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Using the value mapping tool for sustainable business thinking

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Abstract

Pressures on business to operate in a more environmentally and socially responsible and sustainable manner are increasing rapidly. This requires companies to adopt a holistic approach to thinking about business that seeks to integrate consideration of the three dimensions of sustainability - social, environmental and economic – in a manner that balances or ideally aligns value creation for all stakeholders including the environment and society at all levels and through all activities of the business. This is referred to as sustainable business thinking. The business model concept offers a useful framework for system-level innovation for sustainability, and provides the conceptual linkage with the activities of the firm such as product and services design, production processes, supply chains and partnerships, and distribution channels. A value mapping tool has been presented in the literature to assist in a holistic approach to the generation of new business model ideas for sustainability that uses a multi-stakeholder perspective and explores both positive and negative forms of value creation. It is observed that such a holistic approach is also necessary at the functional levels within the business to support sustainability, particularly in product and process design, but as of yet few practical tools are available for these activities. This paper explores the use of the value mapping tool for broader sustainable business thinking, by reflection on its use in workshop settings. The following potential applications to stimulate sustainable business thinking are identified: 1) Ideation for start-ups and established firms, 2) Education, 3) Product and process design and life cycle thinking, 4) Evaluation and screening, 5) Collaboration, 6) Competitive analysis and 7) Policy appraisal. This is expected to be of interest to practitioners in sustainable manufacturing, design for sustainability, business strategy for sustainability, and policy makers. It also serves as a framework for future academic research for sustainability at the various levels of the business.

1. Background

Pressures on business to operate more sustainably are increasing. The World Business Council for Sustainable Development (WBCSD, 2013) in its Vision 2050 spells out the “must haves” for a sustainable society, including internalising the costs of externalities (carbon, ecosystem services and

water), doubling agricultural output without increasing land or water use, stopping deforestation and increasing existing forest yields. As Krantz (2010) proposes 'companies will need even bigger changes, including new business models, greater trust, and greater stakeholder engagement' based on a 'long-term vision' for pursuing sustainability. Hence, the way businesses operate needs to change significantly to address such systemic challenges through collaboration across the industrial network.

The framework of a 'business model' might provide a way to generate holistic sustainable business thinking about the purpose, opportunities for value creation across the network, design of sustainable products and processes and other organisational functions in companies. It is integral to the way business is done (Magretta, 2002) and connects various organisational functions (e.g. product design, production systems and customer relations). As part of collaborative research, a *value mapping tool* was developed to assist in the exploration and design of sustainable business models - the process of identifying new sustainable business ideas for existing companies to reinvent their business models, and new ventures to develop sustainable business models from the outset (Bocken et al., 2013).

This research investigates whether the value mapping tool can be used more broadly to facilitate 'sustainable business thinking' – a holistic approach to thinking about business that seeks to integrate consideration of the three dimensions of sustainability - social, environmental and economic – in a manner that balances or aligns value creation for all stakeholders including the environment and society at all levels and through all activities of the business. This is investigated by reflection on the tool's use in different workshop contexts. The research question this paper addresses is: *How can the value mapping tool be used to enhance sustainable business thinking?*

2. Literature

The literature on sustainable business models and value creation and the linkages between innovation for sustainability and organisational functions are discussed in this section.

2.1 Sustainable business models and value creation

A business model conceptually describes how a company does business (Magretta, 2002). As Zott and Amit (2013) argue, business models center on the logic of how value is created for *all* stakeholders, not just how it is captured by the focal firm; activities are performed by the focal firm as well

as by partners, suppliers, and customers; business models emphasise a system-level, holistic approach toward explaining how firms “do business”; and finally, the business model can be a unit of analysis. Figure 1 offers a conceptual framework for the business model comprising the value proposition (benefits or product/service offering to customer), value creation (resources, suppliers and other partners who help create value) and value capture mechanisms (cost structures and revenue streams). It visualises the elements of a business model. At the core of the business model is the concept of generating value. The literature introduces the terminology of the ‘value proposition’ to describe the product/service offering that the company makes to its customers and other stakeholders for which it receives payment and aims to return a profit (Chesbrough & Rosenbloom, 2002, Richardson, 2008; Zott & Amit, 2010).

