GLOBAL SUSTAINABILITY UNDER UNCERTAINTY: HOW DO MULTI-NATIONALS CRAFT REGULATORY POLICIES?

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Abstract

Multinational corporations are increasingly mindful of the significance of sustainability transitions and the need for operations that are energy efficient and environmentally sound. Achieving sustainability under conditions of uncertainty entails the involvement of multiple stakeholders in initiating and carrying out sustainability-focused initiatives. Using longitudinal analysis of Royal Dutch Shell's sustainability policies, we developed an integrated model to elucidate how uncertainty influences sustainability policies in the specific context of multinational corporations (hereinafter – MNCs). We identified three phases in the evolution of Shell's sustainability innovation: a self-reflective phase (2000–2003) characterized by intense pressure from climate advocacy groups, an investment phase (2004–2006) for which the MNC attempted to rise to the waste disposal and pollution challenge through renewable sources of energy, and a reorganization phase (2007–2010) to streamline operations. We also uncovered themes that influence how regulatory policies are crafted: responding positively to the "community's voice", risk spreading through joint ventures, revenue transparency for government accountability and reporting innovation that confronts hard truths. The practical implications are outlined.

Keywords: sustainable development; stakeholder engagement; environmental policy; global environment; sustainability transitions.

1 Introduction

Policy strategists forecast a mounting global population which is estimated to be 8.6 billion by 2030, then around 9.8 billion in 2050 and culminating at around 11.2 billion on the planet by 2100 (United Nations, 2017). Another major challenge is that greenhouse gas emissions, production and energy consumption all continue to surge as the population increases (United Nations Environment Programme (UNEP), 2013). These global realities underscore constraints and limitations on the availability of natural resources, thereby necessitating action on the part of many governments across both industrialized and developing nations. In parallel, multinational corporations (hereinafter – MNCs) are also called upon to take steps towards mitigating climate change and move the world towards a green economy. MNCs formulate these policies to align with the UNEP's aim of ensuring that "natural resources are produced, processed and consumed in a more environmentally sustainable way" (UNEP, 2013, p. 89).

Although scholars have increasingly touted sustainability policies (SPs) as essential for firms seeking market success, questions are increasingly being asked about the nature and extent of firms' engagement and partnerships for advancing global sustainability. Despite the potential positive effect of implementation

of SPs, however, we know little about how uncertainty influences corporate SPs, particularly for MNCs. This is particularly important given that uncertainty is of concern and significance in how stakeholder value is created – a challenge which researchers often characterize as benefits for consumer/citizen, company and government groups along the Triple Bottom Line (TBL) (Elkington, 1988), i.e. the environmental, economic and social dimensions of sustainability (see, for instance, Vogtländer et al., 2002; Tukker, 2004; Escobar & Vredenburg, 2010). Against this background, we seek to address this gap by examining how uncertainty influences SPs in the specific context of MNCs.

We make some noteworthy contributions to the current literature. First, while sustainability transitions illuminate the synergetic effects and changes of sociotechnical systems within institutional contexts (Kemp & van Lente, 2011; Coenen et al., 2012; Safarzyńska et al., 2012), our interests lie in a bottom-up approach that attempts to shed light on partnership uncertainty (PU) and we concentrate on the niceties of this uncertainty at corporation levels. In doing this, we attempt to enhance and advance the sustainability debate to the adaptations that occur as MNCs refine/reform their existing strategies for formulating SPs. Such adaptations are reflected in how environmental management is actioned through performance measures and regulatory policies that are derived from the insertion of environmental requirements (Jabbour & Jabbour, 2009). Our bottom-up approach is also intended to focus the spotlight on MNC exemplars of sustainability and how these corporations can act as mechanisms that accelerate the unlocking of socio-technical regimes. Furthermore, this study differs from and complements ongoing research into 'sustainability transitions'[1] by exploring strategies that affect adaptations in view of ongoing SPs by MNCs. By analyzing the evolution of sustainability strategies for policies and the PU that influences policies for providing sustainable goods and services, we enhance a new perspective of strategic partnerships. These insights may increase understanding on the strategic issues at stake when formulating policies as alternatives for clarifying uncertainty associated with the delivery of innovative clean/green technologies. Our work is also potentially

[1]Sustainability transitions are "long-term, multi-dimensional, and fundamental transformation processes through which established socio-technical systems shift to more sustainable modes of production and consumption" (Markard et al., 2012; p. 956). These socio-technical systems contain interrelated actors, networks, institutions and technologies/artifacts that tend to be semi-coherent (Coenen et al., 2012).

useful for enhancing how firms leverage stakeholder support to gain legitimacy that strengthens competitive positions and gains influence (Abrahamson & Rosenkopf, 1993; Amankwah-Amoah & Debrah, 2017; Westphal & Bednar, 2008). We begin by reviewing the relevant literature. We then describe the research methodology and present our research findings before discussing the theoretical contributions and policy implications of the study. We conclude by highlighting the limitations of the study and some unanswered questions that may offer useful paths for further research.

2 Theoretical development: sustainability under uncertainty

Uncertainty[2] beleaguers sustainability in a sense that it poses a quandary for decision-makers and merely adopting attitudes for "one-size-fits-all" or "try-everything" fails to address the consequences of uncertainty. Uncertainty for sustainability is further exacerbated by the dearth of a single currency for assessing sustainable value added or destroyed (Ryan, 2003). For contemporary organizations and institutions, uncertainty is driven by a host of factors encompassing intense global competition, decreasing product life-cycles, diminishing margins from undifferentiated products, as well as difficulties in aligning the timely delivery of products with product functionality, quality of product, profitability and effective use of technologies. However, various perspectives have been used by researchers to elucidate or predict the attitudinal, motivational and innate factors underlying sustainability, as summarized in Table 1. Of these perspectives, the resource-based view (RBV) of the firm (Wernerfelt, 1984) and institutional theory (DiMaggio & Powell, 1983) offer perspectives for explaining firm motives. RBV posits that disparities in competitiveness are due to the heterogeneity of firm-level capabilities while institutional theory suggests that institutional pressures (such as from regulators, industry or competitors) tend to generate a net effect in which corporations ultimately adopt similar strategies. Drawing on institutional theory, studies have suggested that the adoption of accountability standards can be attributed to institutional pressures (e.g. legal environment, stakeholder pressures and adoption of other certifiable management standards) as well as internal resources and capabilities (Ahen & Amankwah-Amoah, 2018; Perego & Kolk, 2012). The natural-

[2]We use the term *uncertainty* in accordance with Uncertainty Reduction Theory (Berger and Calabrese, 1975), as the ability to describe, predict and explain behavior.

RBV (Hart, 1995), an extension of the RBV, has been well researched and used to explore pollution prevention, product stewardship and sustainable development strategies. Organization culture is central to this transformation towards corporate sustainability because such regimes involve changes in employees' values and beliefs and changes in core assumptions of the human and ecological ties (Linnenluecke & Griffiths, 2010). Considering these intricacies of sustainability transitions, innovation studies have examined the need for a broadening of the problem and analytical framing for sustainability (Smith et al., 2010). A broadening in problem framing focuses on shifts from clean technology through to system innovation for sustainability and a broadening in analytical framing moves from environmental economics to greener innovation systems with further analysis of transitions in socio-technical regimes. Indeed, this framing has been used in analyzing how institutional embeddedness can play an important role in sustainability transitions as is evident by examples of the waste management system, the carbonization of energy and transport systems, biodiversity, food security and urban development (Coenen et al., 2012).

