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UNDERSTANDING STAKEHOLDER ENGAGEMENT IN SUSTAINABILITY-ORIENTED INNOVATION PROCESSES OF BUSINESS ENTERPRISES

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ABSTRACT

While stakeholders have long been at the forefront of corporate sustainability debates, the emphases have tended to be on stakeholder pressures, or collaboration and conflict in the management of controversial issues. In this paper we ask how different stakeholders, including end users, can contribute to sustainability-oriented innovation in business enterprises. By inspecting innovation practices through a stakeholder lens we bring a fresh direction to stakeholder theory. We examine sustainability-oriented innovation processes in thirteen different companies across Europe, to bring forth the different inputs and roles of stakeholders through the innovation stages. We identify six stakeholder roles in sustainability-oriented innovation processes. A broker role, i.e. mediating between the innovating firm and end-users or other stakeholders, was the most common role that emerged in the data set. A concept refiner role, giving feedback on sustainability innovation in the late stages of the innovation process, was relatively frequent, and helped in adjusting the innovation for acceptability among a wider clientele. We found stakeholders in innovation initiator roles in three cases. These were instances in which the sustainability innovation would not have come about without the stakeholder involvement. We also identified legitimator, educator and impact extender roles. The findings imply that groups traditionally labelled as secondary or fringe stakeholders may actually be more relevant for sustainability-oriented innovations than primary stakeholders. Mapping such stakeholders could offer valuable opportunities for business enterprises as they deal with the complexity of sustainability-oriented innovation.

Key words: stakeholder theory; innovation; sustainability; stakeholders; sustainability-oriented innovation

INTRODUCTION

The quest for sustainable development fundamentally challenges many contemporary business practices. From an organizational perspective, stakeholders and innovation are at the heart of this challenge. This is because on one hand, moving toward sustainable development calls for innovation: minor adjustments in business-as-usual are not sufficient. On the other hand, the content of “sustainability” cannot be defined and decided upon by company managers alone: it is a multi-dimensional concept, the content of which needs to be continuously negotiated between the multiple stakeholders concerned (Hall & Vredenburg, 2003). In line with Zollo et al. (2013), in this paper we bring these essential aspects together by focusing on **how** companies engage stakeholders in their sustainability-oriented innovation processes and **what** stakeholders can contribute to innovation aimed at creating new, more socially and/or environmentally sustainable products, services, or business models.

While stakeholder engagement has been claimed to be an important activity ever since the term was popularized by Freeman (1984), typical stakeholder engagement tends to keep

stakeholders relatively distant from the strategic core of a company (Laplume, Sonpar, & Litz, 2008). Rather than being linked with new product development, a more common focus of stakeholder engagement are discussions about conflicting interests between companies and a stakeholder group, or checking opinions of stakeholders about a company's activities. Our paper goes beyond these typical foci. We examine what deeper forms of stakeholder engagement in sustainability-oriented innovation there are, and how stakeholders can contribute to such innovation. This is in line with the gaps identified in a recent literature review (Laplume et al. 2008) in the context of sustainable innovations.

Given that stakeholder engagement in new product development for sustainability is an understudied phenomenon (Driessen & Hillebrand, 2013), a qualitative approach is appropriate for exploring how and what stakeholders can contribute (Yin, 2009) to sustainable innovations. We follow a multiple case study approach and investigate sustainability-oriented innovation processes in thirteen European companies (from a total of nine countries). The cases were identified through an extensive search as the practice of engaging stakeholders in sustainability-oriented innovation is still rare. In this respect our data is a forerunner sample.

While a unified definition of "sustainable innovation" does not yet exist, (Perl-Vorbach, Rauter, & Baumgartner, 2014) for the purposes of this paper we define sustainable innovation as a new or significantly improved product, service or business model whose implementation in the market solves or alleviates an environmental or a social problem (Bos-Brouwers, 2010; Halme & Korpela, 2014). A key qualifier for including an innovation in the sample was that it had environmentally- and/or socially valuable outcomes.

This paper seeks to advance organization theory by bringing together stakeholder and innovation literatures in the context of social and environmental sustainability. Laplume et al. (2008) and Freeman (2010) argue that stakeholder theory requires new impulses, thereby suggesting, for instance, an integration with other organization theories (e.g. innovation studies), and in general more empirical research in new contexts (e.g. sustainability innovation). We bring a fresh direction to stakeholder theory by inspecting innovation practices through a stakeholder lens. From the innovation side of the coin, trends in innovation show that the innovation process that was once a company's internal effort now reaches out to wider partner networks (Baldwin & von Hippel, 2011; Chesbrough, Vanhaverbeke, & West, 2006; Lee, Olson, & Trimi, 2012). Bringing the stakeholder approach to the innovation context contributes to deepening in particular the concepts of open innovation (Chesbrough, 2003) and co-innovation (Lee et al., (2012).

This article is organised as follows: we begin by briefly reviewing stakeholder theory in the context of sustainability and identifying gaps for further research in this widely used, but often disputed, approach. We then go on to explore more specifically the literature on sustainability-oriented innovations. The next section provides details on our data and method. Following that we present our findings and then offer a discussion of the contributions this study makes to both theory and practice. We end with conclusions on activities that stakeholders perform in sustainability-oriented innovation processes, and roles that they typically take in such processes.

STAKEHOLDERS AND SUSTAINABILITY-ORIENTED INNOVATION

The recent literature on sustainable development has suggested that stakeholders have a key role to play in helping business firms to address social and environmental challenges and in driving innovation towards the development of sustainable products, services and business models. Compared to regular innovation processes, innovating for sustainable development is

usually more complex and ambiguous due to the wide range of stakeholders it has to consider, and due to their often contradictory demands (Driessen & Hillebrand, 2013; Hall & Vredenburg, 2003). If one considers for instance radical sustainability-oriented innovations, they often reveal technological uncertainties, require fundamental changes to raw materials and to the whole set of services being provided (De Marchi, 2012). Furthermore, externalities have to be closely considered, because they might offset the impacts of the innovation itself (Horbach, Rammer, & Rennings, 2012).

Outlined and elucidated during the 1980s, the stakeholder view of the firm assists managers in taking into consideration the wider environment in which they are doing business, enabling them to address changes, and take account of relevant actors in that environment (Freeman, 1984). Stakeholder theory represents a shift in worldview from managing the business firm for the benefit of purely its shareholders, to following a management strategy which creates value for a wider group of stakeholders (Freeman, 1984; Freeman & Reed, 1983) making it well placed as a theoretical lens for examining sustainability-oriented innovation.