Business models are often perceived from a value creation perspective that focuses on satisfying customer needs, economic return and compliance (Stubbs & Cocklin, 2008). For sustainability this focus is too narrow, and raises the need for a more holistic view of value that integrates social and environmental goals, to ensure balancing or ideally alignment of all stakeholder interests to deliver ‘sustainable value’ creation.

Sustainable business models consider a wider group of stakeholders than just customers, and explicitly consider society and environment as stakeholders (Stubbs & Cocklin, 2008; Bocken et al., 2014). They seek to internalise the benefits and harms to society and the environment by the way business is done. Sustainable business models aim to help create competitive advantage through superior customer value while contributing to sustainable development of the company, the environment and society (Lüdeke-Freund, 2010).

2.2 Innovation for sustainability and organisational functions

The business model provides the logic linking specific functional activities in a business such as finance, marketing, R&D, procurement, product design and manufacturing (Zott & Amit, 2013, Osterwalder & Pigneur, 2010). Although not specifically referring to ‘business models’ but to the closely related concept of business strategy, Utterback and Abernathy (1975) argued that there is a strong link between a firm's choice of a strategy and environment in which it operates, the types of product and process innovations that a firm undertakes, the way its productive resources will be deployed, and the state of development that is achieved in its production processes.

Business model innovation is concerned with changing the way business is done – and making changes to all business model elements (Figure 1). An example of a business model that may deliver greater social and environmental benefit is the case of car club company Zipcar (Chase, 2012). In this example, customers pay for a service to use the car, rather than buying and owning the car itself. Cars are accessible to those who could previously perhaps not afford this by changing the value proposition (product/ service), value creation (e.g. Zipcar has contracts with car manufacturers who do not sell cars to end-consumers but 'make them available'), and value capture (pay per hour of use). The fact that customers need to pay per use may make them think before they use the car, and subsequently reduce car usage. Car sharing models may deliver better utilisation of cars and so reduce need for construction of new cars, further contributing to mitigation of environmental impact.

Figure 1. Conceptual business model framework. Source: Bocken et al. (2014), adapted from Richardson (2008) and Osterwalder and Pigneur (2005)

Innovation for sustainability needs to capture the challenges of a complex context and span across company boundaries (Szekely & Strebel, 2013). Szekely and Strebel (2013) describe three types of innovation, which show the linkages between innovation for sustainability and business functions: incremental innovation: (novelty at the products, service and process level), radical innovation (wider sphere of activity and closer interaction with suppliers, regulators and other stakeholders); and game-changing innovation (profound transformation of the practices, structures and the very aims of business). Value is no longer created by firms acting in isolation, but by firms acting together through informal arrangements or formal alliances (Beattie & Smith, 2013). Moreover, innovation is not restricted anymore to corporations: 'everyone' can become an entrepreneur in new peer-to-peer models such as peer-to-peer lending, home rental and car sharing (Chase, 2012). In the most impactful sense, innovation for sustainability transforms infrastructures and the very premises of the way business is done.

It is recognised that innovation for sustainability should occur at multiple levels of an organisation from the strategic level down to the details of manufacturing systems and product design (Waage, 2007; Robèrt et al., 2002). These levels can be integrated within the overarching context of the

business model (Waage 2007; Szekely & Strebel, 2013). For example, business model innovation for sustainability is clearly linked to areas such as sustainable manufacturing and design, which are at the core of manufacturing organisations. *Sustainable manufacturing* as described by Rashid et al. (2008) is characterized by strategies such as waste minimisation, material and resource efficiency, and eco-efficiency, the latter being defined as creating more value with reduced waste, resource use and toxicity (Shamiyeh, 2010, p. 253). *Eco-design* adopts a life-cycle approach to tackle the greatest impacts across the product's life cycle, whereas *sustainable design* takes a holistic approach, including concerns for ethics, dematerialisation, empowerment, sharing, as well as eco-design (Dewberry & Goggin, 1996).