Insert Table 1 about here

2.1 Multinational strategies for SPs: a PU perspective

Policies emerge from strategies and strategies emerge from policies in a continuous evolutionary cycle that shapes corporate codes of conduct, standards, certification, and so on. For MNCs, the strategic challenge posed by corporate sustainability is the basis for formulated policies to alter mission and vision statement foci from stewardship to natural capitalism, from efficiency to eco-efficiency and from business image to environmental champion (Ryan, 2003). Also, taking into consideration accompanying changes in the value systems for actors due to technological regimes (Markard et al., 2012), corporations have tended to implement and adapt regulatory policies that underscore their sustainability transitions. Thus, commentators have suggested the emergence of a "new industrial revolution" in which sustainability is championed through proactive environmental management policies of MNCs (Berry & Rondinelli, 1998). The impetus for this revolution is reflected in the burgeoning stream of research suggesting that MNCs' ability to strategize and implement corporate SPs helps to not only win in competitive environments but

also to retain stakeholder support for their goods and services (Sharma & Henriques, 2005; Doh & Guay, 2006; Berrone & Gomez-Mejia, 2009; Berrone et al., 2010). Indeed, it has been suggested that MNCs that are able to identify and respond to the natural environmental challenges for sustainability are more likely to outperform those who do not even abide by existing legislation (Bansal & Roth, 2000). For some, this modish line of attack by MNCs evolved from pre-existing reactive and preventive management policies in which environmental policies are geared towards meeting legislation or lack strategy for promoting a vision with environmental elements (Steger, 1993; Jabbour & Jabbour, 2009). In Table 2, we summarize the key strategies at the heart of SPs by MNCs. We note that the dominant focus in this area has been on eco-strategy that is fostered by three endeavors: articulating an appealing vision with environmental elements, changing perceptions about environmental issues, and taking symbolic actions to demonstrate personal commitment to environmental issues (Portugal & Yuki, 1994). Scholars also argue that MNCs need to be actively involved in sustainability science for articulating a proactive, interdisciplinary, transparent science on sustainable development (Bäckstrand, 2003). This notion of a "sustainable science" builds on the civic science discipline that reflects the efforts by scientists to reach out to the public, communicate scientific results and contribute to scientific literacy (Clark & Illman, 2001). With these different strategic foci, some studies have examined avenues for mitigating technological and political uncertainties through policies geared towards life-cycle assessment to evaluate stage-by-stage sustainability implementation (Santos et al., 2009) and institutional frameworks for contracts and contracting (Koppenjan & Enserink, 2009). Other areas of policy interests have centered on developing a market-based incentive system, assuring the credibility/effectiveness of certification systems and counter-strategies to cope with NGO pressures for sustainable development (Ramus, 2002; Perez-Aleman & Sandilands, 2008).

Insert Table 2 about here

Although these areas of emphasis for policies have been debated among researchers, there is somewhat of a consensus on the need for interfaces and social constructs to facilitate local- and global-scale partnerships. Thus, the ability of MNCs to strategize stakeholder participation becomes crucial and is realized through

what some researchers have described as "sustainability partnerships"[3], i.e. strategic partnerships that share common visions for realizing sustainable systems (Vogtländer et al., 2002; Krucken & Meroni, 2006). Significantly, these partnerships encompass multi-level participation, communications and complex relationships among stakeholders – developing scientific, social, economic, political and cultural linkages within actor networks (Newton, 2002; Glasbergen, 2007; Anttonen, 2010; Linnenluecke & Griffiths, 2010; Vallaster & Lindgreen, 2013; Lai et al., 2015). This in turn encourages positive attitudes towards selecting products, combining products and services, and formulating regulations that promote lower environmental burden (Vogtländer et al., 2002). In our research, we are motivated by sustainability partnerships as formed by MNCs. In Figure 1 we present our theoretical framing of PU due to partnerships for sustainability. In our framework, we contend that faced with challenges of formulating SPs, MNCs must leverage multi-level participation and communication that contribute to TBL benefits, and at the same time cope with partnership uncertainties that pose quandaries for managing linkages with partners and stakeholders.

Insert Figure 1 about here

2.1.1 Multinationals and sustainability partnerships

Sustainability partnerships can be viewed as fundamentally changing and challenging or pre-existing institutional relationships to leverage levels of creativity (Roy, 2000; Ramus, 2002). Inevitably, they not only exert pressure on firms' operations but also help to shift operations from unsavory production activities which damage the environment or communities (Ramus, 2002; Christmann & Taylor, 2006). Government-community-business partnerships (GCBPs), business-business partnerships (BBPs) and basic learning partnerships (LPs) are some commonly cited examples of sustainability partnerships. These action-oriented partnerships reflect arrangements to tackle the sustainability challenge posed by the 1992 United Nations Conference on Environment and Development (the Earth Summit) that approved the Rio Declaration and Agenda 21 (Ryan, 2003). Indeed, sustainability partnerships have tended to vary according to

[3]Also known as 'stakeholder network' or 'solution-oriented partnerships', these partnerships are formed among platform providers, other providers that are needed to complete the system for delivering sustainable solutions, as well as potential intermediate- and end-users.

implementation. For instance, sustainable energy that stems from reactive environmental management policies tends to be backed by state support and patriotic political rhetoric, while proactive technology-related strategies such as solar and wind energy industries are highly transnationalized and focused on global deployment (Harris, 2011). This variation has influenced studies that examine institutional pressure on multinational responsiveness (Perez-Aleman & Sandilands, 2008; Perego & Kolk, 2012; Aguilera-Caracuel et al., 2013; Fleury & Fleury, 2015) and the level of private involvement that contributes to sustainability (Koppenjan & Enserink, 2009).

Some have argued that MNCs form these sustainability partnerships in response to stakeholder pressure/value (Fuchs & Mazmanian, 1998; Sharma & Henriques, 2005; Escobar & Vredenburg, 2010). While pressure from stakeholders has had the potential for inducing changes in organizational milieus where MNCs operate, increased shareholder value has been leveraged when MNCs efficiently and effectively adapt to new and/or emerging organizational milieus. Globalization facilitated by liberalization has also provided opportunities for MNCs to shift their production activities to countries with weak regulatory regimes, thereby reducing compliance costs and outcompeting rivals (Christmann & Taylor, 2006; Korten, 1995). In developing countries, some scholars have argued that MNCs not only exploit cross-border weaknesses and national differences in environmental regulations by moving their operations to less stringent environments but also use sustainability partnerships to play governments against each other (Christmann, 2004; Christmann & Taylor, 2006). However, in some industries such as chemicals, international standards formulated and authenticated by organizations such as the International Organization for Standardization (ISO) have provided specifications and guidelines in line with many governments regulations. Although the directives from such international standards organizations offer practical guidelines for environmental management to minimize negative environmental impacts and improve sustainable production processes (Corbett & Kirsch, 2001; Chen, 2005), their implementations in advancement of environmental leadership usually require an understanding of how influence processes at

the individual and organizational level are interrelated (Portugal & Yuki, 1994). Here, in an attempt to improve our understanding of the nature of these interrelations, our interest is drawn towards PU.

