CHAPTER 3

Evolutions in Sustainability and Sustainable Real Estate

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1 Introduction

In 2015, the United Nations General Assembly (UNGA) pledged to set the world on the path toward sustainability and sustainable development. The resolution adopted at that meeting, entitled *Transforming Our World: The 2030 Agenda for Sustainable Agenda*, has since gained currency in global affairs. Different multilateral institutions, including the G20 (G20, 2017), have espoused the goals outlined in the Agenda and have contributed to policy coordination. Sustainable development can be broadly interpreted as development anchored in the principles of and geared toward sustainability. Today, the concept has attained a significant level of popularity and acceptance on a global scale. The role of the real estate sector in attaining sustainability is widely recognized. The complex relationship between the built environment and the pillars of sustainability (i.e. social, environmental and economic) has been explored by many scholars. Moving toward sustainable real estate is crucial considering the alarming effects that traditional buildings have on the environment, society, and local and global economies. The current trends in sustainable real estate

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are creating significant developments in the sector which can lead to the institutionalization of sustainable real estate practices on a global scale.

This chapter begins by reviewing the rise of sustainability as a global concept for governance, from its origins in the early 1970s to the establishment of definitions, approaches, clear goals and objectives. In the second section, the connection between sustainable development goals (SDGs) and real estate is made explicit. The relationship between the real estate sector and the three pillars of sustainability (namely the society, the economy and the environment) is explored. In the third section, the possible means of achieving sustainable real estate are presented. Current trends are critically discussed and possible future trends are identified. In addition, the roles of the many stakeholders involved are highlighted. The concluding section proposes a map for the complex sustainable real estate system that can help contextualize research and approaches to the field.

2 The Rise of Sustainable Development

The United Nations (UN) Conference on the Human Environment, which was held in Stockholm in 1972, marked the beginning of the international community's attempt to attune human activity to the natural environment. The Stockholm Conference placed environmental problems within the context of world affairs. The conference also sought to chart the means toward global solutions. That same year, the influential study *Limits to Growth* was published by the Club of Rome. It sought to describe the complex web of interdependencies made up by technology, environment, economy and population (Meadows, Meadows, Randers, & Behrens III, 1972). The study came to the so-called limits to growth conclusion and became the first robust and popular critique of growth-based development. Several years later, another significant report was published, this time by the International Union for the Conservation of Nature (IUCN). The *World Conservation Strategy: Living Resource Conservation for Sustainable Development* (IUCN, 1980) was unique in that it coined the term "sustainable development" to express the harmonious relationship between human development and the biosphere's integrity. In 1987, the term was used as an integral concept of *Our Common Future*, a report by the World Commission on Environment and Development popularly known as the Brundtland Report (after its principal author, Norway's Prime Minister Gro Harlem Brundtland). In this report, the concept of sustainable development was famously defined as "[…] development that

meets the needs of the present without compromising the ability of future generations to meet their own needs".

In 1992, the international community reconvened in Rio de Janeiro (Brazil) at the UN Conference on Environment and Development, which earned the colloquial title of "Rio Earth Summit". From this conference emerged Agenda 21 which put together a comprehensive action plan whereby countries would work together "in global partnership for sustainable development" (UNECD, 1992, chap. 1 subs. 1.1). Agenda 21 was considered the most comprehensive attempt to operationalize sustainable development that had hitherto been developed. It elaborated on the social, economic and environmental dimensions, recognized the importance of multi-stakeholders (beyond governments) and proposed practical means of implementing sustainable development. Two important international arrangements emanated from the Rio Earth Summit: (1) The Convention on Biological Diversity (CBD), which committed the world to the conserve, and (2) the UN Framework Convention on Climate Change (UNFCCC), which challenged the world to stabilize greenhouse gas (GHG) emissions so as to mitigate human disruption of the climate system. A decade after the Rio Earth Summit, Johannesburg (South Africa) hosted the UN World Summit on Sustainable Development (WSSD) where an implementation strategy for Agenda 21 was developed. The strategy incorporated the Millennium Development Goals (MDGs) and paved the way for a holistic understanding of sustainable development that integrated the economic, social and environmental dimensions and recognized them as the mutually reinforcing "pillars" of sustainability (WSSD, 2002, p. 2). A further decade later, the UN Conference on Sustainable Development in Rio de Janeiro (commonly referred to as Rio+20) and the ensuing document *The World We Want* set the scene for the subsequent adoption of the SDGs, which were presented in Agenda 2030 at the UN Sustainable Development Summit (September 2015, New York, USA). The SDGs served as way of mobilizing collective action around a set of common goals.

