

Sustainable Development, Corporate Sustainability and the Circular Economy

Abstract This chapter focusses on the circular economy. Nonetheless, to engage the reader with a more inclusive narrative of the models that have been proposed to move towards a more environmentally and socially sustainable economy, this chapter briefly reviews some critical perspectives of ‘sustainable development’, ‘corporate sustainability’ and other proposals discussed in the literature in the recent years. This chapter also describes the context within which the circular economy thinking has emerged and its characteristics. It reflects on its relationship with ‘sustainable development’ and ‘corporate sustainability’ as well as with its originators, and it reviews some critical perspectives of the concept.

Keywords Sustainability · Corporate environmentalism
Circular economy

2.1 INTRODUCTION

What are the concepts and models that can lead successfully to a more ecologically benign economy and are more effective in engaging corporations in the development process? The introductory section of this manuscript has already briefly outlined the perspective taken in this book. Therefore, it comes as no surprise that the answer to this question is firmly rooted in the circular economy (CE hereafter), which is the focus of this chapter. Particularly, in the second part (from Sect. 2.3 on),

the CE thinking is introduced, outlining the origins of the concept, its main principles, how it differs from its originators and the context within which it is gaining consensus along with a review of some critical perspectives of the concept. Nonetheless, to offer a more comprehensive and detailed explanation of the viewpoint taken in this book and consequently of the answer given to this chapter question, the first part of this chapter (Sect. 2.2) reviews some critical perspectives over the concepts of ‘sustainable development’ and ‘corporate sustainability’. It also briefly analyses other proposals for progressing towards a more environmentally and socially sustainable economy. The flaws in the concepts of ‘sustainable development’, ‘corporate sustainability’ and the other models reviewed, help clarify the reasons why the CE is a more powerful model for a positive transformation of the economy to one that operates and thrives within ecological limits.

2.2 SUSTAINABLE DEVELOPMENT AND CORPORATE SUSTAINABILITY: AN ASSESSMENT

In *Our Common Future*, the 1987 report of the World Commission on the Environment and Development also known as *Brundtland Report*, the most widely acknowledged definition of sustainable development was proposed (Banerjee 2003; Gladwin et al. 1995). The concept of sustainable development has been object of an extensive debate over the last thirty years and additional definitions have been proliferating. ‘Strong’ and ‘weak’ sustainability are the two main declinations of the concept (Beckerman 1994). While advocates of ‘strong’ sustainability counsel that advances in technologies will not suffice to eliminate pressure on finite resources and that there are no substitutes for ‘critical’ natural capital, i.e. those environmental goods and services that cannot be replaced because of the function they explicate, ‘weak’ sustainability places greater emphasis on progress in resources and energy efficiency to attain environmental sustainability, and implies that some substitution of natural capital with man-made capital is possible provided that this substitution increases welfare (Costanza et al. 1997; Revell 2008). The *Brundtland Report* definition has attracted several criticisms for (a) not offering any guidance for action (Banerjee 2003; Montiel and Delgado-Ceballos 2014); (b) not specifying what ‘needs’ exactly mean and which needs should be prioritised (Starik and Kanashiro 2013;

Starik and Rands 1995) and (c) being ‘morally unacceptable’ and ‘totally unpractical’ (strong sustainability) as well as ‘redundant’ as overlapping with the concept of ‘optimality’ in economy (weak sustainability) (Beckerman 1994, p. 191). The first declination of the concept would appear as ‘unacceptable’ and ‘unpractical’ because of its ‘absolutist’ meaning, i.e. ‘as a requirement to preserve intact the environment as we find it today in all its forms’ (p. 194). Beckerman (1994) asks: ‘how far does the Brundtland report’s injunction to conserve plant and animal species really go?’ (p. 194). And ‘how many people lose sleep because it is no longer possible to see a live Dinosaur?’ (p. 194). He also claims that ‘weak’ sustainability, in arguing for the substitution of natural capital with man-made capital provided that there are no losses in welfare, corresponds to welfare maximisation in economics and therefore, it is proposing nothing new.

Within the business community and the Management academic literature, sustainable development ideas have been discussed under the nomenclature of corporate sustainability (Etzion 2007; Gao and Bansal 2013; Winn and Pogutz 2013; Zollo et al. 2013). Elkington (1997) was the first to define corporate sustainability as an approach whereby companies aim for social and environmental performances along economic ones, but since this is quite general, many other definitions have followed (Montiel and Delgado-Ceballos 2014). A complete review of the evolution of the social dimension of corporate sustainability is beyond the scope of this book, which concentrates on the ecological facet of the sustainability concerns. Hence, in reviewing the corporate sustainability concept and its applications, attention is given exclusively to corporate environmentalism.

Interest in corporate environmentalism is a consequence of both, increasing scepticism towards corporations, perceived as sources of environmental degradation and growing public expectations for companies to commit themselves to solving our pressing environmental concerns (Hoffman and Bansal 2012). Since the 1960s, it has evolved through three different phases. The first phase (late 1960s–early 1970s) saw corporate environmentalism as a matter of compliance to the regulatory environment (ibid.). Milton Friedman famously wrote in the *New York Times Magazine* in 1970 that the sole social responsibility of businesses is to maximise shareholders’ return while operating within the rules established by markets and institutions. At that point in time,

being environmentally responsible was considered ‘at best a necessary evil and at worst a temporary nuisance’ (Hoffman 2001, p. 3). One year later, Narver (1971) countered Friedman’s position by arguing that it would be appropriate to engage in some actions to address the impact of corporate activities (e.g. pollution) upon society in advance of legal requirements prescribing to do so. In the face of both growing public concerns about environmental issues and expectations of more proactive business initiatives, not taking actions could result in a company experiencing lower present market value induced by the perceived higher risks and reduced earnings (Narver 1971).

