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Review

Corporate environmental sustainability in the retail sector: Drivers, strategies and performance measurement

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ABSTRACT

Retailers are increasingly required to decrease the internal and external environmental impacts of their operations. To achieve this they progressively adopt different corporate environmental sustainability (CES) actions and strategies. Understanding the motivations of retailers for adopting CES strategies (and the types of actions prioritized) is necessary for determining the possible environmental benefits. This literature review examines the key drivers for the adoption of CES strategies in the retail sector, as well as the most common strategies, and measures of progress. Our review suggests that the primary motivations for retailers to implement CES strategies are the expected economic benefits, mainly through cost-savings from reducing resource use. Thus strategies targeting the internal operations of retailers such as energy conservation and GHG emission reduction measures dominate the sustainability agenda of retailers. Decreasing and recycling packaging materials and food waste is also prioritized in some settings. Pressure from internal and external stakeholders will increasingly become a dominant driver of CES adoption as the impacts of retail products along their entire value chain become more prevalent among stakeholders. However, there is a lack of literature on stakeholder engagement initiatives for CES strategies in the retail sector, especially regarding customer-focused sustainability strategies. Furthermore, the opportunity to take advantage of green markets and expand consumer bases will be hard to resist for many retailers, especially in highly competitive markets. This combined with the increasing policy traction of the Sustainable Development Goals (SDGs), and especially SDG 12 on responsible consumption and production, can catalyse the proliferation of CES strategies in the retail sector. Companies will be expected to report on their sustainability progress, which will further motivate them to adopt fruitful strategies or risk reputational damage.

Contents

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Glossary

ASHRAE	American Society of Heating, Refrigerating and Air-Conditioning Engineers
CEO	Chief Executive Officer
CFCs	Chlorofluorocarbons
EU	European Union
GHG	Greenhouse Gas
GRI	Global Reporting Initiative
HFCs	Hydrofluorocarbons
HVAC	Heating, Ventilation and Air Conditioning
IDS	Institute of Development Studies
JRC	Joint Research Centre
LED	Light-emitting Diode
NGO	Non-governmental Organization
NPO	Non-profit Organization
OECD	Organization for Economic Co-operation and Development
RFS	Retail Forum for Sustainability
TEEB	The Economics of Ecosystems and Biodiversity
UK	United Kingdom
UN	United Nations
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
WBCSD	World Business Council for Sustainable Development
€	Euro

1. Introduction

Global consumption and production trends remain unsustainable, even though sustainable development gained a lot of policy traction in the past decades (United Nations, 2015). As an important social actor, the private sector must play a leading role in identifying and implementing sustainable solutions (Azapagic and Perdan, 2000). In contrast to the anti-industry, anti-profit and anti-growth orientation of much of the early environmentalist movement, it has become increasingly clear that the business sector must play a central role in achieving the goals of sustainable development strategies (Elkington, 1994). Sustainable development and social responsibility have emerged as very important strategic issues for companies in virtually every industry (Fiksel, 2006).

This has been a gradual process since the 1992 Earth Summit in Rio de Janeiro that created a "*new energy in environmental governance, engaging actors beyond the state and across scales, from local to global, from communities to large transnational networks*" (Andonova and Hoffman, 2012: 57). Ten years later, the Rio +10 summit in Johannesburg, further promoted corporate responsibility and accountability (La Vina et al., 2003). The UN Conference on Sustainable Development (Rio+20) went a step further by declaring that sustainable development "*can only be achieved with a broad alliance of people, governments, civil society and private sector, all working together to secure the future we want for present and future generations*" (United Nations, 2012 cited in Filho et al., 2015: 123). After Rio+20, the need to develop a framework to guide and advance business involvement has grown substantially, with stakeholders increasingly expressing the need to reshape the role of business (IDS, 2017). The Sustainable Development Goals (SDGs) adopted by the UN General Assembly in 2015 set out the post-2015 sustainable development agenda. SDG 12 advocates that principles of sustainable production and consumption must be widely adopted by 2030.[1]

In this context, corporations are often perceived to have the resources needed to effectively address sustainability issues (Dyllick and Muff, 2016). Increased policy and consumer pressure to enhance environmental sustainability has often catalysed the development and implementation of corporate strategies to reduce the environmental impacts of the products and services offered by companies (Smith and Perks, 2010). According to the UN Global Compact (2014), businesses should adopt a precautionary approach to environmental challenges, undertake initiatives to promote greater environmental responsibility, and encourage the development and diffusion of environmentally friendly technologies.

The retail sector[2] is a global economic powerhouse that has an average annual growth rate of 3.8% since 2008 and estimated revenues of US$ 22.6 trillion globally (which is expected to rise to US$ 28 trillion by 2019) (BusinessWire, 2016). The sector represents 31% of the global Gross Domestic Product (GDP) and employs billions of

[1] Targets include, among others, to (a) achieve sustainable management and efficient use of natural resources, (b) encourage companies (especially large/transnational companies) to adopt sustainable practices and integrate sustainable information into their reporting cycle, and (c) substantially reduce waste generation through prevention, reduction, recycling and reuse.

[2] Retailing consists of the final activities needed to either place a product in the hands of consumers or to provide a service to consumers. Retailing is usually the last step in a supply chain, so firms that sell products or provide services to the final consumer are performing the retailing function (Dunne et al., 2011).

people worldwide, with hypermarkets and supermarkets currently accounting for 35% of direct retail sales globally (ibid). As a result the retail sector has substantial economic leverage and resources to effectively address sustainability issues.

At the same time retailers can have substantial environmental impacts. This includes direct impacts that stem from retailing operations (Brancoli et al., 2017; Bradley, 2016; Zaatari et al., 2016) and indirect impacts that stem from the production of retailed goods and other ancillary activities (Cimini and Moresi, 2018; Miah et al., 2018). To our knowledge there are no studies that assess the environmental impact of the retailing sector as a whole. However there are several studies about the environmental impacts of individual retailers (Brancoli et al., 2017; Mylona et al., 2017), retailed products (Hallström et al., 2018; Gutierrez et al., 2017; Williams and Wikström, 2011), and supply chains (Fabbri et al., 2018; Cicatiello et al., 2016; Wang et al., 2016), as well as studies that examine the environmental benefits of mitigation strategies in the retail sector (Gimeno-Frontera et al., 2018; De Frias et al., 2015; Hellström and Nilsson, 2011; Ubeda et al., 2011). Such studies attest to the substantial environmental impact of the retailing sector, and its key role in enhancing societal sustainability.

Jones et al. (2009) suggest that as retailers are the active intermediaries between primary producers, manufacturers and consumers, they are in a singularly powerful position to drive sustainable consumption and production through (a) their own actions, (b) partnerships with suppliers and (c) daily interactions with consumers. There is "*huge potential for retailers to use their market position and influence over suppliers and consumers to drive environmental improvement*" (Styles et al., 2012: 59). Giant retailers such as Wal-Mart have "*tremendous control and influence over both their suppliers and the individual consumers who ostensibly make demands on them"* and they should be held *"equally responsible for the choices they make in the wholesale and supply-chain marketplace"* (ibid). However, the role of retailers in coordinating and fostering green practices across their value chains has been largely ignored within the academic literature (Lai et al., 2010). In fact, Delai and Takahashi (2013) state that research on retail sustainability is lacking, especially in emerging country contexts. Tang et al. (2016: 394) assert that the literature on corporate social responsibility (CSR) is largely confined to the manufacturing industry[3] with a *"serious lack of focus on the retail sector*".

Retailers increasingly implement Corporate Environmental Sustainability (CES) strategies[4] to improve their environmental performance. For example, in 2016 approximately 98% of the home furnishing materials (including packaging) of the multinational furniture and home-ware retailer, IKEA, were made from renewable, recyclable or recycled materials (IKEA Group, 2016). Sainsbury's, one of the UK's biggest supermarket retailers, has consistently achieved zero waste to landfills since 2013 (Sainsbury's Ltd, 2017). The multinational clothing retailer H&M, sourced 43% of their cotton from sustainable sources (aiming to increase it to 100% by 2020) (H&M Group, 2016).

The aim of this literature review is to synthesize the existing knowledge about CES in the retail sector. It offers a critical analysis of the (a) main types of CES strategies adopted and implemented in the retail sector, (b) reasons/drivers of their adoption, and (c) tools/approaches for implementing CES and assessing the performance of retailers.[5] Section 2 outlines the literature review protocol adopted to synthesize existing evidence across three main questions:

- What are the main drivers for adoption of CES strategies (Section 3)?
- Which types of strategies are adopted within the retail sector (Section 4)?
- What frameworks/tools do companies use to incorporate CES, measure their environmental performance and report the outcomes (Section 5)?

2. Methodology

After formulating the research questions outlined in Section 1, we conducted an extensive literature search, focusing on peer-reviewed journal papers. Our approach was informed by the review protocols on research methodologies relating mindfulness to sustainable consumption (Fischer et al., 2017), and sustainable business model archetypes (Bocken et al., 2014). The process followed in this literature review involved four steps (Fig. 1):

(1) locating journal articles using online databases and appropriate search terms,
(2) partial screening to establish relevance to the research questions,
(3) in-depth screening and annotation to identify categories and themes and
(4) extraction and categorization of relevant information.