3 Sustainability and Real Estate

The preamble to Agenda 2030, where the most recent (at the time of writing) iteration of the definition of sustainability is presented, identifies people, the planet, prosperity, peace, and partnerships (the "five Ps") as the key areas of sustainable development (UNGA, 2015, pp. 1–2). It marks a

Table 3.1 How the SDGs relate to sustainable real estate

SDGs	*Description*	*Relevant targets*	*Relevant indicators*
Goal 7	Ensure access to affordable, reliable, sustainable and modern energy for all	7.2. Expand supply of renewable energy	Share of energy from renewables
		7.3. Improve energy efficiency	Rate of primary energy intensity improvement
Goal 11	Make cities and human settlements inclusive, safe, resilient and sustainable	11.1. Affordable housing	Rent burden (% of disposable income)[a]
		11.a. Coordinated urban planning	Share of consumption of food and raw materials within urban areas that are produced and delivered in/from rural areas within the country
Goal 12	Ensure sustainable consumption and production patterns	12.7. Sustainability practices and information in the private-sector	N/A
Goal 13	Take urgent action to combat climate change and its impacts[b]	13.1. Climate adaptation	Presence of urban building codes stipulating the use of either local materials and/or new energy-efficient technologies or with incentives for the same.

Sources: UNGA (2015, p. 14), SDSN (2015, pp. 49–59), Sachs et al. (2017, p. 7)

[a]Applies only to OECD countries

[b]Recognizing that the UNFCCC is the primary international forum for responding to climate change

shift in emphasis from a primarily environmental focus to an integrational approach and it frames sustainable development as a goal-oriented endeavor. The SDGs comprise 17 goals spread across the five Ps (Table 3.1). In keeping with the goal-based agenda, the SDGs are fleshed out into 169 targets and many more indicators. The Sustainable Development Solutions Network (SDSN) has been entrusted with collecting, monitoring and updating the relevant data as the Agenda unfolds over time.

Real estate is both directly and indirectly related to the concept of sustainability and to the SDGs. In effect, real estate has to be understood in the broader context of urban development, since cities lie at the intersection of major challenges such as population growth, urbanization and unsustainability. In other words, although sustainability is global in scope, it requires actions to be scaled to local settings, meaning that the role of real estate in sustainable development, that is, that of providing an "urban

opportunity", is crucial (SDSNTGSC, 2015). The Intergovernmental Panel on Climate Change (IPCC)—the research arm of the UNFCCC—dedicated an entire chapter to buildings in its most recent assessment report, which deals with the multifaceted challenge of climate change (Bulkeley, 2012; IPCC, 2014). As the report details, sustainable buildings not only promise emissions reductions through technology and behavioral considerations but also provide benefits from a socioeconomic and health perspective. In the light of this broad view of the role of real estate in sustainable development, SDGs 7, 11, 12 and 13 stand out as being most relevant to real estate, as they cover energy, cities, consumption and production patterns, and climate change.

