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Enabling Sustainable Consumption Through User Centered Design: An Approach

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Introduction

It is recognized that an increased level of consumption in industrialized countries is one of the main factors contributing to continual environmental degradation and does not contribute to our overall wellbeing (Seyfang, 2009; Green and Vergragt, 2002; Tukker *et al*., 2006). Mont and Plepys (2008) argue that the rising levels of consumption are a result of a growing population and increasing affluence. As such, the paper first addresses the importance of sustainable consumption and defines the focus of research. Then it talks about the influence of business on consumers and refers to the need for an in-depth focus on consumers as they account for a large proportion of environmental and social impacts (Defra, 2008; Sto *et al.,* 2006). The paper also identifies user-centred design (UCD) as an approach that can support sustainable consumption as it is used to gain in-depth knowledge of the consumer and their context (Haines et al., 2010; Fulton, 2004).

The paper describes the initial findings of research, which aims to create a framework to help 'business to consumer' i.e. fast consumer goods, electronic consumer goods, e-commerce and services, to understand how UCD can be part of their strategy to enable sustainable consumption. The paper presents the initial framework, which is built on findings from the literature review; semi-structured interviews with experts related to UCD, design, sustainability, and business consultants; a workshop with UCD experts, and a business case analysis (Unilever Sustainable Living Plan launch event).

Addressing Sustainable Consumption

Developed economies account for 20% of the world population, and are responsible for 80% of the life cycle impacts of consumption (WBCSD, 2008; Schor, 2005). This means that on a per capita basis, humans are consuming more resources than the planet can regenerate and discarding waste at a more rapid rate that the planet can assimilate (Princen, 1999). This causes a significant stress on the environment without contributing to overall societal progress (Princen, 1999; Seyfang, 2009). Thus, sustainable consumption seeks to achieve efficient use of resources without affecting our overall wellbeing (Lorek, 2010).

Current approaches addressing the problems to achieve sustainable consumption have focused on public governance and policy making, targeting consumer behaviour and behavioural change based on technological, economical, and

regulatory instruments (Seyfang, 2009, Mont and Plepys 2008, Jackson and Michelis, 2005, Jackson, 2005). However, several disciplines have studied the notion of consumption and acknowledge that consumption goes beyond consumer behaviour as it forms an umbrella of different complexities that comprise issues related to human needs, consumption habits, attitudes, behaviours, lifestyles and the way in which goods and services are delivered (Seyfang, 2009; Mont and Plepys, 2008). Recent studies have argued that sustainable consumption requires a multitude of changes, which have to occur at a 'systems level' (Shove, 2003; Weber *et al.*, 2006; Konrad *et al.*, 2006). Such changes should also be aligned with sustainability principles such as resource efficiency, limits in resource use, waste minimisation, life cycle thinking, quality of life, wellbeing, and consumers' safety, amongst others (Seyfang, 2009; Mont and Plepys 2008, Lorek, 2010).

To address the challenges and issues around sustainable consumption, it is important to clarify the different interpretations that exist around the subject. For example, sustainable consumption can relate to the extraction of natural resources as raw material, or to the consumption, use and disposal of goods and services (Robins, 1999). This discrepancy occurs because of the difficulty of drawing boundaries between consumption and production (Jackson and Michaelis, 2003).

Consumption-production Dichotomy

To explain the ambiguity within sustainable consumption, the life cycle of a product or service will be used to describe the boundary between consumption and production. The life cycle of a product or service is recognized as a means of evaluating sustainability impacts, as there is a continual input of resources and energy, and a continual output of pollution and waste during all stages of the life cycle (UNEP, 2009).

When the life cycle of a product/service was initially utilised to analyse impacts, production stages received significant attention (Mont and Bleischwitz, 2007). However, recent life cycle studies demonstrate that higher impacts occur in consumption, use and disposal (UNEP, 2009; Bhamra, 2008; Mont and Bleischwits, 2007). Such impacts are due to the continuous rise of consumption levels, uncertainties around consumers purchasing choices and consumers disposal choices, as well as the uncertainties around consumer behaviour during use (Green and Vergragt, 2002; UNEP, 2009; Jackson, 2005; Burgess et al., 2003).