For Step 1, we used different databases, as no single database is sufficient for covering all relevant articles (Gray, 2014). Elsevier Scopus was the primary search engine, with complementary searches done using Web of Science and Google Scholar. Search terms included "Corporate Environmental Sustainability", "Corporate Social Responsibility", "sustainable retail sector", "green business" and "sustainable consumption". Additional search terms were included to identify relevant papers that did not directly use the above terms. Boolean operators were used to improve search accuracy and both qualitative and quantitative studies were included, while only sources written in English were considered. The selected documents had to relate to the environmental impacts of the business sector, and more specifically the retail sector. Selected documents comprised mainly of peer-reviewed journal articles and a limited number of books, reports and online resources, including company reports. To a limited extent we included studies that did not explicitly refer to the retail sector, but focused on broader business responses to CES issues. In order to obtain an updated perspective we excluded articles published before 2000, with the exception of two studies. Geographical

[3] This possibly reflects the historical focus of sustainability literature on the manufacturing sector (Hassini et al., 2012).

[4] CES constitutes the environmental aspect of CSR (He and Chen, 2009). For the purpose of this study, we define CES as the actions taken by companies to decrease their internal and external impacts on the natural environment, in order to improve sustainable consumption and production throughout the supply chain. Sustainable consumption is defined as the use of services and products that meet basic human needs and promote quality of life while minimising natural resources and hazardous materials usage, as well as waste and emission generation in the whole product life cycle, so as not to affect the satisfaction of future generations' needs (Delai and Takahashi, 2013). Sustainable production is defined as the continuous application of an integrated preventive environmental strategy applied to processes, products and services to increase eco-efficiency and reduce risks to humans and the environment (ibid).

[5] For the purpose of this paper, we define direct environmental impacts as those caused by retail activities associated with store, warehouse and office areas, such as CO_2 emissions from lighting and refrigeration activities. Indirect environmental impacts are those caused by the activities of suppliers, manufacturers and customers. These can include biodiversity loss due to land clearing for agriculture, and pollution of water and soil due to inappropriate waste disposal.

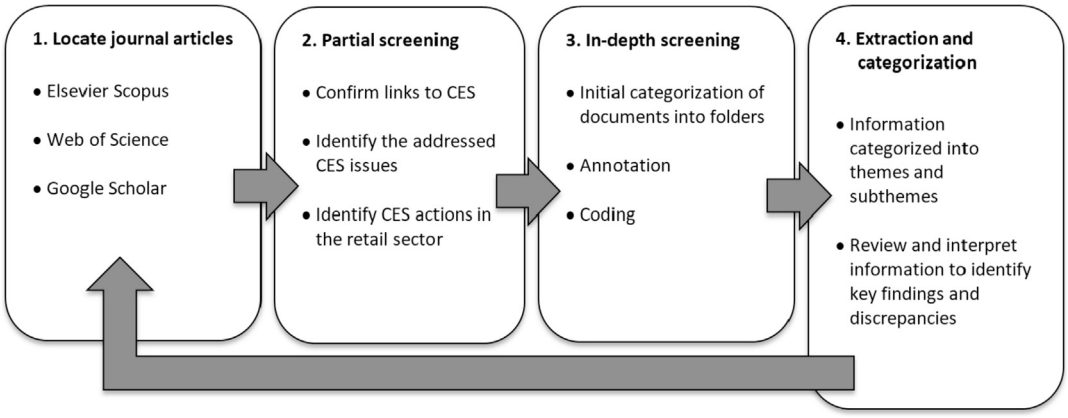

Fig. 1. Methodological approach used in this study. Adapted from (Bocken et al., 2014; Fischer et al., 2017; Merriam and Tisdell, 2016).

factors were not a limiting factor for inclusion in this review.

For Step 2, after locating a relevant document, the abstract was examined to determine if the research was applicable to this study. The content of the document was partially screened to identify relevant information that could potentially help in answering the research questions. If the document was found to be suitable it was reviewed in more depth.

For Step 3–4, once the above criteria were satisfied, each document was categorized into folders based on the focus areas of this study. Thereafter articles were examined in-depth to extract key information by annotating, coding and categorizing the relevant data following Merriam and Tisdell (2016). For this study multiple folders and documents were created for data extraction into categories, themes and sub-themes such as (1) CES drivers, (2) CES strategies, (3) CES tools and guidelines, (4) CES outcomes and (5) CES trends within the retail sector.

3. Drivers of CES adoption in the retail sector

Retailers are increasingly adopting environmental protection initiatives to improve their value chain operations (Tang et al., 2016) and although there may be a combination of reasons, there is usually a primary motivation for companies to 'go green' (Saha and Darnton, 2005). Hendry and Vesilind (2005) claim that only by understanding these motivations will it be possible to promote the greater involvement of the private sector in sustainability initiatives. This literature review identified three main drivers that influence the shift away from business-as-usual approaches in the retail sector towards more environmentally friendly forms of retailing. These are profitability (Section 3.1), environmental policy (Section 3.2) and stakeholder pressure (Section 3.3).

3.1. Profitability

Environmental performance improvements can have considerable economic advantages to countries and companies (Christoff, 1996). Companies around the world are trying to improve their environmental performance, optimize resource utilization, and pay attention to cost control and efficiency of business processes (Krechovská and Procházková, 2014). Many companies look for green engineering opportunities only to provide a way to decrease expenses, thereby increasing profitability (Hendry and Vesilind, 2005).

When it comes to retailing, Tang et al. (2016) state that better resource utilization in production and transportation will lead to cost reduction, while green retail operations can help both reduce costs and create value, allowing firms to obtain greater profitability. Retailers adopting green operations serve their stakeholders well and simultaneously improve financial gains (Tang et al., 2016), while there is increasing evidence that companies can profit from considering environmental externalities (Iacona, 2010). Further examples of internal and external opportunities to becoming green (both in the short- and long-term), include good publicity, achieving competitive advantage, increasing market share, reducing risks, entering into international markets and attracting potential employees (Saha and Darnton, 2005). A company that decreases and eliminates its wastes will most likely reduce its costs, while a company that finds ways to turn waste into a new resource will increase its revenues from existing assets (DesJardins, 2005).

Ambec and Lanoie (2008) state that better environmental performance can boost revenues through better access to markets, differentiating products and selling pollution-control technology. Consequently better environmental performance can lead to cost reductions in four categories: (a) risk management and relations with external stakeholders, (b) cost of material, energy and services, (c) cost of capital and (d) cost of labour (Ambec and Lanoie, 2008). DesJardins (2005) further explains that sustainable companies can gain competitive advantages not only due to increased savings, revenues, and efficiencies that can place a company in a better position relative to its competitors, but also due to their potential to take advantage of 'green' markets. While sustainable practices should not only be a marketing tool, the growing consumer market for sustainable and environmentally beneficial products and services should not be underestimated in business decisions (ibid).

However, even though adopting CES strategies can considerably reduce costs for retailers and expand markets in the long-term, significant cost savings and increased revenues may only occur after substantial initial investments are made to alter the existing systems (Sinha et al., 2014; Chkanikova and Lehner, 2015; Chkanikova and Mont, 2015; Thompson, 2007).

3.2. Environmental policy

Legislation, regulations and voluntary codes of practice, such as the United Nations Global Compact (UNGC), have added to the pressure for corporations to be seen as acting in a sustainable manner (Haugh and Talwar, 2010). Institutional forces "*in the shape of norms and expectations*" have also obliged corporations to acknowledge the importance of sustainability (WBCSD, 2000 cited in Haugh and Talwar, 2010: 385). Azapagic (2003) asserts that one of the main motivations behind the adoption of corporate

sustainability strategies has been legislation increasingly geared towards promoting sustainable development.

Environmental regulations are exerting greater pressure on retailers to emphasize environmental protection in their operations and embrace green practices throughout their value chains (Lai et al., 2010). Christoff (1996) states that the emerging environmental policy discourse emphasises the mutually reinforcing environmental and economic benefits of resource efficiency and waste minimisation. Supranational institutions such as the United Nations are playing a crucial role in setting norms and broad agendas for environmental sustainability, which provide a framework to develop context-specific national regulations (Henzelmann et al., 2011). Moreover, the role of government policy is not simply to respond to existing wants and preferences of citizens, but also to support and encourage environmentally aware behaviour and discourage behaviour that threatens or damages the environment (Weale, 1992).

According to Azapagic and Perdan (2000) mandating fines for unsustainable practices is not enough to make companies change their practices, however, being on a 'shame list' that publically identifies the worst polluters brings negative publicity and a potential loss of business that could cost much more than the financial penalty itself. Leading retailers often foresee and move ahead of legislation in order to take advantage of cost-savings associated with catching up with legislation (Lai et al., 2010; Azapagic and Perdan, 2000).

In the past many companies implemented strategies to reduce their environmental burdens after environmental regulations pressured them into action, and consequently many were overwhelmed by clean up and compensation costs DesJardins (2005). However the "*legal concepts of negligence and foreseeability are waiting to be exploited in holding business liable for the entire life-cycle of its products*", as a result companies that are not pro-active and deal with sustainability as a compliance issue are putting themselves at risk (DesJardins, 2005: 44).

