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Kopnina, H.N.

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Helen Kopnina

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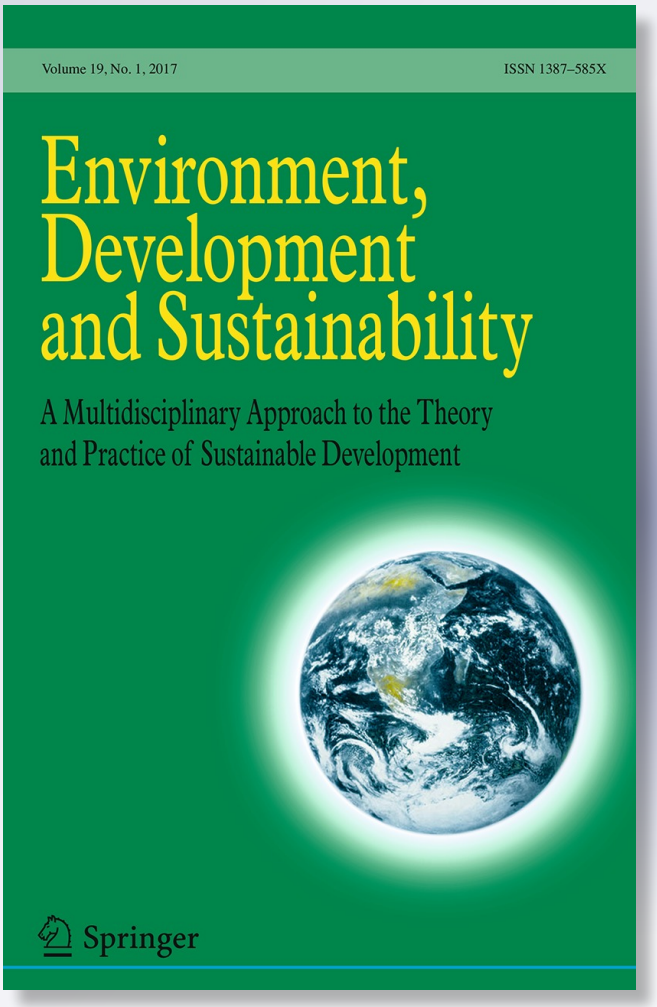

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REVIEW

Sustainability: new strategic thinking for business

Helen Kopnina[1,2]

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Abstract Some researchers insist that sustainability should be represented as a continuous quest, doubting that there is the 'right' way to be sustainable. Acknowledging the immensity of sustainability challenges, this article takes a different perspective, arguing that without understanding of concrete barriers and seeking solutions, the challenge of addressing unsustainable practices becomes unsurmountable. This article will summarize research in sustainability literature that indicates that sustainability requires a constant human population, as well as ecologically benign method of production. This article will survey a number of helpful frameworks that address the key obstacles to sustainability, namely population growth, and unsustainable production and consumption. These frameworks are discussed in the context of business-level solutions and production systems. As illustrated by examples of best practices as well as potential pitfalls associated with each system, these systems have the potential to move the quest for sustainability beyond 'business as usual.'

Keywords Circular economy · Consumer choice editing · Corporate social responsibility · Cradle to Cradle · Sharing economy

1 Introduction

The concept of sustainability the way most of us use it today has emerged in the 1960s in response to concern about environmental degradation and social equity (McKenzie 2004). Many different uses of the term as well as its derivatives, such as social sustainability, environmental sustainability, sustainable development, sustainable living, sustainable

✉ Helen Kopnina
alenka1973@yahoo.com; h.kopnina@hhs.nl

[1] Leiden University, Leiden, The Netherlands

[2] The Hague University of Applied Science, The Hauge, The Netherlands

future and others have emerged (Kopnina and Blewitt 2014). Environmental sustainability typically refers to issues associated with challenges ranging from climate change to biodiversity loss to pollution. Sustainability in business is also linked to ethical concerns, involving a commitment to justice between generations in matters of distribution of wealth, working conditions and human rights (Blowfield 2013; Elliott 2013). Overwhelmed by the challenges of unsustainability, some people have despaired at the possibility of actually addressing the status quo (Smith 2014). Others feel that sustainability challenges, such as overpopulation, are grossly exaggerated (e.g., for a review of denials, see Crist and Cafaro 2012). Yet others—particularly large businesses in their public relations (PR)—have expressed their optimism about their own contribution to sustainability, assuming that no further effort is necessary (Blowfield 2013).

This doubt, despair and misplaced optimism have salient implications on how businesses react to sustainability challenges. Generally, sustainability in business is linked to competitiveness, social inclusion and environmental integrity through the corporate social responsibility (CSR) (Basovníková et al. 2013; Huber et al. 2015). CSR is applied to companies that integrate social and environmental concerns in their business operations and interact with stakeholders on a voluntary basis (Abramuszkinová Pavlíková and Basovníková 2015).

