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Presenting the SCL Model: Adding value to business strategy through UCD principles

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This paper presents the Sustainable Consumption Leveraging (SCL) Model and its toolkit, which was developed to help businesses examine their potential for enabling sustainable consumption whilst identifying areas of opportunity to improve their business model and value proposition.

The paper begins by establishing the contribution of business towards sustainable consumption and sets out user-centred design (UCD) principles as a valuable approach to leverage sustainable consumption. The relationship between UCD principles and sustainable consumption in a business context was studied through qualitative research. The findings of in-depth interviews with experts, a focus group and a document analysis led to the construction of a theoretical framework, which was used to develop the SCL Model and its toolkit.

The paper then evaluates the potential for the SCL model and toolkit to leverage more sustainable consumption through a comparison made between four workshops within multinational companies in two different contexts: Mexico and the UK. The paper also presents a discussion of some implications of applying the SCL Model, as well as some corporate culture implications. The paper concludes by drawing out the opportunities represented by integrating UCD principles as an enabler for sustainable consumption.

***Keywords**: User-centred design, sustainable consumption, business models, innovation*

Introduction

Increasing economic, social and environmental problems around the world have shown that current models of economic development cannot be sustained. Thus, new patterns of consumption are needed. According to the World Economic Forum (2011), global companies are well placed to leverage more sustainable consumption, as their production lines, supply chains, products and services extend across many continents, and as such the cumulative effect of their actions are wide reaching.

The contribution of business towards sustainable consumption will require setting in place new business models which take into account the complex factors that govern consumer behaviour including: aspirations, habits, needs, lifestyles, and the context in which goods and services are delivered (Seyfang, 2009). To address these complex issues, businesses should modify their business models to develop innovative consumer-focused business propositions. Transforming the business model could help companies to engage more effectively with consumers by empowering them with knowledge about their consumption patterns to modify daily habits that can ultimately trigger behavioural change. (Clinton & Whisnant, 2014).

Innovation is considered as a critical factor in business competition (Owen, 2006). Michaelis (2003) argues that to move towards sustainable consumption businesses will need to innovate in their products, services and business models. However innovation strategies and processes might be different according to each organisation's aims, corporate culture and systems (Nijssen, Hillebrand, A.M. Vermeulen & Kemp, 2006).

In the last decade, the area of design has moved forward to understand its contribution to innovation. The consequence has been the development of new theories of design, innovation, and design management (Verganti, 2011). One clear contribution of these new theories is referred to as 'design thinking.' (Lockwood, 2010a; Brown, 2008; Owen, 2006; Brown & Wyatt, 2010). Design thinking is a way of thinking that parallels other ways of thinking to offer a way of approaching issues, problems and opportunities almost uniquely suited to innovation (Owen, 2006). One of its main characteristics is that it has a human-centered focus (Brown, 2008). Thus, it has been argued by Fletcher, Dewberry & Goggin (2001) that design is an interface between consumers and consumption, and thus it has an important role to play moving towards sustainable consumption. The former

is acknowledged through the research presented in this paper, by focusing on user-centred design as an important element of design thinking to improve the innovation process towards sustainable consumption.

User-centred design and sustainable consumption

Design facilitates the ability to understand users and their interactions with the world through different design approaches under the umbrella of user-centred design (UCD), e.g. interaction design, experience design, user interface design, inclusive design, human-centred design, human-computer interaction, and practice-orientated design, amongst others (Moggridge, 2007; Nilstad & Boks, 2008; IDEO, 2009; Saffer, 2006; Abras *et al.,* 2004, Kuijer and de Jong, 2011). Though not all of these approaches are used to contribute towards sustainability, they have recently been seen by design researchers as a valuable approach to bring about a reduction in environmental and social impacts from people's consumption activities (Pettersen, Boks & Tukker, 2013).

User-Centred Design (UCD) is a design process and philosophy in which the designer focuses on users' needs, wants, and limitations through the planning, design and development stages of a product (Usability Professionals Association, 2011). Gould and Lewis (1985) recommend three principles of UCD which are generally accepted to be: an early focus on users and tasks; empirical measurement; and iterative design.

Pettersen et al (2013) recalled different approaches for design that address sustainability issues and are linked to theoretical understandings of behaviour and consumption. Two of these approaches that could be related to UCD principles are those that address sustainability issues of consumption through influencing users practices – namely as practice-oriented design, which is grounded on practice theory (Kuijer & De Jong, 2009; 2011; Scott, Bakker & Quist, 2012; Liedtke, Welfens, Rohn & Nordmann, 2012, Haines, Mitchell & Balaband, 2012) and those based on psychological theories whose aim is influencing user behaviour and are better known under the umbrella of 'design for sustainable behaviour' (Lilley, 2009; Lockton, Harisson and Stanton, 2008; Tang & Bhamra, 2012; Zachrisson and Boks, 2012).

To develop their different positions within the research, the former scholars involved users either as informers or co-creators (Sanders & Kwok, 2007). Informers are seen as a subject of study to get information, and co-creators are users, which actively participate in the design process. However no matter how the users are involved, the major advantage of UCD

principles is that a deeper understanding of user's practices, habits and behaviours emerge from this iterative design process. The partial or complete involvement of users ensures that the product will be suitable for the intended purpose in the environment in which it will be used (Abras *et al.,* 2004). It also helps to communicate user's expectations to higher management and incorporate these concerns into the design process, as user experiences are taken into account in the early stages of design development (Lofthouse & Lilley, 2006).

In a business perspective, UCD research could deliver different advantages such as developing easy-to-use products/services, better satisfying consumers, decreasing company's expenditure on technical support and training, advertise ease-of-use successes, and ultimately increase market share (Vredenburg, Mao, Smith, & Carey, 2002). In addition, it could help companies to avoid rebound effects of certain products designed for environmental sustainability by actually understanding people's practices and behaviours and what can influence them (Liedtke et al, 2012).

Although UCD principles have been applied in user-centred research to address sustainability issues of consumption, this research has mainly focused on everyday practices such as bathing (Kuijer & De Jong, 2009; 2011), laundry (Pink, 2005) or food preparation and storage (Tang & Bhamra, 2008; Bhamra, Lilley, Tang, 2011). However, UCD principles have not been explored as a potential aid for businesses to place the user/consumer at the heart of their strategy to enable more sustainable patterns of consumption. Thus, the aim of this paper is to nurture this area of research and discuss the opportunities of UCD principles to act as enablers for sustainable consumption whilst at the same time adding value to the business.

