

Exploring logistics-related environmental sustainability in large retailers

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EXPLORING LOGISTICS-RELATED ENVIRONMENTAL SUSTAINABILITY IN LARGE RETAILERS

ABSTRACT

Purpose

The purpose of this study is to explore and illustrate ways in which the world's largest retailers describe their logistics-related environmental considerations, their environmental indicators applied to measure the effects of these considerations, and their environmental consciousness in their CSR reports.

Design/methodology/approach

Classification models are developed via a literature review on logistics-related environmental considerations, indicators and consciousness. A content analysis approach is then applied to examine CSR reports from twelve of the world's largest retailers.

Findings

Few retailers show environmental considerations in all logistics activities, and purchasing is especially well described. Even if many retailers claim to use the GRI framework, no one uses it completely. Judging consciousness from CSR reports raised a number of questions.

Research limitations/implications

A contribution to theory is the development of two classification models. The first provides a description structure for environmental considerations related to logistics activities. The second expands the GRI indicator framework by incorporating a structure for logistics activities.

Practical implications

The classification models developed can be an important mean for managers and also consumers to judge the environmental sustainability of retailers by their CSR reports.

Social implications

The study makes a social contribution with its input on sustainability and especially environmental issues.

Originality/value

Few studies have focused upon environmentally sustainable logistics in retailers, and even fewer address how to measure environmental sustainability in this context.

Keywords: Retailer, environmental sustainability, logistics, environmental indicator, consciousness

1. INTRODUCTION

The retail sector is continuously growing, competition increasing, and logistics performance is critical (Menachof *et al.*, 2009; Ganesan *et al.*, 2009; McKinnon and Edwards, 2009; Fernie *et al.*, 2010; ECR, 2011; Forslund, 2014). Considerations to sustainability are growing in importance due to, e.g., the trend towards global supply chains and increased stakeholder consciousness. Retailers alone might not have a large environmental impact, but they play an important role in securing sustainable behaviour in their supply chains (Kolk *et al.*, 2010, Wiese *et al.*, 2015). They are often held responsible for the actions of other actors, as they have contact with both consumers and suppliers (Spence and Bourlakis, 2009; Kolk *et al.*, 2010; Kotzab *et al.*, 2011; Wiese *et al.*, 2015). Furthermore, due to their large size and the consolidation of bargaining power, retailers are described as having the power to change practices along the supply chain (Jones *et al.*, 2005a, 2005b, Wiese *et al.*, 2015). Studies such as Jones *et al.* (2005a, 2005b) have addressed retailers' sustainability practices broadly. As transport is the largest source of environmental impact in the logistics system (e.g. Abukhader and Jönson, 2004), logistics plays an important role in the work towards sustainable development (Seuring and Müller, 2008; Shaw *et al.*, 2010; Abbasi and Nilsson, 2012). It seems therefore relevant to conduct a study focused on retailers' sustainability within logistics. Despite the importance of incorporating environmental sustainability into logistics, research within the field is relatively sparse (Seuring and Müller, 2008; Wiese *et al.*, 2012). Not only is research lacking, there are also large practical needs. Working towards improved sustainability raises new managerial challenges for retailers (Elg and Hultman, 2011), such as the difficult task of judging supply chain partners' sustainability practices. This is a resource-consuming issue. To communicate sustainability, companies are increasingly issuing accessible CSR reports to stakeholders (Tate *et al.*, 2010). It would be convenient if an understanding of environmental sustainability could be achieved from a CSR report.

In this article we have identified three important areas to consider when evaluating the sustainability practices of supply chain partners: First, what they do (i.e. environmental considerations). Ashby *et al.* (2012) and Wiese *et al.* (2012) call for an increased understanding of environmental considerations (or initiatives as labelled by Kotzab *et al.*, 2011). Retailers' sustainability considerations are often described as both fragmented and unsystematic. There would be value in providing an overview of retailers' environmental considerations – what they do - related to logistics. Such knowledge could ease judgement and selection of supply chain partners, providing answers to such questions as: *Q1a. In which logistics activities are environmental considerations undertaken by retailers? Q1b. Do they have a narrow or wide scope—i.e., are these considerations brought into few or many logistics activities?* Second, what they measure (i.e. environmental indicators applied). More research is needed on how to measure sustainability considerations made by companies, in order for the measurement to become consensual, robust and less subjective (Shaw *et al.*, 2010; Elg and Hultman, 2011; Abbasi and Nilsson, 2012). Retailers are expected to measure the effects of considerations undertaken, in order to ensure that the work towards more sustainable logistics has effects and is successful. Interpreting, operationalizing and measuring environmental sustainability in supply chains is challenging (Abbasi and Nilsson, 2012). Measuring environmental logistics performance in retail seems especially relevant, given the complexity present, with a large number of products and the length and number of retailers (Wiese *et al.*, 2012). Björklund and Forslund (2013) found that companies who focus on environmental performance not necessarily consider how to measure it. Forslund (2014) found little interest for environmental performance indicators among retailers. We must consider, then, whether CSR reports can provide insight into questions targeting environmental indicators, such as: *Q2a. For which*

*logistics activities are environmental indicators found? Q2b. Which environmental indicators are commonly used? Q2c. Do retailers apply existing indicator frameworks? Third, why they do what they do (i.e. environmental consciousness). Not only may supply chain partners want to judge what companies do in terms of sustainability, they may also want to know why they do this. The environmental considerations and indicators applied by retailers may mirror the retailers' environmental consciousness. Environmental consciousness is seen in the level of maturity in the approaches, techniques, and strategies applied by organisations in the process of working towards sustainability (Benn *et al.*, 2006). Companies can claim their proactive consciousness by having an environmental management system, however, they may still be focusing on compliance with legal demands and let production processes and products remain unchanged (Closs *et al.*, 2011). Thus, the company can apply a very reactive consciousness. It is therefore important to dig deeper than the labels companies apply to themselves in order to consider their environmental consciousness (Ashby *et al.*, 2012). An investigation regarding retailers' environmental consciousness ought to address questions such as: Q3a. How can environmental consciousness be classified? Q3b. What levels of consciousness are shown by retailers?*

These three areas and the questions stated are used to address the overall purpose of this study: *To explore and illustrate ways in which the world's largest retailers describe their logistics-related environmental considerations, their environmental indicators applied to measure the effects of these considerations, and their environmental consciousness in their CSR reports.*

2. FRAME OF REFERENCE

A literature review was conducted to structure the empirical material and to frame the analysis. The review first describes how environmental considerations can be related to different logistics activities. Then studies measuring the effects of environmental considerations are reviewed and a framework of indicators is presented. The last section provides characteristics for three levels of consciousness.

