

CHAPTER 19

Sustainability management accounting

LEARNING OBJECTIVES

After studying this chapter, you should be able to:

- 19.1 discuss how the concepts of sustainability and sustainability management apply to corporate practice
- 19.2 recognise why it is essential for management accountants to take an integrated thinking approach to sustainability
- 19.3 outline the scope and benefits resulting from sustainability management accounting practices
- 19.4 demonstrate an understanding of key sustainability management accounting tools
- 19.5 communicate the issues faced by managers when trying to implement sustainability change processes within their entities.

IN BRIEF

The relationship between management accounting control systems and organisational goals and culture is a key consideration for managers wishing to pursue sustainability management practices in their individual businesses. Sustainability management is a process undertaken by entities striving for a simultaneous improvement of their *economic, environmental* and *social* goals. Sustainability management accounting is the tool used by organisations to achieve their sustainability management goals. Sustainability management decision making is optimised when supported by management accounting tools that are aligned with sustainability management strategies.

Source: Eldernberg L.G., Brooks A., Oliver, J., Vesly G., Dorner R & Marthy, V. (2014) *Mgt. Accounty* (3rd edit), Wiley

We mean business — sustainable business

Bank Australia, formerly bankmecu, promotes itself as the first bank in the world to commit to all seven climate commitments of the 'We Mean Business' climate leadership platform.¹

We Mean Business is a coalition of organisations that are now working with thousands of businesses and investors around the world. The premise behind We Mean Business is that the only way to secure sustainable economic growth and prosperity for all into the future is to transition to a 'low carbon' economy.²



According to the managing director of Bank Australia, Damien Walsh, the bank is making all seven commitments as part of its longstanding commitment to responsible banking. 'Our approach to banking includes a vision of a healthier planet, and we are determined to do what we can to see Australia transition to a low carbon economy.'³ The commitments follow the smart policy framework outlined by the We Mean Business coalition as follows.

1. Adopt a science-based emissions reduction target.
2. Put a price on carbon.
3. Procure 100 per cent of electricity from renewable sources.
4. Responsible corporate engagement in climate policy.
5. Report climate change information in mainstream reports as a fiduciary duty.
6. Remove commodity-driven deforestation from all supply chains by 2020.
7. Reduce short-lived climate pollutant emissions.⁴

Bank Australia manages its operational activities to help it meet its commitment to these principles. Figure 19.1 highlights the management systems that Bank Australia has identified as essential for management control.

Material topic	Stakeholder/s										
	Board	Employees	Customers	Community sector customers	Potential customers	Communities of interest	Regulators	Media	Key suppliers	Other suppliers	Customer owned banking sector
Ensuring an effective governance framework	✓	✓	✓	✓	✓		✓				
Maintaining regulatory compliance	✓	✓	✓	✓	✓		✓		✓	✓	
Managing risk	✓	✓	✓	✓	✓		✓				✓
Delivering transparent, accountable and complete public performance reporting	✓	✓	✓	✓	✓	✓	✓	✓			✓
Monitoring and managing performance	✓	✓	✓	✓	✓	✓	✓				

FIGURE 19.1 Bank Australia's management systems⁵

MANAGEMENT QUESTIONS

1. How do legislation and societal expectations influence the scope of sustainability management practices within organisations?
2. What is the link between sustainability strategies and management accounting?
3. Why do some companies consider sustainable production and innovation to be important drivers of organisational practice?
4. Why is organisational culture important for sustainability change processes within an organisation?
5. How can management accounting systems help organisations measure and monitor their sustainability impacts?
6. What factors are required for successful implementation of sustainability practices within organisations?

19.1 Sustainability and management accounting

LEARNING OBJECTIVE 19.1 Discuss how the concepts of sustainability and sustainability management apply to corporate practice.

As we have outlined throughout this text, management (or cost) accounting constitutes the central tool for internal decision making and primarily focuses on satisfying the information needs of internal management. As you will recall, the generally accepted management accounting practices are *not* regulated as they are in financial accounting. Thus, managers will adopt the specific management accounting practices and associated tools that will satisfy their individual organisational goals and culture.

The growing awareness of, and concern for, social and environmental welfare issues has changed the ways in which companies account for their social and environmental practices. While many organisations have implemented specific environmental or social management systems for external reporting purposes (to providers of capital as well as other stakeholders), the issue for management accountants is how to integrate these systems within management control practices. For a sustainability culture and related practices to develop within entities, *sustainability management* strategies should be aligned with *sustainability management accounting* systems.

Sustainability

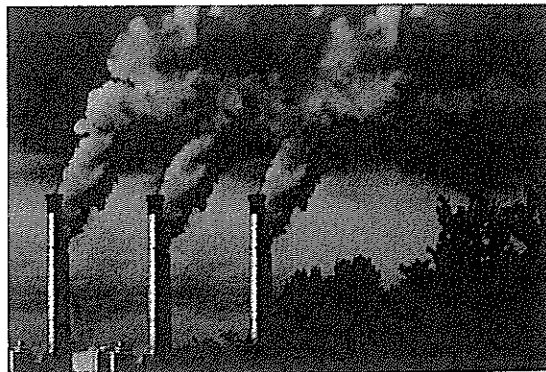
In 1983, the United Nations set up the World Commission on Environment and Development (WCED) to promote quality of life for the present *and future* generations. At a broad level, the UN defines *sustainability* as 'development that meets the needs of the present without compromising the ability of future generations to meet their own needs'.⁶ The key goals relating to sustainability and sustainable development are to:

- live within our environmental resource limits
- achieve social justice
- foster economic and social progress.

Climate change concerns and their impact on global economies are high on most countries' political agendas. For example, in the United Kingdom, the Stern Review, one of the most comprehensive reviews ever carried out on the economics of climate change, estimated that the risks of unabated climate change could be equivalent to 20 per cent of global GDP.⁷ In Australia, Ross Garnaut prepared a Climate Change Review for the Australian Government to address the extent of Australia's role in global mitigation of climate change. Efforts to control pollution and negate the social and environmental impacts associated with climate change have resulted in new carbon accounting approaches. These are highlighted in comprehensive example 1.

COMPREHENSIVE EXAMPLE 1

Corporate externalities are increasingly focused upon by governments and other stakeholders, in particular the concerns with greenhouse gas pollution, which has the potential to cause major global climate change. Greenhouse gases consist of water vapour, carbon dioxide, methane, nitrous oxide and chlorofluorocarbons (CFCs). Excess greenhouse gas emissions are created by human activities such as burning fossil fuels (coal, petroleum and natural gas) to provide energy for industrial processes, transportation, agriculture, heating, lighting and so on; clearing land and burning forests; farming and intensive agriculture



practices; decomposing waste in landfill rubbish tips; and industrial atmospheric pollutants. This human action has increased atmospheric carbon dioxide levels by 30 per cent, thereby trapping radiation and contributing to a changing climate (or global warming). The concentration of carbon dioxide (CO₂) is rising at a faster rate than can be absorbed by the plants, soils and oceans of the world, causing an increase in the frequency of extreme weather events such as floods, droughts and cyclones; rises in sea levels; changing rainfall patterns; and decreasing sea ice and melting glaciers. Despite continued political debates over Australian and global emission targets, it is generally understood that global greenhouse gases need to be cut by at least 50 per cent below 1990 levels by 2050 to prevent global temperatures increasing by more than 2 degrees Celsius. Under the United Nations Framework Convention on Climate Change and the Kyoto Protocol, it is argued that for these substantive decreases in greenhouse gas emissions, there must be global commitment to:

- reduce energy demand
- increase energy efficiency
- reduce use of fossil fuels
- increase use of renewable energy sources
- reduce deforestation
- continue research and development of sustainable technologies
- most importantly, negotiate a comprehensive global climate deal to which all nations will commit.

Achieving the above requires actions, for example, stricter regulation by governments or the implementation of market devices. Three economic approaches to controlling greenhouse gas emissions that have been widely debated and adopted by many countries around the world are: (1) taxation, (2) cap-and-trade, and (3) cost containment. The difference between the first two is in the price versus quantity of emissions. For example, government taxes will fix the price of emissions at the tax rate but not the quantity emitted. Alternatively, the cap-and-trade system is a market-based approach that will fix the allowable quantity of emissions circulating in the marketplace, but the market price of emissions remains uncertain. It has been argued that both approaches offer extreme examples. The mid-way 'cost containment' approach is also being debated by environmental economists and climate change policy makers.⁸ Rather than the 'right to emit' being supplied with infinite elasticity at a fixed price (tax) or with zero elasticity at a fixed supply (the cap), the cost containment approach works with the idea of a 'safety valve' in which a cap-and-trade system is coupled with a price ceiling at which additional allowances can be purchased (in excess of the cap). So long as the allowance price is below the safety-valve price, this hybrid system acts like cap-and-trade systems with emissions fixed but the price left to adjust. When the safety-valve price is reached, however, this system behaves like a tax, fixing the price but leaving emissions to adjust.⁹

Approximately 40 countries around the world have a national emissions trading scheme, including New Zealand. In addition, there are around 20 subnational emissions trading schemes.¹⁰ Many European countries are members of the European Union emissions trading scheme. China and South Korea are planning to launch national schemes. While the United States in general does not participate in emissions trading, there are state-level schemes that have been launched, including one in California. At this stage, the Australian Government has not committed to relaunch Australia's abandoned emissions trading scheme.

Organisations operating in an emissions trading geographical zone are required to purchase permits if they will emit pollution. The cost to purchase permits, in a dynamic market, is argued to be high enough to motivate organisations to innovate and reduce pollution across their varying value-chain inputs, processes and outputs. It is also anticipated that alternative energy demand will lead to global investment in renewable energy worth billions of dollars within a decade.¹¹

The World Bank indicates that the total value of the global carbon market in 2015 is around \$50 billion (combining carbon taxes and emissions trading schemes). Given that the global market for carbon trading is set to be one of the largest global futures trading schemes, the potential requirement for carbon trading accounting by organisations will become an important aspect of management accounting control systems. Carbon trading provides both challenges and opportunities for organisations. Carbon credits created as part of the market for carbon trading represent a new class of asset. Industries that are heavy emitters of carbon dioxide will be faced with potential financial liabilities for continuing to emit the gas, or possible rewards for reducing emissions, so carbon trading has the potential to motivate behavioural and cultural responses within organisations and individuals as well as create an avenue for organisational learning. The amount and type of energy consumed will become a larger focus for entities. For example, alternative renewable energy resources such as that provided by solar power, wind farms or possibly even nuclear power¹² provide additional opportunities for governments and organisations to reduce greenhouse gas emissions and enhance profits through carbon credits.

Politico-economic views and societal pressures are increasingly reflected in changing organisational practices. Achieving sustainability outcomes is a complex process that requires substantive change across the globe. For organisations to encompass the notion of sustainability within their business practices, several key sustainability management factors need to be considered. For example, a change in corporate culture requires critical thinking, reflection and education that focuses on long-term organisational learning and widespread knowledge acquisition. Change is more likely to be achieved by the work of multidisciplinary, cross-departmental teams rather than individual champions promoting sustainability. Thus, participation and collaboration from multiple stakeholders throughout the value chain — from the suppliers to the organisational employees through to the customers — is a key factor for successful sustainability management outcomes.

Sustainability management

Sustainability management is a process undertaken by entities striving for a simultaneous improvement of their *economic, environmental* and *social* goals. It is unique to every entity and depends on the industry in which the organisation operates (for example, mining, industrial, service or government). Desired sustainable outcomes should be reflected in the corporate mission, the image the organisation wishes to project to stakeholders and the strategic goals the organisation wants to accomplish. For most organisations, sustainability management is a continuous cycle as highlighted in figure 19.2. The cycle commences with the identification of sustainability opportunities, followed by the process of realising the sustainability opportunities, which are measured and monitored as part of an entity's management control system. This cycle allows for management to reflect on the actions taken and to develop and direct future sustainability practices. Sustainability opportunities are continuously enabled through technological advances, knowledge acquisition and changes to societal expectations.