Between the late 1980s and early 1990s, corporate environmentalism became a matter of strategic concern (Hoffman and Bansal 2012). Michael Porter, the prominent scholar in the field of competitive strategy, argued that environmental responsibility is not so much a threat to a company bottom line but rather an opportunity that could lead to a better competitive advantage through enhanced resource efficiency (Porter and Van der Linde 1995). On a similar line, Hart (1995) developed the natural-resource-based-view of the firm arguing that in a world of finite resources, competitive advantage will be influenced by the development of new capabilities in the management of the interface with the natural environment, namely pollution prevention, product stewardship and sustainable development. The rise of corporate environmental sustainability as a matter of strategic concern and the increased awareness of environmental issues, the latter triggered by the Rio de Janeiro Earth Summit in 1992, led to the growth of the Business and Natural Environment literature (Etzion 2007; Hoffman and Bansal 2012). The development of this was encouraged by the launch of the Organizations and the Natural Environment division of the Academy of Management in 1994 (Etzion 2007), the advent of special issues in journals like *Long Range Planning* (1992), *The Academy of Management Review* (1995) and *The Academy of Management Journal* (2000) and by other dedicated journals such as *Organization & Environment* and *Business Strategy and the Environment* (Banerjee 2003; Whiteman et al. 2013).

From the late 2000s, corporate environmentalism becomes broader in scope including concerns over equality and the restructuring of our economy (Hoffman and Bansal 2012). Framed as corporate sustainability, it appears more established within management practice (ibid.). Sustainability emerges as a rising business ‘megatrend’ (Lubin and Esty

2010, p. 44) and as a developing ‘long wave’ (Kondratieff and Stolper 1935, p. 105) of innovation (Seebode et al. 2012, p. 196). In addition, new forms of enterprises are observed. Examples include (a) the ‘third generation (...) [or] sustainable corporation’ (Hart 2012, p. 647) characterised by a stakeholder orientation, and (b) ‘hybrid organizations’ (Haigh and Hoffman 2012) operating between for-profit and non-profit to address environmental and social concerns. The founding father of stakeholder theory, R. Edward Freeman, has defined stakeholders as ‘those groups and individuals who can affect or be affected’ (Freeman 1984, p. 25) by the activities of organisations. Customers, investors/shareholders, employees, suppliers, government, trade associations, political groups and communities are generally referred to as stakeholders (Donaldson and Preston 1995). One of the main tenets of stakeholder theory is in postulating that the purpose of doing business should go beyond that of simply maximising short-term shareholders’ wealth towards creating value for all stakeholders (Hörisch et al. 2014). Also notable is the unfolding of *For-benefit Corporations*, *Conscious Capitalism* and *Corporation 2020* movements which share with the former a model of enterprise based on a deeper, more comprehensive purpose of doing business (Waddock and McIntosh 2011).

Over the years, attention to social and environmental sustainability has grown significantly within the business community (Dillick and Muff 2015) and moved away from ‘heresy’ to ‘dogma’ (Haigh and Hoffman 2014, p. 224). Yet, ecological sustainability and social equality continue to deteriorate (Gladwin 2012; Haigh and Hoffman 2014; Laszlo 2015) as noted in the introductory chapter. Inevitably, corporations are demanded to do ‘more’ given that corporate efforts have mostly reduced negative impact (Gorissen et al. 2016; Hawken et al. 2010; Laszlo 2015) but what exactly is ‘more’? Increasingly, scholars in the Business and Natural Environment literature are calling for radical, fundamental changes and particularly for innovative business models that offer new ways of creating, delivering and capturing value, while producing positive ecological and social effects (Haigh and Hoffman 2014; Evans et al. 2017; Roome and Louche 2016; Schaltegger et al. 2016). In relation to this, another pertinent question is: Are these more radical innovations to be grounded in the concepts of sustainable development and corporate sustainability? Donella Meadows, a prominent environmental scientist, in the essay titled ‘*Envisioning a sustainable world*’, comments: ‘the most

widely shared picture of a sustainable world is one of tight and probably centralized control, low material standard of living, and no fun. (...) Whatever the reason, hardly everyone envisions a sustainable world as one that would be wonderful to live in' (Meadows 1996, p. 2). Amory Lovins, an environmentalist and energy policy expert who has authored dozens of articles and influential books like *Natural Capitalism* (2000) and *Reinventing Fire* (2011), once commented: 'if you were to ask one of your friends how their relationship is with their partner and they were to say it's sustainable, you would probably say, I'm sorry to hear that' (as reported in Pawlyn 2016, p. 64). More recently and on a similar line, Laszlo (2015) adds: 'corporate sustainability has largely come to mean doing less harm. As an applied concept and practice it no longer inspires or engages. Corporate sustainability efforts are not meeting our collective expectations for a world in which companies prosper, people excel, and nature thrives' (pp. 106–107).

Sustainable development is a contested concept. Corporate sustainability initiatives have not produced change in a sufficient measure and the catalytic power of 'sustainable' and 'corporate sustainability' in promoting the shift towards a more harmonious and prosperous relationship between economy and ecology, appears to be flawed. Yet, the ecological crisis urges concrete and effective solutions. Therefore, how to address this conundrum?

The 2008 global financial crisis and a series of business scandals, contributed towards many publications which address the concomitant ecological crisis, and advocated wide-ranging reforms in order to develop a more sustainable economy (e.g. Coyle 2011; Jackson 2009; Speth 2008; Waddock and McIntosh 2011). In *The Economics of Enough*, Coyle warns about the consequences of the lack of attention towards future in today's economic policy and she deals with the question of how to continue prospering in the present while not neglecting the future. She emphasises three important steps in the pursuit of such a goal: (a) moving beyond GDP (Gross Domestic Product) as indicator of prosperity; (b) aiming for economic, environmental and social goals simultaneously in economic policy, and (c) a reform of political, social and economic institutions that encourages, for instance, longer time horizons in decision making across the many spheres of our society, and savings rather than overconsumption. Structural changes are encouraged also by Jackson, in *Prosperity Without Growth*, to move away from the current economic system that

relies on consumption for its internal stability. Eco-innovation and service-based business models where customers have access to the performance of a product rather than ownership are also welcomed to promote more resource-efficient production processes. Speth, in *The Bridge at the Edge of the World*, notes that ‘prosperity has been and is being purchased at a huge environmental cost’ (p. 50) and thereby, in line with the other positions just presented, he argues for more government intervention to solve the environmental crisis. Elements of such a government intervention would be an effective fiscal reform that eliminates ‘perverse incentives’ (p. 100) and makes polluters paying for the negative ecological impact produced. Waddock and McIntosh, in *SEE Change*, talk of the necessity of a sustainable enterprise economy, the SEE acronym in their book title, which emerges from a changing perspective, one that ‘bringing together the principles of sustainable development, which include eco-efficiency and social justice, with the principle of allowing enterprise and innovation to blossom, provides the best possible milieu for a wholly new model of capitalism to be born out of the current wasteful and inequitable model of wealth creation’ (p. 40).

