

MANAGEMENT & COST ACCOUNTING

Alnoor Bhimani • Charles T. Horngren
Srikant M. Datar • Madhav V. Rajan

Seventh Edition



MANAGEMENT AND COST ACCOUNTING



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London School of Economics and Political Science

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In memory of Charles T. Horngren 1926–2011

Chuck Horngren revolutionised cost and management accounting. He loved new ideas and introduced many new concepts. He had the unique gift of explaining these concepts in simple and creative ways. He epitomised excellence and never tired of details, whether it was finding exactly the right word or working and reworking assignment materials.

He combined his great intellect with genuine humility and warmth and a human touch that inspired others to do their best. He taught us many lessons about life through his amazing discipline, his ability to make everyone feel welcome, and his love of family.

It was a great privilege, pleasure, and honour to have known Chuck Horngren. Few individuals will have the enormous influence that Chuck had on the accounting profession. Fewer still will be able to do it with the class and style that was his hallmark. He was unique, special and amazing in many, many ways and, at once, a role model, teacher, mentor and friend.

He is deeply missed.

Alnoor Bhimani

London School of Economics and Political Science

Srikant M. Datar

Harvard University

Madhav V. Rajan

University of Chicago

AB: For all women who bring balance to the world

SD: Swati, Radhika, Gayatri, Sidharth

MVR: Gayathri, Sanjana, Anupama

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| Case number | Case details | Short/long | Manufacturing/service | Budgeting | Pricing | Ethical issues | Environmental issues | Activity-based costing | Behaviour/organisation factors | Cash flow | Costing system | Profit/loss measurement | ROI | Transfer pricing system | Management control system | Balanced scorecard | Performance measurement | Variance | Market assessment/competitor analysis | Tableau de bord | Strategic issues | Profitability | Country/area of origin |
|-----------------|--|------------|-----------------------|-----------|---------|----------------|----------------------|------------------------|--------------------------------|-----------|----------------|-------------------------|-----|-------------------------|---------------------------|--------------------|-------------------------|----------|---------------------------------------|-----------------|------------------|---------------|------------------------|
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| 101 | The European Savings Bank: Legal and ethical issues involved in software piracy. | short | SS | | | ● | | | ● | | | | | | | | | | | | | | Europe |
| 102 | The ethical dilemma at Northlake: How far does the notion of 'different costs for different purposes' extend? | mid | M | | | ● | ● | | | | | | | | | | | | | | ● | | Canada |
| 103 | Electronic Boards plc: Design of costing systems for a firm operating in a high-tech environment. Simplistic vs complex costing. | short | M | ● | | | | ● | ● | | ● | | | | | | ● | | | | ● | | N/A |
| PART II | | | | | | | | | | | | | | | | | | | | | | | |
| 201 | Permaclean Products plc: Analysis of costs and price-demand information using past sales data to make decisions on product pricing. | mid | M | | ● | | | | | | ● | ● | | | | | | | | | | ● | UK |
| 202 | The Good Night Motel: Break-even and contribution margin analysis to assess whether to accept or reject an offer. | mid | S | | ● | | | | | | | ● | | | | | | | | | | | Canada |
| PART III | | | | | | | | | | | | | | | | | | | | | | | |
| 301 | Zeros plc: Use of ROI to measure divisional performance. Use of costing systems to produce meaningful profit statements. | mid | M | ● | ● | | | | ● | | ● | ● | ● | | | | ● | | | | | ● | UK |
| 302 | Instrumental Ltd: Analysis of budgeted vs actual performance for different organisational functions. Considers strategic vs operational issues. | mid | M | ● | ● | | | | | ● | ● | ● | | | | | ● | ● | | | ● | | UK |

| Case number | Case details | Short/long | Manufacturing/service | Budgeting | Pricing | Ethical issues | Environmental issues | Activity-based costing | Behaviour/organisation factors | Cash flow | Costing system | Profit/loss measurement | ROI | Transfer pricing system | Management control system | Balanced scorecard | Performance measurement | Variance | Market assessment/competitor analysis | Tableau de bord | Strategic issues | Profitability | Country/area of origin |
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| | PART IV | | | | | | | | | | | | | | | | | | | | | | |
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| | PART V | | | | | | | | | | | | | | | | | | | | | | |
| 501 | High-Tech Ltd: Importance of strategy and cost allocation within the IT manufacturing industry. Considers just-in-time inventory systems. | long | M & SS | | ● | | | ● | ● | | ● | ● | | | ● | ● | | | ● | ● | ● | | UK/France |
| 502 | Tanner Pharmaceuticals and the price of a new drug: Issues of pharmaceutical drug prices in the light of competitive strategy. | mid/long | | | ● | | | | | | | ● | | | | | | | | | ● | | USA |
| 503 | Osram: Analysis of potential savings made by newer, more efficient consumables as opposed to traditionally used ones. | mid/long | M | ● | ● | | | | | | ● | ● | | | | | | | ● | | | ● | Germany |

PREFACE

Accounting influences our lives. Whether or not one uses accounting information, accounting alters our social, economic and physical environment. And of course, it impacts organisations and altering what we do and the decisions we make. Corporate action regarding new product developments, pricing strategy, staff recruitment and salary levels are usually directly influenced by accounting information. At times, accounting motivates certain types of managerial behaviours and discourages others. This book is about understanding the preparation and use of management and cost accounting information, taking account of how it influences decisions. But accounting is not a pre-given in form or process and in this sense accounting is also continuously being reshaped by its context. The book therefore also extensively discusses how different factors alter accounting techniques and processes.

As we'll see in Chapter 1, management accounting is concerned with providing managers with financial and other types of information so they can pursue diverse goals. Cost accounting, which is sometimes used interchangeably with management accounting, is more concerned with information on the acquisition and consumption of resources. We want to address issues relating to the design, use and role of accounting information in the management of organisational activities. We will do this by balancing technical detail with enterprise insight so we can focus on how to best support management action.

Management and cost accounting is a dynamic discipline which differs across firms, nations, industrial settings and management functions. It entails the application of different techniques, which must constantly adapt given the fast pace of changes facing enterprises today. Consequently, the book covers a comprehensive suite of techniques and areas including job costing and process costing, cost–volume–profit relationships, capital investment decisions, budgetary control and responsibility accounting. It looks also at quality costing, throughput issues, non-financial performance measures and strategic analysis. But we are especially concerned with the forces that impact these management accounting practices right now. So all these techniques are discussed in the context of changes witnessed by organisations on an ongoing basis. We argue that the most significant force affecting firms today is technological change and innovation. Digital technologies are rapidly impacting business models and organisational processes and they are doing so in a deep and extensive way. This new edition of the book is thus packed with coverage on how organisations are being digitally transformed and what this implies for management accountants. We look at numerous illustrations of companies using 'big data' and analytics as they draw insights from digitised data. We consider how the 'Internet of Things', robotics, artificial intelligence and other digital innovations are impacting management accounting information deployment. Aside from the digitalisation of enterprises, we consider also the relevance of sustainability concerns, enterprise governance and new business model strategies which influence how firms utilise management accounting information.

To ensure currency and coverage of modern applications of management accounting, we have introduced more than twenty new accountancy examination questions in this edition of the book. Throughout the book, we place emphasis on ensuring company-relevant examples and illustrations of management and cost accounting practices. So although general aspects of different topics and issues are extensively covered, we also discuss situational and organisational adaptations of generic techniques to ensure that you understand the applicability of management accounting approaches. To achieve this, we have added new case studies that have recently been used very successfully by business schools across the globe. We ensure that the reality of enterprise management is reflected in the book and so, rather than accord a separate chapter to

consider organisational and behavioural aspects of management accounting, we integrate this throughout chapters in the book. We further cover global themes that are of relevance to managers in modern enterprises in terms of corporate responsibility and ethical issues. Finally, we have included in this edition, many new survey and study results to illustrate actual management accounting concerns by executives from across the world.

We draw comfort in observing that other management accounting writers try to use our approach of practical examples, case studies and coverage of research findings, while also sharing our preference for the format and structure adopted here. We sharpen this in this edition by providing the very latest in corporate examples, survey findings and case studies. This ensures that you will become familiar with concepts that are of relevance and concern to organisations today.

Deciding on the sequence of chapters in a management and cost accounting textbook that spans introductory through to relatively detailed analysis of material is a challenge we have met successfully. Professors tend to have a preferred way of organising their course material. The five-part structure of this text and the sequencing of chapters have been designed to facilitate flexibility and diversity in the teaching of different topic areas and the use of the text for a range of courses and levels. An outline of the coverage and component chapters of each part is given in the part openers.

Assessment material

This book includes a high quantity and broad range of assessment material to further facilitate the use of the text on a diverse range of courses:

- **Review questions:** These short questions encourage students to review and/or critically discuss their understanding of the main topics and issues covered in each chapter, either individually or in a group.
- **Exercises:** These comprehensive questions are graded and grouped by their level of difficulty: basic, intermediate and advanced. Each question is preceded by a note of its topic coverage and an indication of the time it should take to complete. Where appropriate, the exercises include questions taken from examinations of several professional accountancy bodies. Fully worked solutions to a selection of exercises in each chapter (identified by an asterisk) are provided in Appendix A.

Case study problems

At the end of each of the five parts are problem-based illustrative cases. Each is more substantive and typically more demanding than the end-of-chapter exercises, integrating topics from several chapters in each of the core parts of the text, allowing you to apply your understanding of accounting concepts, issues and techniques within a broader organisational context, and to develop your critical thinking and analytical skills. The questions which follow the case material include some aspects suitable for group discussion/assignment.

Appendix B: Compound and interest rate tables

Students will need to use these tables in studying Chapter 13 of the text and undertaking the end-of-chapter exercises. For ease of reference, we recommend students make a photocopy of these pages.

Glossary

This comprises an alphabetical listing of all the key terms, including a concise definition, so allowing revision of all the key concepts and techniques in the text.

Academic supplements

Academics and lecturers who adopt this text are provided with a range of additional materials to assist in the preparation and delivery of courses. These include:

- complete, downloadable Instructor's Manual with teaching ideas and solutions to end-of-chapter exercises not given in the text;
- suggested teaching notes to all case study problems;
- editable PowerPoint slides and overhead projector masters, organised by chapter, allowing you to provide a lecture or seminar presentation (and/or to print handouts). These incorporate colourful graphics, outlines of chapter material, text exhibits, additional examples and graphical explanations of difficult topics;
- solutions to additional questions and spreadsheet problems.

Alnoor Bhimani
Srikant Datar
Madhav Rajan
March 2019

Lecturer Resources

For password-protected online resources tailored to support the use of this textbook in teaching, please visit www.pearsoned.co.uk/bhimani



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PART I

Management and cost accounting fundamentals

The first part of the book is intended to provide an introduction to fundamental concepts and ideas in management and cost accounting. Chapter 1 considers the role of accounting and accountants in organisations. Chapters 2–7 discuss relevant technical and broader organisational issues in the design and functioning of cost systems. Specifically, Chapter 2 provides an introduction to costing terminology and its aims. Chapters 3 and 4 discuss what might be considered ends of a continuum in costing systems: job order costing and process costing. Chapter 5 addresses fundamental cost allocation issues while Chapter 6 deals with joint-costing situations. The final chapter in this part discusses absorption costing and variable costing as two distinct approaches to stock costing.

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CHAPTER 1

The manager and management accounting

Former accountants have headed many large companies across the world, including Coca-Cola, Siemens, Accenture, P&O, Vodafone, Bass, Royal Bank of Scotland, Asda and Nike. Finance leaders' roles in organisations change continuously. In the UK, 55% of Chief Executive Officers (CEOs) of FTSE 100 (a share index of the 100 companies listed on the London Stock Exchange with the highest market value) have a background in accounting or financial management and one in four are qualified accountants (Robert Half 2018). About 30% of Fortune 500 (the 500 largest US industrial corporations by revenue) CEOs spend the first four years of their careers developing a strong foundation in finance and 15% headed the finance function before taking the helm (Ndegwa 2017). The rapid rise of the Chief Financial Officer (CFO) is unrivalled by any other corporate role. This is partially because accounting executives help guide companies at the most senior level and need to adopt an ever-widening and shifting focus of attention.

Across virtually all organisations, accountants' duties involve management planning, control and decision making, although the enterprise context determines the specific accounting and financial management responsibilities they must deliver on. The demands on accounting and finance professionals always differ and there is no one-size-fits-all in management accounting. Recently, many accountants have broadened their activities to include risk management, business strategy, communication and digital transformation roles. CPA Canada, a national organisation representing the Canadian accounting profession with 210 000 qualified members, considers that: 'To excel, CFOs today must go beyond stewardship to act as catalysts of change and strategists, harnessing resources across the organisation to accomplish strategic and financial objectives, helping to create a risk-intelligent culture, transforming data into information and insights and defining the company's future alongside the CEO' (CPA Canada 2018). Managers in all companies, whether small or large, must understand how revenues and costs behave or they risk losing control of the performance of their firms. Managers' use of management accounting information goes beyond this, however, to encompass making decisions about research and development, production planning, budgeting, pricing, and the products or services to offer customers. Strategic action in enterprises can also be extensively informed by management accounting.

Learning objectives

After studying this chapter, you should be able to:

- Differentiate management accounting from financial accounting
- Recognise the growing role of strategy in management accounting processes
- Identify five broad purposes of accounting systems
- Understand how accounting can influence planning, control and decision making
- Distinguish between the scorekeeping, attention-directing and problem-solving functions of management accounting
- Recognise that economic benefits, costs as well as contextual and organisational process issues are relevant to accounting systems design and operation
- Understand how companies add value
- Explain why digitalisation is management accounting's most important challenge today

How managerial activities and decisions link to accounting intelligence continuously evolves. This book addresses questions such as: What types of decisions do managers make? How can accounting help managers make these decisions? Are managerial needs proactively being met by management accounting solutions? In this first chapter, we look at some dimensions of the role of management accounting in modern enterprises, why management accounting is subject to continual change and what represents today the greatest challenge to the field. A consideration of these issues will give us a framework for studying the succeeding chapters.

Management accounting, financial accounting and cost accounting

A distinction is often made in practice between management accounting and financial accounting. **Management accounting** measures, analyses and reports financial information and non-financial information that are intended primarily to assist managers in fulfilling the goals of the organisation. A management accounting system is an important facet of overall organisational control, as is discussed later in this book. The Chartered Institute of Management Accountants (CIMA) – the largest management accounting body in the world – sees management accounting as an integral part of management. It considers management accounting as combining accounting, finance and management with leading-edge techniques that drive successful businesses. Individual managers often require the information in an accounting system to be presented or reported differently. Consider, for example, sales order information. A sales manager at Porsche may be interested in the total amount of sales in Euros to determine the commissions payable to salespeople. A distribution manager at Porsche may be interested in the sales order quantities by geographic region and by customer-requested delivery dates to ensure vehicles get delivered to customers on time. A manufacturing manager at Porsche may be interested in the quantities of various products and their desired delivery dates so that they can develop an effective production schedule. To simultaneously serve the needs of all three managers, Porsche creates a database consisting of small, detailed bits of information that can be used for multiple purposes. For instance, the sales order database will contain detailed information about a product, its selling price, quantity ordered, and delivery details (place and date) for each sales order. The database stores information in a way that allows different managers to access the information they need.

Professional management accountants apply the principles of accounting and financial management to create, protect, preserve and increase value for the shareholder of for-profit and not-for-profit enterprises in the public and private sectors. They might engage in the identification, generation, presentation, interpretation and use of relevant information relevant to:

- inform strategic decisions and formulate business strategy
- plan long-, medium- and short-term operations
- determine capital structure and fund that structure
- design reward strategies for executives and shareholders
- inform operational decisions
- control operations and ensure the efficient use of resources
- measure and report financial and non-financial performance to management and other stakeholders
- implement corporate governance procedures, risk management and internal controls
- explore the potential for managerial and organisational value creation.

Management accounting information and reports do not have to follow set principles or rules. The key questions are always: (1) how will this information help managers do their jobs better; (2) do the benefits of producing this information exceed the costs; and (3) does the information recognise what is specific about the organisational context?

Financial accounting and management accounting have different goals. **Financial accounting** focuses on external reporting that is directed by authoritative guidelines. Organisations are required to follow these guidelines in their financial reports to outside parties. Financial accounting is guided by prescribed accounting standards. Principles define the set of revenue and cost measurement rules and the types of item that are classified as assets, liabilities or owners' equity in balance sheets which form the standards applicable. Sources of authority for accounting regulation differ across countries. In Spain, for instance, the Instituto de Contabilidad y Auditoria de Cuentas (ICAC) has been appointed by the government for this purpose. In the UK, the Financial Reporting Council (FRC) has the authority to issue accounting standards. The FRC's regulator philosophy is underpinned by its belief that promoting confidence in corporate reporting and governance can make the creation of wealth more likely. In France, the Autorité des Normes Comptable (ANC), a public body, oversees accounting legislation, whereas in Denmark, the Føringen af Statsautoriserede Revisører (FSR), a professional accounting body, oversees the setting of accounting standards. Other bodies which are concerned with accounting standards include: in Australia, the Australian Accounting Standards Board (AASB); in China, the China Accounting Standards Committee (CASC); and in South Africa, the South Africa Accounting Standards Board. In contrast, management accounting is not restricted by accounting principles that guide financial reporting. For example, a car manufacturer may present a particular estimated 'value' of a brand name (say, the Volvo brand name) in its *internal* financial reports for marketing managers, although doing so is not in accordance with the legal framework within which externally oriented financial reports can be prepared in Sweden.

While the work of management accountants and financial accountants tends to be organisation-specific, some broad differences generally exist. They may be categorised as follows:

- *Regulations.* Management accounting reports are generally prepared for internal use and no external regulations govern their preparation. Conversely, financial accounting reports are generally required to be prepared according to accounting regulations and guidelines imposed by law and the accounting profession.
- *Range and detail of information.* Management accounting reports may encompass financial, non-financial and qualitative information which may be very detailed or highly aggregated. Financial accounting is usually broad-based, lacking detail and intended to provide an overview of the position and performance of an organisation over a time period. It tends to focus on financial information.
- *Reporting interval.* Management accounting reports may be produced frequently – on an hourly, daily or weekly basis, possibly to span several years. The interval covered by management accounting information will be dictated by the decision-making and control needs of the information users. Conversely, financial accounting reports are produced annually. Some large companies also produce semi-annual and quarterly reports.
- *Time period.* Management accounting reports may include historical and current information, but also often provide information on expected future performance and activities. Financial accounting reports provide information on the performance and position of an organisation for the past period. They tend to be backward-looking.

Exhibit 1.1 summarises the major differences between management accounting and financial accounting. Note, however, that reports such as balance sheets, income statements, and statements of cash flows are common to both management accounting and financial accounting.

Cost accounting measures and reports financial and non-financial information related to the organisation's acquisition or use of resources. It provides information for both management accounting and financial accounting. For example, calculating the cost of a product is a cost accounting function that meets both the financial accountant's stock-valuation needs and the management accountant's decision-making needs (such as deciding how to price products and choosing which products to promote). However, today most accounting professionals take the perspective that cost information is part of the management accounting

Exhibit 1.1**Major differences between management and financial accounting**

| | Management Accounting | Financial Accounting |
|------------------------------------|--|---|
| Purpose of information | Help managers make decisions to fulfil an organisation's goals | Communicate an organisation's financial position to investors, banks, regulators, and other outside parties |
| Primary users | Managers of the organisation | External users such as investors, banks, regulators, and suppliers |
| Focus and emphasis | Future-oriented (budget for 2019 prepared in 2018) | Past-oriented (reports on 2018 performance prepared in 2019) |
| Rules of measurement and reporting | Internal measures and reports do not have to follow relevant accounting standards but are based on cost-benefit analyses | Financial statements must be prepared in accordance with relevant accounting standards and be certified by external, independent auditors |
| Time span and type of reports | Varies from hourly information to 15 to 20 years, with financial and non-financial reports on products, departments, territories, and strategies | Annual and quarterly financial reports, primarily on the company as a whole |
| Behavioural implications | Designed to influence the behaviour of managers and other employees | Primarily reports economic events but also influences behaviour because manager's compensation is often based on reported financial results |

information collected to make management decisions. Thus, the distinction between management accounting and cost accounting is not so clear-cut, and we often use these terms interchangeably in the book.