CSR in practice is often concerned with 'green alliances' between corporate and non-governmental organizations (Arts 2002), or more crucially, between commercial companies and their various stakeholders (Blowfield 2013). For example, the Dow Jones Sustainability Indices (DJSIs) define the role of CSR as 'meeting shareholders' demands for sound financial returns, long-term economic growth, open communication and transparent financial accounting.' Yet, DJSI prescribes nor requires that corporate leaders address sustainability beyond what is immediately called for by the shareholders.

Increasingly, however, customers, NGOs and pressure groups apply pressure through buying behavior, lobbying and investment (Elliott 2013). Increased awareness has encouraged members of the civil society to play a more active role in the regulatory process, motivating companies to engage in CSR. CSR can involve incurring short-term costs without providing an immediate financial benefit to the company, but can also promote positive change (e.g., Kopnina and Shoreman-Ouimet 2015).

There is a pronounced need to provide the corporate leaders with concrete steps on how to travel down the sustainable path together with examples or applications. The World Business Council on Sustainable Development (WBCSD) has recently presented the result of extensive dialogues involving 200 companies spanning 20 countries, *Vision 2050*, which 'has at its core the attributes of successful business planning: understand your current situation, identify the obstacles to success, and create a pathway to overcome those obstacles (WBCSD 2015). Few authors come up with the clear framework for sustainable solutions (Daly 1974, 1991; Kopnina 2012a; Kopnina and Blewitt 2014; Washington 2015). This article will serve as an invitation to corporate leaders to adopt a sustainability framework that goes beyond the quarterly approach to improve the shareholder value.

This article will argue that in order to address sustainability challenges, we need to understand the bottlenecks of population pressures as well as production and consumption challenges (Engelman 2013; Washington 2015) as people or corporations take action in line with their values depending on the scale of these barriers (Gardner and Stern 2002). It will be argued that we also need to understand paradoxes of sustainability, illustrated by questions that embody these paradoxes or myths of unsustainability.

These questions are: What can motivate businesses to contribute to direct drivers of unsustainability, such as overconsumption, and to invest in counteracting indirect drivers of unsustainability? How do better health and more equitable distribution of resources

contribute to unsustainability? Considering that companies' profit depends on consumption, What type of existing or innovative business models can be applied to promote corporate sustainability? What do pension funds have to do with sustainable business? Why is eco-efficiency not good enough to achieve sustainable production?

This article is based on the assumption that in order to address unsustainability, we need to establish, confirm and act upon concrete opportunities to find solutions. This article will survey mainstream sustainability frameworks, models and paradigms, as well as bottlenecks in the Sect. 1.1. The opportunity to move beyond realization of these bottlenecks will be explored in the Sect. 2. Helpful frameworks for addressing the challenges will be outlined in the Sect. 3.

1.1 Review: outlining paradoxes, contradictions and challenges

1.1.1 'Sustainable growth'

The issue of environmental and social sustainability is still widely debated in business literature which surveys different strategies and approaches (e.g., Blowfield 2013; Nemetz 2013). Commenting that sustainability in general involves many stakeholders, and that in a democratic society we should not seek to establish one 'right' way to be sustainable, 'open,' 'plural' and 'reflective' approaches to sustainability challenges were proposed (e.g., Jickling and Wals 2013; Morley et al. 2014).

Critical scholars have argued that the longer the sustainability discourse is mired in the intricacies of uncertainty, the less likely a transformation will take place (Corner 2014). Diversity of perspectives on sustainability has often resulted in nothing more than helping to 'sustain the unsustainable' (Blüdhorn 2007) through superficial 'sustainababble' (Engelman 2013). As Washington (2015: 36) has stated, sustainability should not be allowed to be subverted and high-jacked to justify further 'business-as-usual' growth, through investment or otherwise: 'If we are to demystify sustainability, we have to be on the same page and speak of the same meaning. In a finite world, we need to accept once and for all that sustainability *cannot* be about further growth. This challenge remains critical, though still denied.' Some deny that population growth is a problem (and see those who worry about it as anti-humanist—see Fletcher et al. 2014); and others deny the problem of climate change (see the work on climate change denial by Dunlap and McCright 2011).

Herman Daly (1974, 1991), Albert Bartlett (1994), William Rees (2008, 2010) and Haydn Washington (2015) have argued that the mainstream approaches to sustainability need to be critically examined. As Bartlett (1994) has noted, the idea of 'sustainable' means 'for an unspecified long period of time.' The term 'sustainable growth' implies 'increasing endlessly,' and when applied to natural resources, the term 'sustainable growth' is an oxymoron.

Following from this, the aim of expanding markets and perpetuating economic growth clash with the empirical evidence of ecological limits (e.g., Daly and Cobb 1994, Rees 2008, 2010; Robertson 2012; Washington 2015). Daly (1991: 99) notes that the verb 'to grow' has evolved from its original meaning, which was to 'develop to maturity' or 'sufficiency.' Instead, industrial or economic expansion has become a (cancer-like) growth and a goal in and of itself (Crist and Cafaro 2012).

