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Strategies to reduce the carbon footprint of consumer goods by influencing stakeholders

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ABSTRACT

Consumer goods contribute to anthropogenic climate change across their product life cycles through carbon emissions arising from raw materials extraction, processing, logistics, retail and storage, through to consumer use and disposal. How can consumer goods manufacturers make stepwise reductions in their product life cycle carbon emissions by engaging with, and influencing their main stakeholders? A semi-structured interview approach was used: to identify strategies and actions, stakeholders in the consumer goods industry (suppliers, manufacturers, retailers and NGOs) were interviewed about carbon emissions reduction projects. Based on this, a summarising presentation was made, which was shared during a second round of interviews to validate and refine the results. The results demonstrate several opportunities that have not yet been exploited by companies. These include editing product choice in stores to remove products with higher carbon footprints, using marketing competences for environmental benefits, and bundling competences to create win–win–win business models. Governments and NGOs have important enabling roles to accelerate industry change. Although this work was initially developed to explore how companies can reduce life cycle carbon emissions of their products, these strategies and actions also give insights on how companies can influence and anticipate stakeholder actions in general.

1. Background

Many companies have recognised that there may be benefits in reducing their carbon footprints ahead of regulation. For example, based on analysing a database of over 4000 manufacturing facilities in 7 OECD countries, Testa and Iraldo (2010) conclude that the rationales for this may include a drive to innovate, improving reputation, and keeping up with the competition. Based on an analysis of the financial data of 375 Japanese retailers, Tang et al. (2011) found that retailers who adopted green store utilisation (use of systems to facilitate resource efficiency) and green transportation (transportation with increased resource efficiency) outperform non-adopting rivals. However, not all actions to reduce carbon footprints will lead to benefits: Aragón-Correa and Rubio-López (2007), based on data from 140 food factories illustrated that environmental progress was not related to financial performance; thus some firms may have no financial incentives to progress beyond legal standards. Acting on their own, individual players within the supply chains of consumer goods can reduce the carbon footprint of their products only within tight constraints: unless customers pay more for lower carbon footprint products, changes must at a minimum be cost neutral. In a market that is already competing heavily on cost, this leaves very little room to manoeuvre. Therefore, well-motivated companies involved in consumer goods production, distribution and retail looking to deliver significant emissions reductions must seek opportunities not just to reduce their own emissions, but also to influence the emissions and choices of other players within their supply chain. It is this influencing activity, which motivates this paper.

If companies aspire to reduce their wider emissions, they need to consider a range of stakeholders. According to Henriques and Sadorsky (1999) proactive companies regard regulators, as well as customers, shareholders and local communities as important stakeholders. Buysse and Verbeke (2003) found that proactive firms differ from reactive ones in their perceptions of the relative importance of different stakeholders. They define the most proactive companies as those who engage with internal (employees) and external stakeholders (regulators, customers, communities, suppliers) to achieve a common goal (carbon emission reductions).

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Stakeholder influencing has been explored widely in the literature, although influencing strategies to reduce carbon emissions across the full product life cycle have not. For example, Frazier and Summers (1984) summarised the following *generic* influencing methods: promises, threats, legislative pleas, requests, information exchanges and recommendations. Based on this, Payan and MacFarland (2005) defined coercive (e.g. threatening) and non-coercive (e.g. informing) strategies. Corporate influencing strategies defined by Frooman (1999) include: withholding (determining whether the firm gets resources) and usage strategies (setting the conditions according to which the firm may use resources), direct and indirect influencing strategies. To improve supplier commitment Ghijsen et al. (2010) based on Frazier and Summers (1984) identified the following strategies for manufacturers: indirect (e.g. recommendations) and direct (e.g. requests) influencing strategies, human-specific (e.g. technical assistance) and capital-specific (e.g. equipment, monetary) supplier development. Some of these strategies, such as providing technical assistance, may be used to influence life cycle carbon emissions but these are generic influencing strategies rather than specific strategies to reduce the wider corporate footprint.

The complexity of environmental issues presents significant challenges, and research is needed to support the evolution to business practices which aim to reduce environmental impact along the entire supply chain. Although many empirical studies have been carried out on environmental issues, Srivastava (2007) argues that these have not dealt with every aspect of the supply chain simultaneously. According to Testa and Iraldo (2010) strategies need to be developed to encourage greater levels of green supply chain management. Moreover few, if any, literature references discuss how to significantly reduce their wider emissions and develop products ahead of current consumer preferences.

To try to contribute to this area, this paper addresses the question "how can consumer goods manufacturers make stepwise reductions in their wider carbon emissions by engaging with, and influencing their main stakeholders?" Section 2 reviews literature examining the question of how the full environmental impacts of consumer goods are influenced by a wide range of stakeholders including corporations, governments and consumers. Section 3 details our two-stage methodology for exploring corporate influencing, with a first round of semi-structured interviews used to create preliminary results that were then evaluated and updated in a second-round of follow-up interviews. The outcomes of this process are presented and discussed in Section 4, which proposes frameworks for anticipating approaches to exerting influence that may be applied now or in the future by different stakeholders.

2. Reducing product life cycle carbon emissions

A wide range of options to reduce product life cycle carbon emissions has been explored, and is presented as follows: supplier and customer influencing within green supply chain management, government and non-governmental organisation influencing, and consumer influencing.

2.1. Green supply chain management

Consumer goods manufacturers may work with their key stakeholders (e.g. suppliers, customers) to reduce the wider impact of their products. The literature of Green Supply Chain Management (GSCM) concerns cooperation among stakeholders to reduce supply chain environmental impact. There is a wide base of GSCM literature, reviewed for example by Srivastava (2007) and Seuring and Müller (2008), which investigates potential carbon emissions reductions through supply chain management, but this mainly focuses on upstream management of suppliers rather than downstream interaction with customers and final consumers. For example, some of the dominant themes in the GSCM literature as summarised by Srivastava (2007) in an extensive literature review, include reverse logistics, green manufacturing, green design, and waste management. Sarkis (2003) developed a decision-making framework for GCSM and included the following similar green supply chain elements: procurement, production, distribution, reverse logistics, and packaging. Although an extensive body of literature focuses on (elements of) green supply chain management, most work appears to focus on activities that result in mutual business benefits, such as optimising logistics. For GSCM to be comprehensive it must include emissions associated with all suppliers and customers, but few literature references deal with options associated with final customers.

