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Drivers and opportunities of sustainability in real estate development

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Abstract

Our interpretation of sustainable development is that the balance of the Triple Bottom Line principles (ecological, economic, and socio-cultural dimensions) is a prerequisite for real estate, in order for it to contribute to intergenerational justice and mitigate global climate change, whilst at the same time ensuring long-term business success in the sector. For too long, real estate companies only felt obliged to generate profits. An awareness of the finite nature of natural resources, progressive climate change, as well as social injustice, and spectacular business failures, have all increased awareness of the need for a clear sustainability agenda at all levels of the sector.

This increasing pressure from society and tighter regulatory framework have placed the real estate industry’s contribution to sustainable development at the forefront of discussions. The industry share amounts to 30–40 percent of all resource utilization and GHG emissions, which emphasizes that the real estate sector is in the limelight of political debate on tackling climate change.

Sustainable real estate development covers all aspects of mitigation. Reducing GHG emission can be achieved, for example, with recycled building materials, higher density and energetic retrofitting. Property certification and a clear focus on life-cycle-costing (LCC) are key elements. Furthermore, adaption of the property stock becomes more and more relevant, as climate change and extreme weather events become more frequent over time. Sustainability must be implemented at the company level, so that every decision is made in accordance with the long-term benefits for all stakeholders.

Introduction

Extreme weather events, which have been reported with increasing frequency by several countries (NOAA, 2016), are a very tangible consequence of climate change. The average global temperatures across land and ocean surfaces have been increasing consistently over the last 100 years, and are now the highest they have been over the past five centuries. In January 2016, the record was broken once more, with the highest level registered for a January in the 137-year period of measurements (NOAA, 2016; IPCC, 2013).
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Proof of considerable global warming: Record high temperatures are regularly being reported
Climate change is already causing massive changes in ecosystems. Moreover, experts say, the ability of ecosystems to adapt to relatively rapidly changing conditions will be exceeded if global temperatures increase by more than 2°C and with disastrous consequences for the plant and animal biosphere, and hence for humans and the built environment.

Until the 1990s, there was no consensus among the international scientific community regarding the prevalence of anthropogenic global warming. However, this situation has changed with the continuing publication of the IPCC Reports and other scientific studies. Today, there is very substantial agreement that climate change is caused by human activities. The scientific community has put considerable effort into studying the emissions of greenhouse gases from anthropogenic sources, and it is now considered a clear phenomenon and key driver for ongoing climate change.

In 2013, the concentration in the atmosphere of carbon dioxide (CO₂), one of the most important greenhouse gases, exceeded what is considered the critical level of 400 parts per million (ppm), compared to 280ppm during the pre-industrial era (IPCC, 2007; IPCC, 2013). In 2014, emissions from fossil-fuel combustion and from industrial processes (production of cement clinker, metals, and chemicals) totaled over 36 billion tons of CO₂ (Olivier et al., 2015).

Climate change is manmade: COP21 put pressure on industries to act more sustainably
Without additional actions and merely maintaining policies and regulations currently in place, the US’s Energy Information Administration (EIA, 2013) forecasts further growth of 46% in global energy-related CO₂ emissions by 2040. Historically, there have been many observed variations in CO₂ emissions in certain regions, and this can be explained partially by events such as the end of coal subsidies in the United Kingdom, the reunification of Germany, or more recently, changes in the Japanese energy matrix due to the Fukushima accident. However, such events only explain short-term variations in CO₂ emissions and not meaningful changes in emissions trends. It is a sad fact that to date, on a global scale, there has not been any real success in effectively reducing the overall amount of GHG emissions.

The reduction of GHG emissions is, however, of central importance to counteract dramatic climate change and unpredictable tipping points in the world’s ecosystem. The international community is well aware of its responsibilities. On December 12, 2015, at the 11th meeting of the Parties to the Kyoto Protocol (CMP11) and the 21st United Nations Climate Change Conference in Paris (COP21), the Assembly adopted the new climate agreement. Those meetings reinforced the main climate objectives – to keep the rise in global average temperature below 2°C. In the framework of the so-called Lima Call for Climate Action, the participating states were urged to submit their national climate action programs (INDCs, Intended Nationally Determined Contributions) in the run-up to the conference. Topics such as the Green Climate Fund or CO₂-pricing were on the agenda, in order to achieve the “2-degree goal” (the limit of global warming to 2 degrees compared to pre-industrial levels) (UN-FCCC, 2016; UNDP, 2016). Of course, there are many regional differences to be considered when analyzing those commitments and reduction targets, especially when evaluating the changing economies of China, India, and other large developing countries.