Stakeholders have been defined in different ways but fundamentally “[a] stakeholder in an organization is (by definition) any group or individual who can affect or is affected by the achievement of the organization’s objectives.” (Freeman, 1984: 46). A range of different ways of identifying and classifying stakeholders have grown up around Freeman’s original definition (Laplume et al., 2008). These include the notion of primary and secondary stakeholders according to the direct or indirect effect they have on the firm (Freeman, 1984; Hall & Martin, 2005); Clarkson (1995) distinguishes between those stakeholders which are, or are not, essential for the survival of the firm; further theorizing classified stakeholders according to their salience based on their attributes of power, legitimacy and urgency (Mitchell, Agle, & Wood, 1997).

One of the key themes in the stakeholder engagement literature is the focus on the different types of stakeholders, their conflicting demands, and the management and resolution of those demands. This point is distilled by Frooman (1999) who claims an underlying assumption of stakeholder theory is that it “is about managing potential conflict stemming from divergent interests” (Frooman, 1999: 193). Despite the emphasis on stakeholder conflict which pervades the management literature, some have taken a more integrative approach and outlined a need for research into the degree of quality and depth of stakeholder engagement at different stages of initiating change towards sustainable business models (Zollo et al., 2013). Such change tends to require some level of innovations, which we will discuss next.

Sustainability-Oriented Innovation

The increasingly complex environment facing business firms, such as extensive international supply chains and advances in technology, as well as the constraints of the critical issues of climate change and resource depletion in the natural environment, have led firms to look towards innovation for sustainability (Perl-Vorbach et al., 2014).

Companies have been typically viewed as innovating in their laboratories and through formal R&D processes. Over the past decade, however, this closed view of innovation has been challenged by alternative innovation paradigms such as open innovation (Chesbrough, 2003; Gassmann, Enkel, & Chesbrough, 2010), user-innovation (von Hippel, 2009), co-creation (Prahalad and Ramaswamy, 2004) or co-innovation (Lee et al. 2012). These new paradigms require business firms to be more open to collaboration with both primary and secondary stakeholders, because it is not always clear which stakeholders might possess the necessary knowledge to pursue sustainability, be it incremental or radical innovations (Slotegraaf, 2012). Therefore, the context of innovation for sustainability offers a rich opportunity to discover fresh

insights into stakeholder theory which have been called for in the literature (Freeman et al., 2010; Laplume et al., 2008).

Studies of stakeholders in sustainability innovation are rare. To our knowledge this topic has been only addressed in a few empirical studies, which involve small samples of a single or a couple of cases (Hall & Martin, 2005; Holmes & Smart, 2009; Driessen & Hillebrand, 2013). Stakeholders have been suggested to play crucial roles in the innovation process, even those who are considered secondary or being at the fringe in the typical stakeholder classifications (Driessen & Hillebrand, 2013). Research by Hall & Martin (2005) implies primary stakeholders are the traditional participants of the innovation value chain (customers, suppliers, investors), while secondary stakeholders can disrupt the familiar innovation routines by challenging companies with social, political or environmental issues, especially in the development of more radical innovations. Secondary stakeholders are comprised of, for example, local communities, NGOs, and the scientific community

To give some examples of stakeholder contributions to innovation: non-profit organizations have a great potential for collaborating with companies to innovate for social good (Holmes & Smart, 2009); government agencies can have a significant influence on the development and acceptance of new products; and companies can gain competitive advantage through collaboration with NGOs that possess complementary resources, and thus, for instance, accelerate innovation (Yaziji, 2004). End user integration may in turn offer new ideas to companies and promote the opportunity to learn collectively (Niinimäki & Hassi, 2011). Hall & Martin's (2005) study indicates that despite the ambiguity and complexity of dealing with secondary stakeholders being much higher than for primary ones, identifying and collaborating with the salient secondary stakeholders leads to more radical innovations.

Studies on co-creation may have implications for our study. Co-creation is widely discussed in the context of customers and end-users/ consumers (Grönroos & Voima, 2013; Hoyer, Chandy, Dorotic, Krafft, & Singh, 2010), as well as employees (Ramaswamy, 2009). But although these actors seem to dominate the discussion, Ramaswamy & Gouillart (2010) point out that co-creation is actually a multi-stakeholder engagement model, where value is being created through a common platform.

Whether or not the inclusion of diverse stakeholders in innovation is a new phenomenon, which constitutes the often disputed term "open innovation", has been debated (Huizingh, 2011; Trott & Hartmann, 2009). Innovation exists in so many forms and varying degrees that it is essential to recognize it as a continuum rather than a dichotomy of open vs. closed (Dahlander & Gann, 2010). According to Lee et al. (2012) this continuum ranges from closed to collaborative innovation (essentially strategic alliances and ventures), on to open innovation, and towards a more collaborative value creation, entitled as co-innovation. What is certain is that the key business trends of today require further illumination on how more open or collaborative innovation methods can help firms to develop new sustainability-oriented process, product, service and business model innovations (Slotegraaf, 2012).

At the moment co-innovation is a concept evolving as a next stage in the evolution of innovation. It remains on a largely conceptual level, and is much less explored than open innovation. Compared to its antecedent, open innovation, co-innovation assumes an even wider network of stakeholders and actors that could be involved in the innovation process (suppliers, partner organizations, outside collaborators, customers and the general public at large) (Lee et al., 2012). Evidently, it shifts the focus away from one single company/organization being the active core of the innovation, and allows for examining much more diverse stakeholder roles in the innovation process.

Both open and collaborative innovation literatures are still lacking an integrated framework that could effectively summarize how and when to deploy such practices. More systematic research is required to address questions like: at what stage of the innovation process collaboration is most effective and with which parties, and how to find and select these parties (Huizingh, 2011). In response to the gaps identified by Huizingh (2011) and our own research questions we adopt a commonly used representation of new product development with four main stages: ideation, development, commercialization and post-launch (Hoyer et al., 2010). Although we recognize that the innovation process is anything but linear, has a more cyclical nature and some stages tend to occur simultaneously (Cooper, 2008), we will utilize the aforementioned stages of innovation as a background for analysing when, and with which contributions, stakeholders are involved in sustainability innovation process.

As a result of that analysis we contribute to the discussion about sustainability-oriented innovation by examining the diversity of stakeholder roles and specific activities of their engagement in the process. We apply a multiple case study approach examining sustainability-oriented innovation processes with multi-stakeholder collaboration with data from eleven different European countries.

