitive investments.

Regulatory Environment: Assumptions about changes in regulations and their potential impact on the company's operations and finances are essential for accurate modelling.

Cost Structures: Financial models require assumptions about the company's cost structures, including variable and fixed costs. These may encompass production costs, operating expenses, overhead costs, and other expenditure categories.

Revenue Growth Rate: Assumptions about the expected growth rate of the company's revenues are fundamental to financial modelling. This growth rate can be based on historical trends, market research, industry outlook, or management's growth projections.

What is Financial Modelling?

2. Historical Data

- Gathering and analysing historical financial information, including income statements, balance sheets, cash flow statements, and other relevant data to understand past performance.

Ratios and Metrics Calculation:
Financial ratios and metrics are calculated based on historical financial data. These ratios provide valuable insights into the company's liquidity, profitability, efficiency, and leverage.

Benchmarking: Historical data can be used for benchmarking the company's performance against industry peers or competitors. This comparison helps identify areas of strength and weakness.

Identifying Seasonal or Cyclical Patterns: Historical data can reveal seasonal or cyclical patterns in the company's financial performance. Understanding these patterns is crucial for accurate forecasting.

What is Financial Modelling?

3. Forecasting

- Using historical data and assumptions, projecting future financial performance.
- This involves estimating revenues, expenses, cash flows, and other key financial metrics over a specific time horizon.

Financial Ratio Forecasting: Financial models also calculate and forecast various financial ratios, such as profitability ratios, liquidity ratios, and leverage ratios, to assess the company's financial health in the future.

Sensitivity Analysis: Sensitivity analysis is conducted to assess how changes in key assumptions impact the overall financial forecasts. It helps in identifying critical drivers and potential risks.

Scenario Analysis: In addition to point forecasts, financial models may include scenario analysis, where different sets of assumptions are used to explore potential outcomes under varying conditions or scenarios.

What is Financial Modelling?

Pro Forma Income Statement:

Pro Forma Balance Sheet:

Pro Forma Cash Flow Statement

Regularly updating the pro forma statements as new information becomes available is essential to maintain their relevance and accuracy for decision-making.

4. Financial Statements

- Creating pro forma financial statements, including income statements, balance sheets, and cash flow statements, based on the forecasted figures.
- These statements provide a comprehensive view of the financial position and performance of the entity being modelled.

Pro forma financial statements are forward-looking statements that project the financial position and performance of a company based on the forecasted figures and assumptions

It is crucial to ensure that the pro forma financial statements are consistent with the underlying assumptions and that any interdependencies between the statements are appropriately accounted for

What is Financial Modelling?

Sensitivity analysis is a vital technique used in financial modelling to assess the impact of changes in key variables or assumptions on the financial outcomes of the model.

It involves systematically varying one or more input parameters while keeping other variables constant to understand how sensitive the model is to these changes.

5. Sensitivity Analysis

- Assessing the impact of changes in key variables or assumptions on the financial outcomes.
- This analysis helps identify the sensitivity of the model to different factors and enhances decision-making under various scenarios.

One Variable Sensitivity Analysis: In this approach, one key variable or assumption is varied while all other inputs are held constant. The model's outcomes are then observed as the variable is changed through a range of values.

Tornado Diagrams: Tornado diagrams are graphical representations that show the sensitivity of the model's output to variations in multiple input variables simultaneously. The bars in the diagram indicate how much the output changes with each variable's variation.

Scenario Analysis: Scenario analysis involves changing multiple variables simultaneously to create different scenarios. Each scenario represents a unique combination of input values, and the model's results are evaluated for each scenario. This allows decision-makers to explore a range of potential outcomes.

Inputs and Outputs of Simple Financial Model

- A simple financial model typically takes various inputs and generates corresponding outputs to analyse the financial performance or forecast the future financial position of a company or project.
- The specific inputs and outputs can vary depending on the purpose and complexity of the model, the following are some examples:

Inputs

1. **Revenue:** The expected or historical revenue generated by the company.
2. **Cost of Goods Sold:** The direct costs associated with producing or delivering the product or service. COGS crucial component in determining the gross profit
3. **Operating Expenses:** The general and administrative expenses incurred by the company, such as salaries, rent, utilities, marketing expenses, etc.

Revenue can be derived from various sources, such as product sales, service fees, subscription fees, licensing, or any other revenue streams specific to the company's business model

Labour, equipment running costs

production overhead

raw materials

refer to the day-to-day costs incurred by the company to maintain its business operations

Inputs and Outputs of Simple Financial Model

4. **Capital Expenditures:** Investments in long-term assets like equipment, property, or machinery.
property, equipment, machinery, vehicles, technology infrastructure, or other fixed assets
5. **Depreciation and Amortisation:** The allocation of the cost of long-term assets over their useful lives.
Depreciation is typically associated with tangible assets like buildings, machinery, and equipment
amortization is related to intangible assets like patents or copyrights
6. **Working Capital:** The current assets and liabilities required to support the day-to-day operations, including accounts receivable, inventory, accounts payable, etc.
working capital include accounts receivable (amounts owed to the company by customers), inventory (the value of goods held for sale), and accounts payable (amounts owed by the company to suppliers and creditors).
7. **Tax Rate:** The applicable tax rate for the company.
Tax rate assumptions are essential in financial modelling as they directly impact the company's tax expense and net income
In some cases, the tax rate may be subject to changes due to tax law amendments or changes in the company's tax position.
The tax rate represents the applicable tax percentage that the company must pay on its taxable income.

Inputs and Outputs of Simple Financial Model

to discount future cash flows to their present value, reflecting the time value of money and the risk associated with those cash flows

bonds, convertible notes, or lines of credit

Financing assumptions in financial modelling refer to the sources and costs of financing that a company plans to use.

Growth rates are fundamental in projecting future financial performance and are often based on historical trends, market research, industry projections, or management's growth forecasts

Accurate and well-reasoned growth rate assumptions are critical for generating reliable financial forecasts and making informed strategic decisions.

8. ***Discount Rate:*** The rate used to discount future cash flows to their present value, often used in valuation models.
9. ***Financing Assumptions:*** The sources and costs of financing, such as interest rates, loans, equity investments, etc.
10. ***Growth Rates:*** Assumptions regarding the growth of revenue, expenses, or other financial metrics.

Inputs and Outputs of Simple Financial Model

Outputs

bottom line or profit after tax, represents the difference between a company's total revenue and total expenses before taxes

PBITA

these outputs are usually projected over the forecast period based on the assumptions and data provided in the model

Inputs and Outputs of Simple Financial Model

5. **Balance Sheet:** A snapshot of the company's financial position at a specific point in time, including assets, liabilities, and equity.

6. **Financial Ratios:** Various ratios like profitability ratios (e.g., gross margin, net margin), liquidity ratios (e.g., current ratio, quick ratio), and return ratios (e.g., return on assets, return on equity).

7. **Valuation Metrics:** Estimates of the value of the company or project, such as discounted cash flows, price-to-earnings ratio, or market multiples.

- **Discounted Cash Flow (DCF) Analysis:** DCF analysis estimates the present value of a company's future cash flows, incorporating the time value of money and the risk associated with those cash flows.

Market Multiples: Market multiples, such as the price-to-sales ratio and enterprise value-to-EBITDA ratio, compare the company's financial metrics to similar metrics of comparable companies in the market.

BS is used to assess the company's liquidity, solvency, and financial health

Profitability Ratios: These ratios measure a company's ability to generate profit in relation to its revenue, assets, or equity. Examples include gross margin, net margin, and return on equity.

Liquidity Ratios: Liquidity ratios evaluate a company's ability to meet its short-term financial obligations. Common examples include the current ratio and the quick ratio.

Return Ratios: Return ratios assess the company's efficiency in generating returns for its shareholders or investors. Examples include return on assets (ROA) and return on equity (ROE).

Debt Ratios: Debt ratios examine the company's level of leverage and its ability to manage debt. Examples include debt-to-equity ratio and interest coverage ratio.

Price-to-Earnings (P/E) Ratio: The P/E ratio compares a company's stock price to its earnings per share and is used to assess how much investors are willing to pay for each pound of earnings.