3.1 Real Estate and the Environment

The unique nature, site and context of each construction project, the large number of stakeholders involved, and the intense financial and time pressures have been identified as key challenges that have mitigated the unsustainable trends in the real estate industry (Teo & Loosemore, 2001). Today, these characteristics are still considered some of the biggest hurdles to the institutionalization, harmonization and broad application of sustainable construction practices. In a paper published in 1992, shortly after the Brundtland report, the effects of construction activities on the environment were organized into the following categories: resource deterioration, physical disruption, chemical pollution, environmental loading, visual impacts and health impacts (Ofori, 1992). These categories have since become the focus of sustainable real estate standards (Brandon & Lombardi, 2010).

Recent studies estimate that buildings consume annually more than 40% of the global energy supply (World Economic Forum, 2016). It is further estimated that 20% of global GHG emissions originate from buildings and that the real estate sector, with more than 8.1Gt of annual emissions, is the single most significant industry in terms of CO_2 contribution (Rashid, Faiz, & Yusoff, 2015; Willmott Dixon, 2010; World Economic Forum, 2016). The building sector is estimated to globally consume about 30% of raw materials and 12% of fresh water, while generating up to 40% of the total landfill waste and 20% of water effluents (World Economic Forum, 2016). The situation is even more alarming in the US, where 40% of the carbon emissions and 88% of the fresh water consumption is attributed to the commercial real estate sector alone (Deloitte, 2014).

Additionally, according to a study published by the Lawrence Livermore National Laboratory on US energy use in 2013, 59% of the total energy produced was rejected and wasted due to inefficient and ineffective use, with the real estate sector and buildings identified as large contributors to this wasted energy (LLNL, 2014). Left unchecked, the effect of real estate on the environment is predicted to worsen. It is projected that, considering the increasingly urban nature of the world's population, the largest 750 cities in the world will require 260 million new homes and 540 million square meters of new office space by 2030 (World Economic Forum, 2016). Furthermore, it is estimated that, by 2030, buildings' CO_2 emissions and proportionate share of global GHG emissions will increase by 56% and 7%, respectively (World Economic Forum, 2016). Since the early 1990s, scholars, activists and policymakers have called for a shift in the real estate sector toward sustainability. Current reports suggest that green buildings, sustainable real estate and development, and environmentally conscious building operations and management have gained significant prominence.

Sustainable building can improve energy and water efficiency and ensure the sustainable use of raw materials (UNEP, 2011). By one estimate, the sustainable construction market could save 23.5 billion kilowatt hours of energy between 2015 and 2018 (The Impact, 2016). The U.S. Green Building Council and Booz Allen Hamilton (2009) report that, in the United States, the energy cost reduction and climate advantages could be lower than financial benefits produced by labor cost-savings and productivity gains for better indoor air quality, natural ventilation, local thermal control, daylighting and rent premium. Increased daylighting and contact with nature also produce benefits in hospitals and schools, improving student performance and patient recovery (Aumann, Heschong, Wright, & Peet, 2004; Ulrich, 1984; UNEP, 2011). It was recently estimated that "green" buildings represent 38% of global building project activities, with the highest proportions being in Singapore, the United Arab Emirates (UAE) and the UK, and that an increasing number of firms are committed to working on "green" projects (Bernstein, Russo, Fitch, & Laquidara-Carr, 2013). These trends are very promising and reflect the active role that sustainable real estate practices may have on the economic and social dimensions.

3.2 Real Estate and the Economy

Sustainable economies, as noted by Bukart (2009), are composed of six interconnected sectors: renewable energy, sustainable buildings, sustainable transport, water management, waste management and land management. Real estate will be one of the key sectors in effecting the transition to a low-carbon economy. Sustainable building integrates practices and techniques to reduce the negative effects of its activity on the environment and on human health. Sustainable building can also create job opportunities in design and construction (in developing countries) and in retrofitting (in developed countries) and can serve as a vehicle for social and economic inclusion and housing formalization (UNEP, 2011). Despite the potential benefits of sustainable building, economists recognize that some market failures or specific market and industry structures induce a systematic under-provision of sustainable buildings. The market failures are due to asymmetric information and externalities.