A Theoretical Framework

Considering the potential of UCD principles to leverage sustainable consumption, the research aimed to build a theoretical framework supported by UCD principles that can guide companies to leverage sustainable consumption. To achieve this aim, the researchers explored the relationship between UCD principles and sustainable consumption in a business context through an extensive literature review and an empirical research.

Summary of literature review

The literature review focused on the complexities of consumption and sustainable consumption by studying economic theories (Fine, 1993; Wilk, 2002), anthropology and social theories (Heap and Kent, 2000), cultural theory (Lury, 1996), systems/infrastructure of provision (Sanne, 2002; Ropke, 1999), system innovation theories (Geels, 2002; 2004) and psychology theories (Ajzen, 1991).

The state of the art review also analysed current theoretical approaches - e.g. product/service life cycles and sustainable product service design proposed by Munasinghe, Dasgupta, Southerton, Bows and Mcmeekin (2009), the Green Marketing Manifesto by Grant (2007), Mindful Consumption by Sheth, Sethia and Srinivas (2011), Collaborative Consumption mainly by Botsman and Rogers (2010)-; and tools - e.g. Consumer Futures 2020 by Forum for the Future (2011), Three Ps of behavioural marketing by Shea (2011); 5 levers of Change by Unilever (2011); Sustainable Consumption Motivators by Hicks & Kuhndt (2011) and the Design tool to achieve sustainable consumption by Hofstetter and Madjar (2003, 2005) - towards influencing sustainable consumption in a business context.

From the literature review, three key concepts that should be embedded within the business model to leverage sustainable consumption were identified. These concepts were: communication, collaboration and innovation, and were further explored through primary data collection to aid the development of the theoretical framework.

Empirical research approach

To build the theoretical framework, the researchers followed a qualitative exploratory research purpose with the aim to investigate the relationship between UCD principles and sustainable consumption in a business context. The following research questions were formulated, which were relevant for the exploratory purpose of this enquiry and were linked to the theory studied through the literature review.

1. Can multinational companies leverage sustainable consumption by focusing on UCD principles?
2. Which are the existing conditions that multinational companies should take into account in order to leverage sustainable consumption?
3. Which user-centred strategies can be applied to leverage sustainable consumption?

4. What are the drivers of multinational companies to leverage sustainable consumption?

To answer these questions and be able to build the proposed theoretical framework, the research needed to generate theory that outlined the opportunities and challenges that companies face in order to influence sustainable consumption by following UCD principles. As such, the research used grounded theory as a research strategy and as a data analysis technique. This is because grounded theory aims to generate theory from data to develop a theoretical framework (Robson, 2002; Charmaz, 2006), and allows using different data collection methods to identify core elements of a phenomenon to provide an understanding of the underlying principles that explain that phenomenon (Denscombe, 2007).

Data collection techniques

Within this research in-depth interviews and focus groups were chosen as data collection techniques, as they provide a more in-depth insight into the research topic, drawing on information provided by expert informants, which for grounded theory is not shaped by prior concepts or theories (Denscombe, 2007). A document analysis was then conducted with the purpose of verifying and complementing the data obtained from the interviews and focus group.

In-depth semi-structured interviews were conducted with five UCD consultants and five experts (e.g. researchers and consultants) in business and sustainability. Then, a focus group with a UCD consultancy was conducted with six participants including three senior designers, a research analyst, the operation manager and the director of strategy and operations. Finally, a document of a section of questions and answers from the general public posted on an on-line webcast during the Unilever Sustainable Living Plan event on November 15th, 2010; was analysed. The aim of this analysis was to report on where global companies stand regarding the path towards sustainable consumption and to verify and complement the data previously collected.

Data analysis and initial findings

The findings for the three different types of data collection were coded and clustered separately using Charmaz (2006) approach to grounded theory. A within method triangulation was used to compare the findings from the interviews. After, a cross-triangulation of the latter findings with

the findings from the focus group and document analysis was applied. The cross-triangulation resulted in:

- Three main conditions, which stated that to leverage sustainable consumption, large companies should have an understanding of the value of integrating sustainability into their core strategy and recognise the important role of innovation in informing their corporate strategy and operations.
- Three different types of strategies based on UCD, which can help companies to understand UCD principles to leverage sustainable consumption and embed sustainability at a strategic level of the company to develop consumer-focused business models.
- Six business drivers that would help companies to leverage sustainable consumption i.e. gain business benefits through an increase on demand, upcoming legislation, finding relevant issues for the company, and minimising economic and environmental costs through innovation, amongst others.

A correlation between these findings and the three key concepts of communication, collaboration and innovation was seen, constituting the theoretical framework. Figure 1 depicts a summary of these findings and how they relate to the theoretical framework.

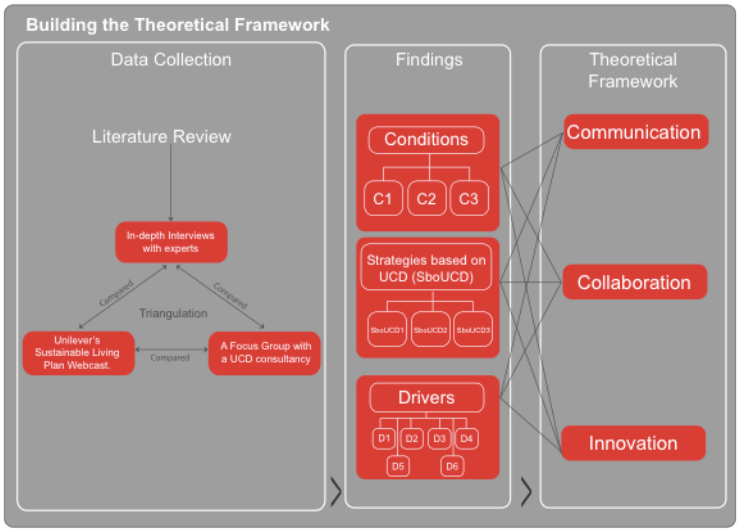

Figure 1 Summary of how the theoretical framework was built

Development of the SCL Model

Based on the theoretical framework described above, the Sustainable Consumption Leveraging (SCL) Model was developed as a mechanism that can enable companies to communicate, collaborate and innovate towards leveraging sustainable consumption. The SCL model is comprised of evaluation criteria, a set of consumer-focused strategies and a Sustainable Consumption Index (SCI) devised from the initial findings previously described.

Evaluation Criteria

The evaluation criteria were divided into four main business areas – Business Model, Consumer, Design and Sustainability – as it was considered that an evaluation of the current business model was necessary to assess further changes in the business proposition. An evaluation of the relationship with, and understanding of, consumers was needed in order to develop more sustainable markets. An evaluation of the capability of a company to apply design thinking was needed in order to see its capabilities to innovate; and an evaluation of the understanding of sustainability was required in order to assess how deeply it is integrated into their strategy and

vision. Figure 2 illustrates the four areas with the corresponding criteria to be assessed.