2.1 Environmental considerations in logistics activities

There are a number of logistics activities that can incorporate environmental considerations. Wu and Dunn's (1995) commonly used model outlines a number of logistics activities that influence the environment, such as raw material acquisition, in- and outbound logistics, production, reverse logistics and marketing. In a paper addressing environmental supply chain management initiatives in retailing companies, Kotzab *et al.* (2011) identify eight broad environmental supply chain categories that include, under our terminology, both logistics activities (but not purchasing) and indicators (such as energy use). Inspired by two retail-based studies, Kotzab *et al.* (2011) and Bernon *et al.* (2011), we focus on purchasing, transport, warehousing and reverse logistics, as they are central logistics activities for a retailer and as they are often covered in sustainability reports. A literature review exemplifying environmental considerations in these logistics activities follows.

Purchasing includes considerations such as the location of suppliers, which affects e.g. transport distances (McKinnon, 2010). Carter and Jennings (2004) mention the design of suppliers' products and processes as a means to reduce environmental impact. For instance, the selection of material used in packaging is one factor that can influence environmental impact (Ferne *et al.*, 2010). The suppliers' environmental process management could be influenced by requiring that suppliers have an environmental management system (EMS) (Björklund, 2010; Young and Kielkiewicz-Young, 2001). Other environmental considerations in purchasing include communicating sustainability policies and goals to suppliers and investing in education and

training (Young and Kielkiewicz-Young, 2001). Transport is the largest source of environmental impact in the logistics system (Wu and Dunn, 1995; Abukhader and Jönson, 2004), raising such considerations as the selection of more efficient transport modes and increased use of intermodal transport solutions (Wu and Dunn, 1995; McKinnon, 2010; Eng-Larsson and Kohn, 2012). Technical solutions such as age, engines, and type of fuel used (Björklund, 2005; Weijers *et al.*, 2012), selection of environmentally conscious transport suppliers (for example Sarkis *et al.*, 2004; Björklund, 2005), and eco-efficient driving and maintenance can reduce the environmental impact (Wu and Dunn, 1995; Björklund, 2005; Aronsson and Hüge-Brodin, 2006; McKinnon, 2010; Weijers *et al.*, 2012). Logistics system design can incorporate more direct transports, continuously improve distribution networks, and decrease the average handling factor and average length of haul (Sarkis *et al.*, 2004; McKinnon, 2010; Martinsen and Björklund, 2012). Transport management can imply planned routes and high fill-rates (McKinnon, 2010; Weijers *et al.*, 2012). Transport includes the use of third party logistics providers, which in itself should have positive environmental effects on all the mentioned levels; mode selection/intermodal transport, technical solutions, transport supplier selection, eco-efficient driving, logistics system design and transport management (see also Table 1).

Warehousing is often overlooked in the discussion of sustainable logistics, but it has a significant environmental impact (Marchant, 2010), for instance through energy management with warehouse resources such as handling equipment, heating, lighting and ventilation (Marchant, 2010; Weijers *et al.*, 2012). Location and capacity of warehouses were found to have a central influence on the possibilities for decreasing environmental impact (McKinnon, 2010; Aronsson and Hüge-Brodin, 2006). Reverse logistics, where retailers have found themselves obliged by law to take back their own products, is a complex but essential aspect of sustainability (e.g. Bernon *et al.*, 2011). Examples of environmental considerations include the selection of load carriers or the management of disposal (van Hoek, 1999; Rogers and Tibben-Lembke, 2001).

Table 1. Environmental considerations in logistics activities (operationalization shaded)

Activities	Environmental considerations	Examples of central references
Purchasing	-Location of suppliers -Design of purchased products -Supplier process design/EMS -Communication of sustainability policies -Training/education of suppliers	McKinnon (2010) Carter and Jennings (2004); Fernie <i>et al.</i> (2010) Carter and Jennings (2004); Björklund (2010) Young and Kielkiewicz-Young (2001) Young and Kielkiewicz-Young (2001)
Transport	-Mode selection/intermodal transport -Technical solutions -Transport supplier selection -Eco-efficient driving -Logistics system design -Transport management	McKinnon (2010); Eng-Larsson and Kohn (2012) Björklund (2005); Weijers <i>et al.</i> (2012) Sarkis <i>et al.</i> (2004); Björklund (2005) McKinnon (2010) Sarkis <i>et al.</i> (2004); Martinsen and Björklund (2012) McKinnon (2010); Weijers <i>et al.</i> (2012)
Warehousing	-Energy management -Location/capacity of warehouses	Marchant (2010); Weijers <i>et al.</i> (2012) Aronsson and Hüge-Brodin (2006), McKinnon (2010)
Reverse logistics	-Selection of load carriers -Management of disposal	van Hoek (1999); Rogers and Tibben-Lembke (2001) van Hoek (1999); Rogers and Tibben-Lembke (2001)