In addition, focusing on the life cycle provides an opportunity to apply life cycle thinking or system thinking, which is considered as a broad concept to conceptualise sustainability issues at a system-level (Mont and Bleischewits, 2007). This means that all social and environmental aspects of a product/service should be considered for improvement along their life cycle, i.e. from resource extraction to final disposal. However, to achieve true sustainability, various actors should be involved to employ a holistic life cycle perspective (Mont and Bleischewits, 2007).

With this in mind it was deemed necessary for the research to draw an imaginary line within the life cycle of a product/service to indicate the focus of research, distinguishing production and consumption by creating a dichotomy *(Figure 1)*. The

boundary between consumption and production was drawn according to Princen (1999) and Stø et al, (2006). They suggested working within a consumption-production dichotomy focusing on the product use, which means examining not just purchasing decisions (planning, buying) but also post-purchasing (using, disposal) and non-purchasing decisions (consumers' reasons for not purchasing certain products/services among others) to measure the environmental impacts of consumption.

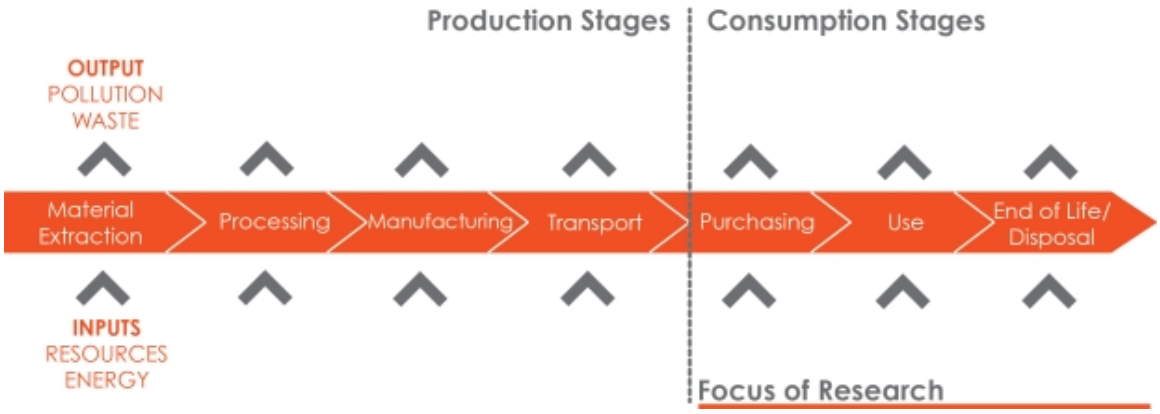


Figure 1: Focus of Research. Consumption-Production Dichotomy

The focus of research *(depicted in Figure 1)* helped to describe what sustainable consumption means for this research, as there is a clear need to address the different complexities around consumption to influence people to consume, use and dispose more sustainably. Despite the fact that the focus of this research does not consider the consumption of resources in the production stages to extract raw material to transform it into goods, the research does recognize the impacts of all stages. As Mont and Bleischewits (2007), recommended a broad understanding of the life cycle linking purchasing, use, and disposal with resource management at the production stages.

Importance of Addressing Change Towards Sustainable Consumption within Businesses

Changing consumer demands, upcoming legislation, and pressure from stakeholders has caused companies to integrate actions towards sustainable consumption and production in their strategy (Sarkis *et al.*, 2010). In fact, there are many approaches and tools that help business to apply sustainability principles into their strategy, i.e. Corporate Social Responsibility, Five Capital Model, Natural Step, Cleaner

production, Green Marketing, and Design for Sustainability among others (Porritt, 2007; Brady, 2005; Bhamra and Lofthouse, 2007; Grant, 2008).

Despite these approaches and the improvements they have achieved regarding sustainability, there is still a need to address the social and environmental impacts of final consumption (Mont and Plepys, 2008). Businesses can play an important role in moving towards sustainability, as they are central to the creation of technology and wealth which is pillar of modern society (Málovics *et al.,* 2008; Mont and Plepys, 2008; Michaelis, 2003). As such, businesses have the power to influence consumers.