For sustainable businesses and business models to become more widespread, 'sustainability' needs to become an integral part of doing businesses, integrated in the different activities of business. Dramatic shifts are required in the way of thinking by aspiring entrepreneurs, existing managers in businesses, and the new generation of business managers, designers and engineers who will think about and develop solutions. This may be referred to as *"sustainable business thinking"* - a way of thinking in which business is viewed as a positive force, which contributes so society and the environment, while still generating a profit. The aim of this paper is to address how this change in thinking can be stimulated.

2.3 Tools for "sustainable business thinking"

Various tools have been developed for product design focusing on environmental performance such as Life Cycle Assessment (LCA; defined in ISO 14044), eco-design (Baumann et al., 2002) and eco-ideation (Bocken et al., 2011). *LCA* addresses the environmental aspects and potential environmental impact throughout a product's life cycle from raw material acquisition through production, use, end-of-life treatment, and disposal, and includes the development of an inventory of inputs and outputs, potential impacts and an interpretation of the results (ISO 14044, 2006). In *eco-design*, the engineer's task includes selecting appropriate material, designing products for recycling, reuse and remanufacture, while management's challenge is to ensure that the different players like raw material suppliers, recyclers, employees and consumers understand and achieve the environmental goals (Baumann et al., 2002). *Eco-ideation* is a process to generate ideas that help reduce the environmental impact of products across a product life cycle (Bocken et al., 2011). These tools can provide important background information (e.g. LCA, about the environmental impacts of products) or give people qualitative insights on good and bad product design (e.g. eco-design). However, with exceptions,

tools such as LCA tend to be narrowly used on a limited range of parameters such as energy and carbon, rather than offering a holistic perspective for analysis embracing all stakeholder considerations and particularly social dimensions. At the business model innovation level, tools such as the "business model canvas" by Osterwalder and Pigneur (2010) have been developed, which give insights on the specific elements of a business model, but do not focus on sustainability necessarily.

A number of scholars have identified the need for more comprehensive tools to assist firms in embedding sustainability at the core of doing business: Robèrt (2002) provides a review of existing tools for sustainability, whereas Waage (2007) identifies the need for holistic sustainability approach within the product design process and offers a framework for such integration. The value mapping tool (Figure 2) attempts to bring a simple and visually engaging format to this activity. It aims to provide a framework for companies to rethink their business models or design sustainable business models from the outset. As the business model connects various organisational functions (see section 2.2), it is proposed that the tool can be used for further 'sustainable business thinking'.

2.4 The value mapping tool and process

The value mapping tool proposed by Bocken et al. (2013) as shown in Figure 2 was developed to assist in sustainable business modelling. This tool intends to assist users in:

- Understanding the positive and negative aspects of value in a network of stakeholders
- Identifying conflicting values (i.e. where one stakeholder benefit creates a negative for another stakeholder)
- Identifying opportunities for sustainable business model redesign – especially to improve societal and environmental impact