A central task of managers is cost management. We use the term **cost management** to describe the actions managers undertake in the short-run and long-run planning and control of costs that increase value for customers and lower the costs of products and services. An important component of cost management is the recognition that prior management decisions often commit the organisation to the subsequent incurrence of costs. Consider the costs of handling materials in a production plant. Decisions about plant layout and the extent of physical movement of materials required for production are usually made before production begins. These decisions greatly influence the level of day-to-day materials handling costs once production begins. For this reason, cost management has a broad focus. It typically includes the continuous reduction of costs and encompasses the whole life cycle of the product from product conception to deletion. Cost management is often carried out as a key part of general management strategies and their implementation. Examples include enhanced customer satisfaction programmes, quality initiatives and more efficient supplier relationships management via the Internet. In other words, cost management is not only about reducing costs. Cost management also includes making decisions to incur additional costs with the goal of enhancing revenues and profits. Whether or not to enter new markets, implement new organisational processes, and change product designs are also cost management decisions. Information from accounting systems helps managers to manage costs, but the information and the accounting systems themselves are not cost management.

Ultimately, management accounting's primary purpose is to enhance value creation within both private and public sector organisations. The management accountant must make use of a sound body of knowledge, as well as abide by ethical guidelines (discussed in the appendix of this chapter). Of particular relevance is the growing contribution which management accountants make to strategic financial management information production and analysis and to strategic management action itself.

Strategic decisions and management accounting

Many organisations seek to be more expansionist, entrepreneurial, risk taking and innovative as a conscious move away from inwardly focused management techniques. Entirely new markets are emerging for products and services and avant-garde innovative firms are reaping significant benefits through innovative management approaches and a growing focus on action through focused strategic information.

A company's strategy specifies how the organisation matches its own capabilities with the opportunities in the marketplace. In other words, strategy describes how an organisation creates value for its customers while distinguishing itself from its competitors. A business might be thought to follow one of two broad strategies (we consider this further in Chapter 20). Some companies, such as Easyjet and Carrefour, follow a cost leadership strategy. They profit and grow by providing quality products or services at low prices and by judiciously managing their costs. Other companies, such as Apple and Bang & Olufsen, follow a product differentiation strategy. They generate profits and growth by offering differentiated or unique products or services that appeal to their customers and are often priced higher than the less-popular products or services of their competitors.

Deciding between these strategies is a critical part of what managers do. Management accountants' work closely with managers in various departments to formulate strategies by providing information about the sources of competitive advantage, such as (1) the company's cost, productivity, or efficiency advantage relative to competitors; or (2) the premium prices a company can charge over its costs from distinctive product or service features.

Management accounting information helps managers focus on strategic issues by answering questions such as the following:

- *Who are our most important customers, and what critical capability do we have to be competitive and deliver value to our customers?* After Amazon's success selling books online, management accountants at Waterstones, a British book retailer, outlined the costs and benefits of several alternative approaches for enhancing the company's information technology infrastructure and developing the capability to sell books online. A similar cost-benefit analysis led Toyota to build flexible computer-integrated manufacturing plants that enable it to use the same equipment efficiently to produce a variety of cars in response to changing customer tastes.
- *What is the bargaining power of our customers?* Kellogg Company, for example, uses the reputation of its brand to reduce the bargaining power of its customers and charge higher prices for its cereals.
- *What is the bargaining power of our suppliers?* Management accountants at Dell Computers consider the significant bargaining power of Intel, its supplier of microprocessors, and Microsoft, its supplier of operating system software, when considering how much it must pay to acquire these products.
- *What substitute products exist in the marketplace, and how do they differ from our product in terms of features, price, cost and quality?* Hewlett-Packard, for example, designs, costs and prices new printers after comparing the functionality and quality of its printers to other printers available in the marketplace.
- *Will adequate cash be available to fund the strategy, or will additional funds need to be raised?* Procter & Gamble, for example, issued new debt and equity to fund its strategic acquisition of Gillette, a maker of shaving products.

Research reveals that companies that emphasise creating long-term value for shareholders are likely to outperform those that focus on preserving shareholder value in the short term. Companies whose primary focus is on internal control and value preservation do not increase their stock market valuations as effectively as those that look outside for opportunities to create value. Outperformers in business are those with the strategic and external awareness to evolve and change when the need arises. Studies have also revealed that performance-based pay, focusing on highly tangible near-term measurable variables damages the creation of longer-term shareholder value. Management accounting information is called upon not only to help managers make balanced decisions in the face of organisational challenges and the opportunities their environments bring, but increasingly also to monitor and evaluate strategic progress.

The trend for professional institutes of management accounting has been to reorient the field towards strategic management information preparation and analysis and the actual participation of management accountants in such activities. Operational accounting techniques and issues continue to be relevant, but their roles are being recast in the context of their contributions and relationships with organisation-wide financial management and strategic concerns.

The shift towards managerial and strategic engagement rather than just acting as providers of largely financial information about enterprises allows management accountants to align their work to the changing business and organisational landscape. The beginning of the millennium has seen a radical shift in the economic context in which companies operate. Early in the twentieth century, the Ford Motor Company demonstrated the ability of mass production to lower the price of a product by 60% or more. This enabled consumption to move its focus away from elite consumers to the masses. Today, another transformation is taking place away from mass consumption to a focus on individuals. New societal and enterprise forms are being created to serve individual end-users. Consumers, in many sectors, are building platforms, tools and relationships which enable a high degree of personalisation. Companies such as Amazon, eBay, Apple, YouTube and Facebook fall into this new category. Digital interactive technologies allow consumers greater self-determination. The owner of a tablet computer, for instance, is allowed a new experience where consumption is self-defined at a fraction of the old cost. Assets, information, relationships and management are now ‘distributed’ because of the availability of the internet, mobile computing, wireless broadband and new software applications. As a result, individualised goods and services can today be experienced at very low costs. Management accountants are now called upon to understand, control and manage such new cost structures.

Even though many management accounting concepts used in traditional industrial and service sectors continue to find application, new circumstances are also reshaping management accounting activities. For instance, some firms invest into digital transformation initiatives, which can involve the use of different technologies such as cloud computing, the **Internet of Things**, **big data**, and **artificial intelligence**, which we discuss in Chapter 22. Consider Virgin Holidays, which uses artificial intelligence (AI) to test its email marketing approach. In one campaign, the company tested different subject lines and text within emails to work out what was most effective. This enabled learnings on how best to promote holidays where the company had assumed that any big promotion (such as 50% off) required the message to lead in all emails. But the AI system indicated that the best results came from emails that had messages like ‘Book before Monday’, or offered a getaway from stress at work or bad weather in London instead of a specific sales message. Saul Lopes who led the AI project at Virgin Holidays notes that ‘The AI took away all of the bullsh*t and we are no longer led by human ego or human bias but by numbers and results’. The Royal Bank of Scotland deploys a chatbot to help with customer queries, such as changing an address on a bank account or activating a new credit card. The result is that the AI approach answers more than 200 000 queries a month, which frees up staff to deal with more complex problems or queries that might need a human touch (Marketing Week Reporters 2018). Organisations like Rolls-Royce (see Concepts in Action box below), Virgin Holidays and Royal Bank of Scotland as well as smaller enterprises can use digital technologies to bring about smarter planning decisions, enabling the reduction of costs, gain deeper and broader insights into their supply chains, extensively improve decision-making processes (Gaus et al. 2018). Digital and other

innovations are and will continue to be of interest to management accountants because they link in to measuring, analysing and reporting of financial information and non-financial information that are intended to assist managers in fulfilling enterprise strategies.

Accounting systems and management controls

What are the objectives of accounting systems? Is Tata's management control system more effective than Audi's? Is Nestlé's more effective at planning than Cadbury's? This section provides an overview of the broad purposes of accounting and management control systems, illustrating the role of accounting information.

The major purposes of accounting systems

The accounting system is among the most significant quantitative information systems in almost every organisation. This system aims to provide information for five broad purposes:

- *Purpose 1: Formulating overall strategies and long-range plans.* This includes new product development and investment in both tangible (equipment) and intangible (brands, patents or people) assets, and frequently involves special-purpose reports. Increasingly, many organisations seek market-, supplier- and customer-based information for determining longer-term strategic action.
- *Purpose 2: Resource allocation decisions such as product and customer emphasis and pricing.* This frequently involves reports on the profitability of products or services, brand categories, customers, distribution channels, and so on.
- *Purpose 3: Cost planning and cost control of operations and activities.* This involves reports on revenues, costs, assets, and the liabilities of divisions, plants and other areas of responsibility.
- *Purpose 4: Performance measurement and evaluation of people.* This includes comparisons of actual results with planned results. It can be based on financial or non-financial measures.
- *Purpose 5: Meeting external regulatory and legal reporting requirements where they exist.* Regulations and statutes often prescribe the accounting methods to be followed. Financial reports are provided by some organisations to shareholders who are making decisions to buy, hold or sell company shares. These reports ordinarily attempt to adhere to authoritatively determined guidelines and procedures which exist in many European countries.

Each of the purposes stated here may require a different presentation or reporting method. Accountants combine or adjust the method and data to answer the questions from particular internal or external users.

The nature of management-oriented accounting information alters in line with changes in the business environment. Over the past decade, many enterprises have experienced a shift from a traditional monitoring and control perspective to a more business- and support-oriented focus. This requires a broad-based understanding of the business, with management accountants working alongside managers, as partners within cross-functional teams rather than in a separate accounting function. Some present-day key influences on changes in accounting information include:

- an increased pace of change in the business world
- shorter product life cycles and competitive advantages
- a requirement for more strategic action by management
- digital transformation of companies and new business models
- the outsourcing of non-value-added but necessary services
- increased uncertainty and the explicit recognition of risk

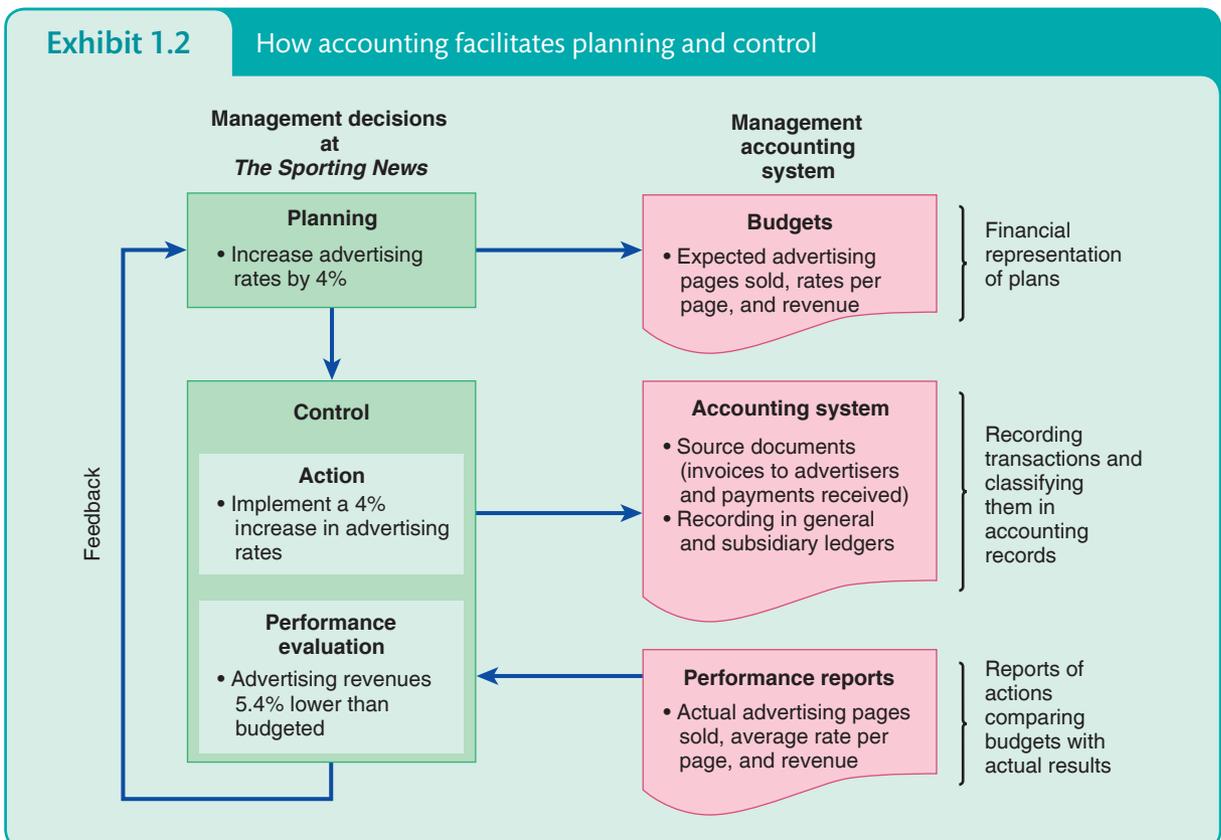
- novel forms of reward structures
- increased regulatory activity and altered financial reporting requirements
- more complex business transactions
- increased focus on customer satisfaction
- new ethics of enterprise governance
- the need to recognise intellectual capital
- enhancing knowledge management processes.

In this book we consider the accounting information implications of many of these developments.

Planning and control

There are many definitions of planning and control. Study the left side of Exhibit 1.2, which uses planning and control at *The Sporting News* (SN) as an illustration. We define **planning** (the top box) as choosing goals, predicting results under various ways of achieving those goals, and then deciding how to attain the desired goals. For example, one goal of SN may be to increase operating profit. Three main alternatives are considered to achieve this goal:

- 1 Change the price per newspaper.
- 2 Change the rate per page charged to advertisers.
- 3 Reduce labour costs by having fewer workers at SN's printing facility.



Assume that the editor, Bérangère Saunier, increases advertising rates by 4% to €5200 per page for March 2018. She budgets advertising revenue to be €4 160 000 (€5200 × 800) pages predicted to be sold in March 2018). A **budget** is the quantitative expression of a plan of action and an aid to the coordination and implementation of the plan.

Control (the bottom box in Exhibit 1.2) covers both the action that implements the planning decision and deciding on performance evaluation and the related feedback that will help future decision making. With our SN example, the action would include communicating the new advertising-rate schedule to SN's marketing sales representatives and advertisers. The performance evaluation provides feedback on the actual results.

During March 2018, SN sells advertising, sends out invoices and receives payments. These invoices and receipts are recorded in the accounting system. Exhibit 1.3 shows the March 2018 advertising revenue performance report for SN. This report indicates that 760 pages of advertising (40 pages less than the budgeted 800 pages) were sold in March 2018. The average rate per page was €5080 compared with the budgeted €5200 rate, yielding actual advertising revenue in March 2018 of €3 860 800. The actual advertising revenue in March 2018 is €299 200 less than the budgeted €4 160 000. Understanding the reasons for any difference between actual results and budgeted results is an important part of **management by exception**, which is the practice of concentrating on areas not operating as expected (such as a cost overrun on a project) and placing less attention on areas operating as expected. The term **variance** in Exhibit 1.3 refers to the difference between the actual results and the budgeted amounts.

The performance report in Exhibit 1.3 could spur investigation. For example, did other newspapers experience a comparable decline in advertising revenue? Did the marketing department make sufficient efforts to convince advertisers that, even with the new rate of €5200 per page, advertising in the SN was a good buy? Why was the actual average rate per page €5080 instead of the budgeted rate of €5200? Did some sales representatives offer discounted rates? Did a major advertiser threaten to transfer its advertising to another newspaper unless it was given a large rate-per-page reduction? Answers to these questions could prompt Saunier to take subsequent actions, including, for example, pushing marketing personnel to renew efforts to promote advertising by existing and potential advertisers.

Planning and control for sustainability is equally challenging. What should SN do about energy consumption in its printing presses, recycling of newsprint, and pollution prevention? Among the uncertainties managers' face is whether customers will reward SN for these actions by being more loyal and whether investors will react favourably to managers spending resources on sustainability. Information to gauge customer and investor sentiment is not easy to obtain. Predicting how sustainability efforts might pay off in the long run is far from certain. Even as managers make decisions, the sustainability landscape will doubtlessly change with respect to environmental regulations and societal expectations, requiring managers to learn and adapt (we consider sustainability issues further in Chapter 22).

A well-conceived plan includes enough flexibility so that managers can seize opportunities unforeseen at the time the plan is formulated. In no case should control mean that managers cling to a pre-existing plan when unfolding events indicate that actions not encompassed by the original plan would offer the best results to the company. Planning and control are so strongly intertwined

Exhibit 1.3

Advertising revenue performance report at *The Sporting News* for March 2018

| | Actual results | Budgeted amounts | Variance |
|------------------------|----------------|------------------|-----------------------|
| Advertising pages sold | 760 | 800 | 40 unfavourable |
| Average rate per page | €5 080 | €5 200 | €120 unfavourable |
| Advertising revenue | €3 860 800 | €4 160 000 | €299 200 unfavourable |

that managers do not spend time drawing artificially rigid distinctions between them. Unless otherwise stated, we use control in its broadest sense to denote the entire management process of both planning and control. For example, instead of referring to a management planning and control system, we will refer to a management control system. Similarly, we will often refer to the control purpose of accounting instead of the awkward planning and control purpose of accounting.

Do not underestimate the role of individuals and groups in management control systems. Both accountants and managers should always remember that management control systems are not confined to technical matters such as the type of computer system used and the frequency with which reports are prepared. Management control is primarily a human activity that tends to focus on how to help individuals do their jobs better. For example, it is often better for managers to discuss personally with underperforming workers how to improve performance, rather than just sending those workers a report highlighting their underperformance.

Moreover, do not view accounting's intended roles as being shared by all organisations. Accounting practice tends to be informed by technical considerations but is always indicative of many organisational, social and political processes that are specific to the enterprise context. Thus, two equally profitable companies of the same size within the same industry and having comparable accounting systems at their disposition may exhibit very different uses and purposes served by these accounting systems. This is because, although accounting systems may be designed with similar aims in mind, users of accounting information will perceive different possibilities and priorities as to the roles accounting can play within their organisations. Do not be surprised to see accounting systems in practice being used in ways that reflect the preferences and idiosyncrasies of their users rather than the predefined functions identified by accounting information system designers.

Feedback: a major key

Exhibit 1.2 shows a feedback loop from control back to planning. Feedback involves managers examining past performance and systematically exploring alternative ways to improve future performance. It can lead to a variety of responses, including the following:

| Use of feedback | Example |
|--|---|
| <ul style="list-style-type: none"> Tracking growth | <ul style="list-style-type: none"> Unilever monitors the attainment of its 'Path to Growth' sales and operating margin targets. |
| <ul style="list-style-type: none"> Searching for alternative means of operating | <ul style="list-style-type: none"> Mbarara University Hospital compares internal processing versus third-party managing (outsourcing) of its accounts receivable operations. |
| <ul style="list-style-type: none"> Changing methods for making decisions | <ul style="list-style-type: none"> Lombard Odier & Cie, a Swiss private banking institution, whose success is built on customised confidential client service, provides tailor-made financial information to customers after assessing client preferences in terms of communication mode and format. |
| <ul style="list-style-type: none"> Making predictions | <ul style="list-style-type: none"> Siemens adopts a team-based new product development process with input from both manufacturing and marketing, following an analysis of information flows. |
| <ul style="list-style-type: none"> Changing operations | <ul style="list-style-type: none"> Land Rover reduces scrap, obsolescence and lost material and improves stock turns after establishing innovative supplier relationships. |
| <ul style="list-style-type: none"> Changing the reward system | <ul style="list-style-type: none"> Convent, Germany's leading producer of crisps and salted snacks, has established data-recording links with customers to minimise use of its shelf space while maximising return for both retailers and Convent alike. |

Scorekeeping, attention-directing and problem-solving functions

Management accountants can be considered to perform three important functions in their reporting: scorekeeping, attention directing and problem solving. **Scorekeeping** refers to the accumulation of data and the reporting of reliable results to all levels of management. Examples are

the recording of sales, purchases of materials, and payroll payments. **Attention directing** attempts to make visible both opportunities and problems on which managers need to focus. Examples are highlighting rapidly growing markets where the company may be underfunding its investment and highlighting products with higher-than-expected rework rates or customer-return rates. Attention directing should focus on all opportunities to add value to an organisation and not just on cost-reduction opportunities. **Problem solving** refers to the comparative analysis undertaken to identify the best alternatives in relation to the organisation's goals. An example is comparing the financial advantages of leasing a fleet of vehicles rather than owning those vehicles.

Accountants serving the scorekeeping function accumulate data and report the results to all levels of management. Accountants serving this function are responsible for the reliability of the reported information. The scorekeeping function in many organisations requires processing numerous data items (millions of items in some cases). Computerised information systems are used by these organisations to automate scorekeeping tasks so that they are executed as flawlessly as possible.

Many organisations which automate scorekeeping have management accountants concentrating solely on the attention-directing or problem-solving function. However, as we have suggested, the adoption of technologies such as AI and the cloud is disrupting traditional roles and functions and many new titles have emerged, which require dealing with management accounting information. The titles of information roles differ. Positions may exist for 'cost systems and financial reporting', 'planning and analysis', 'forecasting' and 'manufacturing analysis and support'. Yoplait, the French yogurt-making company, has staff positions for 'operations analysis', 'budget analysis and reporting' and 'marketing and sales analysis'.