DATA AND METHOD

As demonstrated in our review of the existing literature, stakeholder engagement in new product development for sustainability is an understudied phenomenon (Driessen & Hillebrand, 2013). A qualitative approach is particularly appropriate for exploring such a phenomenon as it allows for rich descriptions (Denzin & Lincoln, 2000). Case studies are one such qualitative approach and are ideal for descriptive and exploratory studies (Yin, 2003), as well as addressing “how” questions (Yin, 2009) such as that expressed in our research question.

We follow a multiple case study design (Eisenhardt, 1989; Eisenhardt & Graebner, 2007) using theoretical sampling to identify cases that were theoretically useful. An extensive desk-based search was necessary to identify the cases due to the fact that the practice of engaging stakeholders in sustainability-oriented innovation is still rare. This resulted in a total of thirteen different companies from nine European countries, where sustainability-oriented innovation processes had taken place. We focus on products and services developed from scratch, or on existing ones, whose performance was improved in terms of environmental or societal impacts. Our sample is to our knowledge one of the first to draw on such a dataset (Table 1).

Data Collection

Case studies can draw on a variety of different data sources both qualitative and quantitative (Yin, 2003). This study uses a variety of sources to generate thick case descriptions and in order to triangulate responses.

First, we developed an interview protocol which was developed with “a priori” consideration of theory (Eisenhardt, 1989). This protocol was used to conduct semi-structured interviews with 2-3 company representatives knowledgeable about, and involved in, the sustainable innovation process (e.g. project manager, head of R&D department). We also interviewed from two to five external stakeholders involved in the innovation process (e.g. municipality and/or NGO). In addition we interviewed 1-2 involved end users (individual persons). Interviews were recorded and transcribed to facilitate the research process.

Second, we utilized desk research to generate documental data such as press releases, news, and blogs related to the innovation. These different data sources enabled us to

triangulate the interview responses with external reports and formed the basis of the within-case reports which we developed for each innovation.

Data Analysis

The unit of analysis for our research was the product or service innovation process. We took an iterative approach to the data analysis moving between theory and data in order to identify the different activities of external stakeholders throughout the innovation process. The analysis was discussed on a regular basis between the three authors and all the authors were familiar with all the cases. During the process of identifying the different activities, a number of stakeholder roles began to emerge from the data, which included different combinations of activities. These roles were discussed, defined and redefined by the three authors until they became distinct categories resulting in six different roles.

Case Overview

Below we provide a rich picture of three of the thirteen cases that are reflective of our findings. Due to space restrictions this is not possible for all thirteen cases, but a summary of all the sustainability innovations and the innovation processes is given in Table 1.

Skanska

Skanska is a multinational construction company with headquarters in Sweden and operations in 17 countries. It builds residential homes, blocks of flats, and offices. The case data here is based on Skanska's BoKlok housing innovation in Finland, which started out as an effort to tap into a new market segment: consumers who are often not able to afford a home of their own (young adults, single mothers and low-income families). BoKlok ("live smart") is an affordable apartment made of quality materials and with a highly functional layout to minimize space and energy use in a comfortable fashion. Two-storey blocks of apartments are typically located in the capital suburban area, with a direct bus or train connection to the city centre (no longer than 40 min). Living "smart" refers to having comparably lower living expenses, smaller ecological footprint, and community spirit in each Boklok location.

Engaging stakeholders to Boklok development has led to a number of environmental improvements. Designing apartments with notably smaller square meters meant that the layout had to be highly functional to compete with regular apartments. Functional layouts were developed in cooperation with IKEA, and refined together with end users through online focus groups. End users also opted for having a common sauna in the yard (instead of a typical Finnish apartment sauna, which involves high energy consumption), and vegetable plots in the yard to create a more social atmosphere for common yard activities.

Rockwool

Rockwool is a Danish manufacturer of stone wool products. For decades their main product had been stone wool insulation, but after the financial crisis of 2008 the company adopted a new R&D strategy towards innovative solutions. In 2013 Rockwool's prototype coordinator came in close contact with Orange Innovation (OI) – an NGO behind the organizing of Roskilde Festival. Jointly they came up with the idea of making a stone wool housing solution for refugee camps as an alternative to regular tents. Stone wool housing insulates from heat/cold, provides more privacy because of noise reducing qualities, and is highly fire-resistant. In disaster areas modules of stone wool can be re-used for constructing permanent housing.

In this case the role of the NGO is noteworthy as they co-authored the idea, supported the innovation process and facilitated the involvement of end users. During a year and a half Rockwool's prototype coordinator had biweekly meetings with the director of OI to push the innovation process forward. Although initially Rockwool was not open to revealing shelter prototypes due to patenting concerns, OI convinced the management of the benefits of testing the prototypes in real life conditions. Thus, different versions of Rockwool shelters were tested as alternative housing to tents during Roskilde music festival 2013 and 2014. OI facilitated getting insights from festival guests, volunteers who installed the shelters, and health organizations that worked with the refugees. It is not an exaggeration to state that if not for OI, the development of Rockwool shelters would not have happened.

BMW

BMW is a multinational automobile company, which launched the group's first mass-produced electric vehicle BMWi3 into serial production in 2013. Innovation development process was both lengthy and diverse in terms of stakeholder engagement. BMW relied on previously established partnerships with universities, as well as creating new ones with various municipalities and energy providers when developing the charging network. The initial exploratory research in 2008 consisted of interviews with mobility experts from twenty megacities around the world.

Engagement of end users was implemented in partnership with the universities based on general guidelines from BMW. Technical University of Chemnitz had a key role in organizing the field trials of e-vehicle prototypes, collecting the data, implementing different methodological approaches, and summarizing findings. Field trials involved hundreds of end users from different countries and ran for almost five years. Also, in order to explore user ideas about future mobility solutions, an online idea contest was launched in 2010.

Despite the extensive involvement of end users, their inputs were related more to the overall refinement of the concept, while the core of the radical innovation – the technology – was developed by BMW. The constellation of related products and services for electric mobility was developed by BMW in partnerships with the other stakeholders: energy providers and municipalities.

Table 1. Case companies and sustainability innovation processes in brief.