Retailers also have a wide range of influence that could be brought to bear to reduce life cycle carbon emissions attributed to products. For example, they can reduce their own store carbon emissions, influence supplier emissions and select or de-select the products they sell. The Round Table on Sustainable Palm Oil (RSPO, 2009) is a collaborative project between retailers, farmers, manufacturers, local communities and NGOs to reduce emissions associated with palm oil. "Refrigerants, Naturally" (2011) is an example of a collaborative initiative between consumer goods manufacturers, retailers, equipment manufacturers and NGOs to reduce high carbon 'footprints' of refrigeration (Tassou et al., 2011). Supplier sustainability scorecards such as those by Walmart (Quinn, 2009) and IKEA (2011) are also used by retailers to motivate supplier performance. Quinn (2009) discusses Wal-Mart's use of supplier sustainability scorecards, and Nagappan (2009) discusses the implementation of a sustainability plan at Marks and Spencer, including success stories such as labelling for lower wash temperatures. Few literature references describe how retailers can influence the wider footprint of consumer goods, ahead of current customer preference or legislation.

The GSCM literature is extensive, but to date has not covered the full scope of strategies that could be used to reduce product life cycle emissions.

2.2. Government and NGOs

To date, the main international effort to mitigate climate change by creating legally binding carbon emissions targets, is the Kyoto Protocol established in 1997 by The United Nations Framework Convention on Climate Change (UNFCCC, 2011). The main Kyoto mechanisms are: the Emissions Trading Scheme (ETS or "carbon market"); Clean Development Mechanism (CDM, which allows carbon-restricted countries to establish carbon reduction projects in developing countries); and Joint Implementation (JI, which allows for flexibility of project implementation in member countries) (UNFCCC, 2011). Although the Kyoto mechanisms do not affect all industries and countries, specific national environmental laws have been passed in some countries. Examples of national environmental product policy instruments can be found in Table 1. As this table stems from 2005 and regulation will have evolved, its main purpose is to indicate the types of environmental product policy instruments in use.

Governments can take a range of measures to mitigate corporate carbon emissions, such as taxing carbon emissions, and various product policies such as labelling and extending producer product responsibility (e.g. to take care of products at the end of product life). Environmental taxes and charges impose an economic cost on environmentally harmful activities. Sollund (2007) found that

Table 1
Environmental product policy instruments in various countries. Source: Li and Geiser (2005).

Country	Taxes and charges	Producer responsibilities	Eco-labelling (ISO, Type I)	Environmentally responsible public procurement
Austria	X		X	X
Belgium	X			
Canada			X	X
Denmark		X	X	X
Finland	X	X	X	X
France				X
Germany		X	X	X
Italy		X		X
Japan		X	X	X
The Netherlands	X		X	X
Norway	X	X	X	X
Sweden		X	X	X
Switzerland	X			X
UK				X
US			X	X

energy, motor vehicles, and waste are taxed most heavily. Still, environmental taxes do not extend to all consumer goods. Integrated Product Policy (IPP) is an overarching term for all policy instruments to improve the environmental performance of product systems. A specific policy instrument to ensure companies take responsibility for their pollution is "producer responsibility policy" defined by Li and Geiser (2005) as producer encouragement to prevent pollution and reduce resource use by taking responsibility for end of product life. An example of this is Germany's Verpackungsverordnung or ordinance on packaging waste. Type I eco-labels are defined by the International Organization for Standardization (ISO 14020, 2000) as voluntary labels, which claim overall environmental preference of a product based on third party verification and life cycle criteria (e.g. EU flower eco-label). These labels may inform both business customers and final consumers. Government's may also act as exemplars, for example through environmentally responsible public procurement of lower impact products and services (Li and Geiser, 2005). Although there is a range of possible government interventions these have not been widely implemented yet.

To drive change more rapidly, additional industry pressure may be required. Companies may advocate (i.e. inform, negotiate, lobby) cases to the government as summarised in Miller (1990, p. 157). However, companies may also directly influence consumer behaviour through marketing techniques and pricing in shops. A report by the Sustainable Consumption Roundtable (2006) showed that despite mandatory refrigerator labelling, market share of A-rated appliances was only 3%; an EU ban of below-C-rated appliances increased market share to 10%, but incentives by retailers ensured a market share of 70%. In this case there were no consumer disadvantages (e.g. quality) and similar trends have been identified for other appliances.

In areas that lack government legislation, NGOs can take an active role aiming to correct societal undesirable practices through use of a wide range of influencing mechanisms. Kong et al. (2002) describe the following NGO strategies: assisting companies in creating green demand, advising companies on how to reduce supply chain environmental impact, and confronting companies. An example of creating green demand is WWF's "Food for the Living Planet Campaign" to stimulate sustainable food consumption. Kong et al. (2002) view "green demand creation" as most effective, because it targets consumers and consumption patterns, stimulates forward thinking, and has economic credibility. Confrontation remains important to pressurise companies to change business practices more rapidly but NGO collaboration with corporations may also be beneficial. However, collaboration with corporations is a delicate area for NGOs, because of the need to stay independent, challenge business practices and cooperate with companies. Ashman (2001) found that despite mutual benefits (e.g. increased positive exposure), NGOs bear more of the costs, such as adapting their organisations to meet collaborator' demands (e.g. adopting to quicker business cycles), and reduced effectiveness due to the lack of influence in the partnership. Moreover, if company adoption of sustainable business practices is slow, this will negatively reflect on NGOs involved. According to Ashman (2001) NGOs need to: scan the environment for suitable partners before engaging with companies, consider the government as a partner, use adverse and collaborative strategies, identify philanthropic and strategic partnerships and communicate NGO practices to business partners for joint learning. NGOs may be under constant scrutiny by other NGOs, so it is important to stay independent, and select collaborations carefully.

Governments may use multiple measures (e.g. taxes, product bans) to mitigate corporate carbon emissions, but in some cases NGOs and even companies step in to push change more quickly.

2.3. Consumers

Understanding consumer behaviour is the core interest of marketeers aiming to stimulate product purchases, but this knowledge can also be used for societal benefits such as reducing carbon emissions. The application of this conventional marketing knowledge for altruistic purposes is sometimes known as social marketing (Andreasen, 1994).