2.1.2 Multinationals and PU

Generally, PU stems from variance in the governance structure and relationship climate of organizations (Bensaou, 1997) and, informed by Uncertainty Reduction Theory (URT), this variance has been attributed to three main sources: self-uncertainty (an entity's involvement in relationships), partner uncertainty (variance in partners' involvement in a relationship) and relationship uncertainty (variance in the relationship itself) (e.g. Berger & Calabrese, 1975; Berger & Bradac, 1982). The notion of relationship uncertainty (termed behavioral uncertainty in Eriksson & Sharma (2003)) encompasses the adaptability of partners to specification changes at short notice and is reflected in an awareness of the resources and goals of partners (Eriksson & Sharma, 2003). In addition, behavioral uncertainty stems from "inability to predict a partner's behavior or changes in the external environment" (Joshi & Stump, 1999, p. 294). Assuming the premise that corporate sustainability is plagued by PU means that it is influenced by the partnerships that MNCs create with stakeholders. This postulation is well established (Vogtländer et al., 2002) and requires an awareness of potential stakeholder uncertainty (Sharma & Henriques, 2005). By stakeholder uncertainty we mean the uncertainty that is brought about by perceptions of corporate reputation, stability of benefits from corporations and prominence of organizations within their fields (Rindova et al., 2005; Reuber & Fischer, 2007).

Using signaling theory (Spence, 1974), stakeholder uncertainty has been conceptualized with a focus on information asymmetry between buyers and sellers, and the suggestion is that signals are used by buyers as indicators of the productive capacity of sellers. With this in mind, several studies (e.g. Dentchev & Heene, 2004; Rindova & Fombrun, 1999; Roberson & Park, 2007) have shown how company rankings based on predefined attributes are used to reduce stakeholder uncertainty by minimizing the need for stakeholders to conduct their evaluations of signals. The different theorized sources of PU we identified, as summarized in Table 3, have been associated with how MNCs can leverage partnerships for realizing sustainability goals

(Halme et al., 2004). Our examination of the literature also suggests that these uncertainties influence the involvement of MNCs in sustainability partnerships. This involvement is necessary for governance of resources to ease goods/service accessibility but it has been argued that this is unlikely to be successful if participants are inadequately incentivized in eco-initiatives (Ramus, 2002; Tukker, 2004; Markard et al., 2012). Additional consideration needs to be taken of overcoming barriers of implementing new business models that coordinate partnerships with a view to ensuring the integration of innovation and environmental policies (Anttonen, 2010). Our analysis focuses on potential partnerships by the MNC that exert not only pressure on the corporation's operations but also helps the MNC craft sustainability-motivated policies for value through more efficient operations and other TBL-related benefits.

Insert Table 3 about here
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3 Research methodology

In an attempt to answer our research question, we followed an inductive methodology (Glaser & Strauss, 1967) and of the two forms of inductive methodologies, grounded theory and analytical induction, we chose analytical induction in view of the methodology's support for existing theories (Manning, 1982). Using analytical induction, we alternated between data elicitation and theory generation, using our initial framework of Figure 1 as our starting point. We iterated between theory and data till we achieved closure, i.e. when discrepancies between gathered data and generated theory are small (Glaser & Strauss, 1967). We adopted a single-case (holistic) design that is revelatory[4] in nature (Yin, 2009) and used this as our form of inquiry to longitudinally study the corporate setting of the case to shed light on how the policies have evolved (Leonard-Barton, 1990; Wilson & Vlosky, 1997). The single-case approach provides an opportunity for depth of understanding of existence of a significant phenomenon and how it has evolved over time (see Eisenhardt & Graebner, 2007). We chose to focus on Royal Dutch Shell PLC (hereinafter – Shell) for two main reasons. First, the operational strategies of Shell have been replicated not only by major

[4]Revelatory cases analyze previously inaccessible phenomenon (Yin, 2009) and our study fits this situation as it looks beyond how firms introduce innovative clean/green technologies to how partnership uncertainty influences the strategy and priority of multinationals for SPs, especially the regulatory policies of multinationals in response to sustainability partnership uncertainty.

global firms, but also by small and medium enterprises in its industry. Unlike many other industries, its products have a "uniform international price and the major companies tend to adopt global rather than multi-domestic strategies" (Levy & Kolk, 2002, p. 278). We also considered a focus on an oil and gas MNC as appropriate for our study in line with suggestions by scholars (e.g. Escobar & Vredenburg, 2010) that this sector is more susceptible to pressures and complexities associated with sustainable development. Second, the firm is a global company whose operations span more than 145 countries with over 100,000 employees. Therefore, understanding how their policies evolve would provide us with a better understanding of how they have responded to uncertainty. Likewise, the gap in the literature compels one to not only examine firm-level issues such as the existence of SPs and associated implementation issues but also those issues raised in the public arena which can inform policy for firms and governments. Our analysis of the literature suggests that the key sustainable development pressures in the oil and gas industry are climate change, biodiversity, renewable energy and social investment (Escobar & Vredenburg, 2010).

We employed public discourse analysis to shed light on the multinational's environmentally friendly policy (Brown & Jones, 2000) which is in line with the growing interest in discourse in business and management disciplines (Brown & Jones, 2000; Phillips & Hardy 2002). Discourse sees language "as a form of social practice, and discourse analysis is analysis of how texts work within socio-cultural practice" (Fairclough, 1995; p. 6). Our analysis drew on publicly available data on the company between 2000 and 2010 from annual and environmental sustainability reports. We also assembled data in the public domain from stakeholder groups such as UNEP, Amnesty International and Friends of the Earth. In addition, business officials, magazines, newspaper reports, web sites, press releases, policy statements and press reports were consulted. Obtaining data from multiple sources using annual reports in tandem with public domain documents was particularly useful in providing not only the rich internal views but also how the outside world perceived and reported on the firm's policies (Leonard-Barton, 1990). We focus on two aspects of sustainability policy: first, the existence of policies and how these policies have evolved during the analyzed

timeframe, and second, the regulatory policy themes that emerge from our analysis in view of the corporation's perception and/or awareness of PU.

Insert Table 4 about here
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4 Research findings

4.1 Evolution of sustainable innovation focus at Shell[5]

Overall, our analysis showed that during the studied period many of the policies articulated by Shell have sought to seize on the opportunities in the environment to help address the climate change challenge and meet the expectation of stakeholders by reducing waste and air pollution stemming from its operations. Below we outline the various phases uncovered based on the public discourse and archival data, and company records. We extrapolated three main phases in the evolution of the MNC's policies over the period, as summarized in Table 4. These phases emphasize the growing pressures of various stakeholders such as media, environmental pressure groups, shareholders and local communities, and their pivotal role in greening policies.