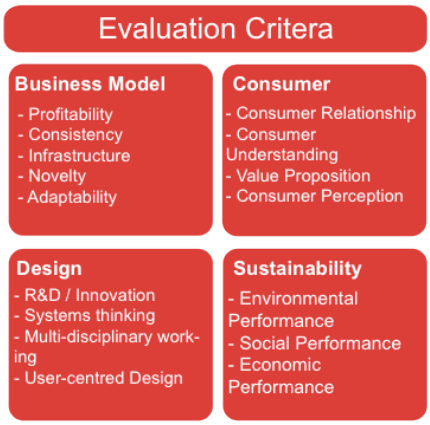

Figure 2 Evaluation criteria according to four areas of the business

Consumer-focused strategies and the Sustainable Consumption Index (SCI)

The model also contains fourteen consumer-focused strategies, which aimed to assist companies in developing ideas that can lead to the creation of a consumer-focused business model to foster sustainable consumption. The strategies were related to the three key concepts of the theoretical framework resulting in five communication consumer-focused strategies, four collaboration consumer-focused strategies and five innovation consumer-focused strategies. All strategies were complemented with prompt questions that could help users to apply each strategy. An example of each set of strategies is depicted in Figure 3.

Figure 3 Examples of each type of consumer-focused strategy

The three key concepts of the theoretical framework were also used to develop the Sustainable Consumption Index (SCI) to qualitatively measure the levels of sustainable consumption that a company wishes to motivate and set its targets to, dependent on their objectives and business strategy. The aim of the SCI is to guide companies to evaluate where to set their targets to the level of sustainable consumption they wish to motivate by applying different consumer-focused strategies.

The SCI is inspired by similar models that explain different levels of eco-efficiency related to different types of innovation (Brezet, 1997; United Nations Environmental Programme, 2009). The premise of the SCI is that there is a fundamental relationship between communication, collaboration and innovation. Thus, to motivate more sustainable patterns of consumption, different innovative actions and degrees of engagement amongst stakeholders are required in order to enable incremental, disruptive or systemic changes within the business model of a company. The former is grounded in the idea that to achieve higher levels of sustainable consumption a greater level of innovation and involvement of stakeholders is needed (Mont and Plepys, 2008; Nilstad and Boks 2008).

The Green Marketing Manifesto by Grant, (2007) also inspired the SCI. Grant (2007) described three green marketing objectives, 1) to set new standards and communicate, 2) to share responsibility and collaborate, and 3) to support innovation and reshape culture, which are associated to the three main concepts of communication, collaboration and innovation, identified in this research. The SCI is depicted in Figure 4. It shows the levels

of sustainable consumption (y axis) as a function of the level of innovation and stakeholder engagement (x axis) in relation to the three different stages identified by Grant (2007).

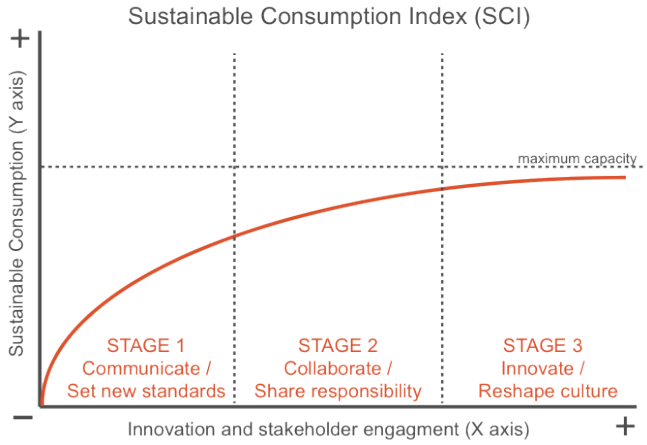

Figure 4 Sustainable Consumption Index: Three different stages to motivate sustainable consumption

The SCI approach argues that certain levels of innovation and stakeholder engagement are always involved in the process of motivating sustainable consumption, as stronger engagement and collaboration with stakeholders, including the consumer, could move a company toward innovation (Lockwood, 2010b). The SCI also argues that global companies will innovate upon other existing products, services or business models, as breakthrough innovations are based on inventions that serve as a source of many subsequent inventions (Assink, 2006).

To motivate higher levels of sustainable consumption, disruptive innovation will be needed (Mont and Plepys, 2008). For this context, disruptive innovation is defined as a product, process or concept that significantly transforms the demand and needs of an existing market or industry, by creating new business models or markets with significant societal impacts, as it might transform the way we live, work and learn (Brown, 2003). However, disruptive innovation is a hard concept to grasp and hardly a one-time effort, thus it requires continuous improvement in the overall capability of firms (Cohen and Levinthal, 1990).

To this respect, with the SCI, companies can choose the consumer-focused strategies according to their targets depending on their current

innovations, business strategies and resources. For example, a company can set its targets to motivate levels of sustainable consumption within the communication stage by applying only communication consumer-focused strategies. This could be done to incrementally innovate in their communication strategies with consumers or other stakeholders. However, if a company wants to innovate further, it will need to apply a mix of communication, collaboration and innovation consumer focused-strategies to possibly achieve a disruptive innovation that could motivate a higher level of sustainable consumption. Disruptive innovation is a circular development process of continuous feed-back loops (Assink, 2006). Thus, in the SCI, there is no clear boundary between its stages and they may even overlap.

The SCI curve has an ever-decreasing slope (Figure 4) in which an innovation has a maximum capacity of disruptiveness, and improvements towards leveraging sustainable consumption diminish as one progress through the stages. In economics this behaviour is called the law of diminishing returns. Paap and Katz (2004) argue three cases in which innovation reaches its maximum capacity of disruptiveness to the point of saturation, which leads to develop further innovations. These cases are:

- The innovation becomes obsolete, as it no longer satisfies the needs of consumers.
- Incremental improvements responding to emerging needs of consumers are no longer seen as valuable.
- There are changes to the environment due to political, economic, sociological, technological, legal and environmental factors.

In order to avoid stagnation of sustainable consumption, new innovations are needed, resulting in a process where new innovations are required at the end of the life cycle of the preceding ones (Figure 5). Building upon innovations has been studied in the growth of cities where innovation is necessary to maintain a city's viability (Bettancourt, Lobo, Helbing, Kuhnert, & West, 2007).