The building process involves mainly negative externalities. For example, construction waste can reduce water and air quality and site selection can affect urban development patterns as well as traffic, air quality and urban visual qualities (Matisoff, Noonan, & Flowers, 2016). The economic and market-based instruments comprise energy performance contracting, cooperative procurement, efficiency certificate schemes and credit schemes. The fiscal instruments comprise tax exemptions and subsidies (grants, subsidized loans and rebates). In the case of capacity support, information and voluntary actions embody voluntary labeling, leadership programs and awareness-raising initiatives. Forces in the private-sector include attractive financial results, changing drivers of asset value and tenant satisfaction, increasing demand and favorable public policy (Morrow, Read-Brown, O'Sullivan, & Garz, 2015). The main opportunity for sustainable building is the lower costs of retrofitting or new construction in terms of emissions-reduction compared with other economic sectors (UNEP, 2011). The net income of responsible investors is increased through lower expenses (as a result of life-cycle assessment and more efficient use of resources) and higher valuations (through lower risk premiums) (Clements-Hunt & Gary, 2007). It is estimated that sustainable real estate practices could reduce emissions from new constructions by almost one-third (29%) by 2020, at near-zero cost, with similarly low investment levels for retrofitting (IPCC, 2007).

3.3 Real Estate and Society

The real estate sector plays an important role in addressing social challenges such as affordable housing, inclusive economic development and food security for underserved populations. According to the United Nations Population Fund (2017) and the World Bank (2016), five billion people will live in towns and cities by 2030 (66% of the world population). In many big cities around the world, housing prices have increased beyond inflation over the last ten years, exacerbating the problem of home affordability. Furthermore, the current housing system is not designed to meet future demographic needs. The World Economic Forum (2016) indicates that people over 65 will represent a higher proportion of the global population than people under 50, driving demand for multi-residential and mixed-use developments. Sustainable urban development, wherein real estate plays an important role, is a crucial area of focus and public policy is beginning to recognize this reality. Sustainable urban living, which favors inclusive economic growth and innovation, has the potential to use resources more efficiently, protect the environment, create jobs and provide a nurturing environment for individuals and communities.

Eizenberg and Jabareen (2017) suggested that the physical aspects of human spaces are very important for social sustainability since they may contribute to reducing environmental risks and improving human welfare. UNEP (2011) discussed the benefits of sustainable buildings in terms of worker productivity and well-being, due to reduced indoor air and noise pollution. Additionally, sustainable urban forms can promote a sense of community and safety. Jabareen (2006) and Eizenberg and Jabareen (2017) provide a set of typologies to explain how sustainable urban forms can affect climate-change risk management. Sustainable urban strategies include compactness of cities, integration to public transportation, density, mixed land use, diversity or inclusivity of urban landscapes, optimization of energy production and consumption, bringing nature into the city, renewal and utilization of urban spaces.

Moreover, sustainable building provides employment opportunities and better working conditions for people in developed and developing countries alike. Sustainable real estate, which is expected to grow by 85% by 2030, is impacting the labor market through direct job creation, both in new constructions and in a retrofitting context. These additional jobs are in the areas of power and civil infrastructure (e.g. social housing, hospitals and schools), the production of sustainable materials, appliances and

components, and the operation and maintenance of energy-efficiency schemes. Furthermore, there are indirect benefits for employment, through recycling and waste management activities. Various studies have concluded that sustainable buildings generate more employment opportunities than they replace in the traditional energy-supply industry (UNEP, 2011). In developing countries, sustainable real estate could contribute to formalizing or creating decent jobs, to providing better working conditions and to upgrading workers' skills. Decent jobs have been shown to improve quality of life and alleviate poverty (UNEP, 2011).

Given that cities are the intersection between the economy, natural resources management, communities and technology, a major goal should be to make cities and other human settlements more inclusive, safer, more resilient and sustainable. Additionally, since developed countries have better sustainable performance in urban development than emerging economies, it is important to facilitate the international exchange of experiences, knowledge and best practices among countries that are at different stages of urbanization.