Yet, the limitations of ‘technological optimism’ and the existence of the so-called Jevons’ paradox also known as ‘rebound effect’, i.e. improvement in energy and resource efficiency leading to uptakes in consumption (Ayres 2008; Jackson 2009), have pushed scholars to argue for even more radical transformations of our market-based economy (e.g. de-growth) and of organisations within this. Described as ‘an equitable downscaling of production and consumption that increases human well-being and enhances ecological conditions at the local and global level, in the short and long term’ (Schneider et al. 2010, p. 512), de-growth considers as inevitable to limit production and consumption to tackle ecological and social crises more effectively. However, concerns over the de-growth agenda have been expressed and particularly on (a) its social desirability, (b) effectiveness at addressing environmental issues and (c) on the limited guidance offered on how to implement the transition (Geels et al. 2015; Plumecocq 2014; Van den Bergh 2011). For one, Van den Bergh (2011) criticises the de-growth agenda for being ‘normative and idealistic rather than analytical and realistic’ (p. 884). In his analysis, a GDP de-growth is very likely to have certain negative social consequences but uncertain positive effects in terms of reduced environmental impact both in the short and long terms. In the short term,

a contraction of the GDP will probably redirect production activities towards cheaper and thus dirtier technologies, and in the long term, a contraction of the GDP is likely to lead to a reduction in cleaner technologies investments too. Equally, Van den Bergh does not regard consumption de-growth as an effective and efficient strategy, which also comes with measurement and policy issues. Indeed, it is not entirely clear how to measure consumption de-growth, which means by how much each individual should reduce his/her consumption to produce a positive effect on the environment (*ibid.*). Furthermore, if there were to be a government policy to reduce consumption, this would resemble a central planned economy (*ibid.*) and bring risk of the environmental disasters produced by this political and economic system, which are well documented (e.g. Feshback and Friendly 1992).

The feasibility, desirability and effectiveness of the de-growth agenda are questioned. The weaknesses of ‘sustainable’ and ‘corporate sustainability’ as instruments for the flourishing of industrial models that are more respectful of the natural world have been highlighted. This might lead into the temptation to surrender to the power of ‘doom and gloom’ and therefore to inaction. Consequently, how to escape this trap? Richard Buckminster Fuller, an engineer, designer and futurist renowned for its pioneering work on renewable energy sources and innovative design, is known for having said ‘you never change things by fighting the existing reality. To change something build a new model that makes the existing model obsolete’ (as reported in Lovins 2011, p. 166). A potential, alternative ‘new model’, which can make the ‘existing model’ of the linear economy ‘obsolete’, catalyse a new ‘wave’ of innovation wherein corporations have a key role to play and address many of the current ecological and social concerns, is the CE. The central role of businesses in the CE is clearly put forward by Ken Webster, head of innovation at the Ellen MacArthur Foundation (EMF hereafter), a British third sector organisation considered the global leader in the CE field (Geissdoerfer et al. 2017; Goyal et al. 2016), who argues that the CE is ‘led by business for a profit within the rules of the game’ (Webster 2013, p. 543). The reasons why it is believed that the CE can be the ‘new model’ are explained within the remaining sections of this chapter, which outline the context within which the CE thinking is emerging, its principles, origins and potential limitations as well as its relationship with the sustainable development and corporate sustainability concepts.

2.3 THE CIRCULAR ECONOMY: CONTEXT, PRINCIPLES, LIMITATIONS AND RELATIONSHIPS

The prevailing, linear logic of take-make-dispose underlying current industrial models, with resources extracted, used in the manufacturing products and then discarded by consumers at the end of their useful life, is not only source of many environmental concerns such as natural resources depletion, waste, significant energy use (EMF and McKinsey 2012; EMF et al. 2015; Esposito et al. 2016), but it is also challenged in its viability by socio-economic and regulatory trends.

Escalating pressures on natural resources, increasing resource price volatility, more middle class consumers entering the market, the rise of the sharing/renting economy and growing regulatory interventions on waste and climate change, are some of these (EMF and McKinsey 2012; EMF 2015a; Lacy and Rutqvist 2015; WEF et al. 2014). Commodity prices and prices volatility climbed substantially at the beginning of the twenty-first century till its first decade (EMF and McKinsey 2012). In its latest commodity markets outlook (April 2017), The World Bank forecasts higher prices for industrial commodities and particularly for energy and metals for the current and the next year (World Bank Group 2017). Resources price and supply volatility are of particular concerns within the EU, considering that Europe is the world's biggest net importer of materials and natural resources (EMF et al. 2015) and that China, controlling about 90% of total production of rare-earth elements essential in the manufacturing of electronic equipment, has placed restrictions on their export since 2010 (Institut Montaigne 2016). The shared utilisation of goods among users is gaining some consensus across sectors as the cases of car/bike/home sharing demonstrate (Belk 2014; Cohen and Kietzmann 2014). The world population is expected to surpass 8 billion by 2030 (Goyal et al. 2016) with middle class consumers doubled within the same period (Esposito et al. 2016). The regulatory context has witnessed remarkable changes that seek to address waste and greenhouse gases emissions. The number of climate change regulations has registered an important increase (by 66%) since 2009 and so it is for landfill taxes (e.g. in Europe, 20 countries levy landfill taxes) (EMF 2015a). In addition, the unfolding of the Fourth Industrial Revolution, leveraging on digital technologies and advances in new technologies including the Internet of Things, 3D printing and robotics, is creating new opportunities in how resources and products are used and consumed as well as breaking up conventional sources