The role of sustainable cities
Urban emissions from cities of emerging economies are already converging with those of
developed cities (World Bank, 2014). Although there is no evidence of a consensual percentage of this contribution, mostly due to compatibility issues with existing GHG emissions-accounting procedures, it is clear that cities worldwide play a major role in achieving carbon-reduction targets. Several studies make an extensive comparison of GHG emissions from several large cities (Kennedy et al., 2009; Dhakal, 2010; Hoornweg et al., 2011). Beijing, Shanghai, and Tianjin, for example, have per capita emissions comparable to those of large European and some North American cities (Sugar et al., 2012).

Due to the fact that cities are a major emitter, several initiatives by city and local authorities were initiated, focusing on decarbonizing, or achieving low-carbon levels. A new report by the New Climate Economy has found that investing in public and low-emission transport, waste management, and building efficiency in cities could generate savings of over €15m by the year 2050 (Gouldson et al., 2015). Aside from these economic benefits, greenhouse gas emissions could be reduced by 3.7 gigatonnes carbon dioxide equivalent per year by 2030, exceeding the current annual emissions of India. This shows the relevance of low-carbon initiatives in cities all over the world.

However, creating sustainable cities is not easy. For example, the goal of creating healthy cities with a lot of green space is to some extent contradictory with aiming at high density in order to reduce emissions from transportation. For developers this is of major importance, as they can moderate and steer the necessary change.

Real estate industry with high potential for mitigation and need for adaptation

The construction industry is a major global employer and can be of significant relevance to the GNP of countries (Murray and Cotgrave, 2007), therefore playing a central role in climate protection, due to its high resource consumption (Nelson et al., 2010; ZIA, 2015). That puts the sector in a position to take meaningful sustainable development actions, for example, contributing to climate change mitigation by fostering sustainable buildings and adopting sustainable management practices.

Aside from its impact on the level of emissions arising from individual buildings (“property level”), there are also opportunities for action on other levels, such as intense collaboration with local governments and urban planners. Given the rapid urbanization trend in cities, the re-urbanization of old central areas in cities, or decontamination of old industrial sites for new developments (brownfield developments), are practical examples of how the real estate industry can act collaboratively to mitigate climate change.

Furthermore, it should be noted that the real estate industry can not only contribute to mitigating climate change and fostering sustainable urban development, but is at the same time highly affected by climate change. In that sense, adaptation measures are also needed, in order to create a less vulnerable and more resilient property stock.

Drivers of and opportunities for sustainability in real estate development

Key challenges (changes in ecological, socio-cultural, and economic conditions)

The overall social responsibility for sustainable action and enhanced environmental protection will shift from voluntary to compulsory, when states anchor the appropriate conditions in their legal systems. In the context of many fields such as energy consumption, pollutant emissions in the production of construction materials or the future disposal costs of problematic materials, this has not yet been done in all countries on a large scale. Against this background, many policy initiatives are currently in place (and planned), aimed at limiting the consumption of
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resources by and emissions of the property and construction sector (IIGCC, 2013; Guyatt et al., 2011; Leurig and Dlugolecki 2011).

Regulatory framework for climate protection will be tighter
Due to the EU directive on the energy performance of buildings, all new buildings in Europe from 2021 onwards must comply with the standard of “nearly zero-energy buildings” (European Council, 2010, 2012, 2013; RICS, 2013a). It is likely that this holding “trend” for greater regulation of the legal framework will be expanded in the wake of COP21. Nevertheless, it should be noted that tightening the legislative framework regarding emissions and conserving resources is occurring not only in Europe – which is often cited as a pioneer – but also worldwide. As an example of those enforcements, mandatory “energy disclosure laws” for real estate portfolio holders are already in place in many cities in the USA (Makower 2013).

It is important to note that the introduction of such laws, regulations, and directives also understandably indirectly affects the behavior of all market participants (for example real estate investors or tenants) (Dent et al., 2012). Consequently, no individual elements can be considered in isolation in terms of achieving sustainable development in the real estate industry. As an example, the changing laws and increasing transparency are changing the behavior of investors, which in turn has a direct effect on their willingness to pay, thus influencing the economic sustainability.

In addition to extensive legislative initiatives at the object level, sustainability is increasingly regulated by law even at the enterprise level. In this context, for example, the European Parliament and the Commission have strengthened regulations on CSR (Howitt, 2013) and commitment to sustainability reporting for large companies (Wensen et al., 2011). Real estate developers should proactively address these aspects, and, for example, carry out reporting (such as Global Reporting Initiative), voluntarily, in order to be ahead of upcoming regulations and ensure a “future-proof” business model.

Demographic change, urbanization, digitalization – challenges beyond climate change
It is not only the ongoing climate change and regulation related to climate protection, but also the demographic change in developed countries, and the continuing global population increase, urbanization, or the increasing scarcity of natural resources, that will change the built environment in this century.