Lai et al. (2010) state that policy-makers should formulate proper environmental regulations and voluntary measures to green the retailing industry. However, this legislation should not be the only mechanism to promote green behaviours in the retail sector, as it is clear that complying with minimum legal standards is no longer enough (Iacona, 2010). Government policies can support development-based green retailing by allocating research funds for green product design and green technology development (Lai et al., 2010).

3.3. Stakeholder pressure

Sandhu et al. (2014) argue that powerful stakeholders, both external (e.g. regulators, supply chain, media) and internal (e.g. top management), can drive corporate environmental responsiveness, as their power and influence can act as strong pushing points for companies. Azapagic and Perdan (2000) highlight several factors related to stakeholder perceptions that motivate companies to adopt voluntary sustainability strategies including: (a) possible reputational costs associated with the social perception and image of a business, (b) increased public awareness of environmental problems and lobbying of various pressure groups, (c) increasing numbers of corporate shareholders with proven environmental and ethical credentials, and (d) preferential investment in environmentally and ethically responsible companies by large lenders. Furthermore, the increasing demand for transparency about decisions and actions taken to overcome sustainability challenges is not to be underestimated (Dyllick and Muff, 2016).

The customer-company relationship is also an important consideration of sustainability, which companies should pay attention to, because it can affect market share and short-/long-term revenue (Delai and Takahashi, 2013). As customers become more aware of the environmental impacts of their consumption patterns, there is an increasing demand for ecological products, which places demand for greening the way businesses deliver their products and services (Smith and Perks, 2010). For example, in his study on the Swedish food retail sector, Lehner (2015: 389) explains that retailers, not only influence physical exchange, but the store itself as a *"point-of-interaction between retailers and consumers fulfils an important role in the process of achieving sustainable consumption … as a place for exchange of information, ideas and understanding of what it means to consume sustainably"*.

There is also a strong reputational angle for retailers to consider, in that they increasingly cannot be seen to be operating in manner detrimental to the environment (Ochieng et al., 2014). Concerns over reputation can decrease brand value, consumer loyalty and eventually threaten a company's legal and social license to operate (UNGC, 2010). Consequently, it has been argued that if the management of a company neglects or acts against stakeholder interests, then it is possible that the company might end up in a financially vulnerable situation (Azapagic and Perdan, 2000). Pressure from customers, employees, government, media, investors, financial institutions, local communities and other interest/pressure groups can therefore encourage retailers to become more environmentally responsible (Ramanathan et al., 2014; Saha and Darnton, 2005). Firms must try to cope with such pressures while staying competitive at the same time (Ambec and Lanoie, 2008). A continuous collaboration with other stakeholders can yield ripple results in terms of new strategies and technologies, which can benefit retailers into the future (Richmond and Simpson, 2016).

4. Main types of CES strategies in the retail sector

Retailers usually undertake three main types of activities to promote sustainable production and consumption (UNEP, 2011 cited in Delai and Takahashi, 2013; Jones et al., 2009; Lai et al., 2010):

- Manage the sustainability impacts of their own operations (e.g. stores, headquarters and warehouses) through the implementation of environmental management systems (EMS);
- Manage sustainability impacts throughout the value chain usually through cooperation with their suppliers (e.g. to develop sustainable products, incentivise the adoption of cleaner production techniques and select suppliers according to sustainability criteria);
- Engage with stakeholders through consumer education about sustainable consumption, incentives to buy eco-friendly products and offering advice on product sustainability, use and disposal.

Table 1includes some of the main CES subcategories identified through our literature review. Sections 4.1–4.3 discuss the most prominent technical and behavioural strategies adopted by retailers to reduce their environmental impact and promote sustainability.

4.1. Management of internal operations

4.1.1. Energy use and GHG emissions

Energy costs are typically the second highest operating expense for retailers, so implementing cost-effective energy saving strategies can have a direct and significant impact on profitability (ASHRAE, 2011). Given that many retailers operate hundreds of stores with millions of square meters of floor space (often between

Table 1
Main types of CES activities.

Internal operations	Supply chain management	Stakeholder engagement
▪ Energy management & GHG emissions reduction ▪ Integrated waste management ▪ Water conservation	▪ Sustainable sourcing ▪ Certification ▪ Take-back mechanisms ▪ Transportation efficiency ▪ Water conservation	▪ Customer engagement ▪ Staff training ▪ Shareholder/investor relations

Source: Adapted from (United Nations, 2011 in Delai and Takahashi, 2013; Jones et al., 2009; Lai et al., 2010).

countries with different energy costs), decreasing energy consumption has become a considerable source of investment both to increase profits and educate customers (Richmond and Simpson, 2016). The retail sector uses most of the consumed energy for lighting, heating, ventilation, air conditioning and refrigeration (Dixon-O'Mara and Ryan, 2018).

Ventilation for improving indoor air quality for the comfort of customers and workers is one of the most energy intensive activities in retail stores (Zaatari et al., 2016). Commercial refrigeration[6] for food freezing and conservation in retail stores and supermarkets is another important energy consuming activity (Mota-Babiloni et al., 2015). According to Fedrizzi and Rogers (2002) lighting usually represents 30–50 percent of energy use in big box retailers and supermarkets, and is usually the best opportunity to improve efficiency. Heating represents the second largest energy use in northern areas, particularly in large facilities (Fedrizzi and Rogers, 2002). Energy demand for heating can be reduced by as much as 50 percent by installing more efficient heating systems/controls, heat recovery equipment and limiting the amount of outside air entering facilities (ibid).

Building energy efficiency strategies for the retail sector entails, among others, setting energy-efficient lighting times and heating/cooling points, as well as ensuring that staff take responsibility for energy-saving actions (Christina et al., 2015). The automation of temperature and lighting equipment is crucial to an energy efficiency strategy (Christina et al., 2015), while real time monitoring requires the physical installation of environmental and energy sensors in specific and representative points of buildings (Raimondo et al., 2015).

In their study on big box retail stores Richmond and Simpson (2016) state that strategies for lighting, heating, cooling and ventilation efficiency have been tested using various technologies. For example, energy use for lighting can generally be reduced by 40–80 percent by installing more efficient lighting fixtures, improved lighting controls and taking advantage of daylight where available (Fedrizzi and Rogers, 2002). Hill et al. (2010) cited in Kolokotroni et al. (2015) summarized the benefits of low energy design initiatives such as enhanced utilization of daylight, combining natural and mechanical ventilation with heat exchange, improved refrigeration cabinets with doors on frozen food cabinets, improved control over lighting and ventilation, acceptance of a wider range of internal temperatures, LED display lighting and renewable energy sources such as biomass or wind power.

Overwhelmingly such strategies have been developed while maintaining the overarching goal of not negatively impacting the sales environment, as energy savings at the expense of reduced sales is not feasible (Richmond and Simpson, 2016). However, Raimondo et al. (2015) asserts that there is insufficient research on energy and climate assessment for retail environments, where the satisfaction of both workers and customers requires a strict control of the environmental conditions.

4.1.2. Waste management

Waste management is interconnected with material consumption practices since the reduction, reuse and recycling of materials can minimize waste generation and land use for waste disposal (Delai and Takahashi, 2013). Waste reduction is also vital to product stewardship, which requires integrating external stakeholders into product design and process development so that waste can be eliminated and other life-cycle environmental costs reduced (Lai et al., 2010).

Food waste is a major social, nutritional and environmental issue that affects the sustainability of the food retail sector as a whole (Cicatiello et al., 2016). Lebersorger and Schneider (2014) state that waste prevention approaches in the food retail sector should focus on (a) avoiding returns, (b) transfer of best practices,[7] (c) informing and educating employees and customers and (d) strengthening food donations to social services. Regarding the latter, the authors assert that in order to prevent waste generation, cooperation between retail outlets and social services should be expanded.

Biodegradable packaging materials from renewable natural resources such as crops, have received increasing attention, particularly in EU countries. For example, noticeable progress has been made to create biodegradable materials with similar functionality to that of oil-based synthetic polymers (Davis and Song, 2006). As the materials are from renewable resources and biodegradable, it is foreseen that "*they would contribute to sustainable development and if properly managed would reduce their environmental impact upon disposal*" (Davis and Song, 2006: 147).

Another interesting way to reduce waste is to shift from selling a product to leasing it. Many companies have realized that for some products[8] there is no need to own the actual product in order to obtain its services (Orsato, 2006). Consequently by shifting from selling products to selling the function provided by them (i.e. the service) some firms can reduce both economic costs and environmental impacts (ibid). At the end of their life these leased products can be recovered by the companies that still own them "*to be either remanufactured and recycled in the same use or cascaded into different life cycles, thus closing the material loop completely*" (Azapagic and Perdan, 2000: 250). We can therefore argue that the service intensity of these products is raised because they provide a service that society requires but at least cost to the environment (Azapagic and Perdan, 2000). Finally, retailers may also facilitate product recycling or re-manufacturing for their suppliers or manufacturers by making use of their extensive networks of retail outlets as collection points for unused materials (Tang et al., 2016).