The World Business Council for Sustainable Development (WBCSD, 2008) argues that businesses can motivate consumers to consume more sustainably. Influencing consumers will depend much on their business strategy. The implementation of such a strategy will need to offer clear benefits to the company. In addition, it is essential for companies to engage, collaborate and participate with other actors to empower sustainable consumption as a common goal (Mont and Plepys, 2008; Málovics *et al.,* 2008).

Why Focus on User Centred Design as Part of the Business Strategy to Enhance Sustainable Consumption?

According to Tischner and Charter (2001), 80% of all product/service-related environmental and social impacts are determined by product design. Therefore, design has an important role to play towards sustainable consumption by influencing how products/services are consumed, used and disposed. Designers are starting to integrate environmental and social considerations into product/service design and development (Tischner and Charter, 2001) Current research in sustainable design is seeking to develop strategies that can help achieve more sustainable consumption, including research to achieve more sustainable behaviour through design (Bhamra *et al.,* 2008; Bhamra and Lofthouse 2007)

To achieve more sustainable consumption through design it is essential to have a major focus on the consumer and their needs (Bhamra and Lofthouse, 2007). That is why UCD is an approach that is becoming popular in supporting sustainable consumption, as it focuses on influencing people and their context (Moggridge, 2007). An early focus on users' requirements will influence how the design process will take shape (Weever, *et al.,* 2008). As such, UCD can enable strong emotional connections to understand the latent needs and desires of people to influence their behaviour, habits, life styles, and context of use to develop products/services/systems that encourage more sustainable consumption (Haines *et al.,* 2010; Fulton, 2004, Moggridge, 2007).

UCD has been applied in many fields, including; human computer interaction (HCI), computer science, software engineer, psychology, sociology, cultural anthropology and design (Moggridge, 2007). The general principles of UCD, drawn from, Haines *et al.* (2010), Moggridge (2007) and Preece *et al.* (2002) are described below:

- Always consider people when designing
- Learn about people by identifying who they are and what they want
- Identify patterns and insights
- Observe what people do, not what they say they do
- Design useful, useable, desirable, meaningful and joyful products/services/systems
- Enable active participation of people
- Make decisions within the context of the user, their work and their environment

UCD and Breakthrough Innovations to Enable Sustainable Consumption

Researchers in the field of design for sustainability and sustainable consumption argue that to achieve sustainable consumption, breakthrough innovation is needed (UNEP, 2009; Fukasaku, 2000). Breakthrough innovation requires a more systemic approach, which looks beyond single products or individuals (Kujier and De Jong, 2009). As such, practices of consumers, their interactions and their interconnected elements, i.e. conventions, competences and artefacts (Shove *et al.*, 2008), should be taken into account in the design process to influence consumption at a 'systems-level' (Kujier and De Jong, 2009).

Companies need to innovate in order to deliver more sustainable solutions to consumers (Sherwin *et al.,* 1998). To achieve breakthrough sustainable innovations within businesses, it is important to involve consumers from the beginning to satisfy their needs with less material and energy intensive products/services/systems (Mont and Bleischewits, 2007). It is also necessary to re-think business strategies (Sherwin *et al.,* 1998). Thus, bringing together the strategic vision of a company within UCD, can offer clear benefits in supporting sustainable consumption by introducing novel sustainable functional solutions.

Preparing to Build the Framework Methodology

The research undertaken to start building the framework was divided into four consecutive phases *(Figure 2)*