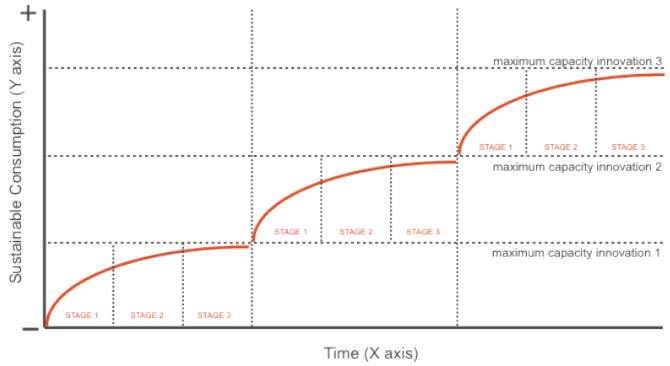

Figure 5 Building upon innovations through time to avoid stagnation

Applying the SCL Model through its toolkit

The SCL toolkit is a resource to assist companies to implement the SCL Model described above. From each element of the SCL Model, each tool of the SCL toolkit emerged, resulting in four evaluative canvases, fourteen consumer-focused strategy cards, and a sustainable consumption index (SCI) template. The SCL Model and toolkit were tested with four global companies through three pilot workshops in Mexico and a main workshop in the UK.

The sampling strategy followed to choose the companies to conduct the workshops with, was based on a convenience sample in which the researches had previously worked with those companies. However, the sample went through a selection process based on the previous findings. The findings revealed certain conditions, which must be present within a company in order to be able to leverage sustainable consumption. These include an understanding of the value of integrating sustainability into their core strategy; and recognising the role of innovation in informing their corporate strategy and operations. As such, three companies in Mexico and one in the UK that have an understanding of integrating sustainability into their core strategy and who recognize the important role of research and development (R&D) in informing their corporate strategy and operations, were selected. To select these companies, secondary data was used to prove that the companies have a global corporate sustainability and innovation strategy set in place.

The companies, which the workshops were conducted with, were considered as a sample to evaluate the effects of the SCL Model and its

toolkit on multinational companies in these regions, but were not considered representative of these countries.

Workshops general layout

Participants that attended the workshops were chosen from different areas and positions inside the company with the condition that they should fit within the four areas of the evaluation criteria of the SCL Model – Business Model, Consumer, Design/R&D and Sustainability -. To do the selection of participants, the researchers worked closely with a person inside the company. An invitation to participate in the study was sent to a list of recommended people, and thus all participants were notified previously that they would be part of this research. This particular recruitment allowed the research to gather different perspectives within the business. In addition, a facilitator was used to moderate discussions and guide participants during the workshop. The workshop consisted of five general activities:

Activity One – Application of the Evaluative Tool: The Evaluative Tool aimed to find areas of opportunity to improve upon in the business model and value proposition to consumers. It consisted of three types of self-completion templates including: two self-evaluation canvases, a score canvas and a strengths and weaknesses canvas. For this activity, participants were divided into four groups according to their expertise in relation to the areas of the evaluation criteria of the SCL Model. Each group completed the SCL self-evaluation canvases, which consists of two questionnaires for each area of the evaluation criteria. The questionnaires follow a scale of 1 to 5 to evaluate the current performance and future improvement of the company regarding the criteria for these four areas. Figure 6 depicts an example of these questionnaires showing the one designed for the Business Model Area.

Figure 6 SCL Self-evaluation Canvases – Business Model Area

After completing the self-evaluation canvases, participants transfer their scores to the SCL Score Canvas (Figure 7) with the purpose of understanding and easily comparing the current performance and future scope for improvement for each criterion. When transferring their scores, participants

were encouraged to use post-it notes and the SCL Strengths and Weaknesses Canvas (Figure 7), to identify strengths and weaknesses for each criterion regarding their scores for their current performance and future scope of improvement. Through identifying strengths and weaknesses, a list of areas of opportunity that could be improved was generated.

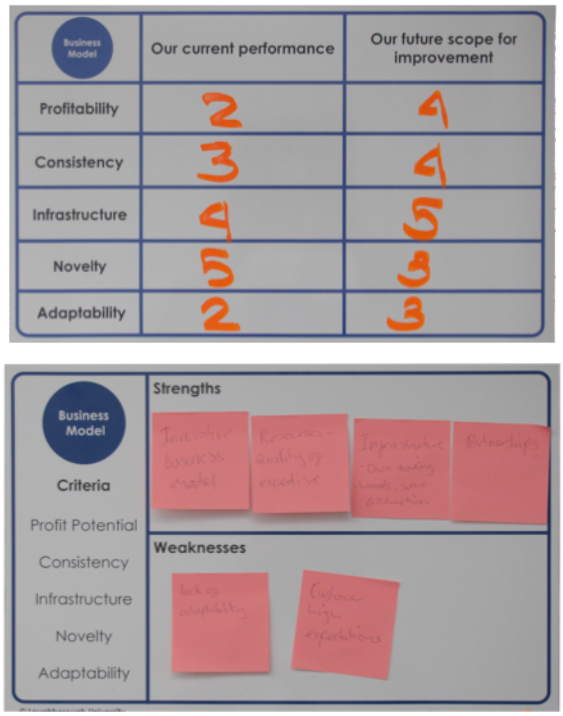

Figure 7 Example of SCL Score Canvas and S&W Canvas used at the workshop

Activity Two – Identifying overall areas of opportunity: In this activity, teams gathered together to present their scores and the areas of opportunity identified. The moderator facilitated a discussion between the teams to identify the most important opportunities. To select these opportunities, certain criteria were used. These criteria was set up according to the four areas of the evaluation criteria and was based on internal (e.g. how cost-effective is the business, current in-house sustainability practices with their employees, in-house activities that motivate creativity and innovation, relationship with their consumers) and external (e.g.

relationship with their supply chain and competitors, external economic, environmental and social factors that could affect their business, perception of their consumers, R&D happening within similar sectors) aspects of the business.

Activity Three – Choosing the areas of opportunity to work upon: Participants were re-organised into new teams by mixing the people from each area of the evaluation criteria. Through facilitation, a filter was applied to identify those areas of opportunity that were deemed most influential for each company. This filter was based on the criteria mentioned above to identify internal and external aspects of the business, which could be utilised to better leverage sustainable consumption. Each new team chose one area of opportunity to brainstorm ideas in response to that opportunity.