Thus, one of the key challenges has to do with the power of neoliberal elites perpetuating a myth of sustainable growth. Perhaps a more positive way of looking at sustainability is an identification of key areas in which production/consumption becomes truly sustainable—as in the case of infinitely renewable energy.

1.1.2 The question of energy

One of the greatest challenges of environmental sustainability discussed today is climate change (Kopnina and Shoreman-Ouimet 2015; Schenck 2015; Washington 2015). The latest report from the United Nations Environmental Program (UNEP 2015) reveals that in 2012 GHG emissions were 20 % higher than in 2000 and is likely to be still higher in the coming years. If emissions are not cut, they will bring the global temperature much higher than the minimal target of 2° and significantly raise the ocean level.

Despite efforts at mitigating climate change, emissions reductions have not materialized, partially due to the fact that an emission trading depends not only on its economic design but also on politics surrounding this process (Pinske and Kolk 2009: 109). While some rich countries and industries have claimed to find 'sustainable' energy solutions, many of them still largely rely on fossil fuels because of low costs and geopolitics (e.g., Kopnina 2014a).

When talking about business strategy for companies in energy and transportation industry, we also need to mention tackling oil dependency and climate skepticism (e.g., Washington 2015). While this article does not allow space to discuss the colossal literature on the subject of energy, there are many studies that demonstrate the power of fossil fuel lobbies that manipulate public information and promote climate skepticism (e.g., Pinske and Kolk 2009; Dunlap and McCright 2011; Corner 2014). However, we should be careful not to label these companies as 'bad' if they do not (yet) consider other sources of revenue as many of them, including Shell, have undertaken research into renewable resources.

Some scholars doubt whether substitution for renewable energy is likely to occur (e.g., Ayres et al. 2013). Other studies insist on strictly adhering to wind and solar, as well as tidal wave energy as other types of energy have proved to be either less ecologically benign (like biofuels, because they compete with productive land and biodiversity conservation areas) or safe (like nuclear energy, whose waste products and storage have proven to be hazardous on several occasions) (e.g., Kopnina and Blewitt 2014). Studies estimate that we could sustain its present level of energy consumption exclusively relying on renewable sources (e.g., Diesendorf 2014).

In order to find solutions to the climate change, the role of the powerful industrial lobbies that have a stake in fossil fuels and promoting climate skepticism needs to be addressed (Washington 2015). Without making a commitment to renewable energy, particularly the sun and wind, the well-meaning corporate CEO's may not hope to achieve real sustainability.

1.1.3 Population growth

Another aspect of growth that is framed in positive terms is demographic. Ensuring that every human life is saved through the advancement of medical technology (thus increasing population growth), elevating global poverty (thus increasing consumption) is seen as worthy moral goals by most mainstream political and corporate leaders. Yet, the long-term implications of population growth and spread of global high-carbon consumer culture are rarely discussed (e.g., Daly 1991; Rees 2008; Wijkman and Rockström 2012). While population growth brings short-term economic benefits (including cheap labor and new markets), the long-term stability of business and indeed social and political systems is threatened by it (Blowfield 2013; Kopnina 2014b). As Nemetz (2013) has pointed out, if an alternative path to economic development cannot be found, then raising the living

standards of developing countries will have 'potentially catastrophic impacts on the global ecosystem' (p. 52). Obviously, this presents an ethical challenge as medical technology should be available to all. Since most for the population growth occurs in developing countries, the challenge is exacerbated by the equity and equality concerns. While developed countries seem unwilling to change their consumption patterns, they cannot prohibit developing countries to following the same path.

If the poor need to consume more, do the rich need to consume less? Indeed, they do, but how to achieve this is another question. Conventional sustainability discourse offers no alternative, such as socialists taking resources away from the overconsuming elites and redistributing them to the less fortunate so that the total amount of natural resources stays the same. Caution is indeed needed as after the communist revolution, corruption and hidden inequality have resulted in repressions and migration (e.g., Kopnina 2005).

Migration, indeed, as well as aging societies, has also been a factor effecting demographic composition as well as demands for economic growth of many Western countries. In this way, demographic and production/consumption issues are closely interlinked (Washington 2015). Thus, another key challenge is demographic, with population growth exacerbating other sustainability challenges.

2 Results: understanding bottlenecks

2.1 Human nature and sustainable consumption

While certain types of human behavior are variably expressed, the global spread of consumer culture under industrial conditions seems to have reached every corner of the globe without much cultural resistance or variation (Rees 2008). It was speculated that perhaps some underlying 'universals,' or features of human psyche that seem more or less constant in all cultures include a number of characteristics that, under industrial conditions, are largely responsible for the collective effects of unsustainability (Kaplan 2000). One such feature could be a drive toward improving one's social status through material possession (Kopnina 2013).