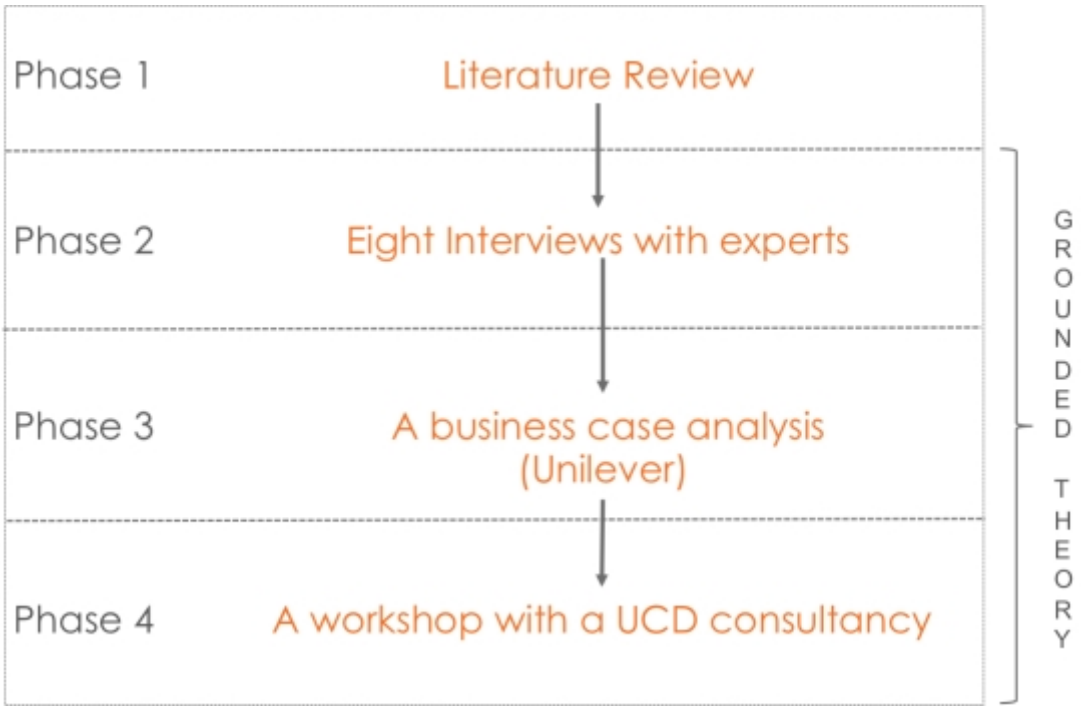


Figure 2: Four Phases of Research to Start Building the Framework

The first phase included an extensive literature review to gain an overview of the different views of sustainable consumption related to design. The understanding of these issues informed the second phase of the research, which consisted of eight semi-structured interviews. The interviews were carried out with four UCD experts, three experts related to the strategic view of design for sustainability, and one consultant on sustainable business strategy. The interviewees were selected from personal networks, and different UCD expertise in different UCD areas were chosen to have an overall view of the concept. The interviews aimed to explore how companies can adopt sustainability into their business strategy, how UCD and innovation can influence sustainable consumption and how to encourage businesses to adopt UCD strategies to enable sustainable consumption.

To complement the set of interviews, a business case analysis was carried out. The research studied Unilever's 'Sustainable Living Plan' released on November 15th, 2010. The segment analysed was a section where Unilever answered questions related to sustainable consumption from the general public. The questions and answers were available on an on-line webcast launched during the event. The aim of the analysis of this business case was to discover where companies such as Unilever stand regarding the path towards sustainable consumption. Finally, a workshop was carried out with six participants from a UCD consultancy to explore a series of strategies and attributes of UCD by asking: How UCD could influence sustainable consumption and which UCD attributes can facilitate this?

The research followed Corbin and Strauss (2008) approach to grounded theory to analyse the findings from the interviews, the case study analysis, and the workshop. This approach is applied to find different concepts that can be related to each other. The concepts can be verified by the frequency of appearance, until no more concepts emerge (Corbin and Strauss, 2008). By following Corbin and Strauss (2008) methodology, the findings from the interviews and the business case analysis were applied to build a series of conditions, which would need to be considered by companies in order to apply the proposed framework. In addition, the research found a series of UCD strategies and attributes that can help business to influence consumers to consume more sustainably by crossing over the findings from the interviews, the business case analysis, and the workshop. These last results are considered to be the components of the proposed framework.

Preliminary Findings to Built the Framework

This section will first describe the formulated conditions that businesses need to follow to implement the proposed framework. Then, it will describe how the research aims to build the framework based on different business goals focused on influencing sustainable consumption, and a series of UCD attributes and strategies discovered through the analysis of preliminary findings.

To understand the level of sustainability that the framework will try to accomplish, a sustainability index was used to measure the level of sustainable consumption that can be achieved from the lesser to the greater, related to different business goals explained below. The sustainability index was adapted from similar models that explain different levels of eco-efficiency, related to different types of innovation (see: Brezet, 1997; UNEP, 2009). The rationale behind this is that to achieve the proposed business goals, it will comprise changes that require different types of innovation (see: UNEP, 2009) in the business model.