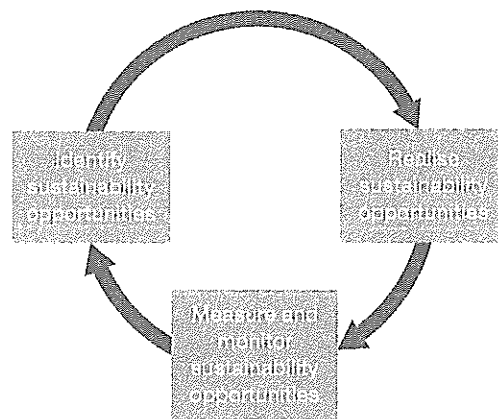


FIGURE 19.2 Sustainability management cycle

Sustainability opportunities can focus on minimising costs by improving current use of resources, or they might present as innovative ways of bringing fresh revenue into the entity. Sometimes, the requirement for sustainability can take a contingency perspective, where sustainability management opportunities emerge through the requirement to comply with tightening legislative requirements and other external factors such as political and societal pressure. In response to the growing pressures for corporations to acknowledge their social responsibility, The Prince of Wales' Accounting for Sustainability (A4S) Project was established.¹³ A4S provides sustainability management support to practitioner bodies and corporate executives. Through the work of A4S and the further establishment of its Accounting Bodies Network, new accounting approaches to sustainability management were developed. This included the establishment of the International Integrated Reporting Council (IIRC), whose role was to develop a more integrated approach to corporate reporting. The IIRC recommends that accountants focus on value creation from multiple capital inputs (financial, manufactured, intellectual, human, social and relationship, and natural capital) and provide an Integrated Report (<IR>) that outlines the management of the value creation (preservation, diminution) process over time.¹⁴ The work by the IIRC has extended the triple bottom line consideration of improving all three economic, social and environmental dimensions in unison, which in turn has extended the A4S ideals of integrated thinking as an important part of sustainability management. Sustainability management is the measuring, monitoring and integrated control of the materially important capital inputs — the financial, manufactured, intellectual, human and social and relationship and natural capital dimensions. These dimensions are often in

conflict, and the role of sustainability management is to work toward sustainable corporate profits in the value creation process.

As was highlighted in comprehensive example 1, the process of sustainability management can also be part of political and governmental intervention. At the corporate level, sustainability management is part of a process that contributes strategically to the achievement of a company's mission while recognising both private and societal impacts.¹⁵ The **private impacts** are those that are internal or have a direct impact on the organisational value chain. **Societal impacts** are often considered 'externalities', or those costs and benefits that are not generally accounted for in an entity's conventional accounting system. For example, a negative externality is the carbon pollution that is emitted indirectly from the consumption of energy and directly from the production process. Other negative externalities include the potential for dirty production processes that affect the health of surrounding residents and contribute to global warming. An example of a positive externality is an improvement in the health and productivity of people in a locality or region because of investment by businesses.

The measuring and monitoring of greenhouse gas emissions offer organisations the potential to realise sustainability opportunities, as highlighted in the following section and comprehensive example 2.

Managing natural capital with carbon footprint accounting

A **carbon footprint** is defined as 'a measure of the carbon dioxide equivalent emissions attributable to an activity, commonly used at an individual, household, organisation or product level'.¹⁶ The International Organization for Standardization's standard *ISO 14040:2006 Environmental Management — Life Cycle Assessment* offers stringent guidelines for life cycle assessment of corporate activities and is an important standard for organisations electing to become involved in their own carbon footprint accounting. A 'cradle-to-grave' analysis of corporate inputs and outputs is a necessary part of categorising corporate emissions. Calculating a carbon footprint for an entity requires the scope of the carbon emissions be understood and classified according to direct, indirect and embodied emissions.

- Scope 1: Direct emissions are those generated from within the organisation (for example, direct electricity generation, emissions from industrial processes, fuel usage for transporting inputs such as fuel consumption by airlines, direct fugitive emissions or onsite waste).
- Scope 2: Indirect emissions are generated from purchased electricity. For example, emissions can be measured by recording electricity consumption.
- Scope 3: Embodied emissions are emissions embedded in purchased materials or outsourced activities. For example, emissions found in waste disposal, business travel and fuel usage for transporting outputs. A company cannot avoid disclosing emissions by electing to outsource. These emissions are required to be accounted for.

Australia's National Greenhouse Accounts track annual emissions from 1990 and are used to meet Australia's reporting commitments to the United Nations Framework Convention on Climate Change (UNFCCC), track progress against Australia's emission reduction commitments, and inform policy makers and the public.¹⁷ In addition, the *National Greenhouse and Energy Reporting Act 2007* (NGER Act) requires large companies (those emitting more than 25 000 tonnes of carbon dioxide equivalent, or consuming more than 25 000 megawatt hours of electricity or 2.5 million litres of fuel in a financial year) to report their greenhouse gas emissions annually. Bound by legislation, accounting for greenhouse gas emissions from corporations and other land-based activities requires accuracy in measurement. The ability to calculate removals of greenhouse gases from the land (sinks) requires extensive knowledge of the growth and life cycles of forests and agricultural crops, climate, soils, land cover change and land management. For a comprehensive analysis of impacts on natural capital, the National Greenhouse Accounts draw on many resources, including ecosystem modelling referred to as the Full Carbon Accounting Model (FullCAM).¹⁸

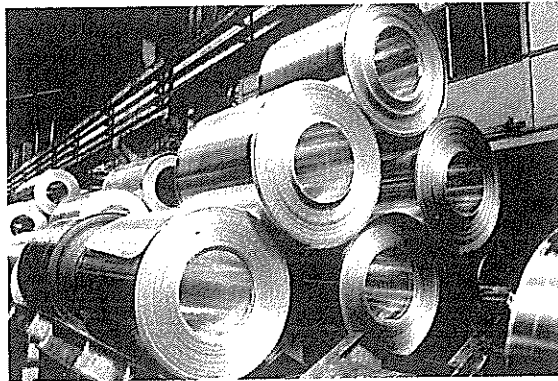
Once a baseline carbon footprint has been determined, a company can monitor and manage the key emissions of concern. A carbon footprint can be reduced by operating efficiencies and changes

in practices. For example, an emissions monitoring plan can be tailored to include organisation-wide, divisional, departmental or individual performance management and control. Depending on a company's sustainability philosophy and core activities, it might also elect to become carbon neutral. **Carbon neutrality** commonly refers to 'a situation where the net emissions associated with a product or an organisation's activities are equal to zero through the acquisition and retirement of carbon offsets that meet additionality criteria'.¹⁹ This means that a company's carbon footprint can also be managed by purchasing approved abatements.

COMPREHENSIVE EXAMPLE 2

Alcoa's sustainability management

Alcoa is a world leader in light metal technologies. Its Australian operation is the world's largest integrated bauxite mining, alumina refining and aluminium smelting system. Approximately 32 million tonnes of bauxite, 9 million tonnes of alumina and 387 000 tonnes of aluminium is produced every year. This represents around 45 per cent of Australia's alumina and almost 10 per cent of total world demand. Alcoa is one of Australia's leading exporters, contributing around \$5 billion in exports per year.²⁰ As a significant global industrial resource corporation, Alcoa's energy intensive operations have not been immune to the climate change spot-



light. The smelting of aluminium is a very energy-intensive process with more than 80 per cent of the industry's greenhouse gas emissions resulting from consumption of brown coal-generated electricity. These emissions are considered to be indirect, or Scope 2 emissions, resulting from the generation of purchased energy. The other 20 per cent are direct, or Scope 1, emissions resulting from owned or controlled sources. Within the aluminium industry, 1.4 tonnes of carbon dioxide equivalent (CO₂-e) emissions are generated per tonne of aluminium produced. This equates to 6 to 7 per cent of Australia's total CO₂-e emissions.²¹ Alcoa Australia's total CO₂-e emissions are 14 242 730 tonnes (made up of 6 637 955 tonnes of Scope 1 emissions and 7 604 775 tonnes of Scope 2 emissions). Australia's national inventory total CO₂-e emissions are 535 000 000 tonnes.

In light of the controversy surrounding global warming and Alcoa's high greenhouse gas emissions, Alcoa must also be seen to be proactive in responding to calls to improve corporate sustainability. This can be observed in company activities such as sustainability reporting, specific public relations campaigns and new product and process innovations. Alcoa has a sustainability mission that considers human, social and financial capital: 'At Alcoa, we use our values to build financial success, environmental excellence, and social responsibility in partnership with all stakeholders'. In identifying and realising sustainability opportunities Alcoa promotes its 'green products' for use in food packaging, smart buildings, electronics and road, air and space transportation. The company's innovative developments have been so successful that it is restructuring into two separate entities: a 'technology-driven value-add company' and a 'globally competitive upstream company', where the latter focuses on its core mining activity. In measuring and monitoring sustainability, Alcoa reports in full accordance to the Global Reporting Initiative (GRI) guidelines and measures its sustainability impact using life cycle assessment (LCA) techniques (discussed later in this chapter). Alcoa also aims to reduce its carbon footprint by the efficient use of resources and control of emissions, waste and land use. This means that certain inputs are recognised as materially important to Alcoa and included in its internal performance measurement processes and corporate disclosures. For example, Alcoa's sustainability performance measurement systems include the measurement and management of: greenhouse gas emissions, energy, health and

safety, economic performance, environmental footprint (emissions and waste), local communities and biodiversity. Among the measures are specific targets that relate to:

- *natural capital*: total direct and indirect CO₂-e emissions, water usage, landfill waste, land rehabilitation, and recycling or reuse of their bauxite residue, aluminium can recycling, and biodiversity development plans
- *human capital*: zero fatalities, incident rate, and representation of women and minorities at executive level
- *social and relationship capital*: number of manufacturing locations implementing the Alcoa Community Framework, representation of employee volunteers, and investments in community programs.

The concepts introduced in this comprehensive example will be further highlighted later in the chapter.

Sustainability management accounting

The environmental or 'sustainability accounting package' includes financial accounting, auditing or assurance services as well as the application of management accounting techniques that suit a sustainability management framework. Sustainability management will produce the most benefits when it becomes an integrated practice with the tools of sustainability accounting. The sustainability accounting package should be viewed in unison and integrated with other social and environmental guidelines provided by such organisations as the United Nations and the International Organization for Standardization.²²

For financial accountants, the focus is on reporting environmental liability costs to external parties such as shareholders and financial institutions. Sustainability audits and assurance services are designed to improve the quality and context of information provided, and generally to monitor and verify corporate disclosures. In some countries, audited environmental or sustainable reporting is a mandatory process. In Australia, however, these services are generally voluntary and unregulated — but are increasingly being used by organisations to promote their image and reporting credibility with their stakeholders.²³ The information required for external financial reporting purposes is far narrower than that required for internal management accounting purposes. As highlighted in figure 19.3, there is a vast array of information that flows internally, but it is condensed to fit external regulatory requirements or management disclosure choices.

For management accountants, the focus is on internal reporting for sustainability management purposes. Sustainability management accounting uses techniques similar to the conventional and contemporary management accounting techniques covered in the earlier chapters of this text, but does so through a sustainability lens. In figure 19.3, sustainability management accounting is noted as the management accounting arm of the wider sustainability or environmental accounting package.²⁴ Sustainability management accounting is the tool that is used to attain the organisation's (or specific business unit's) sustainability goals. It is an important part of the business model that simultaneously integrates the organisation's use of financial, manufactured, intellectual, human, social and relationship, and natural capital performance with strategic management.

