CHAPTER 5

SUSTAINABLE MANAGEMENT

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LEARNING GOALS

1. Explore the rise of sustainable development as an issue
2. Get to know essential tools of sustainable management
3. Learn to manage the triple bottom line

STAGGERING FACT

Ninety-nine per cent of the CEOs of the world's largest companies say sustainability issues are important to their future success [1].

SPOTLIGHT

FROM MISSION ZERO TO CLIMATE TAKE-BACK

Credit: Interface

Management at Interface present themselves as *'Radical Industrialists'* [2]. Interface manufactures and sells carpet tiles. Managing a carpet business is not the easiest starting point on the journey to sustainable development. Plastics used in carpet production are usually petroleum based and the glue often toxic. The production process is energy intensive, and creates large amounts of CO_2. Nevertheless, in 1994 Interface's management declared its 'Mission Zero', to become truly sustainable, without any negative social, environmental and economic impacts by 2020 [3]. The final goal, however, is to become not only a business that does no harm, but one that has a net positive impact, a restorative business [4]. Interface's late founder Ray Anderson called this journey 'climbing mount sustainability', difficult, but not impossible [5, 6].
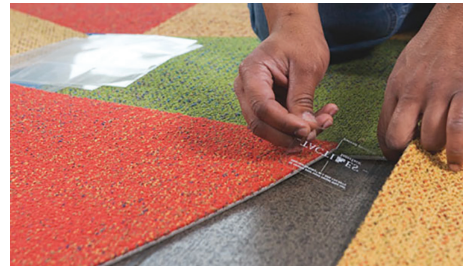
Credit: Interface

Interface started to produce carpet in 1973. The product itself comes with an initial environmental benefit due to 'Modular Flooring' practice [7]. Producing carpet tiles as opposed to large full-floor carpet sheets means that only the most-used tiles of the carpet in a room have to be replaced and disposed of, and there are fewer offcuts and less waste. Management declared they would follow a 'Less is More' philosophy in 1994. Their efforts quickly showed tangible results, reducing the average consumption of fiber by ten per cent in just 12 months. Since then it has been a journey of continuous management innovations. For instance, there is the ReEntry® programme to recover used carpet tiles from customers and recycle them into new products [8]. The 'Cool Carpet' practice, which allows customers

(Continued)

to participate in a carbon-offsetting scheme [9]. Production management uses smart conveyor belts, the 'Intelliveyor', which stops when there is no product to be moved and saves considerable amounts of energy [4]. All products include an Environmental Product Declaration (EPD) of its complete environmental impact, including global warming, abiotic depletion, and the water footprint [10–12].

Mission Zero was accomplished ahead of time. It had required efforts of management across departments, hierarchies, and locations. For instance, Adrian,

a site manager for Interface in Northern Ireland, explains how 'after 25 years driving innovation and business change, Interface recently announced success on our "Mission Zero" commitment to reduce our environmental footprint and have no negative impact by 2020. Looking forward with optimism, we are committed to becoming a Carbon Negative Company by 2040. And as of January 2019, every flooring product that Interface sells is carbon neutral across its full life-cycle through innovation and the purchase of a small number of offsets. We are … now focused on setting our sights higher through our Climate Take Back commitment, which aims to create a movement to reverse global warming' [13].

To become 'net positive' and to have a positive environmental, social, and economic impact, management at Interface is now engaging into a wider variety
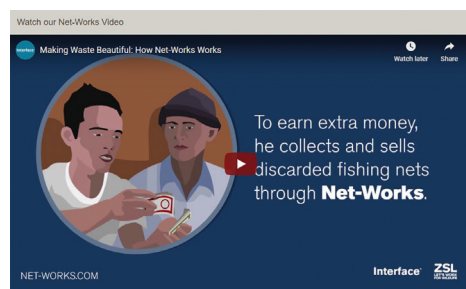
Credit: Interface

of innovative practices. For instance, Net-Works is a sourcing practice with both positive social and environmental impacts. It involves paying fishermen, often from marginalized communities, to collect and sell discarded fishing nets floating in the oceans to Interface as a production input [14]. Sustainable management at Interface translates into sustainable living practices as customers use their products at home [15]. For instance, 'Biophylic Design' practices help people to reconnect to nature by bringing it back into our living space through the use of nature-like designs [16].

Most importantly, Interface's practices related to net-zero and net-positive goals have prepared the ground for the surge in net-zero practices in the 2020s, including corporate giants like Amazon, entire industries like the UK aviation industry, cities like Tokyo, and entire countries like Germany [17–21].

SUSTAINABLE MANAGEMENT

> The TBL's [Triple Bottom Line] stated goal from the outset was system change – pushing toward the transformation of capitalism … a genetic code, a triple helix of change for tomorrow's capitalism, with a focus on breakthrough change, disruption, asymmetric growth (with unsustainable sectors actively sidelined), and the scaling of next-generation market solutions.

> John Elkington [22]

Should management care about humanity's survival on Earth? Should it concern itself with the protection of the planet as a whole, including all of its species? However lofty this might sound, it is the exact aspiration of sustainable management. Management's environmental, social, and economic value creation, its triple bottom line, is the central element of sustainable management. Such management, if successful, may sustain or even restore our planet's social, environmental, and economic systems. **Sustainable management**, such as the practices at Interface, is management's contribution to trying to achieve sustainable development of the world, including the survival of the human race.

Sustainable management sustains and balances social, environmental, and economic capital in the short, medium, and long run

This chapter will first provide a systematic overview of factors that have led to today's global unsustainable society, describe the status quo, and provide an outlook on future scenarios of development. We also discuss the historic developments that have led to development of central theoretical concepts and global institutions involved in setting the stage for sustainable management.

The second section introduces the most important theoretical concepts for analysing sustainability. It also introduces the Brundtland definition of sustainable development and illustrates different approaches to interpreting sustainability. Central topics include the systemic, holistic approach of sustainability, the degree of change that is needed to reach sustainability, and whether sustainability can be reached through economic growth. We will address whether de-growth should be the new paradigm. Finally, we describe three kinds of capital: environmental, social, and economic, and illustrate how sustainable development can only be reached if governmental, business, and civil sectors become sustainable together (see Figure 5.1).

Triple bottom line refers to combined social, environmental, and economic impacts

The final part of this chapter places the **triple bottom line** concept of social, environmental, and economic performance at the centre of sustainable management practices. This approach helps us to achieve the goal of a neutral

or even positive overall value creation in the three dimensions. We apply the tool of footprinting, which provides a sum of a specific impact, such as water usage or jobs creation, and the tool of product life-cycle assessment (LCA). LCA sums up those impacts throughout all stages of a product's production, use, and end of useful life.
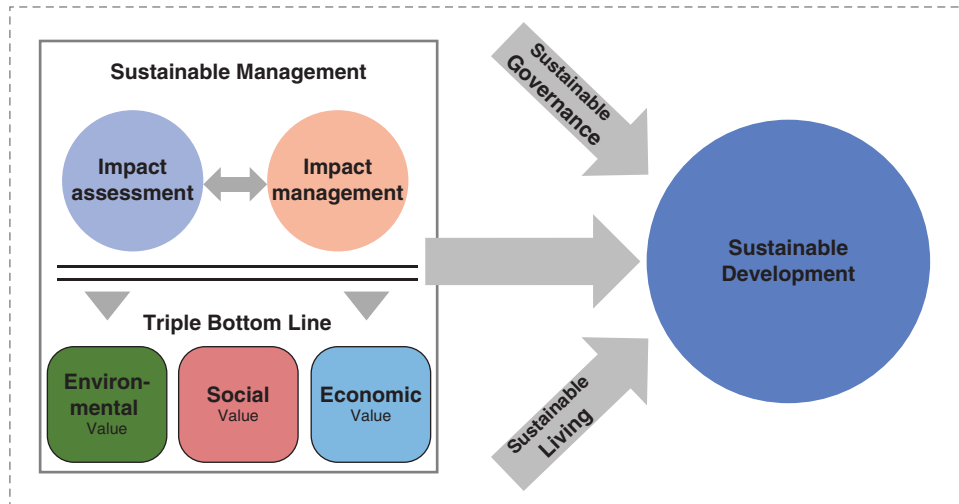

FIGURE 5.1   Sustainable management and sustainable development

ORIGINS OF SUSTAINABLE MANAGEMENT

In 1987 Gro Harlem Brundtland, chair of the World Commission on Environment and Development coined the term '**sustainable development**' and put it on the agenda of politics, business and private people. This historic moment triggered a whole wave of discussion and emerging actions. However, the Brundtland Report was by no means the beginning of (un)sustainable development. In the following paragraphs, you will find a quick storyline of its development, from ancient cultures showing a history of sustainability and unsustainability up to the most recent sustainable management initiatives.

Sustainable development
a development that meets the needs of the present without compromising the needs of future generations

ROOTS: INDIGENOUS SUSTAINABILITY

Although global unsustainability is a problem that started in the twentieth century, sustainable and unsustainable behaviours have been part of human activity from the dawn of human civilization. Ancient practices may be a valuable source of inspiration for humanity today as we start to move towards sustainable global development. Over 40,000 years, the Australian Nhunggabarra Aboriginal people had managed their lives sustainably to thrive in an

environmentally constrained and fragile strip of ecosystem. The sustainability of their society is attributed to an extensive set of 'law stories', which defined their sustainable behaviours through social, economic, and ecological rules [23]. The Polynesian Maori in New Zealand also had an integrated system of penalties and rewards, called Kaitiakitanga, which assured the socially and environmentally sustainable management of their natural resources. The Kaitiakitanga framework followed the ideal of 'guardianship' over a certain territory and social group. It was based on a system of social and environmental resource management, not unlike today's sustainable management activities. The importance of protecting ecosystems and the sustainability of communities progressed to the point where certain endangered species were declared '*rahui*', or untouchable, and meant that those who violated *rahui* were placed under a death sentence [24–27].

We can also learn about sustainability from the comparison between the two histories of the Easter Islands and the small Tikipa Island. Much like Earth today, both islands faced resource depletion and overpopulation around AD 1500, but each took significantly different courses. The inhabitants of the Easter Islands over-harvested trees to move the huge head-shaped statues for which the islands are famous. The resulting consequences included soil and sweet water loss, which resulted in resource wars and ultimately, a reduction of the island's population by two-thirds. In contrast, when the population of Tikipa Island hit its resource limits they reacted in a fundamentally different manner. They replaced 'slash and burn' practices with sustainable agriculture. They engaged in drastic practices, for instance, only allowing first-borns to have children and even practiced abortion and infanticide. They also killed all pigs on the island, in spite of the high value those animals had for them, because pigs had a considerable negative impact on the island's resources [28].

Those are just a few of the many historic pre-colonial and pre-industrial revolution sustainability scenarios, which may have valuable lessons for today's sustainable management, and sustainable development on a global scale [29].

HISTORICAL BEGINNINGS OF GLOBAL UNSUSTAINABILITY

In the previous section, we saw how sustainable development worked on a local scale to tackle environmental situations on isolated islands with scare resources and, therefore, limited carrying capacity. Before global resource scarcity and unsustainability, no one had really questioned human survival on Earth or considered the Earth as similar to such island environments. Human population and our lifestyles may never have begun to exceed Earth's carrying capacity except for a few primary developments in human history (see Figure 5.2).
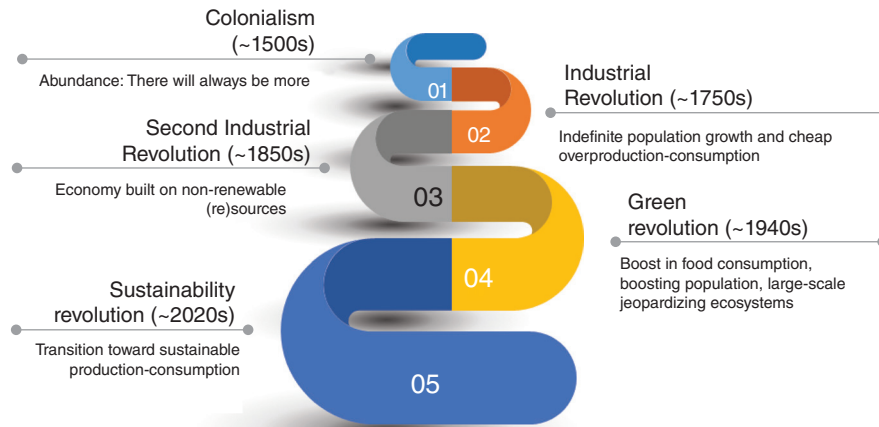
FIGURE 5.2 Historic turns towards (un)sustainability

CREDIT: Slidemodel.com

The first important development was the age of discovery and colonialism between the fifteenth and eighteenth century. This 'age of discovery' fuelled a general conviction of endless abundance of natural resources, wealth, and endless growth. Whenever the resources in a European home country became scarce, other resources would be substituted from one of the colonies. Such behaviour is still visible today. For example, some multinational corporations outsource pollution to developing countries with less environmental legislation and may even outsource complete high-pollution industries [30].