Which consumer influencing strategies could effectively stimulate environmentally responsible behaviour? Simply providing information about environmental issues may change the behaviour of some consumers, but according to DEFRA (2011) will not influence the majority. The theory of planned behaviour aims to explore this response, and proposes that *intentions* can be predicted from people's attitudes, from their perceptions of social pressure and from their perceptions of their own ability to influence the behaviour of others. Subsequently, intentions and *actual* ability to influence explain people's behaviour (Ajzen, 1991). Furthermore, building on a range of analytical models for behaviour change such as the theory of planned behaviour, Kollmuss and Agyeman (2002) found that in addition to this, demographic, external (e.g. culture) and internal factors (e.g. knowledge) help explain pro-environmental behaviour in particular. Knowledge therefore only partly explains behaviour. Fig. 1 illustrates potential gaps between knowledge and behaviour: people may know the right response but not act accordingly. Moreover, Lindenberg and Steg (2007) found that hedonic goals (i.e. actions perceived as fun) often overpower normative goals (considered good by peers), which may lead to acting in an environmentally irresponsible manner: strengthening normative goals or making

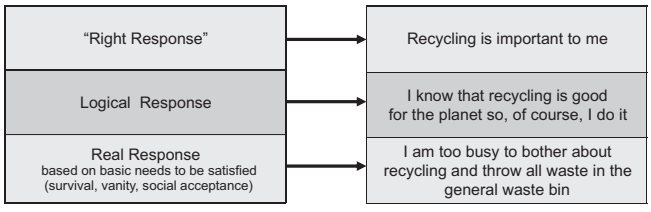

Fig. 1. Consumer responses: there is a discrepancy between knowledge, beliefs and responses. Adapted from Pomfret (2009).

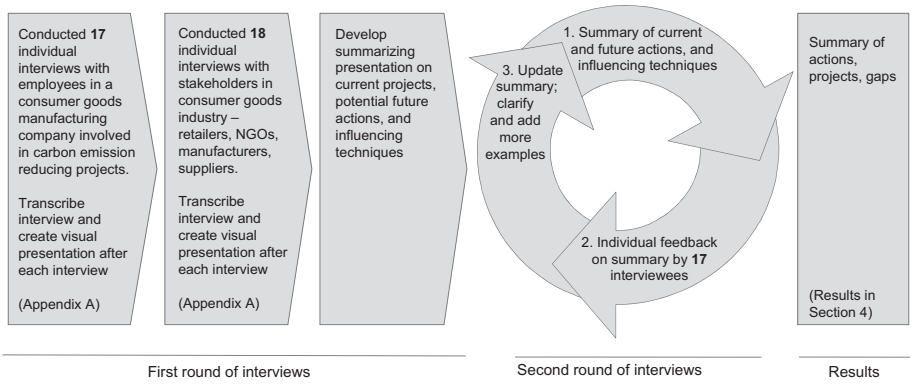

Fig. 2. Research methodology used in this paper.

hedonic goals less compatible with norms could therefore stimulate environmentally responsible behaviour.

The following potential environmental consumer influencing options have been identified from the literature: social norms and peer education, goal setting and feedback, incentives, engaging people in the solution and choice editing and defaults.

Social norms may encourage behaviour change. To evaluate this Goldstein et al. (2008) conducted experiments and demonstrated that hotel guests are more likely to reuse towels if it appears that others have reused towels. Descriptive normative messages such as "75% of our guests reuse their towels" were superior to conventional messages on environmental impacts, and were most effective when immediate connections such as "guests in this room reused their towels" were included in the messages. However, Cialdini et al. (2006) also showed that descriptive normative messages (those which describing "what is" such as the statement that "many people drop litter") may be counter-productive, while injunctive messages (which describe "what ought", such as "littering is socially undesirable") can be more effective. Kallgren et al. (2003), based on experiments, found that injunctive norms affect behaviour most, if norms relevant to the behaviour are prominent: for instance, if participants in an experiment were exposed to someone who picked up litter and put it in a bin, this resulted in significantly less littering compared to experiments where participants were exposed to someone littering.

According to Abrahamse et al. (2005), combining goals with the provision of feedback from peers proves more effective than goal setting alone. Van Houwelingen and Van Raaij (1989) found that subjects who were given goals combined with daily feedback reduced their energy consumption by more than an initially stated target. Carrico and Riemer (2011) found that peer education and feedback could help people reduce energy use in buildings, perhaps because of the personal way in which information was presented. However, positive feedback should be provided with some restraint: Schultz et al. (2007) for instance found that descriptive normative information such as "you use less energy than average", led to an undesired energy consumption rise in below average use households, but a combination of normative and injunctive information avoided this increase. Similarly, Ayres et al. (2009) based on two large field experiments found that utilities can reduce energy consumption by providing feedback that includes peer comparison, and suggest that comparative feedback should be mandatory for high-energy use households in particular. Waters et al. (2009) investigated the use by NGOs of social networking websites, such as Facebook, to draw attention to causes. Their investigation suggests that such sites may also stimulate behaviour change, for example through peer comparison or by facilitating carbon-saving activities.

To stimulate behaviour change, it may help to emphasise the advantages of behaviour change to the user, for example where cost reductions are possible. According to Carrico et al. (2011), real-time feedback or provision of comparative energy reports can reduce energy consumption while Griskevicius et al. (2010) report experiments demonstrating that increasing desire for social status and prestige led to an increased preference for eco-friendly products. They provide an example related to hybrid cars: if a car is only available as an "eco-version", the fact that this is prominent may incentivise purchasing, because the owner's eco-conscious preference is made clear to others. However, Carrico et al. (2011) claim that putting an actual price on such behaviour may undermine intrinsic motivations, and can therefore be ineffective.

Choice editing may stimulate environmentally responsible behaviour. Thaler and Sunstein (2009, p. 3) define choice editing as "organising the context in which people make decisions". Many factors influence the context. For instance, increasing the number of safe cycling lanes and emphasising the health benefits of cycling in a campaign may encourage people to cycle rather than to drive. Alternatively, selecting different default options can also change the choice architecture. For example, retailer M&S (2011) only sells energy intensive appliances whose performance is at least A-rated. Johnson and Goldstein (2003) refer to defaults in a different field: in

Table 2
Interview questions – consumer goods manufacturer.