Ideally, management accountants working in environments that encourage sustainability accounting should have a thorough understanding of the drivers (reputation, regulation, revenue enhancement, cost control etc.) behind a sustainability culture as well as the relationship between external reporting and internal management practices. It is desirable that management accountants should be able to apply internal sustainability management accounting control practices to the information being disclosed in external reports and likewise match the information being disclosed externally to internal management accounting control systems. The sustainability management accountant's role is to provide information for both sustainability decision making and financial sustainability reporting. This helps to ensure a balanced conformance-performance approach is taken for sustainability enterprise governance.²⁵

SUSTAINABILITY MANAGEMENT

Sustainability accounting

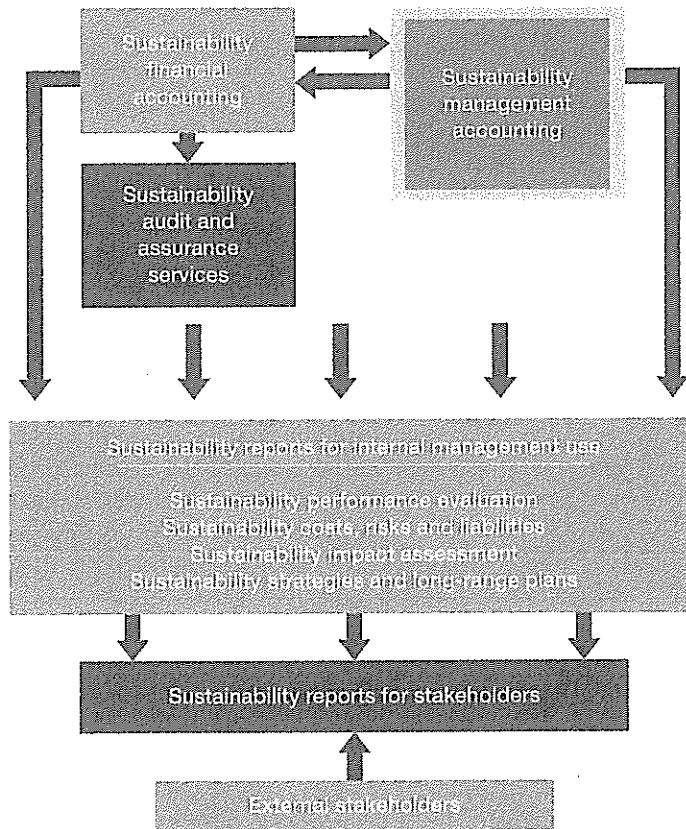


FIGURE 19.3 The context of sustainability accounting as part of sustainability management²⁶

Sustainability accounting and reporting is about highlighting a company's sustainability philosophy and activities to its stakeholders. For example, rather than emphasise energy efficiency, sustainability reports are meant to reveal corporate inputs and outputs produced from 'clean' and/or 'dirty' energy production and associated outcomes on the use of multiple capitals in value creation activities. That is, using resources such as uranium, water, wind, solar, natural gas or brown coal fired power has a sustainability market value. Organisations such as supermarkets use sustainability reports to highlight activities such as banning food products implicated in global deforestation or promoting recyclable green bags for groceries as an alternative to environmentally hazardous plastic bags. Governments are promoting energy-saving products by offering rebates and concessions. Particular products are sought after by consumers because they have an environmentally friendly image and/or are supplied by an entity that is recognised for its sustainability and philanthropic efforts. Greater emphasis on people and the communities in which organisations operate are important in sustainability reporting, with large organisations such as Alcoa, BHP Billiton, National Australia Bank, Fonterra and Santos looking to promote their image through corporate disclosures and by investment in sustainability management practices.²⁷ Increasingly, companies are faced with significant economic considerations that might relate to their current and future sustainability management practices. Legislative requirements for corporate reports and disclosures relating to their social and environmental practices are increasing. In general, there is growing societal pressure for companies

to enact sustainability management practices. However, potential investors are often sceptical about the extent to which organisations might legitimise their activities with sustainability disclosures, suspecting them of using disclosure merely as a form of 'impression management'.²⁸ There is a view among certain ethical investors that the voluntary nature of disclosure can increase the potential for reporting bias. This scepticism is compounded by non-uniform information that makes it difficult for stakeholders to compare businesses, hence the push for Integrated Reporting <IR>. Other initiatives to improve the reliability of reports include GRI, Integrated Reporting, ISO standards that relate to sustainability measurement and the Dow Jones Sustainability Index (DJSI). These external compliance tools influence (and are influenced by) the internal dynamics of management control systems and organisational teams and structures. It is believed that management compliance with these reporting initiatives will enhance a company's access to capital and will increase shareholder value. Other factors that account for the reasons why companies report their corporate social performance are highlighted in figure 19.4.

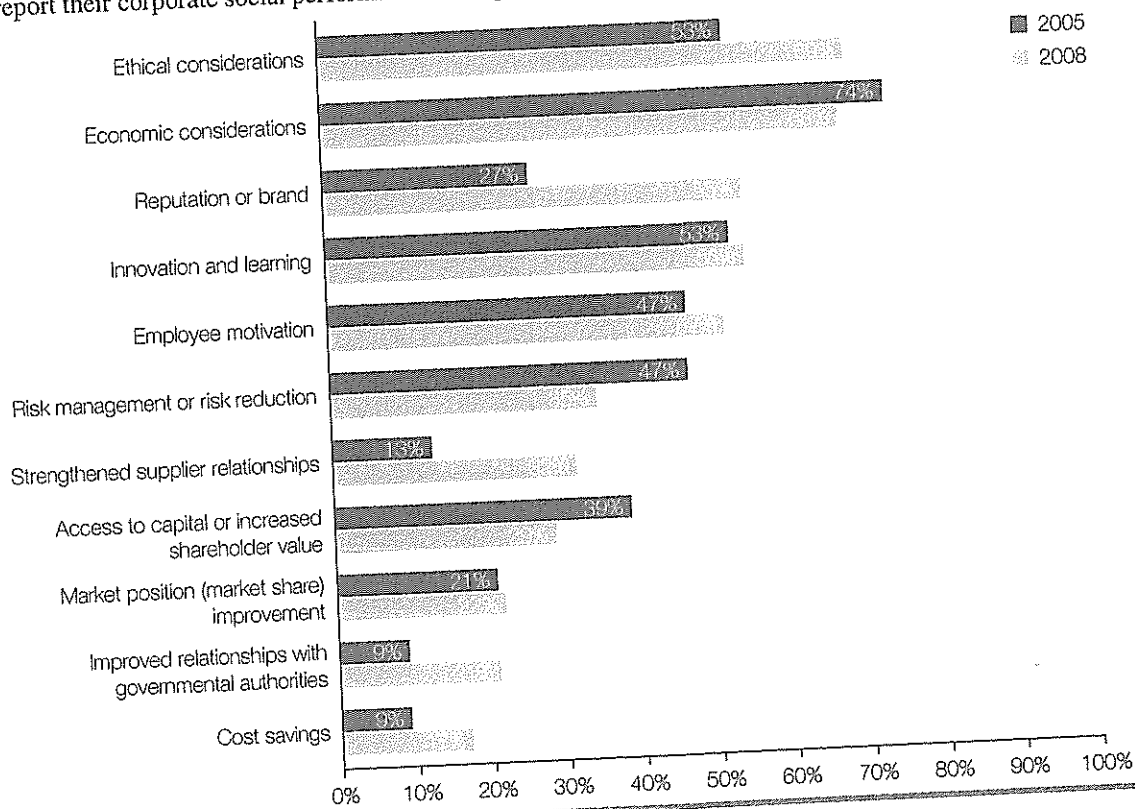


FIGURE 19.4 Factors to explain increased corporate social reporting²⁹

It is important to understand how management accounting tools assist in the translation of corporate sustainability disclosures to internal management practices.³⁰ Thus, the conversion of external reports to internal sustainability management practices and control systems (and vice versa) is a developing domain for future management accountants and management accounting researchers.

19.2 Sustainability, ethics and integrated thinking

LEARNING OBJECTIVE 19.2 Recognise why it is essential for management accountants to take an integrated thinking approach to sustainability.

When viewing sustainability activities through a company's business model, the flow of capital inputs, processes and outputs to capital outcomes can be measured and monitored. If understood in terms of

their value creation, preservation or diminution over time, more holistic and systematic decisions about strategies and resource allocation can be made. This approach is termed integrated thinking and is where senior management have the capacity to take a systems thinking approach to sustainability management.

The IIRC argues that accountants and senior managers need to recognise that the corporate business model is at the core of the organisation. The business model draws on various capitals (financial, manufactured, intellectual, human, social and relationship, and natural) as *inputs* and, through its business *activities*, converts them to *outputs* (products, services, by-products and waste). This leads to *outcomes* in terms of effects on capitals (see figure 19.5).³¹

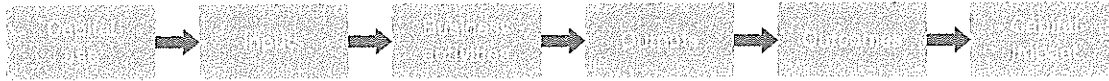


FIGURE 19.5 Integrated thinking and organisational value creation

Each organisation utilises capitals in different ways in value-creation activities that fulfil the organisation's strategic purpose. *Manufactured capital* includes infrastructure, buildings and equipment used in value-generating activities but created by other organisations. *Financial capital* is funding available from debt or equity financing, grants or generated through operations and investments. *Intellectual capital* comprises organisational capital (tacit knowledge, systems procedures and protocols) and intellectual property (patents, copyrights etc.). *Human capital* is people's abilities, experience and motivation. *Social and relationship capital* relates to society's institutions, values and relationships. *Natural capital* comprises renewable and non-renewable environmental resources and processes (e.g. water, minerals, forests and ecosystem health). The stock and flow of capitals is accounted for when providing information for integrated thinking or integrated reporting.

The International Federation of Accountants (IFAC) proposes an integrated framework of enterprise governance. Figure 19.6 illustrates the growing view that there must be a working connection between sustainability *corporate governance* (as demonstrated by, for example, <IR> or GRI reports to stakeholders) and sustainability *business governance* (as demonstrated in the internal management of risk and strategy) for *sustainability enterprise governance*.

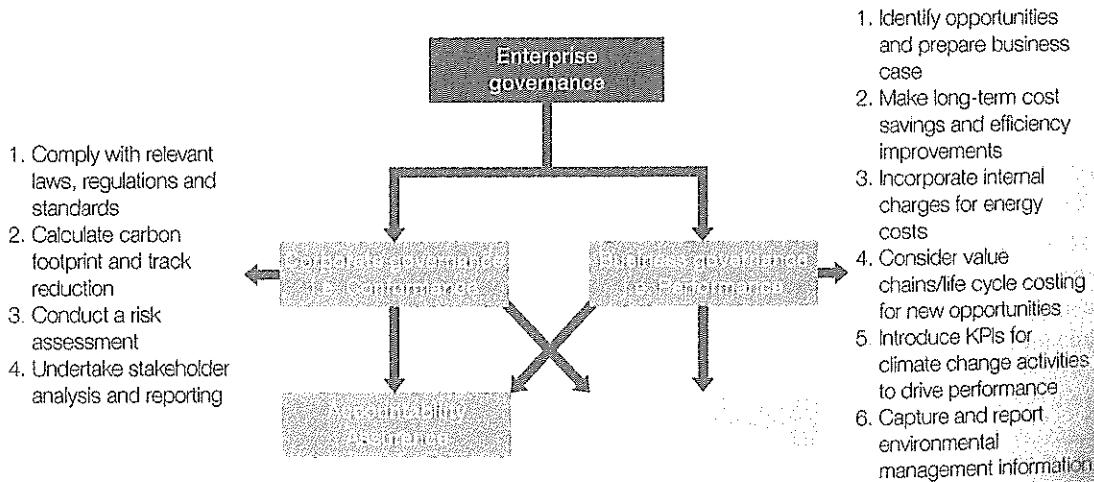


FIGURE 19.6 A framework for sustainability enterprise governance³²

The links to *conformance* and corporate governance are through the adherence to codes, standards and formal internal corporate governance controls. The links to *performance* and business governance are through the:

- strategy (which strategy is chosen and how clear it is)
- how strategy is executed
- the entity's ability to respond to changes, including changing market conditions
- the entity's ability to successfully undertake mergers and acquisitions.