2.2 Environmental indicators

In an extensive study of retail supply chain executives, performance measurement was identified as one key area for future competitiveness (ECR, 2011). Jones *et al.* (2005b) found that a majority of UK's top 20 retailers seek to measure, benchmark and compare their sustainability

performance, and that some of them develop their own performance indicators. Due to global competition, retailers are increasingly interested in measuring performance, particularly logistics performance (Ganesan *et al.*, 2009). Kotzab *et al.* (2011) state that environmental sustainability is easy to demand, but difficult to measure. Elg and Hultman (2011) found, based upon a survey study of Swedish retailers, few retailers providing systematic reporting of environmental performance. The same pattern was found in another retail study by Forslund (2014). Environmental indicators are continuously developing and various systems have been proposed, but there is no universally accepted system (Jones *et al.*, 2005b; Shaw *et al.*, 2010; Searcy, 2011). Bernon *et al.* (2011) relate retail reverse logistics to operational performance, but comment on the difficulties in finding indicators. Shaw *et al.* (2010) studied the development of environmental supply chain indicators in a literature study and found the number of studies to grow considerably over the years. In search of standardized indicators, they described ISO 14001 “Requirements with guidance for use” and the performance evaluation tool ISO 14031. However they found that the indicators used in ISO14031 are variable across organizations and not for public disclosure. In contrast, Shaw *et al.* (2010) described Global Reporting Initiative (GRI) which was developed in order to provide a framework for reporting, exchanging and comparing sustainability performance. An increase acceptance and use of this standardized framework was found. Consequently, GRI is the indicator framework that we expect to find.

The GRI G4 version is the latest update of the GRI’s Sustainability Reporting Guidelines (www.globalreporting.org, 2014). The environmental dimension of the GRI incorporates twelve indicators, which are used to operationalize environmental indicators are shown in Table 2 together with their specifications. They are not structured in a way so the GRI indicators could be related to logistics activities, and it is even more difficult to relate them to environmental considerations.

Table 2. Environmental indicators (operationalization shaded)

Environmental indicators	Specification
Materials	Used, recycled
Energy	Consumption
Water	Withdrawal, recycled, reused
Biodiversity	Protected areas, red lists
Emissions	Greenhouse gas
Effluents and waste	Discharge, waste
Products and services	Environmental impact
Compliance	Fines, sanctions
Transport	Environmental impact
Overall	Protection expenditures, investments
Supplier environmental assessment	% of new suppliers screened, impact/actions in the supply chain
Environmental grievance mechanisms	Number of grievances

www.globalreporting.org, 2014

2.3 Levels of environmental consciousness

Retail companies’ consciousness about the planet’s environmental threats is increasing (McKinnon and Edwards, 2009). The levels (or stages) of maturity in the approaches, techniques, and strategies applied by organisations is described in the literature represent a set of ideal types, which can be used to define the current level of consciousness in considerations or in the organisation. The number of levels and their labels differ between different studies, but the levels typically fall along a continuum ranging from resistant or defensive to more value-

seeking and competitive advantage-oriented (Benn *et al.*, 2006; Tate *et al.*, 2010). Highly detailed stages may be difficult to identify in sustainability reports. Furthermore Tate *et al.* (2010) note that the level of consciousness expressed in sustainability reports may be higher than the level of actual implementation, and that these reports might only focus on the positives and are used as a marketing tool for the company to enhance image among stakeholders. Carbone *et al.* (2012) mean that even if companies increasingly proclaim their environmental concerns, they have been accused of “greenwashing”, i.e. use green words rather than taking green actions. To handle this risk, we use three broader categories in a classification framework. We are also aware about the greenwashing tendencies in our analysis. Our strive to operationalize environmental consciousness is presented in Table 3.

Companies with a reactive consciousness aim towards compliance with existing laws and regulations associated with sustainability, but they seldom make sustainability investments beyond the compliance minimum (Closs *et al.*, 2011). They may also undertake initiatives in response to public protest (McKinnon, 2010). The aim for companies is to achieve cost savings, and the non-economic dimensions of sustainability are seen as low priority and are commonly excluded from the decision-making process (Benn *et al.*, 2006; Closs *et al.*, 2011). These companies attempt to, e.g., influence the market by convincing customers through green promotion of their product in combination with a clear price focus (Brindley and Oxborrow, 2014).

Companies with a proactive consciousness have typically recognised the strategic importance of environmental performance. They focus heavily on their own supply chain, striving to synergistically enhance sustainability, particularly with suppliers (Closs *et al.* 2011). These companies can apply risk management to identify sustainability problems before these are exposed publicly, and include the total life cycle of the product in their practices (Seuring, 2008). They can rely on industry or cross-industry sustainability benchmarking to identify potential initiatives (Closs *et al.*, 2011). Furthermore, these companies strive to pre-empt new laws by, e.g., voluntarily starting programs (Ashby *et al.*, 2012), and they form relationships with different legislators to, e.g., address environmental issues (Carter and Ellram, 1998). When it comes to community involvement, these companies strive to participate, but are less likely to initiate such practices (Closs *et al.* 2011).

Companies with a value-seeking consciousness strive to integrate sustainability activities into the business strategy, and their contribution to sustainability is described as a strategic priority (Closs *et al.*, 2011; Ashby *et al.*, 2012). Gaining competitive advantage through sustainability performance is central. It is necessary to make the environment a key element in the business model in order to extract more value from the adoption of green practices (McKinnon, 2010). These companies often seek best practice performance and changes that positively benefit their stakeholders, the industry and surrounding communities. They typically take a long-term perspective and their initiatives are viewed as longer-term firm investments (Closs *et al.*, 2011). Human capital is used to develop strategic advantage through innovation in products and services (Benn *et al.*, 2006). Tate *et al.* (2010) also propose that companies that create progressive corporate environmental strategies cut across all aspects of sustainable practices. These organizations are driven by market changes and demand, and they strive to influence customers by realizing customer benefits in the green product (Brindley and Oxborrow, 2014).