Interview schedule semi-structured interviews (consumer goods manufacturer)
1. How would you describe your role in the organisation?
2. What is the main project you are involved in that will help reduce CO_2 emissions (far) beyond the company's boundaries?
3. Which stakeholders did you involve?
4. How did you involve stakeholders? (e.g. persuading, informing, consulting, cooperating, influencing, lobbying)?
5. How successful is the project and what are the success and failure factors?
6. How high do you estimate the company's ability to influence via this project? Why is the company able or not able to influence?
7. According to you who are the main stakeholders the company should engage with to *further* reduce CO_2 emissions outside its company boundaries? (suppliers, retailers, local, national or international government, competitors, related industries, academia, industry groups, NGOs). Why?
8. How should the company get involved in the future?
9. How could your company involve different stakeholders (cooperating, influencing etc)?
10. How high do you estimate the company's ability to influence this? Why?

Table 3
Interview questions – other organisations.

Interview schedule semi-structured interviews (other organisations)
1.What is you role in the organisation?
2. What is the main project you are involved in that potentially reduces CO_2 emissions significantly?
3. Who/which stakeholders did you involve? How did you involve them?
4. How successful is the project? What are the success and failure factors?
5. Why are you able or are you not able to influence?
6. What *else* can organisations (e.g. supplier, manufacturer, NGO, retail) do to more significantly cut system-wide CO_2 emissions?

countries where people are organ donors by default, around twice as many people are donors compared to countries where people need to opt in to be donors.

It is important to engage people in the solution of a problem. For example, the Sustainable Consumption Roundtable (2006) recommends action according to the four E's – encourage, exemplify, enable and engage with consumers. DEFRA (2011) define a similar range of activities, but suggest that the actions should differ by consumer segment. Consumer engagement by Unilever (Unilever and Coca-Cola, 2009) and Marks and Spencer (Nagappan, 2009) changed the laundry habits of their consumers. However, apart from relatively anecdotal reports in the "grey literature" (company or government reports) on engagement, little evidence on how companies may convince consumers to live more sustainably has been published.

2.4. The need to understand how organisations can influence life cycle carbon emissions

The potential advantages of pro-active environmental management such as innovation and brand development are well understood. However, there is less understanding of how organisations can use their competences to influence product life cycle emissions, especially beyond satisfying current customer preference. Nevertheless, the grey literature includes some examples: the World Business Council for Sustainable Development (WBCSD, 2011) reports case studies on corporate carbon reduction projects,

Table 4
Interviewees.

	Organisation type	Size/Geographical focus	Interviewee role at time of interview	Type of contact	Second interview?
1	Manufacturer 1 – Branded fast moving consumer goods	Large, multinational	Manager – sustainability	Phone call	Yes
2			Senior engineer – supply chains	Phone call	Yes
3			R&D – New business models	Phone call	No
4			R&D – New business models	Phone call	No
5			Global supply chain expert	Phone call	Yes
6			Global manufacturing manager	Phone call	Yes
7			R&D – Consumer behaviour	Face-to-face	Yes
8			Scientist – Sustainability	Face-to-face	No
9			Senior management – Sustainability	Face-to-face	No
10			Director – external affairs	Face-to-face	Yes
11			Scientist	Face-to-face	Yes
12			R&D – Consumer behaviour	Face-to-face	Yes
13			Scientist	Phone call	No
14			Global director product sustainability	Phone call	No
15			R&D consumer behaviour	Face-to-face	No
16			Scientist	Phone call	Yes
17			Marketing	Phone call	No
18	Educational/Political/sustainability	Medium, multiple international offices	Senior associate	Face-to-face	No
19	NGO 1 – Political/sustainability	Small, national (UK based)	Product sustainability & policy expert	Face-to-face	Yes
20	NGO 2 – Business/sustainability	Medium, multiple international offices	Business advisor	Face-to-face	Yes
21	NGO 3 – Environmental	Medium, multiple international offices	Co-founder	Phone call	No
22	Equipment manufacturer	Small, national (France), international client base	Co-founder + product scientist	Email	No
23	Manufacturer 2 – Durable goods	Large, international	Product development director	Phone and Face-to-face	Yes
24	Service supplier	Large, multinational	Director sustainability	Email and face-to-face	No
25	Product & service supplier	Large, multinational	Head product sustainability	Email and face-to-face	Yes
26	Educational/Political/sustainability	Medium, multiple international offices	Regional director	Phone call	Yes
27	Mining and extraction company	Large, multinational	Sustainability director	Email and face-to-face	No
28	Retailer 1 – Durable consumer goods	UK-based division of a multinational	Director sustainability	Email and face-to-face	Yes
29	Retailer 2 – Consumer goods	Large, international	Director sustainability	Phone call	Yes
30	Retailer 3 – Consumer goods	Large, UK based	Director sustainability	Email and face-to-face	No
31	Manufacturer 3 – Branded durable goods	Large, UK based, international client base	Product development director	Email and face-to-face	No
32	NGO 4 – social/ environmental	UK division of international network	Campaign director	Email and face-to-face	Yes
33	NGO 5 – Social	UK division of international network	Campaign director	Face-to-face	No
34	Retailer 4 – Consumer goods	UK division of multinational	Sustainability director	Phone call	No
35	Retailer 5 – Consumer goods	US based multinational	Sustainability director	Phone call	No

Table 5
Current drivers and actions to reduce product life cycle carbon emissions identified from the interviews.

Current drivers and actions	Interviewees who suggested this strategy	Interviewees who use this strategy
Customer-driven	25	1, 8, 9, 14, 23, 29, 30, 34, 35
Supplier-driven	12, 28	4, 5, 8, 9, 11, 14, 22, 24, 27, 31
Win–win (synergies)	3	12, 13, 21, 29, 30, 34
External force	20	18, 19, 21, 26, 32, 33

and suggests a stepwise approach to create sustainable supply chains, including the assessment of environmental impacts, identification of solutions, development of project plans, implementation, and assessment of results. Although the WBCSD (2011) includes options companies are pursuing now, which may inspire others; it is important to develop future strategies to further reduce the wider corporate environmental footprint. In the literature, the need to develop strategies with a life cycle environmental impact has also been identified: for example, Cronin et al. (2011) identified the research need to find ways to engage with supply chain partners to reduce life cycle emissions, and identify strategies to stimulate consumers to engage in pro-environmental behaviour. Similarly, Testa and Iraldo (2010) identified the need to develop approaches to support the extension of environmental management to supply chain relations. This research aims to identify future actions to reduce the wider carbon footprint of consumer goods.