The following key themes (with the negative potential consequences/attributes in parentheses) are important for enterprise governance.

- Organisational culture and the 'tone at the top' (failure to uphold high ethical standards)
- The CEO (dominant, charismatic and unchallenged)
- The board of directors (weak, poor oversight)
- Internal controls (not enough balance in earnings growth, individual initiative, and the CFO's focus on 'goal kicking' versus 'goal keeping').³³

The conformance–performance accounting connection requires a greater collaboration between the financial and management accounting functions and other organisational stakeholders, such as risk management experts or engineers involved in sustainability activities at both operational and strategic decision-making levels of the organisation.

In organisational culture, the 'tone at the top' and ethics play important roles in sustainability management and are strategically relevant to overall organisational performance. Responsible and ethical behaviour is essential for not only senior management but every employee within an entity. The unethical behaviour of a few accountants and managers can greatly affect investor beliefs and the value of the share market. When investors lose faith in information produced by organisations, they are less likely to invest in those organisations and market downturns occur. These events happen because accountants and managers fail to use ethical decision making. The steps in ethical decision making are presented in figure 19.7.

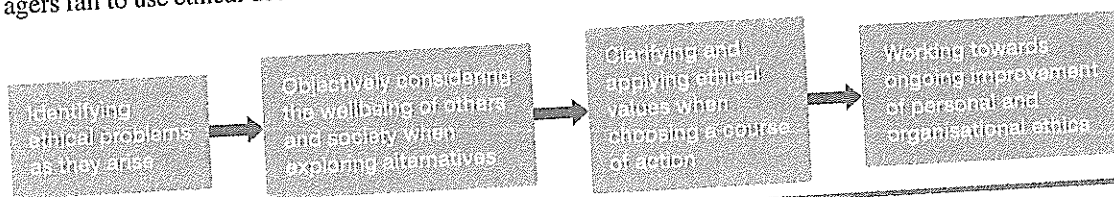


FIGURE 19.7 Steps in ethical decision making

When following these steps in developing management control systems — particularly performance evaluation systems — the constructs relating to ethics and ethical decision making are often difficult for managers to classify, quantify, measure and monitor. One of the main reasons is the social and cultural diversity of individual entities.³⁴ Ethical issues also form an important part of strategic risk management. All managers must continually assess the level of strategic risk and monitor both internal and external environments for information that could destabilise their planned sustainability strategy. Risk can emerge in the form of breakdowns in internal processes (that is, operational risk), in the devaluing of a company's assets due to financial, intellectual or physical damage (asset impairment risk) or in a loss of competitive capabilities because of supplier, competitor or regulatory effects (competitive risk). These three different forms of strategic risk can lead to a reduced reputation for the company (reputation risk).³⁵

Comprehensive example 3 illustrates the social issues faced by large companies such as VW, BHP Billiton, BP and Santos. Both direct and indirect stakeholders of these organisations are affected by management actions. What do you think some of the stakeholder social issues and claims might be? What are the identifiable risks? How might an entity protect itself from these risks? The comprehensive example also highlights the risks and liabilities that can arise for larger companies that have co-ownership, even minority interests. Just because investments are not directly under parent company control does not

mean that sustainability responsibilities and liabilities are waived. The scope and benefits relating to sustainability management accounting are discussed in greater detail in the next section.

COMPREHENSIVE EXAMPLE 3

Ethics and social responsibility

VW emissions scandal

About 11 million Volkswagen (VW) and VW-manufactured cars with diesel engines have been fitted with a 'defeat device' that detects when the car's emissions performance is being tested and 'cheats' by changing the performance to improve results. The result was that engines could emit up to 40 times more nitrogen oxide pollutants than what is permitted in the US and yet still pass the tests. VW has subsequently recalled millions of cars worldwide, setting aside €4.8 billion for the cost of the recall, resulting in the company posting a quarterly loss of €2.5 billion in October 2015.³⁶

BHP Billiton and Samarco Mine Dam Disaster, Brazil

In November 2015, a dam owned by BHP Billiton and Vale SA's Samarco mine in Brazil collapsed. Sixty million cubic metres of mud flattened villages and contaminated 400 kilometres of riverways. Several workers and nearby residents were killed and hundreds more lost their homes to the mud flows. BHP's share price fell to 10-year lows as investors considered the consequences of the Brazil disaster. The companies may face fines and lawsuits. Costs have been estimated to be at least \$850 million in insurance claims on top of \$1.4 billion in clean-up.³⁷

Gulf of Mexico oil spill

In 2010 a surge of natural gas blasted through a concrete core of the Deepwater Horizon oil well in the Gulf of Mexico, killing 11 workers, injuring 17 and creating the world's worst offshore environmental disaster. More than 3 million barrels of oil gushed from the well, harming wildlife, beaches, wetlands, businesses and livelihoods. Contractor Halliburton had recently installed the concrete core in the rig, owned by Transocean and leased to BP. In extensive legal debates, liability was assigned to BP (67%), Transocean (30%) and Halliburton (3%). In 2012, BP, agreed to pay US\$4.5 billion and US\$7.8 billion to settle the criminal and class action cases, respectively. Separate criminal charges were made against three BP employees. In 2015, BP agreed to pay US\$18.7 billion to settle civil claims.³⁸

Santos pays for clean-up operation

The town of Sigaorjo in East Java, Indonesia, was swamped by 13 metres of mud. Some 15 000 villagers were displaced. The catastrophe also forced the permanent relocation of the cross-Java toll road, a rail link, a gas pipeline and other infrastructure. The clean-up and rebuilding costs were estimated at up to \$1 billion. Blame for the mudflow was initially attributed to incorrect drilling practices at an exploration well owned by Lapindo Brantas, in which Santos has an 18 per cent ownership stake. Given the enormity of the disaster, though, geologists have argued that it was more likely to be an 'act of God' — the result of a mud volcano. The mud continues to flow out of the ground at 200 000 cubic metres a day, and experts say that the flow may continue for a further 30 years. The lengthy legal process left Santos unable to inform the market of its total exposure to liability. The fine was eventually agreed at \$32 million (based on 18% ownership). In the meantime, more than \$1 billion was wiped off Santos's market capitalisation.³⁹

These incidents highlight the importance of management accounting controls to help measure and monitor sustainability risk for the longer term and restore stakeholders' belief in the corporate commitment to health, safety, environmental responsibility and sustainable development.

19.3 Scope and benefits of sustainability management accounting

LEARNING OBJECTIVE 19.3 Outline the scope and benefits resulting from sustainability management accounting practices.

Traditional and contemporary management accounting techniques can be used in sustainability management control practices to:

- plan and direct management attention to sustainability issues

- inform sustainability management decisions
- control and motivate behaviour towards sustainable outcomes.

Sustainability management accounting is a two-way process of reporting information for decision making.

1. It can generate information about how the use of resources with sustainability-related impacts can affect the financial performance of the entity.
2. It can be used to consider how organisational operations might affect environmental and social performance.

For organisations to develop a sustainability culture with knowledge of sustainability management accounting applications, the scope of sustainability management accounting practice should be communicated to all employees. Once the sustainability boundaries are defined, specific management accounting tools can be developed to optimise management decisions.

Sustainability scope considerations

The *scope* of sustainability management accounting undertaken by organisations relates to the process of identifying and measuring costs and revenues associated with sustainability management. This is done by identifying the easiest internal costs and revenues through to the more difficult costs and revenues. The greatest difficulty is often associated with societal costs and revenues, or those that are external to the entity — the 'externalities', previously considered beyond the scope of sustainability accounting because they do not affect the statement of financial position (also called the balance sheet). For strategic management purposes, externalities should not be ignored. Efforts by governments and lobby groups are increasingly aimed at creating new legislative and reporting requirements to make organisations more liable for their externalities. This requires that the previously ignored costs (and even revenues) be included in the financial statements and performance reports of the entity that created the externality. Thus, an astute business manager would insist that all information relating to the identification and measurement of externalities — whether they are currently in existence or potentially created through incorrect or non-sustainable management decisions — be included in the reports.

'Carbon accounting' helps to internalise previously ignored externalities. If carbon credits are vehicles of income or liabilities for entities, then carbon accounting has the potential to dramatically alter decision-making processes relating to the allocation of entity resources. Because carbon accounting involves measuring production efficiencies in relation to greenhouse gas emissions, the management accountant will be required to track and report monthly/annual emission targets as if they were potential revenue or liabilities for the organisation. The process of carbon accounting will therefore affect processes along the entire value chain including:

- the choice of raw materials and suppliers
- design or re-engineering requirements
- type of energy used in production processes
- methods of waste management adopted
- in-house or outsourced production
- packaging and transportation options
- the image and culture represented to suppliers, staff, and potential and existing customers.

Figure 19.8 outlines the scope for sustainability management accounting practices in organisations. The scope (in ascending order of difficulty) begins with the easier-to-measure factors at level 1 through to the more difficult societal impacts at level 5. The sum of levels 1 to 4 is generally referred to as 'private costs'. That is, the costs that directly affect entities' reported profits. Note that while level 5 externalities might previously have been ignored by organisations, sustainability management is optimised when all current (or potential future) externalities are identified and internalised and (where possible) included in sustainability management accounting control systems. This is discussed further in comprehensive example 4.

	Scope	Description
Private costs	Level 1	Conventional costs Includes the costs of direct raw materials, utilities, labour, supplies, structures, capital equipment and related depreciation
	Level 2	Hidden costs Includes upfront environmental costs such as search costs relating to finding environmentally conscious suppliers, initial design costs of environmentally preferable products, regulatory costs that are often obscured in overhead costs, and future decommissioning or remediation costs
	Level 3	Contingent costs Defined in probabilistic terms and includes fines for breaching environmental requirements, clean-up costs, lawsuits relating to unsound products or service provision
	Level 4	Image and relationship costs Are difficult to determine and would seldom be separately identified within an accounting system. However, they could be expected to have some influence on the value of some intangible assets such as goodwill, brand names and so forth.
Societal costs	Level 5	Societal costs Are often referred to as externalities, and represent costs that an entity imposes upon others as a result of its operations but which the entity typically ignores. These costs include environmental damage caused by the organisation for which it is not held accountable, or adverse health effects caused by organisation-generated emissions for which the organisation is not held responsible. It is difficult and sometimes controversial to put a cost on these effects and, with the exception of a few organisations worldwide, most entities ignore such costs when calculating profits. However, physical measures can be developed and related key performance indicators (KPIs) can be used to assess performance.

FIGURE 19.8 Scope for sustainability management accounting practices⁴⁰

Management decisions benefiting from sustainability management accounting

Several types of management decisions benefit from sustainability management accounting information. They are listed in figure 19.9.