Table 3. Characteristics for three levels of environmental consciousness

Reactive consciousness	Proactive consciousness	Value-seeking consciousness
-Compliance with laws and regulations	-Recognizing strategic importance -Enhancing sustainability with suppliers	-Sustainability in business strategy -Sustainability is key element in business model

-Compliance with public protest -Cost savings/price focus -Convincing customers/green promotions	-Proactive problem solving -Sustainability benchmarking -Pre-empting new laws -Participation in community involvement	-Long-term investments -Human capital innovating products -Covering all aspects of sustainability -Realizing customers' benefits -Initiating community involvement programs
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3. METHODOLOGY

To offer a broad overview with a global scope, the world's largest retailers (belonging to large retail chains) are targeted. Large retailers were selected since these are likely to have more resources to devote to sustainability measuring and reporting, and thereby present more comprehensive reports. When searching for a sampling frame, many searches landed on the same webpage (www.stores.org), and its "Top 250 global retailers" list. Not every retailer is expected to have a CSR report. We had to study the thirteen largest retailers (by sales rank) in order to find ten retailers having a CSR report. Then we wished to add another two reports to see if saturation was reached. This required another three retailers, since one did not report on their sustainability work. As this second search did not result in any changes in our conclusions drawn, we claim that studying twelve retailers has implied that saturation was reached. This also implies that we can claim higher external validity. We have studied the 16 largest retailers, in order to find 12 CSR reports (75%). According to Tate *et al.* (2010), in 2007 close to 60% of the top 200 global companies had CSR reports and this number is continuously increasing. Our study seems to support this increase. The retailers and their characteristics are shown in Table 4.

Table 4. Characteristics of retailers studied

Sales Rank	Retailer	Country of Origin	Dominant Format	Name of report	Pages	Reporting Standard
1	Wal-Mart Stores	U.S.	Hypermarket	Global Responsibility Report	174	GRI
2	Carrefour	France	Hypermarket	Annual activity and responsible commitment report	76	-
3	Tesco	U.K.	Hypermarket	Tesco and Society	64	-
4	Metro	Germany	Cash & Carry Warehouse	Sustainability Report	97	GRI
5	The Kroger Co.	U.S.	Supermarket	Sustainability Report	69	GRI
6	Costco	U.S.	Cash & Carry Warehouse	Corporate Sustainability Report	36	-
10	The Home Depot	U.S.	Home Improvement	Sustainability Brochure	15	-
11	Target	U.S.	Discount Store	Corporate Sustainability Report	118	GRI
12	Groupe Auchan	France	Hypermarket	Sustainability Report	52	-
13	Aeon Co	Japan	Hypermarket	Sustainability Report	94	GRI
14	CVS Caremark Corp.	U.S.	Drug Store/Pharmacy	Corporate Social Responsibility Report	86	GRI
16	Seven & i Holdings Co	Japan	Convenience Store	Corporate Social Responsibility Report	77	GRI

Adapted from *Top 250 Global Retailers* - www.stores.org

The most recent CSR reports were downloaded from the companies' homepages. Tate *et al.* (2010) found the average length of a CSR report to be 65 pages. The reports in our study varied highly from 15 to 174 pages, with an average length of 80 pages. This can be interpreted as an increase as compared to the study by Tate *et al.* (2010).

Content analysis is applied to systematically and objectively evaluate, categorize and synthesize information in written text (Bryman and Bell, 2011). It is useful for understanding text in three ways: the text itself (what is said in CSR reports), the audience (stakeholders and supply chain

partners) and the creator (the reporting retailers) (Tate *et al.*, 2010). To ensure the quality of the content analysis, the guidelines from Seuring and Gold (2012) were followed. A necessary beginning is the development of research questions/purpose (Bryman and Bell, 2011; Seuring and Gold, 2012). The purpose of this study was to examine CSR reports (sampling media) showing the considerations taken, the environmental indicators applied and the ways in which consciousness is shown in large retailers.

A content analysis requires that the rules for what to include, or keywords, are specified in advance (Bryman and Bell, 2011; Seuring and Gold, 2012). By using the advanced search function in Adobe Acrobat, the following keywords for the first search (for text related to logistics activities) were applied. Purchasing (purchas*, supply, procur*, supplier, vendor, sourc*), transport (transport*, freight, distribution), warehousing (warehous*) and reverse logistics (reverse logistics, return, disposal, recycle). Text that contained the respective keywords was copied into four large word files, one for each logistics activity. Within each such wordfile, a second search for environmental considerations was conducted based upon the keywords/operationalization in Table 1. A third search went back to the original wordfile for environmental indicators, it was conducted based upon the keywords/operationalization in Table 2. Specifying keywords for the second and third search was more difficult due to the vocabulary of the reports; the Adobe Acrobat search had to be complemented with ocular searches for synonyms. This is referred to as “latent content” by Bryman and Bell (2011, p. 290). The second and third search resulted in the copying of text on considerations and indicators into two large (20-40 pages each) documents. From them we could count the existence of considerations and indicators (shown in Tables 5 and 7). From this text we also copied quotations selected as illustrative examples (shown in Tables 6 and 8).

A fourth search for characteristics of consciousness was conducted based upon the keywords in Table 3, however very little information about consciousness was found within the logistics-related text. Instead we had to go back to the CSR reports and use the characteristics of consciousness as keywords, searching in general text. Three researchers conducted the first third of the second, third and fourth search together, within a short time period in order to achieve inter-rater reliability. The remaining search was conducted by at least two researchers together, following the guidelines of Seuring and Gold (2012). This was, as indicated by Bryman and Bell (2011), time-consuming but necessary for accuracy and reliability. The unit of analysis (Bryman and Bell, 2011; Seuring and Gold, 2012) is the CSR report of each retailer. The analysis in the second, third and fourth search was carried out in a “cross-report” manner; we did not study considerations, indicators and each retailer “within-report”.