3. Empirical research

The research question explored in this paper is: How can consumer goods manufacturers reduce their wider carbon emissions by engaging with and influencing their main stakeholders? Fig. 2 shows the research method used.

A semi-structured interview method is used. First, 21 employees of a consumer goods manufacturing company were contacted for an interview about their projects to reduce the wider footprint of consumer products. These interviewees were identified using the snowball technique, so interviewees suggested others to contact (Reed et al., 2009). Eventually, 17 employees agreed and were interviewed for 45-60 m each. Table 2 includes the interview questions.

Table 6
Current influencing strategies to reduce product life cycle carbon emissions identified from the interviews.

Current influencing strategies	Interviewees who suggested this strategy	Interviewees who use this strategy
Use expertise and bargaining power	6	19, 21, 23, 32, 35
Involve and collaborate	2, 6, 14, 22, 27, 34	1, 15, 19, 20, 21, 29, 30, 35
Expose and confront		21, 28, 32, 33
Engage and promote	14, 30	23, 29, 32

Swanborn (2010, pp. 25–26) suggests evaluating multiple stakeholder perspectives for multi-stakeholder issues. In total, 21 different globally operating stakeholders in the consumer goods industry were contacted to integrate multiple perspectives: suppliers of goods and services, consumer goods manufacturers, retailers, NGOs, and an environmental consultancy company. Of these organisations, 20 responded positively to the request for an interview. Two interviewees (the consultancy and an environmental NGO) were unavailable so 18 people were interviewed. Table 3 includes the interview questions. The interviews took about 30–45 min mainly because of a reduced number of questions. The interviewees were identified using the snowball technique and an industry sustainability event was attended to identify more interviewees, so the sample is largely a convenience sample. Table 4 provides an overview of all the interviewees.

Notes were taken during the interviews and the interviews were transcribed immediately after these took place. Some respondents provided secondary data (e.g. internal project information). Transcribing the interviews consisted of two parts: the creation of a detailed report of the interviewee responses per question and a visual representation of the results (Appendix A includes an example). The visual representation was chosen because of the nature of the interview information provided: stakeholder relations and influencing mechanisms.

Based on the detailed interview reports and visual representations, a presentation was created which included current and future influencing strategies and actions. Only strategies that were mentioned by at least 10% of the initial 35 interviewees (i.e. at least 4 people) were included, so the strategies were based on multiple views rather than one opinion. To investigate whether the

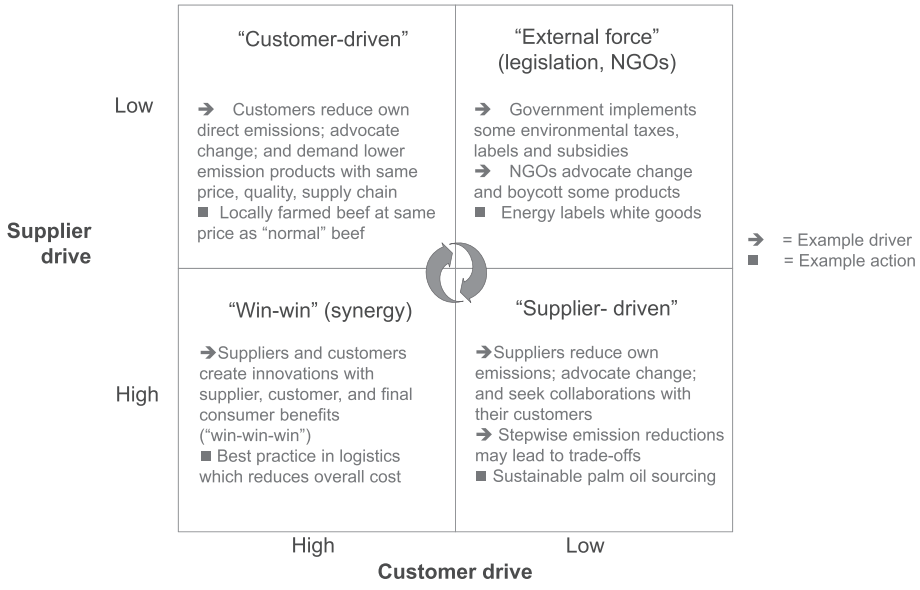

Fig. 3. Current drivers and actions to reduce life cycle emissions.

Table 7
Generic influencing strategies.

Generic influencing strategies	Interviewees who suggested this strategy	Interviewees who use this strategy
Informing	14, 17	1, 2, 10, 30, 32, 33, 34
Positively directing	10, 12, 18, 19	1, 4, 20, 21, 23, 26, 28, 32, 35
Negatively directing	7, 12	20, 28, 33, 35
Forcing	8, 10, 18, 21, 23	9, 33

presentation appropriately reflected current and future actions and strategies, a selection of initial interviewees (17 in total) was contacted to individually comment on the outcomes by phone, evaluate whether important strategies were missing, and provide additional examples as appropriate. These interviewees (column "second interview?" in Table 4) were selected based on background (different expertises and organisations) and availability indicated during the first-round interviews. During each interview the researcher presented the findings and the interviewee was probed to give feedback. In response, interviewees also provided additional examples. The presentation was iteratively improved, and interviewees were sent the most recent presentation before each interview. The results of this process are discussed in the next section.

4. Results and discussion

What are the current drivers and actions to reduce carbon emissions? Table 5 includes current drivers and actions based on the interviews. All interviewed retailers and manufacturers have projects in place to reduce their own operations' emissions. Change driven by customers may not be easy to realise for suppliers especially if the same quality and price criteria are expected to limit consumer impact (e.g. price rises). Only a few successful "win–win–win" options have been identified – options which have additional consumer benefits. An example is concentrated laundry detergent, which takes up less shelf space (retail-win), uses

Fig. 4. Current influencing strategies by NGOs, government and industry. Note: consumption refers to consumer purchasing.