Specific management accounting tools may assist with decision making as a result of identifying and measuring revenues and the direct and indirect costs associated with sustainability management practices. Cost accounting techniques may be used to measure sustainability cost flows. The extent to which the level 1 to 5 costs are included in decision making reveals the extent of full cost accounting adopted in decision-making practices. Capital budgeting projects relating to long-term sustainability management might be used as a vehicle to communicate sustainability strategies throughout the entity, as well as to promote wider-level discussions on the opportunity costs related to sustainability projects. Product costing and pricing techniques that encourage sustainability-related overhead costs to be directly allocated to department and products could enhance management decisions.

Product design	Risk management	Cost allocation
Process design	Sustainability compliance strategies	Product retention and mix
Facility siting	Capital investments	Product pricing
Purchasing	Cost control	Performance evaluations
Operational	Waste management	

FIGURE 19.9 Types of management decisions benefiting from sustainability management accounting information⁴¹

Strategic sustainability practices for the improved use of resources might include industry- or entity-wide strategic tools (such as value chain analysis) to identify the value-adding opportunities throughout the entire value chain. The flow of raw materials along the value chain can be evaluated for compliance with the entity's sustainability standards. Likewise, the sustainability costs related to waste from general production processes (solids, effluent, emissions) or material losses (scrap, rejects, dumping of dead and excess stock) should be accounted for in materials flow analysis.

Sustainability management accounting will also inform make or buy decisions. Life cycle assessment is useful in encompassing all organisational functions relating to sustainability opportunities over an extended period of time. Of growing importance is the need to determine the opportunity costs and risk assessment of forgoing sustainability opportunities and investment. For example, the choice of energy resources and the potential impact on carbon emissions is a growing concern for global entities, and needs to be considered in calculations for internal decision-making purposes.

The balanced scorecard (see chapter 17) is considered a useful tool for sustainability performance evaluation as well as a strategy communication tool — particularly once it is adapted to become a sustainability balanced scorecard. As mentioned earlier, a growing number of Australian companies are using management accounting tools such as the balanced scorecard as a combination tool for corporate sustainability disclosure and internal management control.

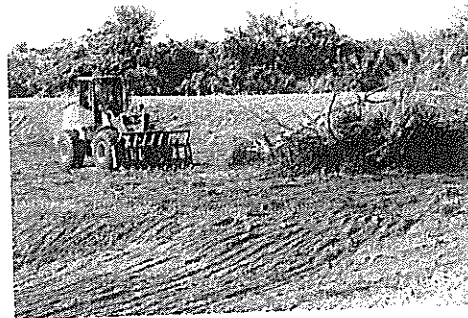
COMPREHENSIVE EXAMPLE 4

Government infrastructure investment — New Zealand

As part of community town planning, an industrial estate was proposed for development on the outskirts of a growing township. The estate required water and sewerage facilities. At this stage the land was vacant but included some vegetation — a few big old native trees (cabbage trees, five finger or Puahou, Totara, southern beech as well as some old kauri pines), an old cave with indigenous cave painting and other artefacts, an old building near the cave and local waterhole for wild animals. As part of the estate development the Council Water Board considered the following factors:

1. financial net present value (NPV)
2. environmental impacts
 - land clearing
 - discharges to the environment (liquid waste into sewerage drains, carbon dioxide emissions to air, and noise pollution)
 - water requirements
3. social impacts
 - indigenous heritage
 - European heritage
 - community acceptance.

The following table presents two development proposals that were submitted to the Council's Water Board from the operational teams. The first row presents a financial figure relating to operational cash flows (discounted over 30 years to today's value). This figure represents the outlay cost and costs to operate the water and sewerage on an annual basis (electricity for pumping, maintenance etc.). The second two rows represent the environmental and social impacts in the form of qualitative data. There were heated debates among the managers when deciding what project should be accepted as there were ramifications associated with each project.



Project 1		Project 2	
Financial NPV	-\$8 000 000	Financial NPV	-\$4 000 000
Environmental impacts:		Environmental impacts:	
<i>Land clearing:</i> 4 hectares (biodiversity impacted, loss of animal and plant species)		<i>Land clearing:</i> 7 hectares (biodiversity impacted, loss of animal and plant species)	
<i>Discharges:</i> additional facility cost to provide grey water use to water sports oval		<i>Discharges:</i> treated water discharged directly to stream	
<i>Water requirements:</i> pumping station (noise buffer included in NPV costs), additional electricity for pumping		<i>Water requirements:</i> gravity-fed water, as using land where indigenous cave artefacts are (no noise buffer required)	
Social impacts:		Social impacts:	
<i>Indigenous heritage:</i> cave site avoided in proposal		<i>Indigenous heritage:</i> cave site used in proposal	
<i>European heritage:</i> N/A		<i>European heritage:</i> old building near cave site will be demolished	
<i>Community acceptance:</i> consultations suggest this option is acceptable		<i>Community acceptance:</i> several complaints have been received	

While the financial NPV would indicate project 2 should be accepted (even though it has a negative NPV, it is \$4 000 000 cheaper), the qualitative data suggests project 1 is the right one to choose. The answer depends on the scope that the evaluator wants to take. The data presented represents all five levels (as highlighted in figure 19.8). Notably, there are issues associated with the NPV calculation, as it does not include any financial data relating to environmental and social costs. Some of the board members wanted dollar values on the other aspects to help justify their decision (for example, a price for community willingness to pay for project 1 versus project 2). They called for a full cost accounting approach to recognise all costs and benefits of the analysis. Others did not mind that the data was in a qualitative format as they recognised some of the potential expenses that they might/might not incur if one option was taken over the other. The operational management team then tried to quantify a large amount of the costs and benefits so they could compare these with the NPV and the traditionally accepted cash flows. However, at the next meeting, there was a strong debate over the assumptions that were made to come up with the figures. They all agreed that they were quite subjective. Nevertheless, and in spite of all the debating and attempts at full cost accounting, the council finally decided to follow the more expensive project due to the sustainability-related impacts and negative community backlash which would tarnish their image.

It should be recognised from comprehensive example 4 that it is not always easy to accurately work out the level 4 and level 5 costs. In this case the decision was made without a full cost accounting approach and qualitative data actually reinforced the decision (also see chapter 13). Frequently companies are faced with decisions such as these, which need a thorough investigation of the potentially costly ramifications if they ignore level 4 and level 5 costs.

19.4 Sustainability management accounting tools

LEARNING OBJECTIVE 19.4 Demonstrate an understanding of key sustainability management accounting tools.

We will now look at some of the more widely used tools in sustainability management practices. The scope and strategies relating to sustainability are typically reflected in operational routines and practices, and are managed and communicated within the management accounting control framework. For improved decision making, sustainability-related income and sustainability-related costs in particular are traced to sustainability-related pools. The drivers of sustainability income and costs can be managed using a holistic value chain approach and life cycle analysis. The process of capital budgeting for

sustainability can be better managed when sustainability costs, income and associated drivers are readily identifiable by managers with detailed sustainability knowledge.

Sustainability value chain analysis

In chapter 1 we introduced the usefulness of value chain analysis to analyse a company's strategic position. In a similar way the value chain is also useful in sustainability accounting to understand both positive and negative impacts of corporate sustainability activities on society (see figure 19.10).

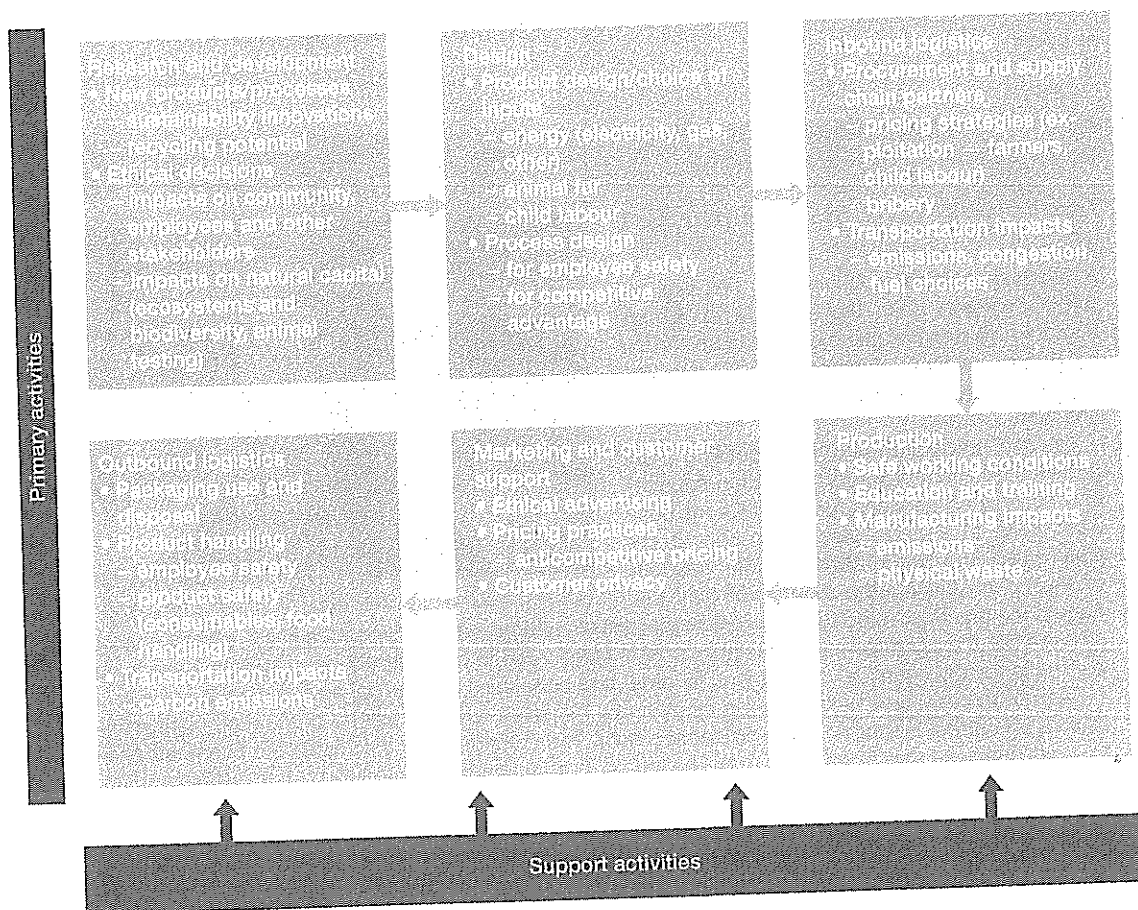


FIGURE 19.10 Sustainability considerations throughout the value chain activities

This value chain analysis approach to sustainability management also promotes an all-encompassing, organisation-wide approach to sustainability accounting as illustrated previously in the sustainability enterprise governance framework (see figure 19.6).

Sustainability cost allocation and full cost accounting

In many organisations, sustainability costs tend not to be treated as separate costs within the accounting system. They are generally treated as overheads, without their own related cost driver(s), and allocated equally to the cost objects. In some circumstances, sustainability costs might also be accounted for as period costs. As highlighted thus far, the identification and classification of sustainability boundaries,

costs and cost objects requires organisation-wide involvement. The tracking and tracing of sustainability costs, and the determination of cost pools and related cost drivers, is crucial for sustainability management accounting purposes. Before sustainability costs can be allocated to the cost object, consensus among the key managers is vital. For example, the cost object might be individual business units, production departments, cost centres, production lines, specific equipment, or the individual job, product or service. Input from department managers is important, particularly where the performance of that unit or manager is based on sustainability cost consumption. Most importantly, the extent of full cost accounting or *fuller* cost accounting undertaken depends on the scope (level 1 to level 5; see figure 19.8) included in the analysis. In comprehensive example 5, a common situation is presented where even the level 1 and 2 sustainability costs can be lost in incorrect or general overhead cost pools.