of competitiveness (EMF and WEF 2016; Lacy 2017). *Philips*, instead of selling light bulbs, offers lighting as a service to its customers and because of access to real-time data on usage patterns, it can offer optimised lighting service, enhancing customers' experience (EMF and WEF 2016). *Zipcar*, a car-sharing model, is enabled by asset tracking and mobile technologies (ibid.). *Apple*, because of the usage of Liam, its iPhone disassembly robot, which is able of both disassembling a discarded iPhone, and separating its components into materials that can be reused, is seizing value (\$40 million) from materials formerly discarded (Lacy 2017). All of these developments in a company's macro environment are changing significantly the competitive landscape, demanding major adjustments in the value creation mechanisms underlying traditional business models while creating potential new sources of value. Can the industrial model be still based on linear patterns given changing modes of consumption, disruptive technologies creating new opportunities for value creation and current and predicted trends in global demand, supply volatility, resource scarcity and regulatory pressures? It is within this context that the CE thinking is gaining increasing consensus in policy and business circles around the world (Franklin-Johnson et al. 2016; Giurco et al. 2014; Gregson et al. 2015; Hazen et al. 2016) by proposing more resource-efficient industrial models that mimic the cyclical functioning of ecosystems where the concept of waste does not exist (EMF and McKinsey 2013).

Described as 'an industrial system that is restorative or regenerative by intention and design [that] replaces the end-of life concept with restoration, shifts towards the use of renewable energy, eliminates the use of toxic chemicals, which impairs reuse and aims for the elimination of waste through the superior design of materials, products, systems, and within this, business models' (EMF and McKinsey 2012, p. 7), the implementation of the CE could have significant positive impact on production and consumptions systems. Notably, it is 'an economy that provides multiple value creation mechanisms which are decoupled from the consumption of finite resources' (EMF et al. 2015, p. 23). Engaging with the CE thinking requires the application of three principles that together lead to an economy that is prosperous while being natural capital restorative and regenerative (EMF et al. 2015). The first one, i.e. *preserve and enhance natural capital*, demands to deliver utility virtually and when products are to be manufactured, only renewable energy and materials should be used whenever possible (ibid.). At the end of their useful life, renewable materials must be returned to nature to enriching natural capital (ibid.).

The second principle, *optimise resources yields*, involves maximising the value of resources over time in both *technical* and *biological cycles* (ibid.). In a CE, materials follow two usage patterns. Biological or renewable materials are designed without toxic components and can be safely returned to nature when reuse is no longer viable (EMF and McKinsey 2012; Lacy and Rutqvist 2015). Technical (synthetic or mineral) materials are conceived to return to the production processes through maintenance, repairing, refurbishing, remanufacturing and recycling, provided that materials quality is preserved (ibid.). These materials recovery strategies are hierarchical in the sense that recycling is the least valuable option as the others preserve more of a product integrity and embedded energy and labour (EMF and McKinsey 2012). In this system, product durability is enhanced and product sharing contributes to extend a product life cycle (EMF et al. 2015). Figure 2.1 compares a linear with a circular industrial model and the different shades of black in the technical and biological materials box indicate the preferred hierarchy of materials strategies (starting from the darkest shades) for end of life recovery.

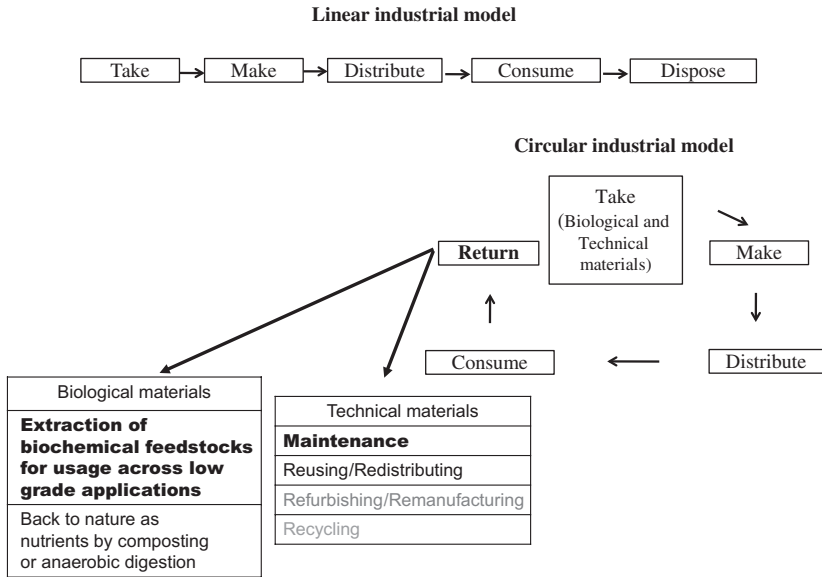


Fig. 2.1 A linear versus a circular industrial model (Source Based on EMF and McKinsey (2012))

The third principle, *foster system effectiveness*, promotes the elimination of negative environmental externalities (pollution in its various forms) (EMF et al. 2015).

Five, more detailed characteristics of the CE can be derived from the definition given by EMF and McKinsey (2012). *Design out waste*: in a CE, the concept of waste does not exist and application of this is obtained by circulating materials in biological and technical cycles (EMF and McKinsey 2013). *Build resilience through diversity*: in living systems, biodiversity ensures system resilience; consequently, the CE values diversity in economy (e.g. different scales of business) as necessary to achieve system resilience and prosperity (ibid.). *Shift to renewable energy sources*: a CE is powered by renewable energies, which warrants system resilience and prosperity because of both reduced exposure to external shocks, i.e. oil price and supply volatility, and diminished dependence on scarce resources (ibid.). *Think in systems*: the CE appreciates the interdependencies existing among the many entities in our complex world and by applying system thinking, it takes them into account in considering how to organise the transition (ibid.). *Think in cascades*: in a CE, biological materials are cascaded across different applications before returning to nature as nutrients (ibid.).