[6] Additionally, the extensive use of refrigerant gases (e.g. CFCs, HFCs) widely used in cold storage in supermarkets can contribute significantly to ozone depletion (Delai and Takahashi, 2013).

[7] An example can be developing food loss and waste measurement protocols and setting food loss and waste reduction targets (Lipinski et al., 2013).

[8] Such examples include printing facilities, computer hardware, household appliances, baby prams and even carpeting (Agrawal et al., 2012; Intlekofer et al., 2010; Mont et al., 2006).

4.2. Supply chain management

4.2.1. Product selection

Retailers can promote environmental improvements in supply chains through different tools. As discussed below, some of these tools include product performance labelling, third-party product certification, and establishing improvement programmes and environmental requirements for their suppliers (Styles et al., 2012). Dekker et al. (2012) identify three product aspects relevant to environmentally friendlier supply chains: (a) the way the product has been produced, (b) the way it has been transported and waiting for use (inventories) and (c) whether the value of the product can be recovered after its use (reverse logistics). This requires the adoption of green supply chain management practices which require the integration of "*environmental thinking into supply chain management, including product design, material sourcing and selection, manufacturing processes, delivery of the final product to the consumers, and end-of-life management of the product after its useful life*" (Srivastava, 2007: 54–55).

Environmentally conscious companies often look at the entire supply chain of their products, assess the environmental performance of their suppliers and make procurement choices on that basis (Ramanathan et al., 2014). When retailers measure and publish the environmental performance of the products they sell, manufacturers are more likely to develop 'greener' products (Dekker et al., 2012). Moreover, green retailing practices differ from green manufacturing practices, because retailers occupy a unique position that intermediates between suppliers and consumers (Tang et al., 2016).

Sustainable sourcing and selection of items to stock can reduce the effect of large retailers on biodiversity and ecosystem services, benefiting companies in return through operating costs reduction, increased customer loyalty and supply chain security (TEEB, 2012). For these reasons many companies seek to buy greener products and materials (green procurement), with some companies participating in buyers' groups to leverage their collective buying power to coerce suppliers into considering alternative production practices (Mazurkiewicz, 2004).

Products that adhere to sustainability standards (e.g. products certified by the Forestry Stewardship Council (FSC), Marine Stewardship Council (MSC) and Roundtable on Sustainable Palm Oil (RSPO)), can further facilitate verification and compliance with environmentally responsible production practices across complex and geographically dispersed supply chains (Chkanikova and Mont, 2015). According to Dyllick and Muff (2016: 167) "*in order to deliver organic or fair trade products to the markets (e.g. textiles, coffee, tea, cacao, bananas, chicken), whole supply chains will have to be reconstructed and controlled, reaching from Third World farmers, to traders, processors, and end-user markets. Rule-changing strategies can be seen in the creation of new institutions securing sustainable supplies like the Marine Stewardship Council for fish and fisheries and the roundtables on sustainable soy or palm oil. They set new standards for sustainable practices and create transparency through certification. This changes the rules of the game for all or most competitors*".

Retailers are also increasingly using choice editing,[9] which although fairly new to many businesses, has huge potential for advancing sustainable consumption and production (UNEP, 2012a). Giant retail companies such as Walmart, have developed their own rating systems which penalize unsustainable products "*to the point where a product may not be found on retail shelves at all. More subtle measures could include differential discounting or denying premium shelf space to less sustainable products*" (UNEP, 2015: 130). For example, Marks & Spencer have been credited as frontrunners in improving animal welfare by implementing their 100 percent free range egg policy, whereby all eggs sold in their stores are acquired from free range sources (Forum for the Future, 2008; Marks & Spencer PLC, 2018).

Finally, although it is important to adopt a life-cycle mentality in product selection as a means to enhance the sustainability of supply chains, this remains a big gap in policy and practice (Chun and Lee, 2013). A life cycle perspective can provide a better picture of the interactions between product selection and the environment, and identify key parts within value chains that can be targeted for improvements (Azapagic and Perdan, 2000). In the context of life cycle thinking, the choice of suppliers directly affects the environmental performance of the products sold, and as an extension that of the retailers[10] (Azapagic and Perdan, 2000). In such contexts, reducing the consumption of resources used through an efficient logistics system benefits retailers, but also their suppliers (Tang et al., 2016).

4.2.2. Green transportation

Transportation is a key element of retailing and a highly polluting activity (Ramanathan et al., 2014). Therefore improving transportation practices can substantially reduce the environmental impact of retailers. It has been suggested that green transportation, which involves the movement of goods with reduced materials, energy consumption and increased efficiency, can be a key element of green retailing (Tang et al., 2016). This can include the appropriate selection of vehicle types, delivery schedules, freight flow consolidation and fuel selection, among others (Ubeda et al., 2011). For example, large French retailers are increasingly adopting new logistics practices such as optimizing delivery schedules, replacing existing heavy goods vehicle fleets with less polluting vehicles (e.g. Casino), streamlining goods transport to decrease greenhouse gas emissions of carriers (e.g. Auchan) and combining road-rail transport (e.g. Decathlon) (Kessous et al., 2016).

4.2.3. Water conservation

Companies have to implement water management procedures at the levels of the facility and the supply chain (UNEP, 2012b), with supply chain water footprints being much larger than operational water footprints (Hoekstra et al., 2011). Despite their extensive supply chains, retailers generally do not perceive water management as a major area of concern, focusing their internal water management operations on water use monitoring systems, rainwater harvesting and installation of automatic taps and urinal control systems (Chkanikova and Mont, 2011).

Excessive wasting of freshwater or reducing water quality will be seen as companies neglecting their fundamental obligations to society, they therefore increasingly need to demonstrate how their water use is both efficient and effective, while minimising the potential for environmental damage (Burritt et al., 2016). However, if retailers decide to seriously take up the challenge of reducing their water footprints it is important to recognise that their supply chain water footprints overlap with that of their suppliers (Hoekstra, 2008). Considering the above, prioritising efforts to reduce supply

[9] Choice editing refers to "*consciously limiting the consumer's opportunities to select unsustainable products and services*" and willingly removing "*products known to be unsustainable, by either completely removing a product range or specific ingredients, components or types within ranges*" (Forum for the Future, 2008: 15).

[10] Important issues that need to be considered when establishing a relationship between supplier and retailer in order to reduce environmental impacts include: (1) the supplier's selection, development and partnership, (2) contracts and (3) development and production of sustainable products and services (Delai and Takahashi, 2013).

chain water footprints may seem more cost-effective (Hoekstra et al., 2011). This is important for water-intensive production processes "*such as farming and products with high embedded-water content such as meat, sugar and cotton*" (RFS, 2014: 1). Various tools can assist companies in reducing freshwater use, including the Global Compact principles, OECD Guidelines for Multinational Enterprises, GRI G3, CEO Water Mandate initiative, WBCSD Global Water Tool and Business Unit Water Footprint, among others (Lambooy, 2011).

Hoekstra et al. (2011) provide examples of how retailers can improve water management for both their internal operations and supply chains. Potential strategies include (a) recycling waste water and chemicals, (b) using water-saving appliances (e.g. dual flush toilets, dry sanitation equipment, water-saving irrigation equipment), (c) replacing/redesigning water-intensive processes, (d) agreeing on reduction targets with suppliers (e.g. avoid or minimize the use of substances in products such as soaps and shampoos that may be harmful when reaching water bodies), (e) switching to better suppliers, (f) investing in improved catchment management and sustainable water use, (g) reporting water-related efforts, targets and progress made in annual sustainability reports, (h) product water labelling, (i) business water certification, and (j) engaging with consumers, civil society organizations and governments on developing relevant regulation and legislation.

4.3. Stakeholder engagement

The effective design and implementation of sustainable production and consumption initiatives require multi-stakeholder engagement and partnerships (UNEP, 2015). An increasing emphasis on the interface of sustainability and stakeholder engagement will continue to protect retailers' license to operate (Forum for the Future, 2008). As discussed above, customer engagement, staff training and shareholder/investor relations are important avenues for reducing the environmental impact of retailers (Table 1). Building strong relationships between customers and retailers is very important for educating and incentivising customers to purchase sustainable products, and eventually changing consumption and production patterns (UNEP, 2011 cited in Delai and Takahashi, 2013). According to Zhu and Sarkis (2016) organizations select and introduce green marketing strategies, which subsequently affect the purchasing behaviours of consumers (or alternatively consumer demand for green products is met through green marketing strategies). For example, the outdoor clothing retailer Patagonia has an impressive homepage[11] that contains photographs, slideshows and videos focusing on issues such as organic cotton production, traceable supplies, climate change action, and repair-and-wear initiatives to minimize waste. The company also actively promotes environmental issues to raise awareness through their social media communications.