Finally to explain how the framework will function, an example of an action towards consuming more sustainably was used to describe how a company could relate and choose UCD attributes and strategies to deliver more sustainable patterns of consumption.

Conditions Encompassing Businesses to Implement the Proposed Framework

Relating and analysing the concepts obtained from the interviews and the business case analysis, a conditional model was obtained *(Figure 3)*.



Figure 3: Conditional Model. Conditions that Should be at the Strategic view of a Company to Apply the Proposed Framework

The model describes three types of conditions, which were formed by connecting different concepts related to UCD and design, sustainability, and business strategy. These conditions will have to be understood and embedded at the top level of the company within a strategic view to define the organizational structure and the operations to be run by the company.

The conditions are described as followed:

- Design and sustainability have to be embedded at the strategic level of a company. If so, it will help to find and communicate business benefits and opportunities.
- By analysing and prioritising sustainability actions, companies will be able to align sustainability with their company's ambitions. Then, they will be able to analyse which consumption phases need to be addressed, and ultimately understand which factors motivate consumers.
- By thinking of Design and UCD as an intellectual process, companies will be able to facilitate design thinking through the company's own values and communicate the value of design both internally and externally.

Relating the Sustainability Index to Different Business Goals

To build the platform of the proposed framework, the green marketing objectives described in the Green Marketing Manifesto were adopted (Grant, 2008). The research interpreted these marketing objectives as business goals to influence

different levels of sustainable consumption, since the role of green marketing is to make more people willing to shift to a more sustainable society through modifying consumption patterns (Grant, 2008). The levels of sustainable consumption achieved by each business goal will depend on different objectives. According to Grant (2008), the business goals are related to three objectives: Commercial success, environmental and/or ethical success, and cultural success. He related each business goal to these objectives and emphasises that it will be necessary to innovate in any case, but the highest level of sustainability will be supported by the business goal that considers all objectives. The description of each business goal and the relation to each objective is explained below.

a. *Business goal 1 - Set new standards/Communicate:* i.e. communicating in a direct way to consumers what companies are reporting in terms of sustainability efforts, brand credentials, and product benefits. It addresses just one objective: Commercial success.
b. *Business goal 2 - Share responsibility/Collaborate:* i.e. collaboration and participation among stakeholders to achieve more sustainable patterns of consumption. It addresses two objectives: Commercial success and environmental and/or ethical success.
c. *Business goal 3 – Support innovation/Culture re-shape:* i.e. changing how, why and what humans consume, use and dispose of. It addresses the three objectives: Commercial success, environmental and/or ethical success, and cultural success.

As seen, only *business goal 3 – Support Innovation/Culture re-shapes* takes into account all objectives. Thus, the Sustainability Index *(Figure 4)* shows the relationship between the business goals, and the levels of sustainability that can be achieved, suggesting that achieving the highest level of sustainable consumption will only be possible by supporting innovation.