Company name	Sustainability innovation	Involved stakeholders	Process in brief
<p>A2A (Italy, large)</p> <p>Energy supplier in Northern Italy: heat & electricity</p>	<p>Product-service innovation:</p> <p>Energy management application for new-generation integrated home appliances (consumption managed via integrated Wi-Fi connection to home appliances).</p>	<p>University; home appliances partnering company; end users.</p>	<p>Wanting to develop an energy management application for integrated home appliances A2A contacts technical university to connect with the home appliances company, which is already a close partner of the university. The latter provides appliances for testing the new application in local households, and runs most of the testing with households. University designs written communication with households simplifying technical language, and develops certain hardware (generator).</p>
<p>BMW (Germany, large)</p> <p>Automobile manufacturer</p>	<p>Product & hybrid innovations (related services and products):</p> <p>The group's first mass-produced electric vehicle - BMW i3.</p>	<p>Municipalities; end users; universities; innovation agency; external experts on megacity mobility.</p>	<p>In order to develop an electric vehicle, BMW co-operated with an open innovation agency to set up a co-creation lab. This lab was the focus point of a contest set up to capture ideas on future mobility solutions from outside BMW. Simultaneously, field trials were set up in several countries to explore customers' attitudes to such products, to get feedback on usability and technical issues, and in a third phase, to explore more specific cases such as long-distance driving. These field trials were conducted in collaboration with municipalities, universities, research institutes and other specialist knowledge partners.</p>
<p>Eco-Veritas (Spain, medium)</p> <p>Retailer of organic food</p>	<p>Production innovation, potential for business model innovation:</p> <p>Cuina Veritas is a project for new products from malformed but high quality fruit</p>	<p>NGOs; end users; customer insight agency.</p>	<p>End users challenged EcoVeritas about the wastage of food. Co-creation workshops were set up after discussions between the CEO of the company and a foundation specialized in educating and promoting healthy eating. These workshops helped to develop recipes and ideas for new products which would be made of seasonal</p>

	and vegetables that consumers reject due to appearance and otherwise end up as waste.		food which was still good to eat but which could not be sold. An NGO also collaborated to integrate mentally and physically handicapped people into the production process. In the stores the staff helped to educate and get feedback from the customers on the new products.
E.ON (UK, large) Energy supplier: electricity & heat	Product-service innovation: Smart control system for solar power in households.	Municipality; university; end users.	E.ON enters in partnership with local municipality (Milton Keynes) to ensure trust from the locals while searching for households to test their newly developed smart control system. Household users provide feedback on the tested system during in-home interviews and focus group. Open university helps to deepen users' understanding during testing by applying participatory methods in discussions.
Fiskars (Finland, large) Gardening & household tools manufacturer	Product innovation: Indoor gardening device for herbs with integrated LED light	NGOs; end users; gardening schools; consumer insights agency.	Fiskars R&D personnel studies contemporary gardening trends by observing users. They come up with an idea for indoor gardening and set out to develop a product, hiring an agency to run user focus groups in early and late stages of the product development. Gardening schools help to test the equipment and bloggers make the product known among users.
Frosta (Poland, large) Producer of frozen fish, seafood and frozen meals	Product innovation: New additive-free recipes for frozen fish and seafood meals	Universities; public health institutions; end users; Marine Stewardship Council (MSC); consumer agency	Polish branch of Frosta hires an agency to conduct a survey of end user expectations concerning additive free frozen products. Thanks to encouraging survey results they develop additive-free recipes for frozen fish meals and test them during workshops with famous chefs and food bloggers. Local public health institution publishes a dictionary of common food additives to educate the public. As part of internships, university students organize events in the local stores with support

			from MSC to communicate with end users and explain the benefits of additive-free food.
HSL (Finland, large) Provider of public transportation services	Service innovation: Demand-responsive mini-bus transportation service that complements other types of public transport.	University; end users; local traffic agency.	A university professor suggests DRT system to HSL. Development receives funding through a municipal innovation competition. HSL focuses on service development, while researchers develop the software. HSL collects end user ideas on how they would utilize DRT service in their everyday life. University mediates end user integration to finetune the service.
IKEA (Poland, large) Retailer that designs and sells ready-to-assemble furniture	Product innovation: A novel segregation kit for household waste separation adjusted specifically to the conditions of typical Polish homes with scarce under-sink space.	Municipality; end users; customer insight agency; partnering firm (waste sector);	Because of new legislation in Poland on waste segregation, IKEA introduces segregation kits for households. To better understand the reality of typical Polish households, IKEA practices home visits to observe kitchens and under-sink spaces. Customer insight agency helps to design questions and agenda for home visits. IKEA store customers propose to add stickers to the kits to make sorting easier. To further encourage waste recycling, IKEA builds a first recycling station in Poland near its store in partnership with Warsaw municipality and a recycling company Stena.
JCDecaux/Velib (France, large) Outdoor advertising & street furniture	Product-service innovation: Largest self-service bicycle sharing system in the world	Municipality; end users; start-up communications company; cycling association.	JCDecaux enters into a partnership with the City of Paris to develop a zero carbon cycle share system for the city in return for outdoor advertising rights. JCDecaux builds on its experience with smaller systems in other cities by observing the behavior of users. At the request of the municipality an end user committee is set up with volunteers who meet with JCDecaux and the City of Paris to discuss new ideas and service extensions and to showcase new innovations. Cycling associations

			are involved by the municipality to improve the infrastructure and facilitate cycle use. A start-up focused on sustainability promotes the use of Vélib' and helps to create a sustainable community around it.
<p>Rockwool (Denmark, large)</p> <p>Manufacturer of innovative products based on stone wool</p>	<p>Product innovation:</p> <p>A stone wool housing shelter for refugee camps. Protects from heat and cold, reduces the noise level when inside, fire-resistant.</p>	<p>NGO; end users; universities.</p>	<p>Together with an NGO's innovation director the prototype coordinator from Rockwool invent an idea for refugee shelters made out of stonewool. The NGO supports innovation process, facilitates rapid prototyping and testing of shelters with the guests of local rock music festival, organized by the NGO.</p>
<p>Skanska (Finland, large)</p> <p>Construction company, builds residential homes & block of flats</p>	<p>Product innovation:</p> <p>Affordable and comfortable housing for low-income families who want to own their home. Functional (eco-efficient) layouts, common spaces, and proximity to public transportation</p>	<p>Municipality; end users; university; customer insight agency; partnering firms;</p>	<p>Skanska hires an agency to run end-user online focus groups on affordable and comfortable housing development. IKEA helps to design optimal standardized solutions for kitchens & storage to fit compact-sized apartments. University (Hanken) organizes a workshop to increase the understanding of the innovative project among involved stakeholders. As a result, City of Vantaa helps to find flat plots for construction, which allows to reduce building costs.</p>
<p>Unilever (Spain, large)</p> <p>One of the world's leading fast-moving consumer goods companies</p>	<p>Business model innovation:</p> <p>Reducing youth unemployment through a new retail business model: the mobile vending ice-cream, using low carbon emission vehicles and providing micro-entrepreneurship opportunities to unemployed.</p>	<p>NGO; municipality; end users; recruitment agency.</p>	<p>Drawing on the success of Asian Unilever micro-entrepreneurship initiatives for food deliveries, Unilever decides to design an innovative business model for mobile vending of ice-cream with low carbon emission vehicles in Southern Europe to tackle local unemployment problems. Spanish municipalities help in negotiating permits to deploy the initiative in their towns. An NGO specializing in integration of high-risk exclusion groups (e.g. immigrants) assists in identifying the eventual participants</p>