The world is becoming more urbanized. Estimates made by the United Nations (UN-DESA 2014, 2015) show a trend of migration from rural to urban areas. As of 2014, 52 percent of the global population live in urban areas, and this percentage is likely to increase up to 66.4 percent, with the expectation that the global population will reach 9.55 billion by 2050. Some cities in Europe have experienced a population decline in recent years. Nevertheless, Europe has 73 percent of its population living in urban areas, and this is expected to exceed 80 percent by 2050. This trend is relevant, since most GHG emissions that contribute to global climate change come from urban areas (UN-Habitat, 2011).

Urban areas are associated with around 70 percent of global energy consumption and energy-related greenhouse gas emissions. The IPCC estimates that in 2010, urban areas accounted for 67–76 percent of global energy use and 71–76 percent of global CO₂ emissions from final energy use (Seto et al., 2014; IEA, 2015).

In the wake of the financial and economic crisis of 2008/2009, the restoration and permanent support of reputation is a major corporate challenge. Through using third-party
recognition schemes, sustainable corporate governance can significantly enhance the reputation of the company (Schleich, 2012).

Another challenge is the progressive transformation of values. This is taking place in the entire economy and hence applies equally to the real estate industry. Companies’ human resources are confronted in this context with issues of work–life balance, the demand for meaningful corporate objectives, and an overall high degree of flexibility. Sustainable corporate strategies in this case can have a supportive effect (e.g. through flexible working hours, health management, open office structures to improve the communication culture) and thereby increase staff motivation and identification with one’s own company (e.g. corporate image, contributions to the common good under the banner “Corporate Citizenship” high standards of environmental protection, etc.) (Rabe von Pappenheim, 2012). The so-called “Generation Y” – that is, people born between 1980 and 2000 – are radically changing the current working and living structures. This generation wants to live, work, and consume in a way that can be clearly distinguished from previously conventional structures (Schleich, 2012).

Besides the economic implications that emerge from the subject area of environmental or social sustainability, there are also a number of other economic challenges that the sector must face. For example, the sovereign debt crisis in Europe and the subsequent low interest rates aimed at supporting the public sector in selected European countries, have already caused strong inflows to real estate investments, leading partially to overheated real estate markets. For real estate developers, this increasing volatility and potentially abrupt shifts are a result of its broad integration with capital markets.

Short-term vs long-term sustainability agenda

The challenges these so-called megatrends pose on the economy and society are already clearly noticeable. As examples, commodity prices are exposed to ongoing fluctuations (Brown, 2008), whole regions are suffering under changing climatic conditions, and extreme weather events are causing massive damage to infrastructure and real estate assets (Messervy et al., 2014; Bienert, 2014). Responsible acting corporate decision-makers must be able to anticipate fundamental structural changes in time and translate them into viable, value-creating business models with reasonable returns for each investor.

Impact on profitability and business cases in the real estate industry

For capital–market oriented companies, maximizing the return on equity is still the central financial target of the so-called shareholder-value-oriented management approach – often associated with short-term thinking (ZIA, 2015; Lasch and Conaway, 2014). At first glance, this ultimate goal seems incompatible with a strong sustainability agenda that focuses on longer periods and might cause significant costs in the present. A more accurate analysis, however, reveals that thinking to secure one’s own competitiveness is important, especially in times of scarce resources, increasing environmental pollution, a critical and networked society, and changing customer needs. More and more decision-makers in companies are aware of their responsibilities and make efforts to avoid a negative impact of their actions on humans and the environment, and attempt to implement sustainable business models.

How climate change and increasing extreme weather events are affecting property values

Especially for developers, location (location, location!) is essential for a viable and successful
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development. Taking this fundamental aspect into account, it might be interesting to think for a minute about the way climate change influences property values.

Property values are based on the highest and best use of a given location. Income-generation potential is directly linked to aspects such as climatic conditions, particularly illumination, wind, emissions (noise, smoke, dust), and rainfall, as well as soil conditions such as surface formation, natural cover, bearing capacity, groundwater conditions, mudslide areas, and exposure to natural hazards (flooding, avalanches, storms, hurricanes).

Location is fixed by definition – increasing extreme weather events imply only downside risks

Good protection against natural hazards is therefore essential for both commercial and residential real estate, and also for infrastructure assets. Negative changes can already be noticed all over the world. Reduced real estate values have negative consequences for the economy as a whole (Bienert, 2014). In developed economies, the value of property amounts to an average of 3.5 times a country’s gross domestic product (GDP) (Brandes and LeBlanc, 2013). Thus, even marginal changes in value can lead to massive monetary damage. In addition, in real estate valuation, present value is regularly considered in assessing future potential benefits. Thus, even relatively moderate reductions in value can trigger substantial losses in expected returns. Table 21.1 summarizes possible negative impacts.

In essence, negative impacts of climate change are likely to result in significant adjustments in the real estate industry, until a new balance has been reached. However, some regions or market participants might even derive benefits out of climate change.