4.1.1 First phase (2000–2003)

From the outset of the studied period, corporate sustainability pari passu competitiveness was a running theme in shaping Shell's SPs, as asserted by Jeroen van der Veer, the then managing director:

> "Sustainability and good business go hand in hand. ... The oil industry cannot ignore the issue of climate change... Environmental, social and ethical issues are therefore central to building brand loyalty and to ensuring long-term competitive advantage." (Renewable Energy World, 2001, p. nd)

For this, the company and its European counterparts such as BP bolstered resources to reinforce their previously declared position of investment in new clean/green technologies to respond to the environmental challenge. As shown in Table 4, the firm committed between US$500 million and $1 billion to renewables such as wind and solar photovoltaic (PV) in 2001 as part of the MNC's sustainability transition. Also, this phase was characterized by the growing influence of the environmental movement in developing countries

[5]Prior to 2005, the Royal Dutch/Shell Group consisted of two public companies: the Royal Dutch Petroleum Company, and Shell Transport and Trading Company. Since then, the Royal Dutch Shell PLC became the single parent company of the two companies.

some through high-profile documentaries and reports on the operation of the company. These often showcased air and water pollution stemming from the operations of the firm and its effects on the local community. Even though the corporation was keen to emphasize that its sustainability efforts were not a "cosmetic public relations exercise", it had its critics as evident by its "Greenwash award" from campaigners at the 2nd World Summit on Sustainable Development. The need for a change in strategy was further necessitated by pressures from stakeholder groups such as Friends of the Earth who asserted that the company was:

> "Still putting more effort into green spin than green delivery, and that little has changed on the ground." (Friends of the Earth, 2003, p. 2)

4.1.2 Second phase (2004–2006)

The second phase was characterized by continuous improvements in clean/green technologies and growing awareness of the need to use technology to reduce waste and emissions. The development of the first commercially available biofuel from straw (through Iogen) in 2004 and the first offshore natural gas production platforms powered by wind and solar electricity in 2006 are some examples of advances made by the corporation. Importantly, in 2005, and in keeping with the 'sustainability goes hand in hand with good business' ethos, the firm recorded the highest profit in Dutch business history. Against this backdrop, the firm was criticized for demonstrating disregard for its stakeholders. The Shell Accountability Coalition's report (2007, p. 5) asserted:

> "*While Shell laughed all the way to the bank, the environment, the people and the communities from whose territories Shell extracts her barrels of crude are groaning under the hammer of this giant. Despite Shell's public commitment to CSR and specific promises it has made to communities, life on the fenceline can be likened to hell*." (Shell Accountability Coalition, 2007, p. 5)

Here, the critique was that the corporation had failed to deliver fully on its corporate responsibility and concern for the environment and its local people.

4.1.3 Third phase (2007–2010)

These community-driven challenges and uncertainty, felt industry wide by the oil and gas industry, coupled with stakeholders' pressure to invest in alternative sources of energy had in the previous stages forced the

firm strategy to shift fundamentally towards "green" seeking motives. However, the third phase was marked by an apparent shift in strategic focus away from renewable technologies such as solar, wind and hydro power to investments in biofuels and developing cleaner ways such as carbon capture and sequestration (CCS) technology. This perceived change was condemned by some environmental groups as misguided. Friends of the Earth noted:

> *"Shell is backing the wrong horse when it comes to renewable energy ... Shell is at least being a bit more honest about the fact they are a fossil fuel company. It has seen the limitations of the greenwash it was putting out a few years ago." - Friends of the Earth (Webb, 2009, p. 16)*

Moreover, 2009 saw a reorganization that reduced senior management positions by 20% and saw 5,000 staff layoffs. Although the layoffs were designed to 'streamline' the business, for some critics this was at odds with the corporation's previous assertion that:

> "People are at the heart of every segment of our business. Their creativity, innovation, energy and motivation are the driving forces of our success." (Shell, 2006)

4.2 PU mitigation themes at Shell

In our case study, we found sustainability partnerships by Shell with a full spectrum of stakeholders that consist of academic institutions, scientific and conservation organizations, and NGOs such as the Smithsonian Institution, International Union for Conservation of Nature (IUCN), Fauna and Flora International on biodiversity, the Pew Center, Environmental Defense and World Resources Institute on climate change, Amnesty International, the Danish Centre for Human Rights and Pax Christi on human rights, and Transparency International on business integrity. Our analysis showed that in view of these partnerships, governance structures and relationship climates were geared towards setting standards and running programs for sustainable development. Informed by our research model, we found that perceived PU during the studied time period plagued Shell's efforts for corporate sustainability and that this uncertainty is mitigated through responding positively to the 'community's voice', risk spreading through joint ventures, revenue transparency for government accountability and reporting innovation that confront hard truths, as summarized in Table 5. These themes are now presented.

Insert Table 5 about here

4.2.1 Responding positively to the 'community's voice'

Strategically, Shell adopts and communicates a community-focused ethos that attempts to listen and, more importantly, respond positively to communities impacted by the MNC's operations. Overall, the analysis showed that the corporation strived to respond positively to these concerns with the goal of winning back stakeholder trust. According to Shell, this is important because:

> *"Without that trust, we will not be able to do the big, complex new energy projects our strategy requires or achieve top-quartile performance in our facilities." (Shell Sustainability report, 2008; p. 26)*

This *modus vivendi* is necessitated by an awareness of potential bilateral interests, i.e. interests of different groups in Shell and the interests of Shell in different stakeholders. In practice and operationally, this has meant engaging, working and strengthening ties with local residents and NGOs to facilitate the sharing of Shell's benefits with local communities. For instance, in Buenos Aires, Argentina, the "Creating Bonds" program was implemented as a series of safety and environmental risk awareness workshops for local residents to complement the corporation's funding for local schools and health centers. Similarly, in Alaska, Shell partnered with Living Earth Foundation, an NGO, to set up "the big conversation" – a community-based dialogue network to discuss exploration concerns and priorities. Proactively, the Shell Foundation – an independent, registered, grant-making charity – was set up by the corporation in 2000 to deliver a range of community-based programs. Working on the recommendations from these different engagement programs, a range of measures to support community development are then implemented such as local jobs, hiring, buying and training, contracts for goods and services, and community program investments. Thus, Shell contends that:

> *"Wherever we operate we are part of a community. Our energy projects and facilities bring jobs and other benefits, but they can also raise concerns. We work with communities to help develop local economies and improve how we operate." (Shell Sustainability report, 2010; p. 6)*

Our data showed that the corporation also applied initiatives such as the "Profits and Principles" campaign and "Tell Shell" aimed at corporate-level consultations for engaging stakeholders. Launched in 1998, the "Profits and Principles" public relations campaign included an audit report and a series of adverts evaluating

and demonstrating sustainability partnerships. "Tell Shell" is a web-based and replied-paid mail service for partners to provide comments, queries and debate. Adopted at corporate level to assess people's feelings towards the corporation (good and bad), the service offers indications of areas of corporate sustainability interest for partners and stakeholders. Other important foci for the corporation towards communities as stakeholders were the intertwined concerns for the legacy of operations and rebuilding trust. These relate to the negative impacts from operations and often this is down to out-of-date or faulty equipment. Oil spillage in Nigeria, pesticide contamination at a former Shell agricultural chemicals plant in Brazil, plant safety and air pollution at the Motiva refinery in Louisiana (Norco) and the Port Arthur Refinery in Texas are just some of the instances of the negative impact from Shell's operations that set into motion remediation plans and long-term monitoring to re-establish community trust.