The second group of developments began with the first industrial revolution in the mid 1700s. Specialized craft production of goods was replaced by machine-based factories that offered new employment opportunities due to the division of labour into simple tasks. It increased average wages, and arguably human welfare. Those changes resulted in an explosion of population in industrialized countries, which put population growth on the unsustainable path we are currently on. As will be illustrated later, the planet cannot sustain continued population growth at the current levels of food and product consumption.
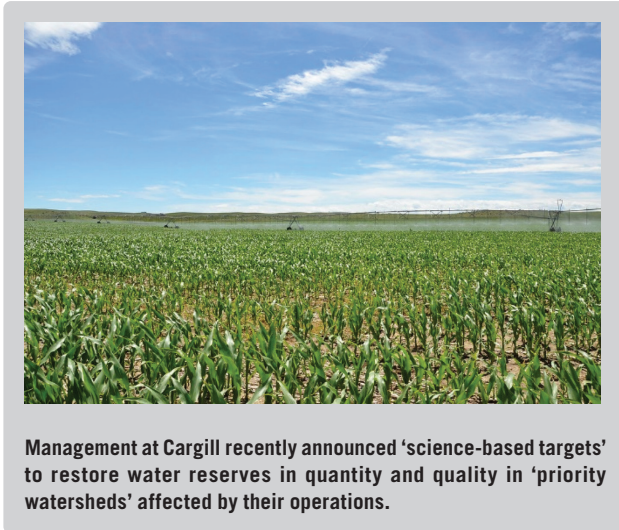
The second industrial revolution began in the mid-1800s and initiated the age of petroleum-based, non-renewable fuels. It was the beginning of today's fossil fuel dependency. Fossil fuel usage is a problem due to non-renewability and due to the pollution caused through burning. As a result, society is using energy beyond what can continue to be harvested from the Earth. Petroleum, which was formed over millions of years, is being used up at an alarming speed. We are living on 'ancient sunlight'. Having a non-renewable energy source that is in danger of running out as the basis of our economies, means that the Earth's carrying capacity will be exceeded [31].

The green revolution was the industrial revolution of the agricultural sector. During the 1940s to 1960s, agricultural production experienced a geometric increase in productivity through the use of chemical herbicides and pesticides, monoculture, and the use of technology in cultivation. This development had a double effect on the (un)sustainability of our world. On the one hand it reduced the cost of food, which led to excessive consumption, and additional population increase. It also caused environmental degradation, most notably water pollution from chemical products and biodiversity loss from both pesticides, loss of habitat and monoculture. Now we are in a tension-laden situation where moving away from intensive/unsustainable agriculture would mean to cause food scarcity, while a global population growth, fuelled by cheap mass-food production, demands more food. With 70 per cent of global freshwater consumption used for agriculture, the depletion of freshwater reserves is a key concern for society, and management of agribusinesses like Cargill. They recently announced a radical plan to not only curb their water impact, but to even restore some of what had been depleted in the past [32].

Management at Cargill recently announced 'science-based targets' to restore water reserves in quantity and quality in 'priority watersheds' affected by their operations.

We now appear to be at the beginning of yet another industrial revolution, a large-scale transition towards sustainable production and consumption, the **sustainability revolution** [33–36]. The sustainability-driven movement is making management practices that used to be considered 'radical' or anti-paradigmatic, like the ones of Patagonia, a mainstream management phenomenon. Examples are net-positive practices, the rise of social purpose management, and humanistic management. The revolution in the business management sector is accompanied by civil society movements like Fridays for the Future, the Extinction Rebellion, or Occupy Wall Street and by governmental sector moves like China's crack down on polluting factories or countries' net zero emissions goals.

The sustainability revolution the latest industrial revolution taking place in the form of a large-scale transition towards sustainable production and consumption

CONCEPTUAL MILESTONES

Arguably, sustainability as a concept was first introduced as early as 1713 by Hans Carl von Carlowitz, a mining administrator and accountant. He who

was concerned about the unsustainable management of German forests. In his book, *Sylvicultura Oeconomica* (forestry management) he developed principles and practices for socially, environmentally, and economically sustainable forestry [37, 38]. When the English scholar and reverend Thomas Malthus in 1798 published his *Essay on the Principle of Population,* he warned about the dangers of overpopulation. Population was growing at a geometrical rate, while food production grew arithmetically. Malthus predicted food supplies could not keep up with growing world population, and there would be famines and suffering [39]. Malthus' views on society's sustainability is contrasted with those of two of his contemporaries. The Marquis de Condorcet proposed that population growth would automatically stop through the free will of enlightened individuals and families who consciously abstain from having many children [40–42]. This position is close to William Golding's ideal of a self-perfecting individual that would finally counteract unsustainable population growth [43].

One of the first predictors of the unsustainability of western lifestyles was the Native American Cree Prophecy dated in the 1850s. The prophecy reads as follows: 'When the earth being ravaged and polluted, the forests being destroyed, the birds would fall from the air, the waters would be blackened, the fish being poisoned in the streams, and the trees would no longer be, mankind as we would know it would all but cease to exist' [44]. A modern counter-part of the classic warnings about unsustainability is the book *The Limits to Growth* published in 1972 by the Club of Rome, a pioneering sustainability organization founded by a motley crew of diplomats, business people, and scientists. The *Limits of Growth* warned of an 'overshoot', a situation of economic and societal collapse from unsustainable usage of natural resources [45,46]. The book *Silent Spring* published in 1962 by Rachel Carson has become a classic publication in the field of ecological sustainability. Carson warned of the environmental consequences of the Green Revolution and illustrated the probable loss of biodiversity by the picture of a 'silent spring' without any birdsongs or insect sounds [47].

An early important concept for the analysis of sustainability is ecology, coined by the biologist Ernst Haeckel in 1866. The field of ecology analyses the interdependence between the social and environmental spheres [48]. For the analysis of a company's impact on society and environment, the concept of external effects is crucial. External effects, first conceptualized by Alfred C. Pigou [49] as social costs, describe the social and environmental impacts of economic activities.

In the same year that the Brundtland Commission [50] coined the term sustainable development (1987), Edward Barbier provided the graphical

representation through a Ven diagram of intersecting circles, which is the most commonly used visualization of sustainable development [51]. In 2005 the United Nations World Summit introduced the pillar model of sustainable development with the pillars of 'economic development, social development and environmental protection', which were described as interdependent and mutually reinforcing in their contributions to global sustainability [52].

Several management frameworks for developing solutions towards sustainable development had been developed at the end of the twentieth century:

- **Life-cycle assessment** is an important tool, which helps to describe social, environmental and economic impacts of a product along all stages of its life-cycle, from production to usage to disposal [53].

- The **cradle-to-cradle** framework calls for a circular economy, without any waste, and with leftover materials at the end of a product's life-cycle becoming an input for a new production process [54].

- The **triple bottom line** approach is an approach of summing up all social, environmental and economic (triple) impacts of a business through a triple bottom line, instead of a purely financial single bottom line [55].

- Finally, **planetary boundaries** (see Chapter 1, 'Management in Context' and the 'digging deeper' section of this chapter) is an important framework for translating sustainability into managerial thought and action: the impact of management on Earth [56].

INSTITUTIONALIZATION

A large variety of global and local institutions related to sustainability have been created, in numbers that far exceed what can be covered in this chapter. The following institutional developments, however, reflect the most influential global entities.

A starting point of this development was the UN Conference on the Human Environment that took place in 1972 in Stockholm, where the organization declared the need for a 'common outlook and for common principles to inspire and guide the peoples of the world in the preservation and enhancement of the human environment' [57]. This goal lead to definition of sustainable development in 1987 through various smaller steps [50], which were then translated into concrete action plans at the Rio Earth Summit in 1992. Concrete outcomes were, among others, the Rio Declaration on Environment and Development, the global sustainability action plan Agenda 21, and the Convention on Biological Diversity [58]. Another outcome was the

THOMAS MALTHUS (1789)

WORLD POPULATION WILL 'OUTGROW' THE NATURAL RESOURCES (FOOD) IT NEEDS FOR SURVIVAL.

RACHEL CARSON (1962)

THE 'GREEN REVOLUTION' WILL LEAD TO A LOSS IN BIODIVERSITY AND DESTRUCTION OF ECO-SYSTEMS.

MARQUIS DE CONDORCET (1794)

POPULATION GROWTH WILL AUTOMATICALLY STOP THROUGH THE FREE WILL OF ENLIGHTENED INDIVIDUALS AND FAMILIES.

EDWARD BARBIER (1987)

SUSTAINABLE DEVELOPMENT CAN BE SUB-DIVIDED INTO SOCIAL, ENVIRONMENTAL AND ECONOMIC DEVELOPMENT.

CHIEF SEATTLE (APROX. 1850)

MANKIND WILL EXTINCT ITSELF THROUGH POLLUTION AND ABUSIVE USE OF NATURAL RESOURCES.

GRO HARLEM BRUNDTLAND (1987)

SUSTAINABLE DEVELOPMENT MUST MEET THE NEEDS OF CURRENT GENERATIONS WITHOUT COMPROMISING FUTURE GENERATIONS' NEEDS.

ERNST HAECKEL (1866)

ECOLOGY IS THE SCIENCE OF THE INTERDEPENDENCES OF ENVIRONMENTAL AND SOCIAL SYSTEMS.

JOHN ELKINGTON (1999)

BUSINESSES MUST PAY ATTENTION TO A TRIPLE BOTTOM LINE OF SOCIAL, ENVIRONMENTAL AND ECONOMIC PERFORMANCE.

ALFRED C. PIGOU (1920)

ECONOMIC ACTIVITY HAS INTERNAL AND EXTERNAL COSTS, SO-CALLED SOCIAL COSTS.

WILLIAM MCDONOUGH AND MICHAEL BRAUNGARTH (2002)

ECONOMIC ACTIVITY MUST BECOME A CLOSED LOOP, WHICH ELIMINATES WASTE 'FROM CRADLE TO CRADLE'.

FIGURE 5.3   Figureheads and central ideas of sustainability

foundation of the Framework Convention on Climate Change (UNFCCC), which was the basis for the climate change action plan of the Kyoto Protocol in 1997 [59]. In 2005 the Millennium Development Goals (MDG) were launched [60] and in 2015 these were replaced by the more extensive and ambitious Sustainable Development Goals (SDG).

The foundation of the World Business Council for Sustainable Development (WBCSD) in 1990 marked the beginning of companies' embedding sustainable management goals and practices. WBCSD is a CEO-led initiative that aims at scalable and tangible contributions to sustainable development from the business sector [61, 62]. The Global Reporting Initiative (GRI) has provided widely applied reporting guidelines for sustainability reports and integrated annual reporting of environmental, social, and economic performance [63, 64].

STATUS QUO AND THE FUTURE

13 CLIMATE ACTION

14 LIFE BELOW WATER

15 LIFE ON LAND

The last time that we could have claimed that humanity was living a sustainable existence on planet Earth was in 1975, when we had an overall environmental footprint of 1. We were using up exactly the amount of natural resources that the planet could replenish [65]. In 2011, the world population reached seven billion and common estimates suggest that there will be almost ten billion people on the planet in 2050 [66]. By 2019, the human footprint had reached 1.75 times the Earth's long-term carrying capacity. This means that around summertime every year the Earth's population has used up one entire planet's worth of natural resources. This day is called the 'world overshoot day' (see Figure 5.4) . This means we are moving towards an inability to sustain all human lives, disaster, as we deplete Earth's resources each year. As environmental resources, such as water, food, and ecosystems become scarcer, world population keeps growing, and the impacts of climate change increase, we are heading towards a grim future.
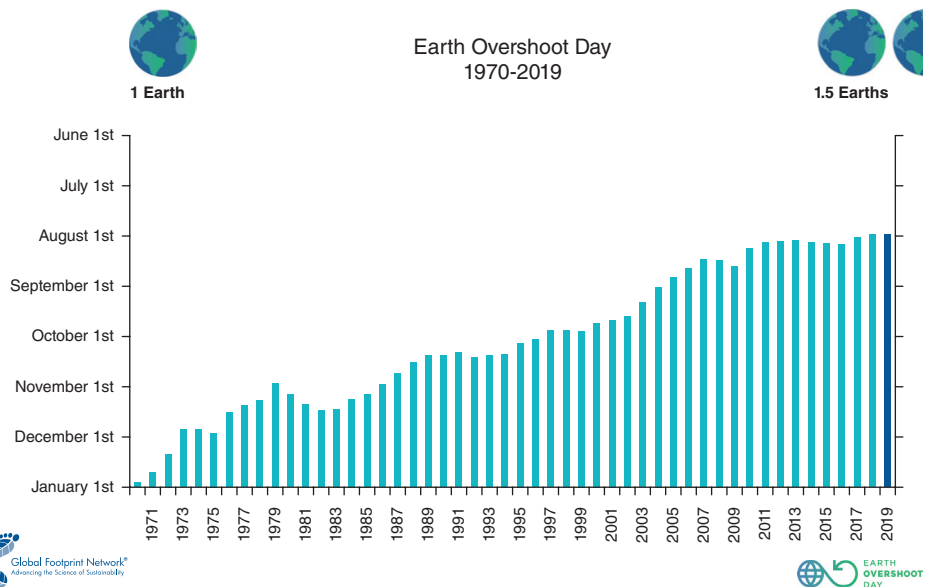