Recognizing this, it might be sensible to adopt changes that effect sustainability that recognize and work together with motivations and inclinations characteristic of us as humans and do not expect 'sustainable action' to spontaneously emerge. Thus, rather than going against the grain of human nature, solutions should be found in the human universals themselves (Kaplan 2000). This has significant implications for business practice as will be outlined in the Sect. 3.

2.2 Realizing impacts

Social psychologists (e.g., Stern 2000; Dietz et al. 2005) have distinguished between direct and indirect environmental impacts. Some behavior directly causes environmental change (e.g., direct dumping of nuclear waste or cutting down the rainforest). Other behavior can be indirectly significant, such as investments done in the logging industry through pension funds, or through savings (Gardner and Stern 2002; Chawla and Cushing 2007). Thus, the ability to move pension funds to a green investment bank that prohibits deforestation can have a greater environmental impact than individually recycling a paper (while this is also important). Another example involves addressing population growth that may

simultaneously help to tackle poverty and the global pressure on resources. Such investment would also indirectly help to protect endangered species through reducing human pressure on last remaining wild habitats.

Chawla and Cushing (2007) have noted that the focus of sustainability researcher has mainly been on behaviors in the private sphere, such as turning off lights, recycling, composting or green purchasing. Yet, given the relatively small impact of one individual, such influence is insignificant unless 'it is combined with organizing for collective public change' (Chawla and Cushing 2007: 438). The deeper causes of environmental problems lie within international development policies, commodity prices on world markets, patterns of investment and consumption and not individual behaviors of consumers that are often too ill-informed or unwilling (Hobson 2002; Isenhour 2010). Thus, in terms of scale of consumption, the most significant decisions are made by governments, regulatory agencies and corporations (Wilk 2009: 4). In fact, the focus on individual responsibility may mask the unwillingness of powerful stakeholders to change their damaging practices by 'empowering' the consumers by an illusion of influence (Hobson 2002). While private actions may contribute to some improvements, as the proponents of 'think globally act locally' campaign would claim, public actions can have a much greater impact (Gardner and Stern 2002; Isenhour 2010).

Purchasing decisions are made in part because of people's inherited or learned and acquired habits, beliefs, assumptions and emotions—such as 'retail therapy,' social influences and aspirations, such as 'keeping up the Joneses,' and conformity to class expectations (Wilk 2009; Isenhour 2010; Kopnina and Blewitt 2014). When the choice is between what is cheap and what is 'right,' responsible behavior voluntarily adapted by the society as a whole is questionable (Kopnina and Blewitt 2014). According to the rebound effect (or the so-called Jevons paradox), 'sustainable' product marketing only drives more production and waste (Greening et al. 2000). Most products these days actually count on built-in (or planned) obsolescence in order to generate long-term sales volume by reducing the time between repeat purchases (Bulow 1986).

Thus, businesses need to realize the challenge of achieving 'real' sustainability will depend on their willingness to change their business models, instructed by some of the constructive frameworks outlined below. In the following section, I shall introduce most promising approaches to production and consumption, also focusing on the key principles of most helpful alternative systems.

3 Discussion

3.1 Addressing overpopulation

Engelman (2012) has proposed a number of strategies to counter population growth, including access to contraceptives and family planning; guaranteeing education through secondary school for all; eradicating gender bias from laws; offering age-appropriate sexuality education for all; ending all policies that reward parents financially based on their number of children; integrating teaching about population, environment and development into all school curricula; putting full pricing on environment costs and impacts; adjusting to population aging, rather than trying to delay it through government programs aimed at boosting birth rates; and convincing leaders to commit to ending population growth through the exercise of human rights.

While many large commercial companies have accepted poverty elevation as normative in their CSR policies, few have addressed the root causes of poverty, part of which is population growth itself (Rees 2010; Washington 2015). Investment in family planning, contraception, education and change in cultural perceptions to counteract unwanted pregnancies needs to be considered a crucial opportunity for sustainability investment (Engelman 2012; Washington 2015). The family planning abandoned by the international development donors in the 1970s needs to be revived (Wijkman and Rockström 2012). The Bill and Melinda Gates Foundation's Family Planning program states that its aim is to 'to bring access to high-quality contraceptive information, services and supplies to an additional 120 million women and girls in the poorest countries by 2020 without coercion or discrimination, with the longer-term goal of universal access to voluntary family planning' (The Bill and Melinda Gates Foundation 2015). The Foundation works with public and private partners and makes selected investments in developing countries. Some pharmaceutical companies, such as Pharma Beyer (2015), have already invested in family planning as part of their CSR. Other corporate leaders could support this investment.