Financial Modelling Process of More Complex Models

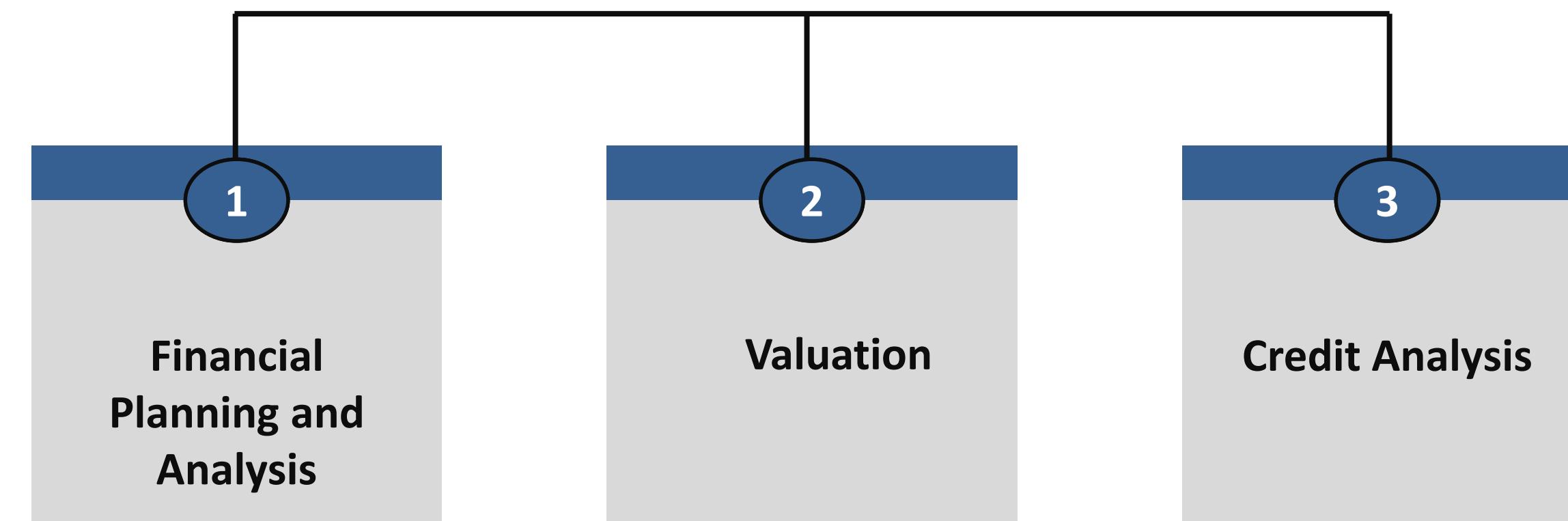
numerous stages, such as construction, operation, maintenance, and sometimes decommissioning or asset disposal.

- Complex models used in Project Finance (long-term infrastructure finance) can span dozens of spreadsheets with hundreds of rows, inputs, and assumptions, and are generated by financial analysis firms that specialise in those models.

Project finance models often cover long time horizons, ranging from several years to several decades, to capture the entire life cycle of the infrastructure project.

Financial Models Complexity

- The properties of the financial model you are developing should be derived from its purpose and constraints. The following are the most prevalent reasons for developing financial models:



Financial Modelling Process of More Complex Models

FP&A

1. **Financial Planning and Analysis:** Models are used by economic departments in businesses and institutions to anticipate budgets for specific projects or operations.
2. **Valuation:** Analysts utilise valuation models to value firms and projects in order to make investment recommendations.
3. **Credit Analysis:** models used in financial organisations such as banks and investment firms to assess the downside risks of a company or project, as part of the debt landing or investment process.

Credit analysis models are extensively used by financial organizations, such as banks and investment firms, to assess the creditworthiness of a company or project

These models evaluate the downside risks associated with lending money to a borrower or investing in a project

Credit analysts examine factors such as the borrower's financial health, historical performance, industry outlook, collateral, and risk factors to determine the credit risk.

FP&A teams in businesses and institutions use financial models to develop strategic plans, set financial goals, and make data-driven decisions.

These models help in evaluating various scenarios, assessing resource requirements, and aligning financial objectives with business objectives. They play a crucial role in budgeting, forecasting, and performance monitoring.

Common valuation techniques include discounted cash flow (DCF) analysis, comparable company analysis (CCA), and precedent transactions analysis (PTA)

Financial Modelling Process of More Complex Models

Data Collection and Validation

Sensitivity Analysis

(Continued)

Data Cleaning and Pre-processing

Model Validation and Testing

- ***These popular applications of financial models have various limits that affect the model's potential complexity:***

Limitation	Financial Planning and Analysis	Valuation and Credit Analysis
Quantity of data lack of historical data may require analysts to rely more heavily on assumptions, which can introduce additional uncertainties.	Depending on the company's data gathering ability, a large amount of very granular data is typically acquired.	Private company analysis: the quantity of data provided by the company being analysed, which is usually not very granular. Public firm analysis consists primarily of public reports as well as industry analysis reports and data.
Quality of data Inaccurate or incomplete data can lead to flawed results and unreliable conclusions.	Mostly high-quality historical data and relatively solid micro-level estimates based on the company's experience in its area.	High-quality (audited) but limited historical data, micro-level estimates vary depending on the analyst's expertise and knowledge, as well as the data provided by the company being analysed.
Time	There is usually ample time to construct and maintain extremely complicated models.	Analysts typically cover a large number of companies and do not have the time to develop highly complicated models.

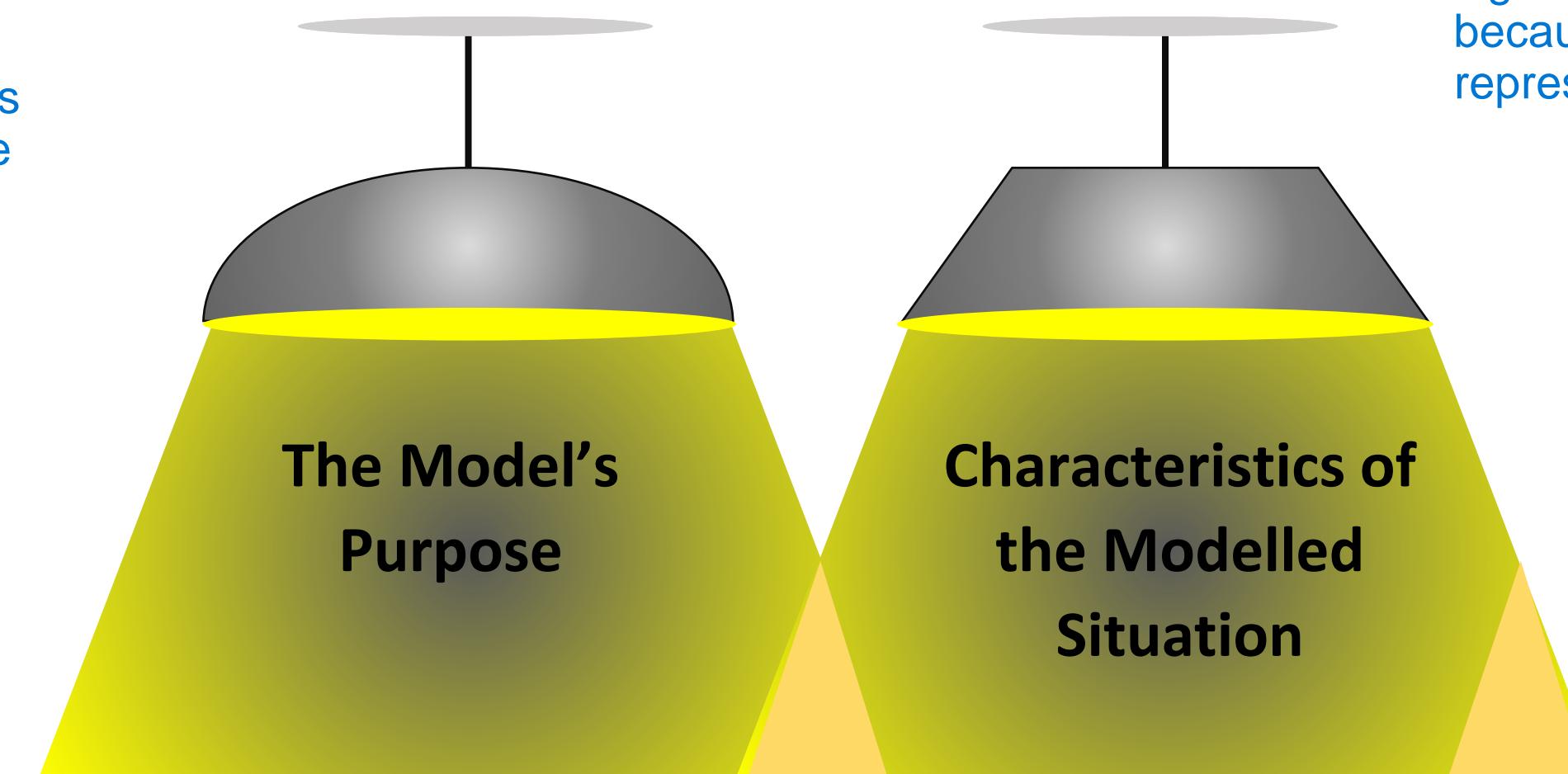
Financial Modelling Process of More Complex Models

Modelling Duration

- *The model's complexity is also affected by its duration. The model's duration decision parameters are as follows:*

projects typically consider the project's entire lifespan as the duration

It should accurately reflect the representative cash flow expected from the company in the long term.



The terminal value often represents a significant portion of the total equity value because it captures the long-term representation of the company's cash flow

Financial Modelling Process of More Complex Models

Modelling in complexity Layers

decision-makers to have a preliminary view of potential outcomes while acknowledging that the model's accuracy will improve over time as more relevant data is gathered

- Building a financial model can be done using "complexity layers" - this method is highly efficient when time is limited or not all of the essential data is accessible.
- The logic is to start with a simple model and then grow and complicate its many aspects.
- With this method, you will get a model output relatively quickly, and accuracy should improve as you add details.
- ***Then you should probably stop adding complexity:***
 - You have run out of relevant information.
 - You cannot make assumptions about the additional layer.
 - The model is becoming too complex, and updates would take far too long.