Costs, benefits and context

This book regards management accounting as encompassing the assessment of costs, benefits and context. That is, one criterion for choosing among alternative accounting systems is how well they are perceived to help achieve organisational goals in relation to the costs of those systems and the context within which they are to operate. Many studies indicate that the functioning of management accounting systems is affected as much by behavioural and social factors as by technical ones. This book identifies many changes in the field. However, it is clear that in many instances, resistance to management accounting change is caused by behavioural attitudes rather than technical flaws in the accounting innovations. At times, resistance to management accounting change can be associated with incompatibilities between the new system and the norms or taken-for-granted ways of thinking within the organisation.

As customers, managers buy a more elaborate management accounting system when its perceived expected benefits exceed its perceived expected costs and only after due consideration of contextual factors is undertaken. Although the benefits may take many forms, managers take decisions that seek to help better attain goals (both personal and organisational). Consider the installation of a company's first budgeting system. Previously, the company had probably been using some historical record keeping and little formal planning. A major benefit of installing the budgeting system is that it compels managers to plan more formally. They may make a different, more profitable set of decisions than would have been done by using only a historical system. Thus, in this instance, the expected benefits exceed the expected costs of the new budgeting system. These costs include investments in computer hardware and software, in training people, and in ongoing operating costs of the system. Naturally, the enhanced formality of the new system must be compatible with the values and inclinations of its intended users.

The measurement of costs and benefits of developing and using information are seldom easy. This is because we cannot assume rational-economic behaviour on the part of managers and accountants. In other words, accounting systems do not exhibit the same characteristics wherever they exist. There are differences across organisations in the patterns and processes of adoption and routinisation of accounting systems as well as in how extensively accounting information is

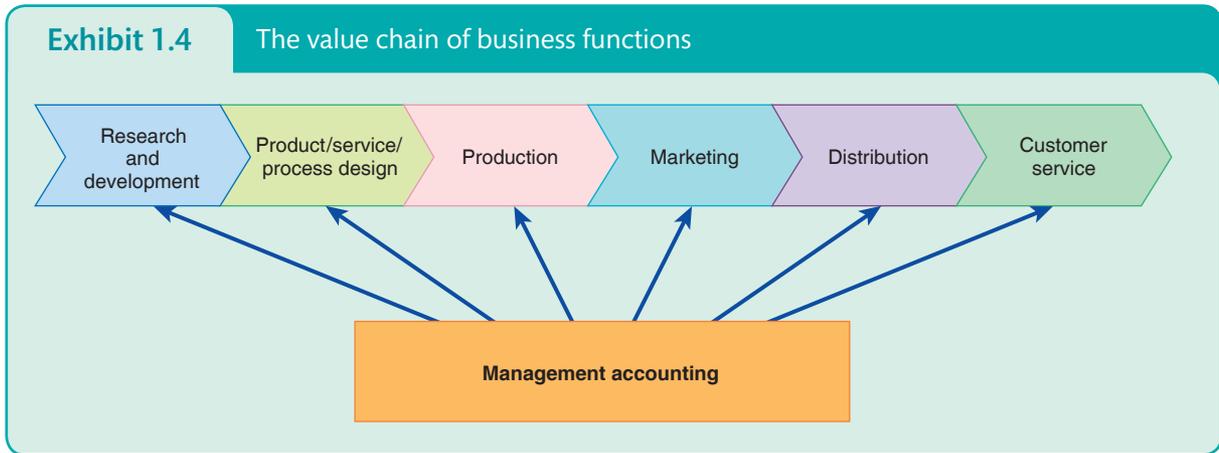
used by managers. An understanding of the contexts in which accounting is used and the processes through which accounting systems influence actions is always useful to accountants. Some organisations such as Amazon, Capital One, Barclays Bank and Yahoo are ‘competing on analytics’. These analytical firms consider both qualitative and quantitative information. Clearly, organisational context is important to consider, but so too is country context in the design of management accounting systems and in understanding differences in the ways in which accounting gets used. Harrison and McKinnon (2007, p. 114) have observed that: ‘Individuals crossing national and cultural borders to work require an understanding of the differences in management control practices they are likely to encounter, and sensitivity to the cultural underpinnings of those practices’. Thus a better understanding of context can help you decide whether differences in the use of accounting information are rooted in enduring national cultural forces, or whether industry specific or other factors affect the reliance on financial information in organisational decision making.

Consider also the fact that some organisations will face important barriers in implementing new accounting systems whereas others will not. Perhaps this is due to differences in enthusiasm by senior managers towards altering accounting systems. Managers differ in how they view the usefulness of accounting information. Insights into the context within which and the process by which accounting information is used can tell us much about differences in the choice and use of accounting systems in organisations. In this book, you will be encouraged to think about both the economic aspects of management accounting as well as factors relating to the organisational and social context of accounting systems. The cost–benefit–context approach provides a solid point for analysing accounting issues. Assessing context and process issues can be useful in choosing and designing accounting information systems and in considering how they will be used.

Value creation

The design of a management accounting system should be guided by the challenges facing managers. Management accounting can play a principal role in helping managers focus on key themes of planning and control. We highlight the following here:

- 1 *Customer focus.* Customers are pivotal to the success of an organisation. The number of organisations aiming to be ‘customer-driven’ is large and increasing. For example, consider Amazon’s CEO Jeff Bezos believes that whilst competitors focus on Amazon, the company will stay ahead if it focuses on customers. The company regards itself as the most customer centric company in the world. The challenge facing managers is to continue investing sufficient (but not excessive) resources in customer satisfaction such that profitable customers are attracted and retained. We discuss this theme in Chapter 12, where we address customer performance measures and customer-profitability analysis.
- 2 *Value-chain and supply-chain analysis.* The **value chain** is the sequence of business functions (see Exhibit 1.4) in which utility (usefulness) is added to the products or services of an organisation. These functions are as follows:
 - **Research and development (R&D)** – the generation of, and experimentation with, ideas related to new products, services or processes.
 - **Design of products, services or processes** – the detailed planning and engineering of products, services or processes.
 - **Production** – the coordination and assembly of resources to produce a product or deliver a service.
 - **Marketing** – the manner by which individuals or groups (a) learn about and value the attributes of products or services, and (b) purchase those products or services.
 - **Distribution** – the mechanism by which products or services are delivered to the customer.
 - **Customer service** – the support activities provided to customers.



Senior managers (including those from individual parts of the value chain) are responsible for deciding the organisation's overall strategy, how resources are to be obtained and used, and how rewards are to be given. This task covers the entire value chain. IKEA, the Swedish home furnishings retailer, focuses on analysing its value-added chain in order to reduce its costs while enhancing perceived value by the customer: unassembled furniture is profitably sold direct from the warehouse to customers who prize easy assembly instructions and family-oriented showrooms. Such efforts have helped IKEA attain the stature of a number 1 brand in Europe and Africa according to various rankings.

To implement their corporate strategies, companies such as Sony and Unilever use **customer relationship management (CRM)** to integrate people and technology in all business functions and deepen relationships with customers, partners, and distributors. CRM initiatives use technology to coordinate all customer-facing activities (such as marketing, sales calls, distribution, and after-sales support) and the design and production activities necessary to get products to customers.

Accounting offers a major mechanism for helping managers to administer each of the business functions presented in Exhibit 1.4 and to coordinate their activities within the framework of the organisation as a whole. This book extensively discusses how accounting aims to assist managers in these tasks. Do not interpret Exhibit 1.4 as implying that managers should proceed sequentially through the value chain. There are important gains to be realised (in terms of, say, cost, quality, and the speed with which new products are developed) from having the individual parts of the value chain work concurrently.

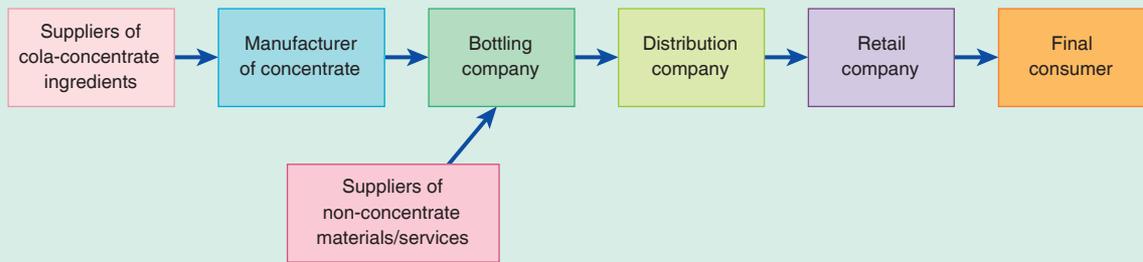
The term supply chain describes the flow of goods, services, and information from cradle to grave, regardless of whether those activities occur in the same organisation or other organisations. Consider the beverage products of Coca-Cola or Pepsi. Many companies play a role in bringing these products to the final consumers. Exhibit 1.5 presents an overview of the supply chain. Cost management emphasises integrating and coordinating activities across all companies in the supply chain as well as across each business function in an individual company's value chain. To illustrate, both Coca-Cola and Pepsi bottling companies work with their suppliers (such as glass and can companies and sugar manufacturers) to reduce their materials-handling costs.

We discuss this theme in Chapter 15 on variance analysis, Chapter 12 on target costing and Chapter 21 on just-in-time (JIT) and supply-chain analysis.

- 3 **Key success factors.** These operational factors directly affect the economic viability of the organisation. Customers are demanding ever-improving levels of performance regarding several (or even all) of the following:
 - **Cost.** Organisations are under continuous pressure to reduce the cost of their products or the services they sell to customers.

Exhibit 1.5

Supply chain for a cola bottling company



- *Quality.* Customers expect higher levels of quality and are less tolerant of low quality than in the past.
 - *Time.* Time has many components, including the time taken to develop and bring new products to market, the speed at which an organisation responds to customer requests, and the reliability with which promised delivery dates are met. Organisations are under pressure to complete activities faster and to meet promised delivery dates more reliably than in the past in order to increase customer satisfaction.
 - *Innovation.* There is now a heightened perception that a continuing flow of innovative products or services is a prerequisite for the ongoing success of most organisations. Managers attempt to continually track their performance on the chosen key success factors vis-à-vis competitors. This tracking of companies outside their own organisation alerts managers to changes in the external environment that their own customers are also observing and evaluating. We discuss this theme in Chapter 11 on using activity-based costing to guide cost reductions; in Chapter 12 on target costing; in Chapter 20 on cost of quality reports, bottlenecks and manufacturing lead time and Chapter 20 on strategic management accounting.
 - *Sustainability.* Companies are increasingly applying the key success factors of cost and efficiency, quality, time, and innovation to promote **sustainability** – the development and implementation of strategies to achieve long-term financial, social, and environmental goals. The sustainability efforts of the Japanese copier company Ricoh include energy conservation, resource conservation, product recycling, and pollution prevention. By designing products that can be easily recycled, Ricoh simultaneously improves sustainability and the cost and quality of its products.
- 4 *Continuous improvement and benchmarking.* Continuous improvement by competitors creates a never-ending search for higher levels of performance within many organisations. Phrases such as the following capture this theme:
- A journey with no end.
 - We are running harder just to stand still.
 - If you're not going forward, you're going backwards.

To compete, many companies concentrate on continually improving different aspects of their own operations. Keep in mind, though, that different industries will focus on improving different operational factors. For example, airlines seek to improve the percentage of their flights that arrive on time. Internet companies seek to improve the percentage of each 24-hour period that customers can access their online systems without delay. Sumitomo Electric Industries, the Japanese manufacturer of electric wire and cable, has daily meetings so that all employees maintain a continuous focus on cost reduction. Continuous improvement targets

are often set by benchmarking or measuring the quality of products, services and activities of the company against the best-known levels of performance found in competing companies. Many companies within industry groups exchange information for the purpose of performance benchmarking. We discuss this theme in the sections in Chapter 14 on kaizen budgeting, Chapter 15 on continuous improvement and standard costs, and Chapter 9 on learning curves.

While these themes are of relevance to many managers in modern enterprises, the design of management accounting systems must also take into account the peculiarities and contextual characteristics of organisations, as noted above. Although the form of one management accounting system within a particular organisation may appear to be similar to that of another, management accounting systems designers must attempt to learn about the organisational context in which the system is to operate. The relevance of understanding organisational specificity and the potential of accounting systems is relevant to all chapters in the book.

Digitalisation: management accounting's most important challenge

Over time, the emphasis placed on the themes in Exhibit 1.4 will change and new themes will emerge. This is because any change requires reaction and more action. In many sectors of the economy, the use of new technologies in the recent past has made possible the shift from selling mass-market, generic products and services to operating in more profitable niches with special-purpose products sold in very small volumes. Such changes mean that management accountants

Concepts in action

How the Internet of Things, artificial intelligence and big data make the unknown visible at Rolls-Royce

In 2018, Rolls-Royce received more than 70 trillion data points from its in-service fleet, which it used to develop engines that are 'connected, contextually aware and comprehending', according to Caroline Gorski, Director of the global ecosystem at Rolls-Royce's R² Data Labs. Samuels (2018) explains that the R² Data Labs team has 200 data architects, engineers, scientists and specialist managers to help the company produce over £250m in value, through engine health-monitoring activities per year and growing. The team of internal and external talent Gorski has put together homes in on four technologies: first, on the industrial Internet of Things (IoT), which refers to the idea of billions of objects being connected to the internet to enable companies make things more visible and to cut costs. IoT technology, according to Deloitte, takes inputs from the physical world, uses digital technologies to derive insights from those inputs, and then makes outputs available for use back in the world. Additionally, autonomy and sensing; blockchain and quantum computing; and artificial intelligence (AI) and advanced analytics are part of the technological data generating focus of the R² Data Labs. During that data utilisation process, the team moves from an ideas phase through to the 'minimum viable product' creation, requiring rapid iteration where there is collaboration with customers (internal or external) and the application of design thinking so business opportunities can be detected.

One example of the application of data relates to the Engine Network. This is, as Samuels (2018) explains, a tool enabling Rolls-Royce to 'extract IoT sensor data from engines and health-monitoring systems, and to combine those records into a social network for the individuals who develop and use an engine'. Consequently, engineers at the company and private jet management companies can use the data obtained to analyse engine performance. There also exists an 'AI-based recommendation engine that presents issues proactively to engineers, so they are aware of issues before a problem exists'. Ultimately, for Gorski, 'this proactive approach creates enormous benefits for our service community and for the end customers that buy our jets'. Gorski likewise gives the example of the R² Data Labs deploying IoT sensors for tracking ship performance. The company couples IoT-derived data with contextual data



derived from the broader market environment, which has allowed the team to produce a fuel-efficiency guidance portal for crews who sail Rolls-Royce-powered ships. The result according to Samuels, is that 'The captains piloting our ships can have real-time messaging from us that tells how to save fuel, how to sail efficiently and how to deal with challenging sea conditions.'

Emerging digital technologies can help large and small enterprises manage business costs and enhance process efficiency. Through connection devices, cost savings can accrue across resource inputs and lead to insights about improving products and activities in ways organisations have been unable to in the past. Although IoT and associated technologies are evolving, they are increasingly being used by firms and shaping our lives. One study by logistics company DHL and IT specialists Cisco predicts that IoT will save businesses close to £1 trillion in productivity costs alone (cited by infisim.com). The management accounting implications of digital technologies such as IoT for firms are very real.

ble to in the past. Although IoT and associated technologies are evolving, they are increasingly being used by firms and shaping our lives. One study by logistics company DHL and IT specialists Cisco predicts that IoT will save businesses close to £1 trillion in productivity costs alone (cited by infisim.com). The management accounting implications of digital technologies such as IoT for firms are very real.

Sources: Samuels, M. (15.5.2018) 'Successful IoT deployment: The Rolls-Royce approach' (www.zdnet.com/article/successful-iot-deployment-the-rolls-royce-approach/); 'How to reduce business costs with the Internet of Things (IoT)' (www.infisim.com/reduce-business-costs-internet-things-iot/); 'The Internet of Things: Moving from cost savings to revenue generation' (www2.deloitte.com/us/en/pages/finance/articles/cfo-insights-internet-of-things-cost-savings-revenue-generation.html); (www.bernardmarr.com/default.asp).

have to ensure that they remain useful to the organisations they serve and that they alter their management practices where required (Bhimani 2020). The global economic crisis, which began in 2008, altered the role of finance specialists in the eyes of governmental regulators and financial markets. Calls for more accountability and transparency were made and enterprises had to respond positively to these demands. Today, demands are expressed that enterprises should move towards models of functioning that are more sustainable and which show evidence of higher standards of corporate responsibility. Compliance requirements naturally need to be balanced with the need for high organisational performance and maintaining global competitiveness and so organisations have to balance the various demands placed on them. Changes in markets, societal structures and norms and in the general business environment in which firms operate have always been of concern to practicing management accountants. Ongoing global and business environment changes will continue to impact management accounting practices.

In fact, the pace of change is ultra-rapid and goes unabated today. A principal concern to all accountancy organisations globally right now is that professional relevance is upheld. Consider for instance, the International Federation of Accountants (IFAC), which has established a Professional Accountants in Business Committee (PAIB) with responsibility to provide guidance on management accounting issues to IFAC member bodies (which represent more than one million professional accountants worldwide working in commerce, industry, the public sector, education and the not-for-profit sector (see www.ifac.org)). In a PAIB report entitled 'Developing a future ready profession' (May 2017), the Chair, Charles Tilley, noted that 'If the accountancy profession and professional accountants in business do not embrace change, other current or emerging professions will take our coveted place at the heart of business... The character traits, attributes, and skills that accountants in business will need to be equipped with for the future represent a significant departure from the accountant stereotype.' The most significant challenge facing accountants today is to address the impact of **digitalisation**. For many enterprises, digitalisation is the process by which they become digital businesses, where the use of digital technologies changes

the business model and provides new revenue and value-producing possibilities. Digitalisation is about enterprises not just having to become digitised but *being* digital. As noted, broad technological change has always concerned management accounting, because: ‘Technology is the principal driver that enables the finance function to be a more effective business partner working with the business by helping provide security, control, and quality decisions focused on value creation and preservation’ (Tilley 2017). Two points in relation to digital technologies specifically need highlighting at this stage:

- *Digital disruption and rapid cognitive business development.* Digital technologies are impacting many industries and driving new business models to take shape. Robotics and automation, for example, are replacing repetitive human tasks and changing the way decisions are made. The rise of cognitive business, powered by the extreme growth of data and machine learning power and accessibility, provides new insights which, if harnessed, can directly shape decision making. It is becoming increasingly clear that finance and accounting professionals need to upskill, so they can play a role in assessing and implementing emerging digital technology-driven approaches to management decision making.
- *Data availability.* The huge volumes of structured and unstructured data (not organised in a predefined manner) that has become available to firms has created both opportunities and also challenges in aiding data-backed decisions and insights. Management accountants have to understand the different sources of data that can exist and their potential utility. That is, they need to be able to know how such data can provide insights that shape decisions. Moreover, they need to understand that the cost of information production is falling as the volume of data grows. Everyday sees better and more refined forms of data analytics to support financial planning and management action.

No aspect of business today remains untouched by digital technologies; and new possibilities for organisations have emerged in relation to altering the speed of enterprise operations, the flexibility of their decision making, their strategic positioning and the reframing of achievable economic efficiencies (Bhimani and Wilcocks 2014; Bhimani 2015).

What emerging technologies are there today which management accountants should be aware of? Here are some that the business community has highlighted:

- *Artificial intelligence (AI) and robotics.* AI can be thought of as the simulation of human intelligence processes by machines. It can increase the effectiveness of human decision making and enhance the advice financial professionals give to other business executives. Robotics is a field that involves the conception, design, manufacture and operation of robots. Robots are programmable machines that can undertake a series of actions. Typically, robots interact with the physical world via sensors; they are programmable and can be autonomous or semi-autonomous. Robots are now increasingly engaging in accounting tasks, which reduces the risk of human error and can remain in operation on a 24/7 basis. Robotics today enables highly valuable input into decision making that is rooted in accounting analyses.
- *Blockchain* is an accounting technology that can be described as a ‘distributed ledger’, which records transactions continuously such that the transacting parties leave a permanent record that remains verifiable. It provides full visibility on past transactions, which cannot be altered by any one participant and so this reduces the possibility of fraud. As the Institute of Chartered Accountants of England and Wales (ICAEW) state in their report entitled ‘Blockchain and the future of accountancy’ (2017): ‘Blockchain has the potential to enhance the accounting profession by reducing the costs of maintaining and reconciling ledgers, and providing absolute certainty over the ownership and history of assets.’
- *Big data and analytics* make possible the provision of insights drawn from large amounts of data. Data is valuable to all organisations and more and more is invested into leveraging data for greater decision-making capacity. The physical world is being rapidly digitised via connected devices and the physical world itself is becoming a sort of information system via

the ‘Internet of Things’ (IoT), where sensorised objects and people (customers, machines, vehicles, etc.) increase multiple-fold the volume of available data. Management accountants form partnerships with other units of their enterprises to make sure that the data analyses they engage in are cross-functional and continuously relevant to strategic and operational decisions. Finance professionals are called upon to be more predictive and to assist in making decisions based on qualitative and quantitative data that link in to budgeting, internal control, risk management and strategic action.