Another way to engage and collaborate with multiple stakeholders is through eco-labelling. Ecolabel standards are becoming more prevalent in CES strategies in the retail sector, and stakeholder engagement is central to their success. Ecolabels are designed to provide information on products' attributes to eventually decrease stakeholder uncertainty about the validity of green product claims (Darnall and Aragón-Correa, 2014). They are necessary in product packaging to communicate to consumers that a particular product is in some significant way less harmful to the environment (Tang et al., 2004). Ecolabels can reduce the cost and effort of obtaining information and promote recycling behaviour to consumers (Taufique et al., 2016). Ultimately the aim of eco-labelling in retail supply chains is to "*enable customers to participate in sustainable purchasing behaviour at the point of purchase*" (Hornibrook et al., 2015: 270). Some ecolabel examples include the Forest Stewardship Council, International Energy Star, EU Flower (EU), Nordic Swan (Scandinavia), Blue Angel (Germany), Environmental Choice (Canada) and Good Environmental Choice (Australia) (Horne, 2009).

Staff engagement can also catalyse retailing sustainability, as staff may simply not be equipped to effectively pursue a commitment toward corporate sustainability. This can be due to a lack of education and training, inability to relate sustainability to other corporate initiatives and lack of authority, among other reasons (Searcy, 2012). According to a study on how to improve retail energy efficiency behaviour in one of the UK's leading retailers, store managers and senior staff were found to have a vital role in directing other staff on responding to instructions from corporate headquarters and influencing them on how seriously to prioritise energy tasks (Christina et al., 2015). Their results point to the importance of having clear task strategies, simple performance goals to train and support operational staff, consistent and responsive support systems to build trust and engagement with staff on the shop floor, leadership support, results feedback and providing rewards/recognition for exceptional performance (Christina et al., 2015).

For example, Marks & Spencer has implemented several initiatives to engage their employees on CES efforts, which include (a) communicate with employees about their 'Plan A' environmental and ethical program goals, achievements and activities through emails, posters, and an intranet site, (b) designate a 'Plan A Champion' at each store and office facility who distributes information, engages with and motivates staff, (c) offer employees free energy monitors and insulation for their homes, (d) launch an innovation fund to finance sustainability projects initiated by employees, and (e) include sustainability as part of training for general merchandise buyers (Siegel et al., 2012). Such activities are promoted because even though employee engagement is *"just one piece of the puzzle, …it is arguably the most significant owing to the enormous power of employees to reach and influence customers, suppliers, and co-workers, to say nothing of family and friends and the broader communities in which they live"* (Siegel et al., 2012: 24).

Green investments[12] are another way to mobilize multiple stakeholders in CES activities. Green bonds[13] are an example of green investments that can help mobilize resources from domestic and international capital markets for climate change adaptation, renewables and other environment-friendly projects (UNDP, 2017). The market for green bonds has grown globally for institutional and retail investors, ranging from pension funds to socially-responsible retailers, seeking to invest in greener options (Wood and Grace, 2011). Finally, corporate sustainability reports, sustainability rankings and corporate green awards (Section 5) help investors make more informed decisions and allows the sustainability performance among different organizations to be compared over time (Skouloudis and Evangelinos, 2009).

[11] For more information see: http://www.patagonia.com/footprint.html.

[12] Reasons for green investments include: (a) ethical considerations, (b) economic returns, (c) legal or regulatory constraints to include an environmental dimension in investments, (d) improving reputation by publically showing concern for the environment (Amenc et al., 2010).

[13] UNDP (2017) defines green bonds as "*innovative financial instruments where the proceeds are invested exclusively (either by specifying the use of the proceeds, direct project exposure, or securitization) in green projects that generate climate or other environmental benefits, for example in renewable energy, energy efficiency, sustainable waste management, sustainable land use (forestry and agriculture), biodiversity, clean transportation and clean water. Their structure, risk and returns are otherwise identical to those of traditional bonds.*"

5. Frameworks for implementing, measuring progress and reporting on CES

There is a wealth of frameworks that can guide retailers in implementing CES strategies, measuring progress, and communicating this to their stakeholders. These include voluntary sustainability frameworks, guidelines and indicators, which are critical in facilitating the effective implementation and success of CES strategies. Below we outline some of the most widely adopted frameworks for implementing, measuring progress and reporting on CES globally (Fig. 2). However, we should stress that these are by no means the only relevant frameworks used for these activities.

The United Nations Global Compact (UNGC) is often seen as a first step towards adopting CES strategies. It is a voluntary corporate citizenship initiative designed to push companies to move beyond traditional compliance and narrow risk assessments (UNGC, 2014). It is *"a leadership platform for the development, implementation and disclosure of responsible corporate policies and practices. Launched in 2000, it is the largest corporate sustainability initiative in the world, with over 8000 companies and 4000 non-business signatories based in 160 countries"* (United Nations, 2017). The compact covers ten principles in the areas of human rights, labour, anti-corruption and the environment,[14] and includes specific practices for endorsing organizations to enact both internal corporate practices and external initiatives (Coyne, 2006).

Environmental Management Systems (EMS) are implemented to increase corporate compliance and reduce environmental impacts. Steger (2000: 24) broadly defines EMS as *"a transparent, systematic process known corporate-wide, with the purpose of prescribing and implementing environmental goals, policies, and responsibilities, as well as regular auditing of its elements."* The International Standardization Organization (ISO) is the world's largest developer and publisher of management systems and guidance standards. ISO 14000 is one of the relevant environmental standards that can *"enable both public and private organizations to identify and manage impacts of their operations from a life-cycle perspective"* (UNEP, 2015: 57–8). ISO standards also outline the general principles for conducting social and environmental audits, the criteria for selecting audit teams, and the qualifications necessary for internal and external auditors (Epstein and Buhovac, 2014).

ISO 14001 sets out the requirements for an EMS and helps organizations improve their environmental performance by implementing more efficient resource use and waste reduction processes (ISO, 2015). However, the mere adoption of an EMS does not indicate a more sustainable operation, unless it is implemented properly (Azapagic and Perdan, 2000). According to the ISO 14001 standard, organizations must conduct regular EMS audits to check if the EMS has been properly implemented.

In the absence of regulatory requirements, voluntary reporting guidelines are important for improving the consistency and quality of disclosure in corporate responsibility reporting (KPMG, 2013). The Global Reporting Initiative (GRI) provides the most recognised set of voluntary guidelines for corporate sustainability reporting. It includes core performance indicators relevant to most organizations and information required by most stakeholders (Skouloudis and Evangelinos, 2009: 44; Roca and Searcy, 2012). It represents the first global framework for comprehensive corporate sustainability reporting (Epstein, 2008) and includes sector-specific supplements with additional guidance on unique, sector-specific reporting needs (Coyne, 2006). The GRI's Sustainability Reporting Framework provides guidance on the disclosure of sustainability performance and the GRI list of indicators is a starting point for defining indicators and establishing the data collection protocols for sustainability auditing programs (Coyne, 2006) (see below).

Retail companies can adopt these voluntary frameworks to help frame sustainability issues pertaining to their operations and communicate their commitment to sustainability to corporate stakeholders (Epstein and Buhovac, 2014). The UNGC, ISO 14000 standard and GRI are complementary initiatives that can help retailers improve transparency when reporting their progress. Retailers such as H&M, Adidas and Woolworths (South Africa) have incorporated these frameworks into their corporate responsibility strategies, and refer to them in their sustainability reports. For example, H&M are signatories to the UNGC and their annual sustainability report serves as their Communication on Progress (COP) for the compact (H&M Group, 2017). Adidas is working with their athletic footwear suppliers to encourage the adoption of EMS systems, namely ISO 14001, to reduce the direct environmental impacts of manufacturing (Adidas AG, 2016). For the South African supermarket company, Woolworths, the GRI G4 Guidelines form the basis for their annual sustainability report and assists in identifying sustainability-related risks to their business (Woolworths Holdings Limited, 2017).

As mentioned above, a corporate sustainability reporting and verification system normally involves internal and external audits. Internal sustainability audits are critical in evaluating financial and sustainability performance (Epstein and Buhovac, 2014). Internal auditing can allow companies to identify areas of concern and improvement, gather information to aid managerial decision-making, monitor performance, and report progress to managers (Epstein and Buhovac, 2014). However, an important component of external reporting is independent verification. Sustainability audits conducted through third-party assurance processes and verifiers[15] can narrow the 'credibility gap' by providing independent and nonbiased assessments of the content, veracity, and accuracy of an organization's sustainability report or program (Coyne, 2006). This independent verification of corporate performance is increasingly being required by legislation and NGOs, so organizations that embrace sustainability principles should be prepared to have the performance of their sustainability program externally reviewed and scrutinised (Coyne, 2006). Corporations increasingly find independent verification and progress evaluation desirable as it adds to the authenticity of the reported results and can essentially improve their credibility among stakeholders. However, while many consulting and accounting firms have begun performing external environmental audits, their level of detail and the level of external verification/assurance vary significantly (Epstein and Buhovac, 2014).

Sustainability reports are the final product of the reporting process. It aims to essentially communicate the relevant information of sustainability performance to stakeholders in an attractive and straightforward way. Business leaders have to properly define and manage environmental communication, as failure to do so will increasingly pose a risk to their company's present/future value,

[14] The principles related to environmental issues are:

- Principle 7: businesses should support a precautionary approach to environmental challenges;
- Principle 8: undertake initiatives to promote greater environmental responsibility; and
- Principle 9: encourage the development and diffusion of environmentally friendly technologies.