	Bulk ice-cream is sold by Unilever.		for the initiative that later became the micro-entrepreneurs.
Verbund (Austria, large) Electricity company specializing on hydropower	Service & business model innovation: A nationwide network of charging stations for e-vehicles, a flexible system of related services via mobile apps. All energy for charging is 100% hydropower.	End users; university; customer insight agency; partnering firms.	Verbund enters in partnership with Siemens, Raiffeisen Leasing and Rewe to receive funding for e-mobility from the Climate & Energy Fund. Innovation agency approaches Verbund and suggests to conduct lead user study to benefit the development of an innovative business model for e-vehicle charging stations. Verbund draws on the competences of the Austrian Institute of Technology to design pilot testing with lay users and perform complex data analysis on large-scale

*Company size is defined according to the European Union categorization for companies based on the number of employees (micro < 10; small < 50; medium < 250; large > 250).

FINDINGS

While stakeholders have been at the forefront of the corporate sustainability debate for nearly two decades, the emphasis has tended to be on stakeholder collaboration in the context of the management of controversial issues. In this paper, we ask how stakeholders, including end users, can contribute to sustainability-oriented innovation of business enterprises.

Our cases demonstrate that stakeholders may simultaneously contribute to sustainability-oriented innovation with a variety of activities and have several roles in different stages of innovation process. Below we highlight activities with which stakeholders can contribute to different phases of sustainability-oriented innovation processes, and the roles they end up performing through the sets of activities. We proceed by presenting the stakeholder roles against the background of the analysed cases.

The role of stakeholders as *innovation initiators* emerged recognizably in three cases: Rockwool, HSL and JCDecaux/Vélib'. In the Rockwool case, the ideation took place during personal discussions between Rockwool's prototype coordinator and the innovation director of the societally-oriented NGO. Although it is difficult to formally distinguish who came up with the idea of innovation first, it is evident that the NGO's experience with societal issues steered the discussion towards the direction of sustainability. The end result was a housing shelter innovation for refugee camps aimed at resolving such issues as improved fire-safety, increased comfort of refugees, and the possibility to re-use shelter parts in (re-) construction of the permanent housing in disaster relief areas. From a sustainability perspective, this is especially relevant when the stakeholder has a general orientation towards resolving environmental or social issues (as was the case with the NGO – Orange Innovation).

In the case of HSL, a university professor initiated a project around demand-responsive transportation (DRT) due to his personal research interests. The research project received

funding through municipal innovation competition, and during the first years it concentrated on developing the concept of DRT for Helsinki, exploring business viability, and the types of potentially interested users and activities where DRT would be most relevant. Although HSL joined the research project from the very first steps, it concentrated on DRT development as a service, while the university researchers worked with the DRT concept and software development.

It was Bertrand Delanoë who played a strong innovation initiator role in the case of Vélib' when he became Mayor of Paris in 2001. His project to “green” the city of Paris by reducing car traffic and pollution, and promoting public transport, pedestrians and cycling, green spaces and local living, was fundamental for the creation and development of Vélib'. The Mayor's call for proposals to provide a zero carbon, cycle-share project in return for the outdoor advertising contract for the capital was the driving force behind Vélib'. Previous attempts by JCDecaux to offer such a project in the capital had been met with scepticism, making this initiating role by the Mayor particularly important.

The next role – *legitimator* – was evident in at least three of the analysed cases. The legitimator role of secondary stakeholders has been previously explored in the literature (e.g. Yaziji 2004), but more from the perspective of potential conflict resolution, in the spirit of “heading off trouble”. Our data expands this even further by showing how partnering with secondary stakeholders (e.g. municipalities and universities) can help to build up trust and legitimize company actions for utilizing end user inputs for new product development. In the case of smart control system development for solar power, the E.ON company quickly realized the need for long-term testing with households. However, they had serious concerns around possible scepticism when reaching out to involve the community. Partnering with the local municipality in the UK early on and involving them in initial communication, provided E.ON with the necessary trust among households, and was the basis for more insightful cooperation in the development of a smart control system for solar power.

This role has even greater importance in Eastern European settings, where social distrust towards corporate communication is very typical. When developing additive-free recipes for frozen meals, Frosta partnered with a network of different stakeholders, such as academics, the Marine Stewardship Council and the local Hygiene Institute to initiate a more trustful and meaningful conversation with Polish consumers about health, environment and additive-free food via different channels (discussions in public television and publishing a “dictionary” of food additives). IKEA Poland collaborated with the city of Warsaw and a recycling company to build a first waste sorting station in the country next to its store in order to further legitimize and support their waste segregation kits for households.

Depending on the stage of the innovation development process, the legitimator role is closely inter-linked with another stakeholder role – *the educator*, which emerged in three of our cases. Our data suggests that in the later stages of product development, such as commercialization and post-launch, stakeholders can be involved in communication, which is both about further legitimation, and sometimes the education of consumers. The need to educate and re-orient public perceptions about certain sensitive issues is pertinent to sustainability-oriented innovations. During the post-launch stages of innovation, Frosta relied on university students to communicate with Polish supermarket customers about the benefits of additive-free food meals. A small but aspiring organic food retailer from Spain – Eco-Veritas - partnered with a non-profit foundation in order to together develop the recipes for new products from malformed organic fruit and vegetables that would have been rejected due to their appearance by most customers. In their collaboration they also greatly benefitted from the consumer cooking workshops organized by the foundation, sensitizing consumers to the

issue of wasted vegetables and adding a “gourmet” element to new products cooked out of unattractive looking fruit and vegetables.