COMPREHENSIVE EXAMPLE 5

Sustainability costs and product prices

A chemical company, ChemiANZ, has five different business units that operate in various sectors and provide chemical products for the paint and building industries as well as for the food and pharmaceutical industries in Australia and New Zealand.

On one production site, a processing plant provides additional top-up production capacity and associated services for the different business units at various stages throughout the year when the units have no idle capacity of their own. During the months of July and



August the plant operated two different processes simultaneously for two of the five business units. One process (for the pharmaceutical business unit) is considered to be relatively clean and the other process (for the industrial chemical department) is 'dirty' and consumes substantial environmental costs.

Each of the business units supplies its own raw materials, and the top-up production plant manager factors in a direct labour cost per production hour. The manager also calculates the overhead charged to each business unit at an hourly rate based on production hours utilised by the business unit. The top-up production plant also receives charges from other cost centres throughout the 25-hectare manufacturing site. For example, it is charged for its annual use of facilities provided by other cost centres that are owned by ChemiANZ. The production plant is charged an annual fee for its continual use of the wastewater treatment plant (contaminated water from the production plant is treated by the plant before clean water is pumped into a nearby river). Another cost department provides specialised energy supplies that can be high in carbon dioxide emissions. Certain processes emit solid waste that needs to be stored in drums and collected by a chemical waste contractor. This contractor provides a weekly waste pick-up service for the entire site, and the top-up plant is charged an annual disposal fee based on the average number of waste drums collected from the plant throughout the year. There are other environmental costs relating to legal fees, fines and permits that are absorbed by corporate head office and charged in corporate overheads to the production plant.

The manager of the top-up plant consolidates all these costs into one production overhead cost pool, and uses the total costs to determine the transfer price charged for every production hour provided to the individual business units. How should the organisation account for its sustainability production costs?

For an organisation like ChemiANZ to fully understand the impact of sustainability costs on product pricing, it is important that these specific environmental cost centres and environmentally driven costs

are differentiated from the other traditional overhead basket of costs. The final determination of product cost will depend on how the environmental costs are allocated. In figure 19.11, the problem of environmental costs being allocated equally among processes and products is highlighted. Accounting for sustainability, in figure 19.11 and comprehensive example 5, might require the isolation and tracking of sustainability costs to the cost object (that is, the 'dirty' production process). This will enable the cross-subsidised 'dirty' products to be sold at a higher price that reflects the environmental harm caused by their production. Alternatively, it allows the more environmentally friendly product the opportunity to maintain market share at a less expensive price. In this situation, it could be difficult to make comparisons between two entirely different products in different sectors. Nevertheless, by isolating the environmental costs, managers are provided with greater insights into alternative or improved sustainability production processes.

	'Clean' process A	'Dirty' process B
Revenues	\$ 200	\$ 200
Production costs	100	100
Environmental costs	0	50
Recalculated profit	100	50
If environmental costs are overhead	25	25
Then the book profit is	\$ 75	\$ 75
Which is incorrect by	-25%	+33%

FIGURE 19.11 Sustainability costs and overhead cost allocation⁴²

Activity-based costing (ABC) enhances the understanding of business processes associated with each product by allocating sustainability costs on the basis of the activities that caused the cost. As discussed in chapter 10, activity-based costing aims to direct the indirect costs more accurately to the cost object. Activity-based costing will reveal where sustainability value is added and where it is lost. Thus, in sustainability management accounting, activity analysis can help to improve the economic consequences of sustainability management by preventing the distortion of product or service provision as well as providing more accurate information for investment decisions.

In the ChemiANZ example, certain sustainability allocation bases might provide greater insight for costing in the top-up processing plant. For example, what if the water treatment plant installed a meter on every input line and charged on volume of emissions or waste treated per line. Likewise, it might be more appropriate to monitor toxicity levels rather than volume. Certain processes might emit large volumes of relatively clean water compared to others with far greater toxicity levels but lower volume output. As all water must enter the river at safe levels, dirtier production output waste will absorb higher treatment costs and potentially greater business risks relating to spills and litigation. Alternatively, the relative costs of treating different kinds of waste emissions might also be a more suitable allocation base for the water treatment plant. Every situation requires individual assessment for the correct choice of allocation base. While attention is given to environmental factors, this approach is also useful for evaluating social costs, including occupational health and safety, training and overheads that contribute to enhancing corporate image and reputation.

Sustainability life cycle costing

Life cycle analysis is a technique that evaluates all the activities involved in the design, development, production, sale, transportation and disposal of a product or service (see figure 19.12). The life cycle of a product or a service is often referred to as 'cradle-to-grave'.

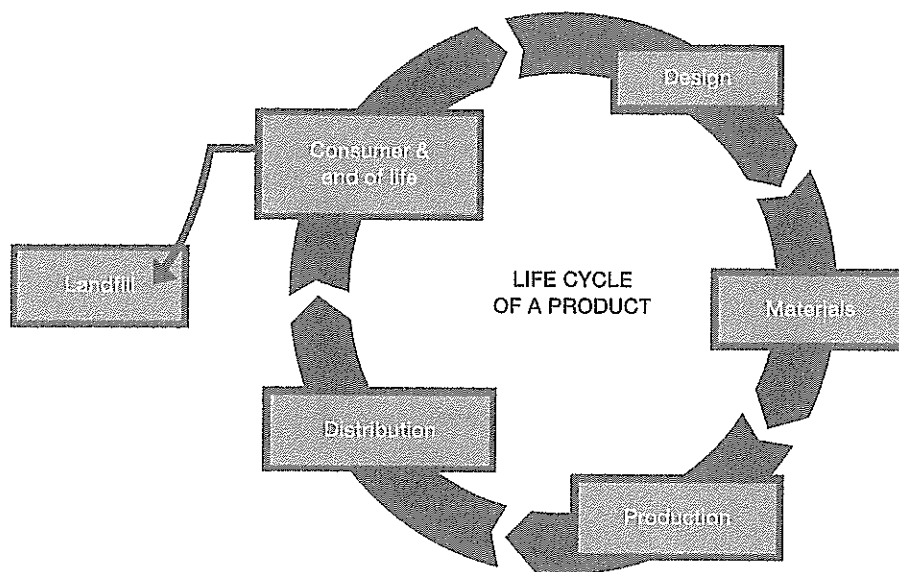


FIGURE 19.12 Life cycle of a product⁴³

Life cycle costing involves summing the costs of these activities throughout the internal and industry value chains — whether they are part of an entity’s activities or not. Life cycle analysis is integral to sustainability management, and is about making more informed decisions in relation to the inputs and outputs generated through organisational activities.

Activity analysis can provide information relating to the life cycle costs of value chain activities pertaining to:

- the products manufactured (decisions may be made to drop or outsource)
- the preferred sustainability suppliers
- re-engineering the design of product or service
- re-engineering operating processes to accommodate changes in
 - energy sources
 - waste disposal
 - packaging and recycling.

When taking a life cycle approach, both private and societal sustainability activities and costs can be included.

A sustainable operation is based on the principle that ‘what goes in must come out’. In most cases, *non-productive output* occurs as a result of operations. The non-productive output (different forms of waste) must be stored or disposed of — resulting in additional sustainability costs for the entity. Figure 19.13 provides an example of a general input–output chart of accounts that could form the basis for sustainability reporting and decision making. The items are measured in physical units of mass or energy. If the general input–output chart of accounts is used by senior managers for sustainability decision-making purposes, they can provide valuable insights for managing life cycles and evaluating the impact of resource (in)efficiencies on the bottom line. These insights might not be revealed with traditional cost management tools.

Waste disposal is a growing issue among entities, with lost value arising as a result of non-productive resource flows. Traditionally companies have focused on cost savings through standard inputs relating to materials or labour rather than evaluating their resource efficiency. In general, entities have not measured the bottom-line impact of their non-productive output.

Input in kg/kWh	Output in kg
Raw materials	Product
Auxiliary materials	Main product
Packaging	By-products
Operating materials	Waste
Merchandise	Municipal waste
Energy	Recycled waste
Gas	Hazardous waste
Coal	Waste water
Other fuels	Heavy metals
Externally produced electricity	Carbon dioxide
Internally produced electricity	Carbon monoxide
Water	Nitrogen oxide

FIGURE 19.13 General input-output chart of accounts⁴⁴

Sustainability and capital budgeting

Capital budgeting for sustainability can be a difficult project requiring 'soft', often intangible, data to be evaluated in conjunction with quantitative data that is based on the best possible estimates of future costs and liabilities. Recall that capital budgeting involves economic variables relating to:

- initial investment costs
- discounted operating costs and earnings
- profit generated
- net present value, return on investment and payback.

In general terms, if the investment is more profitable than gaining interest on a bank deposit, then the project is considered to be worthwhile.

All capital budgeting projects relating to sustainability should consider the conventional costs associated with the project *but* also the contingent and image-related costs that represent the true profitability and riskiness of the project. Sustainability capital budgeting should reflect the varying scope, levels and categories highlighted in figure 19.8. The sustainability categories decision makers should consider include:

- conventional costs (raw materials, utilities, labour)
- administration costs (monitoring, reporting and training)
- contingency costs (potential clean-up, accidents, compensations, fine)
- image benefits and costs (often referred to as 'intangible' costs, or goodwill)
- external costs (potentially internalised at a later stage through regulations, taxes, fees, fines or other non-budgeted expenses).

Figure 19.14 provides an outline of a sustainability capital budgeting calculation sheet recommended by the United Nations Division for Sustainable Development. The UN suggests that this calculation sheet be used to highlight the sustainable costs and benefits of a single project. It can also be used as a basis for direct comparisons between alternative projects. When inputting data into the format provided in figure 19.14, it is important to recognise that, as with most capital budgeting projects, the inputs and outputs for the initial years should be reasonably quantifiable, accurate and reflect the true position. However, the later years of the capital budgeting calculations often require 'guesstimates', which should be sufficient.

Calculation sheet Environmental/social cost/expenditure categories		Initial investment	Year 1	Year 2	Year 3	Year 4	Future liability	Soft factors
1.	Waste and emission treatment							
1.1	Depreciation for related equipment							
1.2	Maintenance, operating materials, services							
1.3	Personnel							
1.4	Fees, taxes, charges							
1.5	Fines and penalties							
1.6	Insurance and environmental liabilities							
1.7	Provisions for clean-up costs, remediation							
2.	Prevention and environmental management							
2.1	External services for environmental management							
2.2	Personnel for general environmental management activities							
2.3	Research and development							
2.4	Extra expenditure for integrated technologies							
2.5	Other environmental management costs							
3.	Material purchase value of non-product output							
3.1	Raw materials							
3.2	Packaging							
3.3	Auxiliary materials							
3.4	Operating materials							
3.5	Energy							
3.6	Water							
4.	Processing costs of non-product output							
Σ	Environmental expenditure							
5.	Environmental revenues							
5.1	Subsidaries, awards							
5.2	Other earnings							
Σ	Environmental revenues							
6.	Soft factors							
6.1	Increased turnover, customer satisfaction, new markets, differentiation from competitors, improved customer relationships							
6.2	Improved corporate image							
6.3	Improved contacts with authorities and agencies, reduced legal compliance costs							
6.4	Reduced risks for accidents, liabilities and contaminated land							
6.5	Increased creditworthiness, better ratings by investment companies							
6.6	Better community relations							
6.7	Increased employee motivation and morale, less worker illness and absenteeism							
Σ	Total benefit							

FIGURE 19.14 Sustainability capital budgeting sheet⁴⁵

The main aim of this calculation process is to highlight costs and not ignore potential savings from sustainability projects. Furthermore, sustainability capital budgeting contributes to ensuring that the so-called soft or intangible factors at least are recognised and become some sort of rough estimates. The benefits of sustainability are highlighted in the following savings potential:

- benefits from reducing waste emissions and disposal costs — carbon emission credits, internal and external disposal costs, related equipment, transport, insurance and liability, production permits and sustainability reporting costs
- reduction in worker health costs, reduced risks of accidents and worker absenteeism because of dangerous materials and reduced motivation, external stakeholder liabilities and contingencies
- savings in energy, water, materials, packaging and scrap
- potential earnings from emerging/new by-products
- improved relations with authorities, which may shorten waiting times for permits and regulated procedures
- savings in remediation costs, which can be extremely high in non-renewable energy production facilities.⁴⁶

Recognising and quantifying sustainability costs and benefits is invaluable for organisations in two ways. First, it is essential for calculating the profitability of existing sustainability investments. Second, it is essential for understanding the potentially hidden or contingent costs relating to long-term operations and future projections. In addition to savings, positive outcomes relating to improved employee morale; shareholder, community and customer satisfaction; and image and relationship enhancement can also flow to the entity.