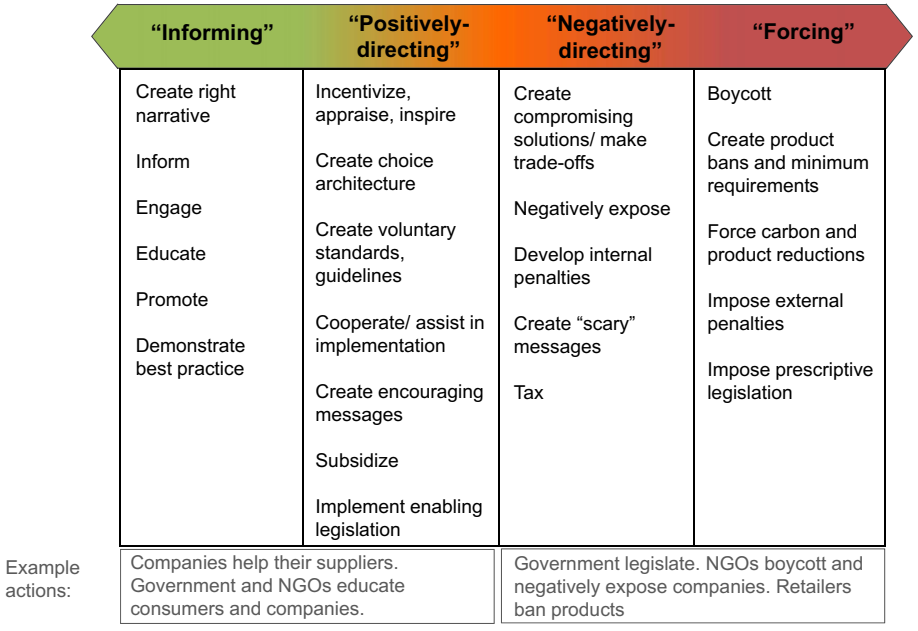

Fig. 5. Types of generic influencing strategies to reduce life cycle carbon emissions.

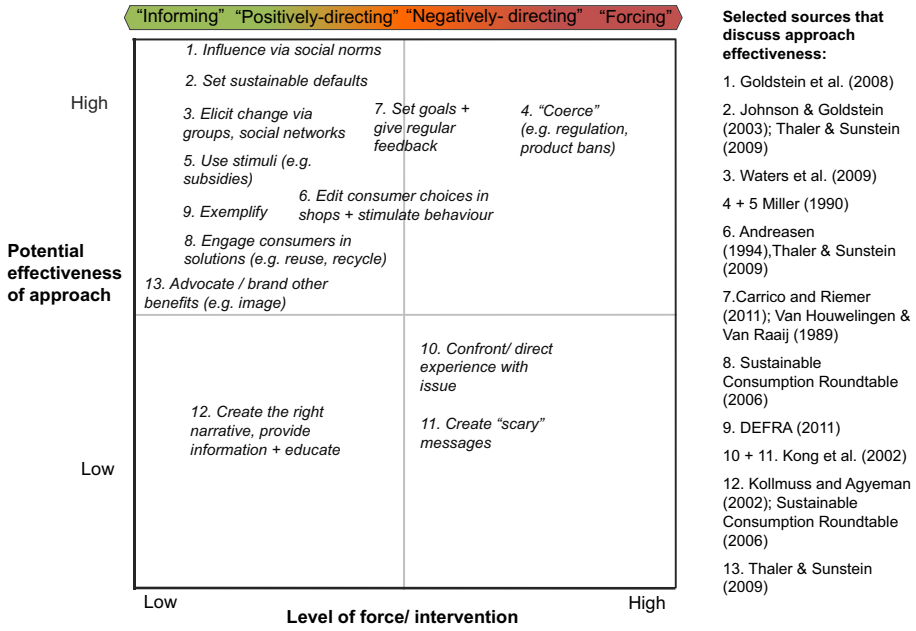

Fig. 6. How can consumers be influenced to reduce their carbon footprints?

less packaging (manufacturer-win) and allows consumers to save energy by low temperature washes (consumer-win). There is little evidence of lower carbon footprint business models developed ahead of current consumer preference.

Fig. 3 is based on Table 5. Initially the axes included difficulty for the supplier and customer respectively, but a few of the second round interviewees pointed out projects may have multiple drivers (as also explained in the introduction). The arrows in Fig. 3 indicate that there are multiple (indirect) drivers and feedback systems: for example, retailer 1's targets to source raw materials sustainably made suppliers change strategic direction, which subsequently affected other customers.

Table 6 contains current stakeholder influencing strategies identified from the interviews.

Fig. 4 was created based on the strategies identified in Table 6. The second-round interviewees could place their actions in at least one of the boxes. Some interviewees used multiple strategies simultaneously: retailer 5 used scorecards and helped suppliers improve their scores. The wording on the axes was changed slightly based on comments from the second round interviewees and different examples were added to clarify each influencing strategy. Fig. 4 may help different stakeholders map current actions and identify a wider range of strategies. Companies and NGOs for instance foresee that collaboration will become more important in future.

How much force do organisations use to influence product carbon footprints? The potential level of force is limited by stakeholder legitimacy and power: for example, legislation is a tactic

Table 8
Future individual influencing strategies.

Individual influencing strategies				
Strategy	Who?	Actions	Existing and possible examples	Interviewees who suggested this
Use marketing techniques for environmental benefits	Companies	- Convince consumers of additional benefits of eco-friendly products. - Communicate/educate about global issues, using your brand. - Make sustainable products more exciting for the mass market	- "Colder, shorter showers are better for my skin" "Dosing water to brew tea reduces my energy bill". - "Designer" low-energy light bulbs - Ben & Jerrys (2011) climate change college	4, 7, 13, 14, 15, 17, 18, 20, 28
Create choice architectures to support low carbon behaviour and purchases	Companies	- Edit product choice in shops: Select low carbon products, use price, promotion, and placement to sell lowest footprint products. - Make it the *easiest* thing to do (i.e. set sustainable defaults) - Ban worst products from shops.	- Distinguish products by uniform carbon footprint labels. Low carbon footprint products in eyesight on shelve. - Availability of good public transport to shops. - No disposable carrier bags as the default - Ban below A-rated appliances	12, 18, 34, 35
Drive change by leading by example/ advocate carbon emissions reductions	Companies and government	- Aim to slow business growth/reduce consumption - Companies show change is feasible by successful examples - Incentivise corporate sustainability - Internal advocacy: drive change by employee engagement. - Management commitments: vision *and* budget - Set ambitious targets.	- "No packaging" retail shops. - Sustainability in business bonus schemes - Companies provide employees free home insulation and energy metres. - UK 80% GHG reduction targets.	2, 5, 11, 18, 21, 26, 29

Table 9
Future enabling influencing strategies.