Developers must now evaluate “location, location, location” in a different sense

Although still of great relevance, the locations of projects no longer rely solely on demographics and market data, as there are now many other aspects to be considered. For example, agriculture will now be feasible in regions that were formerly too cold, allowing vineyards to move further north and opening new opportunities for real estate developments. For developers, it will be of increasing importance to analyze these (positive or in most cases negative) aspects in advance, also considering new technologies for land decontamination (for brownfield developments), exposure to natural hazards, alternative and sustainable sources of energy and water, etc.

The essence of pay-off studies: isolating the “green value”

Enhanced sustainability at all levels of a real estate company is often associated with higher costs (Epstein and Buhovac, 2010). In market-driven companies, higher expenses, if not connected with the fulfillment of legal requirements, must be justified. Put another way, no investments in sustainable action programs will be made, unless their added value, i.e. the positive effect on profits and shareholder value, can be clearly worked out in advance. The Stern Report (Stern, 2006) stressed, for the first time, that the monetarization of manmade climate change is important. Numerous studies attempting to quantify the profitability of sustainable products in different sectors and regions were created as a result of that report (for a review of relevant studies, see Clark et al., 2014; Fulton et al., 2012). For a developer, the crucial question might be whether a LEED–platinum certified building will merely trigger higher construction costs or whether the additional investment will pay off.

Core question – does sustainability pay off?

While the costs of sustainable actions are relatively easy to quantify, it is often difficult to isolate
### Table 21.1 Effects of climate change on property values

<table>
<thead>
<tr>
<th>Climate aspect</th>
<th>Commercial and residential real estate</th>
<th>Forestry</th>
<th>Agriculture</th>
<th>Infrastructure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rise in temperature</td>
<td>Reduced ground rent (lower potential revenue, in the case of regional population changes; also, increased need for cooling, and thus higher operating costs)</td>
<td>Reduced ground rent (in the case of increase in forest fires, pest infestation, extinction of species)</td>
<td>Reduced ground rent (in the case of increasing drought, pest infestation)</td>
<td>Increased wear on installations; unstable ground</td>
</tr>
<tr>
<td>Water scarcity</td>
<td>Decline in attractiveness of a region/decline in ground rent; higher costs for water supply and treatment</td>
<td>Reduced revenues from forestry/ increased danger of forest fires</td>
<td>Reduced harvests; increased costs for irrigation</td>
<td>Decline in bearing capacity of soil</td>
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<tr>
<td>Rising sea level</td>
<td>Reduced settlement area in coastal regions</td>
<td>—</td>
<td>Reduced agricultural land area/loss of potential revenues</td>
<td>Danger to port facilities</td>
</tr>
<tr>
<td>Increase in extreme weather events</td>
<td>1. Direct loss (e.g., hail damage to buildings) 2. Indirect loss (e.g., through gaps in production or rent after hurricanes) 3. Consequential loss (e.g., declining number of tourists in flood areas, rising insurance premiums)</td>
<td>1. Direct loss 2. Consequential loss 3. Depreciation of natural capital (permanent damage to ecosystems, extinction of species)</td>
<td>1. Direct loss 2. Consequential loss 3. Depreciation of natural capital</td>
<td>1. Direct loss 2. Indirect loss (infrastructure damages due to extremes in temperature, precipitation/flooding/overload of urban drainage systems/storm surges, which can lead to damage to roads, rail, airports, and ports; electricity transmission infrastructure is also vulnerable)</td>
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<tr>
<td>Increased regulation</td>
<td>Higher construction costs and running costs; higher costs, particularly in the case of carbon taxation</td>
<td>—</td>
<td>—</td>
<td>Higher construction costs and running costs</td>
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</tbody>
</table>
the resultant financial benefits and ultimately define the added value of a more sustainable property, compared to a non-green peer group. The willingness to pay can be, in some studies, isolated by using multiple regressions (hedonic pricing) (Dent et al., 2012). Here, the basic idea is that the willingness to pay for sustainable real estate properties cannot derive from purely theoretical aspects, but rather directly from the market. The price of a good will be, for example, a property that is “dismantled” by means of statistical methods into its individual components. To obtain meaningful results, correspondingly large data sets need to be used, as a single purchase price cannot be evaluated (Auer, 2005; Maier and Herath, 2015).

Table 21.2 represents only a sample excerpt from reports generated in different markets around the world. It is noteworthy that the majority of these evaluations were able to determine, from real market data, a significant positive relationship between sustainable properties and rents or values.

For developers it is essential to inform end-investors or potential buyers about the upsides that more sustainable properties achieve in the markets. This will speed up demand for these products and clearly also stimulate higher willingness to pay.

**Altruism vs business case: what’s the industry’s logical response?**

Some people now find it hard to approach the “sustainability” topic with the necessary neutrality. Too much has been said about the need for action, and the subject has been intensely exploited for marketing purposes, without actually leading to appropriate operational implementation steps.