To promote the implementation of the CE, four building blocks are also identified (EMF 2015a). *Circular product design and production*: for materials to circulate properly in technical and biological cycles, product design (design for disassembly) and careful materials selection (i.e. durable, easy to sort-out at the end of life) are essentials (ibid.). *New business models*: business models that incorporate circular features (e.g. access over ownership; design for disassembly; product durability) and convert them into appealing value propositions are necessary to compete against linearly produced and low cost products; successful business models will be replicated thus contributing to scaling the circular model up more quickly (ibid.). *Reverse cycle*: circular loops necessitates reverse logistics to function and therefore, collection and treatment systems (e.g. sorting, warehousing) (ibid.). *Enablers and favourable system conditions*: these are not set up by corporations unlike the first three building blocks, but that are also crucial to build a CE and necessitate government intervention. These include (a) *education*, to create the skills for delivering a CE, for example, in circular design and production; (b) *financing*, to support innovation in the CE while reducing the barriers that prevent circular innovators to get access to financial capital; circular models are regarded

as highly risky because, for instance, when innovation comes from start-up and fairly young SMEs, their creditworthiness is not considered as sufficient (FINANCE 2016); (c) *collaborative platforms*, i.e. collaboration within and beyond supply chains and with policymakers, are necessary for the scalability of the model, for instance, in the development of industry standards and to overcome split incentives (EMF 2015a); a split incentive occurs, for instance, when the benefits of design for disassembly are earned by the companies doing the disassembly and recovery and not by the manufacturer (Green Alliance 2013); (d) *a new economic framework*, that prices externalities, moves taxation from labour towards resources and considers more inclusive metrics of wealth assessment than the GDP (EMF 2015a).

Current research identifies the potential economic, environmental and social benefits deriving from a CE in mitigation of unemployment, reduced waste and greenhouse gases emissions, significant materials costs saving (in the measure of US \$1 trillion by 2025) and further sources of revenues (Club of Rome 2015; EMF et al. 2015; Esposito et al. 2016; Van Buren et al. 2016; WRAP and Green Alliance 2015). The economics of the CE calculates that: (a) there could be huge employment opportunities in repair and remanufacturing, recycling, reuse and biorefining in a CE (WRAP and Green Alliance 2015); (b) end users would benefit by accessing goods in a less expensive way (leasing rather than buying upfront expensive items) and by the increased durability of products (because of reduced premature obsolescence) (EMF and McKinsey 2012); (c) reduced costs, reduced supply chain and price volatility risks, new revenues streams and stronger and long-lasting relationships with end users would benefit companies (Accenture 2014); and (d) a full ‘circular advantage’ going beyond resource efficiency to include the attainment of increased customers’ value in product use and after use stages (e.g. take-back schemes; access over ownership) where most of customers’ value is created, could be attained (Lacy and Rutqvist 2015). From an environmental perspective, less wasteful business processes and consumers’ attitudes towards products at the end of their useful life could reduce disposal to landfill and thus soil, water and air pollution, which are negative environmental externalities that the CE seeks to address (EMF et al. 2015). Because of this reduced wastefulness and because the CE aims to shift to renewable energies, it is considered as an appropriate strategy for climate change mitigation (EMF and McKinsey 2012; ZWS 2015). Increased resource efficiency has positive implications

for intergenerational resource distribution since reduced material intensity within the economy today means that valuable resources are more likely to be available for future generations (Murray et al. 2015).¹

As a consequence of the multiple benefits that could be earned in the transition towards the CE, it is not surprising that circular principles are currently implemented by a number of innovators worldwide (EMF and McKinsey 2012, 2013; Lacy and Rutqvist 2015). Recent survey data highlight that the uptake of CE principles is becoming quickly established within companies' supply chains especially across the chemicals, high-tech and automotive sectors (O' Marah 2017) and the concept is gaining grounds within the EU, the USA, Japan and China with a flourishing of numerous initiatives (Ghisellini et al. 2016; Preston 2012). In Europe, the goal of resource efficiency and thus of a more CE is established at the heart of 'Europe 2020 strategy' (EC 2011). In the EU, a 'CE package' was presented by the European Commission in the late 2015 (EC 2015a) containing targets affecting waste to landfill and food waste as well as measures to promote both the uptake of design for reparability/recyclability, and green public procurement among others. This package was replaced later by 'Closing the Loop-An Action Plan for the Circular Economy', whose measures can be fully accessed on the EC web portal (EC 2015b). Many European organisations are also engaged with the concept to promote it and several are in the UK. The EMF is one of these. The foundation in partnership with the *World Economic Forum, McKinsey & Company, SUN and SYSTEMIQ*, has produced several reports outlining the economic rationale of the transition towards a CE and stimulated discussion among businesses, policymakers and higher education institutions with the mission to facilitate the transition towards the CE. The *Aldersgate Group* is a forum of business leaders and members of parliament/civil society that seeks to drive initiatives for a more sustainable UK's economy and has published some reports on the CE (Aldersgate Group 2015, 2016, 2017). *WRAP* is a third sector organisation which works to promote waste prevention and resource efficiency across the UK (WRAP 2016) and the *Forum for the Future* is a non-profit British organisation working with businesses and

¹A comprehensive assessment of the opportunities of a CE is available in the numerous publications that the EMF has produced in collaboration with its partners (WEF, McKinsey & Company, SUN and SYSTEMIQ) to date. See: EMF (2015a, b, 2016), EMF and McKinsey (2012, 2013), EMF et al. (2015, 2017), WEF et al. (2014).

public organisations to develop more sustainable practices mostly in the food and energy systems (Forum for the Future 2017). The British Standards Institute, a third sector body, has very recently launched the ‘BS 8001: 2017 Framework for Implementing the Principles of the Circular Economy in Organisations’. This is the first British and global standard seeking to provide practical guidance to businesses of any size and sector wanting to implement CE principles (BSI 2017). *Circularity Capital* is a private equity firm founded to provide clients with access to the investment opportunities related to the CE in Europe (circularitycapital.com). *Circulab* helps businesses to understand how to align their business models to the CE thinking (circulab.eu). The Netherlands have positioned themselves as an international ‘circular hot spot’ when they were holding the presidency of the EU in 2016 (NLCH 2016). *Circle Economy*, is a Dutch social enterprise that seeks to facilitate the implementation of the CE at scale by providing tools and programmes for business leaders and policymakers (Circle Economy 2016). *Open Source Circular Economy Days* is an open source CE platform which produces documents and CE solutions open to all and organises open events where interested people can test these ideas (oscedays.org). In China, the CE is by law an objective of the country economic development policy (Giurco et al. 2014).² The CE is also part of the new United Nations Sustainable Development Goals adopted in the late 2015 with the aim to tackle poverty, prosperity and environmental protection (UN 2016).