FIGURE 5.4   The development of humanity's footprint over time

SOURCE: Global Footprint Network www.footprintnetwork.org, Global Footprint Network National Footprint Accounts 2019

What is the outlook for the future? Many scenarios exist. For instance, the famous independent scientist James Lovelock is of the opinion that efforts to reach sustainable development, especially to stop climate change, are in vain. He believes society should prepare to survive the inevitable catastrophe, rather than try to stop it [67]. The WBCSD's Vision 2050 represents the other

extreme, in which ten billion people will be able to live sustainably within the planet's resource limits from 2050 onwards [66]. WBCSD suggests that the time from 2010 to 2020 could be called the 'turbulent teens', a time in which the path to sustainable development has become clear through much energy, dynamism, and activity in many levels of society. From 2020 to 2050, according to WBCSD, we are in a transition phase in which a constant change in all parts of society will happen and sustainable development will be reached. As illustrated in Figure 5.5, four future scenarios appear likely [68]:
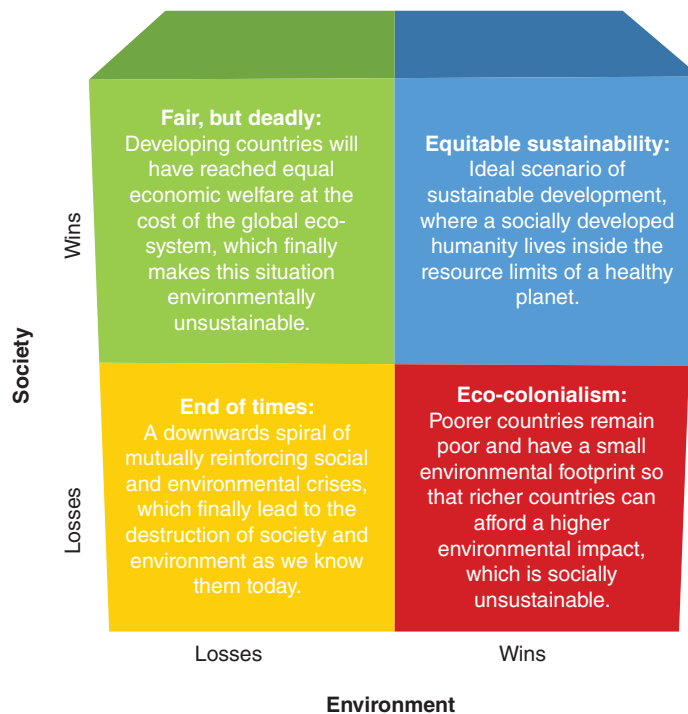

FIGURE 5.5   Scenarios of (un)sustainable global development

CREDIT: Slidemodel.com

An idealistic guide for action and an ultimate vision of what sustainability could look like is the 'Doughnut' model for sustainable development (see Figure 5.6) [69]. It suggests that there are two fundamental aspects we need to get right in order to achieve sustainable development. Sustainability, first, builds up on a social foundation of minimum human and humane needs (e.g. health, housing, equality, safety, and justice) that need to be fulfilled, while staying inside an ecological ceiling (e.g. stopping biodiversity loss, curbing freshwater withdrawals, and reversing ocean acidification). The model suggests that we have to avoid, or rather stop, two basic problems at all cost:

1. **Social shortfalls:** Repair the current shortfall in fulfilling the human/social needs and redistribute needs fulfillment more evenly across the planet, genders, and socio-economic groups.

2. **Environmental overshoot:** Stop our overshoot in terms of using up too much of our planet's resources to survive as humanity.

This can and has been translated to the individual level, or regional level. The city of Amsterdam was the first city adopting the Doughnut Economy approach. They use the Amsterdam City Doughnut as a policy development instrument. This includes economic policy affecting businesses and their management fundamentally [70] to align their responsible and sustainable management practices with both addressing humanistic shortfalls and environmental overshoots [71].
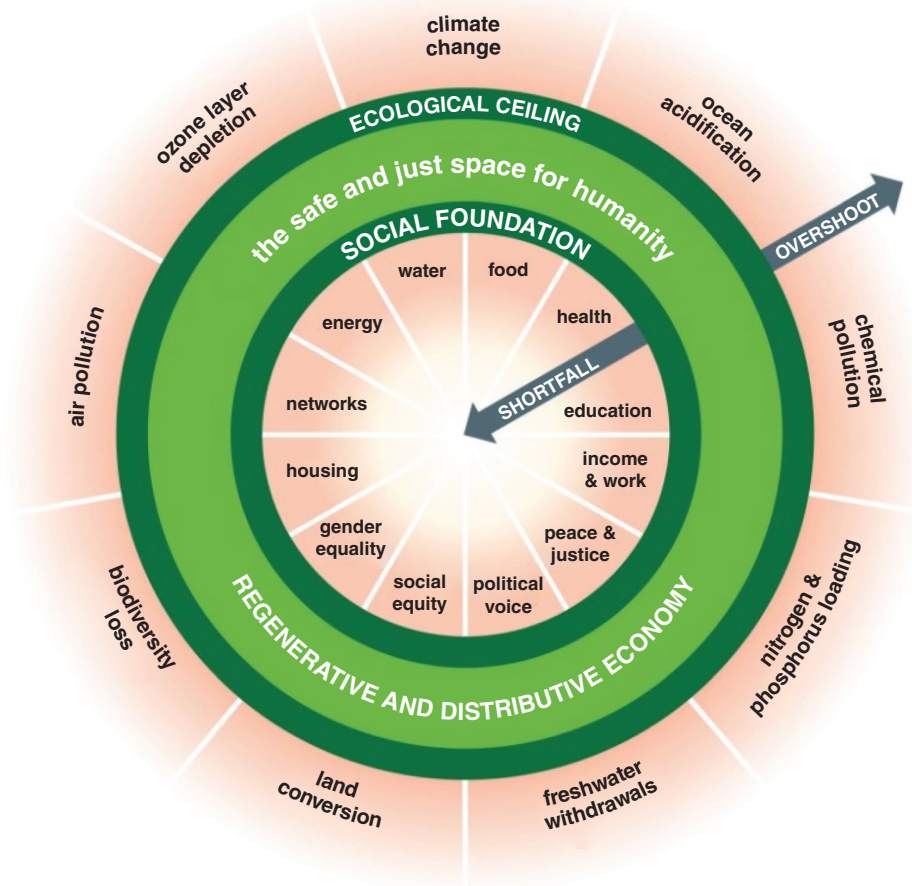

FIGURE 5.6   The Doughnut model of sustainable development

SOURCE: [69]

CONCEPTS OF SUSTAINABLE MANAGEMENT

The term sustainability has been a buzzword since the early 2000s. Unfortunately, the proliferation of a term does not necessarily increase its understanding. The report, *Our Common Future*, published by the United Nations World Commission on Environment and Development (WCED) [50] defines sustainable development as a development that 'meets the needs of the present, without compromising the needs of future generations'. This simple phrase implies much more than first meets the eye. The central term is intergenerational justice: What we do today must meet our needs and should not interfere with the needs of coming generations. We do not actually know what the needs of future generations are, so the only thing we can do is to abstain from destroying basic prerequisites for needs fulfilment, which serve as a basis for our offspring. Needs should also not be confused with superficial wants. We can assume that many of the amenities of 'modern' society rather serve to fulfil superficial wants, instead of profound needs, such as food, shelter, and belonging.

THE THREE DIMENSIONS OF SUSTAINABILITY

Sustainability at its core is about handling the three dimensions of environmental, social, and economic value. We will now discuss three main frameworks aimed at analysing these three dimensions.

Sustainability
describes the degree to which
a situation will maintain
(sustain) environmental,
social, and economic capital

As illustrated in Figure 5.7, in the left side's Venn diagram, truly sustainable development can only be reached if it was based on social, environmental, and economic co-development. If a country such as China focused on mainly economic and social development, such a development would be equitable (fairness between civil and private business sector), but neither be bearable nor viable. For example, the missing environmental development and quality has led to an unbearable amount of air pollution in China's major cities, and non-renewable resources would be used up. Economic growth will no longer be viable if those resources need to be bought at horrendous prices through external trade when internal, non-renewable resources have been used up completely.

The circle model has been translated into a less complex model of mutually interdependent pillars, all necessary to carry 'the roof' of sustainable development, as illustrated in the middle visual of Figure 5.7 [52]. The third visual in Figure 5.7 expresses how economic activity is limited to society's potential to consume and how society's growth in turn is limited to the planet's environmental resource base.
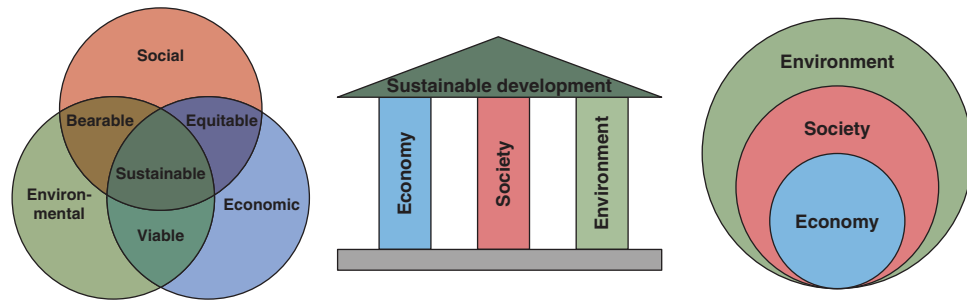
FIGURE 5.7   Models of the three dimensions of sustainable development [51, 52]

A deeper analysis can be reached by understanding the three dimensions as different types of capital. In simple terms, economic development is the increase of quality and quantity of financial capital. Social development implies an increase of quality and quantity of social capital, and environmental development an increase in quality and quantity of environmental capital. Accordingly, sustainable development must be development that increases all three types of capital simultaneously or at least does not decrease any of them [72].

- **Social capital** is value directly embodied in human beings. Social capital on the one hand comprises individual, so-called human capital, including knowledge, skills, values, physical health, and personal well-being. On the other hand social capital also comprises capital that is collectively created by interaction inside groups of human beings, such as joint values, culture, and collective welfare.

- **Environmental capital** (often called 'natural capital') comprises the amount of both renewable and non-renewable natural resources. Resources here should not be narrowly misunderstood as material production inputs, but also as non-material services provided by the natural environment such as recreational value, realized while enjoying nature or flower pollination by bees. A qualitative measure of environmental capital avoids the narrow, instrumental output focus by also considering the internally valuable characteristics of the biosphere, such as the resilience of ecosystems, or the richness of interconnections represented by high biodiversity.

- **Economic capital** can be expressed in monetary terms. It comprises tangible assets (often called 'man-made capital') such as machines or production facilities, intangible assets such as customer loyalty or brand value, and financial resources, such as cash flows or a certain revenue margin. Economic capital can be attributed to an individual company or to the economic system as a whole.

These three types of capital form the foundation of the triple bottom line business application of sustainability [55, 73], which we look at in more detail later in this chapter.

INTERPRETING SUSTAINABILITY

There is still much discussion on how to interpret sustainability and how to reach the sustainable development that is at the core of sustainable management. The following points represent typical opposing views [23, 74].

1. The **fragmentation versus holism** polarization [75] asks if sustainable development can be reached by solving sustainability problems in isolated systems. Economists make the economy sustainable, while sociologists make society sustainable, and ecologists the natural environment. Such a fragmented, siloed approach contrasts with a holistic approach where all three dimensions of sustainable development are considered one joint 'mother' system that can only be made sustainable if analyzed and changed holistically.

2. The **substitution versus complementation** polarization asks if we can actually substitute one type of capital for another. Environmental capital destroyed through pollution, for example, could be substituted through economic capital investment into a new technology that repairs the damage. A good example for substitutionary thinking is the famous macro-economist Robert Solow who stated that 'goods and services can be substituted one for another [and that] … sustainability doesn't require that any particular species of owl or any particular species of fish or any particular tract of forest to be preserved' [76]. The complementary perspective considers social, environmental and economic systems as a mutually reinforcing network of which all elements are important.

3. The **status quo versus change** polarization asks if sustainable development is achievable within the existing economic and social structures. Proponents of the status quo sustainability paradigm aim to reach sustainable development through incremental changes and increases in efficiency of the existing systems and structures. Change-based sustainability considers the existing systems inept and advocates drastic systemic changes to reach sustainable development.