We clearly see the challenges facing the industry because of climate change, but also note in this respect other socio-cultural and economic issues. In particular, risks arise that could lead to increasing values for more sustainable buildings in the case of opportunities, but also potential dangers in terms of objects exposed to natural hazards. Sustainable thinking and economic analysis should therefore be based on the real estate business decision-making processes of developers (Brounen and Kok, 2011).

Serious commitment to sustainability is not necessarily altruistic, but a consequence of the fact that an understanding of the changing context for purely economic reasons for the individual company is no longer an option. Real estate developers must therefore perceive securing their long-term sustainability as an economically and strategically decision-relevant element and implement this accordingly in all areas and levels of the company.
<table>
<thead>
<tr>
<th>Authors</th>
<th>Title</th>
<th>Research details</th>
<th>Research subject</th>
<th>Sustainability measure</th>
<th>Main findings</th>
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</thead>
<tbody>
<tr>
<td>Eichholtz, Kok, Quigley (2010)</td>
<td>Doing well by doing good? Green office buildings</td>
<td>Around 10,000 Office properties.</td>
<td>Impact of sustainability certification on the tenant/transaction prices</td>
<td>LEED/ Energy Star</td>
<td>Energy Star-certified buildings have 3.3% higher rents. LEED-certified buildings have 5.2% higher rents. A 10% reduction in energy consumption causes an increase in the net present value by 1% and 16.8% to 18.8% higher sales prices.</td>
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<td>Fürst and McAllister (2011a)</td>
<td>Green Noise or Green Value? Measuring the effect of environmental certification on office values</td>
<td>24,479 Office properties.</td>
<td>Influence of double standards on lease/transaction prices</td>
<td>LEED/ Energy Star</td>
<td>LEED-certified buildings have 5% higher rents and 25% higher transaction prices. Energy Star-certified buildings have 4% higher rents and 26% higher transaction prices.</td>
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<tr>
<td>Fürst and McAllister (2011b)</td>
<td>Eco-labelling in commercial office markets: Do LEED and Energy Star offices obtain multiple premiums?</td>
<td>2,688 LEED/Energy Star Office properties.</td>
<td>Influence of sustainability certificates on rental/sale prices and occupancy</td>
<td>LEED/ Energy Star</td>
<td>LEED-certified buildings have 4–5% higher rents and 25% higher transaction prices. Energy Star-certified buildings have 3–4% higher rents and 18% higher transaction prices. Double certified buildings have 28–29% higher transaction prices. Energy Star buildings have better occupancy.</td>
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<tr>
<td>Miller, Spivey, Florance (2009)</td>
<td>Does Green Pay off?</td>
<td>1,200 LEED/Energy Star Office properties.</td>
<td>Impact of sustainability certification on transaction prices</td>
<td>LEED/ Energy Star</td>
<td>Energy Star-certified properties have 6% higher transaction prices. LEED-certified properties have 12% higher transaction prices.</td>
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<tr>
<td>Authors</td>
<td>Title</td>
<td>Research details</td>
<td>Research subject</td>
<td>Sustainability measure</td>
<td>Main findings</td>
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<tr>
<td>Wiley, Benefield,</td>
<td>Green Design and the market for commercial office space</td>
<td>7,308 Office properties. Period: 2008 (USA)</td>
<td>Impact of energy-efficient design on rental/transaction prices</td>
<td>LEED/ Energy Star</td>
<td>In comparison to traditional buildings Energy Star-certified buildings have Rent: + 7.3%–8.9% occupancy: + 10–11% LEED-certified buildings have: higher rent: + 15.2%–17.3% higher occupancy: + 16–18%.</td>
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<td>Johnson (2010)</td>
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<td>Reichardt, Fürst,</td>
<td>Sustainable Building Certification and the rent premium: A panel data</td>
<td>1,768 LEED/Energy Star Büroimmobilien Zeitraum: 2000–2010 (USA)</td>
<td>Impact of sustainability certification on rents</td>
<td>LEED/ Energy Star</td>
<td>Energy Star-certified office buildings have 2.5% higher rents. LEED-certified office buildings have 2.9% higher rents. Positive correlation between Energy Star certification and building occupancy is confirmed. Rent Premium varies over time.</td>
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<td>Rottke, Zietz (2012)</td>
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<tr>
<td>Eichholtz, Kok,</td>
<td>The economics of Green Building</td>
<td>21,000 office buildings; 6,000 transactions Period: 2007, 2009 (USA)</td>
<td>Influence of Green Buildings in effective rents, rates, occupancy</td>
<td>LEED/ Energy Star</td>
<td>Increase the number of green buildings between 2007–2009. Crisis has little impact on rents. Price premium for green buildings has dropped slightly, but still high occupancy/rent. Age of the label has a negative impact on the premium; Energy Star-certification premium decreases with 0.4% per year (base: Technological progress of the building). LEED or Energy Star-certified buildings have 3% higher rents; effective rents (consideration of utilization) are about 8% higher (due to the high utilization of certified buildings). Certified buildings have 13% higher transaction prices.</td>
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<td>Quigley (2013)</td>
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Source: Authors
Implementation of sustainable value creation at the company level

Redefine normative and strategic framework

One of the largest initiatives for sustainable investments, the UN Principles for Responsible Investment Initiative, has identified short-term thinking among economic leaders as one of the main barriers to more sustainable initiatives within the business environment (Engshuber, 2013). Therefore, a more long-term view of opportunities and threats will be crucial to enabling future-proof business models to evolve.