If businesses fail to invest into solving overpopulation issue, all other sustainability efforts may not be as effective in the long term. Considering this necessity, political, corporate and public representatives need to develop a more meaningful discourse about population. Is the current seven billion the 'sustainable' number for population, or do we need to reduce global population? Could we maybe sustain eleven billion? According to Crist and Cafaro (2012), even the current population, considering people's lifestyles, is not sustainable, particularly if ethical questions in regard to non-human inhabitants of this planet are considered.

3.2 Addressing biodiversity loss

Addressing biodiversity loss, it was argued that non-human inhabitants of this planet need half of the earth's surface to survive (Locke 2015). This assessment is based, in part, on ecological data that show that in most regions 25–75 % (or on average 50 %) of an area will need protection to maintain biodiversity (Noss and Cooperrider 1994), and in part on ethics. Locke (2015: 15) posits that we need to develop 'a vision in which humanity returns to being one species among many that is humble enough to understand that we must protect all life and the processes it depends on for our own well-being and because it is ethically the right thing to do.' Sustainability is connected to the moral issue of rapid biodiversity loss (Cafaro and Primack 2014; Kopnina 2012b; Miller et al 2014). Ethically speaking sustainability is also about 'fixing the human relationship with nature by recognizing that any relationship needs mutuality to be healthy' (Locke 2015: 15). In the words of Crist (2015: 93–94):

> The prevailing mindset of humanity's entitlement to avail itself of the natural world without limitation is easily, if tacitly, invoked by arguments that demand that wilderness (the last safe zone for species, processes, ecologies, non-human individuals, climatic disruption, and indigenous ways) offer up its "natural resources"—in the name of justice. The cause of justice, however, would be better served by opposing a dominant economic and ideological order which is constitutionally founded on the ceaseless exploitation of all nature (people included) in the pursuit of "prosperity"; a dominant order which, in the course of generating prosperity, spawns ecological impoverishment as well as both real and perceived human poverty.

In the words of Schenck (2015: 103), 'wilderness goes back to the fundamentals of sustainability.'

Concrete framework for addressing sustainability of non-human species is articulated by the well-known environmental journalist George Monbiot (2014) in relation to rewilding, or the mass restoration of damaged ecosystems. Rewilding 'involves letting trees return to places that have been denuded, allowing parts of the seabed to recover from trawling and dredging, permitting rivers to flow freely again. Above all it means bringing back missing species… Rewilding is a rare example of positive environmentalism, in which campaigners articulate what they are for rather than only what they are against' (Monbiot 2014). Schenck (2015: 103) argues that wild areas are important, on the one hand, because of their indirect and direct economic, health, social, research and cultural values, as they are essential laboratories for research into biodiversity and provide gene banks. Wilderness can also contribute to mitigation and adaptation to climate change and provide a wide range of ecosystem services. Spiritually, wilderness can afford an enormous scope for inspiration and physical recreation and renewal.

Businesses seeking to address biodiversity could align themselves with the work on NGOs that support rewilding such as the Rewilding Institute (http://rewilding.org/rewildit/). Sometimes NGOs that cooperate with business need to find compromises between gaining funds and re-asserting its mainstream position for donors or shareholders (The Economist 2013a, b). Normally, the gains between NGO and corporate cooperation overweigh the risks as both were shown to profit from such alliances (Van Huijstee and Glasbergen 2010; Kopnina 2014c). Such cooperative strategies can help to achieve sustainability solutions, as in the case of Rabobank (a large commercial bank) and World wide Fund for Nature (WWF) in The Netherlands (Van Huijstee and Glasbergen 2010), with the bank profiting from a greener image and WWF ensuring investment in protected biodiversity areas.

According to Freese (2015: 212), corporate stakeholders, and particularly corporate landowners, whether motivated by for-profit enterprise or a philanthropic undertaking, or some of both, have a potentially major role to play in protected area development if they wish to seize the opportunity. Some of these corporate landowners by improving profitability of wilderness are increasingly involved in nature tourism and other financial levers for improving wildlife habitat, as exemplified by Turner Enterprises, the owner of seven ranches totaling nearly 615,000 acres in the Great Plains (http://www.tedturner.com/turner-ranches/).

Douglas Tompkins and his wife Kristine M. Tompkins, the businesspeople-turned-conservation philanthropists (who have made their fortune with companies like North Face, Espree and Patagonia), have helped conserve well over 2 million acres of wilderness, creating or expanding five national parks in Chile and Argentina (http://www.tompkinsconservation.org/).

3.3 Green investment

It cannot be stressed enough how important it is that the corporate leaders consider green investment. Yet, caution needs to be exercised that not everything that appears green is more than greenwashing. Sustainable investment banks, like all other banks, are typically based on the principle of exponential growth of money. The monetary motivators that drive business make people more self-interested and thus perpetuate the cycle of increasing demands (Vatn and Bromley 1994; Frey and Jegen 2001; Vatn 2005; Vohs et al. 2008; Caruso et al. 2013). As such, investment in green technologies or products does not necessarily serve to reduce demand. Yet, it does work to support many businesses that

attempt to 'do the right thing,' as in the case of Triodos bank (Dutch green bank) investment in biological farming (Triodos.nl).