4. The **masters versus equals** polarization asks if human beings should be owners and masters of nature or just an equal in the global ecosystem. The masters perspective is well-reflected by the quote, 'The world is made for man, not man for the world.' attributed to the father of modern science, Francis Bacon in the sixteenth century. The perspective of man as equals with other inhabitants of the Earth can be best described by the question 'If natural objects, such as animals, forests, and ecosystems, have rights of their own, should they be treated with responsibility and respect, similar to the way we treat other human beings?' [77].

These opposing views reflect the discourse between a weak and a strong sustainability paradigm (see Figure 5.8) [78, 79]. **Weak sustainability** aims at reaching sustainable development where management 'controls

Weak sustainability
a conformist, conservative, and uncritical approach to sustainable development

both the language and practice of sustainable development with its own, usually economic, interests, firmly to the fore' [80]. That is, management practices meet the needs of the business first. Weak sustainability is reflected by the respective first view in each of the opposing views presented above. Thus, weak sustainability in its most extreme form perceives management as mastering nature, aiming at achieving sustainability without changing existing systems and structures, considering social and environmental capital as substitutable, and believing that pursuing isolated economic, social, and environmental sustainability will result in globally sustainable development.

Strong sustainability instead takes unconventional stances and approaches to change, by criticizing and challenging existing beliefs and structures. This approach 'advocates that society cannot simply let economic activity result in a continual decline in the quality and functions of the environment and of life in general' [80]. Strong sustainability is reflected in the second term in each opposing view. Thus, strong sustainability in its most extreme form views humanity as equal to other living beings in the global ecosystem, and promotes disruptive systemic change, considers social and environmental capital as non-substitutable, and achieves sustainable development holistically. A strong sustainability movement that is increasingly translating into a 'new normal' is the global Extinction Rebellion. Their demands, such as declaring a global emergency, to act radically right now, achieve ecological justice, and values, such as regenerative culture, leaving our comfort zones, and challenging the toxic system, are spot-on examples for a strong sustainability stance [81].

The four opposing views mentioned in the preceding paragraphs serve to help us understand basic attitudes (weak or strong) towards sustainability. Besides these high-level views, it is important to also understand the practical considerations central to achieving sustainability. Figure 5.9 summarizes six important contrasting practical lines of thought.

Strong sustainability
an approach to sustainable development that takes unconventional stances and approaches to criticize, change, and to challenge existing beliefs and structures

As the failure of 'weak' politics and management 'as usual' to achieve effective change has become apparent, 'strong' sustainability thinking as demanded by Extinction Rebellion is becoming a mainstream attitude.

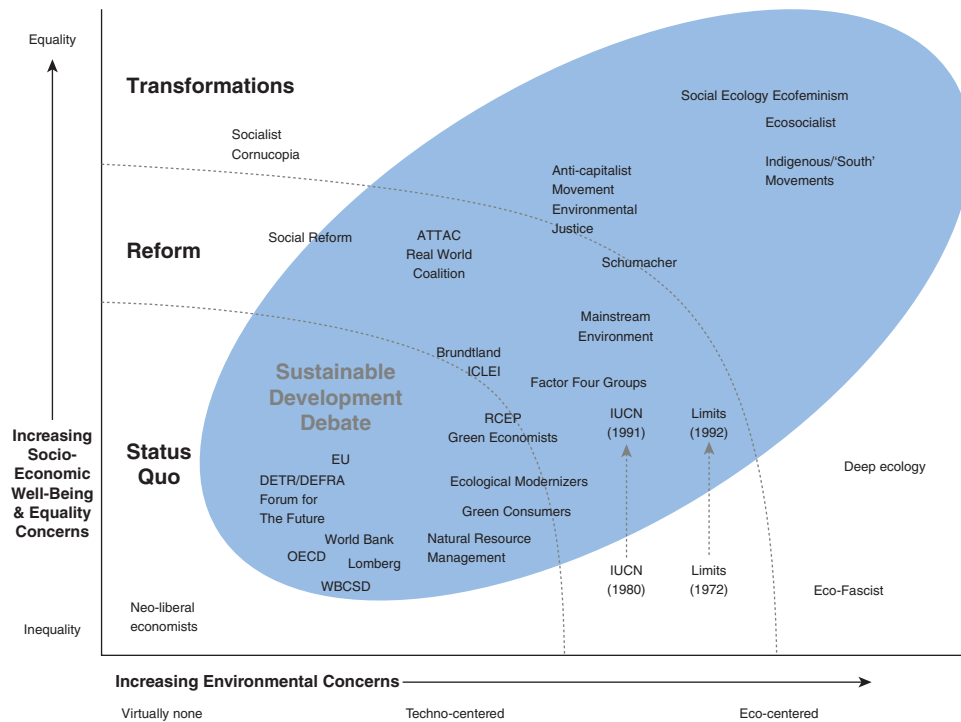'Rebellion Day: Brisbane' by larissawaters is marked with CC0 1.0

FIGURE 5.8   Weak and strong sustainability approaches. Reproduced with permission.

SOURCE: [82]

1. **Process or outcome:** Sustainability in common usage can be considered both the process of becoming sustainable and the aspired to end-state of being sustainable. Likewise, sustainable development can describe a development that leads to a sustainable situation or to the final outcome itself [83].

2. **Inter-generational or intra-generational justice:** Intergenerational justice is best described by the Brundtland Definition of sustainable development, i.e., a fair situation where both current and future generations can live a decent life. Critics have said that for a development process to be truly sustainable, there must be intra-generation justice or fairness among the people of the same generation. The term equitable development picks up on this social development component of sustainable development, which aims at fair development inside the same generation. Central topics are equality between genders and disadvantaged groups, and the fair distribution of wealth and welfare [74, 84].

3. **Short- or long-termism:** Short-term thinking in private life, business, and political life may not lead to sustainable outcomes. A long-term perspective should be adapted and best leads to sustainable future outcomes of behaviour.
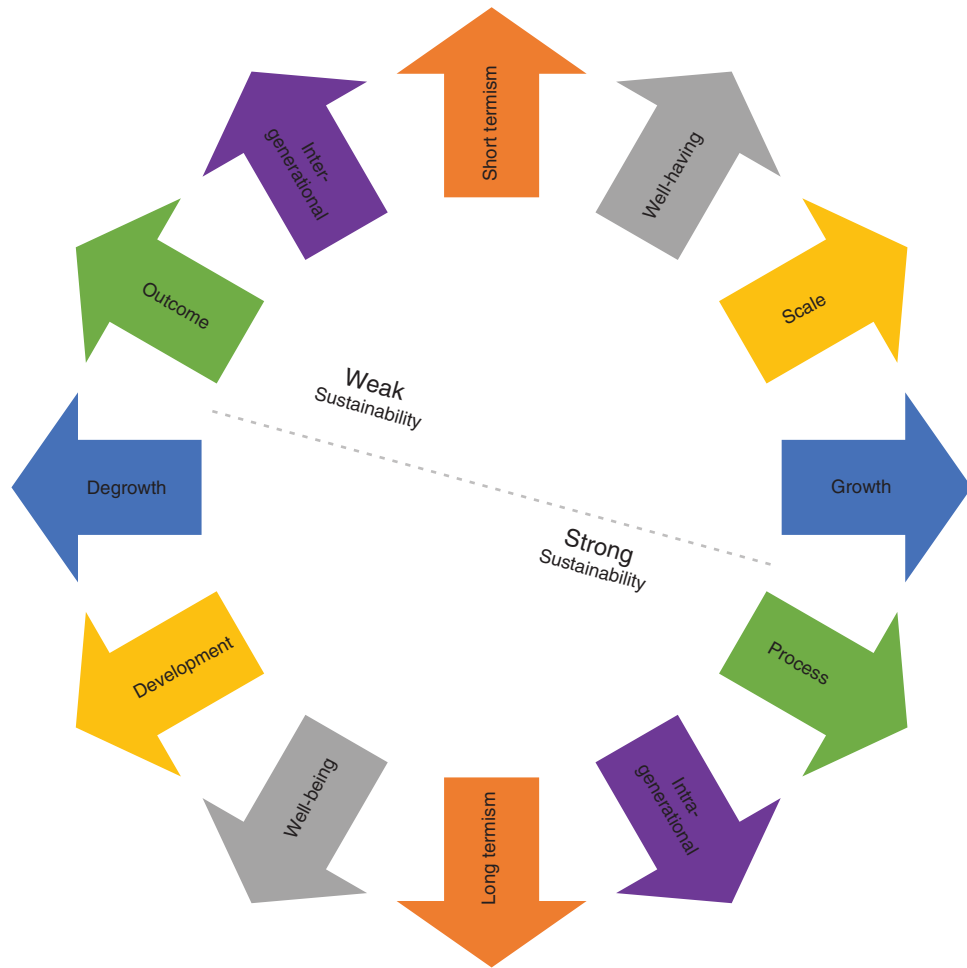
FIGURE 5.9   Contrasting considerations of sustainability

4. **Well-having or well-being:** One could argue that materialism, greed, and the quest for 'well-having' cannot be sustainable. Individual lifestyles should rather be driven by their intrinsic qualities and lifestyle improvement rather than a quest for quantitative gain of additional consumption opportunities [74, 85].

5. **Development or scale:** Sustainable development is often misunderstood narrowly as sustainable economic growth. A broader development perspective that improves quality of life instead of just quantity is more likely to result in sustainable development [86].

6. **Growth or de-growth:** Economic life is geared to growth. Growing GDP of countries and business revenue growth are unquestioned goals and paradigms. However, economic growth is limited by the boundaries of society's consumption power and growth, and by the Earth's resource limits. This fact has led to the discussion on how to achieve economic degrowth as a powerful tool to reach sustainability [86].

SECTORIAL SUSTAINABILITY FOOTPRINTS

Sectoral contributions to reaching global sustainability are perhaps intuitively understandable. As shown in Figure 5.11, we will reach global sustainability only if people live sustainable lifestyles, businesses are managed sustainably, and nations are governed sustainably. If just one level does not make a commitment to sustainable development, global sustainability is impossible [72].

But what commitment is needed to become sustainable? The **footprinting** methodology provides a clear answer: All 'entities', including people, organizations, and entire states, should not use up more environmental resources than the planet can reproduce. Footprinting also can establish single footprints for specific environmental impacts of management, such as a water footprint (e.g. water usage per product), or a CO_2 footprint (e.g. CO_2 emissions per employee). The footprinting methodology has not only been applied on the environmental dimension, but also on the social and economic dimensions. Management can for instance measure the social community impact (e.g. volunteering hours per employee) or the economic return (e.g. revenue per dollar spent) through footprints.

A specific type of footprint measures the relationship between the entity's resource usage and planetary resource reproduction. If a footprint corresponds to the planet's resource replenishing capacity, also called 'biocapacity', it is expressed with the number 1, meaning that exactly 'one planet is used' [87, 88]. The situation is neutrally **sustainable**. If the footprint is smaller than 1, less resource is used up than is replenished; the situation is restoratively sustainable or just **restorative.** An example is Cargill's watershed restoration efforts mentioned earlier in this chapter. If more natural capital is used up than the biosphere can replenish, the footprint is greater than 1, and the situation is **unsustainable**. Accordingly, each entity must achieve a footprint of one or lower to reach a sustainable situation in any of those three sectors.

As illustrated in Figure 5.10, most developed countries far exceed the biocapacity of their national territories with a tendency to worsen the situation by reducing their biocapacity through environmental depletion and increasing their impact through growing consumption [89].