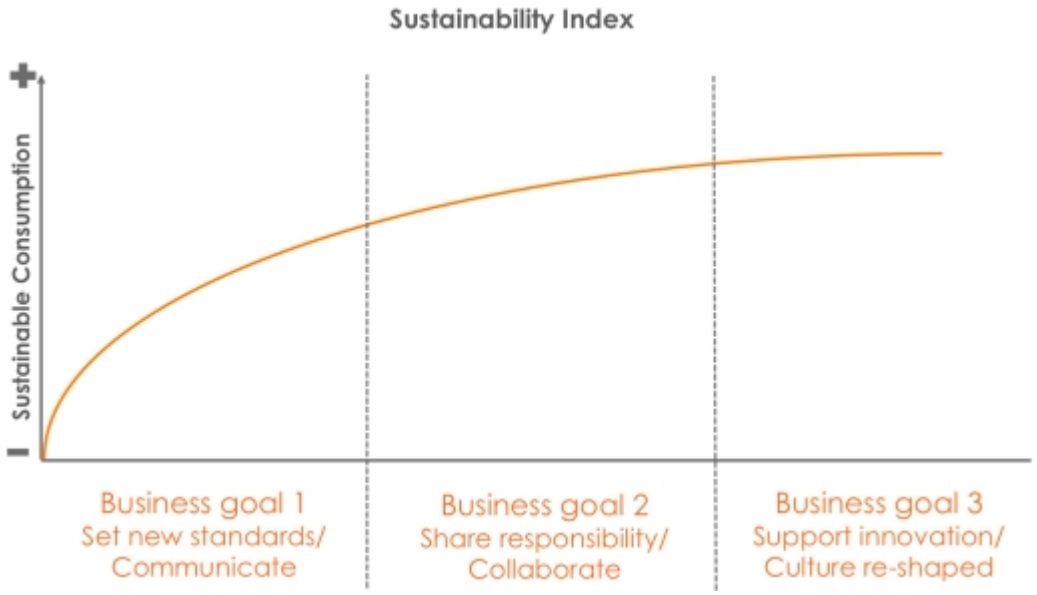


Figure 4: Sustainability Index. Relation between Sustainable Consumption and the Business Goals

Despite this, the research will consider all of the proposed business goals because as Grant (2008) suggested, companies are positioned at different strategic levels towards sustainability depending on their business model. To build the proposed framework the research needs to relate the UCD attributes and strategies found to these business goals.

Relating Business Goals to UCD Attributes and Strategies

Seventeen attributes and twenty-one strategies that can help to influence sustainable consumption were found by crossing over and analysing the results from the interviews, the business case analysis, and the workshop. Preliminary analysis of repetition of concepts indicated the five most important attributes and the five most important strategies *(Table 1).*

Table 1: Table of most Important Attributes and Strategies of UCD

Attributes	Strategies
• UCD can help to find business opportunities • UCD can help to design optimal products • UCD can promote experiences that raise awareness and engage people • UCD can help to promote accountability and to visualize impacts • UCD can champion the design experience, which makes people FEEL GOOD	• Think of product/service as a problem solver • Offer innovation as a value preposition • Engage with all stakeholders • Communicate direct benefits to the consumer • Sustainable benefits and value creation have to coincide to motivate consumers, since sustainability issues will not be the first priority to consumers

To relate these attributes and strategies with the business goals mentioned above, it is necessary to first relate which attributes are needed to perform each strategy and then correspond this to an action towards consuming more sustainably and the business goals. For example: Market research communicated to a company that consumers like fair-trade products because buying fair-trade products result in a good customer experience as the fair-trade label helps to raise awareness. As such UCD tools can be applied to know how fair-trade can 'promote experiences that raise awareness and engage with people', which is an attribute of UCD. This attribute will have to be related to UCD strategies, which can bring benefits to the company. As such, in this case the strategies chosen were: 'communicate direct benefits to the consumer' and 'engage with all stakeholders.' The rationale behind this relationship is that for consumers to buy fair-trade products and have a good experience that supports their decision, the company will have to inform consumers about the direct benefits of fair-trade, i.e. raising awareness, which makes consumers' feel good. In addition, the company will have to engage with certain stakeholders not just to know the benefits of fair trade but also to demonstrate their credibility.

Buying fair-trade products is considered by the research as an action towards consuming more sustainably. Following the sustainability index, buying fair-trade corresponds to *business goals 1 and 2 (Figure 5)*.



Figure 4: Placing Fair-Trade in the Sustainability Index

The rationale behind this is that fair-trade is a consumer-label that guarantees certain social, economic and environmental requirements of where products were sourced (Fair Trade Foundation, 2001). It also requires collaboration with different actors to certify the fair-trade standards. However, fair trade does not represent a high level of sustainable consumption because even though there will be a major change in attitude, it does not change the way consumers use and dispose of a product.

The proposed framework will consider different actions that can promote more sustainable consumption. However, further research has to be carried out to explore more actions and their relationship to the sustainability index. Future work will also explore how these actions can be adapted within an existing business model, or bring new ideas for different business models that can represent value to the company, to the consumer, and to the environment.

Figure 6 depicts the rationale model behind building the proposed framework using the examples of buying fair-trade.