4.2.2 Risk spreading through joint ventures

With well over 400,000 contractor staff and a plethora of suppliers, Shell operates a major part of its business through joint ventures. Our analysis showed that this *modus operandi* was intended to enable the corporation to spread costs and risks with its partners, gain stakes in more projects and, in instances where partners are national oil companies, gain access to resources. For Shell-controlled joint ventures, partners are required to apply the Shell Control Framework (SCF) – a set of standards which includes the corporation's Business Principles (published in 1976), Code of Conduct[6] (introduced in 2006) and company-wide standards such as Health, Safety, Security and Environment (HSSE) standards, or materially equivalent principles and standards. HSSE standards stipulate requirements for biodiversity, managing greenhouse gas (GHG) emissions, environmental management, health management, road and process safety, and ship quality. Even in joint ventures controlled by other companies, the analyzed data indicate that Shell expects business principles and an HSSE commitment and policy equivalent to the SCF. These internally generated standards of the SCF reflect an attempt to embed sustainable development and, at the

[6]The introduction of Shell's Code of Conduct precipitated the third phase (2007–2010) in our analysis of the evolution of Shell's SPs.

corporate level, the CEO takes ownership for how sustainability embeddedness is strategized. Peter Voser, the former CEO of Shell, observed during the 2009 reorganization that:

> *"We (i.e. Shell) wanted to embed sustainable development (SD) as deeply into the businesses as possible. I believe that's where the ownership has to sit. Having said that, there is still a corporate accountability for SD and this sits with me, the CEO. But the businesses are where it will develop. That's where it will be used, improved, and the learning truly embedded." (Interview with Peter Voser, 2009)*

Moreover, a corporate and social responsibility committee made up of at least three non-executive directors assesses policies and performance in relation to the SCF. The implication of these measures is that violations of the Code of Conduct are reported and reviewed. Audits of suppliers are also conducted to assess compliance with key corporate sustainability criteria, including working conditions. Online and face-to-face training to explain elements of the control framework serve as measures to (re)establish compliance but in some cases (e.g. 151 in 2007 and 138 in 2008) relationships are ended with non-compliant staff and contractors. We also found evidence of efforts to align the corporation's requirements with external standards. The UN Universal Declaration of Human Rights, UN Global Compact, the Organization for Economic Co-operation and Development (OECD) Guidelines for Multinational Enterprises, and the Extractive Industries Transparency Initiative (EITI) are examples of these external standards and principles. The corporation also engages in the development of these standards as evidenced by being a founding member of the EITI and the corporation's adoption of a biodiversity standard. For the latter, Shell is required to respect protected sites and participate in partnerships to conserve biodiversity. This commitment is reflected as follows:

> *"We (i.e. Shell) also committed to follow strict operating practices in places designated by the World Conservation Union (IUCN) as Category I–IV protected areas and in other areas of high biodiversity value. We are currently working on standards for sourcing biofuels for transport sustainably." (2006; p. 18)*

4.2.3 Revenue transparency for government accountability

Shell accrues substantial revenue for governments around the world. For instance, the corporation reported that in 2010, it paid $15.4 billion in corporate taxes and $2.2 billion in oil and gas royalties, and collected over $81 billion in excise duties and sales taxes for governments on sold/transported products. Against the backdrop of these contributions are critical perspectives that suggest reduced payments to governments. We found some suggestions that the corporation payments actually reduced:

> *"Its tax payments … down from £958 million in 2006 to £783 million in 2011. This despite boosting its global pre-tax profits from $44.6 billion in 2006 to $55.6 billion in 2011. So, while global profits increased by 25%, Shell cut its payments to HMRC by 18%." (Evans et al., 2013, p. 5)*

For the corporation, making these revenues transparent is a priority that is closely connected with the spreading of risks through joint ventures because both themes relate to accountability. In support of revenue transparency, our analysis showed that Shell – as part of the UK Government's EITI – backs a transparency in payments ethos for companies of the extractive industries to publish government payments. The publishing of Shell's payments to the Nigerian government and to the Russian government for the Sakhalin-II project are examples of EITI implementation. Transparency is also at the heart of communicated efforts by the corporation to behave with integrity[7]. The corporation's interpretation of integrity is communicated clearly and simply as:

> *"Zero tolerance of bribes and fraud, including facilitation payments." (Shell Sustainability report, 2007; p. 32)*

The Audit Committee deals with reported cases of bribery/fraud and an externally managed global whistle-blowing helpline, introduced in 2005, enables staff and business partners to confidentially report suspected infringements. For instance, 361 violations were identified in 2007, 40% of which were reported through the helpline. Behaving with integrity for Shell additionally implies zero tolerance for anti-competitive behavior such as price-fixing and unfair retail advertising and pricing policies. Cases of violation often result in fines such as the 2005 Swedish Market Court fine ($2.5 million) for price-fixing and the 2007 El Salvador fine ($852,000) for unfair pricing practices in retail. Following internal consultations, contracts/ relationships with perpetrators are reviewed.

Insert Table 6 about here

4.2.4 Reporting innovation that confronts hard truths

Next, we found that the reporting of innovations for sustainability was used by Shell as an avenue for mitigating stakeholder uncertainty. In our analysis, this is evidenced by a range of reported instances of novel clean/green technologies, as summarized in Table 6. These innovations are motivated by Shell's

[7]Integrity along with honesty and respect for people are the three core values of Shell.

diverse customers, as the "lifeblood" for its business and are communicated as novel sustainability solutions with a view to positively enhancing corporate reputation. For instance, tailored fuel brands such as Shell Pura™, Shell Optimax™ and Shell V-Power™ are targeted for and advertised as meeting the fuel efficiency needs of consumers/end-users whereas automated service stations and online brokering services are offered as customized support client businesses and commercial customers. Innovative industrial services such as full factory maintenance services and energy advice (Shell Energy, Coral and Energise™) are also offered to industrial users. These innovations reflect a multi-faceted focus (product, process, power, platform and provision) by Shell towards an efficient energy-system vision. This vision is in line with the transition management 'vision of a future sustainable sector structure' (Kemp & van Lente, 2011, p. 6) that maximizes energy generation and minimizes carbon dioxide ($C0_2$) emission. The envisaged energy system is necessitated by what the corporation describes as 'hard truths', i.e. truths which create challenges not only for innovation but also for demand and supply. During a 2008 interview with earthsky, Jan van der Eijk, the then Chief Technology Officer for Shell, dissected these truths as follows:

> *"The first hard truth is that the world's energy demand will grow … The second hard truth is that the supply of energy from conventional oil and gas sources will struggle to keep up with this growing demand and we will need new sources of energy … Then finally, this increase in energy demand and also the need to use all kinds of sources of energy will lead to an increase in CO_2 emissions … So that's a major concern and also something that calls for aggressive action." (Interview with Jan van der Eijk, 2008)*

In view of these truths, two scenarios for the development of an energy system to meet these challenges are proposed. "Scramble", the first scenario, centers on a helter-skelter rush by nations for energy irrespective of the global consequences. The suggestion from the data is that such scenarios would ultimately lead to short-term and reactive government responses to energy and climate problems as well as economic volatility. The second scenario and the course of action favored by Shell, "Blueprints", begins with a range of local and national initiatives that over time amalgamate into an organized collective that leverages a global policy framework. This framework is envisaged as benefiting from the innovative technologies (e.g. wind and solar power, CO_2 capture and storage (CCS), biofuels, and hydrogen-powered vehicles) of the different initiatives. With this in mind, the firm maintains a resilience-based business strategy such that even when:

"Tackling the problems of the financial crisis is an immediate priority … We are sticking with our business strategy: more upstream, profitable downstream." (Shell Sustainability report, 2008; pp. 2–4)

In this context, more upstream means maintaining the bulk of investments in oil and natural gas production, and profitable downstream means consolidating revenue streams from existing oil products and chemicals assets and adjusting the downstream portfolio to meet the needs of emerging markets. Significant long-term investment for innovations to support this two-pronged focus is considered crucial for differentiation. For Shell, this investment centers on novel technology, operational excellence and sustainability-oriented management systems for complex and difficult projects.