In spite of large-scale footprinting initiatives, like the Carbon Disclosure Project [90], the footprint of the business sector is less well documented. However, the general consensus is that truly sustainable businesses management is still an utopia. The crucial question to change this unsatisfactory situation is: What tools does each sector need to become sustainable? For the governmental sector, shaping public policies for sustainability is crucial to reach sustainable governance. The private sector's efforts must be centred on the development of sustainable lifestyle practices (sustainable living) and the business sector must manage the life-cycle of their products so that the

A footprint
sums up one or several types of environmental, social or economic impacts for one pre-defined entity

Sustainable
resource usage and reproduction rate are equal

Restorative
fewer resources are used up than reproduced

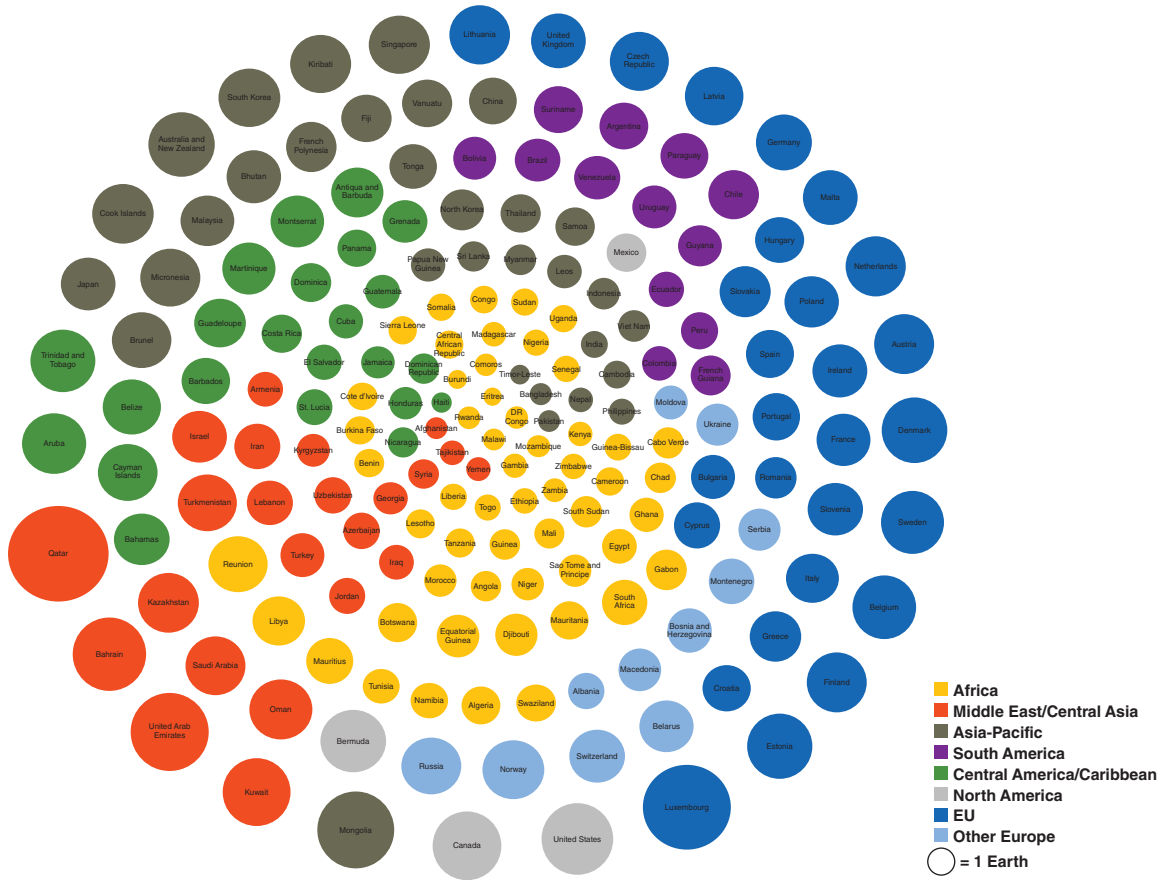**Unsustainable**
resource usage exceeds the resource reproduction rate

FIGURE 5.10   How many Earths do we need if the world's population lived like…

SOURCE: Global Footprint Network www.footprintnetwork.org

Acting sustainably in the most unusual situation, during COVID and while getting married.

overall social, environmental, and economic impact becomes either neutral or restorative (sustainable management).

A great example of how different sectors interact in sustainability is that of Rebecca and Neil who thought of social and environmental sustainability when they got married during the Coronavirus crisis. The couple had taken seriously the UK government's social distancing advice (social sustainability) while ensuring to not add more plastic waste to the environment (environmental sustainability). This was made possible by the

REELshield Flip Visors produced by the social enterprise Plastic Free Planet. The visors are made from Forest Stewardship Council certified paper board and cellulose from wood pulp for the clear, mist-free screen, making them both recyclable and home compostable. Rebecca explains that 'especially after lockdown, our wedding was an opportunity to create a positive new normal and to be more environmentally conscious in our decision making,' said Rebecca [91].
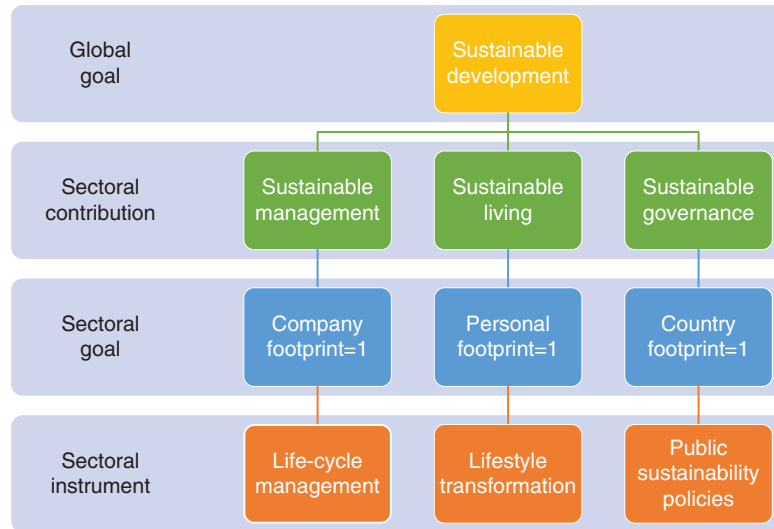

FIGURE 5.11   Sectoral contributions to sustainability

TRIPLE BOTTOM LINE MANAGEMENT

Management at Innocent Drinks claims their mission is to 'strive to do business in a more enlightened way, where we take responsibility for the impact of our business on society and the environment, aiming to move these impacts from negative to neutral or (better still) positive. It's part of our quest to become a truly sustainable business where we have a net positive effect on the wonderful world around us' [92]. The statement embodies what **triple bottom line management** in a business means. They provide the perfect definition, including a 'net positive impact' and defining the key measurement tool, the triple bottom line, as 'business, society and environment'. In order to measure the triple bottom line, sustainability management has to consider all three impacts made, or as they put it, to 'take responsibility for the impact of our business'. Management must measure and manage all impacts in order to create a neutral to the positive triple bottom line of social, environmental, and economic impacts.

Triple bottom line management comprises practices influencing environmental, social, and economic bottom lines in order to reach a neutral or positive triple bottom line

THE GOAL: A NEUTRAL TO POSITIVE TRIPLE BOTTOM LINE

Triple bottom line
refers to combined
social, environmental
and economic value

The **triple bottom line** (also TBL or 3BL) of environmental, social, and economic value is often paraphrased as the three Ps of sustainability, Planet, People, Profit [55, 73, 93]. When management assesses the triple bottom line, how will they know if their practice is sustainable? The following three types of management link different triple bottom line results to the classifications of unsustainable, sustainable, and restorative management [72].

1. **Below-average unsustainable** management exerts a negative net-triple bottom line impact on environment, society, and economy, which is below the one of similar peers.

2. **Average-unsustainable management** exerts a net negative triple bottom line impact that corresponds to the normal impact of similar peers.

3. **Sustainable management** exerts a small net negative triple bottom line impact that does not exceed the planetary systems' restorative capacity.

4. **Neutral impact management** exerts a neutral net triple bottom line.

5. **Restorative management** exerts a net positive triple bottom line impact, which means it replenishes at least one type of capital, while not depleting any of the other ones.

Does this mean that, for instance, a management practice that is highly profitable, socially neutral, and only 'a little bad' for the environment is sustainable or maybe even restorative? To be truly sustainable or restorative, management must be sustainable in each of the three dimensions. As an example, imagine a management practice that is good to all its stakeholders and has reached a situation where its environmental impact is neutral. The business is socially restorative and environmentally sustainable. Unfortunately, the management practice was too costly and therefore not economically sustainable, which makes it overall an unsustainable management practice. This argument holds true in many scenarios and leads us to the two main meta-tasks of sustainability management, balancing and sustaining all three types of capital [72].

Figure 5.12 stresses the importance of balancing and sustaining when managing the three capitals. When management does not sustain one type of capital, it threatens the overall sustainability of management activities. Not sustaining social capital may cause a situation in which social groups start actively opposing management. For example, labour union protests triggered by exploitative (not socially sustaining) management practice. Also, the lack of balance among the three capitals causes problems due to mutual interdependence. Balancing here refers to creating a mutually reinforcing co-development of social, environmental, and economic capital or to protect from the
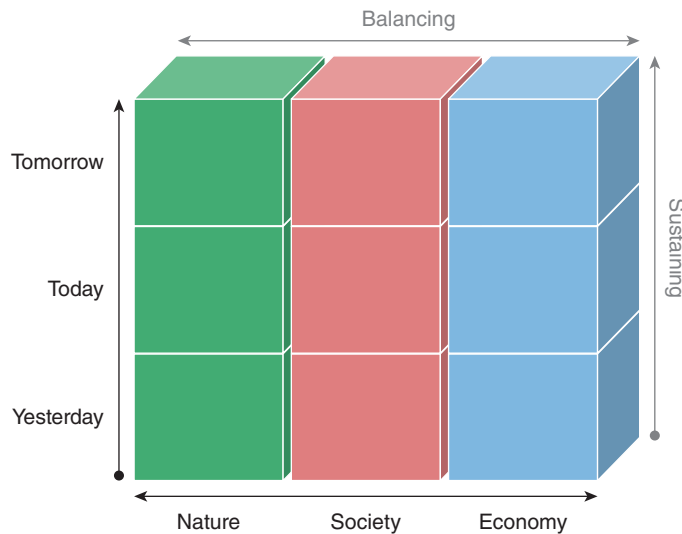
FIGURE 5.12 Sustainable management as balancing and sustaining the three capitals

SOURCE: Adapted from [94]

favouring of one capital at the expense of others, and to making trade-offs when necessary. The final goal is to create what John Elkington [95] calls a triple win or win–win–win situation for business, society, and environment.

In this section, we examine closely how to manage in order to create a positive or even restorative triple bottom line, which requires managing **impacts** across the three dimensions of the triple bottom line management. Sustainable management in practice is about accounting and managing positive or negative environmental, social, and economic impacts. Impacts should then add up to a neutral or positive triple bottom line. The next sections then introduce tools for assessing impacts and provide guidance on impact management for the good of environment, society, and economy.

Impact
a negative or positive environmental, social, or economic value created

IMPACT ASSESSMENT

The triple bottom line has been criticized as a mere 'article of faith', 'vague, confused and often contradictory' [96]. Accounting for just the economic bottom line can be difficult, and has led to a number of business scandals. Accounting for the three interconnected bottom lines is a highly complex task.

In this section, we examine appropriate tools to assess the triple bottom line. These help to make social and environmental facts more manageable. We also provide an overview of social and environmental indicators and describe a toolbox of methods for 'making sustainable development operational' [97]. Chapter 18 ('Accounting and Controlling') will look at these indicators in greater detail.

7 AFFORDABLE AND CLEAN ENERGY

LIFE-CYCLE ASSESSMENT AND IMPACT INVENTORY

Before impacts can be managed, it is necessary to map them. The product life-cycle model illustrated in Figure 5.13 can be used to provide a complete overview of impacts at all stages, from the extraction of the first raw material and sourcing of first inputs to the end of the product's or service's useful life. **Life-cycle assessment** enables us to sum up different impacts across stages of the life-cycle in even complex cases. Imagine, for instance, management at ISCC, who, on the one hand, power their operations (production stage) with an impressive solar power plant, while mining coal, one of the most polluting forms of energy generation (use stage of the coal life-cycle) [98].

Management need to map and measure environmental, social, and economic impacts through all stages of the life-cycle. The final goal of this

The Indian Singareni Collieries Company (ISCC) have set up solar power plants to fuel their coal mining operations: 'Oh sweet irony!'

'File:The Singareni Collieries Company Limited.png' by Pashamohammad444 is licensed under CC BY-SA 4.0
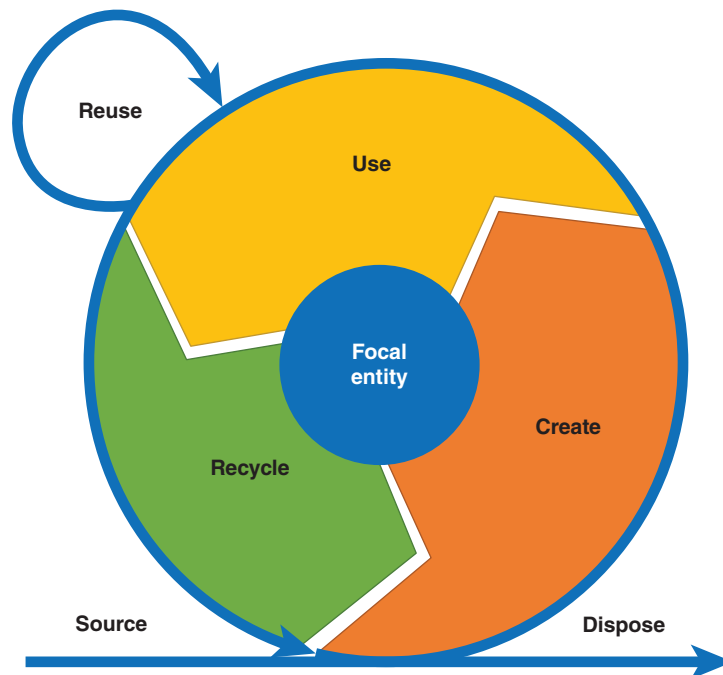

FIGURE 5.13   The life-cycle model

CREDIT: Slidemodel.com

mapping process is to establish a complete **life-cycle impact inventory**, summing up all impacts for all products and services a company offers. Table 5.1 provides an inventory of exemplary impacts throughout the three stages and the three impact types, exemplified by Samsung Electronics [99].