[15] Such verifiers include accounting, consulting and specialised verification firms such as PricewaterhouseCoopers, KPMG, Ernst and Young and Deloitte (Fernandez-Feijoo et al., 2016). Shareholders or environmental NGOs can also provide such independent verification (Coyne, 2006).

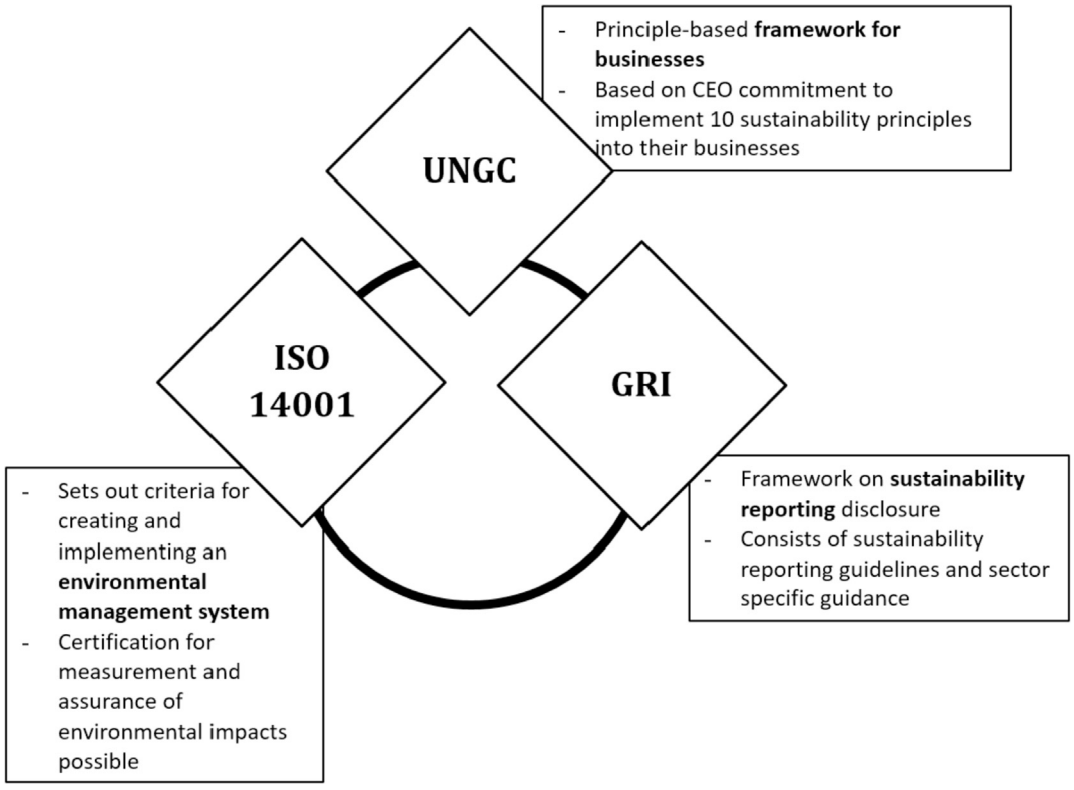

Fig. 2. Primary CES voluntary frameworks adopted by retail companies.

undermine their position as a responsible corporate citizen and their competitive advantage (Elkington, 1994). Indeed, robust sustainability reporting can offer a competitive advantage, as organizations increasingly experience more pressure from national and international competitors (Skouloudis and Evangelinos, 2009). Morhardt et al. (2002) cited in Daub (2007) outline several reasons behind the increase in sustainability reporting including: (a) meeting regulatory requirements, (b) reducing the potential cost of future regulations through a pro-active approach, (c) improving the public perception of corporate environmental activities to maintain and enhance competitiveness, and (d) reinforcing corporate social legitimacy through the adoption of an active environmental management approach. While retailers use various methods to report their sustainability commitments and progress, publishing reports on company websites is the most popular and most accessible reporting mechanism (Morhardt, 2009 cited in Jones and Comfort, 2018).

Performance measurement systems are used to assess the achievement of corporate goals and ultimately to improve management and financial/strategic decision-making. This entails the assessment of different types of indicators through accurate, consistent, complete and relevant data to support corporate decisions (Krechovská and Procházková, 2014). Sustainability Performance Measurement Systems (SPMS) are key components of corporate sustainability initiatives. SPMS is "*a system of indicators that provides a corporation with information needed to help in the short and long-term management, controlling, planning and performance of the economic, environmental and social activities undertaken by the corporation*" (Searcy, 2012: 240). By helping to better understand the current situation and the desired end-state, a well-designed SPMS can assist decision-makers in navigating the challenges of corporate sustainability (ibid).

Key performance indicators (KPIs) constitute the SPMS, and are used to measure progress and report corporate performance on set targets and objectives (KPMG, 2013). In fact corporate sustainability reports include environmental KPIs,[16] which are then compared against industry standards (Caritte et al., 2015). While many environmental KPIs have been suggested in the literature, it is not clear how they are used in practice (Roca and Searcy, 2012). They may be developed based on organization-specific sustainability goals, opportunities, risks, and/or commitments, or alternatively from external indices with company-specific customization (Coyne, 2006). While there is no clear-cut list, performance indicators should be (a) accurate; (b) understandable and unambiguous; and (c) able to allow comparisons between years, benchmarks and regulatory targets (JRC, 2011d cited in Caritte et al., 2015).

Retail companies, given their diverse operations and involvement in extended supply chains, adopt multiple types of CES strategies (Section 4). Table 2 summarises some of the main academic studies that have examined the performance of different types of CES strategies of retailers, and the indicators used to measure progress.

Finally, sustainability rankings are used to identify exemplary corporate sustainability performance. These include, among others, the Corporate Knights Global 100, the Guardian Sustainable Business Awards, the Dow Jones Sustainability Index[17] and Forbes Top

[16] An environmental indicator is "*a parameter, or a value derived from parameters, which points to, provides information about, and describes the state of the environmental performance of a technique or measure*" (JRC, 2011c cited in Caritte et al., 2015).

[17] The Dow Jones Sustainability Index, established in 1999, identifies the best companies in specific sectors and was the "*first index to attempt to assess the ability of businesses to create long-term shareholder value by embracing opportunities and managing risks deriving from economic, environmental and social developments*" (Szèkely and Knirsch (2005: 634).

Table 2
Examples of studies on measuring CES progress in the retail sector.

Reference	Country/region	Sector	CES issue/strategy	Indicators	Main findings
Mylona et al., 2017	United Kingdom	Frozen food retail	Energy use and space environmental systems	- Energy use per unit of sales area per year (kWh/m^2/year) - Annual energy use contribution of each sub-system (lighting, refrigeration, HVAC and electrical equipment) (kWh/year)	- Very high energy use intensity due to increased refrigeration load of 60% compared to 40% for typical supermarkets - Closed frozen food cabinets allowed for acceptable and comfortable environmental conditions for staff and customers - Highest energy reductions achieved when the HVAC system is operating during trading hours only. However this affects refrigeration performance due to increased indoor temperatures.
Spicer and Hyatt, 2017	USA	Supermarket retailer (Walmart)	Sustainable product sales strategy	NA	- Move away from customer-facing initiatives (e.g. change consumer preferences, product labeling) to supplier-facing initiatives to spur innovations toward improving environmental or social performance without raising costs - The shift did not require the direct buy-in from customers since more sustainable products continued to compete favorably in terms of price - Walmart's strategy avoided the transaction costs of changing customer attitudes and behaviors, moving toward low-cost innovations that aligned with its existing low-cost strategy
Moser, 2016	Germany	Retail (daily needs)	Consumer purchasing behaviour for environmentally friendly products	- Willingness to pay (WTP) for environmentally friendly products (€) - Budget share: Ratio of expenditures for environmentally friendly products to the total expenditures in the respective product category for one year (percentage)	- Self-reported purchasing behaviour was not significantly related to actual green purchasing behaviour in any product category - High prices of green products seem to constrain the ability to purchase them - Consumers reported WTP does not automatically influence their purchasing behaviour - Consumers spent 2% or less of their expenditures on environmentally friendly laundry detergent or organic chocolate and meat, while shares for milk (5.1%), yogurt (6.3%) and eggs (15.7%) were higher. The highest budget shares were for recycled toilet paper (28.7%) and laundry detergent refill packs (44.4%).
Caritte et al., 2015	United Kingdom	Food retail	Decarbonisation strategies	- Fraction of in store electricity use from renewable sources (%) - Mileage reduction for freight transport (km) - Waste disposed to landfill (tons) - Water savings in store through water harvesting (m^3)	- Waste-related indicators are the most commonly reported environmental performance indicator category. This is likely because retailers have abundant experience in managing waste. - Water-related impacts are the least reported environmental impact category
De Frias et al., 2015	USA	Supermarkets	Energy cost reduction through retrofitting open refrigerated cases with doors	- Electrical energy consumption of refrigeration display cases (kWh/day)	- Operational energy costs for refrigeration display cases with retrofitted doors were 69% less than with open display cases - Cost of door retrofits could be recouped in less than two years by energy savings alone
Hornibrook et al., 2015	United Kingdom	Supermarket retailer	Carbon labelling in retail supply chains	NA	- Trial of carbon labels on the supermarket retailer's own brand products has had no discernible