Activity Four – Brainstorm ideas with the Sustainable Consumption Index (SCI) and the consumer-focused strategy cards: The SCI was introduced as a tool that participants could use to co-relate the consumer-focused strategies to the three key concepts of communication, collaboration, and innovation; to target the level of sustainable consumption they wanted to motivate. The consumer-focused strategy cards were also introduced by explaining that each card had prompt questions that enabled participants to reflect on how and when to apply the strategy and generate ideas within the area of opportunity previously chosen (Figure 8).

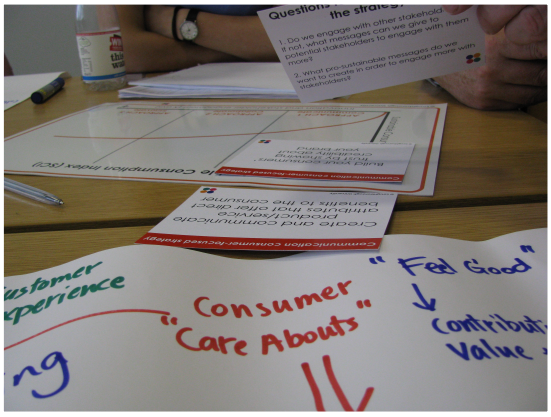

Figure 8 Applying the SCI with the consumer-focused strategy cards to generate ideas that target the chosen area of opportunity

Activity Five – Presentation of ideas: Finally, the sub-groups presented their ideas, which could result in new/improved products, services or business models.

Pilot Workshops

The pilot workshops aimed to identify corporate reactions to the SCL Model and to assess its application with different configurations so improvements could be made. The pilot workshops were carried out with three multinational companies from different sectors including; a pet food manufacturer (C1), a breakfast cereal manufacturer (C2); and a large chain of retailers (C3), with the purpose of making a comparison between them. Because of confidentiality issues, it has not been possible to disclose with which companies the model was tested. For this reason, each company was labelled with a code (e.g. C1, C2 and C3).

The workshops had the same format but were designed in different configurations in relation to the number of participants, the level of seniority of participants, and the areas of specialist knowledge represented by the participants. For example, with C1 and C3 the participants were chosen from different areas and positions inside the company that fit within the four areas of the evaluation criteria. As such the activities described above were conducted with multi-disciplinary teams. This format was chosen because in design thinking, multi-disciplinary collaborative perspectives are considered to lead innovative business solutions (Vianna et al., 2012). Table 1 depicts teams for Activity 1 and Table 2 shows teams for Activities 3 and 4 conducted with C1.

Table 1 Teams formed for C1 Activity 1

Participants' Description	Code
Business Team	
Purchasing and Logistics Director	BMC101
R&D Director	BMC102
Manufacture Director	BMC103
Corporate Affairs Director	BMC104
Consumer Team	
Packaging Purchase Coordinator	CoC101
R&D Product and Packaging Manager	CoC102
Design Team	
Packaging Manager	DesC101
Product Manager	DesC102
R&D Manager	DesC103

Sustainability Team	
Raw Material Purchasing Coordinator	SusC101
Raw Material Purchasing Coordinator	SusC102
Environmental and Sanitation Coordinator	SusC103
Raw Material Purchasing Coordinator	SusC104
Technician on Environmental Security	SusC105
Factory Manager	SusC106

Table 2 Teams formed for C1 for Activities 3 and 4

New Teams C1
Blue Team
Purchasing and Logistics Director (BMC101)
Factory Manager (SusC106)
Raw Material Purchasing Coordinator (SusC104)
R&D Product and Packaging Manager (CoC102)
Yellow Team
Corporate Affairs Director (BMC104)
R&D Manager (DesC103)
Raw Material Purchasing Coordinator (SusC101)
Red Team
Manufacture Director (BMC103)
Packaging Purchase Coordinator (CoC101)
Technician on Environmental Security (SusC105)
Raw Material Purchasing Coordinator (susC102)
Green Team
R&D Director (BMC102)
Packaging Manager (DesC101)
Product Manager (DesC102)
Environmental and Sanitation Coordinator (SusC103)

In contrast, for the workshop carried out with C2, participants with a higher position inside the company related to sustainability but with sufficient knowledge about the other three areas of the evaluation criteria were recruited. Thus the activities mentioned above were conducted within a single team.

Targeting the right area and level of participants was considered a limitation, due to the availability of participants in the time given to conduct

the workshop. It was particularly difficult to get participants from higher positions in the company. Despite this, these different configurations of the workshop allowed the researchers to assess the level of influence of different participants in developing strategies to address sustainable consumption.

Main Workshop

The main workshop was conducted with a leading pharmaceutical, health and beauty retailer and manufacturer. To identify this company the code C4 was allocated.

As the research followed an iterative process, reflection on the findings of the pilot workshops, led to the conclusion that a multi-disciplinary team that covered different areas of specialist knowledge, and that have certain power to influence, is needed to implement the SCL Model and its toolkit. As such, the participants chosen to conduct the main workshop with, were part of the sustainability champions programme that C4 implements between its employees to influence more sustainable practices within the company. The levels of participants were senior managers, managers and coordinators.

Potential of leveraging sustainable consumption

The potential of leveraging sustainable consumption was assessed by a comparison between the four workshops of how participants used the SCL Model and toolkit. The findings described an evaluation of ideas generated by participants through using the consumer-focused strategy cards and the sustainable consumption index (SCI). The findings also revealed that the potential of leveraging sustainable consumption would be dependant on the successful application of the SCL Model and on the corporate culture of each company. Thus, some implications on how the workshop was conducted, and some corporate culture implications are also described.

Workshops' data analysis and findings

All workshops were recorded by using up to four Dictaphones to capture what participants in each team were saying. Transcriptions were made to further analyse the data. In addition, three questionnaires were applied to participants: two in the workshops and one three months after the workshops. The questionnaires and the comparison between workshops were analysed through a thematic coding analysis, by following a concept-driven system in which categories and concepts were already

predetermined (Miles and Huberman, 1994). Different master codes were used and classified as evaluation codes (e.g. EXT – external factors, INT – internal factors POS- positive comment, NEG- negative comment) to study positive and negative comments and external and internal factors that could influence the use of the model and its toolkit; and perception codes (e.g. CFSC – perceptions about the cards, SCLM – perceptions about the model) to analyse the perceptions of participants towards how by using the model and each part of the toolkit could help them to generate ideas to motivate sustainable consumption. Sub-codes were attached to the master codes when needed. To interpret the data, counting and making contrasts and comparisons were used, as this helped the researchers to see what is in the data by looking at the frequency of occurrence of recurrent events (Miles and Huberman, 1994 p.245).