- *The cloud* refers to services where information and files are kept on servers connected to the Internet. The cloud enables enterprises to store, access and share resources at lower costs and with greater flexibility. Cloud computing permits enterprises to obtain practically real-time information with different organisational systems of information being fully integrated and on-line. This allows management accountants to focus on financial management information provision for decision-making and control purposes from different sources at lower costs and faster.

It can be expected that as organisational structures, priorities and modes of operations change, so pressures mount for management accounting systems to alter their information focus. Factors like digitalisation, accountability and corporate responsibility, operational complexity, customer responsiveness, product life-cycle concerns, strategic management and novel business models will continue to change what is expected of management accounting. The survival of the profession will depend on the perceived relevance of the management accountant’s contribution to organisations. The changing managerial demands on management accounting make the field a fascinating one to study and practice in. It is intended that this book will help you think about operational, technological and wider organisational and strategic issues of concern to management accountants.

Summary

The following points are linked to the chapter’s learning objectives.

- 1 Management accounting is used to provide future-oriented information to help managers (internal users) make decisions and pursue an organisation’s goals. Financial accounting is used to develop reports for external users on past financial performance using authoritative guidelines.
- 2 Strategy concerns affect management accounting processes.
- 3 Accounting systems are intended to provide information for five broad purposes: (a) formulating overall strategies and long-range plans, (b) resource allocation decisions such as product and customer emphasis, (c) cost planning and cost control, (d) performance measurement, and (e) meeting external regulatory and legal reporting obligations.
- 4 Accounting influences planning, control and decision making through budgets and other financial benchmarks, its systematic recording of actual results and its role in performance evaluation.
- 5 In most organisations, management accountants perform scorekeeping, attention-directing and problem-solving functions.
- 6 Economic benefits and costs in the design, implementation and use of accounting systems need to be assessed in the light of organisational context and process issues. Assessing costs, benefits and context is important to understanding management accounting processes.
- 7 Companies add value through research and development (R&D), design of products and processes, production, marketing, distribution and customer service. Customers want companies to deliver performance through cost and efficiency, quality, timeliness, and innovation.
- 8 Technologies have always impacted management accounting practices. Today, digitalisation presents management accounting with its most important challenge.

Appendix

Professional ethics

Ethical guidelines

Professional accounting organisations representing management accountants exist in many countries. For example, CIMA in the UK provides a programme leading to membership of the institute. Membership signals that the holder has passed the admission criteria and demonstrated the competence of technical knowledge required by the CIMA to become a chartered management accountant. To become a CIMA member, students complete examinations on operational, management and strategic aspects of the field and must show professional competence in management accounting (see www.cimaglobal.com for more information).

Management accounting topics are also covered by several other professional bodies. The syllabus for the examinations of the Association of Chartered Certified Accountants (ACCA) includes a variety of examinations, practical work experience and knowledge of ethics requirements (see www.accaglobal.com). Other accounting bodies include the Institute of Chartered Accountants in England and Wales (ICAEW) (see www.icaew.co.uk) and the Institute for Chartered Accountants of Scotland (ICAS) (see www.icas.org.uk). These institutes have requirements that cover proficiency in general management topics as well as professional accounting and ethics topics.

Professional accounting organisations play an important role in promoting a high standard of ethics. CIMA has issued a code of ethics for its members. Exhibit 1.6 presents a summary of CIMA's 'fundamental principles'.

Typical ethical challenges

Ethical issues can confront management accountants in many ways. The following examples are illustrative.

Exhibit 1.6 Summary of CIMA's Code of Ethics

To achieve the objectives of the profession, accountants have to observe the following fundamental principles:

- **Integrity.** Being straightforward, honest and truthful in all professional and business relationships. You should not be associated with any information that you believe contains a materially false or misleading statement, or which is misleading by omission.
- **Objectivity.** Not allowing bias, conflict of interest or the influence of other people to override your professional judgement.
- **Professional competence and due care.** An ongoing commitment to your level of professional knowledge and skill. Base this on current developments in practice, legislation and techniques. Those working under your authority must also have the appropriate training and supervision.
- **Confidentiality.** You should not disclose professional information unless you have specific permission or a legal or professional duty to do so.
- **Professional behaviour.** To comply with relevant laws and regulations. You must also avoid any action that could negatively affect the reputation of the profession.

Source: www.cimaglobal.com/Professionalism/Ethics/CIMAs-code-at-a-glance/

- **Case A.** A management accountant, knowing that reporting a loss for a software division will result in yet another ‘rightsizing initiative’ (a euphemism for lay-offs), has concerns about the commercial viability of software for which R&D costs are currently being capitalised. The divisional manager argues vehemently that the new product will be a ‘winner’ but has no credible evidence to support the opinion. The last two products from this division have not been successful in the market. The management accountant has many friends in the division and wants to avoid a personal confrontation with the division manager. Should the management accountant require the R&D to be expensed immediately, owing to the lack of evidence regarding its commercial viability?
- **Case B.** A packaging supplier, bidding for a new contract, offers the management accountant of its customer an all-expenses-paid weekend to Disneyland Paris for her and her family. The supplier does not mention the new contract when making the invitation. The accountant is not a personal friend of the supplier. She knows operating cost issues are critical in approving the new contract and is concerned that the supplier will ask details about bids by competing packaging companies.

In each case the management accountant is faced with an ethical challenge. Case A involves competence, objectivity and integrity, whereas case B involves confidentiality and integrity. Ethical issues are not always black or white. For example, the supplier in case B may have no intention of raising issues associated with the bid. However, the appearance of a conflict of interest in case B is sufficient for many companies to prohibit employees from accepting free ‘gifts’ from suppliers.

Key terms

| | |
|-------------------------------------|---|
| management accounting (3) | attention directing (12) |
| financial accounting (4) | problem solving (12) |
| cost accounting (4) | value chain (13) |
| cost management (5) | research and development (R&D) (13) |
| artificial intelligence (7) | design of products, services or processes (13) |
| big data (7) | production (13) |
| planning (9) | marketing (13) |
| budget (10) | distribution (13) |
| control (10) | customer service (13) |
| management by exception (10) | customer relationship management (14) |
| variance (10) | sustainability (15) |
| scorekeeping (11) | digitalisation (17) |

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CHAPTER 1

Assessment material

Review questions

- 1.1 The accounting system should provide information for five broad purposes. Describe them.
- 1.2 Distinguish between *management accounting* and *financial accounting*.
- 1.3 Describe the business functions in the value chain.
- 1.4 Explain the meaning of *cost management*.
- 1.5 ‘Knowledge of technical issues such as computer technology is necessary but not sufficient to becoming a successful accountant.’ Do you agree? Why?
- 1.6 Peter Drucker, a noted business observer, made the following comment in an address to management accountants: ‘I am not saying that you do not need a “cop on the beat”, you do . . . But your great challenge is to get across to your associates your ability to identify the opportunities – to identify the wealth-producing characteristics.’ Do you agree? Explain.
- 1.7 As a new accountant, reply to this comment by a plant manager: ‘As I see it, our accountants may be needed to keep records for shareholders and for the tax authorities – but I don’t want them sticking their noses in my day-to-day operations. I do the best I know how. No pen-pushing bean-counter knows enough about my responsibilities to be of any use to me.’
- 1.8 When explaining a motor vehicle market-share turnaround, a car manufacturer stated: ‘We listened to what our customers wanted and acted on what they said. Good things happen when you pay attention to the boss.’ How might management accountants apply the same perspective to their own tasks?
- 1.9 A leading management observer stated that the most successful companies are those which have an obsession for their customers. Is this statement pertinent to management accountants? Explain.
- 1.10 Changes in the way managers operate require rethinking the design and operation of management accounting systems. Describe five themes that are affecting both the way managers operate and developments in management accounting.

Exercises

Basic level

*1.11 Financial and management accounting (15–20 minutes)

Anne-Jorun Sørensen, an able electrical engineer, was informed that she was going to be promoted to assistant plant manager. Anne-Jorun was elated but uneasy. In particular, her knowledge of accounting was sparse. She had taken one course in financial accounting but had not been

* Fully worked solutions to exercises thus marked are provided in Appendix A.

exposed to the management accounting that her superiors found helpful. Sørensen planned to take a management accounting course as soon as possible. Meanwhile, she asked Siri Aspelund, an assistant controller, to state two or three of the principal distinctions between financial and management accounting using some concrete examples.

As the assistant controller, prepare a written response to Sørensen.

*1.12 Purposes of accounting systems (10 minutes)

The European Sports Management Group (ESMG) manages and promotes sporting events and sporting personalities. Its managers are currently examining the following reports and accounting statements:

- a Five-year projections for expanding into managing sports television networks for satellite television.
- b Income statement to be included in a six-month interim report to be sent to investors.
- c Profitability comparison of cricket tournaments directed by different managers, each of whom receives a percentage of that tournament's profits.
- d Monthly reports of office costs for each of the 14 ESGM offices throughout Europe.
- e Statement showing the revenues ESGM earns from different types of sporting event (for example, squash, triathlon and cricket).

Required

Classify the reports in parts a–e into one of the five major purposes of accounting systems.

1.13 Value chain and classification of costs at Compaq (15 minutes)

Compaq Computer incurs the following costs:

- a Electricity costs for the plant assembling the Presario computer line of products.
- b Transportation costs for shipping Presario software to a retail chain.
- c Payment to David Kelley Designs for design of the Armada Notebook.
- d Salary of a computer scientist working on the next generation of minicomputers.
- e Cost of Compaq employees' visit to a major customer to illustrate Compaq's ability to interconnect with other computers.
- f Purchase of competitors' products for testing against potential future Compaq products.
- g Payment to a television station for running Compaq advertisements.
- h Cost of cables purchased from an outside supplier to be used with the Compaq printer.

Required

Classify each of the cost items in parts a–h into a component of the value chain shown in Exhibit 1.4.

1.14 Value chain and classification of costs at Boots (15 minutes)

Boots, which operates a chain of pharmacies in the UK, incurs the following costs:

- a Cost of redesigning blister packs to make drug containers more tamperproof.
- b Cost of videos sent to doctors to promote sales of a new drug.
- c Cost of website's 'frequently asked questions' for customer enquiries about usage, side-effects of drugs, and so on.
- d Equipment purchased by a scientist to conduct experiments on drugs yet to be approved by the government.

- e Payment to actors on a feature to be shown on television promoting new hair-growing product for balding men.
- f Labour costs of workers in the packaging area of a production facility.
- g Bonus paid to a salesperson for exceeding the monthly sales quota.
- h Cost of the courier service to deliver drugs to hospitals.

Required

Classify each of the cost items in parts a–h into a component of the value chain shown in Exhibit 1.4.

1.15 Uses of feedback (10 minutes)

Six uses of feedback are described in the chapter:

- a Changing goals.
- b Searching for alternative means of operating.
- c Changing methods for making decisions.
- d Making predictions.
- e Changing the operating process.
- f Changing the reward system.

Required

Match the appropriate letters from the preceding list to each of the following items.

- 1 The Potters Bar University system explores subcontracting its gardening operations to a private company instead of hiring its own gardeners.
- 2 Sales commissions are to be based on total operating profit instead of total revenue.
- 3 Fiat adjusts its elaborate way of forecasting demand for its cars by including the effects of expected changes in the price of crude oil.
- 4 The hiring of new sales personnel will include an additional step: an interview and evaluation by the company psychologist.
- 5 Quality inspectors at Volvo are now being used in the middle of the production process as well as at the end of the process.
- 6 Virgin enters the telecommunications industry.
- 7 Worker assignments on an assembly line are made by teams instead of directed by a foreman.

1.16 Scorekeeping, attention directing and problem solving (15 minutes)

For each of the following activities, identify the major function (scorekeeping, attention directing or problem solving) the accountant is performing.

- a Preparing a monthly statement of Spanish sales for the BMW marketing vice-president.
- b Interpreting differences between actual results and budgeted amounts on a performance report for the customer warranty department of Tefal.
- c Preparing a schedule of depreciation for forklift trucks in the receiving department of a Hewlett-Packard plant in Scotland.
- d Analysing, for a Toshiba international manufacturing manager, the desirability of buying some semiconductors made in Ireland.
- e Interpreting why a Birmingham distribution centre did not adhere to its delivery costs budget.
- f Explaining a Niceday shipping department's performance report.

- g Preparing, for the manager of production control of a German steel plant, a cost comparison of two computerised manufacturing control systems.
- h Preparing a scrap report for the finishing department of a Volvo parts plant.
- i Preparing the budget for the maintenance department of Mont-Blanc Hospital.
- j Analysing, for a Volkswagen product designer, the impact on product costs of some new headlight lamps.

1.17 Scorekeeping, attention directing and problem solving (15 minutes)

For each of the following activities, identify the major function the accountant is performing – scorekeeping, attention directing or problem solving.

- a Interpreting differences between actual results and budgeted amounts on a shipping manager's performance report at a Lada distribution centre.
- b Preparing a report showing the benefits of leasing motor vehicles versus owning them.
- c Preparing adjusting journal entries for depreciation on the personnel manager's office equipment at Crédit Suisse.
- d Preparing a customer's monthly statement for an Argos store.
- e Processing the weekly payroll for the University College Dublin maintenance department.
- f Explaining the product-design manager's performance report at an Audi division.
- g Analysing the costs of several different ways to blend materials in the foundry of a Krupp plant.
- h Tallying sales, by branches, for the sales vice-president of Unilever.
- i Analysing, for a senior manager of British Telecom, the impact of a contemplated new product on net income.
- j Interpreting why a Moulinex sales district did not meet its sales quota.

1.18 Changes in management and changes in management accounting (15 minutes)

A survey on ways organisations are changing their management accounting systems reported the following:

- a Company A now reports a value-chain income statement for each of the brands it sells.
- b Company B now presents in a single report all costs related to achieving high quality levels of its products.
- c Company C now presents estimates of the manufacturing costs of its two most important competitors in its performance reports, in addition to its own internal manufacturing costs.
- d Company D reduces by 1% each month the budgeted labour-assembly cost of a product when evaluating the performance of a plant manager.
- e Company E now reports profitability and satisfaction measures (as assessed by a third party) on a customer-by-customer basis.

Required

Link each of the above changes to the role management accounting can play in helping managers focus on key themes of planning and control.

1.19 Planning and control, feedback (15–20 minutes)

In April 2018, Bérangère Saunier, editor of *The Sporting News* (SN), decides to reduce the price per newspaper from €0.70 in April 2018 to €0.50 starting 1 May 2018. Actual paid circulation in April is 7.5 million (250 000 per day × 30 days). Saunier estimates that the €0.20

price reduction would increase paid circulation in May to 12.4 million ($400\,000 \times 31$ days). The actual May circulation turns out to be 13 640 000 ($440\,000 \times 31$ days). Assume that one goal of SN is to increase operating profit. The budgeted increase in circulation would enable SN to charge higher advertising rates in later months of 2018 if those budgeted gains actually occur. The actual price paid in May 2018 was the budgeted €0.50 per newspaper.

Required

- 1 Distinguish between planning and control at SN, giving an example of each.
- 2 Prepare a newspaper revenue performance report for SN for May 2018 showing the actual results, budgeted amounts and the variance.
- 3 Give two types of action Saunier might take based on feedback on the May 2018 circulation revenue.

1.20 Professional ethics and reporting divisional performance (10–15 minutes)

Marguerite Devallois is division controller and Jacques Clément is division manager of the Royaume de la Chaussure SARL, a shoe company. Devallois has line responsibility to Clément, but she also has staff responsibility to the company controller.

Clément is under severe pressure to achieve budgeted division income for the year. He has asked Devallois to book €200 000 of sales on 31 December. The customers' orders are firm, but the shoes are still in the production process. They will be shipped on or about 4 January. Clément said to Devallois, 'The key event is getting the sales order, not shipping of the shoes. You should support me, not obstruct my reaching division goals.'

Required

- 1 Describe Devallois's ethical responsibilities.
- 2 What should Devallois do if Clément gives her a direct order to book the sales?

Intermediate level

1.21 Responsibility for analysis of performance (20–30 minutes)

Kari-Anna Nedregotten is the new corporate controller of a multinational company that has just overhauled its organisational structure. The company is now decentralised. Each division is under an operating vice-president who, within wide limits, has responsibilities and authority to run the division like a separate company.

Nedregotten has a number of bright staff members. One of them, Signy Henriksen, is in charge of a newly created performance-analysis system. Henriksen and staff members prepare monthly division performance reports for the company president. These reports are division income statements, showing budgeted performance and actual results, and they are accompanied by detailed written explanations and appraisals of variances. In the past, each of Henriksen's staff members was responsible for analysing one division; each consulted with division line and staff executives and became generally acquainted with the division's operations.

After a few months, Øyvind Hedby, vice-president in charge of Division C, stormed into the controller's office. The gist of his complaint follows:

'Your staff are trying to take over part of my responsibility. They come in, snoop around, ask hundreds of questions, and take up plenty of our time. It's up to me, not you and your detectives, to analyse and explain my division's performance to central headquarters. If you don't stop trying to grab my responsibility, I'll raise the whole issue with the president.'

Required

- 1 What events or relationships may have led to Hedby's outburst?
- 2 As Nedregotten, how would you answer Hedby's contentions?
- 3 What alternative actions can Nedregotten take to improve future relationships?

***1.22 Software procurement decision, ethics (30 minutes)**

Walter von Stolzing is the Innsbrück-based controller of Beckmesser GmbH, a rapidly growing manufacturer and marketer of Austrian food products. Stolzing is currently considering the purchase of a new cost management package for use by each of its six manufacturing plants and its many marketing personnel. There are four major competing products being considered by Stolzing.

Pogner 1-2-3 is an aggressive software developer. It views Beckmesser as a target of opportunity. Every six months Pogner has a three-day users' conference on the Costa del Sol. Each conference has substantial time left aside for 'rest and recreation'. Pogner offers Stolzing an all-expenses-paid visit to the coming conference. Stolzing accepts the offer believing that it will be very useful to talk to other users of Pogner software. He is especially looking forward to the visit as he has close relatives living near Marbella.

Prior to leaving, Stolzing received a visit from the president of Beckmesser. She shows him an anonymous letter sent to her. It argues that Pogner is receiving unfair favourable treatment in the Beckmesser software decision-making process. The letter specifically mentions Stolzing's coming 'all-expenses-paid trip to Marbella during the depths of Innsbrück's winter'. Stolzing is deeply offended. He says he has made no decision and believes he is very capable of making a software choice on the merits of each product. Beckmesser currently does not have a formal written code of ethics.

Required

- 1 Do you think Stolzing faces an ethical problem as regards his forthcoming visit to the Pogner's users' group meeting? Refer to the chapter's appendix. Explain.
- 2 Should Beckmesser allow executives to attend users' meetings while negotiating with other vendors about a purchase decision? Explain. If yes, what conditions on attending should apply?
- 3 Would you recommend Beckmesser develop its own code of ethics to handle situations such as this one? What are the pros and cons of having such a written code?