4. FINDINGS AND ANALYSIS

This section is structured as the frame of reference in environmental considerations, indicators and consciousness. The presentation of the findings is structured around the questions posed in the introduction.

4.1 Environmental considerations in logistics activities

The vertical dimension in Table 5 shows with “X” the existence of considerations described in purchasing, transport, warehousing and reverse logistics for each retailer (Q1a).

Table 5. Environmental considerations in logistics activities

Logistics activities	Environmental considerations	R1	R2	R3	R4	R5	R6	R10	R11	R12	R13	R14	R16	Sum	Sum/act
Purchasing	-Location of suppliers	X	X	X	X	X	X			X	X	X		9	48
	-Design of purchased products	X	X	X	X			X	X		X	X	X	9	
	-Supplier process design/EMS	X	X	X			X		X	X	X	X	X	9	
	-Communicate sustainability policies to suppliers	X		X	X	X	X	X	X		X	X	X	10	
	-Training and education of suppliers	X	X	X	X	X	X	X	X	X	X	X		11	
Transport	-Mode selection/intermodal transportation		X							X	X			3	29
	-Technical solutions	X				X	X		X		X	X	X	7	
	-Transport supplier selection													0	
	-Eco-efficient driving	X									X		X	3	
	-Logistics system design	X								X	X	X	X	5	
	-Transport management	X	X			X	X	X	X	X	X	X	X	10	
Warehousing	-Management of energy	X	X	X	X		X	X	X	X	X	X	X	11	16
	-Location and capacity of warehouses		X				X			X	X	X		5	
Reverse logistics	-Selection of load carriers	X					X		X	X	X			5	12
	-Management of disposal	X			X		X		X		X	X	X	7	
Sum		12	8	6	6	5	10	5	9	9	14	11	9		105

Purchasing is the logistics activity that gets the highest score; 48 individual examples of considerations were found in the five environmental considerations investigated. Four retailers (R1, R3, R13 and R14) show all purchasing considerations, four retailers have four, and four have three. As one purpose of the study is to illustrate practices, some quotations concerning environmental considerations from CSR reports are provided in Table 6. Transport is the second most frequently described activity, with a score of 29 distributed among six considerations. Still, the average retailer will not include even half of the considerations. The highest score in transport is found in R13, who describes five considerations. Transport management is the consideration that was targeted by the most (ten) retailers, as seen in Table 5, while the other considerations regarding transport were seldom applied. For instance, there were only three sightings of mode selection/intermodal transport, and transport supplier selection was — surprisingly — not mentioned by any retailer. Purchasing (five considerations) and transportation (six considerations) had a similar number of considerations in the literature, while it is interesting to note that purchasing demonstrates twice as many considerations as transport in the CSR reports. Warehousing contains just two considerations drawn from the literature, and the retailers scored 16. Management of energy was targeted by several retailers, while location/capacity of warehouses, a central consideration, appeared in only a few of the reports (see Table 5). Reverse logistics contains two considerations from the literature; we noted 12 considerations used among the 12 retailers. R1, R6, R11 and R13 describe both considerations. Reverse logistics is the logistics activity that is least described in the CSR reports.

Table 6. Illustrating environmental considerations in logistics activities

Activities	Environmental considerations	Illustrating examples
Purchasing	Location of suppliers	“Our customers value the ‘locally grown’ and ‘locally produced’ programs as these products /.../ help lessen the impact /.../ through reduced transportation and minimized handling” (R5, p16).

Transport	Mode selection/ intermodal transport Logistics system design Transport management	“[I]ncrease the use of /.../ multimodal transport combining rail/road or river/ road” (R2, p22). “[D]epots are strategically located /.../ to provide the most efficient routes of transport” (R6, p24). “The depots’ emphasis on load maximization ...significantly reduce trailer usage, fuel, and emissions.” (R6, p24).
Warehousing	Management of energy Location/capacity of warehouses	“[We] use the cooling power of snow for preservation of potatoes after harvest” (R13, p33)” “[To] reduce its carbon footprint, [we work] to optimise its logistics activities. Its initiatives include sharing warehouses to reduce the distances travelled.” (R2, p63)
Reverse logistics	Selection of load carriers	“[We] use reusable containers in our reverse logistics business, reducing our use of traditional wood pallets” (R11, p20)

Table 5 also provides insights regarding the scope (Q1b) of the considerations. A full score in our model would imply 15 considerations. The “best case,” R13, scores 14 and the “worst cases,” R5 and R10, both score 5. Six of the retailers scored higher than the average score of 8. Remembering that we have studied the world’s largest retailers, this is disappointing. Taking into consideration that “greenwashing” might exist, thus that the companies use green words rather than taking green actions (Tate *et al.*, 2010 and Carbone *et al.*, 2012), the results are even more disappointing. Overall, we can see that seven of the retailers (R1, R6, R11, R12, R13, R14 and R16) show considerations in all four logistics activities. Three of the chains describe considerations in three activities, excluding either reverse logistics (R2 and R10), or transportation (R4). Two of the chains have considerations in just two logistics activities, excluding transportation and reverse logistics (R3) or warehousing and reverse logistics (R5). We can consequently see vastly differing scopes in the studied retailers, and it is difficult to see any patterns in terms of scope.

4.2 Environmental indicators

The existence of environmental indicators found in logistics activities (Q2a) for each retailer (numbers as from Table 4) is illustrated in Table 7. The retailers that show certain indicators in certain activities are listed in each box. Table 7 shows that environmental indicators are used in all four logistics activities studied. Ten retailers (R1, R2, R3, R4, R6, R11, R12, R13, R14 and R16) have at least one indicator in each of the four activities. Purchasing is the logistics activity where the most indicators were found, especially measuring emissions, materials and products/services. Transport is second; emissions are also considered here. This is the same pattern as for the considerations shown in 4.1, where purchasing was the most prominent. We can therefore see, on a “cross-case” level, a relation between retailers’ environmental considerations and indicators.