The environmental, economic and social gains that could be attained in the circular model have also stimulated academic publications concerning the relationship between the CE and the concept of sustainable development. Ghisellini et al. (2016) suggest that the CE proposition is compatible with the sustainable development concept as presented in the *Brundtland Report* because it promotes resource efficiency and thus not only environmental protection but also intergenerational justice. Korhonen et al. (2018) concur with Ghisellini and colleagues. In the authors’ opinion, the CE thinking is akin to the three dimensions of the sustainability concept as it promotes more resource-efficient industrial processes (environmental dimension), reduced materials cost volatility and increased business opportunities (economic dimension) and shared consumption as well as increased employment (social dimension).

²For a comprehensive review of regulatory policies in the context of the CE across different regions, see: Mathews and Tan (2016), McDowall et al. (2017), Murray et al. (2015).

On a similar line, Santos et al. (2017) contend that the CE is a viable path to attain sustainable development. By contrast, Murray et al. (2015) warn about the environmental consequences of some CE strategies. According to the authors, enhanced product durability is not always beneficial because this can result in products composition that is over complex and potentially hard to breakdown at the end of their useful life. In addition, they also argue that social goals are not contemplated within the CE discourse which emphasises more the economic and environmental gains. Consequently, to address this void, they re-conceptualise the CE as ‘an economic model wherein planning, resourcing, procurement, production and reprocessing are designed and managed, as both process and output, to maximize ecosystem functioning and human well-being’ (p. 7). Similarly, Sauvé et al. (2016) underline the mostly neglected social dimension in the CE discourse though also suggesting that there is some overlap between the latter and the concept of sustainable development and that they are both useful to attain a better environmental protection. Hobson and Lynch (2016) associate the CE with the ‘weak sustainability’ perspective and they counsel that it is not so radical to attain the transformation of current production and consumption systems as it does not address fundamentally the roots of the impending ecological and social crises. The limited attention of the social dimension in the CE thinking is highlighted also by Geissdoerfer et al. (2017) with the danger of this being that public and private resources and attention may be diverted from more inclusive approaches. However, on a more positive note, they state that the CE approach offers better guidance for action than the concept of sustainable development which, by contrast, has been criticised for being too vague.

This book differs from the studies just outlined because it does not intend to place sustainable development and corporate sustainability in relation to the CE but rather to distance the latter from the former. This is the case for some reasons. First of all, the suitability of the concept of sustainable development and corporate sustainability for inspiring and providing effective direction to firms to address ecological and social concerns is open to question. Consequently, here it is argued that linking the CE to flawed concepts would bring risks of potentially limiting the capacity of this new model to fully attain its ambitions and that it is more fruitful to let the ‘CE talk’ walk on its own legs. This consideration is backed by scientific evidence suggesting that up to now

Management scholars have not yet provided sufficient guidance on how to address ecological problems more effectively (Montiel and Delgado-Ceballos 2014). Therefore, Management scholars would not move much forward if guidance is linked in some ways to weak models. Secondly, sustainable development initiatives have been implemented within the prevailing linear mindset (Sauvé et al. 2016). Therefore, associating the circular model with sustainable development would appear as an oxymoron. Thirdly, managers are confronted with a plethora of corporate sustainability definitions (Zollo et al. 2013) and ‘sustainability’ problems are framed as ‘wicked’ issues (Haigh and Hoffman 2012; Waddock and McIntosh 2011), i.e. as complex problems, with cause and effect difficult to establish, and thus hard to solve (Rittel and Webber 1973). Hence, could the overlapping of different constructs help them to navigate the ‘sustainability cloud’, improve their understanding and follow-up with action? Fourthly, for the many originators, the CE ‘concept remains eclectic’ (EMF et al. 2015, p. 23), its comprehension is fairly low (de Jesus and Mendonça 2018; Preston 2012) and confusion on the meaning of the words CE exists (Gallaud and Laperche 2016; Murray et al. 2015). Consequently, aiming for conceptual clarity in the literature that should inform management practices would seem to be appropriate and this would be the case also for theory building.

A brief diversion into the criticism that the CE has attracted is now necessary to paint a more balanced picture of its potential and it is accomplished next. To begin with, Allwood (2014) has argued that the CE ‘might be technically feasible if global demand for both the volume and composition of products [is] stabilized’ (p. 446). That is to say that efficiency and effectiveness strategies alone, i.e. doing more with less and ensuring materials quality so that they are suitable to subsequent cycles of production and use, are inadequate to attain more environmentally sustainable production systems (Bocken and Short 2016; De Man and Friege 2016). Efficiency and effectiveness need to be coupled with sufficiency strategies, i.e. reduced consumption (ibid.). Yet, sufficiency would seem to be at odds with circular strategies which could lead to uptakes in resource demand and consumption, given that new customers in both higher and lower end market segments can be reached with bespoke and less expensive products respectively (Kortmann and Piller 2016). Hazen et al. (2016) offer a complementary perspective on the role of consumers in a CE warning about the potential consequences

for the scalability of the model following from limited consumers' preferences towards remanufactured goods. For other studies, CE ambitions are to be more adequately assessed. Products according to CE principles do not always have lower environmental impacts, e.g. the recovery of materials from electronic consumer products results in additional ecological impact (De Man and Friege 2016). Despeisse et al. (2017) are sceptical about whether advanced manufacturing technologies can effectively enable more circular production systems and over their potential beneficial effects from a sustainability perspective. Cullen (2017), drawing on thermodynamics laws, argues that the CE is not fully attainable in practice. He counsels that there will be always material losses in closed-loop cycles and that their energy requirements, often overlooked in CE analyses, cannot be fulfilled exclusively with renewable energy though Cooper et al. (2017) analysing the effect on energy use of CE strategies, found that these 'have the potential to reduce the global energy use relating to economic activity by 6%-11%' (p. 1366). Rizos et al. (2016) advice that there are number of factors internal and external to organisations that can impede the implementation of more circular business strategies like difficulties in accessing financial capital and assessing the potential value creation opportunities, the lack of a supportive corporate culture and collaboration across supply chains.