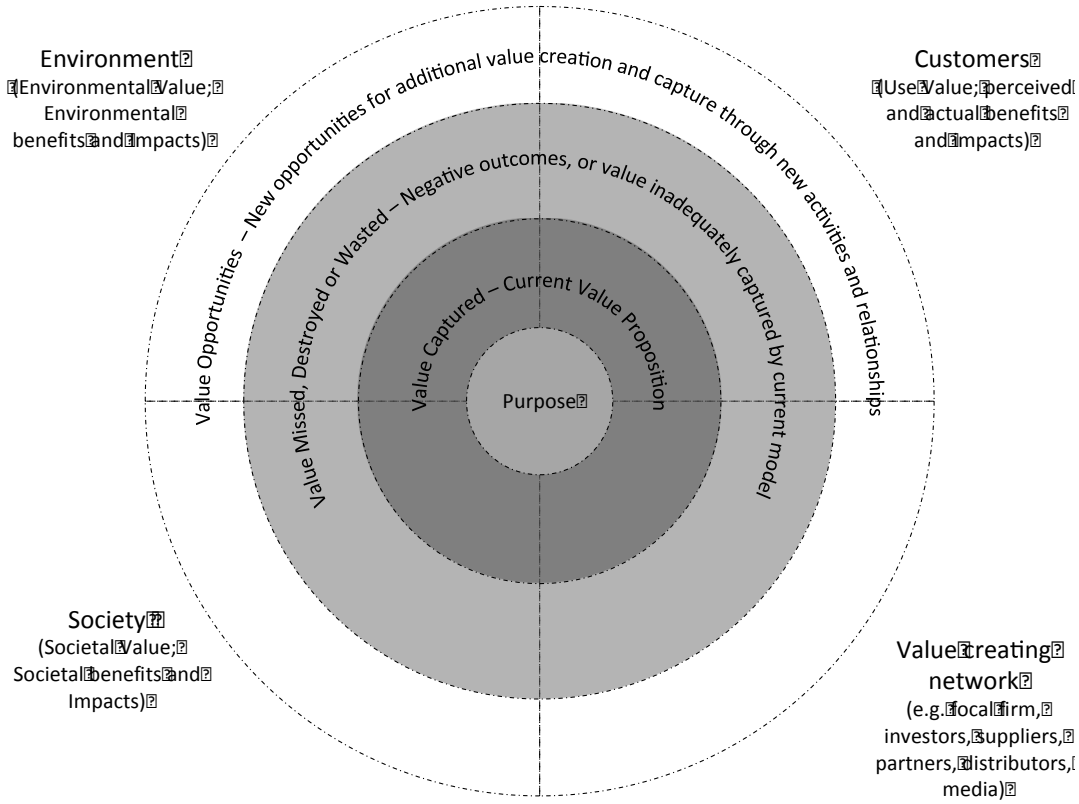

Figure 2. Value mapping tool. Source: Bocken et al. (2013). *Note. The 'value creating network' include actors who create value such as the focal firm, suppliers, distribution channels, and in some cases, media and academia, which is distinct from those who receive the direct benefits or impacts of the product/ service (customers, environment, society).*

This multi-stakeholder approach for understanding and exploring sustainability can and must be applied at all levels for successful sustainability innovation: it does not only concern strategy-making but also needs to involve product designers and production engineers who design the products and processes for sustainability.

The value mapping tool process for sustainable business modelling typically consists of four simple brainstorms:

- Brainstorm 1: The purpose of the business is discussed. Why is the business here in the first place? What is the product or service offered?

- Brainstorm 2: What value is created for different types of stakeholders? What positive value is created and what negative value do the stakeholders mitigate?
- Brainstorm 3: What is the value destroyed or missed or negative outcomes for any of the stakeholders? Is the business missing an opportunity to capture value, or wasting value in its existing operations? For example, are assets, capacity and capabilities under-utilised? Are potentially useful materials going to landfill?
- Brainstorm 4: This brainstorm is intentionally put at the end and is about blue-sky thinking. The focus is on turning negatives into positives. What new positive value might the network create for its stakeholders through introduction of activities and collaborations? What can you learn from competitors, suppliers, customers or even other industries?

The more elaborate process is discussed in Bocken et al. (2013). Although initially developed for generation of new business model ideas for aspiring and existing businesses, the authors propose that the value mapping tool may be used for wider purposes of 'sustainable business thinking'.

3. Method

This paper investigates the following research question: *How can the value mapping tool be used to enhance sustainable business thinking?*

The method is based on reflection on experiences of using the value mapping tool with practitioners through workshops and the evaluation of this process, and discourse with practitioners on the development of future workshops on using the value mapping tool. Seven workshops were conducted by the authors in Europe and the US, between 2012 - 2013 (workshops 1-7 in Table 1).