Evaluation of ideas generated using the consumer-focused strategy cards and the SCI

By comparing both pilot and main workshops it was seen that in the pilots, the levels of sustainable consumption that their ideas could motivate did not surpass the communication-collaboration stages of the SCI. For example, the two teams (red and blue, see: table 2) that made up the C1 workshop worked in areas of opportunity that could encourage consumers to adopt more sustainable behaviours.

The blue team worked on: 'communicate simple sustainability actions to the consumer through their packaging', and applied the following consumer-focused communication strategy:

- Create and communicate product/service attributes that offer direct benefits to the consumer,

And the following consumer-focused innovation strategy:

- Continual evaluation of a new product/service/campaign/business model through iterative processes, procedures or/and appraisals.

The red team worked on: 'engage consumers into sustainability actions through programmes and innovation in their products', and applied the following communication strategy:

- Make pro-sustainable consumption/behaviour rewarding, fun, and interesting to the consumer,

And the following innovation strategy:

- Create experiences that make consumers feel good.

However, although a mix of communication and innovation consumer-focused strategies were used, these teams only thought about communicating the actions towards sustainability that the company is implementing to the consumer:

"*We can evaluate if our services and processes are sustainable before, during and after we manufacture a product…[as such, we can] inform our consumers [about our sustainability actions] so they can be informed about what we are doing to then influence them*" (CoC102).

Thus it was inferred that at this moment the levels of sustainable consumption they could motivate could not surpass the communication stage of the SCI. Despite this, the company acknowledged three months afterwards that the workshop had helped them to set a five-year plan in which they are *"…looking at the corporate efforts/metrics to align (them) as much as possible [with the consumer] to have a robust sustainability strategy in the company"* (BMC103).

Within the workshop conducted with C2, the participants worked on: 'developing new business models that are more convenient for the consumer, but at the same time to encourage more sustainable services.'

Although the team in C2 used a mix of communication, collaboration and innovation consumer-focused strategies, they did not relate the strategies to the SCI, and thus it was not clear which levels of sustainable consumption they felt they could motivate and to what extent. In addition, after three months, C2 acknowledged that they had not followed up any of the ideas that emerged at the workshop as *"they ha[d] other priorities to attend [to] with certain time frames"* (SusC202).

Within C3, teams worked upon areas of opportunity related to: '…know[ing] about consumers' environmental impacts and consumers' perception to integrate this knowledge in the innovation process', and 'on creating strong partnerships to communicate sustainability to the consumer in order to influence them.'

Even though a mix of communication and innovation consumer-focused strategies, and a mix of collaboration and innovation consumer-focused strategies were used, the discussion amongst these two teams focused on:

"Communicating to the consumer and other stakeholders what the company will do to innovate to deliver more sustainable products" (DesC301) and on: *"Which collaborations are needed to design social and environmental programmes that can engage consumers into more sustainable actions e.g. packaging take back scheme"* (CoC302).

Thus, it could be said that the levels of sustainable consumption could not surpass the communication-collaboration stages of the SCI, as there was no evidence of ideas generated during the workshop that actually focus on innovating in the business model or their products/services. In addition, after three months of conducting the workshop, C3 also acknowledged that *"first the company has to recognize a sustainability strategy, to then create the awareness between the employees to start working on [influencing consumers]"* (CoC301).

In contrast, in the main workshop the ideas generated reached the innovation stage of the SCI. For example, one of the teams chose: 'to encourage more sustainable living by building on the trust that consumers have for the company's brand' and used three communication consumer-focused strategies and one collaboration consumer-focused strategy.

Although, only these four consumer-focused strategies were used to develop an overall idea that could target the area of opportunity identified, the team also used several collaboration and innovation strategies to evaluate their idea by plotting each card on the SCI tool.

"*Does it provide opportunities for collaboration between consumers and the company to enable two-way feedback, and as such improve consumer experience – Yes it does…Our idea is innovative and does it communicate a strong value proposition to the consumer – Yes it does*" (Red team).

Although innovative approaches could be developed through expanding on these ideas, three participants from C4 acknowledged that it would be difficult to achieve this expansion as *"higher management needs to be involved to drive through such significant business changes"* (CoC401).

Despite this, three participants with a degree of influence in corporate-level decision acknowledged "*in the past we had worked bottom-up achieving sustainability improvements in our products… to this, higher management had responded positively"* (DesC401). As such, building a business case "*with some of the ideas that are currently being investigated in the company [could] had a good response of people by saying yes*" (SusBMC401).

In comparison with the companies from the pilot studies in which C1 and C3 acknowledged that they have to work first on embedding a much more integrated sustainability strategy within the business; C4 recognized after three months, that participants followed some of the ideas to *"incorporate [them] into a product sustainability strategy paper"* (SusBMC401). This reveals that they took action to work 'bottom-up', and as such they also

shared the outcomes of the workshop with internal colleagues and were planning to present them to internal and external stakeholders.

Implications on how the workshops were conducted

It was found that to better benefit from the workshop; it should be conducted with a multi-disciplinary team. Having this configuration showed that participants had a more collaborative approach to make linkages between what is happening in different teams or areas. In addition, having a multi-disciplinary team allowed discussions that led participants to account for a more holistic perspective. These discussions helped participants to understand their position in relation to what is needed to innovate in their business model and from which perspective.

Participants that are recruited to attend the workshop preferably should be corporate-decision makers, or at least people that have certain degree of influence in corporate level decisions, as the findings revealed that the effectiveness of the model will depend on the buy-in of decision makers or higher management. However the findings also revealed that this could also be achieved through a "bottom-up" approach through which ideas could be tested before being scaled up for senior management.

Corporate culture implications

The comparison between the pilot and the main workshops brought to light that to effectively motivate sustainable consumption, strategic level engagement is vital. Whilst, the secondary data used to prove that the participant companies had set in place a sustainability strategy worldwide, the workshops proved that some of these strategies are difficult to filter down to region specific areas. Three drivers to filter down quicker global sustainable consumption strategies to region specific operations were found from the workshop findings and were compared to the drivers found to built the model. These drivers are:

Gaining a financial benefit: the workshops revealed that global companies would be more confident if those strategies could demonstrate an immediate financial benefit.

Finding relevant issues for the company: Benefits such as secure resources, controlling of energy use, and avoiding pollution are in the interest of companies, as they have proved beneficial e.g. improving environmental performance in the manufacturing stages. In the four workshops it was recognized that similar benefits could be gained by focusing on "*the sustainability of consumption as most of the environmental*

impacts are in the consumption stages of the life cycle of a product/service". (C4 workshop)

Being motivated through the influence of other stakeholders: Including legislation and voluntary standard codes. Legislation was found in the workshops as a key driver for companies to filter down innovative strategies towards sustainable consumption. Legislation can vary by country and region. However, global companies situated in countries that have more support from their governments, seem more likely to establish measures to comply with legislation. As such, they might want to influence other regional operations to implement similar measures.