(*continued on next page*)

Table 2 (*continued*)

Reference	Country/region	Sector	CES issue/strategy	Indicators	Main findings
					impact on shifting demand to lower carbon products - Possible reasons include (a) lack of awareness and understanding of carbon labelling, (b) constraining or facilitating social and cultural influences, and (c) heterogeneity among consumers.
Kolokotroni et al., 2015	United Kingdom	Food retail	Ventilation and energy use in buildings	- Total operational CO_2 emissions for entire operations (kgCO2/year)	- Low energy ventilation strategies can lead to significant savings with attractive investment returns - Low-ventilation options include (a) improved envelope air-tightness, (b) natural ventilation components, (c) reduction of specific fan power, (d) ventilative cooling, (e) novel refrigeration systems using CO_2 combined with ventilation heat recovery, and (f) storage with phase change materials.
Delai and Takahashi, 2013	Brazil	Supermarkets and department stores	Corporate sustainability practices and management	NA	- Few internal eco-efficiency activities across the studied retailers. These are mainly implemented in new or "green stores" that focus on remediation rather than on the elimination of the causes of problem. - Focus on suppliers' selection rather than developing partnerships to change processes and create more sustainable products - Consumer sustainability awareness and education is limited to store communication, recycling stations and incentives to use eco-bags.
Dos Santos et al., 2013	South Africa	National supermarket chain	Sustainable business indicators	- Reduction in relative energy consumption from benchmark (kWh/m^2/year) - Reduction in relative water consumption from benchmark (%) - Carbon dioxide emissions (tCO2/year) - Reduction in food packaging (%)	- Commitment by management has enabled performance targets and measures to be embedded into the company's overarching long-term strategic plan - Continuous monitoring and revision of targets at tactical and operational levels against long-term objectives
Galvez-Martos et al., 2013	Europe	Retail stores	Energy performance in the retail sector	- Specific energy consumption per number of stores and sales area (kWh/m^2/year) - Leakage control (% of refrigerant) - Stores using natural refrigerants (%) - Energy from alternative generation (%)	- The relatively low importance of energy costs within the total operational costs of retailers reduces the economic attractiveness of energy saving measures - Building characteristics substantially affect some of the indicators but are only partially under the control of retailers - Lack of suppliers seriously constrains the uptake of novel technologies in some European regions. High technical skills and training associated with innovative energy applications can reduce their rate of uptake.
Kolk et al., 2010	China	Retail sector	Sustainability dimensions and reporting	NA	- Chinese retailers report more on economic dimensions (including philanthropy), while international retailers operating in China report more on product responsibility. - Environmental and labour issues receive relatively limited attention by both groups of retailers in China

Table 2 (*continued*)

Reference	Country/region	Sector	CES issue/strategy	Indicators	Main findings
Matopoulos and Bourlakis, 2010	Greece	Food retail	Sustainability practices and indicators in food retail logistics	- Fraction of air-transported products to total products on the shelf (%) - Fraction of direct-to-store deliveries to total number of deliveries (%) - Frequency of deliveries to store (number per week) - Fraction of vehicle filled to total capacity (%) - Fraction of alternative fuel use compared to normal fuels (%)	- Practical difficulties in assessing the overall sustainability performance of entire supply chains due to a significant fraction of transportation and distribution provided by third-party logistics providers - Logistics managers do not consider sustainability issues in the design and implementation of transportation and distribution plans - Strategic decision-making emphasises mainly cost improvements, while sustainability can be considered only in connection with this objective.
Erol et al., 2009	Turkey	Grocery retailing	Sustainability indicators	NA	- Categories for environmental sustainability indicators for grocery retailing include 'water consumption', 'energy consumption', 'category selection and management', and 'product and packaging recovery'.

100 sustainability leaders (Bocken et al., 2014). Similarly, numerous international and local 'green business awards' publically recognise corporate efforts to decrease their environmental impact. Retailers are increasingly awarded such honours,[18] which provide excellent public relations opportunities, distinguish companies as sustainability leaders, and attract potential investors.

6. Discussion

6.1. Key literature findings

Section 3 indicates that the primary motive of retailers to implement CES strategies revolves around expected economic benefits, mainly due to cost savings from reducing operational expenses (see also Dummett (2006)). Overall energy conservation strategies and GHG emission reduction strategies dominate the CES agendas of retailers (Section 4), as energy use represents one of the highest operational expenses for retailers. Policy shifts and regulatory actions towards climate change and energy efficiency, (coupled with the escalating costs and unreliability of energy provision in some developing countries), can accelerate the investments of retailers in renewable energy and energy saving measures. However, there is insufficient research about the optimal energy use and indoor climate for retail outlets, where the satisfaction of workers and customers require the strict control of indoor environment conditions (Raimondo et al., 2015).

Retailers also prioritise waste reduction strategies such as decreasing food waste and reducing/recycling packaging materials (Section 4). This largely relates to increasing waste disposal costs, as retailers have to regularly and appropriately dispose of substantial amounts of plastic, cardboard and food waste. Of the CES strategies we have identified in Section 4, there is particularly little peer-reviewed literature on CES strategies on water use in the retail sector. While some articles do mention indicators related to water use in the retail sector, there is a critical lack of studies on specific strategies such as the instalment of water saving technologies or pollution control measures. This is possibly because the highest amount of water use occurs in upstream supply chains during food production/packaging or product manufacturing (Section 4.2.3), which are not under retailers' direct control, which means that many of the environmental costs are externalised (Yu et al., 2010; Ridoutt et al., 2010; Hoekstra et al., 2011). Retailers may view this as an issue that pertains to the suppliers or manufacturers, which goes beyond their own operations and therefore take less initiative to tackle. The price and availability of water may also affect actions to address its use and conservation. For example low water tariffs and reliable supply in some countries may encourage lack of action from retailers.

It is interesting to note that the justification of CES investments in the retail sector on ethical grounds is rarely mentioned and elucidated in the peer-reviewed literature. While it may be the 'right thing to do' and companies want to be seen as 'doing the right thing', altruism is not perceived as a key reason for CES adoption in the retail sector. While Saha and Darnton (2005) suggest that altruism or moral concerns (e.g. concern about environmental issues) may influence those decision-makers that feel a sense of responsibility to the environment and the community, this review suggests that a CES strategy is unlikely to be adopted unless there is a good business case or financial incentive for it (Section 3). We should also note that we could not identify peer-reviewed literature, which suggests that resource availability and degradation concerns are primary CES drivers in the retail sector[19] (although they may jeopardize supply chain security thereby having an indirect negative impact on revenues) (TEEB, 2012).

Regulatory pressure seems to drive CES up to a certain extent, but does not explain why some companies decide to go beyond measures required by law, as shown by company examples discussed previously (see Section 1 and 4). On the other hand expectations from internal and external stakeholders are increasingly becoming the dominant driver for CES in the retail sector. For example, environmental organizations, consumer groups, the media, governments, and even competitors, put pressure on retailers

[18] For example the Green Awards in Ireland is in its 10th year and awarded its 'Green Retailer Award' to the supermarket retailer Lidl Ireland in 2018. In South Africa the supermarket company Woolworths was awarded the 'Corporate Citizenship Award' at the 15th annual National Business Awards in 2017.

[19] This comes in contrast with other sectors that depend on natural resources such as mining, pharmaceuticals, tourism and fisheries (TEEB, 2012).

to increase accountability and transparency when reporting the impacts of their internal operations and wider supply chains (Section 3.3). Pressure from rival companies to implement CES strategies and sustainability should not be underestimated as this can be perceived as a competitive advantage (Skouloudis and Evangelinos, 2009).

Market-based instruments such as sustainability standards have become a very popular tool to facilitate verification and assure compliance with best sustainability practices for various products (Chkanikova and Mont, 2015). For example retailers increasingly work with organizations such as the Roundtable on Responsible Soy (RTRS), and the Better Cotton Initiative (BCI), among several others, to ensure the sustainable sourcing of raw materials and finished products (Section 4).

To elucidate further, as more retailers join the BCI the demand for sustainably sourced cotton has risen substantially, with 12% of global cotton production already licensed as 'Better Cotton'[20] (the expected target for 2020 is 30%) (BCI, 2016). Aeon, Japan's largest supermarket chain, introduced its first MSC certified product in 2006 and has committed to further increase the sales of certified seafood. Its target is that by 2020, 15% of seafood sales by volume will come from MSC certified fisheries or Aquaculture Stewardship Council (ASC) certified farms (MSC, 2017). Through collaboration with the RSPO, leading UK retailers have reached their target of selling 100% certified sustainable palm oil by the end of 2015 (RSPO, 2017). Similarly the RTRS has a significant presence in the UK retail sector, with top retailers such as Marks & Spencer, ASDA and Tesco being members (RTRS, 2014).