The “**broker**” or “**mediator**” role was evident in all the cases we explored. The companies always used the services of a professional customer insight/innovation agency, or a secondary stakeholder to mediate the relationship between the innovating company, and other groups of stakeholders, e.g. end users. Not all companies possess the capabilities of internalizing ideas collected from different stakeholders or users, while NGOs and universities (due to their nature and background) often have greater experience, knowledge and skills to work with different groups of citizens in a meaningful way, extracting the insights and organizing them into structured findings (e.g. co-creation workshops, focus group discussions, etc.). In addition, secondary stakeholders such as municipalities and NGOs often have a wider network of contacts available to specialized self-organized groups of end users, which might possess the characteristics of lead users. Out of thirteen companies from our data set, eight relied on secondary stakeholders for brokering/mediation. In the case of Rockwool, the partnering NGO provided the company with access to festival grounds for doing shelter testing with festival guests, as well as reaching out to festival volunteers via their database, prior to the festival, in order to set up the shelters. In the e-mobility cases (BMW and Verbund), as well as in the DRT service of HSL, the involved universities mediated end user integration to different extents. They either fully designed the method of user integration, implemented it and compiled the results, or were closely involved in both co-designing and implementing user integration activities. Expertise in participatory methods and design thinking were particularly useful in making end users more reflective of their own experiences, needs and orientations.

In the case of the bicycle sharing scheme – Vélib’ – the municipality insisted on having a biannually selected user committee, which brought together members of the public, JCDecaux and the municipality, for continuous product and service development and testing of different ideas. The municipality also connected the ideas and insights emerging from their collaboration with the local cycling association to develop the bicycle sharing service. In order to find the shortest/fastest route to potential innovation partners, companies may turn to stakeholders that possess such contacts. Unilever cooperated with an NGO to help identify and select the unemployed participants who would be interested in becoming an ice-cream entrepreneur-distributor using zero emission vehicles (hand-push carts, tricycles, etc.). Because the NGO already had experience working with disadvantaged groups, it was able to make this business-model innovation more socially sustainable by especially targeting the young unemployed of immigrant origin. The Italian energy supplier – A2A – engaged with the local polytechnic university that was already in partnership with one of the leading household appliances companies. This facilitated forming the collaboration to develop an energy management application for third generation home appliances. Although the polytechnic had a solid role of its own - developing a piece of hardware for the innovation - the professors also helped to coordinate the extensive innovation project, and facilitated the integration of households for testing by preparing simple and understandable initiator texts for the households.

At the later stages of sustainability-oriented innovations, end users can have a crucial role as **product (service) concept refiners**, making the resulting innovation more attractive to a wider range of consumers. This particular role emerged in six cases. For instance, in BMW, Verbund and Skanska, the end users lacked technical and architectural knowledge to be at the front end of the innovation, but their inputs were relevant and valuable enough to make the final product more acceptable to the regular consumers.

End users were also engaged in shaping marketing communication about the resulting innovations for the same purpose of making it employable to a wider range of people. It was especially evident in the case of Fiskars, where end users helped to design communication regarding the indoor gardening device for herbs and make home food gardening trendier. Also in the case of new DRT service, HSL reached out for end user ideas in Helsinki on how they would utilize such a service for their everyday life activities. The initiative resulted in almost one thousand responses with creative and relevant ideas that were later employed in marketing.

Finally, stakeholders can serve as *impact extenders* of sustainability-oriented innovations. This role clearly emerged in the case of Vélib'. While the main purpose of the bicycle sharing service in Paris is reducing pollution from cars, collaboration with the sustainability-driven start-up CitéGreen not only encourages greater usage of Vélib' but rewards more intensive users with bonus points. These points can then be exchanged for other sustainable living products and services such as organic food or cosmetics thus extending the impact on sustainability beyond the original objective. Although this role only strongly emerged in the case of Vélib', there is also some evidence of such a role in the case of Eco-Veritas. The objective in this second case is to reduce food wastage. However, a more socially-sustainable element emerged when an NGO was used to aid the integration of physically and mentally handicapped people in the production process. In this way the impact was extended from environmental impact to social impact.

Table 2 depicts the stakeholder roles identified in the different sustainability innovation processes. These roles will be elaborated in the Discussion section.

Table 2. Stakeholder roles in the data set.

Stakeholder Role	Cases
Innovation initiator	HSL, ROCKWOOL, JCDecaux/Vélib'
Legitiminator	E.ON, IKEA, Frosta
Educator	Eco-Veritas, Frosta, JCDecaux/Vélib'
Broker /mediator	A2A, BMW, HSL, JCDecaux/Vélib', Skanska, ROCKWOOL, Unilever, Verbund
Product (service, business model) concept refiner	BMW, Fiskars, HSL, Skanska, Verbund, JCDecaux/Vélib'
Impact extender	JCDecaux/Vélib', Eco-Veritas

DISCUSSION

In this study we define the concept of role as “the action for which a person or thing is specially fitted or used or for which a thing exists”. This definition adheres to Merriam-Webster thesaurus with the only difference that in our sample we have secondary stakeholders (organizations, not separate individuals) who fitted with and performed multiple actions in the innovation process. Thus, we examine the activities stakeholders performed in the innovation development, and these activities inform the “roles”. This offers an alternative to the

organizational capabilities perspective, which focuses rather on how stakeholders could potentially be useful based on their original purpose and the resources they possess. Figure 1 depicts the activities in relation to the six different roles.