Workshops 8-9 in Table 1 comprise of proposed workshops based on the value mapping tool, which have not taken place yet. The experiences of using the tool with different groups - students, NGOs, start-ups and established small and large companies – and observations for future uses of the tool were collated to develop a range of potential uses of the value mapping tool for sustainable business thinking. The experiences of using the tool were collected by a workshop evaluation schedule including queries on:

1. The brainstorming outputs of the workshop (actual ideas generated)
2. Usability and effectiveness of the tool to capture sustainable business model innovation
3. Additional opportunities for using the tool
4. Any other feedback by the tool users

	Workshop	**Use of tool in workshop**	**Additional uses identified**
1	Workshop - Engineering Masters Students in Genoa, Italy, October 2012	A case study exercise to explore sustainability issues of companies	Education - it was used as a teaching and analysis tool to explore sustainability issues of companies. The exercise contributed towards case study write-up.
2	Workshop - Sustainable business modelling for circular economy, Netherlands, November 2012	Ideation for NGOs, small and large companies	Education about circular economy and sustainable business models, life cycle thinking for future products
3	Workshop – Start-up in the automotive sector, London, July 2013	Clarify the needs and expectations of each stakeholder group	Collaboration - identification and awareness of conflicts, while opening debate over impacts, trade-offs and compromises.
4	Workshop – 5 start-ups in software, hardware and manufacturing sectors, Cambridge, Aug-Sept2013	Provide additional focus and insight into a strategy development process for start-up companies	Integration with other tools in a strategy workshop to inform roadmapping sessions to create future strategies for start-ups
5	Workshop – System integrator SME and Finnish research institute, Finland, September 2013	Sustainable business model development – new offering	Broader strategy development: revisiting the existing vision and business model of the company
6	Workshop - Sustainable business modelling, October 2013. Student sustainability entrepreneurship prize, Yale university, USA.	Ideation and education on sustainable business models for aspiring entrepreneurs	Education on sustainable business models for start-ups, future product and process design
7	Sustainability innovation workshop, November 2013. Student social entrepreneurship prize, Yale University, USA.	Ideation and education on sustainable business models (also non-profit, social entrepreneurs) for aspiring entrepreneurs	Education; opportunities for aspiring entrepreneurs
8	*Proposed* sustainability strategy workshop	*Proposed*: Exploring the potential merger of two organisations and the risks and opportunities for their future strategy	Future strategy development, Collaboration exploration
9	*Proposed* sustainability screening workshop for SMEs	*Proposed*: Exploring the use of the tool to *screen* sustainable business model ideas	Screening a portfolio of business model options.

5. Table 1. Potential uses of the value mapping tool

The workshop evaluation schedule and observations of the usage of the tool in practice led to the identification of potential additional uses of the tool to assist in sustainable business thinking (Table 1).

4. Findings

The value mapping tool was developed as an idea generation tool but has potential other purposes as discussed in this section. Table 1 shows that usage of the tool was explored for multiple areas. We suggest that the concepts of multi-stakeholder value creation, alignment of interests, a system perspective, and understanding different forms of value (missed/destroyed, etc.) embodied is the value mapping tool are equally useful at the product/process level, and the organisational level, the competitive positioning strategy level, at the financial system level, and at institutional policy making level. Through evaluation of the *actual* use of the tool during the workshops, a range of potential uses and purposes of the value mapping tool were identified. These include:

- **Ideation for entrepreneurs/start-ups** who can design and refine their business model ideas.
- **Ideation for existing companies**, looking to reinvent or reconfigure their business models.
- **Education** – to help students consider sustainability dimensions of businesses more fully and more generally, raise awareness about the broader issues of business (un) sustainability.
- **Product and process design and life cycle thinking** to get product designers to think more broadly about the range of stakeholders during the product design phase and process designers to consider the wider societal and environmental impacts of manufacturing. The tool could encourage life cycle thinking or be useful in conjunction with LCA to gain deeper insights into the value missed, destroyed and opportunities at each life cycle stage.
- **Evaluation and screening** of business model options to evaluate and compare potential business model innovations and strategies.
- **Collaboration** with suppliers and customers seems integral to conventional business model (re-design). The tool could facilitate a high-level assessment of the value derived by different stakeholders from potential future collaborations. It can help draw out conflicts and create awareness of varying needs and objectives.

5. Value mapping for sustainable business model thinking

This section discusses the potential uses of the value mapping tool for sustainable business thinking in greater detail.