[1. Simple Model](#)

[2. Gradual Complexity](#)

[3. Improved Accuracy](#)

[4. Stopping Point](#)

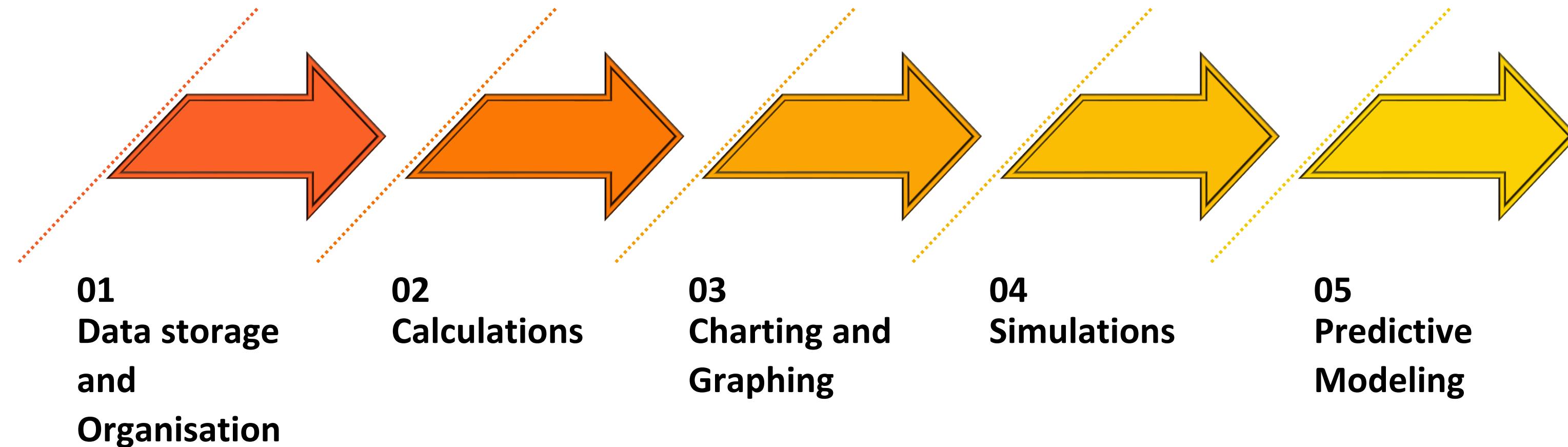
[Relevant Information](#)

[Assumptions](#)

[Manageability](#)

Excel as a Tool of Modelling: Capabilities and Limitations

Capabilities



Excel as a Tool of Modelling: Capabilities and Limitations

1. ***Data Storage and Organisation:*** Excel can be used to store and organise large amounts of data in a variety of formats. This data can then be easily accessed and manipulated for analysis.
2. ***Calculations:*** Excel can be used to perform a wide variety of calculations, including simple arithmetic operations, statistical functions, and financial calculations. This makes it a powerful tool for data analysis.
3. ***Charting and Graphing:*** Excel can be used to create charts and graphs to visualise data. This can be helpful for understanding the data and communicating the results of the analysis to others.
4. ***Simulations:*** Excel can be used to develop simulations to test hypotheses and explore the impact of different variables on a system. This can be a valuable tool for decision-making.
5. ***Predictive Modelling:*** Excel can be used to build predictive models to forecast future outcomes. This can be helpful for making decisions about things like inventory, sales, and marketing.

Excel as a Tool of Modelling: Capabilities and Limitations

Limitations



Excel as a Tool of Modelling: Capabilities and Limitations

1. **Programming:** Excel is not a programming language, so it cannot be used to create complex algorithms or applications. For this, you would need to use a programming language.
2. **Statistical Analysis:** Excel is not a statistical software package, so it is not ideal for performing advanced statistical analysis. For this, you would need to use a statistical software package.
3. **Data Management:** It can be difficult to manage large datasets in Excel. If you have a lot of data, you may need to use a database management system (DBMS).
4. **Model Complexity:** It can be difficult to create complex models in Excel. If you need to create a complex model, you may need to use a specialised modelling software package.

Security and Data Protection: Excel files may lack sufficient security measures, making them vulnerable to unauthorized access and data breaches.

Power BI for Specialized financial modelling as designed for handling complex models and perhaps more appropriate for these scenarios.

Module

02



Short Primer in the Accounting of Financial Statements

1

Accounting Equation

2

Balance Sheet

3

Income Statement

4

Cash Flow Statement

5

Articulation of Income Statement, Balance Sheet, and Cash Flow Statements

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Financial Statement Analysis: Ratio Analysis

Accounting Equation

- The accounting equation, also known as the basic accounting equation or balance sheet equation, is a fundamental principle in accounting that states a company's assets are equal to the sum of its liabilities and shareholder's equity. This equation ensures that the balance sheet remains balanced by maintaining a correspondence between debits and credits.
- In a company's balance sheet, which is a financial statement, two main columns represent its financial position: assets and liabilities. Assets are the valuable resources owned and controlled by the company, while liabilities represent the obligations or debts owed to external parties, typically in the form of money.
- The third column on the balance sheet is shareholder's equity, which indicates the portion of the company's assets that is attributable to the owners or shareholders. It reflects how the company is financed, either through investment by shareholders or retained earnings.

The accounting equation illustrates that a company's assets are financed either by its liabilities (obligations to creditors) or shareholders' equity (the owners' investment and retained earnings)

If there are any changes to one side of the equation, there must be corresponding changes to the other side to maintain the balance.

Accounting Equation

(Continued)

- The accounting equation serves as a framework for understanding the relationship between assets, liabilities, and shareholder's equity. It provides a clear demarcation between these components and helps to maintain accurate financial records and balance the books.

The accounting equation acts as a powerful tool for identifying accounting errors.

If the equation does not balance, it indicates that there is an error in the recording of transactions

Identifying Accounting Errors

The accounting equation acts as a powerful tool for identifying accounting errors. If the equation does not balance, it indicates that there is an error in the recording of transactions, and accountants can investigate to rectify the mistake.

By adhering to the accounting equation and the principles of double-entry accounting, companies can maintain accurate financial records, prepare reliable financial statements, and provide stakeholders with a clear and transparent view of the company's financial position and performance

Balance Sheet

- A balance sheet is a financial statement that reports a company's assets, liabilities, and shareholder equity at a specific point in time. It is one of the three core financial statements (income statement and cash flow statement being the other two) used for evaluating the performance of a business.
- ***The balance sheet is divided into two main sections:***

Assets: Represents what the company owns and includes both current assets (such as cash, accounts receivable, and inventory) and non-current assets (such as property, plant, equipment, and investments).



Liabilities: Represents the company's obligations or debts to external parties and includes both current liabilities (such as accounts payable and short-term debt) and non-current liabilities (such as long-term debt and deferred tax liabilities).

Shareholders' Equity: Represents the residual interest in the company's assets after deducting its liabilities. It includes the initial capital contributed by shareholders and retained earnings.

Income Statement

- The income statement, also referred to as the profit and loss (P&L) statement or the statement of revenue and expense, is a vital financial statement that reports a company's financial performance over a specific accounting period.
- It provides information about the company's revenue, expenses, gains, and losses during that period.
- Together with the balance sheet and cash flow statement, the income statement forms one of the three major financial statements used to assess a company's financial health.
- The income statement offers valuable insights into various aspects of a company's operations.

Revenues (Sales)

- It helps evaluate the efficiency of management by analysing the company's revenue generation, cost management, and profitability.

Cost of Goods Sold (COGS)

Gross Profit

Operating Expenses

Operating Income (Operating Profit)

Other Income and Expenses

Net Income (Net Profit)

The income statement allows for comparisons of financial performance over different accounting periods. This helps identify trends, seasonal patterns, and changes in the company's financial performance over time.

Income Statement

(Continued)

Tracking Performance Over Time

Decision-Making for Resource Allocation

- By comparing the revenue and expenses, one can identify sectors or activities that may be underperforming or contributing significantly to the company's profits.
- Additionally, the income statement enables benchmarking against industry peers to assess the company's performance in relation to competitors.

1. Identifying Underperforming Sectors or Activities

By examining the revenue and expense components separately, businesses can pinpoint specific sectors, product lines, or services that may be underperforming.

If a particular division or product line is consistently generating lower revenues or incurring higher expenses, it may warrant further investigation and strategic decision-making to improve its performance

2. Assessing Profitability by Business Segments

Companies often operate multiple business segments or divisions. The income statement can be segmented to analyse the financial performance of each business segment separately

3. Identifying Cost Efficiency and Expense Management

Analysing the expense breakdown on the income statement helps in identifying areas where cost efficiency can be improved. Companies can focus on reducing unnecessary expenses or streamlining operations to enhance overall profitability

Net Cash Flow : The cash flow statement's bottom line, known as "Net Cash Flow," represents the total change in the company's cash position during the period. It is the sum of cash inflows from operating, investing, and financing activities.

Cash Flow Statement

positive net cash flow indicates that the company generated more cash than it used during the period

a negative net cash flow suggests that the company used more cash than it generated.

- A cash flow statement is a financial statement that presents consolidated information about the cash inflows and outflows of a company.
- It encompasses the cash received from ongoing operations and external investment sources, as well as the cash used for business activities and investments during a specific period.
- The cash flow statement is considered to be the most straightforward financial statement as it tracks the cash generated by the business through three main categories: operations, investment, and financing.
- The combination of these segments is referred to as net cash flow. Investors can use the cash flow statement's three sections to assess the value of a company's stock or its overall financial health.