Table 7. Environmental indicators found related to logistics activities

Log. Activities GRI Indicators	Purchasing	Transport	Warehousing	Reverse logistics	Sum
Materials	1, 2, 3, 4, 12, 13, 14, 16	1, 5, 11	13	1, 12, 14	15
Energy	1, 2, 12, 13, 14, 16	1, 2, 3, 4, 5, 6, 10, 11, 13, 14, 16	1, 2, 6, 13, 14, 16	1, 2, 16	25
Water			3, 4, 13, 14, 16		5
Biodiversity	16				1
Emissions	1, 2, 3, 4, 5, 6, 10, 11, 12, 13, 14, 16	1, 2, 3, 4, 5, 6, 10, 11, 12, 13, 14, 16	1, 2, 3, 4, 5, 6, 10, 11, 12, 13, 14, 16	1, 3, 4, 6, 11, 13, 14, 16	44
Effluents/waste	1, 3, 16	1	1, 13, 14, 16	1, 12, 16	11
Products/service	1, 2, 4, 5, 11, 13, 14, 16	1, 2, 11, 14	13		16
Compliance					0
Transport		1, 2, 5, 11, 12, 13, 14, 16	13		10
Overall	1, 4, 6, 10, 11, 14, 16	1, 4, 5, 6, 10, 11	1, 4, 6, 10, 11, 13, 16	1, 4	22
Supplier assessment	2, 14				2
Environmental grievance					0
Sum/activity	47	44	37	19	

Common indicators (Q2b) are addressed in Table 7, showing that emissions, energy and overall indicators are the most frequent indicators. For the GRI indicator transport, we have chosen to present the indicators that could be related to environmental impact, but were not yet covered by the other environmental indicators, i.e. materials and energy. However, two indicators from the GRI framework are not addressed by any retailer: compliance and environmental grievance mechanisms. We note a substantial focus on indicators related to reducing disposable plastic checkout bags; however, this indicator is not clearly related to logistics and therefore has not been included in Table 7. No retailer addresses all 12 GRI indicators. The “best-practice” retailers from Table 7 are R14 and R16, both describing nine indicators, and R13 describing eight, while R10 just describes three. Illustrations of environmental indicators, and to some extent guiding examples on ways to address them, are provided in Table 8. Instead of showing the most commonly applied and easy-to-find indicators, the examples in the table focus on the indicators more seldom applied.

Table 8. Illustrating environmental indicators in logistics activities

Indicator	Activity	Illustrating example
Water	Warehousing	“[We] measure both our total use (m3) and water intensity (m3/ square foot) of our stores and distribution centres” (R3, p42).
Effluent/ waste	General Reverse logistics	“[We] diverted more than 96 percent of operational waste from landfills” (R1, p149). “We will work with suppliers to drive customer returns on defective merchandise virtually out of existence (less than 1 percent) by the end of 2012” (R1, p152).
Supplier environmental assessment	Purchasing	“Percentage of new supplier that were screened using environmental criteria” (R14, p14).

Q2c addressed the use of existing frameworks. As shown in Table 4, a majority or seven retailers used the GRI framework as reporting format. The remaining retailers mentioned the use of many other certifications (however not the expected ISO14031), methods, declarations and protocols, both official and company-internal ones.

4.3 Environmental consciousness

The literature review provided clear and similar ways of classifying environmental consciousness (Q3a), spanning from a reactive approach to a more value-seeking approach. In practice, and based only on the content of the sustainability reports, classifying the retailers’

environmental consciousness was difficult for several reasons. Firstly, the sustainability reports provide a scattered picture of the logistics-related environmental considerations actually undertaken. Due to the lack of logistics-related information, we had to study environmental consciousness on a more general company level. Secondly, the reports seldom describe the underlying strategic reasons – the why - for environmental considerations. Thirdly, when the underlying motives are presented, we found that a single retailer could have characteristics of consciousness on all three levels. In such cases, we have classified each retailer as belonging to the level where it shows the most consciousness characteristics. We must also acknowledge that the data in this study depicts what retailers write in their CSR reports, not necessarily what they do, and it is here where we see the largest risk of greenwashing (e.g. Carbone *et al.*, 2012) descriptions. Most reports we classified as being in-between the reactive and value-seeking levels, i.e. the reports suggest that these retailers have a proactive consciousness. The reports of four of the retailers (R10, R11, R12, R13) represent companies on the other end of the consciousness spectrum, i.e. suggesting a value-seeking consciousness. We exemplify consciousness on different levels in the text below.

4.3.1 Reactive consciousness

Several retailers are guided by national objectives and strategies; however, few address compliance with laws and regulations. Cost saving/price focus is addressed on a general level with statements such as, “[H]as been optimizing its responsible sourcing strategy at [the] global level to reduce its impact on the ecosystem and biodiversity, and to increase the economic sustainability of its operations” (R2, p38). The economical factor is also used to convince customers/use of green promotions: “We advise our customer to enable them to make sustainable purchasing decisions. That pays – both in their wallet and for the environment.” (R4, p40).

4.3.2 Proactive consciousness

The strategic importance of environmental performance is recognized by several of the retailers. For example, one writes, “For the past twenty years, the Group has been optimizing its responsible sourcing strategy at global level to reduce its impact on the ecosystem and biodiversity” (R2, p38). Enhancing sustainability with suppliers is addressed in several retailers’ reports. For example, a company claims they “want deeper relationships, with more skill and insight, enabling more investment and innovation – on both sides” (R3, p37). Proactive problem solving is often exemplified in the reports by the testing and use of new, more environmentally friendly technology. One example is a company that has “been active in the search for and testing of viable alternative vehicle fuels for more than 20 years” (R1, p59). Sustainability benchmarking is put forward by “bringing together more than 360 members across the supply chain, and suppliers to raise industry standards and improve sourcing practices” (R5, p24). If and how the studied retailers strive to pre-empt new laws is not clearly described in the reports. However, examples can be found of how collaborating with authorities can give the retailer an important role in designing the future development. R3 offered one example in how they “are working with the UK Government’s Technology Strategy Board to explore how combining diesel with biogas can reduce emissions.” The participation in community involvement can be exemplified by a company that notes, “In 2012, we began working with Cooperativa Finca El Pongo, a group of about 80 small farmers in the city of Perico” (R1, p68).