Insert Table 7 about here

In Table 7, we synthesize the main strategies for SPs that we uncovered and the firm's sustainability science and sustainability partnership strategies that focus on reporting innovative clean/green technologies, working in joint ventures and community-focused engagement, programs and initiatives. The dynamic nature of eco-strategy and counter-strategy that shaped how Shell's SPs evolved through the three earlier mentioned phases and that this progression partly stems from pressures from governments through regulations, environmental groups and local communities. Public concerns and the intense pressure from stakeholders such as Amnesty International and Friends of the Earth particularly drew attention to the adverse effects of its operations. From the first phase (2000–2003) recognition of the alternatives and voluntary corporate reporting, the multinational's regulatory policies appear to have shifted more and more towards embracing partnership with governments, NGOs and citizens. This shift is reflected through increasing focus on working in joint ventures, community-focused programs, revenue transparency and reporting innovation as routes to sustainable competitive advantage.

Insert Figure 2 about here
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5 Discussions

In this study, we examined how uncertainty influences SPs in the specific context of MNCs. Using the case of Shell, we analyzed the path-dependent activities that have shaped and led to the MNC's implementation

and adaptation of sustainable regulatory policies. Along these lines, we identified three phases in the evolution of Shell's sustainability innovation: a self-reflective phase (2000–2003) characterized by intense pressure from climate advocacy groups, an investment phase (2004–2006) in which the MNC attempted to rise to the waste disposal and pollution challenge through renewable sources of energy, and a reorganization phase (2007–2010) to streamline operations. We uncovered themes that influence how regulatory policies are crafted: responding positively to the 'community's voice', risk spreading through joint ventures, revenue transparency for government accountability and reporting innovation that confronts hard truths. Our findings also indicate that PU of SPs is influenced by focal points and priorities for engagement through programs, internal standardization, embedded sustainable development and legacy of operations. Our analysis also suggests that sustainability adaptation pursued through sustainability partnerships appears to be mainly effective in allowing information to be disseminated, i.e. signaling to multiple stakeholders and thereby garnering their support and involvement towards policy implementation.

With this in mind, we distinguish between 'glean' and 'preen' aspects of uncertainty for sustainability adaptation alongside the clean/green duality that characterizes technologies for sustainability, as shown in Figure 3. By gleaning, we mean the engagement of partners (in our case study, Shell concentrated on community engagement) and how this engagement clarifies concerns by assessing people's feelings and sharing benefits from operations. Preening, on the other hand, concerns corporate reputation and relates to the smoothing of relationships to rebuild trust and public image. This complements the social interaction within MNCs that is needed to foster brand commitment and shared brand beliefs (Vallaster & Lindgreen, 2013). Importantly, our insights from the Shell case suggests intensified preening efforts to demonstrate concern for local communities and partnerships with them as a means of addressing their concerns and helping improve its public image. Through revenue transparency, it is also an attempt to mitigate the effects of stakeholders' discontent and uncertainty. This finding correlates with existing work suggesting that MNCs tend to project a symbolic image of accountability through assurance (Perego and Kolk, 2012). The subsequent adaptations from the second (2004–2006) to the third (2007–2010) phase in the evolution of Shell's SPs also suggest a shift in eco-strategy that moves away from a mainly firm performance focus to

a more stakeholder- and partnership-oriented approach to sustainability targeted at reducing waste and addressing environmental concerns. These findings reinforce Steger's (1993) findings that organizations move beyond 'compliance' strategies towards innovative approach to sustainability. In addition, policies such as reducing waste and pollution appear to have been effective in reducing the pressures from stakeholders.

Insert Figure 3 about here

5.1 Theoretical and practical implications

Our work offers theoretical insights for corporate sustainability literature. First, we depart from much of the literature on SPs of MNCs which has largely viewed the issue as causes/effects or as failure to articulate the complex processes leading to sustainable innovation (Bansal & Roth, 2000; Perego & Kolk, 2012). We integrate the URT, RBV, institutional theory and signaling theory to develop a conceptual model of partnership uncertainty for sustainability (PUFS), as shown in Figure 2. In the PUFS model, we account for "community signals", i.e. indicators of the sustainability capacity of firms, which in our case study was generated through the anonymous "Tell Shell" online reporting service. Our analysis also suggests that regulatory policies towards mitigating PU tended to be rooted in "community programs" and "regulatory standards". These mitigation-focused avenues aided the corporation in coping with partner/behavioral, relationship/behavioral and stakeholder sources of PU, as presented in Table 3. These broad uncertainty sources have interacted to facilitate the adoption and adaptation of corporate SPs by Shell. We have inculcated these uncertainty mitigation points and captured their roles within the case of Shell for running community projects and for control frameworks that foster organizational integrity. Accordingly, we view our findings as an addition to theoretical knowledge and the assertion by Elkington (1998) that sustainable competitive advantage does not merely stem from creating economic value for shareholders but needs to account for social and environmental effects of the TBL. In so doing, we provide further specificity of how sustainability innovation can lead – through 'sustainability adaptation' – to developing and sustaining a competitive advantage (Perego & Kolk, 2012). In addition, our conceptual model articulates not only how

MNCs' SPs emerge and develop but also how such multinationals forge partnerships towards developing sustainability innovation. This is our attempt to address the lack of sector-specific analysis in the literature with regard to how such firms' policies evolve to respond to uncertainty and pressures in their environment (Fuchs & Mazmanian, 1998). Our findings also lend support to the thesis that SPs are shaped by a quest to achieve sustainable competitive advantage (Amankwah-Amoah et al., 2019; Adomako et al., 2019; Bansal & Roth, 2000; Danso et al., 2019a, 2019b).

Our findings also have some implications for strategizing SPs. For a start, our analysis suggests that SPs require a multi-faceted strategy in which corporations remain resilient but maintain a relationship climate for learning, leveraging and co-producing of sustainability knowledge. Strategic partnership arrangements need to be continuously evaluated to allow information about current conditions of "local communities" to be channeled in adapting regulatory policies. Thus, MNCs that are increasingly sustainable through partnerships are more likely to anticipate, identify and respond to stakeholders' concerns before their rivals. This aids in mitigating/reducing negative publicity stemming from lack of awareness of stakeholders' requirements and concerns. Thus, such an approach through partnership is very likely to help firms stay ahead of the competition by developing and maintaining "response lag", i.e. "the time it takes competitors to respond aggressively enough to erode the competitive advantage" (MacMillan, 1989, p. 24). There is also a need for effective government policy that recognizes/rewards gleaning and preening efforts of in pursuant of SPs with a view to incentivizing others to imitate good behavior and discourage policies that allow waste and resource misallocation to occur. Given that our study focused on Shell in the oil and gas industry, future research should seek a larger sample of international companies across an array of industries. Such analysis would help to provide further insights on our conceptualization. Second, future research should also seek to examine not only the stages entailed in the formulation of SPs but also how and why such firms renew such policies over time. Such analysis would help us to better understand the effects on stakeholder pressures. We hope that this work helps in igniting more studies on the sustainability adaptation issue.