Operating Activities

Represents the cash flows from the company's core business operations, such as cash received from customers and payments to suppliers and employees.

Investing Activities

Includes cash flows related to the purchase or sale of long-term assets, investments, or other non-operating assets.

Financing Activities

Shows cash flows from transactions with shareholders and creditors, such as issuing or repurchasing stock, borrowing or repaying loans, and paying dividends.

Cash Flow Statement

(Continued)

provides the company's net cash flow for the period, indicating whether the company generated more cash than it used (positive net cash flow) or used more cash than it generated (negative net cash flow).

➤ Key Takeaways:

It is a valuable tool for understanding a company's cash position and its ability to meet short-term and long-term financial obligations.

- The cash flow statement provides an overview of all cash inflows and outflows in a company.
- It consists of three sections: cash flow from operations, cash flow from investment, and cash flow from financing.
- Cash flow from operations reflects transactions from the company's core business activities.
- Cash flow from investment accounts for gains or losses from investments made by the company.
- Cash flow from financing summarises the cash used for debt and equity transactions.

Investors, creditors, and other stakeholders use the cash flow statement to assess a company's financial health, evaluate its cash management practices, and make informed decisions about investment and financing

Articulation of Income Statement, Balance Sheet, and Cash Flow Statements

Articulation indeed refers to the process of verifying the coherence and precision of the information presented in a company's financial statements

- The articulation of financial statements refers to the process of verifying the coherence and precision of the information presented in a company's financial statements. It entails aligning and cross-referencing the figures and data reported in different financial statements to ensure consistency and accuracy.
- The purpose of articulation is to obtain a comprehensive and accurate depiction of a company's financial position. By ensuring that the figures in one statement correspond to those in another statement, potential errors or discrepancies can be identified and rectified. This process is essential for providing reliable and trustworthy financial information to stakeholders, aiding in decision-making, and enabling investors to make well-informed choices regarding their investments

Articulation involves cross-referencing and aligning the figures and data reported in different financial statements, such as the balance sheet, income statement, and cash flow statement.

By verifying that the figures in one statement correspond to those in another statement, the company can identify and rectify potential errors or discrepancies

Articulation ensures that the financial statements collectively present a comprehensive view of the company's financial position

Accurate articulation leads to reliable financial statements, which are crucial for stakeholders, such as investors, creditors, regulators, and management

Financial Statement Analysis: Ratio Analysis

quantitative technique

understanding how well a company is performing and managing its financial resources

- Ratio analysis is a quantitative approach used to analyse a company's financial statements, such as the balance sheet and income statement.
- It involves comparing various line items to gain insights into the company's liquidity, operational efficiency, profitability, and solvency.
- Ratio analysis is a fundamental tool in equity analysis and is useful for evaluating a company's performance over time and comparing it to industry peers.
- External parties often use ratio analysis to establish benchmarks related to risk. While ratios provide valuable information, it is important to consider them alongside other metrics to obtain a comprehensive understanding of a company's financial health.
- Examples of ratio analysis include the current ratio, gross profit margin ratio, and inventory turnover ratio.

Ratio analysis enables the evaluation of a company's performance over time.

By tracking ratios across multiple periods, analysts can identify trends and patterns that provide valuable information about the company's financial progress and overall trajectory

Module

03



Financial Statement Modelling

1

How Financial Models Work?

2

Collecting and Analysing Historical Data

3

Selecting the Key Forecast Drivers

4

Modelling the Income Statement

5

Modelling the Balance Sheet

6

Modelling Interest and Circular References

7

Modelling the Cash Flow Statement

Purpose and Objectives?

Data Inputs?

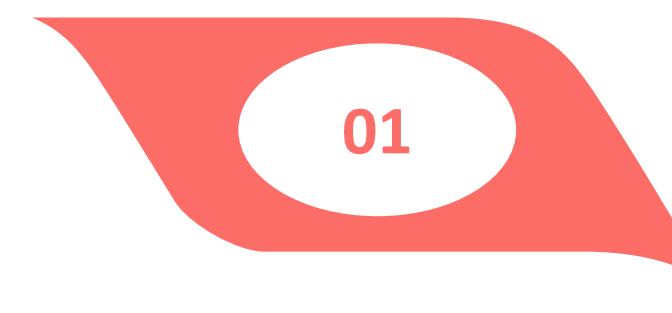
How Financial Models Work?

Assumptions and Projections?

Sensitivity Analysis?

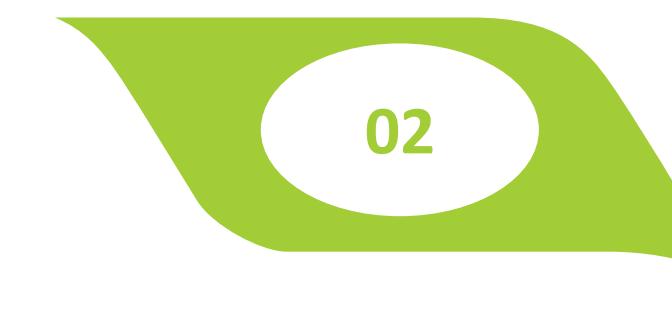
Risk Assessment?

- Financial models are constructed from previous data, assumptions, and computations that work in tandem to forecast the future.
- Financial models are more than just spreadsheets.
- While Excel is frequently used to develop a financial model, there are important features to a financial model and how it operates.
- ***The main characteristics of how a model works are that it:***



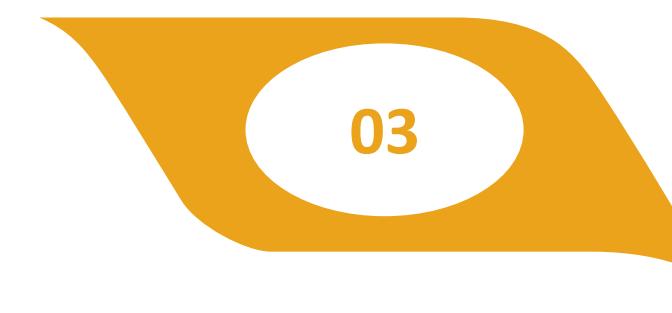
01

Is Dynamic



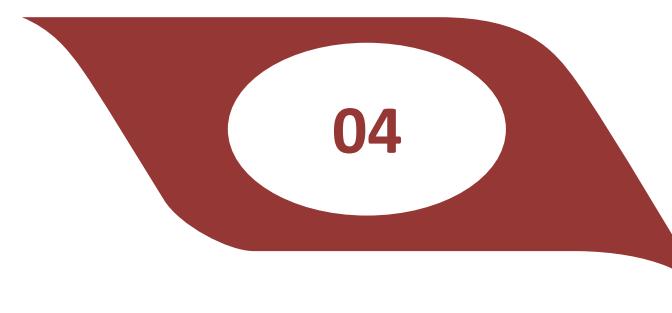
02

Displays Forecasts



03

Relationship-driven



04

Is Structured

Integrity and Error-Checking

How Financial Models Work?

- 1. *Is Dynamic:*** Each input influences the calculations and outcomes, or output. Models are designed to be dynamic and flexible in order to understand the impact of factors.
- 2. *Displays Forecasts:*** Forecasts are used to forecast the future based on several circumstances that could occur. For example, what will your company's cash flow be in ten years if it grows at a 5% annual rate?
- 3. *Relationship-driven:*** When you modify one input, numerous variables change in response to that single change.
- 4. *Is it Structured:*** Financial models come in various forms, but they all have inputs, situations, calculations, and outputs.

Financial models are relationship-driven, meaning that changes to one input can lead to multiple changes in other variables.

Financial models follow a structured approach that includes four main components: inputs, scenarios, calculations, and outputs

Financial models use historical data, assumptions, and calculations to generate forecasts and projections for future financial performance.

Collecting and Analysing Historical Data

- The first step in financial statement modelling is to collect historical data.
- This data can be obtained from the company's financial statements, as well as other sources, such as industry reports and analyst research.
- The data should be cleaned and organised so that it is easy to understand and analyse.
- Once the data has been collected, it can be analysed using a variety of statistical and financial techniques.
- The goal of the analysis is to identify trends and patterns in the data that can be used to forecast future financial performance.

Collecting and Analysing Historical Data

(Continued)

- The results of the analysis can be used to make strategic decisions about the company.
- For example, the company may decide to invest in new products or services, expand into new markets, or acquire another company.
- Financial statement modelling is a powerful tool that can be used to improve the decision-making process.
- By collecting and analysing historical data, companies can gain a better understanding of their financial performance and make more informed decisions about the future.

Selecting the Key Forecast Drivers

- The key forecast drivers are the factors that will have the greatest impact on a company's future financial performance.
- *These factors can vary depending on the industry and the company's specific business model, but some common key forecast drivers include:*



Economic conditions, including GDP growth, unemployment rates, and consumer spending patterns?

market demand and customer preferences?

Selecting the Key Forecast Drivers

customer retention and building customer loyalty?

competitive landscape?

1. Revenue

- The amount of revenue a company generates is a key driver of its profitability.
- Revenue can be affected by a number of factors, such as the company's product mix, pricing, and marketing efforts.

geographic expansion to access new markets?