Despite these drivers, sustainable consumption strategies might take longer to disseminate "*due to region specific cultural differences*" (C1) (i.e. population segment, readiness of the market, legislation, availability of technologies, amongst others). Corporations might have to target their strategies to region specifics, which can be resource consuming and, as such, they might not be willing to spend the time and money on doing so. However, it could be argued that multinational companies that have a strong sustainability and innovation corporate culture will filter down all kinds of global sustainable consumption strategies amongst all regions, as they will understand that the sustainability of consumption is a key determinant for future growth and profitability.

Conclusion

Through this paper a theoretical framework was presented which was then used to develop the SCL Model and its toolkit. The key concepts of the theoretical framework - communication, collaboration and innovation – were considered as part of applying UCD principles in a business context to leverage sustainable consumption. The former was reveal from initial findings which demonstrated that to influence sustainable consumption it would be necessary to communicate and collaborate with people inside and outside a company in order to propose new innovative business models.

Applying the SCL model within multinational companies drew out some opportunities for UCD principles to act as an enabler for sustainable consumption. Opportunities were seen through the workshop whilst ideas were developed through using the consumer-focused strategies and the SCI. Such opportunities were: a) Companies were able to place the consumer at the heart of their business model, which was seen as a way to help them to build brand trust and engagement, and at the same time offer alternatives

that could influence consumers to purchase, use and/or dispose of products differently; b) Companies thought about developing programmes that could engage their stakeholders including their employees to collaborate with the purpose of improving the sustainability of their products, services and business models; c) UCD principles were used to develop new ideas from the bottom-up, which could result on thriving innovation at all levels of the business, enabling structural changes to happen; d) UCD principles were seen as useful to innovate in their value proposition by developing and deploying new business models that could support more sustainable patterns of consumption and at the same time gain financial benefits. These opportunities will need to be seen by decision makers within the company and could be hindered by regional policies, cultural differences of each population segment in which they operate, and corporate culture and values.

The paper presents UCD principles as an enabler for sustainable consumption and draws out some opportunities through applying the SCL Model in a business context. However, there is no means that UCD principles will address the scale of the problem and further changes in the structure where businesses operate are needed.

References

Abras, C., Maloney-Krichmar, D., & Preece, J. (2004). User-centred design. In Encyclopedia of Human-Computer Interaction.

Ajzen, I. (1991). The theory of planned behavior. Organizational Behavior and Human Decision Processes, 50(2), 179–211. doi:10.1016/0749-5978(91)90020-T

Assink, M. (2006). Inhibitors of disruptive innovation capability: a conceptual model. European Journal of Innovation Management, 9(2), 215-233.

Bettancourt, L., Lobo, J., Helbing, D., & Kuhnert West,Geoffrey, C. (2007). Growth, innovation, scaling and the pace of life in cities. Proceedings of the National Academy of Sciences of the United States of America, 104(17), 7301–7306.

Bhamra, T; Lilley, D; Tang, T. (2011). Design for Sustainable Behaviour: Using Products to Change Consumer Behaviour. The Design Journal, 14(4), 427–445. doi:10.2752/175630611X13091688930453

Botsman, R., & Rogers, R. (2010). What's mine is yours : the rise of collaborative consumption. (R. Rogers, Ed.). New York: Harper Business.

Brezet, H. (1997). Dynamics in Ecodesign Practice. UNEP IE: Industry and Environment, 20(1-2), 21–24.

Brown, J.S. (2003), Innovating Innovation, foreword to: Chesbrough, H.W. Open Innovation - The New Imperative for creating and profiting from Technology. Boston: Harvard Business School Press.

Brown, T., (2008). Design Thinking. Harvard Business Review, pp. 1-10.

Brown, T., & Wyatt, J. (2010). Design thinking for social innovation.

Charmaz, K. (2006). Constructing grounded theory: A practical guide through qualitative analysis. Pine Forge Press.

Clinton, L., & Whisnant, R. (2014). Model Behaviour: 20 Business Model Innovation for Sustainability (pp. 3–62).

Cohen, W. M., & Levinthal, D. A. (1990). Absorptive capacity: a new perspective on learning and innovation. Administrative science quarterly, 128-152.

De Kluyver, C. A. (2010). Fundamentals of global strategy : a business model approach. Strategic management collection. New York: Business Expert Press.

Denscombe, M., (2007). The good research guide: for small-scale social research projects. 3rd edn. Maidenhead: Open University Press.

Fine, B. (1993). The world of consumption. (E. Leopold, Ed.). London ; New York: Routledge.

Fletcher, K., Dewberry, E., & Goggin, P. (2001). Chapter 12: Sustainable consumption by design. In M. J. Cohen & J. Murphy (Eds.), Exploring sustainable consumption (pp. 213–224). Emerald Group Publishing.

Forum for the Futre (2011). Consumer Futures 2020. UK: Forum for the Future.

Gould, J., & Lewis, C. (1985). Designing for Usability: Key Principles and What Designers Think. Communications of the ACM, 28(3), 300–311.

Grant, J. (2007). The green marketing manifesto. Chichester: John Wiley & Sons.

Haines, V., Mitchell, V., & Mallaband, B. (2012). Merging a practice–orientated approach with an engineering–driven product development: a case study on home improvement. Journal of Design Research, 10(1), 28–49. doi:10.1504/JDR.2012.046138

Heap, B., & Kent, J. (2000). Towards sustainable consumption: A European perspective. (R. B. Heap & J. Kent, Eds.) London, UK: The Royal Society.

Hicks, C. and Kuhndt, M., (2011). Visions and Actions for Sustainable Lifestyles. In: UNILEVER & FUTERRA, ed, Inspiring Sustainable Living.

Experts insights into consumer behaviour and Unilever Five Levers for Change. UK: Unilever & Futerra, pp. 22-27.

Hofstetter, P., & Madjar, M. (2005). How to increase happiness and support sustainable consumption? A check list for evaluation and design. Zurich: BAO & Consultrix GmbH.

IDEO (2009). Human Centred Design Toolkit. IDEObooks.

Kuijer, L., & De Jong, A. M. (2009). A Practice Oriented Approach to User Centered Sustainable Design. In EcoDesign. Saporo.

Kuijer, L., & Jong, A. M. De. (2011). Practice Theory and Human-Centered Design: A sustainable bathing example. In Nordes - Making Design Matter (pp. 1–7).