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Table 1: Key theoretical perspectives applied to clarify sustainability under uncertainty

Theoretical perspective	Premise	Example of sustainability focus	Sample sources
Resource-based view	Heterogeneity of firm level capabilities induces disparities in competitiveness.	Capabilities for pollution prevention, product stewardship, and sustainable development.	Hart, 1995
Institutional theory	Homogeneity of firm strategies tend to be the net effect of institutional pressures.	Adoption of accountability standards.	Perego & Kolk, 2012; Aguilera-Caracuel et al. 2013
Instrumental rationality	Calculation of benefits can help in 'de-coupling' environmental impact from economic growth.	Analyzing how waste reduction and effective pollution. Management contributes to cost reduction.	Maxwell, 1996; Payne and Raiborn, 2001; Ayres, 2004.
Evolutionary theory	Analyzing sociotechnical change in the context of variation, selection and differential replication.	Analyzing sustainability transitions.	Smith et al. 2010; Kemp & van Lente, 2011; Markard et al. 2012; Safarzyńska et al. 2012

Table 2: Strategies for multinational SPs

Strategy	Overview	Main concerns and uncertainty	Sources
Eco-strategy	Strategically influencing and developing relationships for sustainability.	Environmental learning, legal compliance and beyond, leadership and leverage.	Portugal & Yuki, 1994; Ryan, 2003; Corbett & Kirsch, 2001; Chen, 2005
Counter-strategy	Countermeasures to address stakeholder issues of sustainable development.	Coping with stakeholder pressures.	Perez-Aleman and Sandilands, 2008
Sustainability science	Ability of corporations to articulate elements of sustainability to citizens.	Co-production of sustainability knowledge.	Bäckstrand, 2003;
Solution-oriented partnerships	Strategic partnerships with common visions for sustainable systems.	Multi-level participation, communications and complex relationships among.	Vogtländer et al. 2002; Krucken & Meroni, 2006

Table 3: Sources of PU

Source	Description	Main determinants	References
Partner/ Behavioral uncertainty	Variability of entities in partnerships.	Awareness of the goals of partners. Awareness of the resources of partners. Predictability of partner performance for next business cycle. Adaptability of partners to specification changes at short notice.	Williamson, 1985; Joshi & Stump, 1999; Eriksson & Sharma, 2003;
Relationship/ Behavioral uncertainty	Unpredictability of partners' behavior or changes in external environments.	Governance structure of the relationship. Climate of the relationship. Variance in an individual's involvement in relationships. Variance in partners' involvement in a relationship. Variance in the relationship itself.	Berger & Calabrese, 1975; Berger & Bradac, 1982 Williamson, 1985; Joshi & Stump, 1999
Stakeholder uncertainty	Volatility of stakeholder perceptions of corporation value and operations.	Perceptions of corporate reputation. Stability of benefits from corporation. Prominence of an organization within its field.	Spence, 1974; Rindova & Fombrun, 1999; Dentchev & Heene, 2004; Rindova et al., 2005; Reuber & Fischer, 2007; Roberson & Park, 2007

Table 4: Key salient events in the evolution of Royal Dutch Shell's sustainability strategy

Phase	Year	Focus of strategy and pivotal issues/events
First phase (2000-2003) • Recognition of the alternatives and voluntary corporate reporting. • Ethical commitments of top management team. • Environmental awareness campaigns across the developing world. • Intense pressure from climate advocacy groups.	2000	• Industry support and industry trend setter. • The Shell Foundation is set-up with $250 million as an independent, registered, grant-making charity. • Association with Ocean-connect – an internet-based trading site for the shipping industry. • Signed strategic alliance with Sinopec for operations.
	2001	• Committed US$500 million and $1 billion to renewables such as wind and solar photovoltaics in tandem with capacity development in biomass and geothermal. • "Tell Shell", an online reporting service is introduced. • The 1998 "Profits and Principles" campaign developed further. • September 11 attacks.
	2002	• Invested US$29m in Iogen Energy Corporation, a leading bioethanol technology firm. • Shell Pura Diesel launched in Thailand. • Acquired shares held by Siemens and EON in the photovoltaic joint venture. • Received a "Greenwash award" from campaigners at the 2nd World Summit on Sustainable Development.
	2003	• The firm acquired 40% stake in La Muela Wind Park in north-east Spain as a springboard to further expansion to the sector in Europe. • Political upheaval in the Middle East following the Iraq war.
Second phase (2004-2006) • Greening policies across the industry. • Threat of and regulation in host and home countries. • Rising international concern for waste disposal and pollution.	2004	• January 2004, the firm Shell shocked the financial markets by downgrading its "proved" oil and gas reserves by as much as one-fifth. • First commercially available biofuel from straw (through Iogen). • First hydrogen dispenser at a retail service station in Washington, DC. • Formulated 5-year focus on 'More upstream, profitable downstream'.
	2005	• The firm recorded the highest annual profit of 22.9 billion dollars. • Kyoto Protocol on the reduction of greenhouse gas emissions comes into force. • Hurricane Katrina.
	2006	• SolarWorld acquired the corporation's solar crystalline operations. • Corporation's research and development investment increases to $1.2 billion. • First offshore natural gas production platforms powered by wind and solar electricity. • Company-wide Code of Conduct provided for more detailed guidance on implementing the corporation's General Business Principles.
Third phase (2007-2010) • Threat of and regulation in host and home countries. • Environmental concerns about oil contaminating not only the local water source but also destroying the livelihood of communities including fishermen. • Opportunities based on increased efficiency and waste reduction. • Going beyond mere compliance.	2007	• Shell's Strategic Energy Scenarios describes two routes for a future energy system: Scramble and Blueprint scenarios. • "Goal Zero" launched and targeted at zero fatalities and zero significant incidents.

Table 5: Themes from case study

Themes	Foci	Subthemes	Evidence from case
Responding positively	Focus on the "community's voice" so as to listen and respond accordingly through community-focused initiatives and programs.	• Sharing benefits. • Rebuilding trust.	"The cornerstone of being a good neighbor … is listening and responding positively to local communities and broader society" (Shell Sustainability report, 2009; p. 19). The presence of a range of community-focused initiatives geared at understanding how benefits can be shared and trust rebuilt such as "Creating Bonds", "Tell Shell" and "the big conversation".
Risk spreading	Focus on joint ventures with intention of spreading the costs and risks of sustainable development.	• Formulating environmental approaches. • Aligning requirements.	"We conduct a big part of our business through joint ventures (JVs). Working with partners spreads costs and risks, gives us a stake in more projects" (Shell Sustainability report, 2007; p. 19). The presence of the "Shell Control Framework" that enables the corporation to formulate, embed and align its sustainable development strategies with external requirements.
Revenue transparency	Focus on governance and government accountability through transparency how payments and revenues are reported.	• Maintaining accountability. • Behaving with integrity.	"In the interests of transparency and accountability, we believe in the disclosure of revenues that extractive industries pay to host governments" (Shell Sustainability report, 2010; p. 26). The corporation's involvement in the EITI and support for accountability through an Audit Committee that handles reported cases of bribery/fraud and an externally managed global whistle-blowing helpline.
Reporting innovation	Focus on confronting the hard truths of an efficient energy system by reporting innovative clean/green technologies.	• Formulating system scenarios. • Customer focus.	"We are constantly looking to improve our products and services to better meet changing customer needs" (Shell Sustainability report, 2002; p. 29). Communicating new products and services such as Shell Pura™, Shell Optimax™ and Shell V-Power™ fuel brands, and the Shell Energy, Coral and Energise™ advisory services.