Streamlining the supply chain, reducing transportation costs, and optimizing inventory management can lead to cost savings

2. Cost of Goods Sold

- The cost of goods sold is the cost of the materials and labor used to produce a company's products. Energy and utility costs, such as electricity and fuel expenses, are factors that affect the cost of production and, subsequently, the cost of goods sold.
- This cost can be affected by a number of factors, such as the cost of raw materials, labor costs, and manufacturing efficiency.

fluctuations in exchange rates and global sourcing decisions can affect COGS

Selecting the Key Forecast Drivers

3. Operating Expenses

accounting, legal, consulting, and auditing services?

cost of renting or leasing office spaces?

advertising campaigns, digital marketing, public relations, and other promotional activities?

- Operating expenses are all of the costs associated with running a business, other than the cost of goods sold. costs for maintaining facilities ?
Costs related to employee travel?
- These expenses can include things like marketing, sales, general and administrative costs.

4. Taxes

tax planning strategies to minimize their tax burden legally

deferring income, accelerating deductions, or optimizing the company's tax structure

- The amount of taxes a company pays can vary depending on its income, the tax rates in the countries where it operates, and the types of deductions it is eligible for.

Tax treaties between countries can impact the tax treatment of cross-border transactions

specific tax considerations or exemptions

transfer pricing arrangements between affiliated entities can impact the allocation of profits and tax liabilities across different jurisdictions

1. Gather Historical Financial Data
2. Identify Key Revenue and Expense Drivers

Modelling the Income Statement

3. Forecast Future Revenue and Expenses 4. Build Pro Forma Income Statement 5. Consider Different Scenarios

- Modelling the income statement is a process of forecasting a company's future revenue, expenses, and profits.
- This information can be used to assess the company's financial health and to make investment decisions.
- There are a number of steps involved in modelling the income statement.
- First, you need to gather historical financial data for the company. This data can be found in the company's annual report or 10-K filing.
- Once you have the historical data, you can identify the **key revenue and expense drivers**. These are the factors that have the biggest impact on the company's profits.
- Once you have identified the key drivers, you can start to forecast the company's future revenue and expenses.

6. Validate and Fine-Tune the Model
7. Sensitivity Analysis

8. Use of Financial Ratios
9. Incorporate External Factors

10. Communicate Results and Findings:

Modelling the Income Statement

(Continued)

- This can be done by using historical trends, industry data, and your own judgment.
- Once you have forecasted the revenue and expenses, you can calculate the company's future profits.
- Modelling the income statement is a complex process, but it can be a valuable tool for investors.
- By forecasting a company's future financial performance, you can make better investment decisions.

assumptions can be based on various factors, such as market trends, economic conditions, and company-specific factors

Understanding business cycles and seasonal patterns helps in creating more accurate projections

Modelling the Income Statement

(Continued)

- *Here are some of the steps involved in modelling the income statement:*
- Gather historical financial data.
 - Identify the key revenue and expense drivers.
 - Forecast the company's future revenue and expenses.
 - Calculate the company's future profits.
 - Analyse the results and make investment decisions.

Modelling Interest and Circular References

- Interest is a cost that is incurred when a company borrows money.
- It is calculated as a percentage of the amount borrowed and is paid over a period of time.
- Interest expense is an expense that is reported on a company's income statement.
- Circular references are a type of error that can occur in financial statement models.
- They occur when a formula in a cell refers to another cell that contains the same formula.
- This can cause the model to become unstable and produce inaccurate results.
- There are a number of ways to deal with circular references in financial statement models.

property lease agreements

equipment lease arrangements

modelling process is a dynamic and iterative one, where assumptions and data inputs may be refined over time.

Modelling Interest and Circular References

(Continued)

- One way is to use the iteration function in Excel.
- This function will repeatedly calculate the values in the model until the results converge.
- Another way to deal with circular references is to break the circularity by using a different formula.

Goal Seek and Solver

Excel's "Goal Seek" and "Solver" tools can also be helpful in handling circular references. "Goal Seek" can be used to find the value needed in a particular cell to achieve a specific result. "Solver" is an add-in that can optimize a target cell's value based on certain constraints.

Excel allows users to enable iterative calculations, which repeatedly recalculate the values in the model until a specified convergence criterion is met. This is particularly useful when dealing with circular references that require multiple iterations to reach a stable solution

Iteration Function in Excel

To enable iterative calculations in Excel, go to the "File" tab, select "Options," then click on "Formulas." Check the box next to "Enable iterative calculation," and specify the maximum number of iterations and the desired level of precision

Excel will perform the calculations based on the iterative settings until the results converge or the maximum number of iterations is reached.

Modelling Interest and Circular References

Interest Rate:

- The interest rate is a fundamental factor in interest calculations. It represents the cost of borrowing or the return on investments. The interest rate can be fixed or variable, and it may vary based on market conditions, credit risk, and other factors.

2. Amount Borrowed or Invested:

- The principal amount borrowed or invested is the initial sum on which interest will be calculated. For loans, it is the original loan amount, and for investments, it is the initial investment made.

3. Term of the Loan or Investment:

- The term refers to the duration for which the interest will be charged on a loan or earned on an investment. It is commonly expressed in years or months. The term plays a significant role in determining the total interest expenses or interest income.

(Continued)

➤ ***When modelling interest, it is important to consider the following factors:***

- The interest rate.
- The amount borrowed.
- The term of the loan.
- The frequency of payments.

4. Frequency of Payments:

- For loans, the frequency of payments refers to how often the borrower makes payments toward the loan. Common payment frequencies include monthly, quarterly, or annually. The payment frequency affects the interest calculations, especially when interest is compounded.

5. Compounding Periods:

- For investments or loans with compound interest, the compounding period is essential. It represents how often the interest is added to the principal or outstanding balance. Common compounding periods include annually, semi-annually, quarterly, or monthly.

Modelling Interest and Circular References

- Interest expense is considered a non-cash expense because it does not involve a cash outflow from the company. Instead, it represents the cost of using borrowed funds or financing activities.

(Continued) - While interest expense does not directly reduce the company's cash balance, it does impact the company's net income. Interest expense is deducted from the company's revenue on the income statement, resulting in a decrease in net income. Lower net income affects the company's profitability and can influence investors' perceptions of its financial health.

- It is also important to consider the impact of interest expense on the company's financial statements.
- Interest expense is a non-cash expense, which means that it does not reduce the company's cash balance.
- However, it does reduce the company's net income.
- Circular references can be a challenge to deal with in financial statement models.
- However, there are a number of ways to overcome these challenges.
- By understanding how circular references work and how to deal with them, you can create accurate and reliable financial statement models.

Modelling the Cash Flow Statement

Changes in cash balances should match changes in cash from the operating, investing, and financing activities

➤ *The following are some tips for modelling the cash flow statement:*

01

Gather the Necessary Data

02

Identify the Cash Flows from
Operating Activities

03

Identify the Cash Flows from
Investing Activities

04

Identify the Cash Flows from
Financing Activities

05

Calculate the Net Change in
Cash and Cash Equivalents

06

Prepare the Cash Flow
Statement

Key components include cash inflows from sales and services, cash outflows for operating expenses (e.g., salaries, rent, utilities), and adjustments for non-cash items like depreciation and changes in working capital.

After modelling each cash flow category (operating, investing, and financing), calculate the net cash flow for the period. The net cash flow is the sum of all cash flows and represents the overall change in the company's cash balance for the period.

Modelling the Cash Flow Statement

(Continued)

Positive operating cash flows indicate that the company's day-to-day operations are generating more cash than they are using, which is a positive sign of financial health.

➤ ***The following are some examples of how to use the cash flow statement:***

1. ***To Assess a Company's Ability to Generate Cash:*** The cash flow statement can be used to assess a company's ability to generate cash. A company that is generating more cash than it is using is in a strong financial position.
2. ***To Understand a Company's Use of Cash:*** The cash flow statement can be used to understand a company's use of cash. A company that is using cash to invest in new assets is growing. A company that is using cash to repay debt is becoming more financially secure.
3. ***To Assess a Company's Financial Flexibility:*** The cash flow statement can be used to assess a company's financial flexibility. A company that has a lot of cash on hand is more financially flexible than a company that does not have a lot of cash on hand.

critical information for investors, creditors, and management to make informed decisions about the company's financial position and performance

Module 04



Forecasting Performance

- 1 Designing a Dashboard Like Control Panel
- 2 Statistical Methods Used for Forecasting
- 3 Forecasting Sales
- 4 Forecasting Costs
- 5 Forecasting CAPEX and Depreciation
- 6 Forecasting Working Capital and Funding Needs

Designing a Dashboard Like Control Panel

- A dashboard-like control panel is developed with the appropriate financial indicators that must be monitored based on the specific problem that the model is required to solve.
- This is the interface for measuring and visualising KPIs (key performance indicators) that is extremely useful.
- Size A4 .
- Knowing what information we will offer is crucial because of the limited space available. The problem that the model must address (the model output) and the key performance metrics that determine this output ultimately direct this choice.