4 Toward Sustainable Real Estate

4.1 Current Trends

Sustainability has moved from being a niche in the construction industry to being an approach that is increasingly adopted by firms in the design, construction, operation and even demolition phases of real estate projects (Bernstein et al., 2013). As presented in the previous sections, the environmental, social and economic benefits of sustainable real estate are no longer debated (Deloitte, 2014). Recent studies suggest that the industry is gradually taking a more favorable view of ecological and sustainable buildings due to the decreasing cost of technologies, increasing demand and greater incentives for sustainable development (Arbor, 2005; Bernstein et al., 2013). Additionally, the perception of "sustainable" real estate is shifting: more people are realizing that ecological buildings and sustainable projects are a product of a well-integrated design process and that sustainable projects do not need to be visibly different from traditional buildings (Arbor, 2005). In a report published by Deloitte in 2014 on commercial real estate, which builds on the seminal paper *Doing Well by Doing Good* (Eichholtz, Kok, & Quigley, 2010), it is noted that the implementation of sustainable practices in existing buildings can result in higher

internal rates of return than the use of traditional practices (Deloitte, 2014). The report further claims that sustainable investment results in more than just cost-savings and that, for commercial properties, it results in an increase in asset values (Deloitte, 2014). However, some of the reported challenges to the adoption of sustainability principles in buildings include higher initial costs, lack of political support, affordability, lack of market demand and a lack of trained professionals (Bernstein et al., 2013).

It is widely accepted that the current sustainable real estate market is essentially demand driven (Arbor, 2005; Bernstein et al., 2013; DLA Piper, 2014), that is, that the uptake of ecological building activities is mainly driven by commercial factors (such as market transformation and local competition) and that higher building values and lower operating costs are the main influencers of investment decisions (Bernstein et al., 2013; World Economic Forum, 2016). However, it is important to note that the increased internal commitment to sustainability in many firms is also due to a growing recognition of the value of branding opportunities (Bernstein et al., 2013). The McGraw-Hill *World Green Building Trends* report, published in 2013, indicates that for new green buildings, the expected decrease in operation cost is about 15% over five years, the expected increase in asset value is 5%, the expected increase in building value is 7%, and the average payback period for additional costs attributed to "green" features is about eight years (Bernstein et al., 2013). The report also suggests that green products used in buildings are mainly mechanical, electrical, plumbing and waste related and that the most commonly used renewable energy source is solar (Bernstein et al., 2013). This is in alignment with the technical, structured approach to sustainable building that is generally adopted.

Environmental certification and evaluation tools are widely used for making sustainability goals and principles more accessible to industry and a large number of such tools are available (Brandon & Lombardi, 2010). Although some of the building evaluation tools are government-run, they are mostly voluntary third party and privately operated (Ding, 2008). Typically, the selection of the evaluation tools for a project is strongly influenced by the geographic location, while economic and financial aspects may not be considered, which presents a challenge to investors (Ding, 2008; Hens, 2012). Furthermore, although some tools use multi-criteria matrices for evaluation, a large proportion of tools focus solely on one criterion (in many cases, operational site energy) (Ding, 2008).

Practitioners appreciate that these simplifications make the tools easier to adopt in projects (DLA Piper, 2014). However, Morrow et al. (2015) highlight the recent discussion in the real estate industry around the need to take into account not only environmental issues but also occupant productivity, health and well-being. In October 2014, the WELL Building Standard (which is administrated by a Leadership in Energy and Environmental Design [LEED] standard) was launched to promote people's health and well-being. The report foresees that the industry will shift from "green" real estate to a broader perspective of "sustainable" real estate and buildings (Bernstein et al., 2013; Ding, 2008). Thus, while it can be argued that the existing tools serve an important role in improving the sustainability of many projects, by guiding the design, heightening the environmental awareness and structuring the environmental information, many scholars are calling for more comprehensive and advanced approaches to sustainability. Their vision is to be able to assess buildings and real estate projects across a broader range of considerations and to integrate sustainability on the strategic decision-making level (Apanavičiene, Daugeliene, Baltramonaitis, & Maliene, 2015; Cucuzzella, 2009, 2011; Ding, 2008; Fadaei, Iulo, & Yoshida, 2015).