1.23 Planning and control decisions: Internet company (30 minutes)

WebNews.co.uk is an Internet company. It offers subscribers multiple online services ranging from an annotated TV guide to local-area information on restaurants and cinemas. It has two main revenue sources:

- Monthly fees from subscribers. Recent data are:

| Month/Year | Actual number of subscribers | Actual monthly fee per subscriber |
|---------------|------------------------------|-----------------------------------|
| June 2017 | 28 642 | £14.95 |
| December 2017 | 54 813 | £19.95 |
| June 2018 | 58 178 | £19.95 |
| December 2018 | 86 437 | £19.95 |
| June 2018 | 146 581 | £19.95 |

- Banner advertising fees from companies advertising on WebNews.co.uk page sites. Recent data are:

| Month/Year | Advertising revenues |
|---------------|----------------------|
| June 2017 | £400 988 |
| December 2017 | £833 158 |
| June 2018 | £861 034 |
| December 2018 | £1 478 072 |
| June 2018 | £2 916 962 |

The following decisions were made in the June to October 2018 period:

- June 2018. Decision to raise the monthly subscription fee from £19.95 per month in June 2018 to £24.95 per month in July 2018. The £19.95 fee first applied in December 2017.
- June 2018. Decision to inform existing subscribers that the July 2018 subscription fee would be £24.95.
- July 2018. Decision to upgrade the content of its online services and to offer better Internet mail services.
- October 2018. Demotion of manager of marketing after significant slowing of subscriber growth in accounts and revenues. Results include:

| Month/Year | Actual number of subscribers | Actual monthly fee per subscriber |
|----------------|------------------------------|-----------------------------------|
| July 2018 | 128 933 | £24.95 |
| August 2018 | 139 419 | £24.95 |
| September 2018 | 143 131 | £24.95 |

Budgeted amounts (set in June 2018) for the number of subscribers were 140 000 for July 2018, 150 000 for August 2018, and 160 000 for September 2018.

- October 2018. Decision to reduce the monthly subscription fee from £24.95 per month in September 2018 to £21.95 in October 2018.

Required

- 1 Distinguish between planning decisions and control decisions at WebNews.co.uk.
- 2 Classify each of the decisions a–e as a planning or a control decision.

1.24 Problem solving, scorekeeping and attention directing: Internet company (continuation of Exercise 1.23) (30 minutes)

Management accountants at WebNews.co.uk can play three key roles in each of the five decisions described in Exercise 1.23: problem solving, scorekeeping and attention directing.

Required

- 1 Distinguish between the problem-solving, scorekeeping and attention-directing roles of a management accountant at WebNews.co.uk.
- 2 For each of the five decisions outlined in Exercise 1.23, describe a problem-solving, scorekeeping or attention-directing role. Where possible, provide your own example of an information item that a management accountant could provide for each decision.



CHAPTER 2

An introduction to cost terms and purposes

Cost concepts and terms are useful in many enterprise contexts. They help managers decide such issues as: How much should we spend on research and development? What is the effect of product design changes on production costs? Should we replace some assembly workers with a robot? Should we spend more of the marketing budget on sales promotion coupons and less on advertising? Should we outsource some engineering and production activities? Should we provide a free phone number for customer enquiries regarding our products? Such questions require an understanding of costs. This chapter explains several widely used cost concepts and terms. They will help us demonstrate the multiple purposes of cost accounting systems.

In many companies, especially smaller ones, when times are good, managers focus on selling as much as they can. Costs gain less attention. When times are difficult, they shift their emphasis toward cost containment. But as firms get larger, the focus on costs often becomes relentless. A large scale survey of 1013 corporate executives in Europe, Asia Pacific, North America and Latin America reported that cost reduction has become a standard business practice in every region. Half of the firms surveyed were pursuing cost-reduction targets of less than 10% but virtually two-thirds failed to achieve their cost-cutting goals (Deloitte 2017). Typically, when uncertainty exists in politics and the economy, cost reduction becomes high on the agenda of executives. Thus, a survey of 350 Chief Financial Officers (CFO) reported that more than half of the CFOs saw cost reduction as a priority for their business over the next year, with focus on cost control becoming the highest in the eight years the survey had been carried out (*Financial Director* 2018).

An understanding of where costs exist and how they behave is of great relevance to most business decisions. At times, cost-reduction strategies can also change reporting structures in companies. Consider the world's second largest financial services company AXA. In a reorganisation move to cut costs, its Chief Executive Officer (CEO), Thomas Buberl launched a drive in late 2017 to slash 25% of head office costs which would give more autonomy to local managers. The company aimed to cut 300 jobs from head office operations, slimming down central functions to save €300 million per year as part of a wider programme to remove €2.1 billion from the company's cost base by 2020. Many large companies undertake extreme cost-cutting measures, especially during times of economic uncertainty. Understanding the behaviour of costs proves useful to any cost management effort.

Learning objectives

After studying this chapter, you should be able to:

- Define and illustrate a cost object
- Distinguish between direct costs and indirect costs
- Explain variable costs and fixed costs
- Understand why unit costs must be interpreted with caution
- Distinguish between service-sector, merchandising-sector and manufacturing-sector companies
- Differentiate between capitalised costs and period costs
- Explain how different ways of computing product costs are appropriate for different purposes

Costs in general

Cost objects

Accountants usually define **cost** as a resource sacrificed or forgone to achieve a specific objective. Most people consider costs as monetary amounts (such as shillings, euros, pounds or yen) that must be paid to acquire goods and services. For now, we can think of costs in this conventional way. An **actual cost** is the cost incurred (a historical or past cost), as distinguished from a budgeted cost, which is a predicted, or forecasted, cost (a future cost).

To guide their decisions, managers often want to know how much a certain thing (such as a new product, a machine, a service or a process) costs. We call this ‘thing’ a **cost object**, which is anything for which a separate measurement of costs is desired. Exhibit 2.1 provides examples of several different types of cost object.

Exhibit 2.1

Examples of cost objects

| Cost object | Illustration |
|----------------|--|
| Product | An eight-speed bicycle |
| Service | An airline flight from Paris to Dubai |
| Project | An aeroplane assembled by Airbus for Emirates |
| Customer | All products purchased by Rolls-Royce (the customer) from Lucas |
| Brand category | All soft drinks sold by a PepsiCo bottling company with ‘Pepsi’ in their name |
| Activity | A test to determine the quality level of a television set |
| Department | A department within a government environmental agency that studies air emissions standards |
| Programme | An entrepreneurship showcase programme of a university |

A costing system typically accounts for costs in two basic stages:

- 1 It *accumulates* costs by some ‘natural’ classification such as materials, labour, fuel, advertising or shipping.
- 2 It *assigns* these costs to cost objects.

Cost accumulation is the collection of cost data in some organised way through an accounting system. **Cost assignment** is a general term that encompasses both (1) tracing accumulated costs to a cost object, and (2) allocating accumulated costs to a cost object. Costs that are *traced* to a cost object are direct costs, and costs that are *allocated* to a cost object are indirect costs. Many accounting systems accumulate actual costs, which as noted above are the costs incurred (historical costs), as distinguished from budgeted or forecasted costs.

In some organisations, stage 1 (cost accumulation) and stage 2 (cost assignment) occur simultaneously. Consider the purchase by Airbus of 76 business-class seats to be installed in an A380 aeroplane to be sold to Emirates. This transaction could be coded to a general ledger account such as materials (the cost accumulation stage) and simultaneously coded to three separate cost objects (the cost assignment stage):

- a department (assembly)
- a product (A380 product line)
- a customer (Emirates).

Alternatively, stage 1 (cost accumulation) could occur first, followed by stage 2 (cost assignment). For example, the 76-seat purchase by Airbus could first be coded to the materials account, then

subsequently assigned to a department, then reassigned to a product, and finally reassigned to a customer. Advances in information-gathering technology (such as barcoding) are facilitating the simultaneous assignment of costs to more than one cost object at the time costs are incurred.

Remember, managers assign costs to designated cost objects to help decision making. For example, costs may be assigned to a department to facilitate decisions about departmental efficiency. Costs may also be assigned to a product or a customer to facilitate product or customer profitability analysis.

Direct costs and indirect costs

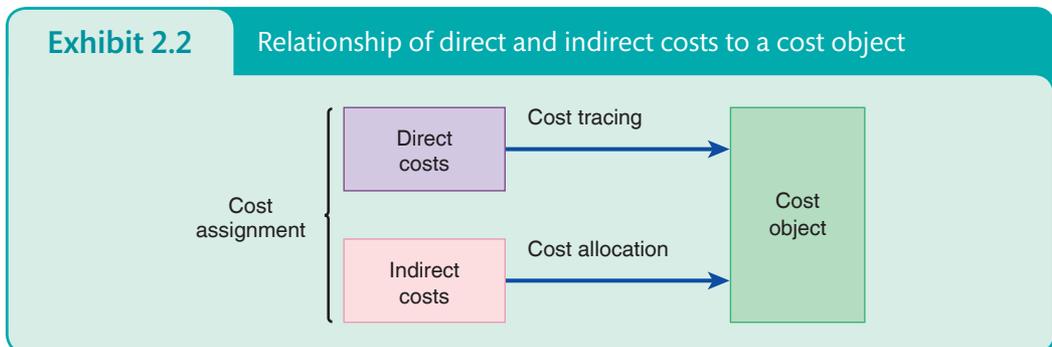
Cost tracing and cost allocation

A major question concerning costs is whether they have a direct or an indirect relationship to a particular cost object.

- **Direct costs of a cost object** are costs that are related to the particular cost object and that can be traced to it in an economically feasible (cost-effective) way.
- **Indirect costs of a cost object** are costs that are related to the particular cost object but cannot be traced to it in an economically feasible (cost-effective) way. Indirect costs are allocated to the cost object using a cost-allocation method.

Take a tennis racket as a cost object. The cost of the carbon fibre used to make that racket is a direct cost. Why? Because the amount of material used in making the racket can easily be traced to the racket. The cost of lighting in the factory where the racket was made is an indirect cost of the racket. Why? Because although lighting helped in the making of the racket (the workers needed to see), it is not cost-effective to try to determine exactly how much lighting cost was used for a specific racket.

Managers prefer to make decisions on the basis of direct costs rather than indirect costs. Why? Because they know that direct costs are more accurate than indirect costs. The relationship between these terms is summarised in Exhibit 2.2.



Cost tracing is the assigning of direct costs to the chosen cost object. **Cost allocation** is the assigning of indirect costs to the chosen cost object. *Cost assignment* encompasses both cost tracing and cost allocation.

Factors affecting direct/indirect cost classifications

Several factors will affect the classification of a cost as direct or indirect:

- 1 *The materiality of the cost in question.* The higher the cost in question, the more likely the economic feasibility of tracing that cost to a particular cost object. Consider a mail-order

catalogue company. It would probably be economically feasible to trace the courier charges for delivering a package directly to each customer. In contrast, the cost of the invoice paper included in the package sent to the customer is likely to be classified as an indirect cost because it is not economically feasible to trace the cost of this paper to each customer. The benefits of knowing the exact number of (say) 0.5p worth of paper included in each package typically do not justify the costs of money and time in tracing the costs to each package.

- 2 *Available information-gathering technology.* Improvements in this area are enabling an increasing percentage of costs to be classified as direct. Barcodes, for example, allow many manufacturing plants to treat certain materials previously classified as indirect costs as direct costs of products. Barcodes can be read into a manufacturing-cost file by waving a 'wand' in the same quick and efficient way that supermarkets now enter the cost of many items purchased by their customers.
- 3 *Design of operations.* Facility design can impact on cost classification. For example, classifying a cost as direct is helped if an organisation's facility (or part thereof) is used exclusively for a specific product or specific cost object, such as a particular customer.

This book examines different ways to assign costs to cost objects. For now, be aware that one particular cost may be both direct and indirect. How? *The direct/indirect classification depends on the choice of the cost object.* For example, the salary of an assembly-department supervisor may be a direct cost of the assembly department at Fiat but an indirect cost of a product such as the Fiat 500 Punto.

Cost drivers and cost management

The continuous cost-reduction efforts of competitors create a never-ending need for organisations to reduce their own costs. Cost-reduction efforts frequently identify two key areas:

- 1 Focusing on **value-added activities**, that is, those activities that customers perceive as adding value to the products or services they purchase.
- 2 Efficiently managing the use of the cost drivers in those value-added activities.

A **cost driver** (also called a *cost generator* or *cost determinant*) is any factor that affects total costs. That is, a change in the level of the cost driver will cause a change in the level of the total cost of a related cost object. Costs that do not vary in the short run and have no identifiable cost driver in the short run may in fact have a cost driver in the long run.

Exhibit 2.3 presents examples of cost drivers in each of the business functions of the value chain. Some cost drivers are financial measures found in accounting systems (such as direct manufacturing labour costs and sales), while others are non-financial variables (such as the number of parts per product and the number of service calls). We now discuss the role of cost drivers in describing cost behaviour.

Cost management is the set of actions that managers take to satisfy customers while continuously reducing and controlling costs. A caveat on the role of cost drivers in cost management is appropriate. Changes in a particular cost driver do not automatically lead to changes in overall costs. Consider the number of items distributed as a driver of distribution labour costs. Suppose that management reduces the number of items distributed by 25%. This reduction does not automatically translate to a reduction in distribution labour costs. Managers must take steps to reduce distribution labour costs, perhaps by shifting workers out of distribution into other business functions needing additional labour or by laying off some distribution employees.

Exhibit 2.3

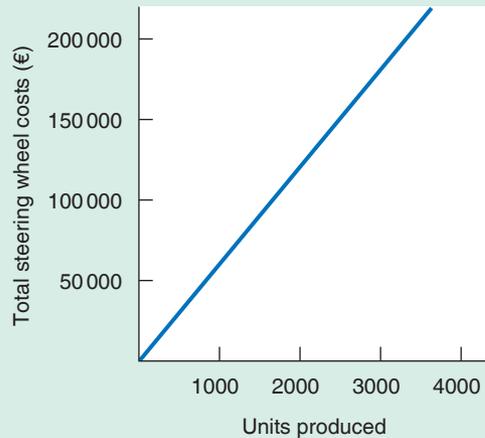
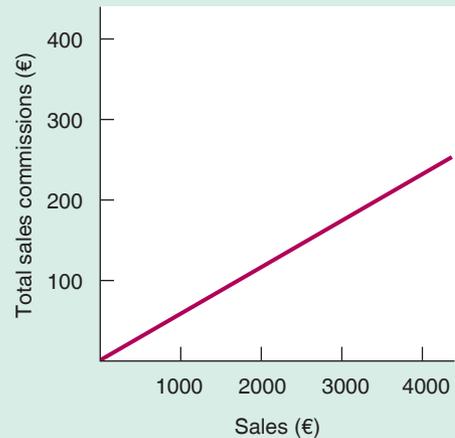
Examples of cost drivers of business functions in the value chain

| Business function | Cost driver |
|--|---|
| <ul style="list-style-type: none"> • Research and development | <ul style="list-style-type: none"> • Number of research projects • Labour hours on a project • Technical complexity of projects |
| <ul style="list-style-type: none"> • Design of products, services and processes | <ul style="list-style-type: none"> • Number of products in design • Number of parts per product • Number of engineering hours |
| <ul style="list-style-type: none"> • Production | <ul style="list-style-type: none"> • Number of units produced • Direct manufacturing labour costs • Number of set-ups • Number of engineering change orders |
| <ul style="list-style-type: none"> • Marketing | <ul style="list-style-type: none"> • Number of advertisements run • Number of sales personnel • Sales |
| <ul style="list-style-type: none"> • Distribution | <ul style="list-style-type: none"> • Number of items distributed • Number of customers • Weight of items distributed |
| <ul style="list-style-type: none"> • Customer service | <ul style="list-style-type: none"> • Number of service calls • Number of products serviced • Hours spent servicing products |

Cost behaviour patterns: variable costs and fixed costs

Management accounting systems record the cost of resources acquired and track their subsequent use. Tracing these costs allows managers to understand how these costs behave. Let us now consider two basic types of cost behaviour pattern found in many of these systems: variable costs and fixed costs. A **variable cost** is a cost that changes in total in proportion to changes in the related level of total activity or volume. A **fixed cost** is a cost that does not change in total despite changes in the related level of total activity or volume. Costs are defined as variable or fixed with respect to a specific cost object and for a given time period. Consider costs at Opel’s Zaragoza plant in Spain. The company produced to a capacity of 382 250 vehicles in 2017. The Corsa is Opel’s best-selling model.

- **Variable costs.** If Opel buys a steering wheel at €600 for each of its Corsa cars, then the total cost of steering wheels should be €600 times the number of cars assembled. This is an example of a variable cost, a cost that changes in total in proportion to changes in the cost driver (number of cars). The variable cost per car does change with the number of cars assembled. Exhibit 2.4 (Panel A) illustrates this variable cost. A second example of a variable cost is a sales commission of 5% of each sales euro. Exhibit 2.4 (Panel B) shows this variable-cost example.
- **Fixed costs.** Opel may incur €20 million in a given year for the leasing and insurance of its Corsa plant. Both are examples of fixed costs: costs that are unchanged in total over a designated range of the cost driver during a given time span. Fixed costs become progressively smaller on a per-unit basis as the cost driver increases. For example, if Opel assembles 10 000 Corsa vehicles at this plant in a year, the fixed cost for leasing and insurance per vehicle is €2000 (€20 million ÷ 10 000). In contrast, if 50 000 vehicles are assembled, the fixed cost per vehicle becomes €400.

Exhibit 2.4**Examples of variable costs****Panel A: Steering wheel costs at €600 per car assembled****Panel B: Sales commissions at 5% of sales**

Do not assume that individual cost items are inherently variable or fixed. Consider labour costs. An example of purely variable labour costs is the case where workers are paid on a piece-work basis. Some textile workers are paid on a per-shirt-sewn basis. Often, labour costs are appropriately classified as fixed where employment conditions restrict an organisation's flexibility to assign workers to any area that has extra labour requirements.

Major assumptions

The definitions of variable costs and fixed costs have important underlying assumptions:

- 1 Costs are defined as variable or fixed with respect to a specific cost object.
- 2 The time span must be specified. Consider the €20 million rent and insurance that Opel pays for its Corsa assembly operations. This amount may be fixed for one year. Beyond that time, the rent and insurance may be renegotiated to be, say, €22 million for a subsequent year.
- 3 Total costs are linear. That is, when plotted on ordinary graph paper, a total-variable-cost or a total-fixed-cost relationship to the cost driver will appear as an unbroken straight line.
- 4 There is only one cost driver. The influences of other possible cost drivers on total costs are held constant or deemed to be insignificant.
- 5 Variations in the level of the cost driver are within a relevant range (which we discuss in the next section).

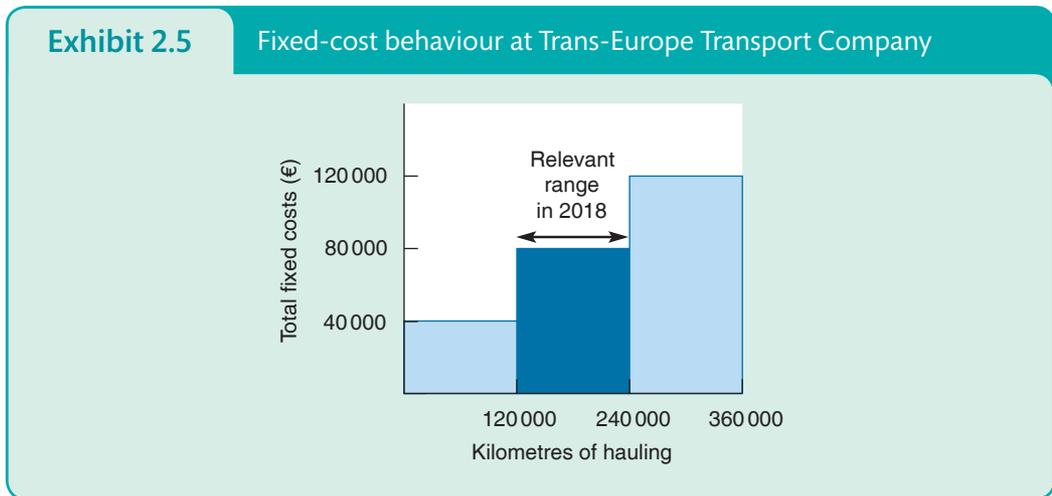
Variable costs and fixed costs are the two most frequently recognised cost behaviour patterns in existing management accounting systems. Additional cost behaviour patterns are discussed in subsequent chapters (see Chapters 9 and 11).

Relevant range

A **relevant range** is the range of the cost driver in which a specific relationship between cost and the level of activity or volume is valid. A fixed cost is fixed only in relation to a given relevant range

(usually wide) of the cost driver and a given time span (usually a particular budget period). Consider the Swedish-based Trans-Europe Transport Company (TETC), which operates two refrigerated vehicles that carry agricultural produce to market. Each vehicle has an annual fixed cost of €400 000 (including an annual insurance cost of €150 000 and an annual registration fee of €80 000) and a variable cost of €12 per kilometre of hauling. TETC has chosen kilometres of hauling to be the cost driver. The maximum annual usage of each vehicle is 120 000 kilometres. Suppose that in the current year (2018) the predicted combined total hauling of the two vehicles is 170 000 kilometres.

Exhibit 2.5 shows how annual fixed costs behave at different levels of kilometres of hauling. Up to 120 000 kilometres, TETC can operate with one vehicle; from 120 001 to 240 000 kilometres, it can operate with two vehicles; and from 240 001 to 360 000, it can operate with three vehicles. This pattern would continue as TETC added vehicles to its fleet. The bracketed section from 120 001 to 240 000 is the range at which TETC expects the €80 000 fixed costs to be valid given the predicted 170 000-kilometre usage for the year.