Sustainability pays off – maturity as a key challenge

When discussing the pay-off for sustainable actions, the issue is frequently not the lack of profitability of “investment in the future” per se, but the challenge of dealing meaningfully with the maturity and calculability of seemingly intangible benefits. In the long term, it becomes meaningful for sustainability investments to optimize profits by avoiding future – and probably higher – adjustment costs, thus developing new markets, creating competitive advantage, and improving the corporate image (Seidel and Menn, 1988; Bleis, 1995). This positive relationship between success and sustainability was described by Porter and van der Linde in 1995, in their internationally acclaimed research work “Green and Competitive: Ending the Stalemate.” The results were impressively confirmed in a variety of current real estate related studies (see Table 21.2) (Porter and van der Linde, 1995).

Triple-bottom-line guidance for normative positioning and goal setting

The sustainable corporate governance of real estate developers is characterized by the simultaneous and equal implementation of environmental, economic, and social dimensions of project, portfolio, and company-level objectives. Some specific examples of the various dimensions of sustainability in the real estate industry are:

- Ecological component: Reduction of resource consumption in the life cycle of developed projects and avoidance of emissions (in particular direct, and possibly indirect GHG emissions) at all levels of the company. Introduction of appropriate control instruments and indicators (Key Performance Indicators, KPIs), sustainability reporting, and benchmarking. Certification of the portfolio and general focus on “Green buildings” (green building or expanding “sustainable building,” i.e. sustainable buildings) (Sayce et al., 2007).
- Socio-cultural component: Maximizing comfort, health, satisfaction, and well-being of future occupiers/integration of projects in the direct local environment/consideration of interests of all stakeholders, especially employees.
- Economic component: Reducing the life cycle costs of buildings and maximizing revenues. Ensuring high use capacity and functional flexibility of the property portfolio in order to support stable and sustainable financial performance. Foster innovations for an economical use of resources and energy. Ensuring the long-term competitiveness of the company.

An essential prerequisite for meaningful adjustments to the business model is initially the corresponding normative positioning. In this respect, the developer formulates a corporate vision, corporate mission, and its fundamental values, in order to define the main aspects of corporate sustainability and endeavor, in an attempt to derive overall corporate goals.

After establishing the normative frame of reference, the strategic direction of the project development company is based on overarching company targets, in which the specific
sustainability goals and strategies, and the performance potential of the company, are determined, so that the strategic planning achieves the defined objectives.

Resolve trade-offs and making complementarities of transparent goals
For the real estate industry, the strong interactions and trade-offs between the abovementioned dimensions are particularly valid. It is important in this context, to ensure complementarity and balance between objectives. While short-term trade-offs between profit maximization and an intensification of the environmental benefits are often obvious, the long-term trade-offs and complementarity are not normally readily visible. However, the achievement of complementary targets is possible, which can contribute through a corresponding ecological work environment for achieving better productivity together with a socio-cultural improvement of employee comfort, health, and satisfaction, which will ultimately reflect positively in monetary results.

However, even these simple examples are sometimes beset by long payback periods, interdependencies, uncertainty and not entirely transparent effect chains, all of which represent significant challenges for sustainable management in the real estate industry.

Implementation of CSR agenda in property development companies
Sustainable corporate management within the CSR-understanding used here, is nowadays directed to the entire enterprise as an economic entity. This includes the executives, employees, suppliers, customers, and thus in effect all the company’s relations with its immediate and broader environment (Schwerk, 2012). A consistent implementation of CSR is thus manifested in the real estate industry in addition to the management functions in the value chain.

Implementation of sustainable management follows a clear and stringent logic
Achieving sustainability-oriented corporate management requires a structured integration of all the above-mentioned CSR elements in the values and objectives catalog, planning the appropriate programs of action in various corporate functions and operational processes, and in the subsequent monitoring of any implementation failure within the company. In this context, it is important to differentiate and integrate the sustainable corporate governance at the normative, strategic, and operational levels (Baumgartner, 2010). Figure 21.1 illustrates the implementation steps and the individual consideration levels, which are explained in more detail in the next section.