A full examination of the limits and of the unintended consequences of the CE is beyond the scope of this book. Clearly, there are aspects of the CE proposition that needs additional investigation as emerged and scholars in other disciplines (e.g. material scientists, life cycle analysis and energy experts, biologists) are certainly better equipped than this author in performing these analyses, which are more than welcomed to advance our understanding of the CE and of its implications. However, these comprehensive assessments should be conducted without bringing risks of 'throwing away the baby with the bath water', which rather appears to be the case in the publications exploring potential limitations and negative consequences of a CE. There is much merit to the CE thinking. It is forging a positive, alternative way of framing the relationship between economy and ecology which, together with its nascent applications, seem to be more powerful than other concepts ever before in moving us towards a more ecologically responsible economy. In what follows, an overview of the origins of the CE thinking is presented.

2.4 THE CIRCULAR ECONOMY: ORIGINATORS

The CE thinking, though gaining particular momentum now, is not new as its foundations, which can be found in Economics, Industrial Ecology and Management Studies, date back to the late 1960s. The perspectives offered by these different disciplines though differing in details and focus, share the need for more resource-efficient industrial processes.

The economist Kenneth Boulding in *The Economics of the Coming Spaceship Earth* (1966), used the metaphor of a spaceship to portray earth as a closed system. Such a metaphor is powerful to raise the issue of using finite natural resources more wisely: in a spaceship with limited resources available, waste has to be converted into subsistence. A closed economy would replicate the functioning of the ecosystem where the output of one process becomes the input of another process (waste is not conceived as such). Subsequently, other two economists, Pearce and Turner (1990), saw economy as closed and circular and they first proposed the CE term and as a path for growth within ecological limits. The ‘astronaut’s’ perspective of the economy is not dissimilar from the ‘sailor’s’ perspective of Dame Ellen MacArthur. The fastest solo sailor to circumnavigate the world in 2004, she founded the Ellen MacArthur Foundation in 2010. Dame Ellen MacArthur comments: ‘sailing around the world against the clock in 2004, I had with me the absolute minimum of resources in order to be as light, hence as fast, as possible. At sea, what you have is all you have, stopping en route to restock is not an option and careful resource management can be a matter of life or death – running out of energy to power the autopilot means you can be upside down in seconds. My boat was my world, I was constantly aware of its supplies limits and when I stepped back ashore, I began to see that our world was not any different. I had become acutely aware of the true meaning of word ‘finite’, and when I applied it to resources in the global economy, I realised there were some big challenges ahead’ (EMF 2017).

The CE has also its roots in the area of Industrial Ecology where a more efficient use of resources and materials is advocated. The field emerged in the 1990s (Desrochers 2002; Gibbs and Deutz 2007) following the publication by Frosch and Gallopoulos (1989), two General Motors senior executives, launching the analogy between industrial systems and ecosystem whereby the former should work

by replicating the functioning of the latter (Lifset and Boons 2012). The research in the field of Industrial Ecology has mainly focussed on industrial metabolism involving ‘analysis of material flows on different levels and various scales’ (Bringezu 2003, p. 34), and on industrial symbiosis which focusses on the exchange of by-products, materials and energy between companies in geographical vicinity, generally within eco-industrial parks, whereby the outcome of one industrial process becomes the input for a different process (Chertow 2000). The focus of Industrial Ecology has been the technical side: considerations of which technologies could make it possible to close materials and energy loops, rather than how such change could be enacted at the social level (Blomsma and Brennan 2017; Lifset and Boons 2012; Wells 2013).

In the Management literature, originators of the CE can be found in the work on Natural Capitalism (Lovins et al. 1999), closed-loop supply chains (e.g. Linton et al. 2007; Wells and Seitz 2005), Biomimicry (Benyus 2002), Cradle-to-cradle® (Braungart et al. 2007) and Blue Economy (Pauli 2010). The concept of Natural Capitalism is attributed to Lovins, Lovins and Hawken, following from their formative article in the Harvard Business Review in 1999. They define it as ‘what capitalism might become if its largest category of capital – the natural capital of ecosystem services – were properly valued’ (Lovins et al. 1999, p. 146). The case for Natural Capitalism follows from recognition that industrial capitalism has failed to take into account the full value of natural capital, and as a consequence, it has produced wasteful industrial processes (Hawken et al. 2000). To stop the wasteful use of natural resources, they advocate a different way of conceiving business processes, involving companies achieving competitive advantage from radically developing a more harmonious relationship with the natural environment. They suggest this can be attained by following some intertwined steps. Firstly, they propose that companies improve natural resources productivity, becoming more eco-efficient. Secondly, and fundamentally, Natural Capitalism aims at not just reducing waste but eliminating it. The approach they advocate to achieve this is for industrial practices to replicate the principles in natural cycles where waste does not occur. This implies implementing closed-loop production processes, where disposed products at the end of their useful life are recovered and components are either reused as input materials for new production processes or composted to produce nutrients for the natural environment. Following the implementation of the first two steps, companies might modify further their business practices

by shifting from selling products to selling services, bringing potential benefits to both producers and consumers. Under this system, producers preserve the ownership of products and are responsible for providing maintenance over time, and thus an incentive for designing more durable products is in place (*ibid.*). Therefore, producers could benefit from reduced primary materials costs (products are returned to the manufacturer at the end of their useful life and thus secondary raw materials can be recovered), and from long-lasting relationships with customers (*ibid.*). The gain to customers is that they can rely on a flow of particular performances to satisfy their needs without buying expensive goods and appliances (*ibid.*). For instance, Hawken et al. (2000) argue that consumers could benefit from the service of having clothes cleaned via the payment of a monthly fee instead of purchasing a washing machine. In Natural Capitalism, it is also argued that not taking measures to restore the ecosystem can have both direct and indirect effects on companies' profitability. The direct impact results from a shortage of ecosystem services which can impede human and business activities from taking place (*ibid.*). The indirect impact results from poor company reputation and legitimacy that translate in customers' boycotts and sales decline (*ibid.*).