Enabling influencing strategies				
Strategy	Who?	Actions	Existing and possible examples	Interviewees who suggested this
Tighten environmental legislation (driven by NGO and corporate lobbies)	Government NGOs Companies	- Carbon budgets for all industries and clear "future legislation plans" - Governments create bans, minimum requirements and labels. - Proactive company and NGO lobbying.	- WEEE Directive for electronics. - European car industry legislation plans - Energy labels white goods: EU bans worst appliances - Proactive companies lobby for stricter EU carbon emissions targets	2, 10, 18, 19, 20, 23, 26, 27, 32, 33
Appraise/promote companies that do well to encourage further good practice	Consumer organisations, media, NGOs, governments, companies	- Third-party recognition may drive further industry carbon emissions reductions (if there are clear commercial trade-offs) - Promote "green initiatives"	- Dow Sustainability Index. - Green Business Awards. - Customer-led supplier awards: Best suppliers educate others	6, 9, 29, 30
Enable open information and innovation	NGOs, research institutes, companies, government	- Customers value supplier sustainability similarly to price/quality. - Customers do not "misuse" energy/CO_2 data to cut prices. - Retailers, NGOs and universities facilitate industry learning	- Sustainable Shipping Initiative - Supplier conferences on industry best practice organised by retail.	1, 2, 3, 9, 28, 29, 30, 34

exclusive to the government. However, companies may also use forceful interventions (e.g. setting minimum supplier standards). Retailer 5 gave a recently introduced "green product" prominent shelf space – a positively directing change – and retailer 1 removed unsustainable products from its range.

Based on the findings in Table 7, Fig. 5 was developed. Actions range from providing information and giving positive direction (e.g. assisting suppliers in implementation) through to negatively directing actions (e.g. taxing) and forcing (boycotts and product bans). The examples actions were added during the second-round interviews. Organisations may use Fig. 5 to map their current actions, identify gaps and plan future actions of different level of force.

Fig. 5 becomes more practicable, when applied to a specific context. To identify options to reduce the carbon footprint of consumer use, Fig. 6 was adapted from Fig. 5 and further developed based on the literature in Section 2.3. Fig. 6 intends to give an indication of the potential effectiveness of future strategies to reduce consumer carbon footprints based on the literature, although effectiveness depends on how options are put into practice. Besides forcing, positively directing options look effective, for example, advocating other product benefits and driving change by defaults and norms. Informing may not be effective as the sole strategy, but can be complementary: for example, companies advocate benefits of product introductions (e.g. low temperature washes make clothes last longer) and governments educate (e.g. about climate change). As the relative effectiveness of strategies is not tested in this paper, Fig. 6 serves best as a starting point to map and test consumer-influencing strategies in different organisations.

Tables 8–10 were created based on possible and emerging influencing strategies mentioned by the interviewees. Interviewees provided innovative examples from other companies and NGOs, so examples are not necessarily those pursued by the interviewees. Possible future strategies and actions not yet fully explored by organisations include: 1) *Individual influencing*

Table 10
Future cooperative influencing strategies.

Cooperative influencing strategies				
Actions	Stakeholders	Actions	Existing and possible examples	Interviewees who suggested this
Create "win–win–win" business models	Supply chain partners (suppliers, customers)	- Jointly develop low carbon footprint business models and promote consumer advantage - Use promotion skills in shops - Educate consumers about "win"	- Suppliers and customers develop cheaper reusable products, refillable in shops - Promote new business models at retail (e.g. refills) - Increase service intensity (e.g. diet advice rather than products) - Promote benefits of sustainable use (e.g. hang-drying clothes is better for clothes, environment, and is cheaper)	3, 5, 7, 9, 12, 13, 14, 15, 17, 23
Establish multi-disciplinary, multi stakeholder consortia	NGOs, research institutes, companies, government	- Establish multi-stakeholder consortia to represent all viewpoints and combine different types of expertise	- Round Table on Sustainable Palm Oil (RSPO, 2009) - Refrigerants Naturally (2011)	1, 5, 10, 12, 14, 21, 28, 35
Drive change by joint education and engagement	NGOs, government, companies	NGOs, government and companies jointly use skills to encourage alternative lifestyles (e.g. sustainable purchases, energy use)	For instance, to reduce hot water use government educate consumers and companies; utility companies offer free energy metres; shops only sell efficient showerheads	7, 14, 18, 20, 28, 35

strategies: organisations use their core competences to influence life cycle emissions; 2) *Cooperative influencing strategies:* organisations bundle their expertises to create positive outcomes; 3) *Enabling influencing strategies:* enabling change for others.

In general, companies and NGOs welcomed more collaboration to reduce carbon emissions: combining organisations strengths (e.g. government authority, commercial insight, NGO credibility) is expected to improve outcomes. Moreover, companies and NGOs suggested governmental carbon emissions caps could accelerate innovation (e.g. similar to EU car industry emissions targets), so governments have important enabling roles. Companies recognised they do not use their individual corporate skills fully. Retailers for instance could only stock the lowest footprint products. Still, industry examples of product bans ahead of legislation and consumer demand are not yet widespread. For some companies, sustainability only recently became a strategic priority and companies with an emerging sustainability agenda valued exemplars from industry leaders. Evidence of win–win–win business models is however scarce, and few companies use their business competences fully to drive carbon emissions reductions.

5. Conclusions

A few proactive companies have started to adopt pro-environmental business practices beyond legal requirements; and some even lobby for stricter legislation. Product introductions can stimulate consumer behaviour change (e.g. dry shampoo, which postpones one hair wash) but it is difficult to imagine corporate messages aimed at selling less. Similarly, offering products ahead of current consumer preference is seen as risky. Still, marketers constantly create consumer needs, so a "green need" could be created too (similar to green demand; Kong et al., 2002). Government-established defaults (e.g. phasing out incandescent light bulbs), minimum standards (e.g. labelled white-goods), and carbon budgets may accelerate change, so governments play an important role.