4.3.3 Value-seeking consciousness

How sustainability is integrated in the business strategy is seldom described in the reports. One exception identified that “The Sustainability Integration System provides a forum for business unit reporting to measure and highlight a wide range of sustainability goals, achievements and improvements. It connects our individuals, teams, decisions and actions to our overall goal of sustainability” (R10, p7). Key elements in business model is difficult to identify but is exemplified in the statement, “The Group is acutely aware of new trends in food purchasing and consumption, which lean towards healthier products and place more emphasis on local, seasonal produce from sustainable production systems” (R12, p5). Long-term investments are illustrated by a company that is “preparing to roll out an energy saving programme with all its transporters. In exchange for energy economy certificates, the brand is funding various measures to enable its suppliers to improve their energy performance” (R12, p18), as well as “participating in environment related research and other gatherings held by governments, logistics operators, natural gas companies, automobile makers, universities, etc. organize environmental vehicle research meetings and rail transport research meetings, furthering our pursuit of adopting heavy duty gas vehicles and expanding our modal shift in transportation” (R13, p33). When it comes to realizing customers’ benefits, one company states, “An increasing number of consumers are not simply interested in the quality and safety of the products they buy – they also want to know about their social and ecological compatibility” (R4, p45).

5. DISCUSSION

By suggesting a classification model that relates environmental considerations to logistics activities (Table 5), we have provided an increased, logistics-related understanding of environmental considerations, as demanded by e.g. Ashby *et al.* (2012). This state-of-the-art description of the world’s largest retailers’ work with environmental sustainability related to logistics, together with the provided quotations, illustrates environmental considerations at work and can inspire retailers and other supply chain partners. Our findings are in line with the findings of Jones *et al.* (2005a, 2005b) and Kotzab *et al.* (2011); that a majority of retailers address environmental sustainability but with substantial variation. We see a value for both practitioners and researchers in the model, as it provides an overview of important areas seldom targeted such as transport supplier selection, mode selection and eco-driving. Just five of the world’s largest retailers have a broad scope and cover all four areas of logistics activities with their environmental considerations. Purchasing is by far most fully covered while transport, warehousing and reverse logistics receive comparably less emphasis. This is surprising, as the literature provided most considerations in transport, and transport is considered the most significant source of environmental impact in the logistics system (Wu and Dunn, 1995; Abukhader and Jönson, 2004). Reverse logistics should be an obligation for retailers by legislation (Bernon *et al.*, 2011), yet it was found to be the logistics activity with the fewest considerations in sustainability reports. These findings are difficult to relate to previous research; one similar study by Kotzab *et al.* (2011) used a different structure for categorizing considerations and did not cover purchasing. One could therefore question why these reports do not show more environmental considerations in logistics activities; more than half of the studied retailers have a narrow scope and only address half of the logistics activities identified in the literature. The depth in their considerations varies highly among the retailers. This accords to Kotzab *et al.* (2011) who found that no studied retailer had a full set of considerations, and had overall large variations among them.

The GRI indicator standard (www.globalreporting.org) was developed and complemented by a structure for logistics activities (Table 7), which is another contribution of the study. Energy

and emissions are frequent indicators, in line with the findings of Shaw *et al.* (2010) and Kotzab *et al.* (2011). However, many of the studied retailers do not show clear indicators. Instead they make general statements, such as “Minimize number of deliveries of product to our warehouses by consolidation of freight at our distribution centers and maximizing the load per truck”. No retailer describes all 12 GRI indicators. The best-practice retailer in this context describes eight. This seems to support the findings of Elg and Hultman (2011), who found that few retailers provide systematic reporting of environmental performance, and Forslund (2014), who found a weak interest for environmental indicators among retailers. It also supports Jones *et al.* (2005a, 2005b) and Searcy (2011), who claim that no universally accepted measurement system exists. We found that four retailers use the GRI framework without commenting on it. We believe that this serves as evidence that no retailer covered all indicators, for they chose to exclude those they did not wish to comment upon. The most indicators were surprisingly found in purchasing, not in transport being the single largest source of environmental impact on the logistics system (Abukhader and Jönson, 2004). We found no clear link or alignment between considerations and indicators, which supports the statement of Kotzab *et al.* (2011) that environmental sustainability is easy to demand but difficult to measure. This area calls for future research as there is a need for guidance, tools, and methods in order to improve performance measurement within sustainable logistics.

When it comes to environmental consciousness, we found only three retailers that would be classified as value-seeking. In particular, the characteristic “key elements in business models” was difficult to find. This indicates a future research need in order to identify the elements in the business model of largest relevance with regard to this. Classification was challenging with the current methodology. We agree with Ashby *et al.* (2012) in their claim that it is necessary to go behind the labels the companies apply to themselves. Consciousness is a very complex matter to judge, and many difficult situations appear in this context. If a company has both reactive (the lowest level) and value-seeking (the highest level) characteristics (in line with the illustrating examples from R4 in 4.3.1 and 4.3.3), should it then be classified as proactive (the middle level)? If the same characteristic is related to several driving forces, such as compliance with public protest combined with long-term investments, how should that be handled? Should retailers even be value-seeking? Might it be more relevant for supply chain partners to understand and judge considerations and indicators – the what - than consciousness – the why? Are the driving forces for sustainability (consciousness) important or are the actual results (considerations and indicators) more interesting? These questions are of importance to address in future research.