Life-cycle impact inventory
an extensive list of a company's impacts. This list results from a cumulative life-cycle assessment, summing up all impacts of a business along with all products and services in its portfolio

**TABLE 5.1** Exemplary company life-cycle-impact[1] portfolio for Samsung Electronics [99]

	Social	Environmental	Economic
Production	Employee education of 29,300 people, with an average of 87 hours per person and education cost of 977 USD per person.	'Reduction in GHG emission (relative to sales) by 31 per cent from the level in 2008' resulting in 5.11 tons of CO_2 per 88,800 USD [100,000 KRW] revenue.	Direct economic value creation of 130 billion USD out of which 99 billion USD have been redistributed to suppliers, 12 billion USD to employees; and the remainder reinvested or distributed to other stakeholders.
Use	Total customer enquiries and complaints accounted for 57 million.	Ratio of eco-products is 91 per cent of Samsung's of the company's products that were classified as eco-products with above average performance in material reduction, energy usage, and toxicity.	Economic savings for clients through energy savings were between 17 per cent and 88 per cent. A price ceiling on repairs of products stimulates longer product usage through incentives for repairs and savings.
End-of-useful lifetime	100 per cent PVC/BFR free laptop models. Those chemical substances otherwise would result in toxic waste, harmful for human health [100].	Through an end-of-life, take back scheme, 1.06 million mobile phones have been recovered in Korea. Samsung has over 2000 collection points in 61 countries.	In-kind donations of used electronic products for low-income communities increased the community's economic capital.

A company's overall life-cycle assessment is an accumulative measure of the company's products' and services life-cycles.[2] Life-cycle assessment (LCA) was traditionally applied to understand environmental impacts. However, it has been broadened to take into account environmental, social, and economic impact in the sustainability management context [37, 101, 102].

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[1]Many of the impacts mentioned in this table are relative impacts expressed in percentages. For the purpose of establishing a company's triple bottom line, total impacts expressed through sums are preferable.

[2]Life-cycle assessment can be conducted for both products and services. For the sake of simplicity, we will use the word 'product' to jointly refer to products and services.
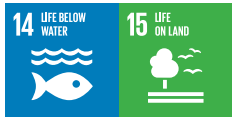
- Typical impacts summarized through an **environmental life-cycle assessment** (ELCA) are impacts on water, air quality, and biodiversity.

- The assessment of economic factors is often called **life-cycle costing** (LCC). It might include the amount of wages paid, economic value added or profit made per life-cycle stage.

- Assessing social life-cycle impacts through a **social life-cycle assessment** (SLCA) may require a more complex effort for developing measurable indicators than the first two categories. A valuable support for identifying these indicators are the Global Reporting Initiative and the Dow Jones Sustainability Index [103]. Social life-cycle assessment is an emerging tool crucially important for including the social dimension into sustainable management [104–106].

The process of life-cycle assessment can be subdivided into the following stages (see Figure 5.14) [107–109].
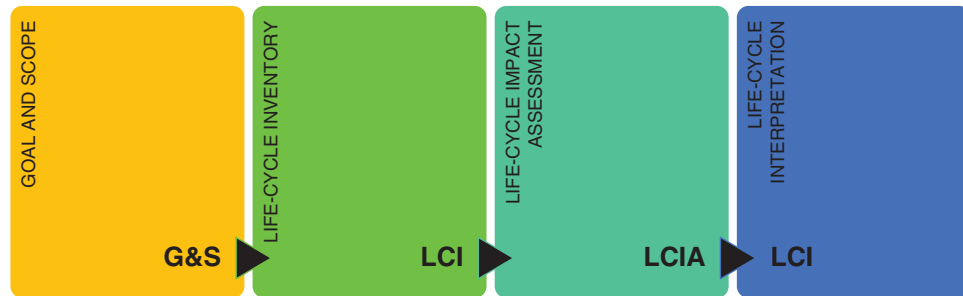

FIGURE 5.14   Stages of the life-cycle assessment process

1. Defining **goal and scope (G&S)** of LCA first serves to develop a deep understanding of why the LCA is conducted. In the context of sustainable management, the primary goal should be a complete description of all environmental, social, and economic impacts as a basis for subsequent management activities. A secondary goal might also be to create comparability to other products or alternative practices. For example, a company might consider substituting petroleum-based diesel with biodiesel in its processes, and it needs to compare the triple bottom line of both products before making a decision to improve their sustainability performance. Another secondary goal might be external communication purposes and the creation of transparency about the company's impacts. Defining the scope of the assessment involves defining the product system to be analysed and setting the boundaries of the LCA, which define the parts of the system that will be included into the assessment. Figure 5.15 illustrates how the three life-cycle stages can be divided into functional units, which together form the product system. The overall production process runs through the functional units of extraction, supply, manufacturing, distribution, and retailing. The use stage can be divided into first

use and following secondary uses. At the product end-of-life, the functional units are either disposal or the revalorization of the product, which re-integrates the product into previous life-cycle stages. The scope of a life-cycle assessment defines which of those stages will be included and in what detail. The ideal scope for a maximum quality sustainable management would be a complete inclusion of all functions in the greatest depth possible.
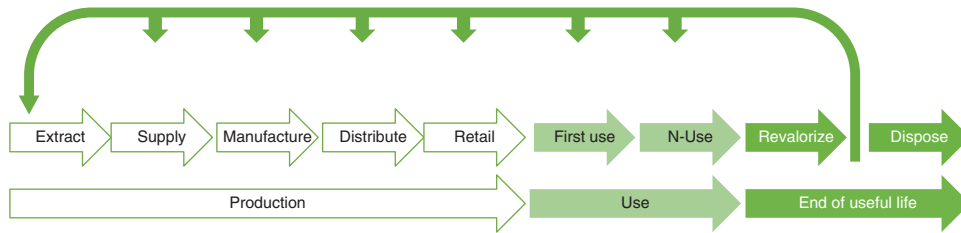

FIGURE 5.15   Interconnectedness of a supply chain and a life-cycle's product system

2. A **life-cycle inventory (LCI)** serves to quantify all inputs and outputs of the product's life-cycle. This inventory consists of the three stages of data collection, data calculation, and the allocation of flows and releases. Central to the stage of data collection is the development and measurement of quantifiable indicators for inputs and outputs in all three dimensions. Inputs are, for instance, the amount of water used (environmental), the number of employees (social), and the capital invested (economic). Related examples for output are the water quality after the production process (environmental), employee well-being (social), and the profit made (economic). At the stage of data calculation the measurements made are related to specific process and functional units. Few processes result in only one product output. Therefore, the allocation of flows and releases to respective products in processes helps to reach a clear picture of the impact of a single product or service.

3. The stage of conducting a **life-cycle impact assessment (LCIA)** serves to evaluate the significance of impacts listed in the inventory and organizes them for analysis and management purposes. Impacts at this stage refer to real-life outcomes caused by the life-cycle. Figure 5.16 illustrates different types of data organization. For instance, sustainable management might need to specify the product's 'water footprint'. A company could plan to use the economic savings generated from a new energy efficient product as a sales argument, and therefore it needs to know the single impact of 'economic savings per customer'. The company could plan to fundamentally redesign the product's end-of-life and require understanding of the 'end-of-use impact' in all three dimensions. LCIA pursues the final goal of categorizing life-cycle inventory data by their importance. Importance can depend

on the size of the impact, the negative or positive external consequences of the impact or also its instrumental value for the business.
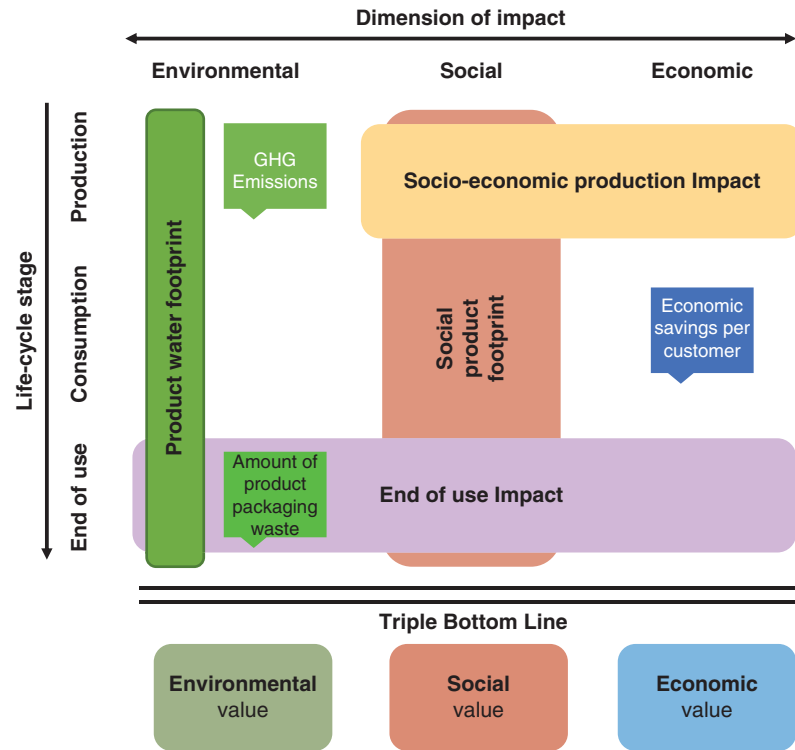
Dimension of impact

Environmental   **Social**   **Economic**

GHG Emissions

Socio-economic production Impact

Product water footprint

Social product footprint

Economic savings per customer

Amount of product packaging waste

End of use Impact

Life-cycle stage: Production / Consumption / End of use

Triple Bottom Line

| **Environmental** value | **Social** value | **Economic** value |

FIGURE 5.16   Exemplary application of impact assessment, life-cycle management, and footprints

4. **Life-cycle interpretation (LCI)** is the connecting element between life-cycle assessment and impact management. At the interpretation stage, the task is to plan actions based on the outcomes of the life-cycle process.

IMPACT MANAGEMENT

The management of environmental, social, and economic impacts is based on a sound life-cycle assessment. It is the core task of sustainable management. The basic goal of impact management must be centred on the aspiration of achieving sustainable or restorative outcomes of management activity. Similar to financial performance, the cumulative triple bottom line of all activities adds up to its sustainability performance. Thus, any person in the company should base their actions on the following simple set of principles:

- **Optimize triple bottom line impacts** to move towards sustainability. Optimizing impacts does not always mean reducing negative and increasing positive impacts. A company that is highly profitable (positive economic impact) might be so at the cost of its social and environmental bottom lines. In this case the company should actually re-invest the positive economic bottom line into boosting the social and environmental bottom lines.

- **Eliminate waste** in whatever form. Wasting resources will result in an unnecessary loss of environmental, social, and economic capital and automatically reduces triple bottom line performance.

- **Scale** your sustainable management practices to have a larger impact. Grow your own activities and inspire others to share your good practices inside and outside your business.

Whenever sustainable management practices are based on a sound life-cycle analysis and a systemic understanding of environmental, social, and economic dimensions of sustainable development, they enable the manager to make a lasting impact for the best of planet, people, and profit.

PRINCIPLES OF SUSTAINABLE MANAGEMENT

I. **Sustainable development** is a development that meets the needs of present generations without compromising the needs of future generations.

II. **Sectoral sustainability** is a necessary precondition to reach sustainable development. The three sectoral sustainability goals are sustainable management, sustainable living, and sustainable governance.

III. **Three types of capital** have to be sustained and balanced in order to reach sustainable development: Environmental, social, and economic capital. Those three capitals comprise elements measured by the triple bottom line.

IV. The **triple bottom line** sums up all environmental, social, and economic impacts of an activity.

V. **Unsustainable management** has a negative triple bottom line; **sustainable management** is neutral; and a **restorative management** has a positive triple bottom line.

VI. **Sustainable management** is the process of managing in a way that reaches a neutral or positive triple bottom line.

VII. The **process of sustainable management** is based on the tool of product life-cycle impact management and can be subdivided into two main activities of impact assessment and impact management.

VIII. Product **life-cycle impact management** administers all environmental, social, and economic impacts of a product or service through the stages of production, use, and end-of useful product life.

IX. The **stages of life-cycle impact management** are 1) goal and scope definition, 2) life-cycle inventory, 3) life-cycle impact assessment, and 4) life-cycle interpretation.

MANAGEMENT GYM: TRAINING YOUR PROFESSIONAL SIX-PACK

Knowing

1. Dig for stories! Look up some ancient stories about sustainable and unsustainable practices and identify something we can learn from them about sustainable management.

2. Prepare a mindmap that interrelates the following terms: Triple bottom line, sectoral sustainability, sustainable management, restorative management, and life-cycle assessment.