Identify the key metrics, data, and functionalities that the users will need to access and control

a clean and intuitive layout with easy-to-navigate menus and sections

easy to interpret and provide a clear representation of the information

dashboard focused on the most critical information and functions to avoid overwhelming the users

incorporate real-time data updates to ensure that users have access to the most current information

Designing a Dashboard Like Control Panel

Title: Financial Performance Dashboard

1. Sales Area:

- Selling Prices: Display a line chart showing the historical trend of selling prices over time.
- Sales Volume: Present a bar chart illustrating the monthly or quarterly sales volume

2. Finance Area:

- Profits: Show a line chart representing the company's historical profits over time.
- Revenues: Display a bar chart indicating the company's monthly or quarterly revenues.

3. Key Performance Indicators:

- Days Inventory Outstanding (DIO): Include a gauge or scorecard to present the DIO value and highlight whether it's within the target range.
- Days Sales Outstanding (DSO): Show another gauge or scorecard for DSO with color-coded indicators for performance.
- Days Payable Outstanding (DPO): Similarly, use a gauge or scorecard to visualize DPO's value and performance status.
- Gross Margin (assuming constant sales prices): Present a line chart displaying the gross margin trend over time, assuming constant sales prices.

(Continued)

➤ ***Categorised by individual business areas:***

- In the sales area: selling prices and sales volume.

- In the finance area: profits and revenues.

➤ ***The most important Key Performance Indicators (KPIs):***

- The Days Inventory Outstanding (DIO).

- The Days Sales Outstanding (DSO).

- The Days Payable Outstanding (DPO).

- The gross margin assuming constant sales prices.

Designing a Dashboard Like Control Panel

(Continued)

➤ ***Typical Structure***

- The growth rate of the sales volume of the long and flat products.
- Main Inputs.
- Main Outputs.

Data Sources

- Identify the primary sources of historical sales volume data for long and flat products.
- Specify any secondary data sources used for external factors affecting the forecast.

Assumptions

- List and document the main assumptions that will drive the forecast for sales volume growth.
- Assumptions may include market conditions, industry trends, product demand, pricing strategy, and any other relevant factors

Limitations or concerns

- Highlight any limitations or caveats associated with the forecast and the model's accuracy.
- Acknowledge uncertainties and potential risks that may affect the actual sales volume growth.

Main Inputs

Clearly specify the main inputs required for forecasting sales volume growth.

- These inputs may include:
 - Growth rates of the overall industry or market segment.
 - Market share trends for long and flat products.
 - Product-specific factors like marketing efforts, product innovation, or changes in customer preferences.
 - Economic indicators influencing demand.

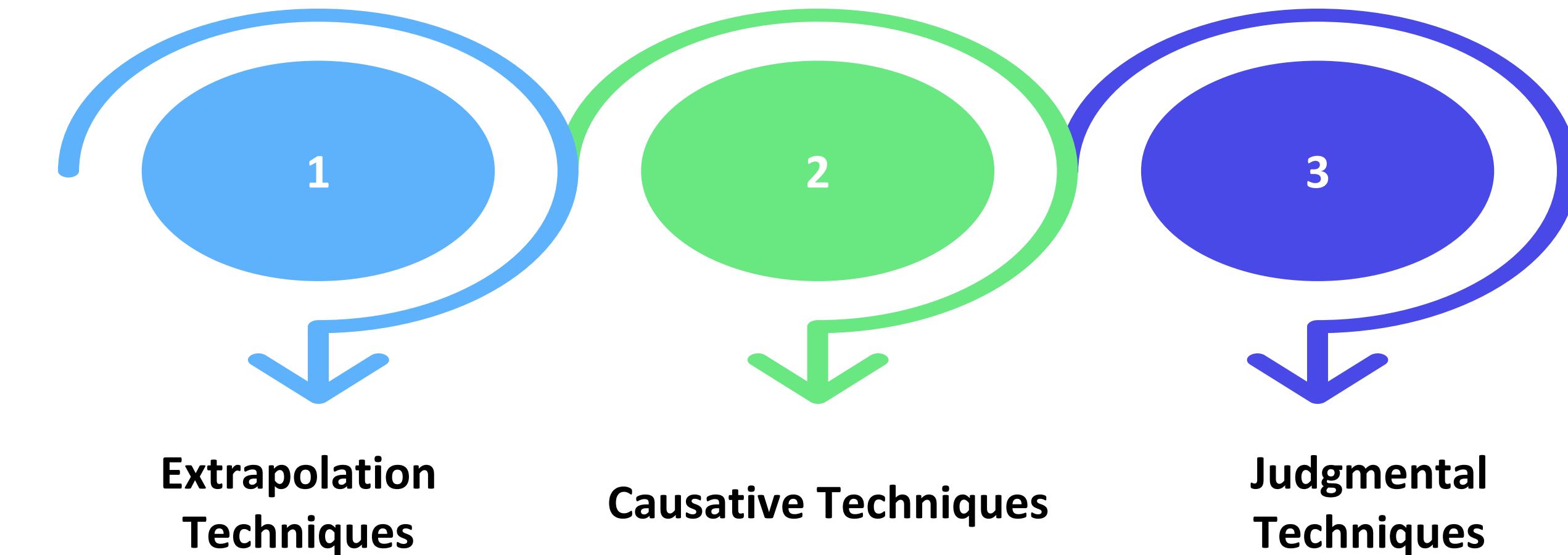
Main Outputs

- Clearly identify the main outputs of the model, which are the forecasted growth rates of the sales volume for long and flat products.
- These outputs are essential for decision-making and planning purposes.

Statistical Methods Used for Forecasting

- *The following are approaches to forecasting:*

The choice of method depends on the availability of data, the nature of the forecasted variable, and the level of uncertainty involved



based on time series analysis, involve using historical data to project future values by assuming that past patterns and trends will continue into the future

Statistical Methods Used for Forecasting

1. *Extrapolation Techniques*

- Analysis of time series.
- Make the implicit assumption that the past is a reasonable predictor of the future.
 - Applicable to established and reliable enterprises like water and gas utilities.
- The use of this technique to industry sectors undergoing growing levels of structural change may yield poor results.

can be effective for established and reliable enterprises with stable and predictable business environments

may yield poor results for industries undergoing significant structural changes or disruptions

The past may not accurately reflect the future in such rapidly changing environments.

- Time Series Analysis: Analyzing historical time series data to identify trends, seasonality, and cyclical patterns for forecasting future values.
 - Moving Averages: Calculating the average of a fixed number of recent data points to smooth out short-term fluctuations and identify underlying trends.
 - Exponential Smoothing: Weighting recent data more heavily and progressively decreasing the weights for older data points to make short-term forecasts.
- Trend Analysis: Fitting a mathematical model to historical data to project future trends and estimate their impact.

Statistical Methods Used for Forecasting

2. *Causative Techniques*

Causative techniques use causal relationships and external factors to predict future values. These methods go beyond historical data and consider other variables that influence the forecasted outcome.

- Analysis of Regression.
 - Econometric Models: Complex models that incorporate multiple variables and their interactions to understand causative relationships and predict outcomes.
- Make an effort to comprehend the fundamental relationships that govern market dynamics.
 - This insight, together with a set of future assumptions, serves as the foundation for the forecast.
- Because the underlying relationships are frequently predicted based on past data, these strategies are useful when only minor, incremental changes in assumptions are expected in the future.
 - Regression Analysis: Identifying the relationship between dependent and independent variables to estimate future values based on the relationships.
 - Leading Indicators: Using leading indicators or economic variables that tend to change before the main variable of interest to forecast future trends.

The lack of hard data means that forecasters must rely on creativity, intuition, and expert judgment to make predictions.

Statistical Methods Used for Forecasting

3. Judgmental Techniques

- Judgmental techniques involve the use of subjective judgment and expert opinion to make forecasts. These methods are used when historical data is limited or when unique circumstances require human intuition.

- Modellers are frequently requested to generate a forecast for a new product or market where no historical data is available Subjective and Qualitative Approach
- In these circumstances, forecasting can become judgmental and highly subjective.
 - While projections can be enhanced by reviewing the results of market research and examining the experiences of comparable or related items in other markets and nations, forecasting becomes more of an art than a science.

- Delphi Method: A structured approach that involves collecting opinions from a panel of experts and iteratively refining the forecasts through discussions.

- Market Research: Gathering opinions from customers, stakeholders, or industry experts to gauge future demand and trends.

- Managerial Judgment: Relying on the knowledge and experience of managers to make informed forecasts in complex or uncertain situations.

No Historical Data:

- When dealing with new products or markets, there is often no past data available to analyse for forecasting. This lack of historical data makes it challenging to apply traditional quantitative forecasting methods.

Forecasting Sales

- Most businesses rely on advanced applications to complete their work because of the complex mathematical formulae used for sales forecasting. [Incorporate Marketing and Sales Efforts](#)

1. *Existing Business;*

[Input from Sales Team](#)

[Trend Identification](#)

[Data Analysis](#)

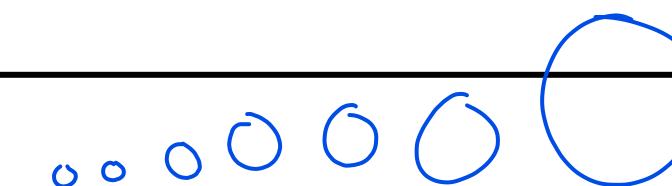
- Since there is a sales history, much simpler. [Conduct scenario analysis](#)
- The forecast represents the organisation's business plan and how sales are trending, either up or down.