Fixed costs may change from one year to the next. For example, if the annual registration fee for refrigerated vehicles is increased in 2018, the total level of fixed costs will increase (unless offset by a reduction in other fixed items).

Relationships of types of costs

We have introduced two major classifications of costs: direct/indirect and variable/fixed. Costs may simultaneously be:

- direct and variable
- direct and fixed
- indirect and variable
- indirect and fixed.

Exhibit 2.6 presents examples of simultaneous cost classifications with each of the four cost types.

Total costs and unit costs

Meaning of unit costs

Accounting systems typically report both total-cost and unit-cost numbers. A **unit cost** (also called an **average cost**) is calculated by dividing some amount of total cost by the related number of units.

Exhibit 2.6

Examples of simultaneous direct/indirect and variable/fixed-cost classifications

| | | Assignment of costs to cost object | |
|------------------------|---------------|--|---|
| | | Direct cost | Indirect cost |
| Cost behaviour pattern | Variable cost | <i>Cost object:</i> Assembled car <i>Example:</i> Tyres used in assembly of car | <i>Cost object:</i> Assembled car <i>Example:</i> Power costs where power usage is metered only to the plant |
| | Fixed cost | <i>Cost object:</i> Assembled car <i>Example:</i> Salary of supervisor on Opel's Corsa assembly | <i>Cost object:</i> Assembled car <i>Example:</i> Annual lease cost at Corsa plant line |

The units might be expressed in various ways. Examples are hours worked, packages delivered or cars assembled. Suppose that €980 000 of manufacturing costs were incurred to produce 10 000 units of a finished good. Then the unit cost would be €98:

$$\frac{\text{Total manufacturing costs}}{\text{Number of units manufactured}} = \frac{€980\,000}{10\,000} = €98 \text{ per unit}$$

If 8000 units are sold and 2000 units remain in ending stock, the unit-cost concept helps in the assignment of total costs for the income statement and balance sheet:

| | |
|---|-----------------|
| Cost of goods sold in the income statement, 8000 units × €98 | €784 000 |
| Closing stock of finished goods in the balance sheet, 2000 units × €98 | <u>196 000</u> |
| Total manufacturing costs of 10 000 units | <u>€980 000</u> |

Unit costs are found in all areas of the value chain – for example, there are unit costs for product design, sales calls and customer-service calls.

Use unit costs cautiously

Unit costs are averages. As we shall see, they must be interpreted with caution. For decision making, it is best to think in terms of total costs rather than unit costs. Nevertheless, unit-cost numbers are frequently used in many situations. For example, assume that the President of the Jazz Society at the Católica Lisbon School of Business & Economics is deciding whether to hire a music group for a forthcoming party. The group charges a fixed fee of €1000. The president may intuitively calculate a unit cost for the group when thinking about an admission price. Given the fixed fee of €1000, the unit cost is €10 if 100 people attend, €2 if 500 attend, and €1 if 1000 attend. Note, however, that with a fixed fee of €1000 the *total cost* is unaffected by the attendance level, while the *unit cost* is a function of the attendance level. In this example, each attendee is considered to be one unit.

Costs are often neither inherently fixed nor variable. Much depends on the specific context. Consider the €1000 fixed fee that we assumed was to be paid to the music group. This is just one way the music group could be paid. Possible payment schedules that might be considered include:

- Schedule 1: €1000 fixed fee
- Schedule 2: €1 per person attending + €500 fixed fee
- Schedule 3: €2 per person attending.

Under schedules 2 and 3, the euro amount of the payment to the music group is not known until after the event.

Concepts in action

Reducing fixed costs and managing profit growth at Porsche

All companies seeking to show profits have to be concerned about fixed costs. Investments to achieve future profitability often imply that as fixed costs rise, volume of sales should rise also, so they can be allocated to a larger sales-volume base. But there may be a time lag between investing heavily and seeing volumes grow. Consider Porsche’s plans to invest €3 billion over the 2018–2023 period for electrified vehicles (EVs), which its CFO Lutz Meschke says is ‘... an enormous burden for a company our size’. But, Porsche does not wish to reduce its 15 per cent operating margin profitability target despite the heavy investments that EVs will need to make – at least not in the long run. Approximately €8000 to €10 000 is the added cost of content added to an electrified vehicle. Customers do not just fathom these costs being passed on to them as price increases. Yet, Porsche’s strategy, like other global motor car players, is to move in the direction of EV. So the answer for Porsche is to make investments such that its strategy pays off in the long-term, whereby it retains its high profitability. Managing costs is crucial. As Meschke explains: ‘To protect your margin, you have to look at substantial fixed-cost cuts, but there’s only so much potential since the biggest chunks are personnel and development. As sales shift toward EVs, a temporary drop in profitability in the midterm may be expected.’

So Porsche does not slow down its cost containment efforts. The company recognises that ‘identifying and extracting efficiencies is our everyday business’. Consequently, it has operationalised its Porsche Improvement Process, whereby Meschke aims for ‘Annual savings of at least 3 per cent in indirect areas and 6 per cent in direct ones’. On top of that, Porsche reviews its ‘core cross-departmental processes every year for another 10 per cent savings’.

Source: Hetzner, C. (2017) ‘Porsche CFO outlines how company will thrive in EV era’, (<http://europe.autonews.com/article/20171101/ANE/171029772/porsche-cfo-outlines-how-company-will-thrive-in-ev-era>) (27/1/2018).

The effects of these three payment schedules on unit costs and total costs for five attendance levels are shown in Exhibit 2.7.

Exhibit 2.7

The effects of the three payment levels on unit costs and total costs for five attendance levels

| Number of persons attending | Schedule 1: €1000 fixed | | Schedule 2: €1 per person + €500 fixed | | Schedule 3: €2 per person | |
|-----------------------------|----------------------------|-----------|---|-----------|------------------------------|-----------|
| | Total cost | Unit cost | Total cost | Unit cost | Total cost | Unit cost |
| 50 | €1000 | €20 | €550 | €11 | €100 | €2 |
| 100 | 1000 | 10 | 600 | 6 | 200 | 2 |
| 250 | 1000 | 4 | 750 | 3 | 500 | 2 |
| 500 | 1000 | 2 | 1000 | 2 | 1000 | 2 |
| 1000 | 1000 | 1 | 1500 | 1.5 | 2000 | 2 |

The unit cost under schedule 1 is calculated by dividing the fixed cost of €1000 by the attendance level. For schedule 2, the unit cost is calculated by first determining the total cost for each attendance level and then dividing that amount by that attendance level. Thus, for 250 people, schedule 2 has a total cost of €750 (€500 + 250 × €1), which gives a unit cost of €3 per person. Schedule 3 has a unit cost of €2 per person for any attendance level because the music group is to be paid €2 per person with no fixed payment.

All three payment schedules would yield the same unit cost of €2 per person only if 500 people attend. The unit cost is not €2 per person under schedule 1 or schedule 2 for any attendance level

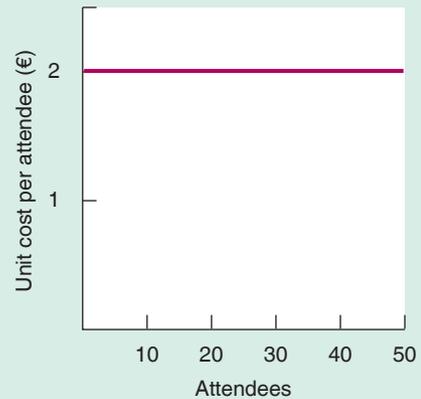
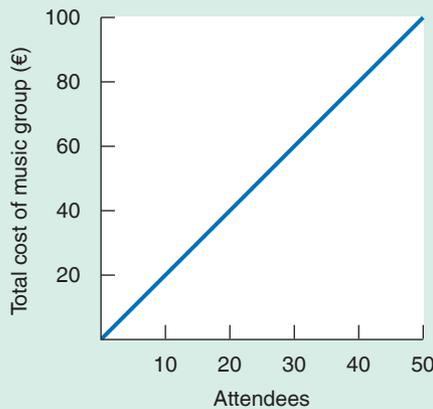
except 500 people. Thus, it would be incorrect to use the €2 per person amount in schedule 1 or 2 to predict what the total costs would be for 1000 people. Consider what occurs if 250 people attend and the group is paid a fixed fee of €1000. The unit cost is then €4 per person. *While unit costs are often useful, they must be interpreted with extreme caution if they include fixed costs per unit.* When estimating total cost, think of variable costs as an amount per unit and fixed costs as a lump-sum total amount.

Exhibit 2.8 Behaviour of total costs and unit costs when the level of the cost driver changes with illustration of alternative payment schedules for music group

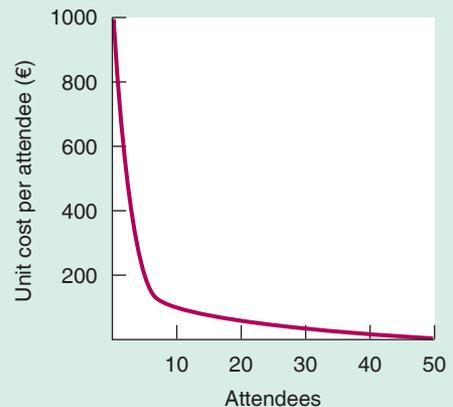
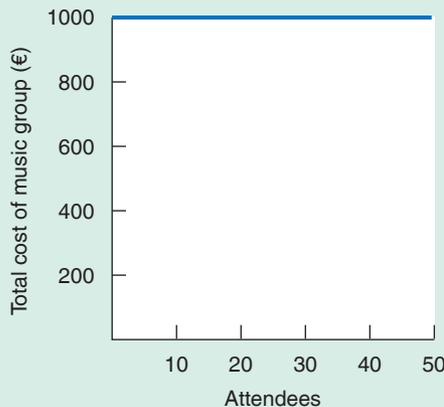
Panel A: Summary of key relationships

| Cost behaviour pattern | Total costs | Unit costs |
|------------------------------|--|---|
| When item is a variable cost | Total costs change with changes in level of cost driver | Unit costs remain the same with changes in level of cost driver |
| When item is a fixed cost | Total costs remain the same with changes in level of cost driver | Unit costs change with changes in level of cost driver |

Panel B: Payment is €2 per attendance



Panel C: Payment is a fixed €1000



The key relationships between total costs and unit costs are summarised in Panel A of Exhibit 2.8. Panel B illustrates these relationships for schedule 3 where the university social club pays the music group on a variable basis (cost of €2 per person). Panel C illustrates schedule 1 where the music group is paid a fixed amount (cost of €1000).

Financial statements, business sectors and the recognition of costs

We now consider the different sectors of the economy, the different types of stock that companies hold, and how these factors affect commonly used classifications of capitalised and revenue-based costs, which tie into the income statements or balance sheets of service, merchandising and manufacturing-sector companies. Let's first look at service companies.

Service-sector companies provide services or intangible products to their customers – for example, legal advice or an audit. These companies do not have any stock of tangible product at the end of an accounting period. Examples include law firms, accounting firms, advertising agencies and television stations. Labour costs are typically the most significant cost category, often being as high as 70% of total costs.

Exhibit 2.9 presents an income statement for Ahamed & Partners, a law firm specialising in libel lawsuits. The customers (clients) of this law firm receive legal advice and representation on their behalf in court and in negotiations. Salaries and wages constitute 67.3% of total operating costs ($€970\,000 \div €1\,442\,000$).

Exhibit 2.9

Service-sector income statement

Ahamed & Partners income statement for the year ended 31 December 2018

| | | |
|--------------------|----------------|------------------|
| Revenues | | €1 600 000 |
| Costs | | |
| Salaries and wages | €970 000 | |
| Rent | 180 000 | |
| Depreciation | 105 000 | |
| Other costs | <u>187 000</u> | <u>1 442 000</u> |
| Operating profit | | <u>€158 000</u> |

The operating-cost line items for service companies will include costs from all areas of the value chain (production of services, marketing, and so on). There is not a line item for cost of goods sold in the income statement of Ahamed & Partners. Why? Because the business sells only services or intangible products to its customers.

As opposed to service companies, **merchandising-sector companies** provide tangible products they have previously purchased in the same basic form from suppliers. Merchandise purchased from suppliers but not sold at the end of an accounting period is held as stock. The merchandising sector includes companies engaged in retailing (such as book stores or department stores), distributing or wholesaling. **Manufacturing-sector companies** provide tangible products that have been converted to a different form from that of the products purchased from suppliers. At the end of an accounting period, a manufacturer has stock that can include direct materials, work in progress or finished goods (see below). Examples are computer, food processing and textile companies.

Manufacturing-sector companies purchase materials and components and convert them into finished goods. These companies typically have one or more of the following three types of stock:

- 1 **Direct materials stock.** Direct materials is stock that will be used in the manufacturing process (for example, computer chips and components needed to manufacture mobile phones).
- 2 **Work-in-process stock.** Goods partially worked on but not yet completed (for example, mobile phones at various stages of completion in the manufacturing process). This is also called **work-in-progress**.
- 3 **Finished-goods stock.** Goods (for example, mobile phones) completed, but not yet sold.

Merchandising-sector companies purchase tangible products and then sell them without changing their basic form. These companies hold only one type of stock, which is products in their original purchased form, called *merchandise stock*. As noted, service-sector companies provide only services or intangible products and do not hold stock of tangible products.

How to classify manufacturing costs

Three terms commonly used when describing manufacturing costs are *direct materials costs*, *direct manufacturing labour costs* and *indirect manufacturing costs*. These terms build on the direct versus indirect cost distinction we described earlier in the context of manufacturing costs.

- 1 **Direct materials costs** are the acquisition costs of all materials that eventually become part of the cost object (work in process and then finished goods) and can be traced to the cost object in an economically feasible way. The aluminium and tyres used to make the Porsche Panamera and the computer chips used to make mobile phones are examples of direct material costs. Note that the costs of direct materials include not only the cost of the materials themselves, but the freight-in (inward delivery) charges, sales taxes and customs duties that must be paid to acquire them.
- 2 **Direct manufacturing labour costs** include the compensation of all manufacturing labour that can be traced to the cost object (work in process and then finished goods) in an economically feasible way. Examples include wages and fringe benefits paid to machine operators and assembly-line workers who convert direct materials to finished goods.
- 3 **Indirect manufacturing costs** are all manufacturing costs that are related to the cost object (work in process and then finished goods), but cannot be traced to that cost object in an economically feasible way. Examples include supplies, indirect materials such as lubricants, indirect manufacturing labour such as plant maintenance and cleaning labour, plant rent, plant insurance, property taxes on the plant, plant depreciation, and the compensation of plant managers. This cost category is also referred to as **manufacturing overhead costs** or **factory overhead costs**. We use *indirect manufacturing costs* and *manufacturing overhead costs* interchangeably in this book.

We now describe the distinction between stock-related and revenue cost. One key distinction of costs is their classification as **capitalised costs** that are first recorded as an asset (capital) when they are incurred. These costs are presumed to provide future benefits to the company. Examples are costs to acquire computer equipment and motor vehicles. These costs are written off to those periods assumed to benefit from their incurrence. For example, the cost of acquiring motor vehicles is written off as a depreciation expense that occurs each year of the expected useful life of the vehicle. And then, there are **revenue costs**, which are recorded as expenses of the accounting period when they are incurred. Examples are salaries paid to marketing personnel and monthly rent paid for administrative offices. In this book, we also refer to **operating costs** as all costs associated with generating revenues, other than cost of goods sold. For now, in relation to the company's financial statements, we want to focus on the following, which tie into how we regard accounting for stock.

Stock-related costs (also called **inventoriable costs**) are all costs of a product that are considered assets in a company's balance sheet when the costs are incurred and that are expensed as cost of goods sold only when the product is sold. For manufacturing-sector companies, all manufacturing costs are inventoriable costs. The costs first accumulate as work-in-process inventory assets (in other words, they are 'inventoried') and then as finished goods assets. Note that the cost of goods sold includes all manufacturing costs (direct materials, direct manufacturing labour, and manufacturing overhead costs) incurred to produce them. Thus, inventorying manufacturing costs in the balance sheet during the accounting period when the products are manufactured (i.e. capitalising these costs) and expensing the manufacturing costs in a later income statement when the products are sold matches revenues and expenses.

For merchandising-sector companies such as Primark, inventoriable costs are the costs of purchasing goods that are resold in their same form. These costs are made up of the costs of the goods themselves plus any incoming freight, insurance, and handling costs for those goods. Service-sector companies provide only services or intangible products. The absence of inventories of tangible products for sale means service-sector companies have no inventoriable costs.

Period costs are all costs in the income statement other than cost of goods sold. Period costs, such as design costs, marketing, distribution and customer-service costs, are treated as expenses of the accounting period in which they are incurred, because managers expect these costs to increase revenues in only that period and not in future periods. For manufacturing-sector companies, all non-manufacturing costs in the income statement are period costs. For merchandising-sector companies, all costs in the income statement not related to the cost of goods purchased for resale are period costs. Examples of these period costs are labour costs of sales floor personnel and advertising costs. Because there are no inventoriable costs for servicesector companies, all costs in the income statement are period costs. These are in effect, revenue costs, which are recorded as expenses of the accounting period when they are incurred. Examples are salaries paid to marketing personnel and monthly rent paid for administrative offices.

In this chapter, we assume that all manufacturing costs are inventoriable. The term *absorption costing* is used to describe the method in which all manufacturing costs are inventoriable. Chapter 6 further discusses this method and *variable costing*, in which only variable manufacturing costs are inventoriable. Fixed manufacturing costs under variable costing are treated as *period costs*, that is, they are treated as expenses in the period in which they are incurred rather than being inventoried.

Two further terms used in manufacturing-cost systems are prime costs and conversion costs. **Prime costs** are all direct manufacturing costs. As information-gathering technology improves, companies may add other direct-cost categories. For example, power costs might be metered in specific areas of a plant that are dedicated to the assembly of separate products. In this case, prime costs would include direct materials, direct manufacturing labour and direct metered power. Computer software companies often have a 'purchased technology' direct manufacturing-cost item. This item, which covers payments to third parties who develop software programs included in a product, would also be included in prime costs. **Conversion costs** are all manufacturing costs other than direct materials costs. These costs are for transforming direct materials into finished goods.

Consider the income statement of a manufacturer, Cellular Products, which is shown in Exhibit 2.10 (Panel A). Cost of goods sold in a manufacturing company is calculated as follows:

$$\begin{array}{r} \text{Opening finished} \\ \text{goods stock} \end{array} + \begin{array}{r} \text{Cost of goods} \\ \text{manufactured} \end{array} - \begin{array}{r} \text{Closing finished} \\ \text{goods stock} \end{array} = \text{Cost of goods sold}$$

For Cellular Products in 2018, the corresponding amounts (in thousands, Panel A) are

$$€22\,000 + €104\,000 - €18\,000 = €108\,000$$

Exhibit 2.10**Income statement and schedule of cost of goods manufactured or manufacturing-sector company****Panel A: Cellular Products income statement for the year ended 31 December 2018 (€000)**

| | | |
|--|----------------|----------------|
| Revenues | | €210 000 |
| Cost of goods sold | | |
| Opening finished goods, 1 January 2018 | €22 000 | |
| Cost of goods manufactured (see Panel B) | <u>104 000</u> | |
| Cost of goods available for sale | 126 000 | |
| Closing finished goods, 31 December 2018 | <u>18 000</u> | <u>108 000</u> |
| Gross margin (or gross profit) | | 102 000 |
| Operating costs | | <u>70 000</u> |
| Operating profit | | <u>€32 000</u> |

Panel B: Cellular Products schedule of cost of goods manufactured* for the year ended 31 December 2018 (€000)

| | | |
|---|---------------|-----------------|
| Direct materials | | |
| Opening stock, 1 January 2018 | €11 000 | |
| Purchases of direct materials | <u>73 000</u> | |
| Cost of direct materials available for use | 84 000 | |
| Closing stock, 31 December 2018 | <u>8 000</u> | |
| Direct materials used | | €76 000 |
| Direct manufacturing labour | | 17 750 |
| Indirect manufacturing costs | | |
| Indirect manufacturing labour | 4 000 | |
| Supplies | 1 000 | |
| Heat, light and power | 1 750 | |
| Depreciation – plant building | 1 500 | |
| Depreciation – plant equipment | 2 500 | |
| Miscellaneous | <u>500</u> | <u>11 250</u> |
| Manufacturing costs incurred during 2018 | | <u>105 000</u> |
| Add opening work-in-progress stock, 1 January 2018 | | <u>6 000</u> |
| Total manufacturing costs to account for | | 111 000 |
| Deduct closing work-in-progress stock, 31 December 2018 | | <u>7 000</u> |
| Cost of goods manufactured (to income statement) | | <u>€104 000</u> |

*Note that the term cost of goods manufactured refers to the cost of goods brought to completion (finished) during the year, whether they were started before or during the current year. Some of the manufacturing costs incurred during the year are held back as costs of the closing work-in-progress stock; similarly, the costs of the opening work-in-progress stock become part of the cost of goods manufactured for the year. Note too that this schedule can become a schedule of cost of goods manufactured and sold simply by including the opening and closing finished goods stock figures in the supporting schedule rather than directly in the body of the income statement as in Panel A.