4.2 Criticism of Current Trends

The evolving definition of sustainability, combined with its multifaceted nature, create significant challenges. The field of sustainable building is not without tension (Cucuzzella, 2016). Recent studies suggest that 80% of the industry would prefer a single certification scheme that provides clear guidelines (DLA Piper, 2014). On the other hand, researchers, designers and scholars have heavily criticized the reductionist nature of current evaluation approaches and are developing ever more complex matrices of evaluation (Deshmukh, Herber, & Allison, 2015; Gibberd, 2014; GlobalGiving, 2016; Lynch & Mosbah, 2017; Sustainable Cities Institute, 2013). These scholars argue that current tools, which are usually highly structured and aim for eco-efficiency (Fletcher & Goggin, 2001; Jonas, 1979; Madge, 2008; Naess, 1973), fail to capture the complexity of the topic of sustainability in the built environment (Cucuzzella, 2015b, 2015a; Newsham, Mancini, & Birt, 2009; Sterman, 2015) and are thus presenting designers, owners and investors with significant limitations (Cucuzzella, 2009; Orr, 2006; Papanek, 2000).

In addition, designers are heavily criticizing the excessive dependence on evaluation criteria in defining sustainability in buildings. They argue that the use of these evaluation methods as design tools places the visual character of our cities and buildings at risk and can result in "shallow" green approaches (i.e. buildings being used as demonstrative devices) (Cucuzzella, 2015b, 2015a; Ding, 2008). In other words, with the current focus on the technical aspects of sustainability, architecture and design are marginalized from the debate and a paradigm shift in approach is needed (Chansomsak & Vale, 2008; Fadaei et al., 2015; McLennan, 2004). Others have criticized the universal and rigid criteria of the existing evaluation tools and have called for more regionally adapted, softer methods of assessment (Boyko et al., 2012; Lynch & Mosbah, 2017). A further train of thought aims to reposition tenants, users and occupants at the center of the sustainability debate by actively engaging them in imagining and creating possible sustainable futures (Robinson, Burch, Talwar, O'Shea, & Walsh, 2011; Shaw et al., 2009; Sheppard et al., 2011). Although these critiques, tensions and debates denote the struggle of the industry in embracing sustainability, they also highlight the profound level of understanding that has emerged through the practice of sustainable real estate activities and the remarkable breadth and depth of innovation achieved over the past decade.

4.3 The Role of Tenants, Investors, Governments and Financial Institutions

It was argued earlier that the sustainable building sector is mainly market and demand driven. Tenants, especially in the commercial real estate sector, are becoming increasingly aware of the positive financial, health and productivity benefits of green buildings (Deloitte, 2014). Many industry reports suggest that tenants are increasingly willing to share the responsibility of the sustainable operation of buildings and to pay premiums for green properties; furthermore, tenants are increasingly demanding that green features be integrated in their leases (Deloitte, 2014; DLA Piper, 2014; World Economic Forum, 2016). Thus, tenants play an important role in keeping away from "brown" properties (i.e. buildings that are not green, have significantly lower market value and are usually developed in response to high green building activity in the same area). This can help maintain and increase the demand for sustainable urban planning,

community development and green building construction and operation (Bernstein et al., 2013; Deloitte, 2014).

Investors, for their part, play an important role in advancing green and sustainable real estate. Although research suggests an increasing rate of sustainable and green building activities in firms across the world, a large proportion of firms and investors are still unsure about the financial and environmental outcomes of their green investments (Bernstein et al., 2013; Deloitte, 2014). Generally, there are three approaches to investment in the sustainable real estate sector: (1) defensive—adhering to written law, (2) responsible—optimizing benefits in line with investment goals and (3) sustainable—a commitment to sustainability in all actions (Apanavičiene et al., 2015). If significant advances in sustainable real estate are to be achieved, investors will have to commit to green and sustainable building practices, to integrate sustainability at all their decision levels and to aim toward sustainable investments.