2. *Start-up Business;*

[Analyse the sales funnel to understand the conversion rates at each stage \(prospects to customers\) and estimate the number of leads needed to achieve sales targets](#)

- More Complex. [Begin with a break-even analysis to determine the minimum sales volume required to cover fixed and variable costs](#)
- To produce the sales forecast, the break-even point could be used as a starting point. [Identify potential risks and uncertainties that could impact sales performance](#)
- The sales volume at which a company's total revenue and total expenses are equal is known as the break-even point.

Forecasting Sales



(Continued)

➤ **Bottom-up vs Top-down Forecasting:**

➤ The revenue forecasts discussed so far are the so-called “bottom-up”;

- Forecasts since they contain the units that will ultimately be sold.

➤ Sometimes referred to as "top-down";

- forecasting an alternative forecast total revenue without considering the various components of total revenue.

➤ When dealing with an uncertain future market;

- many modellers use both top-down and bottom-up methodologies. It is frequently advisable to use a variety of methods to increase the confidence in a forecast. For instance, the profits of a newly established business.

Bottom-up forecasting is often used when there is sufficient data and detailed information available at the micro-level, and the sales process can be broken down into discrete units

This approach is more granular and allows for a detailed understanding of the underlying drivers of revenue.

Takes into account the specific characteristics and trends of individual products or segments.



In top-down forecasting, the total revenue forecast is derived first, and then it is broken down into its individual components or units.

This approach provides a broader view of the overall market and helps identify the general direction of revenue.

Helps set high-level targets and identify overall market potential.

Forecasting Costs

1. **Costs of Goods Sold:** The forecast for Costs of Goods Sold and sales are closely connected. The level of sales directly affects how much it costs to produce items.

$$\text{COGS} = \text{Sales} - (\text{Sales} \times \text{Gross Profit Margin})$$

$$\text{or COGS} = \text{Sales} \times (1 - \text{Gross Profit Margin \%})$$

➤ **Calculation**

- To calculate the cost of goods forecast;
 - Calculate it indirectly by estimating gross profit and forecasting the percentage of gross profit margin.
 - $\text{COGS} = \text{Sales} - \text{Gross Profit} = \text{Sales} - \text{Sales} \times \text{Gross Profit Margin (\%)} = \text{Sales} \times (1 - \% \text{ GPM})$.
- Use the unit costing approach to directly calculate it.
 - Cost of Goods Sold = Number of Units Sold × Cost per Unit.
 - sometimes referred to as a standard cost.

The gross profit margin is an important indicator of a company's profitability and efficiency in producing goods

The indirect method using gross profit margin is helpful when the gross profit margin is relatively stable and can be estimated based on historical data or industry benchmarks.

The direct method using unit costing is more suitable when the cost structure is well-defined and can be easily attributed to individual units of products or services.

Forecasting Costs

(SG&A) Selling, General, and Administrative Expenses (SG&A)

2. *Selling General Administrative & Operating Expenses*

➤ **OPEX**

- Contain ~~17~~ categories, such as payroll, cleaning, etc., and are distributed across various departments depending on the industry.

costs incurred by a company to support its day-to-day operations and are typically not directly tied to the production of goods or services

➤ **Approaches**

- You have to calculate each cost for a new business from scratch.
- The per cent-of-sales technique and comprehensive regression analysis are two options for an older business.

SG&A-to-sales ratio 20%

projected sales £1m

the forecasted expenses $\text{£1m} \times 20\% = \text{£200,000}$

Forecasting Costs

(Continued)

Fixed costs are typically time-bound and are incurred regularly, irrespective of short-term fluctuations in production or sales.

➤ ***Fixed and Variable***

- Fixed costs are expenses that a business must cover regardless of the volume of its sales
- Includes rent, utilities, insurance, service costs (such as accounting fees), utilities (e.g., electricity consumed in the offices and not during production), and salaries Variable costs depend on the volume of production.
- They are lower when output or sales are lower and greater when production or sales are higher.
- Includes raw materials, labour (mostly paid on an hourly basis), utilities (such as electricity related to the operation of machinery for production purposes), packing, and delivery expenses.

Variable costs, as the name suggests, vary with the level of production or sales volume.

These costs increase as production or sales increase and decrease when production or sales decrease.

Forecasting CAPEX and Depreciation

- Capital Expenditures (CAPEX) are the purchases of fixed assets such as buildings, office equipment, furniture and fittings, computers, motor vehicles, and so on.
 - Fixed assets are objects that are not for resale and have a longer economic life than a year.
 - CAPEX is a cash flow item (cash flow from investing activities); depreciation affects financial statements (balance sheet and income statement).
 - It is critical for a financial modeler to comprehend the distinctions between all three.
 - Depreciation rates differ amongst fixed asset categories.
 - The term during which an asset is depreciated under International Financial Reporting Standards (IFRS) is its projected useful life.

IAS16 for FAs

IFRS 16 for leases

Depreciation is a non-cash expense that represents the allocation of the cost of a fixed asset over its estimated useful life.

Compliance with accounting standards, such as International Financial Reporting Standards (IFRS) or Generally Accepted Accounting Principles (GAAP)

Forecasting CAPEX and Depreciation

(Continued)

- The estimated useful life is the amount of time an asset will be used to create revenue for the company.
- Depreciation rates under IFRS differ from those used for income tax purposes, which vary according on the nation in which the company operates.

It is important to differentiate the accounting treatment of depreciation under International Financial Reporting Standards (IFRS) and income tax regulations, as they often use different depreciation rates and methods

The estimated useful life is an estimate based on the company's experience, industry norms, and other relevant factors.

It represents the management's best judgment of how long the asset will be economically viable and productive in generating revenue.

Forecasting Working Capital and Funding Needs

- In accounting terms, working capital is defined as the sum of current assets and current liabilities.
- When we talk about working capital in this book, we mean commercial working capital, which is defined as.
 - Commercial Working Capital = Accounts Receivable + Inventory Accounts Payable.
- Why are businesses running out of cash?
 - Because its operations are going well and it is expecting rapid expansion.
 - The more cash it has locked up in working capital and the greater its funding requirements.

Inventory Management Issues:

Excessive inventory levels or slow-moving inventory can lead to cash being tied up in unsold goods. Efficient inventory management is crucial to maintaining healthy cash flow

Slow Collections and High Receivables

Inadequate management of working capital can lead to a situation where the company has a high level of accounts receivable and inventory, but its accounts payable are not well-managed. This imbalance can result in cash flow problems

If a company's customers take longer to pay their invoices or if there are delays in collections, it can tie up cash that could otherwise be used for day-to-day operations or investment

Forecasting Working Capital and Funding Needs

(Continued)

➤ ***When forecasting working capital, we shall always do it as follows:***

1. We will estimate revenue and annual turnover. update the working capital forecast based on actual performance and changes in business conditions
2. As previously indicated, we shall forecast the cost of commodities sold directly or indirectly.
3. Assumptions will be made concerning future Days Sales Outstanding, Days Payable Outstanding, and Days Inventory Outstanding.
4. We will forecast accounts receivable, accounts payable, and inventories based on the statistics from the preceding steps.

DSO represents the average number of days it takes to collect receivables

DPO represents the average number of days it takes to pay suppliers

DIO represents the average number of days inventory is held before being sold

Forecast Accounts Receivable: Use the revenue forecast and DSO assumption to estimate the accounts receivable

Forecast Accounts Payable: Use the COGS forecast and DPO assumption to estimate the accounts payable: Multiply the average daily cost of goods sold by the projected DPO to determine the accounts payable balance

Module

05



Business Valuation

1

Valuation Approaches

2

Applying the DCF Method

3

Calculation of Free Cash Flows

4

Calculating the Weighted Average Cost of Capital

5

Estimating the Terminal Value

6

Enterprise Value Adjustment

Valuation Approaches

- *There are three main approaches to valuing a business: the asset approach, the income approach, and the market approach:*



Asset Approach

The asset approach values a business based on the value of its assets and liabilities. It is particularly relevant for companies with significant tangible assets, such as real estate or manufacturing equipment. This approach includes the cost approach, which values the business based on the cost to replace its assets, and the net asset value (NAV) approach, which deducts liabilities from the total value of assets.



Income Approach

The income approach determines the value of a business based on its expected future income or cash flows. The most widely used method within the income approach is the discounted cash flow (DCF) analysis. DCF involves projecting future cash flows and discounting them back to the present value using a discount rate that represents the risk associated with the investment.



Market Approach

The market approach involves comparing the business to similar companies that have been sold or are publicly traded. This approach uses market multiples, such as price-to-earnings (P/E) ratio or price-to-sales (P/S) ratio, to estimate the value of the business based on the multiples of comparable companies.