Rather than focussing on one element of the product life cycle (e.g. raw material sourcing) only, this paper identified future strategies and actions to reduce carbon emissions across the life cycle of consumer goods. Potential future options were identified based on the interviews (found in Tables 8–10).

How can the findings be used to influence wider product carbon footprints? Organisations may use Figs. 5 and 6, and Tables 8–10 to develop a wider range of influencing strategies and actions, and learn from underutilised strategies in Fig. 4. Fig. 5 includes similar influencing strategies to those identified by Frazier and Summers (1984) but provides a wider range of options by level of intervention, to influence carbon emissions in particular. Suggestions to influence consumer behaviour – although not tested in this paper – can be found in Fig. 6, which may serve as a starting point to find more strategies. Tables 8–10 include advice for future corporate carbon emissions reductions: Organisations can bundle competences and create low-CO_2 win–win–win business models with consumer benefits (e.g. improving health, reducing cost), which receive prominent shelf-space. Successful examples may stimulate competitor initiatives. Marketing messages could drive norm changes – for instance, a shampoo advertised for "the normal weekly hair wash".

Existing knowledge on consumer segments used for branding can be used to stimulate sustainable behaviour in different consumer groups. NGOs and governmental bodies can learn from marketers, and tailor messages to consumer segments. Lower income segments might be concerned with cost savings and affluent consumers might value convenience (e.g. time saving) or status. DEFRA (2011) defined consumer segments by climate change interest (e.g. concerned or disengaged), and argues that actions should be tailored accordingly. However, marketing tactics and market segmentation already used by companies may also be powerful to target consumer groups. To promote low carbon footprint products to all consumers, uniform retail-wide carbon footprint labels (similar to nutrition labels) may be beneficial.

Can the figures and tables be used in different contexts? The findings could apply to different corporate externalities such as social issues, and may give insights on (stakeholder) influencing *in general*. Fig. 3 shows that companies may take individual or joint action to drive down carbon emissions, and with the absence of company drive, external force can drive change. The same applies to social issues: some companies treat employees well, but for other companies, external force (e.g. government sanctions) is required to achieve this. Fig. 4 may also apply to social supply chain issues: for instance, NGOs may expose companies who still use child labour or underpay suppliers. Tables 8–10 may also be used to address social problems: companies may "sell" socially desirable messages such as healthy eating habits and set sustainable defaults (e.g. to only sell fair-trade products). Fig. 5 includes influencing strategies to reduce wider carbon emissions, which may also be relevant to how people influence one another in general (e.g. by informing), or more specifically, how companies can innovate across the supply chain (e.g. by setting minimum supplier standards).

The empirical work of this paper has focused on stakeholders in companies and NGOs. Government representatives and consumers have not been interviewed for this research. However, NGOs are familiar with government practices as they operate in areas, which lack government leadership. Retailers and consumer goods manufacturers have significant consumer knowledge and each interviewee is also a consumer. Sometimes, respondents for instance explained their personal – in addition to their professional – viewpoints. So, although consumers were not interviewed specifically, inevitably, interviewers will have also responded from their viewpoints as consumers. Ideally consumers would have been interviewed, but this would have required a much larger research scale to create a representative example. The interview questions for the consumer goods manufacturer and other interviewees (Tables 2 and 3) slightly differed which may have affected how interviewees responded. The interview sample was largely a convenience sample, although a wide range of internally operating organisations was interviewed. Alternatively, an in-depth case study approach could have been chosen, which would have allowed for more detail on strategies to be used. However, the projects discussed during the interviews were mostly of a confidential nature so it was not possible to include a great level of detail on projects.

This research was of an exploratory nature. Future research may include in-depth case studies and experiments (e.g. in shops) to test the effectiveness of possible future influencing strategies, and business models based on the future strategies and actions identified.

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Appendix A. Example visual interview transcription

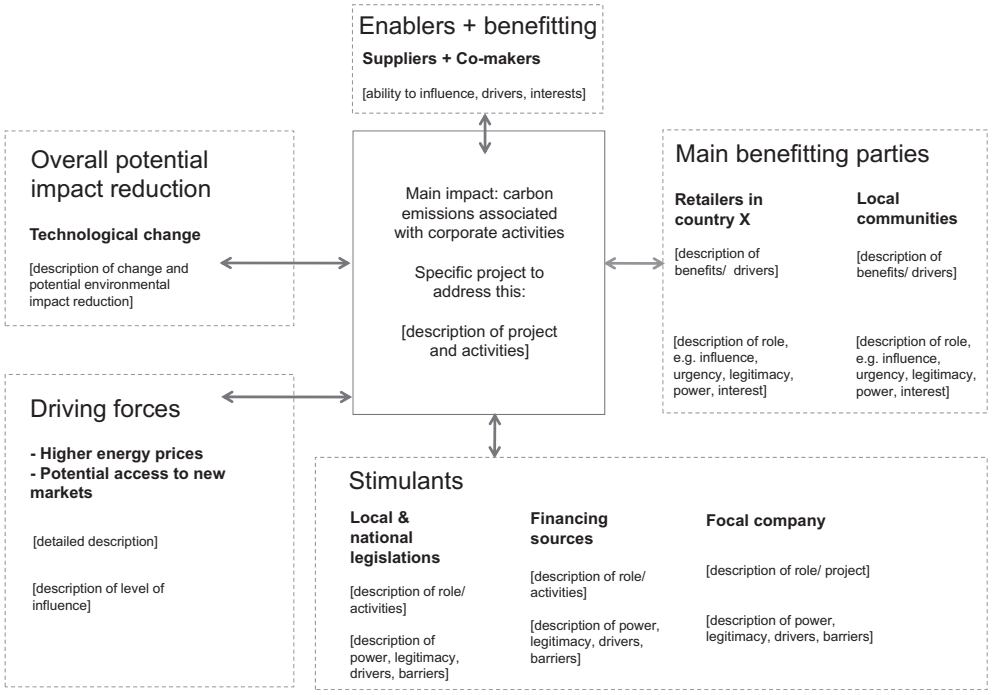

Figure A1. Example of visually mapping interview outcomes. Note: project details have been removed for confidentiality reasons.

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