3.4 Addressing consumption: consumer choice editing

As discussed in the case of the rebound effect above, efforts to encourage sustainable living depend on structural changes that require political and corporate leadership (Wilk 2009). This requirement is based on the realization that only a small committed margin of consumers choose fair trade or organic options, when given a choice of a cheaper product; and since consumer's sphere of influence can be too small (Hobson 2002; Isenhour 2010). Thus, consumer choice editing, or the active process of controlling or limiting the choices available, and thus denying the chance to buy non-sustainable goods, has been proposed (Blowfield 2013). This might not be the most popular choice for business or governments since such editing requires costly regulation and enforcement, inconsistent with neoliberalism and the cult of economic growth.

The opportunity may lie in economics and retailers themselves. Since retailers do not always possess capital to stock up on all available products, consumer choice editing can help eliminate unsustainable choices (Blowfield 2013: 282). Such decision by retailers also avoids reliance on individual's good will (as touched upon in the mention of human nature above). In fact, a lot of retailers engage in consumer choice editing already and simply do not offer certain products or services—such as a package-free supermarket Bag and Buy (http://bagandbuy.nl) that opened in The Netherlands in 2015 thanks to a successful crowdfunding campaign.

3.5 Sharing economy

Sharing economy, also called collaborative consumption, helps to reduce waste, saves money and connects people to their communities (http://www.collaborativeconsumption.com/). The sharing economy works particularly well for items that are expensive and are owned by people who do not make full use of them (The Economist 2013a). These models have been successful applied already by many companies, such as car sharing (e.g., car2go), or Zonline, a company that installs solar panels for free and gets paid back by energy savings. Other examples include computer-leasing companies, renting them when you need them means fewer products are required and fewer resources must be devoted to making them (The Economist 2013a). This is a challenge to mainstream businesses that used to strive on the sales of planned obsolescence products and requires that new business models to be applied (Brennan et al. 2015).

3.6 Alternative models

In the introduction, we have inquired: What can motivate businesses to reduce consumption (while their profit depends on consumption)? Cynical readers might suggest that corporate social sustainability is only good for PR (Nemetz 2013). The maxim 'business is business' implies that CSR will go as far as there are external pressures for doing so (Blowfield 2013). In this view, sustainability is nothing but green-washing (Engelman 2013), as discussed in business ethics (Crane and Matten 2010).

Yet, the role of multinational corporations' leaders on CSR policy in a global perspective is multifaceted and too complex to be easily dismissed as window-dressing. Many

businesses prefer to appear to be pioneers of reform, praised by the public and media as bold innovators, rather than being shamed into compliance either by governmental or by the (social) media (Blowfield 2013). Existing mechanisms for CSR support—certifications, stakeholders associations, civil society players and political pressures all form a complex web of relationships which may or may not lead to sustainability outcomes (Basovníková et al. 2013; Huber et al. 2015; Abramuszkinová Pavlíková and Basovníková 2015). One of the crucial dimensions of the efficacy of CSR policies is the company's long-term commitment to their implementation (Blowfield 2013; Kopnina and Blewitt 2014).

The role of the European Union (EU) in particular on pioneering certain transnational CSR policies shows that countries can be successful in implementing CSR—or strict corporate regulations and fostering compliance—at the large scale (Huber et al. 2015; Abramuszkinová Pavlíková and Basovníková 2015). International development policies play a large role on how global CSR is presently exercised (Elliott 2013; Blewitt 2014). While ecological footprint of different nations opens a question of national responsibility, global action inspired by political and corporate leaders often trickles down to local policy, arguably with mixed results and efficiency (Blowfield 2013).

The mechanisms that support CSR range from voluntary or compulsory. Sometimes, corporations choose to be more sustainable in order to prevent government regulation, to avoid persecution and litigation, as well as because government regulation can create level the playing field by preventing their competitors from unsustainable practices (e.g., Kopnina and Blewitt 2014). In the case of climate change measures, for example, both voluntary and compulsory measures have been proven effective in cases of at least monitoring and reporting is now mitigating or limiting emissions (e.g., Pinske and Kolk 2009).

Perhaps the biggest motivation is saving on the corporate bills, notably from improved energy efficiency and waste management strategies (Blowfield 2013; Nemetz 2013). While the economic impact of investing in CSR is clearly understood (e.g., Arts 2002; Blowfield 2013; Kopnina and Blewitt 2014), less cynical readers would point out that these ulterior motives detract from the realization by corporate stakeholders that being sustainable is the right thing to do, trusting that if all the external incentives were removed, businesses would still choose to be sustainable (Kopnina and Blewitt 2014). Understanding constraints to sustainability is part of moving toward sustainability. Another aspect of transition is realizing the choices available and choosing the best ones. Luckily, good ideas and solutions already exist.