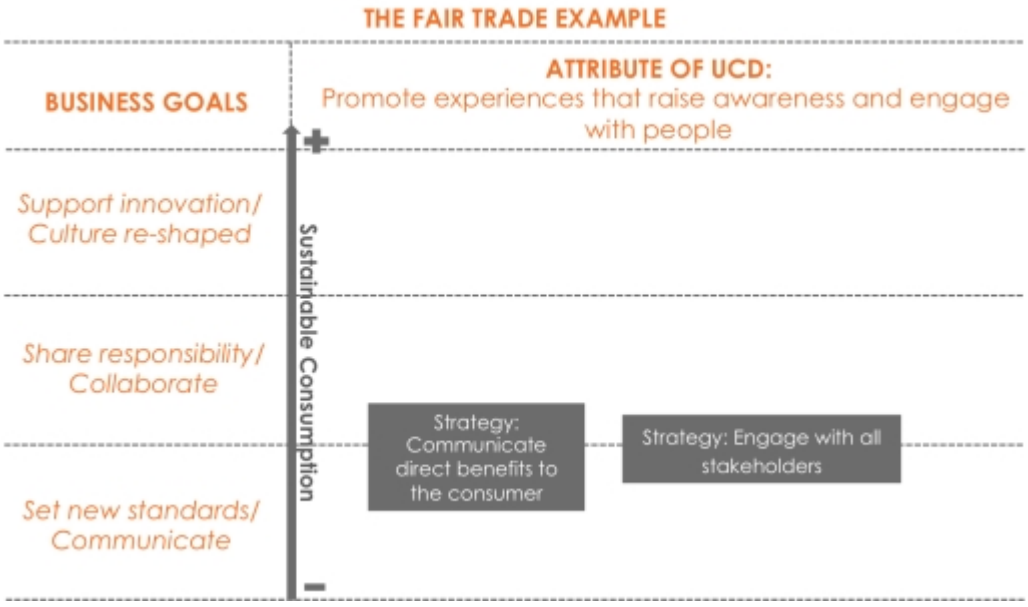


Figure 5: Relating Business Goals to UCD Attributes and Strategies. A fair-Trade Example

Following the buying fair-trade example, the framework will allow companies to know where their chosen UCD strategy is placed in relation to the business goal, and the level of sustainability they can achieve through that goal. These should be measured by setting a rationale that will vary on case-to-case basis. The framework currently provides one example of how companies can embed UCD into their strategy and illustrates which level of sustainability they can hope to achieve.

The development of the framework will be based on considering different actions that can promote more sustainable consumption and how these actions can be adapted or bring new ideas to generate different business models. It is important to relate such actions into the sustainability index, as the main goal of the framework will be to encourage companies to influence the highest level of sustainable consumption.

The relationship between the business goals and the chosen UCD attributes and strategies will depend on the company's current context and future aspirations. As such, the development of the framework will see how the strategies can be applied in different contexts depending on the chosen attributes, and the resources to support the generation of the business model.

Conclusions and Future Challenges

Enabling sustainable consumption through the application of UCD is a relatively new area that involves an in-depth understanding of human attitudes and behaviours. Despite the fact that it has been used in businesses to improve products/services, it has not been studied as a strategic tool to enhance

sustainability. As such, this research proposed the need for the development of a framework to help businesses understand how UCD can be part of their business strategy to enable sustainable consumption.

The initial findings of this research present a proposed framework that indicates how UCD can be embedded into a business strategy to achieve different levels of sustainable consumption. The framework relates three business goals with UCD attributes and strategies and indicates which level of sustainability can be achieved through these goals.

A future challenge for this research is the development of the framework by identifying which actions towards consuming more sustainably can support innovation, and be supported by UCD strategies to enable higher levels of sustainable consumption. To address this challenge, future work will analyse how the business goals relate to each other simultaneously. And, it will try to demonstrate that by supporting innovation, the other two goals will be met.

Finally how to measure the success of the framework will also need to be addressed. In order to do this, multiple case studies of 'business to consumer' companies within three different sectors (fast consumer goods, electronic consumer goods, e-commerce and/or services), will be conducted. This multiple case-study research will evaluate the framework, in order to investigate its real effects towards sustainable consumption and its replicability in different business contexts. Finally, the case-study research will help to test the framework to study the effects on the consumption-production dichotomy and ultimately see its influence at a 'system-level'. However, a major challenge will be the level of engagement with the three companies to apply the case study research. Thus, the framework will have to offer significant benefits and be easy to apply.

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