Liedtke, C., , Welfens, M.J., Holger, R., & Nordmann, J. (2012). LIVING LAB: user-driven innovation for sustainability. International Journal of Sustainability in Higher Education, 13(2), 106–118. doi:10.1108/14676371211211809

Lilley, D. (2009). Design for sustainable behaviour: strategies and perceptions. Design Studies, 30(6), 704–720.

Lockton, D., Harrison, D., & Stanton, N. (2008). Making the user more efficient: Design for sustainable behaviour. International Journal of Sustainable Engineering. UK: Taylor & Francis.

Lockwood, T., (2010a). Design Thinking. Integrating Innovation, Customer Experience, and Brand Value. New York, USA.: Allworth Press.

Lockwood, T. (2010b). Design Thinking. Integrating Innovation, Customer Experience, and Brand Value. (T. Lockwood, Ed.)Design Thinking. Integrating Innovation, Customer Experience and Brand Value (pp. 23–34). New York, USA.: Allworth Press.

Lofthouse, V., & Lilley, D. (2006). What they Really, Really Want: User Centred Research Methods for Design. In International Design Conference - Design (pp. 1–8).

Lury, C. (1996). Consumer culture. Cambridge: Polity.

Michaelis, L. (2003). The role of business in sustainable consumption. Product Service Systems and Sustainable Consumption, 11(8), 915–921. doi:DOI: 10.1016/S0959-6526(02)00160-9

Miles, M. and Huberman, M. (1994). Qualitative data analysis: an expanded sourcebook. 2nd edn. Thousand Oaks, California; London: Sage.

Moggridge, B. (2007). Designing interactions (p. 766). Cambridge, Mass. London: MIT Press.

Mont, O., & Plepys, A. (2008). Sustainable consumption progress: should we be proud or alarmed? Journal of Cleaner Production, 16(4), 531–537. DOI: 10.1016/j.jclepro.2007.01.009

Munasinghe, M., Dasgupta, P., Southerton, D., Bows, A., & McMeekin, A. (2009). Consumers, business and climate change. UK: Sustainable Consumption Institute, University of Manchester.

Nijssen, E. J., Hillebrand, B., Vermeulen, P. A., & Kemp, R. G. (2006). Exploring product and service innovation similarities and differences.*International Journal of Research in Marketing*, *23*(3), 241-251. DOI: 10.1016/j.ijresmar.2006.02.001

Nilstad, I., & Boks, C. (2008). Chapter 6. User-centred Design Strategies for Sustainable Patterns of Consumption. In T. Geer Ken, A. Tukker, C. Vezzoli, & F. Ceschin (Eds.), Sustainable Consumption and Production: Framework for Action. 2nd Conference of the Sustainable Consumption Research Exchange (SCORE!) Network (pp. 107–127). SCORE!

Owen, C. L. (2006). Design thinking: Driving innovation. The Business Process Management Institute, (pp. 1-5)

Paap, J., & Katz, R. (2004). Predicting the Unpredictable. Anticipating Disruptive Innovation. Research Technology Management, 47(4), 13–22.

Pettersen, I. N., Boks, C., & Tukker, A. (2013). Framing the role of design in transformation of consumption practices: beyond the designer–product–user triad. International Journal of Technology Management, 63(1), 70–103.

Pink, S. (2005). No Dirty laundry. Everyday practice, sensory engagement and the constitution of identity. Social Anthropology, 13(3), 1469–8676. doi:10.1111/j.1469-8676.2005.tb00391.x

Robson, C., (2002). Real world research: a resource for social scientists and practitioner- researchers. 2nd edn. Madden, Mass; Oxford: Blackwell Publishers.

Røpke, I. (1999). The dynamics of willingness to consume. Ecological Economics, 28(3), 399–420. DOI: 10.1016/S0921-8009(98)00107-4

Saffer, D. (2006). The elements of interaction design. UX matters.

Sanders, E., & Kwok, P. (2007). Emerging Trends in Design Reserach. International Association of societies of design research. In. 12-15. November, 2007, pp. 1-2.

Sanne, C. (2002). Willing consumers—or locked-in? Policies for a sustainable consumption. Ecological Economics, 42(1-2), 273–287. DOI: 10.1016/S0921-8009(02)00086-1

Scott, K., Bakker, C., & Quist, J. (2012). Designing change by living change. Design Studies, 33(3), 279–297. doi:10.1016/j.destud.2011.08.002

Seyfang, G. (2009). New Economics of Sustainable Consumption: Seeds of change. Energy, climate and the environment series. Basingstoke: Palgrave Macmillan.

Shea, L. (2011). The 3 Ps or behaviour marketing or how brands will save the world. The Guardian.

Sheth, J., Sethia, N., & Srinivas, S. (2011). Midful consumption: A customer-centric approach to sustainability. Journal of the Academy of Marketing Science, 39, 21–39.

Tang, T., & Bharma, T. (2012). Putting consumers first in design for sustainable behaviour: a case study of reducing environmental impacts of cold appliance use. International Journal of Sustainable Engineering, 5(4), 288–303. doi:10.1080/19397038.2012.685900

United Nations Environmental Programme (2009). Design for Sustainability: A step-by-step approach. (Vol. DTI/0825/P). France: United Nations Environmental Programme and Delft University of Technology.

Usability Professionals Association (2011); 2011-last updated, what is user-centred design? [Homepage of UPA], [Online].
Available:http://www.upassoc.org/usability_resources/about_usability/what_is_ucd.html [10/2011, 2011].

Verganti, R. (2011). Radical design and technology epiphanies: A new focus for research on design management. *Journal of Product Innovation Management*,*28*(3), 384-388.

VIanna, M., Vianna, Y., Adler, I., Lucena, B. and Russo, B., 2012. Design Thinking. Business Innovation. 1st edn. Rio De Janeiro, Brazil: MJV Press.

Vredenburg, K., Mao, J.-Y., Smith, P. W., & Carey, T. (2002). A survey of user-centered design practice. In SIGCHI Conference on Human Factors in Computing Systems (CHI '02) (pp. 471–478). New York, USA. doi:10.1145/503376.503460

World Economic Forum (2011). The Consumption Dilemma. Leverage Points for Accelerating Sustainable Growth. Geneve: WEF.

Wilk, R. (2002). Consumption, human needs, and global environmental change. Global Environmental Change, 12(1), 5–13. DOI: 10.1016/S0959-3780(01)00028-0

Zachrisson, J., & Boks, C. (2012). Exploring behavioural psychology to support design for sustainable behaviour research. Journal of Design Research, 10(1), 50–66. doi:10.1504/JDR.2012.046139