Contextual factors as the basis for individualized approach
When undertaking the first implementation, it should be noted that it is either not possible or does not make sense to proceed without serious consideration of the specific business situation. In other words, there is no single solution. Rather, the individual, so-called contextual factors of each real estate development company are of particular importance. Mainly the demands of internal and external stakeholders, as well as the various factors in the general business and industry environment, should be considered in the context of sustainability.

Critical aspects of sustainable property development
Sustainability orientation needs to be fully integrated into value-added features of the real estate company. It is impossible to cover details of all of these aspects in a short chapter. Therefore, we will briefly discuss a couple of critical aspects that should be considered when discussing the development of sustainable real estate.
Green building as the starting point
Of course, the crucial starting point for a sustainable real estate development is the project itself. Terms like “green building” or “sustainable property” and “responsible property investment” are widespread in the real estate sector (Roberts et al., 2007), although a really satisfactory “green
building” definition is always difficult to formulate, since it is a controversial topic. The United States Green Building Council defines it as:

the planning, design, construction, and operation of buildings with several central, foremost considerations: energy use, water use, indoor environmental quality, material section and the building’s effects on its site.

(US Green Building Council, 2016)

Figure 21.2 shows the elements that can be cited as relevant features of green buildings.

Already a market standard: property certification and labels
Looking to the increased attention paid to real estate market stakeholders regarding sustainability issues, certification labels have been tried worldwide, in an attempt to create standards for rewarding particularly sustainable buildings, so-called “green buildings.” These certification systems work together with planning instruments and with consideration for aspects of sustainable construction, such as energy efficiency, life cycle assessment, and life cycle costs. The certification scheme is designed to provide tenants and investors, property developers, and project developers with verifiable proof of the sustainable quality of the building after its completion. However, certification schemes rely not only on ecological aspects, but also on offering a number of advantages for a sustainability-oriented enterprise:


Figure 21.2 Green building features in a building’s life cycle
Source: Authors based on ZIA, 2015
• reduction and control of pollution of buildings;
• improved national and international comparability of the quality of real estate;
• improved competitiveness over the entire life cycle;
• reduced life cycle costs and insurance amounts;
• simplified financing or favorable lending;
• minimizing the risk of vacancies due to increasing demand for certified real estate (especially in government agencies and multinationals);
• improved marketability as a result of existing excess demand in the investment market.

Nowadays many different national certificates exist, which have been developed and awarded by the Green Building Councils in the various countries. On an international level, there are the established English Building Research Establishment Environmental Assessment Method (BREEAM) and the American Leadership in Energy and Environmental Design (LEED).

In Germany, the Deutschen Gesellschaft für Nachhaltiges Bauen (DGNB) also plays an important role (Ebert et al., 2010; RICS, 2013b). The Green Star (Australia), HQE (France), and the CASBEE (Japan) also have high regional significance. These systems share similar criteria in the fields of economy, ecology, and social issues, but with different priorities, and the standards for achieving these goals are determined in comparison with national building standards. Especially in the field of large-volume projects, certifications are now designated as the market standard and thus provide less of a unique selling proposition for a project, but in many markets are already a sine qua non. The most widely used certification system globally, LEED, has certified more than 90,000 and 140,000 registered buildings (US Green Building Council, 2014; UNEP FI, 2012; RICS, 2013a).

**Increased focus on LCA and LCC**

Due to the wide range of built-up materials in stocks and the longevity of properties, it is becoming increasingly important to obtain reliable data concerning the LCA of construction materials and production inputs, and also to check and monitor this data. This is of particular importance when it comes to the subject area of CO₂ footprints.

There is general agreement that greater inclusion of natural cycles on economic value chains is of increasing importance. By focusing on biodegradable raw materials and increasing recycling, this circuit concept is actively supported. While ecological systems generally consist of closed material cycles, this is certainly not yet the case in the real estate industry.

It is therefore the task of product development to enable the development of such innovative solutions. The stronger focus on Life Cycle Assessment (life cycle analysis, often referred to as LCA) and concomitantly, Life Cycle Costing (LCC) are targeted steps in this direction (RICS, 2013b). The term LCC, or the total costs of a product – here the property itself – should be understood as for its entire lifetime. Generally, in this case, the initial cost (investment, production costs) and follow-up costs (usage, renewal, maintenance or demolition costs) are to be distinguished from one another (Wübbenhorst, 1984). The term LCA describes the systematic analysis of environmental aspects and potential environmental impacts during the life cycle of a product, that is, in relation to the widest possible application “from the cradle to the grave.” Environmental influences are shown and analyzed across the entire life cycle of a property (Feifel et al., 2009).

**Innovative technical solutions**

Innovation management is one of the three most important aspects of a business strategy (Capgemini, 2010). This is also true for the real estate industry, especially in terms of
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technology, quality construction, materials, and employed processes. Because the real estate sector, as mentioned, has a very high proportion of global resource consumption, it plays a central role in generating innovations for greater dematerialization (i.e. the reduction of materials used) and substitution (i.e. the use of ecologically offered products). Integral planning and thus the early inclusion of a broad variety of disciplines in the development of the projects is a useful tool to achieve progress in this area.