Valuation Approaches

1. **Asset Approach:** This approach values the business based on the value of its assets, less the value of its liabilities. This approach is often used for businesses that are not profitable or that have few intangible assets. calculating the value of its tangible and intangible assets and deducting its liabilities
2. **Income Approach:** This approach values the business based on the present value of its future earnings or cash flows. This approach is often used for businesses that are profitable and have a history of generating cash flow. discounted cash flow (DCF) analysis and the capitalization of earnings approach
3. **Market Approach:** This approach values the business based on the prices paid for similar businesses in recent transactions. This approach is often used for businesses that are publicly traded or that have been sold recently. enterprise value-to-EBITDA (EV/EBITDA) ratio

Each approach provides a unique perspective on the value of a business, and they can be used individually or in combination, depending on the specific circumstances and purpose of the valuation

The valuation process requires a careful analysis of the company's financials, market conditions, industry trends, and other relevant factors to arrive at a fair and accurate assessment of the business's worth

Enterprise value (EV) measures a company's total value, often used as a more comprehensive alternative to equity market capitalization.

Enterprise value includes in its calculation the market capitalization of a company but also short-term and long-term debt and any cash on the company's balance sheet.

Enterprise value is used as the basis for many financial ratios that measure a company's performance.

Applying the DCF Method

- The discounted cash flow (DCF) method is a valuation method that uses the present value of future cash flows to determine the value of an asset. The discounted cash flow method is based on the idea that the value of an asset is the present value of all future cash flows that it will generate.

The actual value of the asset may be higher or lower than the DCF value, depending on a number of factors, such as the accuracy of the cash flow estimates and the level of risk associated with the asset

- ***To calculate the discounted cash flow value of an asset, you need to:***

- Estimate the future cash flows that the asset will generate.
- Choose a discount rate. The discount rate is the rate of return that you expect to earn on an investment of similar risk.
- Calculate the present value of the future cash flows.

The discount rate should be chosen based on the company's risk profile, industry norms, and prevailing market conditions

Once the future cash flows and the discount rate are determined, the present value of each cash flow is calculated by dividing each future cash flow by the $(1 + \text{discount rate})$ raised to the power of the corresponding period

The formula for discounting cash flows is: $PV = CF / (1 + r)^n$, where PV is the present value, CF is the cash flow in a specific period, r is the discount rate, and n is the number of periods.

The present values of all the projected cash flows and the terminal value are then summed to arrive at the discounted cash flow value of the asset.

This value represents the present worth of all expected future cash flows associated with the asset.

Calculation of Free Cash Flows

- Free cash flow (FCF) is a measure of a company's cash flow available after accounting for capital expenditures and working capital changes. Free cash flow is a valuable metric for investors because it provides a more accurate picture of a company's financial health than net income.
- ***There are two main ways to calculate Free cash flow:***
 - ***Operating Cash Flow Minus Capital Expenditures:*** This is the most common way to calculate Free cash flow . Operating cash flow is the cash flow generated from a company's core business operations. Capital expenditures are the cash outflows used to acquire or maintain long-term assets, such as property, plant, and equipment.

Begin by calculating the operating income of the business, also known as Earnings Before Interest and Taxes (EBIT)

Add back any non-cash expenses like depreciation and amortization to the operating income.

Take into account changes in working capital, which includes adjustments to accounts receivable, accounts payable, and inventory

Subtract the capital expenditures (CAPEX) from the previous year

Account for taxes by multiplying the company's taxable income by the effective tax rate

Calculate Free Cash Flow

add or subtract the values obtained from the previous steps to calculate the Free Cash Flow for the business

Free Cash Flow (FCF) is:

$$FCF = EBIT + \text{Depreciation/Amortization} - \text{Changes in Working Capital} - CAPEX - \text{Taxes}$$

Calculation of Free Cash Flows

(Continued)

- Net income plus non-cash expenses minus changes in working capital: This method is more complex, but it provides a more comprehensive view of a company's Free cash flow . Net income is the company's profit after accounting for all expenses, including taxes. Non-cash expenses are expenses that do not require a cash outflow, such as depreciation and amortisation. Changes in working capital are the changes in a company's current assets and liabilities, such as accounts receivable and inventory.

Free Cash Flow (FCF) = Net Income + Non-Cash Expenses - Changes in Working Capital

$$WACC = (E/V * Re) + (D/V * Rd * (1 - Tc))$$

E = Market value of the company's equity (stock price * total number of shares outstanding)

V = Total market value of the company (E + D, where D is the market value of debt)

Tc = Corporate tax rate

Re = Cost of equity (the required rate of return expected by shareholders)

D = Market value of the company's debt

Rd = Cost of debt (the interest rate or yield to maturity on the company's debt)

Calculating the Weighted Average Cost of Capital

- The weighted average cost of capital (WACC) is a measure of a company's cost of capital, taking into account the relative proportions of debt and equity used to finance the company.
- weighted average cost of capital is used in capital budgeting to determine the discount rate for future cash flows.
- weighted average cost of capital is used to calculate the present value of a company's future cash flows.
- The present value is the amount of money that would be needed today to generate the same stream of future cash flows.
- The higher the weighted average cost of capital, the lower the present value of the company's future cash flows.
- There are a number of factors that can affect a company's weighted average cost of capital, including the company's industry, its financial leverage, and its risk profile.

Calculating the Weighted Average Cost of Capital

(Continued)

- A company in a high-growth industry with a lot of debt will typically have a higher WACC than a company in a low-growth industry with little debt.
- The weighted average cost of capital is an important input into the discounted cash flow (DCF) method of business valuation.
- The discounted cash flow method calculates the value of a company by discounting its future cash flows to the present day. The weighted average cost of capital is used as the discount rate in the discounted cash flow calculation.
- The discounted cash flow method is a widely accepted method of business valuation.
- It is relatively easy to understand and it is based on sound financial principles.
- However, the discounted cash flow method can be sensitive to the assumptions that are made about the company's future cash flows and the weighted average cost of capital.

Estimating the Terminal Value

- The terminal value is the present value of a company's future cash flows beyond a certain point in time. It is used in discounted cash flow (DCF) analysis to calculate the value of a company.
- ***There are two main methods for estimating the terminal value:***
 - The perpetuity growth method: This method assumes that the company's cash flows will grow at a constant rate in perpetuity.
 - The exit multiple methods: This method assumes that the company will be sold at a certain multiple of its earnings or cash flow in the future.

exit multiple method

"Last Year Cash Flow" represents the cash flow in the last year of the explicit forecast period

Terminal Value (TV) = Last Year Cash Flow × Exit Multiple

The exit multiple is determined by analysing similar companies' valuations or recent acquisitions in the industry

Estimating the terminal value is a critical step in the discounted cash flow (DCF) valuation method

The terminal value represents the present value of all future cash flows beyond the explicit forecast period, which typically extends into perpetuity

Since forecasting cash flows indefinitely is impractical, the terminal value allows us to capture the value of the company beyond the forecast horizon

Terminal Value (TV) = Cash Flow in Year (n+1) / (Discount Rate - Perpetual Growth Rate)

"Cash Flow in Year (n+1)" is the cash flow expected in the first year beyond the explicit forecast period

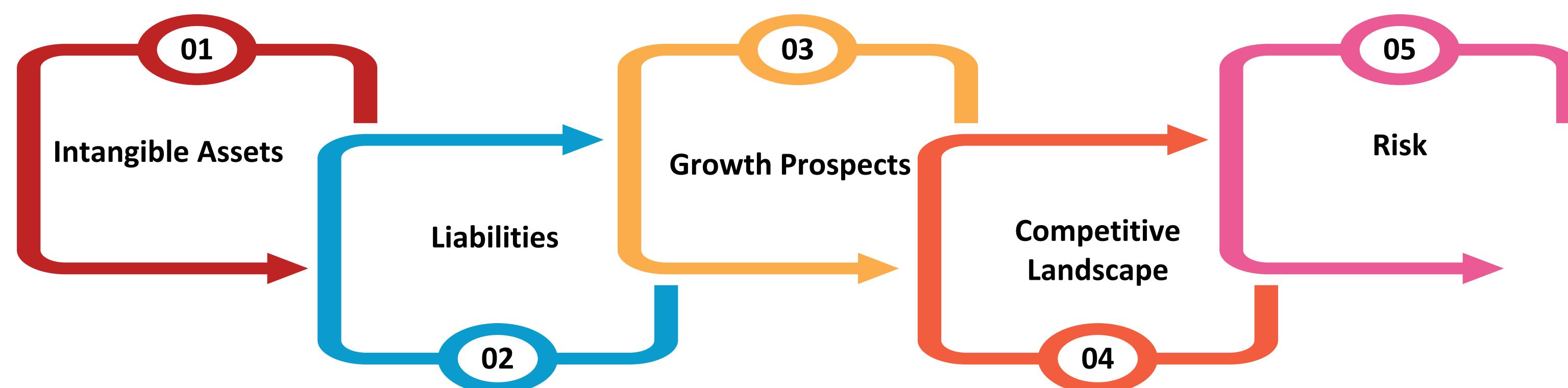
"Discount Rate" is the company's weighted average cost of capital (WACC)

"Perpetual Growth Rate" is the assumed long-term growth rate for the company's cash flows

. It is used to assess the overall value of a company, irrespective of its capital structure. When valuing a company, it is essential to consider any adjustments to Enterprise Value to account for certain items that might impact the overall valuation.

Enterprise Value Adjustment

- Enterprise value adjustment is a process of adjusting the enterprise value of a company to reflect specific factors that may not be fully captured by traditional valuation methods.
- These factors can include intangible assets, such as brand value or customer relationships, or liabilities, such as environmental remediation costs.
- *The following are some of the most common factors that may be adjusted in an enterprise value calculation:*





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