5.1 Ideation for start-ups and established firms

For start-ups the tool could be used to encourage thinking about how to best design their business models so they are sustainable from the outset. In this case (especially when the start-up idea is not yet well-developed), it can be beneficial to look at related incumbent industries first. For example, a start-up in the food industry might benefit from first jointly developing value maps from well-known brands before scrutinising their own business models during a value mapping session. Start-ups in particular may have difficulty in identifying their immediate customers (very often they focus on the end users) and articulating the benefits to them. Even if there are several relevant stakeholders (different customers, suppliers and partners), smaller companies may have only considered one or two. This tool helps them to identify and understand broader network of stakeholders.

Established companies can use the tool to start the redesign of their current business models. In existing firms it can serve as a useful tool to stimulate discussion, raise awareness, engage with the broader range of stakeholders, and begin the process of changing perspectives. The challenge here is to identify actions for the short, medium and long-term, because business model change in large incumbent companies faces significant barriers due to the institutionalisation of existing mental models and physical infrastructures. As such, it is likely to be an incremental and often difficult transition process (Christensen, 1997; Massa & Tucci, forthcoming).

Techniques such as technology roadmapping (Phaal et al., 2004) can assist the process of planning actions over time, because such visual aids allow people from various functional backgrounds to work together on a shared future vision and plan next steps. Exemplars, such as sustainable business model archetypes (Short et al., 2012; Bocken et al., 2014) may be used to stimulate idea generation. The business model canvas by Osterwalder and Pigneur (2010) may be useful to map the business model elements that need to be changed (e.g. value proposition, activities, partnerships) as a result of the new business model idea.

5.2 Education – to teach students about sustainable business models

The value mapping tool can serve as a visual aid for experiential learning, where students apply concepts in real-life contexts (Erzurumlu & Rollag, 2013); it may reduce dependency on the instructor by facilitating

independent ‘problem-solving’. Three potential ways to educate students about sustainable business models include interactive workshops, a case base method and a consulting exercise.

First, similar to the normal ideation sessions discussed, an *interactive workshop* could help students to grasp the concept of sustainable business models. However, more time would need to be dedicated to what a sustainable business model is and why these are important to make students more familiar with these concepts, which have not necessarily introduced in the classroom before. This is especially important for students who do not have a business education background (e.g. engineers, designers). Second, a *case based teaching method* could be used, where students are first exposed to the material on what a (sustainable) business model is, and then what the concepts of value missed, destroyed and opportunities are. The case could be fairly simple:

1. Choose one of the companies [from a predefined list] as your case company.
2. Consider the current business model. In what areas does the business model fail to capture environmental and societal concerns?
3. What could potential sustainable business models look like for this company? Describe how the different elements of the model would need to change.

These simple questions can help students critically evaluate current business models and think about new ones. The full teaching note with questions for students to consider is available upon request by the authors. Third, the business case might be turned into a *consulting exercise* to help existing companies, which is recommended by Erzurumlu and Rollag (2013) as a useful method to improve the usage of business teaching cases. These methods may be mixed, so that varied learning preferences and teaching objectives are catered for.

5.3 Product and process design and life cycle thinking

The value mapping tool can be used to encourage the exploration of life cycle impacts of a product, process or business model by evaluating value captured, missed, destroyed and opportunities for different stakeholders. For designers, it might generate greater awareness of the potential impact of products, services and manufacturing processes. Rather than merely focusing on customer needs or energy use in isolation, the tool can give broader qualitative insights of the value created, destroyed and missed for a range of stakeholders without the need for a full LCA. As such, the value mapping tool can be particularly useful for small and medium sized companies (SMEs) with limited time and budgets (Bos-Brouwers, 2002).

Compared to a typical LCA process or using detailed indicators (e.g. the Global Reporting Initiative) the value mapping tool might present a simplified and visually engaging tool. Potentially, the tool can also precede an in-depth LCA by exploring the positive and negative impacts of a company, or augment an LCA, by gaining insight on what the impacts of a LCA mean for different stakeholders at each stage of the product life cycle. It might also enhance deeper thinking about the social impacts of a business, which may be omitted in a typical LCA.