Cost of goods manufactured refers to the cost of goods brought to completion, whether they were started before or during the current accounting period. In 2018, these costs amount to €104 000 for Cellular Products (see the schedule of cost of goods manufactured in Panel B of Exhibit 2.10). The manufacturing costs incurred during 2018 (€105 000) is a line item in Panel B. This item refers to the ‘new’ direct manufacturing costs and the ‘new’ manufacturing overhead costs that were incurred during 2018 for all goods worked on during 2018, regardless of whether all those goods were fully completed during this year.

The manufacturing costs of the finished goods include direct materials, other direct manufacturing costs, and indirect manufacturing costs. All these are inventoriable costs; they are assigned

to work-in-progress stock or finished goods stock until the goods are sold. Inventoriable costs include the costs of assets that facilitate the manufacturing process and (typically) become part of indirect manufacturing costs. For example, the costs of the blast furnace of a steel company are first capitalised at the time of construction. These costs subsequently become part of steel stock costs, as depreciation on the blast furnace is included in indirect manufacturing costs over the useful life of the blast furnace.

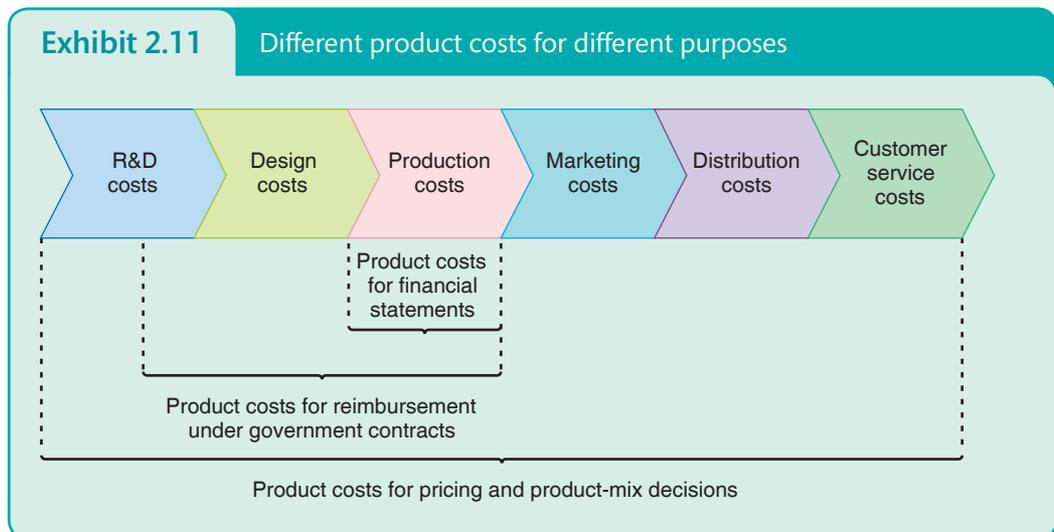
Newcomers to management accounting frequently assume that indirect costs such as rent, telephone and depreciation are always costs of the period in which they are incurred and are unconnected with stocks. However, if these costs are related to manufacturing per se, they are indirect manufacturing costs and are inventoriable. Operating-cost items in the income statement in Panel A of Exhibit 2.10 include: (1) the expensing of capitalised costs (such as depreciation on a fleet of delivery vehicles or depreciation on computers purchased for marketing personnel), and (2) the cost of items recorded as an expense as incurred (such as the salaries of customer-service representatives).

Differences exist across companies in the way accounting terms are defined. Consider a direct labourer, such as a lathe operator or an assembly-line worker, who earns gross wages calculated on the basis of a regular wage rate of €20 per hour. This person receives fringe benefits (employer contributions to the employee’s National Insurance, life insurance, and so on) totalling, say, €8 per hour. Some companies classify the €20 as direct manufacturing labour cost and the €8 as manufacturing overhead cost. Other companies classify the entire €28 as direct manufacturing labour cost. The latter approach is conceptually preferable because these payroll fringe benefit costs are a fundamental part of acquiring manufacturing labour services. The magnitude of fringe benefits makes this issue important. Countries where fringe benefit costs are over 30% of wage rates include Italy (105%), France (90%), Germany (86%), the UK (43%) and the USA (38%).

The many meanings of product costs

An important theme of this book is ‘different costs for different purposes’. This theme can be illustrated with respect to product costing. A **product cost** is the sum of the costs assigned to a product for a specific purpose. Exhibit 2.11 illustrates three different purposes:

- 1 *Product pricing and product emphasis.* For this purpose, the costs of all those areas of the value chain required to bring a product to a customer should be included.



- 2 *Contracting with government agencies.* Government agencies frequently provide detailed guidelines on the allowable and non-allowable items in a product-cost amount. For example, some government agencies explicitly exclude marketing costs from reimbursement to contractors and may reimburse only a part of R&D costs. Hence, the bracket in Exhibit 2.11 shows that a specific contract may provide for recovering all design and production costs and part of R&D costs.
- 3 *Financial statements.* The focus here is on inventoriable costs. In most countries, generally accepted accounting principles in manufacturing companies allow only manufacturing costs to be assigned to products reported in the financial statements.

Exhibit 2.11 illustrates how a product-cost amount may include only inventoriable costs in the financial statements, a broader set of costs for reimbursement under a government contract, and a still broader set of costs for pricing and product emphasis.

Classification of costs

This chapter has provided many examples of cost classifications that have various purposes. Classifications can be made on the basis of:

- 1 Business function
 - a Research and development
 - b Design of products, services and processes
 - c Production
 - d Marketing
 - e Distribution
 - f Customer service
- 2 Assignment to a cost object
 - a Direct costs
 - b Indirect costs
- 3 Behaviour pattern in relation to changes in the level of a cost driver
 - a Variable costs
 - b Fixed costs
- 4 Aggregate or average
 - a Total costs
 - b Unit costs
- 5 Assets or expenses
 - a Inventoriable (product) costs
 - b Period costs.

Summary

The following points are linked to the chapter's learning objectives.

- 1 A cost object is anything for which a separate measurement of costs is desired. Examples include a product, service, project, customer, brand category, activity, department and program.
- 2 A direct cost of a cost object is any cost that is related to the cost object and can be traced to that cost object in an economically feasible way. Indirect costs are costs that are related to the cost object but cannot be traced to



that cost object in an economically feasible way. A cost may be direct regarding one cost object and indirect regarding other cost objects. This book uses the term *cost tracing* to describe the assignment of direct costs to a cost object and the term *cost allocation* to describe the assignment of indirect costs to a cost object.

- 3 A cost driver is any factor that affects costs. Examples include the number of set-ups and direct-labour hours in manufacturing and the number of sales personnel and sales euros in marketing. A variable cost is a cost that does change in total in proportion to changes in a cost driver. A fixed cost is a cost that does not change in total despite changes in a cost driver.
- 4 Unit costs of a cost object should be interpreted with caution when they include a fixed-cost component. When making total cost estimates, think of variable costs as an amount per unit and fixed costs as a total amount.
- 5 Service-sector companies provide services or intangible products to their customers. In contrast, merchandising- and manufacturing-sector companies provide tangible products to their customers. Merchandising companies do not change the form of the products they acquire and sell. Manufacturing companies convert materials and other inputs into finished goods for sale. These differences are reflected in both the balance sheets and income statements of companies in these sectors.
- 6 Capitalised costs are first recorded as an asset when they are incurred. They become cost of goods sold when the product is sold. Period costs are expensed in the period in which they are incurred.
- 7 Managers may assign different costs to the same cost object depending on its purpose. For example, for financial reporting purposes, the (inventoriable) costs of a product include only manufacturing costs. In contrast, costs from all areas of the value chain can be assigned to a product for decisions on pricing and product emphasis.

Key terms

| | |
|---|---|
| cost (31) | capitalised costs (41) |
| cost object (31) | revenue costs (41) |
| cost accumulation (31) | operating costs (41) |
| cost assignment (31) | direct materials stock (41) |
| actual costs (31) | work-in-progress stock (41) |
| direct costs of a cost object (32) | work in process (41) |
| indirect costs of a cost object (32) | finished goods stock (41) |
| cost tracing (32) | direct material costs (41) |
| cost allocation (32) | direct manufacturing labour costs (41) |
| value-added activities (33) | indirect manufacturing costs (41) |
| cost driver (33) | manufacturing overhead costs (41) |
| variable cost (34) | factory overhead costs (41) |
| fixed cost (34) | stock-related costs (42) |
| relevant range (35) | inventoriable costs (42) |
| unit cost (36) | period costs (42) |
| average cost (36) | prime costs (42) |
| service-sector companies (40) | conversion costs (42) |
| merchandising-sector companies (40) | product cost (44) |
| manufacturing-sector companies (40) | |

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CHAPTER 2

Assessment material

Review questions

- 2.1 Define *cost object* and give three examples.
- 2.2 Which costs are considered direct? Indirect? Give an example of each.
- 2.3 Describe how a given cost item can be both a direct cost and an indirect cost.
- 2.4 Give three factors that will affect the classification of a cost as direct or indirect.
- 2.5 What is a *cost driver*? Give one example for each area in the value chain.
- 2.6 What is the *relevant range*? What role does the relevant range concept play in explaining how costs behave?
- 2.7 Explain why *unit costs* must often be interpreted with caution.
- 2.8 Describe how service-, merchandising- and manufacturing-sector companies differ from each other.
- 2.9 What are the three major categories of the inventoriable costs of a manufactured product?
- 2.10 Define the following: direct materials costs, direct manufacturing labour costs, indirect manufacturing costs, prime costs and conversion costs.

Exercises

Basic level

2.11 Total costs and unit costs (10 minutes)

A student association has hired a music group for a graduation party. The cost will be a fixed amount of €40 000.

Required

- 1 Suppose 500 people attend the party. What will be the total cost of the music group? The unit cost per person?
- 2 Suppose 2000 people attend. What will be the total cost of the music group? The unit cost per person?
- 3 For prediction of total costs, should the manager of the party use the unit cost in requirement 1? The unit cost in requirement 2? What is the major lesson of this problem?

***2.12 Total costs and unit costs** (15 minutes)

George Mathenge is a well-known motivational speaker. The Europe Speaker’s Bureau (ESB) wants Mathenge to be the sole speaker at an all-day seminar. Mathenge’s agent offers ESB the choice of three possible fee arrangements:

- Schedule 1: €8000 fee
- Schedule 2: €20 per person + €2000 fixed fee
- Schedule 3: €50 per person.

Each attendee will be charged a €200 fee for the all-day seminar.

Required

- 1 What is ESB’s fixed cost and variable cost for hiring Mathenge under each alternative schedule?
- 2 For each schedule, calculate the total cost and unit cost per seminar attendee if (a) 50 attend, (b) 200 attend, and (c) 500 attend. Comment on the results.

2.13 Total costs and unit costs (10 minutes)

Weltferien AG markets vacation packages to Tenerife from Dresden. The package includes a round-trip flight on Saxon-Air. Weltferien pays Saxon-Air €60 000 for each round-trip flight. The maximum load on a flight is 300 passengers.

Required

- 1 What is the unit cost to Weltferien of each passenger on a Saxon-Air round-trip flight if there are (a) 200, (b) 250, or (c) 300 passengers?
- 2 What role can the unit-cost figures per passenger calculated in requirement 1 play when Weltferien is predicting the total air-flight costs to be paid next month for Saxon-Air carrying 4000 passengers on 15 scheduled round-trip flights?

2.14 Classification of costs, service sector (15–20 minutes)

Presta-Serviços SA is a marketing research firm that organises focus groups for consumer product companies. Each focus group has eight individuals who are paid €9000 per session to provide comments on new products. These focus groups meet in hotels and are led by a trained independent marketing specialist hired by Presta-Serviços. Each specialist is paid a fixed retainer to conduct a minimum number of sessions and a per-session fee of €360 000. A Presta-Serviços staff member attends each session to ensure that all the logistical aspects run smoothly.

Required

Classify each of the following cost items as:

- a Direct or indirect (D or I) costs with respect to each individual focus group.
- b Variable or fixed (V or F) costs with respect to how the total costs of Presta-Serviços change as the number of focus groups changes. (If in doubt, select the cost type on the basis of whether the total costs will change substantially if a large number of groups are conducted.)

You will have two answers (D or I; V or F) for each of the following items:

| Cost item | D or I | V or F |
|---|--------|--------|
| A Payment to individuals in each focus group to provide comments on new products | | |
| B Annual subscription of Presta-Serviços to <i>Consumer Reports</i> magazine | | |
| C Phone calls made by Presta-Serviços staff member to confirm individuals will attend a focus group session. (Records of individual calls are not kept) | | |

| Cost item | D or I | V or F |
|---|--------|--------|
| D Retainer paid to focus group leader to conduct 20 focus groups per year on new medical products | | |
| E Hotel meals provided to participants in each focus group | | |
| F Lease payment by Presta-Serviços for corporate office | | |
| G Cost of tapes used to record comments made by individuals in a focus group session. (These tapes are sent to the company whose products are being tested) | | |
| H Petrol costs of Presta-Serviços staff for company-owned vehicles. (Staff members submit monthly bills with no mileage breakdowns) | | |

2.15 Classification of costs, merchandising sector (15–20 minutes)

Crescendo Srl operates a large store in Milan. The store has both a film (video/DVDs) section and a musical (compact discs and tapes) section. Crescendo reports revenues for the film section separately from the musical section.

Required

Classify each of the following cost items as:

- a Direct or indirect (D or I) costs with respect to the film section.
- b Variable or fixed (V or F) costs with respect to how the total costs of the film section change as the number of films sold changes. (If in doubt, select the cost type on the basis of whether the total costs will change substantially if a large number of films are sold.)

You will have two answers (D or I; V or F) for each of the following items:

| Cost item | D or I | V or F |
|--|--------|--------|
| A Annual retainer paid to a film distributor | | |
| B Electricity costs of Crescendo store (single bill covers entire store) | | |
| C Costs of films purchased for sale to customers | | |
| D Subscription to <i>Video-Novo</i> magazine | | |
| E Leasing of computer software used for financial budgeting at Crescendo store | | |
| F Cost of popcorn provided free to all customers of Crescendo | | |
| G Earthquake insurance policy for Crescendo store | | |
| H Freight-in costs of films purchased by Crescendo | | |

Intermediate level

2.16 Cost drivers and the value chain (15 minutes)

A Toyota analyst is preparing a presentation on cost drivers. Unfortunately, both the list of its business function areas and the accompanying list of representative cost drivers are accidentally randomised. The two lists now on the computer screen are as follows:

| Business function area | Representative cost driver |
|--------------------------------|---|
| A Design of Products/Processes | 1 Number of cars recalled for defective parts |
| B Customer Service | 2 Number of machine assembly hours |
| C Marketing | 3 Number of research scientists |
| D Research and Development | 4 Hours of computer-aided design (CAD) work |
| E Distribution | 5 Number of sales personnel |
| F Production | 6 Weight of cars shipped |

Required

- 1 Match each business function area with its representative cost driver.
- 2 Give a second example of a cost driver for each of the business function areas of Toyota.

2.17 Computing cost of goods manufactured and cost of goods sold (20–25 minutes)

Calculate cost of goods manufactured and cost of goods sold from the following account balances relating to 2018 (in € millions):

| | |
|--|-------|
| Property tax on plant building | 0.45 |
| Marketing, distribution and customer-service costs | 5.55 |
| Finished goods stock, 1 January 2018 | 4.05 |
| Plant utilities | 2.55 |
| Work-in-progress stock, 31 December 2018 | 3.90 |
| Depreciation of plant building | 1.35 |
| General and administrative costs (non-plant) | 6.45 |
| Direct materials used | 13.05 |
| Finished goods stock, 31 December 2018 | 5.10 |
| Depreciation of plant equipment | 1.65 |
| Plant repairs and maintenance | 2.40 |
| Work-in-progress stock, 1 January 2018 | 3.00 |
| Direct manufacturing labour | 5.10 |
| Indirect manufacturing labour | 3.45 |
| Indirect materials used | 1.65 |
| Miscellaneous plant overhead | 0.60 |

2.18 Income statement and schedule of cost of goods manufactured (25–30 minutes)

Howell Ltd has the following account balances (in millions):

| For specific date | | For year 2018 | |
|------------------------------------|-----|-------------------------------|------|
| Direct materials, 1 January 2018 | £15 | Purchases of direct materials | £325 |
| Work in progress, 1 January 2018 | 10 | Direct manufacturing labour | 100 |
| Finished goods, 1 January 2018 | 70 | Depreciation – plant building | |
| Direct materials, 31 December 2018 | 20 | and equipment | 80 |
| Work in progress, 31 December 2018 | 5 | Plant supervisory salaries | 5 |
| Finished goods, 31 December 2018 | 55 | Miscellaneous plant overhead | 35 |
| | | Revenues | 950 |
| | | Marketing, distribution and | |
| | | customer-service costs | 240 |
| | | Plant supplies used | 10 |
| | | Plant utilities | 30 |
| | | Indirect manufacturing labour | 60 |

Required

Prepare an income statement and a supporting schedule of cost of goods manufactured for the year ended 31 December 2018. (For additional questions regarding these facts, see the next problem.)

2.19 Interpretation of statements (continuation of Exercise 2.18) (20–25 minutes)

Refer to the preceding problem.

Required

- 1 How would the answer to the preceding problem be modified if you were asked for a schedule of cost of goods manufactured and sold instead of a schedule of cost of goods manufactured? Be specific.
- 2 Would the sales manager's salary (included in marketing, distribution and customer-service costs) be accounted for differently if Howell Ltd were a merchandising company instead of a manufacturing company?
- 3 Plant supervisory salaries are usually regarded as indirect manufacturing costs. Under what conditions might some of these costs be regarded as direct manufacturing costs? Give an example.
- 4 Suppose that both the direct materials used and the plant depreciation were related to the manufacture of 1 million units of product. What is the unit cost for the direct materials assigned to those units? What is the unit cost for plant building and equipment depreciation? Assume that yearly plant depreciation is calculated on a straight-line basis.
- 5 Assume that the implied cost behaviour patterns in requirement 4 persist. That is, direct materials costs behave as a variable cost and depreciation behaves as a fixed cost. Repeat the computations in requirement 4, assuming that the costs are being predicted for the manufacture of 1.2 million units of product. How would the total costs be affected?
- 6 As a management accountant, explain concisely to the CEO why the unit costs differed in requirements 4 and 5.

2.20 Finding unknown balances (20–25 minutes)

An auditor for the Inland Revenue is trying to reconstruct some partially destroyed records of two taxpayers. For each of the cases in the accompanying list, find the unknowns designated by letters A to D (figures are assumed to be in £000).

| | Case 1 | Case 2 |
|---|--------|--------|
| Debtors, 31 December 2018 | £6 000 | £2 100 |
| Cost of goods sold | A | 20 000 |
| Creditors, 1 January 2018 | 3 000 | 1 700 |
| Creditors, 31 December 2018 | 1 800 | 1 500 |
| Finished goods stocks, 31 December 2018 | B | 5 300 |
| Gross margin | 11 300 | C |
| Work in progress, 1 January 2018 | 0 | 800 |
| Work in progress, 31 December 2018 | 0 | 3 000 |
| Finished goods stocks, 1 January 2018 | 4 000 | 4 000 |
| Direct material used | 8 000 | 12 000 |
| Direct manufacturing labour | 3 000 | 5 000 |
| Indirect manufacturing costs | 7 000 | D |
| Purchases of direct material | 9 000 | 7 000 |
| Revenues | 32 000 | 31 800 |
| Debtors, 1 January 2018 | 2 000 | 1 400 |

2.21 Fire loss, computing stock costs (30–40 minutes)

A distraught employee, Guy Pirault-Manne, put a torch to a manufacturing plant on a blustery day, 26 February 2018. The resulting blaze completely destroyed the plant and its contents. Fortunately, certain accounting records were kept in another building. They revealed the following for the period from 1 January 2018 to 26 February 2018:

| | |
|--|-------------------------|
| Direct materials purchased | €3.2 million |
| Work in progress, 1 January 2018 | €680 000 |
| Direct materials, 1 January 2018 | €320 000 |
| Finished goods, 1 January 2018 | €600 000 |
| Indirect manufacturing costs | 40% of conversion costs |
| Revenues | €10 million |
| Direct manufacturing labour | €3.6 million |
| Prime costs | €5.88 million |
| Gross margin percentage based on sales | 20% |
| Cost of goods available for sale | €9 million |

The loss was fully covered by insurance. The insurance company wants to know the historical cost of the stocks as one factor considered when negotiating a settlement.