Truly innovative in this context is the research area of bionic buildings, which take nature as a role model for building components and try to implement them architecturally, while increasingly changing the working environments of the users of buildings (Rabe von Pappenheim, 2012). The continuous monitoring of innovative breakthroughs is needed, not only to meet the quality requirements of users in the future, but also the quantitative development of space requirements. In that sense, the real estate development company plays a major role to overcome the apparent contrast between increasing density and healthy, livable neighborhoods with innovative real estate projects. For that, the involvement of different stakeholders in the planning phase is essential, especially for companies that are involved in neighborhood and large project developments.

Retrofitting the property stock
A major part of the existing property stock in many countries requires some degree of retrofit in order to improve energy efficiency. Refurbishing the existing property stock is key to reducing carbon emissions from heating and other energy-related demands. In addition to improving the energy consumption in the use phase of the properties, the real estate industry should also address the mitigation of indirect emissions, incurred in the course of the construction. It is interesting, that the advantages of a new building compared to the refurbishment of the stock through a so-called “whole life carbon approach” can relativize the decision-making (RICS, 2013a), since the already-emitted CO₂ (so-called “sunk cost”) may no longer influence the decision.

Brownfield vs greenfield development
In many cities, the saturated urban infrastructure and scarcity of available areas, combined with the high value of land, makes it virtually impossible to carry out large real estate projects in consolidated central areas. Given the lack of options in the urban core, urban expansion ultimately occurs horizontally, in an “urban sprawl” manner. However, the urban sprawl in undeveloped areas consumes large amounts of agricultural land, eliminates forests, seizes habitats and natural resources, requires considerable public investments in infrastructure, increases the demand for energy, and promotes the intensive use of private vehicles. Thus, this pattern of unlimited urban expansion is no longer viable, and in fact, is regarded as an outdated, highly unsustainable urban model. The search for solutions for growth within the urban core must restore urban environmental quality, from the perspective of compactness and diversity, promoting diversity of use in a dense and compact urban fabric. In this sense, the redevelopment of urban areas (brownfield) is a suitable alternative to be explored, as it takes advantage of existing resources, and reconnects the urban fabric of underutilized areas of the city.

Brownfields are potentially sustainable development opportunities for neighborhoods in which these kinds of sites exist, and can provide a range of benefits (Glumac et al., 2014). For example, the physical improvements of a brownfield result in better site characteristics, such as lower contamination levels, better site accessibility, and ultimately improve the image of a neighborhood. Brownfield sites present particular challenges to national and regional policy makers in terms of bringing the land back into beneficial use and in terms of cleaning up
contaminated land and groundwater. While contaminated land management aims at the management or elimination of risks, the primary objective of brownfield redevelopment is the reuse of land and reintegration of properties into the economic cycle. Brownfield redevelopments entail much broader aspects that need to be considered and converted into action to achieve effective solutions. Not only the environmental aspect, but also the political, social and economic context of brownfields becomes clearer through an analysis of related aspects in these areas (Schädler et al., 2011).

On the other hand, greenfield developments (business as usual) lead to a less complicated ownership structure and might result in a faster approval process by local governments. Nevertheless, the physical improvements of land quality and legal endeavors often lead to financial benefits, such as value capturing or improved real estate value. However, the need to deal simultaneously with physical improvements, legal frameworks, financing, and the associated trade-offs may explain why brownfield problems are not easily resolved. Dealing with brownfields in this broader sense also means dealing with the different interests of a variety of stakeholders, including regulators, investors, landowners, developers, consultants, academics, community groups, technology providers, and the financial sector.

Conclusion

Sustainable real estate development can deliver healthy and energy-efficient property, with benefits for all stakeholders, being the users, investors, or on a broad scale, the city. Every property type can be built or refurbished with sustainable attributes, to a highly variable degree. Mitigation and adaptation options for real estate development companies demand a full range of interdisciplinary actions, at property, company, and city level.

Therefore, a coherent strategy for sustainable development demands transparency and true commitment. Communication, planning, and coordination are the key to establishing strategies that harmonize the requirements and priorities of distinct stakeholders, aligned with national and regional climate policies, regulations and programs. A systemic view, accounting for causal relations between every stakeholder, is needed to integrate all sources of information relevant to the implementation process and, in that sense, the development of a sustainable development strategy and implementation plan establishes a common base, enabling stakeholders to identify both adaptation and mitigation options, and find common ground.

It is clear that the real estate sector plays an important role in achieving the commitments made by many countries with the Paris Agreement. For many years, “to raise awareness” was a dominant mantra when discussing the subject of sustainable development. Now, there is already a critical mass of knowledge, expertise, and technology available, which allows the real estate sector to lead the way and take action towards a more sustainable real estate development.

References

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