Capital budgeting for sustainability should be done with maximum knowledge, specialist input and appropriate timelines to ensure that all possible quantitative and qualitative factors are included in the model. Tangible cash flows relating to the impact of changes in input prices and other matters, such as those relating to the regulatory environment (that is, future fees, fines and penalties) must be taken into account. It is also essential that the less tangible aspects are included in the management accounting information.

Different sustainability scenarios should be raised, costed and made available to decision makers. For optimum sustainable decisions, various capital investment scenarios must be evaluated. For example, the alternative scenarios presented for a company that uses significant electricity such as Alcoa could range from capital investment to improve traditional coal-powered operations through to adopting other sustainable and renewable power sources based on solar, wind or water-generated power.

Sustainability balanced scorecard

The balanced scorecard is a performance measurement system that links key performance measures with business strategy in four main ways: financial, customer, internal processes, and innovation and learning (refer to chapter 17). The key to balanced scorecard success is the focus on the cause-and-effect relationships between the performance measures that ultimately lead to successful operations as measured by shareholder wealth (the score) in the financial perspective. The balanced scorecard was originally intended to be the *shareholder* scorecard.⁴⁷ Kaplan and Norton did not consider it to be a *stakeholder* scorecard despite introducing key measures relating to staff and customers. Over time, the balanced scorecard has been adapted for use in the not-for-profit and public sectors where financial outcomes are not necessarily the goals. It has also begun to be popular with organisations as a tool for monitoring sustainability.

A sustainability balanced scorecard can be developed in three ways.⁴⁸

1. The environmental and social aspects can be integrated within the four standard perspectives.
2. An additional 'sustainability' perspective can be added.
3. A separate sustainability balanced scorecard can be developed.

If the sustainability measures are captured within the existing scorecard, this ensures that cause-and-effect relationships are developed between the measures and perspectives so that sustainability becomes entwined within the entity's overall vision and strategic objectives. Sustainability actions can thereby be captured in organisational 'innovation and learning' perspectives and become integral to the value chain activities ('internal processes') undertaken by the organisation. Successful sustainability practices will be rewarded by the 'customer' who purchases the entity's products or services. Sustainability success should then be reflected in the 'financial' perspective. This should demonstrate that the social, environmental and financial dimensions are managed in unison. One concern with this first style of integrated scorecard is that for 'successful' sustainability operations, entities might focus solely on their private measures (financial success) to the exclusion of societal measures. Depending on how the measures are integrated into the balanced scorecard, there is a risk that the organisation might ignore the externalities to focus on the bottom line.

The second development relates to an additional sustainability perspective being added. This reinforces the fact that sustainability is central to the organisation's mission and strategies. An additional quadrant also provides scope for approximately four to six more key sustainability measures to be included in the balanced scorecard (a traditional scorecard has about 22 to 24 measures in total). The importance placed on achieving these measures will depend on the weighting given to these measures in comparison to the others. A problem that has been previously identified with balanced scorecard use is that too much emphasis tends to be placed on the financial quadrant in comparison to others.⁴⁹ This is a risk with the sustainability measures, particularly when including an additional quadrant and related measures. In this situation, the weighting of measures has the potential to be diluted in comparison to the financial measures and so receive less attention by managers and subordinates who are being evaluated.

A separately 'derived' sustainability balanced scorecard is considered to be the most useful of the three approaches.⁵⁰ First, it enables sustainability teams or departments to more closely monitor the social, environmental and financial dimensions. Secondly, it does not consist of individual sustainability measures that are 'tacked onto' existing operational measures. All measures on this scorecard have been derived from operations where sustainability is the fundamental building block. For optimal outcomes, the individually derived sustainability balanced scorecard should not be viewed independently from other performance measurement systems but considered as an *extension* of the other alternatives.⁵¹ In this way, the derived scorecard should be developed in conjunction with an existing balanced scorecard to ensure that the sustainability measures are given strategic relevance and position in the management accounting framework. Thus, the difference between the first two scorecard alternatives and the derived balanced scorecard is that the derived scorecard measures emerge from a core balanced scorecard in which sustainability becomes the fundamental driver.

The scope of sustainability accounting encourages the inclusion of items previously treated as externalities or societal costs. A further extension to the 'derived' sustainability balanced scorecard can be made by adding an additional 'societal' perspective.⁵² This means that the purpose of the derived scorecard can both fulfil the private interests of the firm and shareholder, and also draw managers' attention to the strategically relevant societal interest to be captured in the additional perspective. Figure 19.15 presents an overview of the process of formulating a sustainability balanced scorecard. It considers the issues covered throughout the chapter — sustainability accounting, reporting principles, and the balanced scorecard as an integration framework.

The measures should be tailored to the specific business unit and fit with the entity's corporate vision and strategies. The environmental measures might relate to emissions, waste, materials, energy or other factors that can directly affect the environment. The social aspects relate to any factor/exposure of a business unit, and the additional societal (or non-market) perspective measures might relate to freedom of action, legitimacy or legality.⁵³ Success in fully realising opportunities for cost savings or revenue generation through sustainability accounting requires that both technical and human factors work together.

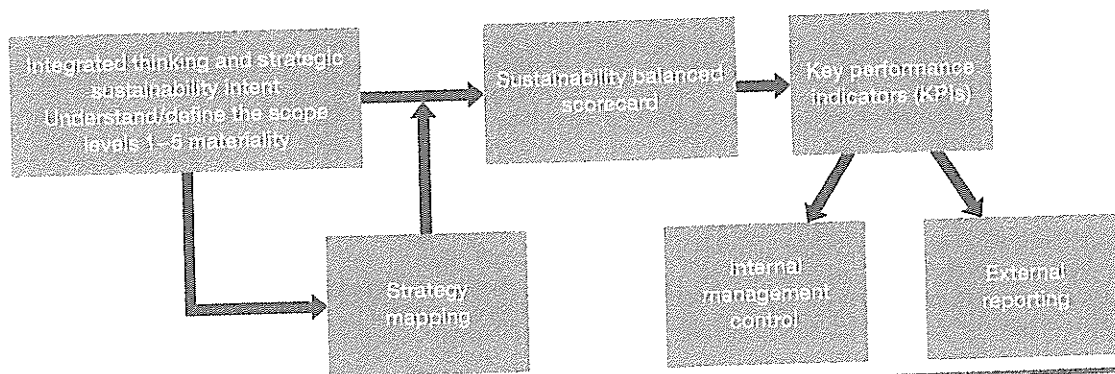


FIGURE 19.15 The balanced scorecard as a sustainability integration framework

19.5 Sustainability management accounting – issues relating to successful integration

LEARNING OBJECTIVE 19.5 Communicate the issues faced by managers when trying to implement sustainability change processes within their entities.

It has been found that integrating sustainability within the organisation and into everyday practices can be achieved by a broad systems thinking approach. Successful organisations achieve this through recognising the importance of:

1. adopting a clear, shared vision for the future
2. building teams, not just champions
3. using critical thinking and reflection
4. going beyond stakeholder engagement
5. adopting a systematic approach
6. moving beyond expecting a linear path to change.

These insights are a strategic tool for managers to use when proactively implementing sustainability management practices within their organisations.⁵⁴

It is important to recognise accounting as both a technical and a social practice. Several key technical and behavioural/social issues must be considered.⁵⁵ The technical issues, as highlighted in figure 19.16, relate to strategic development being supported by appropriate management accounting systems. A broad view of sustainability costs and benefits is necessary to capture associated externalities. Costing systems should enable sustainability costs and benefits to be directly allocated to the associated operations of the entity rather than being accumulated within overhead accounts, treated as period costs or allocated to wrong revenue or costing categories.

If suitable management accounting tools are in place with appropriate feedback mechanisms, the behavioural issues relating to performance evaluation and rewards (discussed in chapter 18) should be minimised. To optimise organisational change towards sustainability, other factors such as top management support and the adoption of a team-based approach in preference to a single sustainability 'champion' to promote sustainability throughout the organisation should be considered. For example, by using a multidisciplinary team (or cross-departmental teams), sustainability management ownership is created across the entity and the potential for change to corporate culture is increased.

For management accountants, an opportunity to play a key role in the sustainability management change process — as a change agent (where high consideration is given to many non-financial factors) — may be provided. A note of caution: if 'accounting' is viewed as a purely technical or financial function by other organisational members, then a change in the way accounting is viewed within the entity might be required. It is essential that there is adequate communication between all business units and support departments.

Technical issues	Behavioural/social issues
<ul style="list-style-type: none"> • Defining sustainability costs • Suitable objectives in line with sustainability strategies • Identification of suitable social and environmental measures for performance evaluation • Setting challenging but achievable targets • Positioning of sustainability performance within the organisational performance measurement system • Able to demonstrate sustainability links to operations via strategy map • Issues associated with regularity of reporting, timeliness of feedback and format of reports • Use of a pilot test • Use of external consultant or not 	<ul style="list-style-type: none"> • Senior management support • Multiple advocates • Creating ownership of the project of participants • Not conducting other initiatives that could conflict with sustainability management protocols • Perceptions of management accounting within the company • Suitable communication and feedback mechanisms

FIGURE 19.16 Sustainability management accounting: technical and behavioural issues

Progress towards sustainability may also be thwarted if other initiatives conflict with sustainability management practices. For example, if an entity is undergoing a downsizing program, then issues relating to the social setting and employee morale must be managed if the remaining employees are to support the sustainability program. In such situations, it is essential for managers to recognise that sustainability management practices that are economically sound should continue to be practised in times of crisis and not only when operations are successful.⁵⁶