3. Look up detailed information on the nine planetary boundaries. You might want to explore how management practice impacts on these boundaries (e.g. *Journal of Management Studies* article by Gail Whiteman and colleagues [56]). You might also want to explore how the planetary boundaries relate to the United Nations Sustainable Development Goals (SDGs) featured in the first chapter of this book.

Thinking

4. Engage in 'group think' with two other people by together drawing a 'rich picture' (see how to do this online) that describes a major sustainability issue, all of its interrelations and impacts now and later, here and elsewhere.

5. We have presented Interface as company pioneering sustainable management practices. However, in early 2020 they had let go their CEO who in his role had engaged in sustainable management due to some ethical misconduct, which had been revealed through a whistleblowing employee (the entire story is online). Use this example as a reflection about how ethics, responsibility, and sustainability need to come together to be a truly professional manager.

6. Compare two products of two different brands by assessing their main triple bottom line impacts. Decide which of the two products is the more sustainable one by ranking both products on a scale between 0 (highly unsustainable) and 10 (highly restorative).

Acting

7. Prepare a life-cycle assessment for one product that you use frequently and identify one environmental, social, and economic impact per life-cycle stage. Research online if necessary.

8. Innovative paper-like materials like 'stone paper' (also called mineral paper) and Npulp (also called straw paper) have recently been presented as a more sustainable alternative to 'normal' paper. Imagine, you are a representative of a major recycled paper maker and have to analyse what competitive threat this new material poses to you. Your line manager tasks you with writing a one-page briefing answering the question: In which part of the life-cycle are these innovations better than normal recycled paper, and in which parts worse?

9. Prepare the sustainability product portfolio of one company of your choice. Prepare a one-page proposal for how to make one product of the portfolio an environmentally restorative product.

Interacting

10. Together with someone else, watch and critically discuss a clip titled 'The story of stuff' available online. It illustrates a high-speed life-cycle assessment of our main production and consumption practices.

11. Look up three terms you are interested in the online 'Sustainability Dictionary' (http://sustainabilitydictionary.com/), Wikipedia, or a similar online resource. Suggest an improvement to at least one definition using the site's comment back function.

12. Get in touch with a company of your choice to explain an idea for a more sustainable management practice. You can do so through hotlines, online contact forms, or the contact provided in the company's sustainability report. Document their reaction.

(Continued)

Being	Becoming
13. So who are you? Evaluate yourself. Are you rather a proponent of strong or of weak sustainability? Go through the four categories and try to define your personal stance on each.	16. Close your eyes and imagine a restorative management practice that you could engage in. Watch yourself doing this practice. What would it entail? What would it feel like to engage in? How would others react? What kind of support or resistance do you think you would encounter?
14. Imagine a typical Tuesday in your life in the year 2050, from waking up until you go back to bed. Where and how do you live? How do you work? How do you move around? Whom do you spend your time with? What does the environment look like? What are typical challenges and how do you tackle them? How have your work and/or private practices changed?	17. Use an online footprinting tool to assess a personal footprint, such as your modern slavery footprint, CO_2 footprint, or water footprint. How would your personal practices need to change in order to halve this footprint?
15. How does it make you feel to think about the consequences of climate change? How do you think it makes others feel, for instance, a Somalian fisherman, a middle-level manager in a petroleum business, or an Australian seven-year old?	18. How do you feel about your available job choices in relationship to their impact on sustainable development? Do you feel like you can actually pick a job in which you can be a sustainable manager, or do you feel you have no other choice than being an 'unsustainable' manager in your next job? What practices or tactics could you engage in, in order to be able to engage in sustainable management?

SOURCE: Adapted from [110]

PIONEER INTERVIEW
JOHN ELKINGTON

INTERVIEWER: OLIVER LAASCH

John Elkington arguably is the most influential pioneer of the sustainable management movement and the creator of powerful ideas, including the triple bottom line.

The breakthrough wave? In some parts of the world, that last wave will never come; elsewhere it may be achieved for short periods of time, then lost. Sustainability is a dynamic state, a resolution of forces in tension, so depends on the quality of leadership (and followership/implementation) over time. Fundamentally, it is a cultural (and civilizational) challenge. Changing mindsets does not guarantee the necessary changes in behaviour, and the cultures that lock in unsustainable behaviours may require a paradigm shift to change

(Continued)

sufficiently. We think a fifth, Breakthrough wave will begin to build within 2–3 years and peak around 2020–2022. It will likely be driven by growing frustrations with the failures and weaknesses of current CSR, SRI and similar agendas.[3]

Zeronauts. Zeroing is possible for any company, any industry, in the sense that 'the impossible takes a little longer', as the US Army Corps of Engineers used to say. But it depends on a timely alignment of drivers and on leadership. At a time when most leaders are defensive or incremental in this space, and elsewhere, the chances are that breakthrough change will come in fits and starts. Zero-based targets help jolt leaders and C-suites out of complacency – and need well-designed financial incentives and recognition-based rewards (and penalties) to sustain the necessary levels of change.

Unreasonable people. The point is, as the playwright George Bernard Shaw put it, reasonable people adapt themselves to the world as they find it, whereas unreasonable people can imagine a different world, different realities. So in the early stages, anyone who aims to change the system in which people currently operate is going to be seen as unreasonable. Our future depends on the success of the more positive among them.

Mind the gatekeepers. I am answering this set of questions on a Eurostar train to Paris, for a session organised by the supply chain management firm EcoVadis for a growing group of major corporate customers. Such organizations are helping to drive triple bottom line considerations through supply chains, as are market gatekeepers like Wal-Mart with its 'Sustainability Index' and Marks & Spencer with its 'Plan A'. One of the most interesting recent initiatives has been the Zero Discharge of Hazardous Chemicals platform, catalysed by Greenpeace's 'Detox' campaign, and now involving a growing range of manufacturers, retailers and others in driving a major detoxification process through their supply chains into China.

Unreasonable leaders for systems change. We need all sorts of innovation for sustainable business. Clayton Christensen talks in terms of enabling, sustaining and efficiency forms of innovation, all of which have a role to play here. But we are at a point in all of this where incremental innovation must increasingly give way (or lead) to innovation that drives the necessary system change. Which is where unreasonable leaders come in again.

Watch this space! This is an agenda we tackle in our report, 'Breakthrough: Business Leaders, Market Revolutions', and in a book with former PUMA CEO Jochen Zeitz, called *Tomorrow's Bottom Line*.

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[3]This interview was conducted in 2013.

(Continued)

QUESTIONS

1. What do you think John means with breakthrough waves, paradigm shifts, and systems change? How do those terms belong together in the sustainability context? How might these relate to the four scenarios mentioned early on in this chapter?

2. Have a look at John's publications over time, as books, and ones from his consultancies SustainaAbility and Volans. Use them to understand how sustainability topics have developed and changed over time. Try to make a list of terms he has coined, such as the 'triple bottom line', which is the one he is probably most famous for.

3. John talks about profiles of 'Zeronauts', gatekeepers, and unreasonable people. What kind of profiles and personal characteristics do you think a sustainability leader needs to have nowadays? What would you call them?

4. At the time this interview was conducted in 2013 John forecasted that the breakthrough wave of sustainability would arrive in the early 2020s. Do you think this has happened yet? Will it happen?

PRACTITIONER PROFILE
JUDITH RUPPERT

My name is Judith Ruppert and I am an environmental consultant at 360 Environmental, a Western Australian environmental management consultancy. We provide a wide range of environmental services, including carbon and

Courtesy of Judith Ruppert

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energy management, impact, site and contamination assessments, flora and fauna surveys, compliance reporting, and environmental monitoring and training. After a Bachelor of Business at Goethe University in Frankfurt Germany, I did a Master of Environmental Policy and Management at Lincoln University in New Zealand.

My responsibilities. I am responsible for undertaking environmental impact assessments (EIA), developing and implementing environmental management plans, conducting audits and managing and reducing our clients' carbon footprint. I also ensure our clients comply with relevant environmental legislation and help them prepare compliance documents for submission to the Environmental Protection Agency. I also develop, organize and present environmental training workshops to enhance environmental awareness throughout a company. Apart from the typical office work, I also go out into the field and do fauna surveys to assess the impact of projects on conservation significant species.

A typical day at work. For an EIA, for example, I do background research about the site I am assessing, which includes finding out about the, for example, biological, hydrological, geological, and social/cultural situation onsite. I then do a risk assessment, analysing the probability and potential consequences of the project. After that, I would give recommendations on how to mitigate potential adverse effects. For more business related topics, I would do research on different ways of improving energy efficiency and reducing carbon or water footprints. I'd then put together a management plan and a presentation and liaise with the client on how to best convey the message to employees. There are of course also more mundane tasks to do such as doing data entry, reviewing energy or carbon data and making sure everything is on track and compliant. When I'm out in the field, I would walk through environmentally sensitive areas, counting animal scat or finding tracks and nests to be able to assess the likely occurrence of a species.

Juggling bottom lines. Our business is based on the triple bottom line, in fact our slogan is people, planet, profit. Every day we have to juggle the economic interests of our clients with the environmental and social impacts of a big infrastructure, mining or oil and gas projects. Especially in Australia where the resource sector is a major part of the economy, environmental and social impacts are often significant. Also, given the fact that many projects in Western Australia affect indigenous communities, which represents a whole different level of social impacts than the usual neighbouring properties issue. As environmental practitioners, we have the responsibility to protect the environment as good as possible while not stifling the national resource

(Continued)

industry, which in some situations is a big challenge. Barrow Island for example is a class A Nature Reserve off the coast of northern Western Australia, which now has LNG and oil being extracted from it – probably one of the most controversial projects in Australia, which requires a balance act between economic and environmental interests.

Here's an example. When working with clients on increasing their energy efficiency and reducing their carbon footprint, decisions are based on environmental and moreover financial factors. With one client, who had numerous car yards around Australia and also owned a refrigerated truck/logistics company, I had to work viable energy efficiency opportunities. In this specific case, we had seven different opportunities identified: from staging compressor loads so the big compressor was only used during peak hours, to upgrading to more energy efficient equipment, to changing their entire lighting system. I first calculated their energy cost savings over the life of the project and then subtracted the sum of the initial investment cost, the ongoing maintenance cost over the life of the project, the cost of assessment and other compliance costs. I then divided that number by the number of project years, which enabled me to compare the seven net annual savings.

The initial investment cost included e.g. the cost of buying a new compressor or more fuel-efficient trucks while maintenance cost covered all cost arising when e.g. servicing the new equipment etc. Costs of assessment typically include consultant fees, energy consumption metering cost or time spent by staff members to collect data or communicate outcomes. Compliance costs cover all fees occurring through hiring consultants to write compliance reports or internal staff time when liaising with the external consultant.

Although this approach does not take into account the depreciation over time, it yet gave us an indication of which project was the most financially viable. For companies who have to report under the Australian Clean Energy Mechanism (Carbon Tax), factoring in carbon liabilities with \$23 per ton CO_2 would be an addition to the above-mentioned calculation. However, for this approach, energy consumption has to be converted into CO_2 emissions before financial burdens can be calculated.

Use the business-speak wisely! When talking to decision-makers you rarely encounter people with an environmental or CSR background – you more likely talk to business-minded people. In this case it is crucial to use an approach that is using business-speak when trying to convince your client why they should spend a

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lot of money for something that is not part of their core business. Good indicators to use are figures around return on investment (ROI), cost savings, decreased legal liabilities, enhanced reputation amongst the public, and increase in sales etc. However, it always depends on who you are talking to – don't play the hard business person when talking to very environmentally and socially aware people – motivate them with passion. In contrast to that, don't talk about hugging trees when talking to the CFO of a business. Appealing to people's emotions is great, but backing it up with numbers often helps projects getting realized.

Navigating trade-offs. The main challenge being an environmental consultant is the balance act between the triple bottom line factors: ideally, you want to achieve the best environmental and social outcomes possible, but this is often being stifled by economic and especially financial interests. As the market is very competitive in Western Australia, the project budgets are usually very tight, which often leads to decisions based on 'best information available' and 'the best solution for the resource industry' rather than the best outcomes for the environment and indigenous communities.

QUESTIONS

1. What concepts and tools mentioned in this chapter's main text can you spot in Judith's words? Which core concepts and tools are absent? Why?

2. What examples of the social, environmental, and economic dimensions of sustainability can you find in Judith's story? What relationships between these three dimensions can you spot?

3. What role do different sectors play in Judith's sustainability management activities? How do different sectors interrelate and mutually influence each other?

4. Could you imagine to be an environmental consultant like Judith or would you prefer to work as an internal sustainability director like Kene (see practitioner profile in Chapter 2)?

TRUE STORY
(FLIGHT)SHAME ON ME

Who I was, am, and should be. My name is Olivier and I am a frequent traveller. Or rather, should I say, I used to be one?

Careful what you wish for. I still remember the first time I flew, a trip to London with my grandparents, still a young teenager. It got me hooked. I loved to watch out of the window fascinated by the sea and the picturesque English landscape moving by under us. The trip made such a big impression on me that for a long time while growing up I wondered how I could work in a job where I could travel all the time and get to know the world.