Finally, there is a relative lack of studies discussing indicators to evaluate the performance of CES interventions in the retail sector, with most of these studies focusing on food retailers and supermarkets (Table 2) (Spicer and Hyatt, 2017; Caritte et al., 2015; De Frias et al., 2015; Hornibrook et al., 2015; Kolokotroni et al., 2015; Ochieng et al., 2014; Delai and Takahashi, 2013; Dos Santos et al., 2013; Matopoulos and Bourlakis, 2010; Erol et al., 2009). Studies for other types of retailers such as electronics, clothing and home furnishing, are very few and apart in the peer-reviewed literature.

6.2. Research gaps

Despite the expanding literature at the interface of CES and the retail sector, there are several important knowledge gaps.

First, even though sustainability reporting has proliferated in the retail sector, there is inadequate research on assessing (a) the overall environmental impact of the retail sector, (b) the possible environmental benefits of CES in the retail sector, and (c) whether the possible benefits of CES implementation are sustained. For example, despite several studies tracking the environmental impact of different aspects of retailing (see also Section 1), there is a lack of comprehensive studies about the environmental impact of the retail sector as a whole, or a comparison of its environmental impact with other sectors such as mining, manufacturing, and food production. Such comparative and comprehensive studies can offer a better understanding of the overall scope of CES and further justify its widespread promotion in the retail sector. Furthermore, such studies can be a first step towards establishing both the extent to which CES can actually reduce the overall environmental impact of the retail sector, as well as whether these environmental benefits are sustained. The latter is particularly important in view of possible rebound effects emerging from the implementation of CES that could possibly negate any long-term environmental benefits. This is a very pertinent concern considering that strategies aiming to curb the negative environmental impact of retailing can possibly have counter-productive environmental outcomes due to rebound effects (e.g. Chen, 2018).

Second, some environmental impacts/issues such as biodiversity loss are neglected among retailers (Delai and Takahashi, 2013). We could not identify any peer-reviewed journal articles on CES and the retail sector, which focused on biodiversity or other related issues such as habitat loss and ecosystem services. Considering the critical role of biodiversity and ecosystem services in product value chains (TEEB, 2012), further research will be needed, especially on the impacts of retailers on upstream supply chains and whether/how CES strategies could mitigate them. This could assist relevant stakeholders to develop guidelines for best practice design and implementing CES strategies to reduce the negative biodiversity outcomes of retailing practices. To tackle such upstream issues, retailers increasingly require the expertise of certification agencies and NGOs/NPOs to act as 'connectors' that can guide suppliers and producers in sourcing more sustainable products and improve traceability. However, current research on such collaborative initiatives is limited.

Third, as we discussed in Section 3, consumer demand is a major driver of the adoption of CES strategies. Social media increasingly facilitate the flow and spread of product information, allowing stakeholders to link directly to local and international retailers. The avoidance of public backlash from social media (and possible subsequent boycott) for non-compliance, negligence or irresponsible behaviour may have a stronger influence on retailers to adopt CES strategies rather than issuing fines. Incentives such as tax rebates for recycling waste, constructing energy-efficient buildings, and adopting greener alternatives (e.g. solar panels, fuel-efficient vehicles), can also be more coercive for CES adoption. There is some evidence to suggest that CES will progressively become a strategic management issue for retailers rather than a cost saving and marketing incentive, as companies better understand the multiple value creation options it can bring. However there is currently very little literature to substantiate or find ways to catalyse such phenomena.

Fourth, there is a lack of research on how CES strategies are perceived by and affect the actions of consumers and staff of retailer companies. The lack of research on consumer visibility could be partly attributed to the reluctance of retailers to disclose information about the results of CES strategies such as green marketing and eco-labelling. Some studies have outlined how staff awareness can influence the environmental performance of supermarkets (Braun et al., 2016) and how management awareness and commitment is a pre-condition for organizational change, and social and environmental improvements (Pedersen, 2010) (see also Section 4.3). It is thus important to better understand whether (and how) managers can reconcile the need to contribute to environmental sustainability, while simultaneously meeting other corporate objectives.

Fifth, the use of big data to inform CES strategies and measure their performance is a particularly under-researched domain (Keeso, 2014). According to Manyika et al. (2011) retailers can use big data to their advantage by tracking individual customer data (including clickstream data from the Web), to track changes in customer behaviour and inform product-related CES strategies. Studies on how retailers can use big data to potentially improve their CES performance through supply chain optimization, tailoring green marketing strategies and product offerings, are currently missing.

Finally, there is a general lack of studies on CES in the retail sectors in developing countries. Furthermore, while there are some studies focusing on food retailing and supermarkets, research on other retailing sectors such as electronics, clothing, medicine,

[20] For more information refer to: https://bettercotton.org/about-bci/who-we-are/.

furniture and speciality retailers is very limited.

6.3. Policy implications

Information on CES strategies and reasons for failing to meet targets are usually not disclosed or are inadequately explained in retailers' sustainability reports. While internal and external audits become more common among retailers (Section 5), there is uncertainty on how detailed and inclusive they are, and to what extent the results are made public. Not all retailers publish sustainability reports, and sustainability guidelines like GRI and ISO 14001 are voluntary. At the same time many governments do not require sustainability reporting to be disclosed to the public. Considering the above, the question of how to incentivise companies to adopt and implement CES initiatives remains.

First and foremost, it is not easy to delineate whether it is better to drive sustainable behaviour by enforcing regulations or allow retailers to voluntarily decide which sustainability issues to address. While environmental policies and regulations have pushed companies to take action on sustainability issues (Section 3), the law moves at an extremely slow pace compared to changes in societal beliefs (Iacona, 2010). It has been suggested that companies should periodically improve their structures to comply with the changing societal demands, rather than with the minimum legal requirements (Iacona, 2010). This can be ever more important now that social media catalyse consumer behaviour (see also Section 6.2).

Considering the findings of this review, we believe that the development of a mix of regulations, incentives and voluntary actions in collaboration with key stakeholders is the most promising approach to enhance the uptake and implementation of CES strategies in the retail sector. Regulatory minimal standards should be periodically revised to motivate sustainability 'stragglers', especially when voluntary mechanisms have proven to be ineffective. Progress should be monitored by governments and/or watchdog organizations, with particular attention on critical sustainability issues and neglected problems in specific regions. Collaboration among these stakeholders is essential to develop, strengthen and maintain long-term sustainability solutions in the retail sector.

The recent policy traction of the SDGs offers a very promising opportunity to further enhance the uptake and implementation of CES strategies in the retail sector (Section 1). SCP national action plans and mainstreaming SCP as a priority into national policies is a key target for SDG 12[21] (United Nations, 2018). The present and future contributions of CES strategies in the retail sector to achieving SCP and sustainable development targets should be continually emphasized at all levels of stakeholder engagement, in order to normalize CES adoption, learn from best practices and effectively design and reform policies.

Finally it is important to emphasize a moral/altruistic approach in redesigning current consumption and production patterns to support the adoption of market-based instruments, such as voluntary certification schemes. Chkanikova and Mont (2011) state that it is necessary for retailers to develop suppliers' capacity to green supply chains and create markets for green and ethically-produced products. This would be necessary to appeal to customers' pro-environmental worldviews to increase support for the production and sale of environmentally friendly products and services (and ultimately the greening of entire supply chains), as the buy in of consumers is a key factor determining the success of these sustainability initiatives.

7. Conclusion

This study identified the critical issues related to the drivers, strategies, tools and measurement of progress of CES in retail companies. Instead of focusing on a specific CES theme or strategy within a single country, sector or company, we took an inclusive view of CES. Our review suggests that the main reasons for CES adoption are profitability, environmental policy and stakeholder pressure. Currently, cost-savings seem to be by far the dominant reason for CES adoption in the retail sector, but stakeholder pressure is emerging as an equally important driver. Considering that cost is the main motive for CES development, most retailers prioritise CES strategies that improve the resource use and environmental performance of their internal operations. However there is an increasing adoption of CES strategies related to supply chain management and stakeholder engagement.

Despite the emerging academic literature in the domain of sustainability and retailing, there are still substantial gaps. Specifically, there is a need for more in-depth quantitative research on sustainability metrics, as well as qualitative research from multi-stakeholder perspectives (e.g. managers, retail staff, suppliers/manufacturers, customers, NGOs and shareholders). Most relevant literature originates from developed countries, with a critical lack of information from developing countries. There is a need for case studies from different regional and national contexts to identify the similarities and differences in CES adoption, challenges and best practices between different parts of the world. Key study points should be the factors that motivate consumers to purchase and support sustainability products, services and programs.

Overall we believe that more research on CES and stakeholder engagement could enhance the long-term fruitful collaboration between academia and the private sector. Eventually this can catalyse the adoption of CES strategies and the significant change needed in the way societies produce and consume products and services. We believe that the beneficiaries of this change will be the stakeholders who prepare and engage for this transformation, while the losers will be those who take the 'wait-and-see' approach by not attempting to go beyond complying with minimal standards.

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[21] Le Blanc (2015: 184) points to the multiple links between SDG12 and the other SDGs, stating that "*until now SCP has suffered from being weakly integrated with other areas of work and addressed as an 'add-on' (for example, resource efficiency considerations in various sectors were not often given prominence in development strategies and policies)*". However now *"actors in many sectors will have to work with SCP-related targets under their goals, which may finally enable greater integration of SCP across the board*" (Le Blanc, 2015: 184).

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