Biomimicry (Benyus 2002) is the study of nature and it can be used to implement innovative solutions to societal challenges that find inspiration in natural processes. Studying a leaf to invent a better solar cell is an example according to the author. It is based on three principles: 'nature as model' (what can we apply from it?), 'nature as measure' (based on ecological principles, how can the sustainability of our innovations be assessed?) and 'nature as mentor' (what can we learn from it?). Cradle-to-cradle® (Braungart et al. 2007) is a design philosophy wherein materials are conceived either as 'technical nutrients' (p. 1343) or as 'biological nutrients' (*ibid.*). Whereas the former (synthetic and mineral materials) can be used over and over again within subsequent production processes, the latter (renewable materials) are designed to be safely disposed of to the natural environment as they do not contain any chemicals that could harm the ecosystem. Designing materials in this way allows to recover and preserve the value of resources over time, a process that the authors call 'upcycling' (p. 1338) as opposed to 'downcycling' (*ibid.*) associated with the recycling of products that are not designed for disassembly and recovery. Closed-loop supply chains, consisting of forward and reverse supply chains (Guide and Van Wassenhove 2009; Wells and Seitz 2005), are also related to CE principles insofar as they enable

collecting back products at the end of their useful life for repairing, refurbishing, remanufacturing and recycling.

Another originator of the CE thinking is The Performance Economy (Stahel 2006). The main argument behind the performance economy is that of suggesting, like Natural Capitalism, the shift towards a functional service economy, based on selling services rather than products to reduce resource (materials and energy) consumption and boost job opportunities. The architect and industrial analyst Stahel also highlights the economic gains deriving from reusing, repairing, refurbishing and remanufacturing products. These end of life materials recovery strategies compared to recycling reduce materials consumption can save 75% of the energy embedded into a product and are labour intensive (*ibid.*). The Blue Economy, introduced by the former Ecover CEO Gunter Pauli, summarises many of the principles contained in the perspectives presented so far: increased resource efficiency, innovations inspired by nature, waste as by-product to use in other production processes, using resources that are local, and gravity and solar energy as the main sources of energy (Pauli 2010). Table 2.1 indicates the originators of the CE thinking.

Earlier academic writing on the CE, mainly within Economics and particularly Ecological Economics (e.g. Boulding 1966; Pearce and Turner 1990) shared a resemblance with Industrial Ecology, in presenting the need for change at the macro system level, but not investigating sufficiently societal-level mechanisms supporting changes. In addition, Industrial Ecology and similarly, closed-loop supply chains have focussed prevalently on their technical, engineering angles more than on the

Table 2.1 Circular economy originators

Circular economy	Economics (Boulding 1966; Pearce and Turner 1990) Blue Economy (Pauli 2010) Closed-loop Supply Chains (e.g. Guide and Van Wassenhove 2009; Wells and Seitz 2005) Biomimicry (Benyus 2002). Cradle-to-cradle® (Braungart et al. 2007) Natural Capitalism (Lovins et al. 1999) Performance Economy (Stahel 2006) Industrial Ecology (Frosch and Gallopoulos 1989; Lifset and Boons 2012)
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implications for their development from a business perspective (Blomsma and Brennan 2017; Johnsen et al. 2014). By contrast, Natural Capitalism and The Performance Economy consider more in detail the role of business model innovation in a resource-efficient economy alongside the need for wide, system-level changes to support such an economy (e.g. tax reform). Biomimicry and Cradle-to-cradle® are closer to design and innovation philosophies and The Blue Economy can be considered as sitting between the business-centred approaches on the one hand and the design and innovation philosophies on the other hand. The CE thinking builds on and integrates substantially these different perspectives just outlined but it is also different insofar as it gives significant more attention to the motivations and role of business organisations in enabling change (Domenech et al. 2013; Pollard et al. 2016). Notably, as emphasised in the first paragraph of this chapter, the CE ‘is led by business for a profit within the rules of the game decided by an active citizenship in a flourishing democracy’ (Webster 2013, p. 543). The CE approach is also different for its potential catalytic function having created a conversational space where discussion and best practices about resource efficiency meet (Blomsma and Brennan 2017) and also because it stimulates businesses to ‘doing good’ rather than ‘doing less bad’ with innovative business practices that are ‘restorative’ and ‘regenerative’ (Pollard et al. 2016; Webster 2013).

2.5 SUMMARY

This chapter has focussed on what is understood by the term CE and comparing and contrasting with the associated concepts of sustainable development and corporate sustainability. It has argued that the CE offers an effective model that may inspire businesses to foster corporate strategies that encourage the development of an economy that thrives within ecological limits. In offering a critical discussion on the limits of other approaches to developing an ecologically sustainable economy, the case is made for why the CE offers the most opportunity for making obsolete the ecologically destructive linear economy.

This chapter has started articulating some of the reasons why this book differs from previous attempts in the emerging CE practitioner and academic literature and more broadly in the sustainable development literature. First of all, it departs from the prevailing negative rhetoric in vogue among environmental publications. It does not fall in the ‘doom

and gloom' approach but rather it leverages on the CE metaphor and thinking as a model for inspiring business leaders' involvement towards an economy that is prosperous but not at the expenses of the natural environment. The CE thinking and related initiatives are involving actors across many spheres of our society, including corporations, in the development of measures that are crucial for its implementation. Recalling Buckminster Fuller's thought, this empowering feature of the CE thinking brings hope of succeeding in positively transforming our economy. Secondly, this book does not place the CE and sustainable development in relation to each other. By contrast, the relationship between the two is subject of some academic debates. Thirdly, while the origins of the concept of the CE are articulated here, differences are more markedly highlighted and the strengths of the CE framework are emphasised. In the next chapter, attention is given to business models and business model innovation which is one of the crucial constituents of a CE (EMF and McKinsey 2012; Hopkinson et al. 2016; Lacy and Rutqvist 2015; Scheepens et al. 2016).

It is clear that the transition towards a CE would not happen without costs and wider institutional, societal level changes as 'no single intervention on its own will create the tipping point for a circular economy. It is a systems problem that needs a systems solution' (Green Alliance 2013, p. 28). The required systemic changes are crucial for the scalability of the CE model and have been delineated in a number of publications (see, e.g., Aldersgate Group 2017; EASAC 2015; Ex'tax Project 2016; Green Alliance 2013; ING 2015). However, these are not the subject of this book, which, instead, focusses on the business aspect of the CE and thus on the role of companies in the transition towards the CE and the transformation they have to undertake to rip its benefits. Consequently, the next two chapters are occupied by discussing circular business models.

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