COMPREHENSIVE EXAMPLE 6

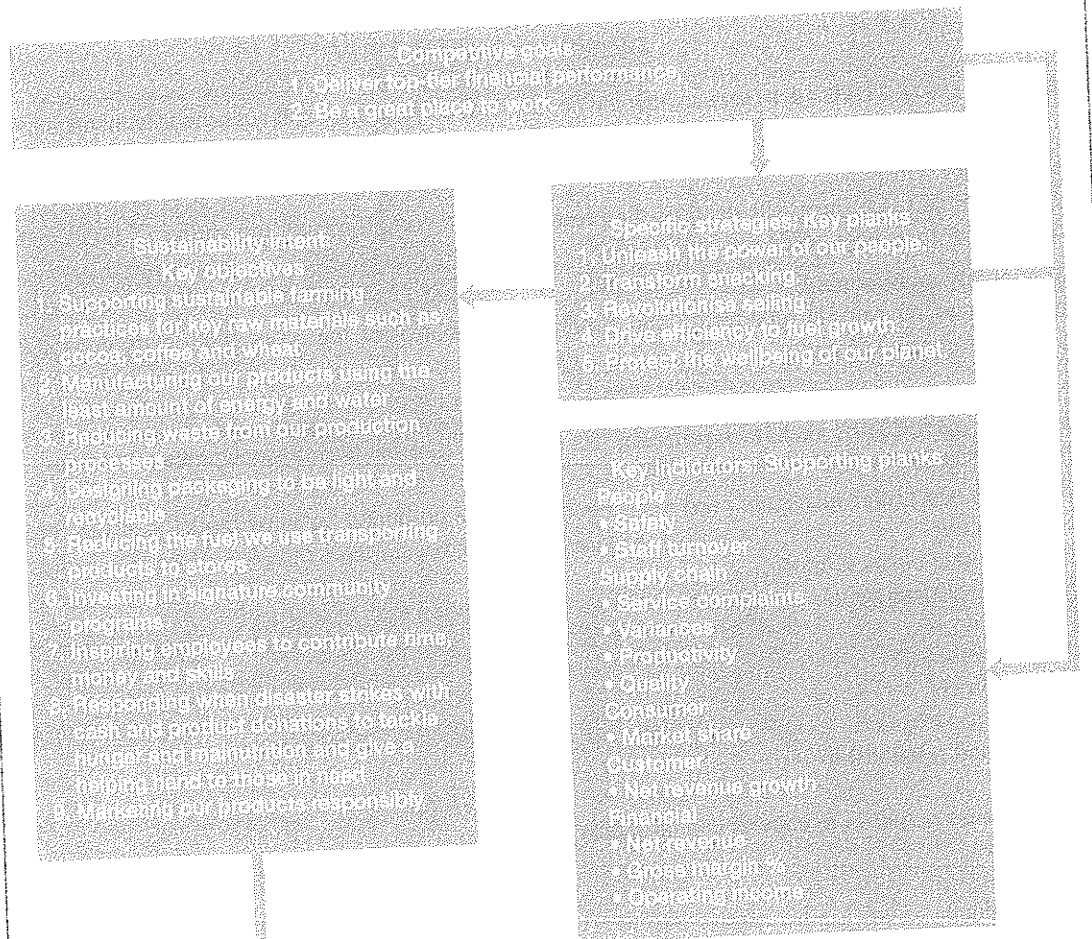
Mondelēz Australia's strategy map

The Prince of Wales' Accounting for Sustainability (A4S) Project recognised that there are ten elements (see figure 19.17) required to successfully embed sustainability within organisational practices. This is essential to integrated thinking.

1. Board and senior management commitment
2. Understanding and analysing the key sustainability drivers for the organisation
3. Integrating the key sustainability drivers into the organisation's strategy
4. Ensuring that sustainability is the responsibility of everyone in the organisation and not just of a specific department
5. Breaking down sustainability targets and objectives for the organisation as a whole into targets and objectives which are meaningful for individual subsidiaries, divisions and departments
6. Processes that enable sustainability issues to be taken into account clearly and consistently in day-to-day decision making
7. Extensive and effective sustainability training
8. Including sustainability targets and objectives in performance appraisal
9. Champions to promote sustainability and celebrate success
10. Monitoring and reporting sustainability performance in an integrated way

FIGURE 19.17 Integrated thinking: 10 elements required to successfully embed sustainability⁵⁷

These factors were used to examine Mondelēz Australia, previously recognised for its Kraft Foods and Cadbury Chocolate labels. The walls of Mondelēz Australia's head office are lined with posters of iconic brands, such as Vegemite, which first went on sale in 1923 in Australia, and Cadbury Dairy Milk Chocolate, which has had a presence in Australia since 1881. In drawing on the 10 A4S factors, the strategy map (figure 19.18) enables the reader to follow the corporate sustainability intent and key goal to specific strategies that result in the development of key performance indicators and initiatives that, in turn, help to demonstrate strategy in practice.



- Key sustainability initiatives supporting key sustainability objectives**
- DuS – became member in 2011-12
 - Commitment to Fairtrade Certification
 - Packaging recycling programs, landfill alternative – consumers fund in used packaging
 - Signatory to the Australian Packaging Covenant (APC) – product stewardship
 - Australian Government's Energy Efficient Opportunities – utilise gas from wastewater treatment plant as an energy source for the steam boiler, reduced the amount of natural gas used by 3000 gigajoules (saving CO₂ emissions by 200 tonnes)
 - Commitment to World Health Organization's global strategy on diet, physical activity and health
 - Commitment to Australian Food and Grocery Council's Responsible Children's Marketing Initiative
 - Participant in the Roundtable for Sustainable Palm Oil (RSPO) – WFC recognition as one of the leaders in a cohort of palm oil buyers

FIGURE 19.18 The links between competitive goals and sustainability intent: key objectives and initiatives⁵⁸

This follows the balanced scorecard mapping highlighted in figure 19.15 and is driven by board and senior management commitment.

SUMMARY

LEARNING OBJECTIVE 19.1 Discuss how the concepts of sustainability and sustainability management apply to corporate practice.

Sustainability

The development that meets the need of the present without compromising the ability of future generations to meet their own needs.

Sustainability management

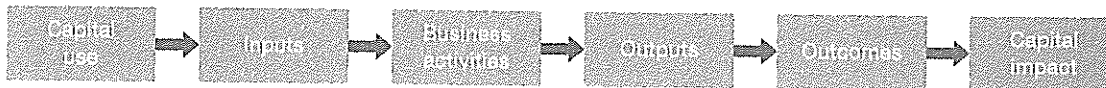
The process of measuring, monitoring and simultaneous control of the economic, environmental and social dimensions of an entity.

LEARNING OBJECTIVE 19.2 Recognise why it is essential for management accountants to take an integrated thinking approach to sustainability.

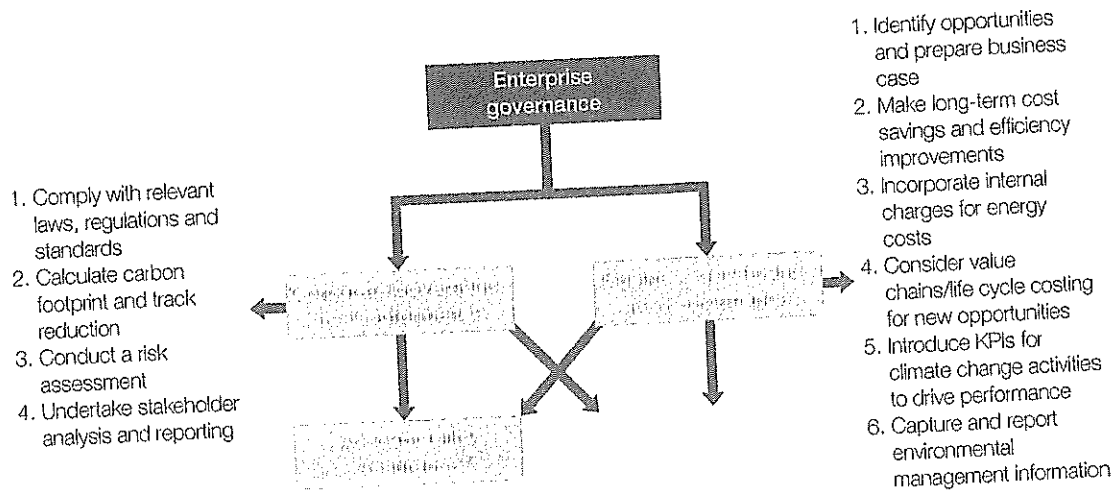
Accountants and senior managers need to recognise that the corporate business model is at the core of the organisation.

The corporate business model:

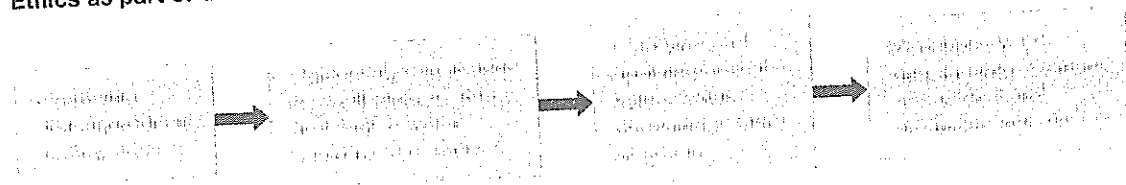
- draws on various capitals as inputs:
 - financial
 - manufactured
 - intellectual
 - human
 - social and relationship
 - natural
- uses business *activities* to convert capital inputs to *outputs*:
 - products
 - services
 - by-products
 - waste
- leading to *outcomes* in terms of effects on capitals.



- Management accounting plays an important role in integrated thinking and value creation (reservation, diminution) over time.
- There is a growing view that there must be a working connection between sustainability *corporate governance* and sustainability *business governance* for sustainability *enterprise governance*.
- The conformance–performance accounting connection requires a greater collaboration between the financial and management accounting functions and other organisational stakeholders.



Ethics as part of the internal management decision-making process



Ethical issues and strategic risk management

- Operational risk
- Asset impairment risk
- Competitive risk
- Reputation risk

LEARNING OBJECTIVE 19.3 Outline the scope and benefits resulting from sustainability management accounting practices.

Scope

• Conventional costs	Private
• Hidden costs	
• Contingent costs	
• Image and relationship costs	
• Societal	Societal

Benefits

Product design	Capital investments
Process design	Cost control
Facility siting	Waste management
Purchasing	Cost allocation
Operational	Product retention and mix
Risk management	Product pricing
Sustainability compliance strategies	Performance evaluations

LEARNING OBJECTIVE 19.4 Demonstrate an understanding of key sustainability management accounting tools.

Sustainability value chain analysis

- Understand the positive and negative impacts of corporate sustainability activities on society

Cost allocation and full cost accounting

- Sustainability costs isolated from other overhead costs pools
- Sustainability costs should be traced to the cost object

Life cycle costing

- The sum of the 'cradle to grave' costs throughout industry and internal value chains
- Should include both private and societal costs

Capital budgeting

- Includes conventional cash flows associated with the project
- Adapt conventional model to include contingent, image and external benefits and costs

Performance measurement

- Sustainability balanced scorecard
- Social and environmental aspects integrated within the four perspectives
- An additional sustainability perspective
- A separate sustainability balanced scorecard

LEARNING OBJECTIVE 19.5 Communicate the issues faced by managers when trying to implement sustainability change processes within their entities.

Technical issues

- Defining sustainability costs
- Suitable objectives in line with sustainability strategies
- Identification of suitable social and environmental measures for performance evaluation
- Setting challenging but achievable targets
- Positioning of sustainability performance within the organisational performance measurement system
- Able to demonstrate sustainability links to operations via strategy map
- Issues associated with regularity of reporting, timeliness of feedback and format of reports
- Use of a pilot test
- Use of external consultant or not

Behavioural issues

- Senior management support
 - Multiple advocates
 - Creating ownership of the project of participants
 - Not conducting other initiatives that could conflict with sustainability management protocols
 - Perceptions of management accounting within the company
 - Suitable communication and feedback mechanisms
-

KEY TERMS

carbon footprint A measure of the carbon dioxide equivalent emissions attributable to an activity, commonly used at an individual, household, organisation or product level.

carbon neutrality A situation where the net emissions associated with a product or an organisation's activities are equal to zero through the acquisition and retirement of carbon offsets that meet additionality criteria.

life cycle analysis A technique that evaluates all the activities involved in the design, development, production, sale, transportation and disposal of a product or service. The life cycle of a product or a service is often referred to as 'cradle to grave'.

life cycle costing A decision-making method that considers changes in price and costs over the entire life cycle of a good or service, from the time the product is introduced through a number of years.