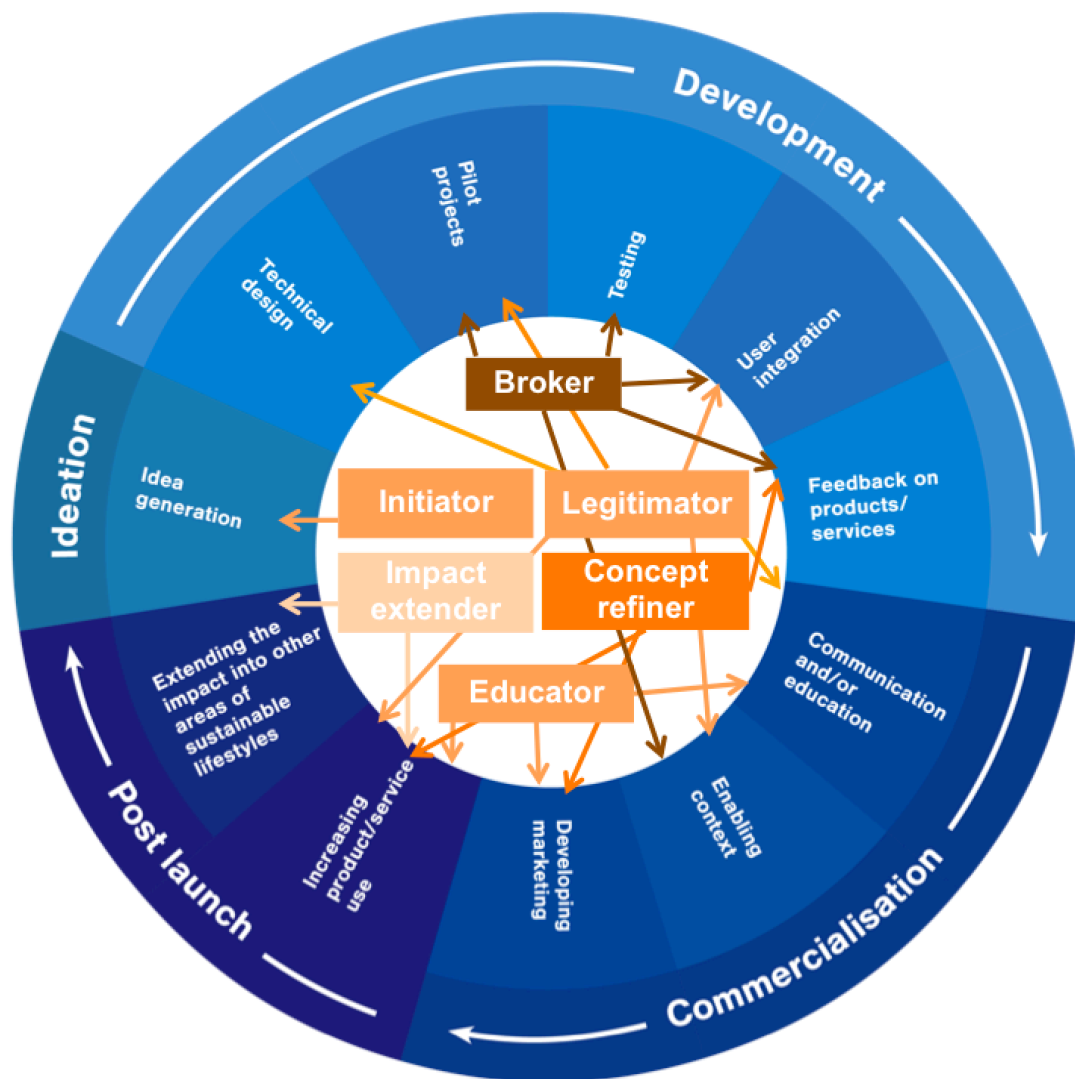


Figure 1. Stakeholder roles in the sustainability innovation process.

As our findings show, stakeholders may have a multitude of roles (functions) within the same innovation process. The extent of stakeholder involvement in the innovation development depends on the actual needs of the innovating company (whether expressed explicitly, or discovered implicitly in the process). In addition, our cases suggest that although some roles easily fit with certain stages of new product/service development process (e.g. “innovation initiator” with ideation stage), they may also be pertinent to several stages at the same time.

Beyond the stakeholder roles, our empirical analysis suggests that the groups of people traditionally labelled as secondary or fringe stakeholders, may actually be more relevant for sustainability-oriented innovations than their primary counterparts. This supports the arguments presented by Hall & Martin (2005) and Hart & Sharma (2004), which so far have

not been empirically tested. Secondary stakeholders are typically represented by scientific community (universities, research institutes), local communities (i.e. different types of potential end users), various types of NGOs (driven by social, safety and/or environmental issues). Government and regulators (including municipalities) are typically on the border between primary and secondary: their primary role is to set the rules of the game and regulate, but on the other hand they often do have potential for secondary roles as well (Hall & Martin, 2005).

The complexity and ambiguity of secondary stakeholders is higher than that of primary ones that have their roles defined rather clearly (e.g. customer, supplier), but it is that ambiguity of the secondary stakeholder roles that can lead to greater potential for innovations. Although Hall & Martin (2005) suggest that the path towards more radical innovations is through disruptive activities of the secondary stakeholders that politically or socially challenge the primary set of stakeholders in the innovation value chain, we emphasize that secondary stakeholders have a multitude of complementary roles in the sustainability-oriented innovation process, which are not borne out of conflict. Thus, we zoom in on cooperation and secondary stakeholder contributions to those processes.

The role of **innovation initiator** is about stakeholders explicitly initiating and/or co-authoring the innovation. Here we stress the importance of the stakeholder being known (as opposed to anonymous ideas/suggestions), because it leads to active involvement in the ensuing innovation development. In the context of sustainability, the initiator role has an added value of steering companies towards sustainability-oriented innovations in pursuit of mutual interests/goals. While looking for business expansion possibilities, companies might not come up with the idea of addressing certain social/environmental challenges, thus interested organizations, such as NGOs and municipalities, may steer them towards this direction by proposing or co-authoring innovative ideas.

The **legitiminator** role is about providing credibility and building up trust either towards the company actions and the genuineness of sustainability-focused innovation, or towards the end product/service itself. Building on Yaziji's (2004) work on the benefits of cooperation between NGOs and companies, with our findings we highlight that not only NGOs, but also other types of secondary stakeholders: e.g. municipalities, university faculty and students are all capable of increasing the legitimacy of sustainability-oriented innovations at different stages of the innovation process. In the context of more open innovation, secondary stakeholders are valuable, legitimacy-improving partners for motivating/getting different groups of end users integrated into the innovation process. At the later stages of innovation (e.g. commercialization and post-launch), secondary stakeholders may help in the marketing strategy development and legitimization of the end products.

Closely related to legitimating is the **educator** role of stakeholders. Especially in the sustainability context, it is about educating the public on certain environmental or social issues, health and safety aspects, but also about sensitizing/preparing the public towards more sustainable lifestyles, which might not yet represent the societal norm. Governments and regulators, including municipalities, have a strong say in normalizing new lifestyles through regulation, yet some issues are challenging to regulate, such as public perceptions of hygiene, food and comfort (Shove 2003). Companies might have difficulties doing the educating or preparing the public on their own, as their communication might be met with much scepticism. Thus, partnering up with secondary stakeholders for educational and legitimizing purposes is a more viable route. Academic institutions and NGOs are more experienced and suitable for opening up such topics for discussion, organizing workshops and normalizing the use of novel products/services. A recent study about mainstreaming low-

energy housing found that changing user perceptions requires intensive two-way communication with end users (Heiskanen & Lovio 2010). Having information poured over users even from the most reliable sources is insufficient. Rather, more engaging and interactive methods are necessary. Our findings indicate that, for instance, NGOs organizing cooking workshops with bloggers can help to both change perceptions about which foods are acceptable for cooking, and to disseminate these perceptions using web 2.0 technologies.