Required

Calculate the cost of:

- 1 Finished goods stock, 26 February 2018.
- 2 Work-in-progress stock, 26 February 2018.
- 3 Direct materials stock, 26 February 2018.

2.22 Comprehensive problem on unit costs, product costs (30 minutes)

Overtoom International Nederland BV manufactures and sells metal shelving. It began operations on 1 January 2018. Costs incurred for 2018 (V stands for variable; F stands for fixed) are as follows:

| | | |
|--|----------|---|
| Direct materials used costs | €280 000 | V |
| Direct manufacturing labour costs | 60 000 | V |
| Plant energy costs | 10 000 | V |
| Indirect manufacturing labour costs | 20 000 | V |
| Indirect manufacturing labour costs | 32 000 | F |
| Other indirect manufacturing costs | 16 000 | V |
| Other indirect manufacturing costs | 48 000 | F |
| Marketing, distribution and customer-service costs | 245 700 | V |
| Marketing, distribution and customer-service costs | 80 000 | F |
| Administrative costs | 100 000 | F |

Variable manufacturing costs are variable with respect to units produced. Variable marketing, distribution, and customer-service costs are variable with respect to units sold. Stock data are as follows:

| | Opening 1 January 2018 | Closing 31 December 2018 |
|------------------|---------------------------|-----------------------------|
| Direct materials | 0 kg | 2000 kg |
| Work in progress | 0 units | 0 units |
| Finished goods | 0 units | ? units |

Production in 2018 was 100 000 units. Two kilograms of direct materials are used to make one unit of finished product.

Revenues in 2018 were €873 600. The selling price per unit and the purchase price per kilogram of direct materials were stable throughout the year. The company's ending stock of finished goods is carried at the average unit manufacturing costs for 2018. Finished goods stock, at 31 December 2018, was €41 940.

Required

- 1 Direct materials stock, total cost, 31 December 2018.
- 2 Finished goods stock, total units, 31 December 2018.
- 3 Selling price per unit 2018.
- 4 Operating profit 2018. Show your computations.

*2.23 Budgeted income statement (continuation of Exercise 2.22) (30 minutes)

Assume management predicts that the selling price per unit and variable cost per unit will be the same in 2019 as in 2018. Fixed manufacturing costs and marketing, distribution and customer-service costs in 2019 are also predicted to be the same as in 2018. Sales in 2019 are forecast to be 122 000 units. The desired closing stock of finished goods, 31 December 2019, is 12 000 units. Assume zero closing stock of both direct materials and work in progress. The company's closing stock of finished goods is carried at the average unit manufacturing costs for 2019. The company uses the first-in, first-out stock method. Management has asked that you prepare a budgeted income statement for 2019.

Required

- 1 Units of finished goods produced in 2019.
- 2 Budgeted income statement for 2019.

Advanced level

*2.24 Variable costs and fixed costs (5–20 minutes)

Lutukka Oy owns the rights to extract minerals from beach sands in Enare Lappmark. Lutukka has costs in three areas:

- a Payment to a mining subcontractor who charges €80 per tonne of beach sand mined and returned to the beach (after being processed on the mainland to extract three minerals: ilmenite, rutile and zircon).
- b Payment of a government mining and environmental tax of 50 per tonne of beach sand mined.
- c Payment to a barge operator. This operator charges €150 000 per month to transport each batch of beach sand – up to 100 tonnes per batch per day – to the mainland and then return to Enare Lappmark (that is, 0–100 tonnes per day = €150 000 per month; 101–200 tonnes = €300 000 per month, and so on). Each barge operates 25 days per month. The €150 000 monthly charge must be paid even if less than 100 tonnes is transported on any day and even if Lutukka requires fewer than 25 days of barge transportation in that month.

Lutukka is currently mining 180 tonnes of beach minerals per day for 25 days per month.

Required

- 1 What is the variable cost per tonne of beach sand mined? What is the fixed cost to Lutukka per month?
- 2 Plot one graph of the variable costs and another graph of the fixed costs of Lutukka. Your plots should be similar to Exhibits 2.4 and 2.5. Is the concept of relevant range applicable to your plots?

- 3 What is the unit cost per tonne of beach sand mined (a) if 180 tonnes are mined each day, or (b) if 220 tonnes are mined each day? Explain the difference in the unit-cost figures.

2.25 Revenue and cost recording and classifications, ethics (25–30 minutes)

Aran Sweaters Ltd designs and markets wool jumpers to many retailers and distributors around Europe. Its corporate headquarters are situated in Dublin, Ireland. Manufacturing is done by a subcontractor (O’Neil’s Clothing Ltd) on Achill Island. The local council in Achill Island grants locally-owned companies a 20% income tax rebate if the ratio of their domestic labour costs to total costs exceeds 25%. Domestic labour costs are defined as the employment costs of all employees who are Achill residents. Siobhan Sheridan, the newly appointed controller of Aran Sweaters, has recently been examining payments made to O’Neil’s. She observes that O’Neil’s purchased wool from Aran Sweaters (€3 million in 2018). Aran Sweaters paid O’Neil’s €12 million for the jumpers manufactured on Achill in 2018. Based on her industry experience, the €12 million amount is very low. She was told it was ‘a great deal’ for Aran Sweaters. There is also a sizeable payment by Aran Sweaters to the Swiss subsidiary of O’Neil’s (€4.8 million in 2018). Sheridan is told by the O’Neil’s CEO that this payment is for fabric design work that O’Neil does with Aran Sweaters. Aran Sweaters has included the €4.8 million payments in its own product design cost. The director of product design at Aran Sweaters told Sheridan it is an ‘off-statement’ item that historically he has neither responsibility for nor any say about. To his knowledge, O’Neil’s uses only Aran Sweaters designs with either zero or minimal changes.

O’Neil’s domestic labour costs in 2018 were €3.6 million while its total costs were €10 million. Included in this €3.6 million was €1.3 million for labour fringe benefits (for health insurance, etc.). A component of this €1.3 million is €600 000 for life insurance for O’Neil’s executives. Aran Sweaters helped arrange this life insurance policy. It negotiated with the insurance company managing its own executive life insurance plans to include the O’Neil’s executives at rates much more favourable than those available in Achill.

Required

- 1 What concerns should Sheridan have about the revenue and cost numbers in Aran Sweaters’ financial reports?
- 2 Which (if any) of the concerns in requirement 1 raise ethical issues for Sheridan? Explain.
- 3 What steps should Sheridan take to address the ethical issues you identify in requirement 2?



CHAPTER 3

Job costing

How much does it cost Ernst & Young to audit Yamaha? How much does it cost Kraft to promote its new pre-sliced, cracker-sized cheese? How much does it cost Peugeot to manufacture and sell an iOn all-electric car to a customer? How much does it cost Apple to incorporate wi-fi and Bluetooth within an iPad? Managers ask these questions for many reasons, including formulating overall strategies, determining product and service emphasis and pricing, engaging in cost control and meeting external reporting obligations. This chapter presents concepts and techniques that guide the responses to such questions. Chapter 11 will refine some ideas presented here.

Costing systems aim to report cost numbers that indicate the manner in which particular cost objects – such as products, services and customers – use the resources of an organisation. Before we explore the details of costing systems, three points are worth noting:

1. The cost-benefit-context approach we discussed in Chapter 1 is of relevance in designing and choosing costing systems. The costs of elaborate systems, including the costs of educating managers and other personnel, can be quite high. Managers may choose to install a more sophisticated system if they believe that its benefits will outweigh its costs. In practice, experienced managers tend to act on intuition rather than a fully quantified cost-benefit analysis. Behavioural, political and institutional factors generally influence accounting information systems choice and design.
2. Systems tend to be tailored to the underlying operations and not vice versa. Any significant change in underlying operations is likely to justify a corresponding change in the accompanying costing systems. Systems fail when operating managers perceive them as misleading, useless or incompatible with their management style.
3. Costing systems are only one source of information for managers. Generally, managers combine cost information with non-financial metrics and qualitative information when making decisions.

Learning objectives

After studying this chapter, you should be able to:

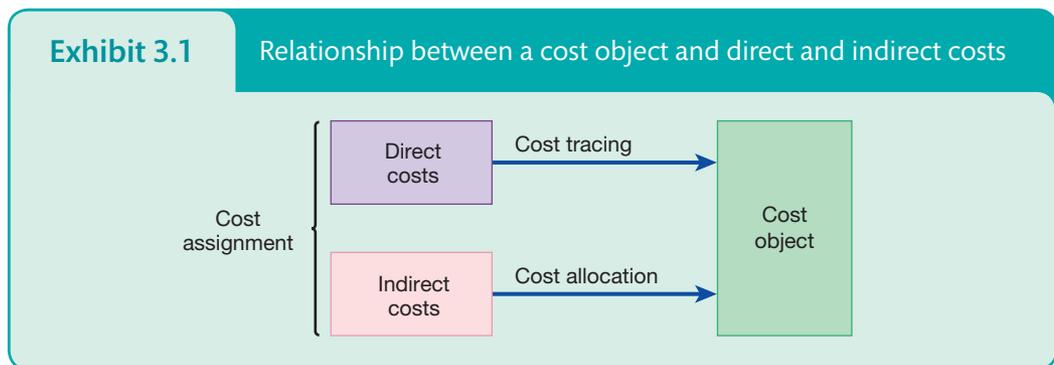
- Describe the building block concept of costing systems
- Distinguish between job costing and process costing
- Outline a six-step approach to job costing
- Distinguish actual costing from normal costing
- Understand job costing in service and manufacturing contexts
- Describe key source documents used in job-costing systems
- Understand how the steps in the production process are tracked in a job-costing system
- Describe alternative methods of dealing with period-end under- or overallocated indirect costs

The building block concept of costing systems

Let us briefly review some terms introduced in Chapter 2 that we will use in discussing costing systems:

- *Cost object* – anything for which a separate measurement of costs is desired.
- *Direct costs of a cost object* – costs that are related to the particular cost object and can be traced to it in an economically feasible (cost-effective) way.
- *Indirect costs of a cost object* – costs that are related to the particular cost object but cannot be traced to it in an economically feasible (cost-effective) way. Indirect costs are allocated to the cost object using a cost-allocation method.

The relationship among these three concepts is shown in Exhibit 3.1.



Two concepts not previously defined are also important when discussing costing systems:

- **Cost pool** – a grouping of individual cost items. Cost pools can range from the very broad (such as a company-wide total-cost pool for telephones and fax machines) to the very narrow (such as the costs of operating a car used by a travelling salesperson).
- **Cost-allocation base** – a factor that is the common denominator for systematically linking an indirect cost or group of indirect costs to a cost object. A cost-allocation base can be financial (such as direct-labour costs) or non-financial (such as the number of car kilometres travelled). Companies often seek to use the cost driver of the indirect costs as the cost-allocation base. For example, the number of kilometres travelled may be used as the base for allocating motor vehicle operating costs among different sales districts. Or, for example, if the indirect costs of operating metal-cutting machines is £500 000 based on running these machines for 10 000 hours, the cost-allocation rate is £500 000 divided by 10 000 hours = £50 per machine-hour, where machine-hours is the cost-allocation base. If a product uses 800 machine-hours, it will be allocated £40 000, or £50 per machine per hour times 800 machine-hours.

These five terms constitute the building blocks that are considered relevant in the design of costing systems.

Job-costing and process-costing systems

Companies frequently adopt one of two basic types of costing system to assign costs to products or services:

- **Job-costing system.** In this system, costs are assigned to a distinct unit, batch or lot of a product or service. A job is a task for which resources are expended in bringing a distinct product or service to market. The product or service is often custom-made, such as an audit by an accounting firm or a gearbox system for a particular car system.

- Process-costing system.** In this system, the cost object is masses of identical or similar units. The cost of a product or service is obtained by using broad averages to assign costs to masses of identical or similar units. The customers all receive the same product (such as teddy bears or soda ash).

These two types of costing system are best viewed as ends of a continuum:



Most companies have costing systems that are neither pure job costing nor pure process costing. Rather, they combine elements of both job costing and process costing. For now, we introduce these two systems by focusing on their pure versions. Exhibit 3.2 presents examples of job and process costing in the service, merchandising and manufacturing sectors.

The products or services accounted for with job costing can differ greatly. Accounting firms typically define individual audits as jobs, which can differ markedly in complexity among clients. An aircraft assembly company may define an individual aircraft for a specific customer as a job. Customers usually differ in their specifications about electronic equipment, size of toilet cubicles, and so on. Consider also job-order costing in bespoke cars production. Many luxury car brands such as Rolls-Royce, Ferrari and Aston Martin make bespoke cars – cars that are built to customers’ specific specifications. Wealthy buyers are willing to pay millions for a personalised, one-off car. The Rolls-Royce ‘Sweptail’ reportedly cost an anonymous patron £12 million. In this market, customers may ‘desire to curate, commission and collect’ and ‘demand true personalisation in the goods they seek to commission’, according to Torsten Müller-Ötvös, CEO of Rolls-Royce (Harvey 2017). Such bespoke cars can take more than a year to build due to their uniqueness. The car-makers incur various types of costs and use job-order costing to track them. For example, the coachbuilding of the Rolls-Royce ‘Ghost Elegance diamond stardust’ requires direct-labour input from an in-house bespoke team of car designers, clay-model makers, manufacturers, mechanics crew, assembling team involved in any car-making process, as well as those of diamond specialists Jean Boule Luxury Group. The direct materials include the auto parts outsourced from material production companies, such as bodies, roof, wheels, engines, cooling system and, in this case, diamonds and special paints. Overhead costs include depreciation of equipment, utilities in the factories and headquarters, R&D, marketing and executive salaries. Creating bespoke cars in general involves unusual and rare materials, more crafting and labour input into every process. The costs of making each bespoke car differ due to their ‘personalised’

| | Service sector | Merchandising sector | Manufacturing sector |
|-------------------------|--|---|---|
| Job costing used | <ul style="list-style-type: none"> ● Accounting firm audits ● Advertising agency campaigns | <ul style="list-style-type: none"> ● Sending a catalogue to a mailing list ● Special promotion of a new store product | <ul style="list-style-type: none"> ● Aircraft assembly ● House construction |
| Process costing | <ul style="list-style-type: none"> ● Deposit processing ● Postal delivery (standard items) | <ul style="list-style-type: none"> ● Grain dealing ● Processing new magazine subscriptions | <ul style="list-style-type: none"> ● Oil refining ● Beverages production |

nature. A careful track must be kept of all costs involved to ultimately provide accurate information for pricing and profit-determination purposes. In such cases, the service or product is distinct and identifiable. Job-costing systems are designed to accommodate the cost accounting for these individual services or products.

Companies that use process costing provide similar (in many cases identical) products or services to their customers. For example, a bank usually provides the same service to all its customers in processing deposits. A magazine publishing company provides the same product (say, a weekly issue of *Le Point* or *The Times*) to each of its customers. The customers of an oil-refining company all receive the same product – crude oil. Process-costing systems average the costs of providing a similar product or service to different customers to obtain a per unit cost. Chapter 4 discusses process costing in more detail.

Job costing in service organisations using actual costing

Service-sector companies provide their customers with services or intangible products. Within the service sector, jobs often differ considerably in terms of their length, complexity and resources used. Examples include a service call to repair a television, an audit engagement, the making of a musical and a university research project for a government agency.

Job costing of an audit engagement

Lindsay & Associates is a public accounting firm. Each audit engagement is viewed as an individual job. Lindsay bids a fixed fee for each audit in advance of doing the work. A key issue for Lindsay is the cost of an audit engagement. A record of costs on previous jobs enables it to make informed estimates of the costs of potential future jobs. The more knowledgeable Lindsay is about its own costs, the more likely it is to price jobs so that it makes a profit on those accepted.

First, consider the actual costing system Lindsay uses to determine the cost of individual jobs. Actual costing is a costing method that traces direct costs to a cost object by using the actual direct-cost rate(s) times the actual quantity of the direct-cost input(s) and allocates indirect costs based on the actual indirect-cost rate(s) times the actual quantity of the cost-allocation base. The Tracy Transport audit illustrates **actual costing**. In November 2018, Lindsay was awarded the 2019 Tracy Transport audit job for a fee of €86 000. The 2019 audit job was done in the January to March 2019 period and covers Tracy Transport's 2018 financial year.

General approach to job costing

The six steps taken in assigning costs to individual jobs are presented here. They apply equally to job costing in the service, merchandising or manufacturing sectors.

Step 1: Identify the job that is the chosen cost object In this example, the job is the annual audit of the financial statements of Tracy Transport.

Step 2: Identify the direct costs for the job Lindsay identifies only one category of direct costs when costing individual audit jobs – professional labour. Each auditor keeps a daily time record for tracing professional labour-hours to individual audit jobs. These records show that the Tracy Transport job used 800 professional labour-hours. The actual direct-labour cost rate is €51 per hour. The actual direct-labour cost rate is the average rate at which professional labour is paid (actual total professional compensation divided by actual total direct-labour-hours worked) during the period in which the Tracy Transport audit was done. Lindsay traces the actual direct-labour costs for the Tracy Transport job as €40 800 ($€51 \times 800$).

Step 3: Identify the indirect-cost pools associated with the job Lindsay groups all its individual indirect costs into a single cost pool called audit support. This cost pool represents all costs in Lindsay's Audit Support Department. The indirect-cost pool consists of a variety of individual costs, such as general audit and secretarial support, which are less predictable and less traceable to jobs than direct labour. Hence, the actual indirect-cost rate can often only be calculated on an actual basis at the end of the year. In 2019, indirect costs totalled €12 690 000 (€4 990 000 for 'other-labour-related costs' plus €7 700 000 for 'non-labour-related costs').

Step 4: Select the cost-allocation base to use in allocating each indirect-cost pool to the job The allocation base selected for the audit support indirect-cost pool is professional labour-hours. Total professional labour-hours worked in 2019 were 270 000.

Step 5: Develop the rate per unit of the cost-allocation base used to allocate indirect costs to the job The actual indirect-cost rate for Lindsay in 2019 is €47 per professional labour-hour:

$$\begin{aligned} \text{Actual indirect-cost rate} &= \frac{\text{Actual total costs in indirect-cost pool}}{\text{Actual total quantity of cost-allocation base}} \\ &= \frac{€4\,990\,000 + €7\,700\,000}{270\,000} \\ &= \frac{€12\,690\,000}{270\,000} \\ &= €47 \text{ per professional labour-hour} \end{aligned}$$

The actual indirect costs allocated to the Lindsay audit job are €37 600 (€47 × 800).

Step 6: Assign the costs to the cost object by adding all direct costs and all indirect costs The information from steps 1 to 5 can now be used to calculate the 2019 actual cost of the Lindsay audit:

| | |
|--------------------------------|----------------|
| Direct job costs traced | |
| Professional labour, €51 × 800 | €40 800 |
| Indirect job costs allocated | |
| Audit support, €47 × 800 | <u>37 600</u> |
| | <u>€78 400</u> |

Recall that Lindsay was paid €86 000 for the 2019 Tracy Transport audit. Thus, the actual costing system shows a €7600 operating profit (€86 000 – €78 400) on this audit job.

Exhibit 3.3 presents an overview of the Lindsay job-costing system. This exhibit includes the five building blocks of this chapter: cost object, cost pool, direct costs of a cost object, indirect costs of a cost object and cost-allocation base. Costing-system overviews like Exhibit 3.3 are important learning tools. We urge you to sketch one when you need to understand a costing system. (The symbols in Exhibit 3.3 are used consistently in the costing-system overviews presented in this book. For example, a triangle always identifies a direct cost.)

Source documents

Managers and accountants gather the information that goes into their cost systems through **source documents**, which are the original records that support journal entries in an accounting system. Time records are Lindsay's main source documents. All professional staff members record how they spend each half-hour of the day. At the end of each week, the number of total professional labour-hours spent on each job (both for the most recent week and the cumulative total since the start of the job) is tabulated. The accuracy of information on how employees spend their time is important, especially in service organisations, where labour costs often make up over half of total costs. Accounting and law firms often impose penalties on personnel who do not submit accurate time records when required. Computers simplify the recording and preparation of job cost information.