Table 6: Examples of innovative clean/green technologies from Shell

Type	Overview	Innovative clean/green technologies
Power-focused	Pioneering technologies for generating coal, gas, nuclear, wind & solar energy	• Cleaner fossil fuels and biofuels. • Tailored automotive fuels e.g. Shell Pura and Optimax. • Hydrogen and electric fuel cell engines. • Geothermal energy. • Green electricity generated from renewable resources. • Advanced Copper indium diselenide (CIS) thin-film technology* • Zero-sulphur Shell Gas to Liquids (GTL) Transport Fuel** • Solar Dew*** • Ultra-clean fuels and electricity.
Process-focused	Innovative processes and techniques geared towards efficient and environmentally friendly operations	• Shell Middle Distillate Synthesis (SMDS) process† • Shell gasification technology that partially oxidizes coal, gas (and even oil and biomass) to make syngas†† • Carbon capture and storage (CCS) technology • Operational improvements through the Energise™ program by Shell Global Solutions.
Platform-focused	Novel equipment and facilities for sustainable power generation	• Hydrogen filling stations. • Monotower# • Network of Solar Centers for generating and delivering solar electricity. • Offshore wind farms and wind turbines to support refineries.
Provision-focused	Customer-focused services for delivering sustainable value in (re)use	• Shell at home‡ • Using waste heat to warm swimming pool. • Sale of CO_2 emissions to fizzy drink companies. • Consultancy services to industry. • CleanWave‡‡

*breakthrough technology for solar power
**cuts pollution by turning natural gas into cleaner-burning transport fuel
***water purification systems powered by solar energy
†for fuels free from aromatic and sulphur components
††syngas is a synthetic gas that can be used for electricity generation with 90% less SO2 and 15% less CO2 than conventional coal-fired plants
#a lightweight, low-cost and zero-emission platform that taps small natural gas fields
‡providing a variety of energy types (gas and electricity), energy advice and services to households
‡‡an overnight pick-up and delivery laundry service

Table 7: Shell's strategies for multinational SPs

Strategy	**Focus at Shell**			**Confronted issues**
	First Phase	**Second Phase**	**Third Phase**	
Eco-strategy	• Corporate and social responsibility and audit committees for governance. • Setting up the Shell Foundation. • Researching and developing innovative clean/green technologies.	• Corporate and social responsibility and audit committees for governance. • Formulating the Shell Control Framework (SCF). • Researching and developing innovative clean/green technologies.	• Corporate and social responsibility and audit committees for governance. • Researching and developing. Innovative clean/green technologies.	Operations legacy. Embedding sustainable development.
Counter-strategy	• Community-based dialogue network and development.	• Scenarios for an energy system. • 'More upstream, profitable downstream' focus.	• Scenarios for an energy system. • Resilience in 'more upstream, profitable downstream' focus. • Increased focus on renewables. • Reorganization of the corporation. • Revising SCF in line with external standards.	Engaging through programs. Internal standardizati on.
Sustainability science	• Reporting innovative clean/green technologies. • Community engagement.	• Reporting innovative clean/green technologies. • Community engagement.	• Reporting innovative clean/green technologies. • Community engagement.	Engaging through programs. Operations legacy.
Solution-oriented partnerships	• Working in joint ventures. • Community-focused programs and initiatives.	• Working in joint ventures. • Community-focused programs and initiatives.	• Working in joint ventures • Community-focused programs and initiatives.	Internal standardizati on. Embedding sustainable development.

Figure 1: Theoretical framework

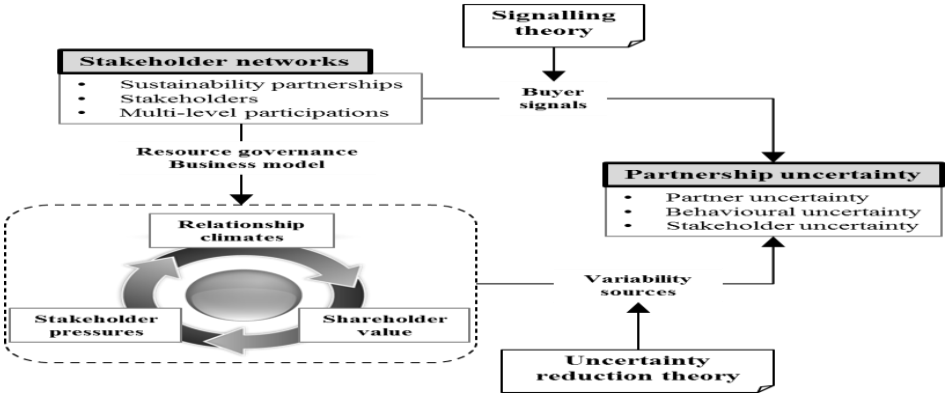

Figure 2: Partnership uncertainty for sustainability (PUFS) model

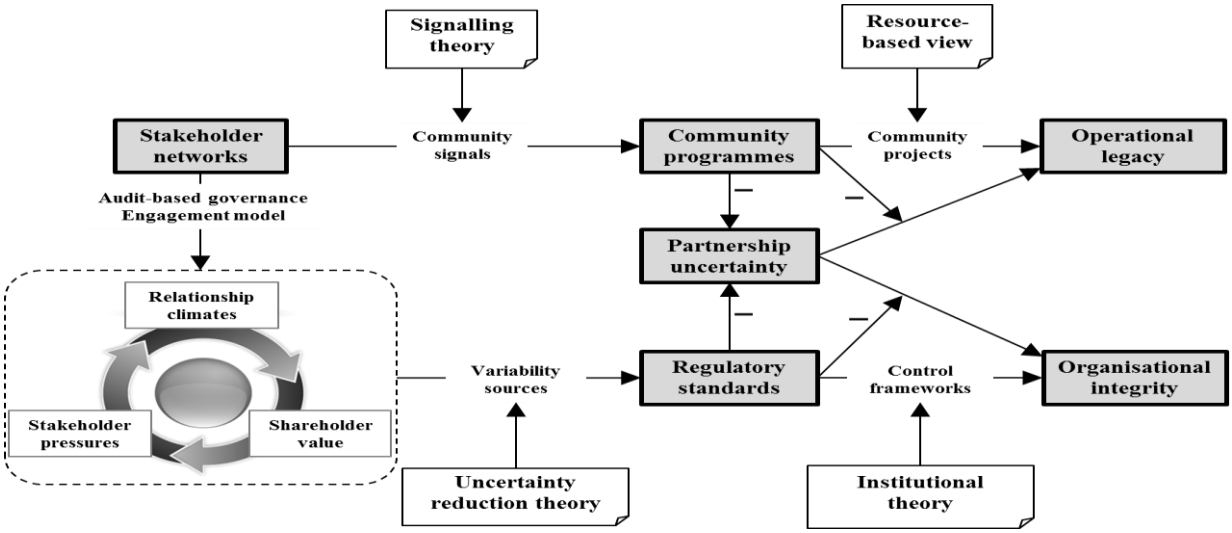

Figure 3: Technology and uncertainty policy duality of sustainability adaptation