A dream come true? Last year I did over 40 roundtrips to some 30 different destinations. Mostly, these were business trips with a handful of holidays in between. While doing so I have ticked many of the boxes for my personal 'see before you die' places across the globe, the Peruvian Amazon and Mongolia's steppes, Tokyo's Sumo's and Mexico's Lucha Libre, Icelandic Geysers, and Dubai's skyscrapers, Cape Town's Table Mountain and Rio's Sugarloaf Mountain, you name it, I have probably been there. It's a dream, isn't it? But something doesn't feel quite right.

What's wrong in this picture? So here's what doesn't make sense in this picture. I am a very environmentally conscious person. I haven't owned a car in over a decade to save emissions, and at some point considered not to have kids as

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I firmly believe we are too many people on this planet already. How on earth can I then be travelling the planet with these 'carbon bombs' that are planes? Also, seeing the amount of single use plastic waste I cause on overseas trips makes me feel sick and guilty: A new cup for every sip, a plastic box for every meal, a plastic bag for three nuts and a raisin … I don't want to be a part of this any more.

Trying to calm my conscience. Most of the times when I travel I do so to train others in sustainable, responsible, and ethical management. I want to believe that maybe, just maybe, I can influence enough people on every trip to reduce their carbon emissions so that I have a 'net positive' impact. I doubt it though. So I have begun to take other baby steps. I now always bring my own water bottle and fill it up from the tap before I board a plane. When given the chance, I order vegan on-board meals to avoid the emissions from dairy and meat. I refuse silly plastic packaged mini-items.

Who's friend, who's foe? I am not quite sure what to think about typical airline practices. On the one hand, there has been so many good pieces of news in the airline industry recently. Zero carbon emission goals, edible food boxes, and biofuels. On the other hand, most flight attendants still decline to fill up my water bottle and force me to use plastic cups as 'it's our airline's policy'. Every time I see another advertisement that promotes 19 Euros weekend plane trips or to 'just fly' when there is a perfectly fine train to go on, I want to lose faith in humanity. But whose fault is it really? Are we as travellers 'making' those super-unsustainable practices, or is it the airline management and pricing schemes? Probably both.

Minor acts of rebellion. Recently I happened to have what I feel was a major win. I paid for carbon offsetting of three major trips out of my own pocket (some 150 Euros per trans-continental trip) assuming, in the worst case to have to pay it myself to ease my conscience. However, I then submitted them for reimbursement as part of my normal travel expenses. My employer paid it without further questions! I still think it was rather an oversight than a purposeful action for sustainability. What an opportunity for sneakily normalizing carbon offsetting as a taken-for-granted reimbursement practice! So I sent a message to a dozen or so environmentally conscious colleagues to let them know what had happened so that they could do the same. Did they? Will they? I am not sure yet.

Envisioning bigger steps. After all, every flight with or without carbon offsetting is one too many considering the climate change mess we are in. So what to do? I am trying to figure out both alternative ways of travel, but expect that much of it would imply a major struggle with my employer. Things I have been looking into are, for instance, organizing trips actively with multiple events along the way or in the same location, so that there is 'less carbon per event'. How much influence I can have on individual events' scheduling, and that I might have to

(Continued)

say no to events that don't fit the logistics are things that are likely to cause major difficulties. I have also looked into radically different means of transportation, including travelling to the Americas via boat and taking long-distance train lines like the Orient Express between Europe and China. I could work while travelling on my laptop, but the travel time and possibly higher costs might be a real issue. Also, I am a young father and really want to be with my family more. So maybe, what I have to do is to change jobs, or to drastically change how I do my job. Decisions, decisions.

QUESTIONS

1. Do you think how you travel has anything to do with you being a professional manager or not?

2. Conduct a basic brainstorming life-cycle assessment for a typical flight you have taken in the past. What kind of impacts can you think of beyond the ones that Olivier mentions?

3. Changing jobs to avoid flights? Isn't he going a bit too far?

DIGGING DEEPER: POPULATION AND FOOTPRINT

An important factor that prevents reaching global sustainability is the constant growth of world population and the footprint-growing effect of economic development on the environmental footprint of under-developed countries (see Figure 5.10 in the main chapter text).

One approach to solve the population issue appears to be to live in smaller families, 'small planet, small families' [111]. Most economically developed countries have a fertility rate close to or below the rate of 2.0 (two children per woman) (e.g., Germany 1.41, USA: 2.06 Singapore: 0.78), which means that the population of those countries is decreasing. Most of the least developed countries have a fertility rate far beyond the replacement rate of 2 (e.g. Cambodia: 2.78, Afghanistan: 5.64, Niger: 7.52, Honduras: 3.01) [112–114]. If we take the fertility-reducing effects of socio-economic

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development as given, one can assume that to reduce stress on the global resource, we would only need to bring social and economic development to all developing countries. Their fertility rates would drop, humanity's environmental impact would drop, and the world population would shrink itself to a sustainable level. There are several problems with this assumption, which will be illustrated in the following section.

The Kuznets curve is named after the economist Simon Kuznets, who revolutionized the understanding of relationship between economic development and wealth inequalities. Kuznets curve helps us to understand the effect of an aspired future economic development of poor countries and sustainability. The curve evaluates the impact economic development has on the two crucial components of sustainable development, environmental degradation [115] and the degree to which wealth is equally distributed between the rich and the poor [116]. Figure 5.17 suggests that economic development affects wealth inequality and environmental degradation in an inverted u-shaped pattern. Economic development in economically underdeveloped countries creates an increase in income inequality, increased differences between rich and poor people, and additional environmental degradation through the pollution created by increased economic activity. The sustainability threshold marks the level of inequality and pollution that is unsustainable in the long run. Thus, the parts of the Kuznets curve (K_1) that are located above this sustainability threshold are unsustainable: pollution exceeds Earth's carrying capacity and inequality increases above the socially bearable level.
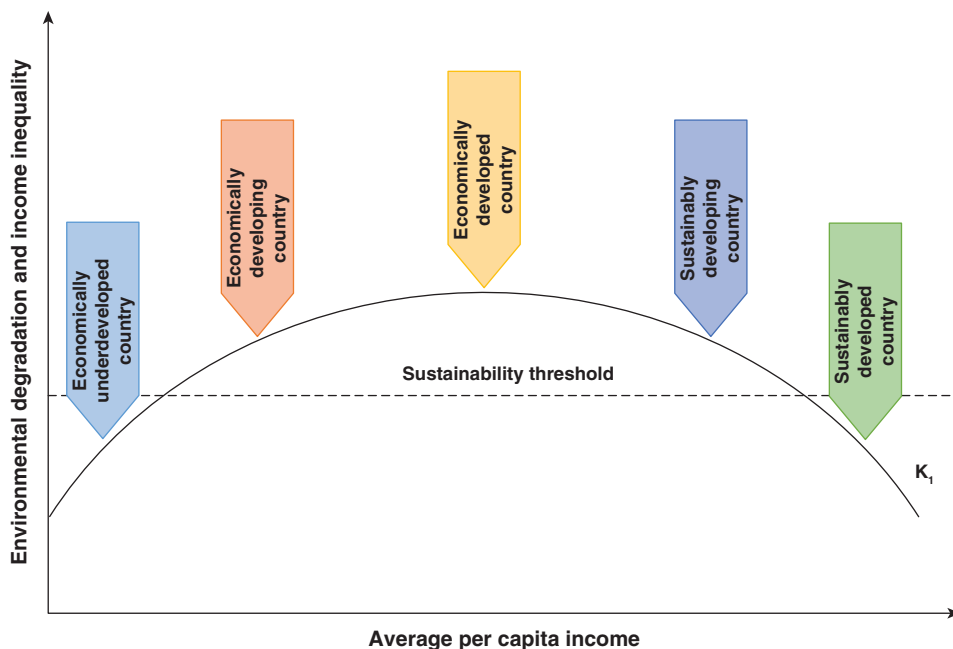

FIGURE 5.17   The sustainability Kuznets curve and country development stages

(Continued)

Assume that a country's usual economic development follows the path of economic development before focusing on social and environmental development. Thus, at the peak of economic development efforts, we would assume such countries would begin focusing on reducing environmental impact and increasing social equality. Countries based on this scheme can be divided into five categories.

1. **Economically underdeveloped countries** have little inequality, as most people are homogenously poor. Because of low levels of consumption and economic activity, the country's environmental impact is within the planetary resource limits. Countries such as Afghanistan and Niger represent this stage.

2. **Economically developing countries** increase inequality, as lucrative entrepreneurial opportunities of economic development initially increase in only a minority of society. The environmental impact of the country begins to exceed the planetary resource limits because of the higher exploitation of the country's natural capital and lower eco-efficient production methods. Prominent examples are Thailand, Mexico, and Brazil.

3. **Economically developed countries** decrease income inequality but start to create a major middle class society. This group shares the benefits of economic development through equitable wages and employment schemes. Negative environmental impact, however, decreases because of more eco-efficient production schemes. Good examples for this stage are South Korea and on a more advanced level the USA.

4. **Sustainably developing countries** have reached high equality through developing a solid middle class and reducing the country's footprint through mainstreaming sustainable production and consumption patterns. Good examples are Japan, Germany, and many Nordic countries.

5. **Sustainably developed countries** are characterized by an almost equal distribution of wealth and a global environmental footprint that is within the planetary resource threshold, while providing an advanced standard of living. Such countries do not currently exist.

There are two main hurdles to reaching sustainable development. First, the vast majority of the world population lives in countries that are either underdeveloped or developing. If we believe in the Kuznets curve, those countries will become much more unsustainable, before they start to reduce their negative social and environmental impact. The crucial question is whether the planetary system can resist this increase in environmental and social stress. If not, are we moving towards a global showdown of crises as described in the first chapter of this book? Second, none of the developed countries has reached the level of a sustainably developed country, which would be necessary for globally sustainable development. Will developed countries be able to make the transition towards a truly sustainable situation? Fortunately, a large group of specialists agree that the social and environmental Kuznets curves can be altered by public policies [117–119]. The following two types of strategies are recommendable for the first four categories of countries.

(Continued)

Strategy 1: Economically underdeveloped and developing countries (Types 1 and 2) should harness the learning of already economically developed and sustainably developing countries. They should become fast-learners in sustainable development by deploying methodologies and technologies tried and tested in the countries of Categories 3 and 4. The policy goal must be to achieve economic growth and welfare, while keeping inequality and pollution inside the sustainability threshold.

Strategy 2: Economically developed and sustainably developing countries (Types 3 and 4) must follow the primary goal of increasing equality and decreasing their industries' and citizens' environmental impact into the planetary resource limits.

POINTERS

This section invites you to dig deeper into the (un)sustainable development implications of local footprints and population growth. You could play with distinct scenarios. For instance, if developing countries like Nigeria would bring down their exceptionally high fertility rate, how would that change their possibility of allowing a higher per-capita footprint? Also, you could critically explore the frameworks used here. For instance, empirical evidence suggests that the Kuznets curve's main proposition (higher income, lower pollution/ inequality) can be true, but is not always so. Why, how, and when?

WORKSHEET

LIFE-CYCLE ASSESSMENT

Source	Use	Dispose
Create	Recycle and Reuse	

POINTERS

This worksheet can be used in many ways. After you have picked a focal entity (typically, products or service, but also event or activity) you could list main impacts, issues, or stakeholders per life-cycle stage. Five items per stage would be extensive enough, but still a manageable number. Alternatively, you could focus on one main item per stage and research it in depth. You could do this either for assessment, or to list distinct impact management practices for each stage. If you are using this sheet as a group, it is recommended that you use a poster-sized copy.

IN THE SUSTAINABLE MANAGEMENT CLOUD

Equitable sustainability
Eco-colonialism
Zeronauts
Strong sustainability
Developed
Triple bottom line
Sustainable development
Scale
Masters
Holism
Life-cycle interpretation
Social reform
Recycle
Fragmentation
Sustainability
Impact management
Substitution
Dispose
Use
Create
Equals
Status quo
Reuse
End of times
Eliminate waster
Being
Impact
Gatekeeping
Economic capital
Underdeveloped countries
Change
ccia
Life-cycle assessment
Sustainable management
Social capital
Pollution
Complementation
Footprint
Weak sustainability
Sectoral sustainability
Restorative management
Sustainability revolution
Unsustainable
Small planet
Environmental capital

Created with www.wordclouds.com

POINTERS

Most of the terms in this word cloud have been covered in this chapter, but there are also some additional items that connect to the chapter topic. You could, for instance, spot the new items, or test your and others' knowledge by going word-by-word, explaining what you know about each. You could also look for terms that are similar in meaning, synonyms, antonyms, or the ones that belong together in other ways. Another way of 'working the cloud' would be to reorganize the words to make sense of them, for instance, by putting them into a mindmap form, or clustering them.

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