Considering that defensive investment strategies are still the most prevalent in the market (Apanavičiene et al., 2015), governments are faced with the important responsibility of setting the benchmark and minimum sustainability requirements for developers and owners. A significant number of government bodies, at local, national and multinational levels, have started developing and enforcing regulations, which are usually focused on energy (Deloitte, 2014). Furthermore, a large proportion of firms report that they are required by law to work toward and report sustainability across their activities (World Economic Forum, 2016). However, in general, these minimal and narrow requirements leave considerable scope for improvement. Governments, on the policy and regulation side, must institutionalize green and sustainable building codes, including developing regulatory frameworks for the review, reporting and benchmarking of projects. They also have a key role to play in streamlining the processes for the acquisition of permits for renewable energy sources (Deloitte, 2014; DLA Piper, 2014; World Economic Forum, 2016).

Through collaboration with financial institutions, governments must ensure that the correct incentives are in place to encourage investors and owners to increase their sustainability and environmental focuses. Some of the most popular types of incentives include tax benefits, attractive financing options and lower fees (Deloitte, 2014). Other incentives, such as zoning density bonuses and access to government controlled land, are common in developed and developing countries, respectively. These incentives are important drivers for real estate investors and developers

since they create tangible cost reductions and benefits that can significantly improve the internal rate of return of green investments (World Economic Forum, 2016). To generate a broader interest in green building activities, governments have to work with other institutions (such as non-governmental organizations and financial and technical consultants) to align the incentives with the needs of the regional market and investors.

Achieving sustainability in the real estate sector is complex (Putnik, 2009). Investors, governments, owners and tenants readily indicate that the deterrents to green building activities are related to the complexity of the topic. Examples include the multitude of environmental evaluation systems, the large differences in regional regulations and the interconnectedness of sustainability across many levels of the decision-making process (Deloitte, 2014; Ding, 2008; DLA Piper, 2014).

4.4 Future Directions in Sustainable Real Estate

Recent initiatives and trends have helped develop and enforcing an interest in sustainability within the real estate industry. However, it is apparent from the criticism presented earlier that moving forward will require some of the current fundamental assumptions and standards to be rethought (Putnik, 2009; Qian, Chan, Visscher, & Lehmann, 2015; Robinson et al., 2011). Approaches that are transdisciplinary—or ideally interdisciplinary—have been advocated as a valid means of tackling sustainability in the real estate and in the built environment (Fisher, 2008; Fry, 2009; McDonough & Braungart, 2002; Walker, 2006). One can argue that approaching sustainability in real estate requires the incorporation of its complexity. Some argue that the key to achieving sustainability in the real estate sector will be to reconceptualize the design profession (Fisher, 2008; Fry, 2009). Others argue that changes in the processes need to be considered (McLennan, 2004), that the way objects are made needs to be rethought completely (McDonough & Braungart, 2002) and that the design profession (Nelson & Stolterman, 2012) can serve as a guiding principal (Walker, 2006) for shaping sustainable real estate.

Although the construction and real estate sector does pose some unique challenges, rethinking the fundamental definition of sustainability in the built environment can serve as an important step in moving forward. Such a definition needs to be embedded in the social, environmental, economic and ethical realms (Ehrenfeld, 2009) and has to consider variations in location, context and scale, both temporal and geographic (Wilbanks, 2007).

The UN's 17 SDGs proposed in 2015 serve as a useful guide for understanding and approaching sustainable real estate from a holistic perspective and highlight the need for continuing to strive toward a balanced approach.