We have used content analysis applied to CSR reports to fulfil our purpose and respond to our questions. Content analysis is useful for understanding three aspects; the text itself, the audience and the creator of the text (Tate *et al.*, 2010). Our study has so far focused on the text itself; we will now discuss the audience. Sustainability reports should serve a function for both consumers and supply chain partners. We found lengthy reports, each with its own logic and structure. However, large reports are difficult to grasp and judge, in particular, we believe, for consumers. One of the most accessible reports has only 15 pages. It is called a sustainability brochure and was the only report publically accessible to, e.g., consumers. Retailers have a unique position in the supply chain as they have contacts both with suppliers and consumers (Spence and Bourlakis, 2009; Kolk *et al.*, 2010; Kotzab *et al.*, 2011; Wiese *et al.*, 2012). As such, it seems to be a good idea for retailers to more clearly state for which stakeholder a specific sustainability report is intended.

The fact that purchasing is so emphasized in the sustainability reports makes us wonder about the third aspect in content analysis from Tate *et al.* (2010), the creator. Who creates sustainability reports? Professionals involved in purchasing, sustainability managers or maybe

logistics managers? We were surprised to see that the sustainability reports do not contain that much logistics-related information. We ask, in line with Seuring and Müller (2008) and Abbasi and Nilsson (2012), what role does logistics play in the work towards sustainable development? We have studied non-producing companies to whom logistics should be even more central (Wiese *et al.*, 2012). In addition, this is no average sample — we investigated the largest retailers in the world.

Finally we want to see what contingencies we can see in our sample, which possibly could explain the differing descriptions of considerations, indicators and consciousness. The size of the CSR report is touched upon above in relation to the audience. The longest CSR report does indeed show many considerations and indicators, but the best report in term of the number of considerations and indicators (R14) in the sample, is less than half the size of the longest report. R13 can be said to be the overall strongest report as it scores well in all three dimensions (considerations, indicators and consciousness). Most retailers in our sample are from the US, representing both higher and lower scoring reports. The best report overall is a Japanese report. Those reports that build upon GRI tend to be strong on the indicators side. As this study is limited to the retail industry, it is hard to evaluate external validity in terms similar or the same patterns are to be found within other industries. Based on our sample, we are not comfortable to formulate propositions on contingencies, but leave that for further research.

6. CONCLUSIONS AND CONTRIBUTIONS

The purpose of this study was to explore and illustrate ways in which the world's largest retailers describe their logistics-related environmental considerations, their environmental indicators applied to measure the effects of these considerations, and their environmental consciousness in their CSR reports. We find that few retailers show environmental considerations in all logistics activities, but that purchasing is well described. Even if many retailers claim to use the GRI framework, no one uses all the indicators in the framework. Environmental consciousness was difficult to judge in CSR reports. We have provided state-of-the-art descriptions of the world's largest retailers' work with logistics-related environmental sustainability, but found it difficult to understand the driving forces for environmental considerations and judge consciousness by studying CSR reports.

A contribution to theory is the development of two classification models. The first provides a description structure for environmental considerations related to logistics activities. The second expands the GRI indicator framework by incorporating a structure for logistics activities. These models enable continued research as suggested below. Practical contributions are made in showing how an understanding and judgment of supply chain partners can be achieved by studying accessible sustainability reports, which may be helpful and useful for managers and consumers. The classification models can also be used as environmental considerations and indicators checklists, which could be used for a retailer wishing to cover a broad scope logistics-wise with their environmental sustainability work.

This study has its limitations. The classification model for considerations was developed from scratch and could have resulted in another, but similar, model. However, the logistics activities and indicators were based upon existing frameworks. There may be other sampling frames for large retailers than www.stores.org, but we feel confident that we have studied some of the largest retailers in the world. The search function in Adobe Acrobat was an important and useful tool, but it may also constitute a limitation. The greatest limitation is the difficulty in conveying how examples of considerations, indicators and consciousness were identified in the second, third and fourth search, a difficulty we tried to overcome by having three authors work on this process together until consensus was reached. We agree that it is a challenge to interpret,

operationalize and measure environmentally sustainable development in supply chains (Abbasi and Nilsson, 2012), but we have made an attempt to clarify this process with our classification models. Furthermore, we have studied what the companies report in terms of logistics-related environmental sustainability, not necessarily what they actually do.

A large number of further studies are suggested. Continued analyses of the retailers in this study can be carried out, such as further studying background or contingency variables as the size of a CSR report, industry, the report's country of origin, related to the scope and depth of considerations and indicators. Another interesting question evoked during this study, is the possible alignment within each retailer among considerations, indicators and consciousness. We see, for example, R1, which is strong in both considerations and indicators, but does not show a value-seeking consciousness in its report. R10 showed a value-seeking consciousness but had fewer considerations and indicators. R13 is strong on all three dimensions. We want to believe that there should be an alignment between considerations and indicators, as companies should want to measure the effects generated by their environmental considerations. However, should there also be alignment with environmental consciousness?

Using the same methodological approach (studying CSR reports), the current study could be expanded to also cover the seldom investigated social considerations, indicators and consciousness related to logistics. Further studies about the role logistics play in the work towards sustainable development and in sustainability reports is also of interest. In what ways are logistics professionals and purchasing professionals involved in being creators of CSR reports? What dialogue occurs between the information/marketing creators of sustainability reports and those who are responsible for the contents? Are different professionals within a company such as marketers, category managers, even suppliers/brand owners competing for being mentioned within CSR reports? This topic could be investigated in a case study building upon deep access. Understanding a company's environmental consciousness was difficult while working from only a CSR report. Another deep case study of retailers could allow for better judgment and classification of consciousness and address such questions as whether the level of consciousness in logistics activities differs from the companies' overall level of consciousness.

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