5.4 Evaluation and screening

The value mapping tool could be used for *evaluation* rather than ideation. The tool can give a general indication of the range of impacts of different business model innovation options, and serve as a first level of screening, before detailed analysis (e.g. financial, environmental) takes place. Although several qualitative and quantitative tools have been developed for evaluation in eco-design (Baumann et al., 2002) this tool can be useful for business model evaluation by allowing for comparison of different business model options and their impacts on stakeholders. It can be a way to accelerate the decision making process on which business model innovation looks most promising.

5.5 Collaboration

Practitioners viewed the tool as a potential mechanism to evaluate the value derived by different stakeholders on potential collaboration and even a merger or acquisition. Collaboration is regarded as increasingly important activity for companies to succeed and tackle sustainability issues (Lowitt, 2013; Beattie & Smith, 2013, Bocken & Allwood, 2012), so this could be a promising use. As issues extend beyond business boundaries (e.g. climate change, deforestation), partnerships will need to be formed to tackle these issues together. The tool could help potential collaborators evaluate the value and opportunity of new partnerships. A third-party could facilitate such a workshop, or separate stakeholders can first individually form their value maps, before engaging in an open discussion with partners. The tool might help draw out the potential value created and destroyed from collaborations. Although the tool does not provide a quantified output and is not likely to be used for detailed investment decisions on mergers and acquisitions, it may be used to balance benefits and impacts across all stakeholders of informal or more formal collaborative arrangements.

5.6 Potential other uses of the tool: competitive analysis and policy appraisal

Although this did not directly emerge from running the workshops, the authors suggest the value mapping tool could also assist in the following: competitive analysis and policy appraisal.

The tool might be used as part of a suite of tools for *competitive analysis* of and benchmarking against competitors, to bring a greater focus on sustainable value creation and destruction to tools such as SWOT (to evaluate strengths, opportunities, weaknesses and threats), PEST (to assess macro-level political, economic, social, and technical factors) conventional competitor analysis and scenario analysis (Bocken et al., 2013). Such use assists in investigating how the focal firm compares to others on value created, missed and destroyed across stakeholder groups. The value mapping tool may facilitate deeper analysis to help users investigate how to turn current advantages (e.g. environmental excellence) into real competitive advantage for the firm. Finally, the tool might be used for *policy appraisal* by government to broadly assess potential government policy options qualitatively before more in-depth quantitative assessment or to provide a structure for evaluation of existing policies post implementation. It could also be used for businesses to screen the potential implications (e.g. value destroyed, opportunities) of new government policy (e.g. tax on fossil fuels, subsidies for renewable energy initiatives) on their business.

6. Conclusions

'Sustainable business thinking' is a holistic approach to thinking about business that seeks to integrate consideration of the three dimensions of sustainability - social, environmental and economic – in a manner that balances or aligns value creation for all stakeholders including the environment and society at all levels and through all activities of the business.

This paper has explored the potential application of the value mapping tool to encourage sustainable business thinking. The following potential applications to stimulate sustainable business thinking identified using the tool include: 1) Ideation for start-ups and established firms, 2) Education, 3) Product and process design and life cycle thinking, 4) Evaluation and screening, 5) Collaboration, 6) Competitive analysis of value creation and destruction and 7) Policy appraisal.

As demonstrated in this paper, the value mapping tool can be used for sustainable business thinking. However, the tool is largely qualitative in nature and does not allow for detailed quantitative analysis. Although the tool has been used in isolation, it is particularly useful when used in

conjunction with certain strategy tools (e.g. technology roadmapping; Phaal et al., 2004), sustainable business model exemplars, such as business model archetypes (e.g. Short et al., 2012; Bocken et al., 2014) or perhaps in conjunction with LCA. Future research might look into exploring this potential in greater detail by further testing of the tool in different settings. This will help clarify what the best ways are to stimulate sustainable business model thinking through education, ideation, life cycle thinking, screening and strategy development. Future researchers are encouraged to develop future tools and frameworks, which facilitate "sustainable business thinking" within and across company boundaries.

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