Brokering or mediator role is about linking the innovating company with other stakeholders, but also about enabling/facilitating meaningful collaboration with these other groups of stakeholders. This could mean, for example, organizing stakeholder co-creation workshops that generate useful insights for the innovation, or processing collected data from a large pool of insights (e.g. end user studies). In sustainability-oriented innovations, relying on NGOs or other publicly trusted stakeholders allows the combination of the legitimizing and brokering functions, making the whole process more feasible for companies. At the same time, mutual value is being created for all involved: e.g. while companies gain more insight for their innovation development, the academic institutions/universities are acquiring interesting data for their research purposes while mediating data collection from other stakeholders. As pointed out by Lee et al. (2012) this is characteristic of co-creation projects, where the value is being created not only for the innovating company, but also for all the involved participants, including the public at large. When the mediating role is being hired out to the professional agencies, the synergistic effects of co-creating value might be lost. In other words, rather than a purely functional economic relationship, extended benefit, measured in a variety of ways could be achieved by involving a wider range of stakeholders. For example, while the company can probably get the same data collected from end users through a professional agency, an academic institution might miss out on the opportunity to access data for societally relevant research.

Our case data showed that the role of **product (service) concept refiners** was most often fulfilled by engaging with potential end users. This role is about giving feedback in the late stages of the innovation in order to make the product/service more attractive and accessible to a wider range of end users. In their study Gruner & Homburg (2000) found that customer interaction during early and late stages of new product development can increase new product success, while they also found lead users to be relevant. Our case findings suggest that in the development of sustainability-oriented innovations getting end users involved during the late stages of the process helps to avoid some of the earlier pitfalls of 'green' products (Peattie & Crane 2005). With green products the problem has often been their narrow focus on sustainability-minded consumers only, and the lack of effort to change the perception of the more sustainable product's inferior quality as compared to the regular ones. While engaging lead users might be essential in the early stages, having regular lay users in the final stages of innovation helps to streamline the product features, and communication about the product in such a way that it is attractive to a wider range of end users.

The final role of **impact extender** means that the stakeholder promotes increased use of the sustainable product/service itself, and even works to extend its impacts to other areas of sustainable lifestyles (e.g. from sustainable mobility to healthier and more sustainable eating). This role could be understood as particularly relevant in a sustainability context as it appears to suggest that a shared sustainability focus could lead to potential synergies for collaboration beyond the original product/service innovation. Working towards a goal of sustainability provides a common ground or joint purpose which opens the door to further innovations. This depth of engagement in terms of worldview or values which underlies the theme of sustainability is a potentially untapped source of innovation.

CONCLUSION

We identified six stakeholder roles that emerged during sustainability-oriented innovation processes: innovation initiator, legitimator, educator, broker/mediator, product (service) concept refiner, and impact extender. Sometimes these roles are fulfilled by the traditional participants of the innovation value chain – the primary (market) stakeholders, such as suppliers or service providers (Hall & Martin 2005). However, this research points to the relevance of secondary stakeholders and their ability to play a number of complementary roles in the sustainability-oriented innovation process.

Although previous stakeholder literature emphasizes the importance of eliminating potential conflict as the basis for stakeholder relationships, our cases illustrate a deeper, more collaborative form of stakeholder engagement. Particularly the engagement of secondary stakeholders in the context of sustainability offers all parties involved an opportunity to advance a shared sustainability agenda, which moves beyond a simple transaction relationship, in order to generate a broader range of impacts at a social and environmental level. This suggests a potentially untapped source of sustainability-oriented innovation

The roles we identified, especially the roles of legitimator and educator are rather typical for the sustainability context, and have been previously discussed in the literature, although through different approaches (e.g. Yaziji 2004; Eisenhardt & Schoonhoven 1996). Our findings suggest that when secondary stakeholders take on the broker/mediator role, it is often combined with such roles as legitimator and educator. Thus, when the same stakeholder fulfils several roles, it results in synergistic effects for the company. The broker/mediator role was evident in all of our cases, thus it seems to be highly relevant for sustainability-oriented innovations.

Although previous literature mostly addresses co-creation in connection to B2B collaborations, company-consumer interactions and internal employees' roles in innovation, Ramaswamy & Gouillart (2010) point out that it can actually be a multi-stakeholder engagement effort. Our findings illustrate how sustainability-oriented innovation benefits from the involvement of several secondary stakeholders in the innovation process and these findings make a valuable contribution to the co-creation discussion. Gupta & Govindarajan (2003) claim that the main function of innovation is creating value for the organization and its stakeholders. Even though traditionally innovating companies are seen as pushing their own strategic plans in product development on to suppliers, innovation partners and even customers, Lee et al. (2012) discuss the concept of co-innovation as a highly collaborative approach with strong co-creation elements. As a next step in the evolution from open innovation, co-innovation shifts the main focus away from companies as central actors and allows other involved stakeholders to take on important roles in the innovation process. Our research demonstrates how this is possible in practice in sustainability-oriented innovations, when secondary stakeholders accept multiple roles in the innovation process, or play a key role in initiating the innovation and steering business expansion of companies in more sustainable directions.

Our research contributes to the literature on stakeholder theory by addressing three identified gaps in the literature. Firstly, in contrast to much of stakeholder theory, which addresses the conflict between stakeholders, we explore the deep engagement of stakeholders in the development of sustainable products and services. This challenges Frooman's position that if there were no conflict between the firm and its stakeholders, there would be no need for a stakeholder theory. Secondly, by approaching stakeholder theory from a sustainability perspective we attempt to unite the social, environmental and economic aspects which are so

often separated in measuring stakeholder effects (Harrison & Freeman, 1999). Thirdly, through detailed case analysis we build theory to respond to the call for “rich and rigorous cases that could lead us to see the overall stakeholder relationship as a multifaceted, multiobjective, complex phenomenon.” (Harrison & Freeman, 1999: 484). We offer a fine-grained analysis of stakeholder relationships in a (social and environmental) sustainability setting which responds to the “dearth” of empirical studies on stakeholder engagement (Laplume et al., 2008).

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