

## A Conceptual Review of Sustainable Innovation: A Driver for Growing the Manufacturing Industry in Botswana

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### Abstract

This paper analyses sustainable innovation in the context of business model innovations which have potential in growing the stagnant manufacturing industry in Botswana. The business as usual mentality should be countered by a balanced approach that ensures profit generation over a long period of time, with less negative environmental impacts and sustained improvement in quality of life of customers. This can be achieved through decoupling economic success from resource consumption. Service innovation is rapidly redefining traditional manufacturing to meet customer needs with fewer resources. This paper reviews sustainable innovation and three promising sustainable innovation business models with the potential to rethink and redefine the manufacturing landscape in Botswana. Through an analysis of five factors; the value of understanding the context, the need for a mature service culture, building a positive mind-set through design, driving competitiveness and entrepreneurship development through sustainability targets and the role of support intermediaries, the paper proposes a shift in value definition and value creation for manufacturing in Botswana to that of a mix of products and services. A more promising sustainable business model called product service system is further explored during this analysis. The paper concludes by proposing a roadmap going forward and recommendations to policy makers.

**Keywords:** manufacturing, product service system, service innovation, sustainable business models, sustainable innovation, creative value creation.

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### Introduction

Several changes in the world, including climate change, aging population, population growth, desertification, pollution and scarcity of raw materials (Moltalvo et al, 2006) have given a rising interest in sustainable innovation. Sustainable innovation can be defined as a process “...that improves sustainability performance, where such performance includes ecological, economic, and social criteria” (Boons et al, 2013). Sustainable innovation is widely viewed as a great strategy to drive and enhance competitiveness across all dimensions of the triple bottom line. Regional and global competition cannot be ignored as it is on the increase as a result of innovations in technology, freedom of trade, sophistication in communication, product and service design, service delivery, social innovations and dynamic production and consumption patterns. Even more inevitable is the transition towards service and knowledge economy and the quest to create a sustainable society (Rapitsenyane, 2014; 2015). In the global competitiveness index report, innovation and business

sophistication are closely related pillars, where non-technological innovation is understood to be business sophistication (World Economic Forum, 2014). The most competitive countries, mostly western and some Asian countries, are those understood to be exhibiting innovation and business sophistication (World Economic Forum, 2014). These have been called innovation-driven economies and at the top of them is Sweden. Botswana is ranked among those in the transition from factor-driven economies to efficiency-driven economies. These countries are in the midst of fulfilling basic requirements and efficiency enhancers for their economies.

Although the analysis of the World Economic Forum (2014) may be a true reflection of what is happening, the criteria may be argued to have been developed based on definition of development and competitiveness in a consumerist culture. Defining and characterising sustainable innovation tends to differ in different contexts depending on sustainability challenges in those contexts with regards to quality of life issues, environmental concerns and economic performance in consumerist economies, emerging economies and the so-called Base-Of-The- Pyramid economies (Boons et al, 2013; Tukker et al, 2008; Hart and Milstein, 1999).

A business application of sustainable innovation strategies in developing economies such as Botswana may complement other political and economic interventions. Such strategies can act as an opportunity to facilitate the process of industrialization, by leapfrogging a stage characterized by individual consumption/ownership of mass produced goods leading to promotion of culture of waste typical of western economies, towards the more advanced service-economy (Manzini and Vezzoli, 2002).

There is often more motivation to incorporate sustainability in business by businesses if pressure for innovation exists (Hockerts and Morsing, 2008; Preuss, 2007). Whilst improvements to systems, processes, products and services contribute towards incremental changes/innovation, the benefits to economic performance and sustainable development are fewer over a long period of time (Bhamra and Lofthouse, 2007). The manufacturing sector in Botswana has exhibited stagnant growth for many years and has consequently, insignificantly contributed to the country's GDP. There is a need to relook at and rethink what can be done beyond incremental improvements, to take the manufacturing industry forward as far as product and service development is concerned. This paper attempts to answer two research questions,

- Which sustainable business models may be suitable in creating value added in the manufacturing industry in Botswana?
- Which factors determine success possibilities for a sustainable business model to grow the manufacturing industry in Botswana, contributing in

the transition towards a sustainable society?

This paper will first elaborate on sustainable innovation and sustainable innovation business models in order to build an understanding of the concepts and their relevance to driving Botswana's economy into the future. The lack of design practice in Botswana is argued as adversely contributing to non-growth of the manufacturing industry. The paper then discusses some sustainable business models and their potential in developing the manufacturing sector in Botswana. Issues that determine whether a Product Service System strategy can work for the manufacturing industry in Botswana or not, are then analysed. In conclusion, emphasis on a systems approach is made and recommendations for policy are drawn.

### **Sustainable Innovation**

The concept of sustainable innovation has been discussed under various terminologies varying from, for example, environmental innovation, eco-innovation, cradle-to-cradle, service innovation, eco-design, design for environment, sustainable design, design for sustainability, service design, whole system design and system design for sustainability (Hellstrom, 2007; Charnley et al, 2011; O'Connor & Cox, 2005; Vezzoli et al, 2014; Bhamra & Evans, 1999; Bhamra & Lofthouse, 2007; Curedale, 2013; Baines & Lightfoot, 2013). Our current rate of material extraction for industrial activities poses a threat for our future generations to match lifestyles of modern day development. Dependency on finite resources rapidly being exploited to meet increasing needs of an increasing population, satisfied by individual product ownership is a true picture of unsustainable consumption (Evans et al., 2009). Revolutionary new technologies are not necessarily the answer to all problems caused by our industrial systems but new revolutionary ways of thinking which embody effective use of resources, optimised use of available technology and collaborative ways of creating value in a systemic manner (UNEP, 2011). The importance of sustainable innovation for manufacturers cannot be overemphasised. The concept of sustainable innovation aims at aiding manufacturers make significant savings from eco-efficient practices to eco-effective strategies involving closed-loop processes that consider the entire product life cycle (Sustainability Learning Centre, 2013). Sustainable innovation concepts and strategies are essential in addressing environmental and social concerns with financial targets when looked at as a whole, making it a fit into the triple bottom line philosophy of environment, people and profits (Evans et al., 2009). Adoption of Eco efficiency by industry can reduce environmental impacts when targeted at addressing energy and materials concerns (Knight and Jenkins, 2009). However being less bad is not the answer as with current approaches of being less bad adopted by companies especially in industrialised nations who account for 30% or more of greenhouse gas generation, the earth still takes one year and four months to recover from resources humanity