In order to move toward sustainability in the real estate sector, a comprehensive system of sustainability principles needs to be agreed upon (World Economic Forum, 2016). Such a system should include a set of intricate, decision-making frameworks that allow all the elements and their interactions to be optimized and institutionalized (Apanavičiene et al., 2015; Ding, 2008; Putnik, 2009). In addition, the concept of sustainability has to be strongly embedded within all activities throughout the lifecycle of buildings, community development and investment (Deloitte, 2014; Lawrence, 2015). Practically, every project, decision and strategy has to enforce and link that which needs to be developed (individuals, the economy or society), with that which needs to be sustained (nature, life support systems or community) (Robert, Parris, & Leiserowitz, 2005).

5 Conclusion: Mapping the Sustainable Real Estate System

In this chapter, as a backdrop to exploring the ways toward sustainable real estate, different issues and trends related to the topic were presented. The historic overview at the beginning of the chapter highlighted the fact that the concept of sustainability has matured significantly since it was first conceived in the 1970s. The current definition of sustainability, including its three main pillars (social, environmental and economic), is becoming widely accepted and a new reality that interlinks sustainability and real estate is beginning to emerge. In order to expedite this reality, innovative approaches that are embedded in transdisciplinary, holistic methods will be required.

The concept of sustainable development encompasses a number of key dimensions: ethics, policy and governance. The different stakeholders (both private and public, both individuals and communities) have crucial roles to play in moving toward sustainable real estate. The development of goals (such as the SDGs), tools and assessment methods can help guide action. However, these tools must be applicable to all asset types (buildings, infrastructure and common goods), stakeholders (investors, owners and tenants) and processes (design, construction, operation and demolition/end

of life). Awareness of the enormous environmental impact of real estate has led to the current situation whereby most tools aim to (1) optimize the performance of buildings (in terms of energy reduction), (2) ensure the efficient use of materials and (3) minimize environmental degradation. In other words, the main focus so far has been on the environmental dimension of sustainability, specifically on operational energy. Future developments in the industry call for holistic approaches that incorporate all three pillars of sustainability and pay greater consideration to the sector's relations to the key natural resources (i.e. materials, energy, food and water).

To conclude this chapter, a map of the sustainable real estate system is proposed (Fig. 3.1). It presents the constituent components and guiding concepts of this complex system and allows the relationship between its elements to be explored systematically. Rooted in the evolving definition of sustainability, which includes a holistic, transdisciplinary approach, a wide variety of topics can emerge by linking the elements of a sustainable real estate system presented.

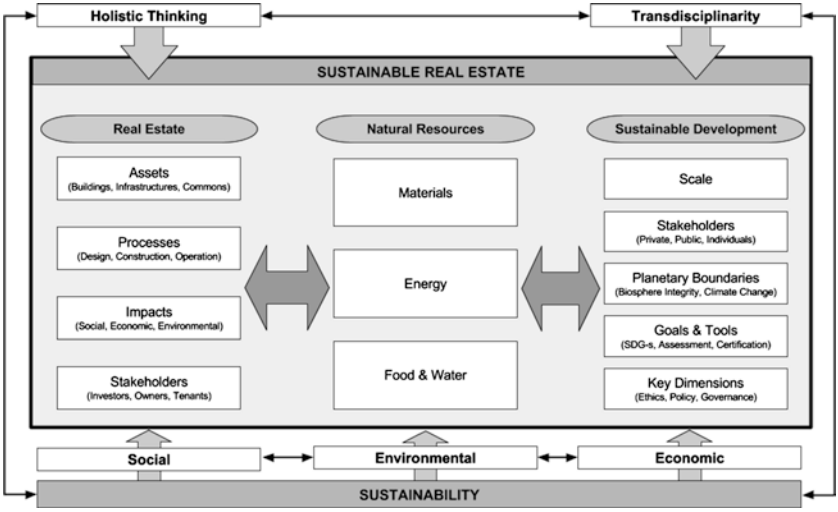

Fig. 3.1 A map of the complex sustainable real estate system

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