3.7 Biomimicry

Biomimicry basically imitates the nature's models or takes inspiration from naturally occurring designs in application to human industry (Benyus 1997). Biomimicry appreciates nature's diversity, as it is recognized that healthy ecosystems are complex communities of living things, each adopted through centuries of evolution to unique climate or geographic features of surrounding landscape.

Related to biomimicry is the concept of industrial ecosystem that emphasizes the optimization of energy and material flows whereby the waste from one production process becomes an input to another (Graedel 1996; Lyle 1996). One should be careful, however, not to see biomimicry or industrial ecosystem as only production methods, but also a system that protects biodiversity, as in the case of rewilding (Monbiot 2014).

3.8 Cradle to Cradle

Based on the notion of industrial metabolisms, McDonough and Braungart (2002) developed the notion of the Cradle to Cradle (C2C). McDonough and Braungart ask us to contemplate not just minimizing the damage the way eco-efficiency does, but eliminating it all together. C2C critiques many tenants of conventional minimization of damage strategies, such as eco-efficiency. While eco-efficiency is currently favoured in sustainability discourse, according to C2C it only serves to 'slow the process of destruction' and 'makes a bad design last longer.'

Instead, the C2C framework propagates a simple dictum: waste equals food. A cherry tree metaphor exemplifies the C2C principle, with the tree's 'waste' (blossoms and berries) either consumed or decomposing into food for soil, with nutrients flowing indefinitely in cycles of birth, decay and rebirth. Understanding these regenerative systems allows product engineers to recognize that all materials can be designed as nutrients that flow through natural (biological) or designed (technological) metabolisms. In permacultures, for example, materials designed as biological nutrients, such as textiles and packaging made from natural fibers, can restore soil after use (Doherty 2015). Ideally, every product can be designed from the outset so that after its lifetime is over, the product can be dismantled so that its elements will continue to 'live' by becoming a nutrient, creating inherently benign material flows (Brennan et al. 2015).

However, in the case of business, such close-loop system requires that reverse logistics is considered. If products are to be up-cycled (Pauli 1998, 2010, 2011), this requires collection, sorting and transportation, all of which can be costly. This is both a challenge and an opportunity for business as product design impacts the ease and success of all re-use strategies (Hopewell et al. 2009). For example, Design for Disassembly and Design for Remanufacturing (DfREM) attempts to factor in the close-loop requirements, including standardisation of components (Brennan et al. 2015). Remanufacturing in electronics in China shows the promise of how corporations can profit from reuse strategies (Hatcher et al. 2013).

At the simple technical level, practically all pre-industrial designs were 'Cradle to Cradle' as the products were non-toxic, biodegradable and easily traded between their owners. Obviously, the return to pre-industrial designs is not desired by most businesses (as there is little money to be made from 'back to the basics' and it does not sound 'progressive'). Thus, most of C2C products are based on innovative and not necessarily affordable designs (Kopnina and Blewitt 2014). At a 'fancier' innovation level, a large number of companies have adopted C2C principles. An example includes Desso, the first carpet manufacturer to adopt the C2C design (http://www.desso.nl/). Desso carpets and artificial grass are produced using manufacturing processes that relies on renewable energy, conserves water and embraces social responsibility. Their products are designed in such a way that they can be biologically or technologically (reused) at the end of their useful lives.

The challenge for business adopting C2C is slipping into yet another growth model, as C2C certification agencies have themselves become a big business. The Cradle to Cradle Products Innovation Institute, a nonprofit organization that administers the Cradle to Cradle Certified Product Standard, and The Cradle to Cradle Certified CM program, a third party, multi-attribute eco-label have all emerged as powerful corporate players (Brennan et al. 2015). The founding fathers of C2C system have been blamed for monopolizing the market and keeping authorship rights to their concepts preventing its wide usability (McIntire-Strasburg 2008). Dramatic failures of C2C design were discussed in the case of

China, where eco-cities were designed with little awareness of local conditions, and the much-touted projects have largely been scrapped (e.g., Larson 2009).

Yet, keeping this critique in mind, it is also important not to throw a baby out with a bath water. If C2C is applied globally, this can signify nothing less than a new industrial revolution that has a potential to be ecologically benign.

3.9 Circular economy

Walter Stahel and Genevieve Reday (1981) and Stahel (1984) have sketched the vision of circular economy, or a 'self-replenishing economy.' This economy is 'restorative by intention,' implying that businesses have a positive rather than environmental impact (Hawken 1993). Similar to C2C and biomimicry, natural systems perspectives are used as models for industrial design (Pauli 1998, 2010, 2011). The report Towards a Circular Economy Report by Ellen MacArthur Foundation launched at World Economic Forum (WEF) emphasized design for reuse and access over ownership models that promote greater circularity as a lucrative business opportunity. Selling the use or function of the product (e.g., service) rather than the product itself enables the efficient cycling of materials and simultaneously giving incentives for innovation (Scott 2011).

Sharing economy can be also seen as opportunities for new business that employ the leasing model of their products and appeal to the environmentally conscious audiences. For example, the Dutch company Mud Jeans (http://www.mudjeans.eu) applies such a model to leasing their denim products.

While all these constructive frameworks are the promises for the future, some of them, however, can be subverted by profit-seeking innovative designs and technologies (Kopnina 2014a). Once again, caution is called for. Rammelt and Crisp (2014) warn that while circular economy undoubtedly has something to offer, it will end up chasing its tail if the social and economic forces driving up production and consumption are not addressed. The possibility of decoupling environmental impact from economic growth is problematic (Victor 2008; Jackson 2009). The case studies of Ellen MacArthur Foundation (2015) also show that some companies, such as Coca Cola, commit to 'maximizing the usage and value of the plastics used in bottle production… including a target of reducing 25 % of material used by 2020, says little about sustainability on a larger scale. Even if part of the bottles is reused (although recycling seems more likely), there is no indication as to how the materials will be reused and what happens to the rest 75 % of the production. As for the commitment to 'improve the overall *recyclability* of their packs,' the company seems to be selling old Cola in new bottles. This demonstrates how seemingly green compromises might be high-jacked to justify further 'business-as-usual' trajectory.

While ideas, ideals and innovations can be subverted and greenwashing is common, the challenge is to retain the constructive ones. A good guiding principle in adapting these frameworks is an application of *ideals* and *ethics*.

4 Conclusions

One of the challenges of realizing sustainability is critical examination of common assumptions and paradoxes of the mainstream sustainability thinking. While focused on the symptoms of unsustainability, including resource depletion, climate change and poverty, conventional framework tends to ignore the ethical and practical contradictions.

One of these contradictions involves the desire to improve human health and material well-being on the one hand and to secure the carrying capacity of this planet on the other hand. In addressing the question 'How do better health and more equitable distribution of resources contribute to unsustainability?' we have addressed one of the most ethically charged and paradoxical sustainability challenges of our time. This challenge involves the desire to improve human health (resulting in population growth) and material well-being (resulting in increase in consumption) *and* to secure the carrying capacity of this planet (which is conditional on halting population and consumption), reflecting the 'have your cake and eat it' oxymoronic objective. While many companies are aware of the symptoms of unsustainability, few of them have realized the core challenges and bottlenecks of unsustainability. Few CSR programs have addressed the root causes of poverty, part of which is population growth itself, and the economic growth imperative. While many businesses have accepted poverty elevation and economic aid to developing countries as normative in their CSR policies, few of them invest in family planning or attempt to halt production of unsustainable products.

Realizing that many barriers are built into the fabric of everyday life through political establishment, business practices, or social conventions and cultural assumptions, dismantling barriers to more sustainable business will also mean addressing the 'deeper' challenges to sustainability (Chawla and Cushing 2007). One of the barriers is the denial of population growth as a driver of unsustainability; another is the belief that overproduction and overconsumption problems can be solved by eco-efficiency.

In order to achieve sustainability, business and public and government stakeholders need to better understand the mechanisms underlying unsustainable practices (e.g., Washington 2015). Once these and mechanisms are understood, a more positivistic turn toward solutions becomes possible.

Various constructive approaches were discussed, beginning with the useful distinction between public and private as well as direct and indirect environmental impacts (e.g., Stern 2000). In answering 'What do pension funds have to do with sustainable business?' we have discussed the indirect factors (financial investment) influencing unsustainability. Thus, stimulating new forms of consumption associated with consumer choice editing, sharing economy and collaborative consumption could be strategically linked to investment strategies.

Thus, clear, positivist definition of sustainability requires a constant and ideally declining human population, and sustainable production and consumption. Ideally, sustainable consumption needs to be based on Cradle to Cradle, circular economy, or steady-state economy models, with consumption of energy limited to solar, wind or tidal waves. In answering 'Why is eco-efficiency not good enough to achieve sustainable production?' we have evoked the critique of eco-efficiency as a mechanism that makes a destructive system last longer (as most 'energy mixes' do) rather than promoting radical change (as transformation to renewable energy *only* would). This seemingly uncompromising vision is necessary to meet the challenges of sustainability. This vision is anything but grim. In a resource constrained world, companies can make profit by developing products that reuse valuable materials, completely eliminating waste and adding value to both human and natural diversity.

The greatest challenge remains convincing the corporate leaders that adaptation of these frameworks is necessary. The opportunity lies in the fact that businesses—for reasons ranging from profit to real concern about the state of the planet—already have shown that they can take bold steps to address unsustainability. We, the academics and the public, can

help ensure that these steps are taken in the right direction. In rising above the despair or endless doubts, we need to continue moving theory and practice toward sustainability aims.

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