consume in one year (Evans et al., 2009).

### **A Life Cycle Approach**

The use of material resources to create economic value by manufacturers requires a life cycle approach since products can have negative environmental impacts at any life cycle stage (Bhamra and Lofthouse, 2007). For manufacturers a life cycle approach is an opportunity for product stewardship to aid material recovery at the end of life of the product (Lewis, 2005). The idea behind product stewardship is to reduce waste caused by consumption patterns during product use by empowering producers with the responsibility to take back their products at the end of life (Michaelis, 1997). This can be achieved through legislation as was the case in Europe, called extended producer responsibility (Michaelis, 1997; Lewis, 2005), or through a voluntary approach as was the case in the United States (Fishbein et al, 2000). Voluntary product take back depends on responsibilities shared by consumers, government, manufacturers and other stakeholders in the value chain (Lewis, 2005). Product stewardship, resource and impact decoupling can be driven by design and sustainable innovation to create competitive advantage. Opportunities to deploy company resources through a life cycle approach can be exploited from such approaches as design for remanufacture, repair, longevity and reuse. Differences in how companies deploy their resources for these concepts can create competitive heterogeneity, where the company gains a unique position in the market, often with the emphasis to develop dynamic capabilities (Hoopes and Madsen, 2008).

Involving various actors across a product life cycle is systemic in nature (Charnley et al, 2011) which requires that the design of products caters for all life cycle stages (extraction of raw materials, manufacturing, packaging and distribution, use and disposal) and not only end of life (Lewis, 2005). The second dimension to consider is the system itself to facilitate interactions between actors in win-win problem solving scenarios. Complex problems systemic in nature provide an opportunity for designers to adopt holistic and integrated approaches to develop more sustainable solutions to deliver customer satisfaction (Coley and Lemon, 2008; Charnley et al., 2011). Although incremental solutions are valuable, the need to move towards more sustainable products, services and systems to meet customer needs is even more inevitable (Bhamra and Evans, 1999; Charnley et al., 2011).

### **Design and Design for Sustainability in Botswana**

Design in the country is still at its rudimentary stage despite the fact that design is a direct input of manufacturing (Bhamra and Lofthouse, 2007; Rapitsenyane, 2014). The manufacturing industry in the country cannot experience significant growth if design is not promoted alongside business. Although there are design related companies operating in the country, the overall awareness of the value of design for companies and consumers is still very low. This is still generally a

problem in Africa. Network of Africa Designers (NAD) continues to fight for design recognition in Africa through three areas of collaboration among members as design education, professional design and communication of the activities and design events in member countries (NAD, 2001). The involvement of World Design Organisation (WDO) in Southern Africa also promotes design awareness. This is done through application of product based approaches of sustainable design looking at improving the quality of life in the rural context and reduction of environmental problems through contextual designs that people are likely to use and keep with ease and low maintenance costs (ICSID Africa Regional Report 2003; 2005).

Tertiary education institutions in Botswana offering industrial design courses contribute to making an impact through collaborative projects and their graduates. However, there appear to be only one which focuses on design for sustainability (Moalosi et al., 2010). With a less design-informed industry, most products are still imported from neighbouring countries with a developed design and manufacture culture. Locally, design has been reduced to small graphical communication products such as logos, business cards, websites, magazines and annual reports for corporations. This understanding of design hinders efforts towards showing policy makers a bigger picture of what design can contribute as it has and continues to contribute in developed economies (Rapitsenyane, 2016). A more visible practical impact is yet to be seen in a small industry in Botswana largely composed of SMEs who cannot afford to hire professional industrial designers.

### **Moving Towards Sustainable Business Models**

This section stimulates dialogue towards answering the question; which sustainable business models may be suitable in creating value added in the manufacturing industry in Botswana? To address this question, the concept of decoupling is discussed, followed by three sustainable business models; social innovation, service innovation and product service systems innovation business models. Elements of a business model have been discussed in general by Boons et al (2013) as (1) the value proposition, (2) the configuration of value creation and (3) the revenue model. Tukker (2004) applies these elements to a specific business model called Product Service System (PSS) as follows;

1. The value proposition – value elements in PSS
2. The configuration of value creation – the sustainability case: factors influencing sustainability potential
3. The revenue model – analysis of key economic elements per type of PSS

These three elements of a business model are important for sustainable innovation. Value can now be redefined in a balanced manner between social, environmental and economic focus instead of solely economic terms as has

been the case in the business as usual mentality. Value creation can be configured in a systemic way, taking into consideration all actors across the entire life cycle of the product or service (Manzini and Vezzoli, 2003). This life cycle approach redefines revenue streams for these various actors, ensuring that business transactions do not only occur and end as single transactions at the point of sale as is the case in the traditional linear and unsustainable approaches (McAloone and Andreasen, 2006).

### Decoupling

The ultimate aim of eco-efficiency and eco-effectiveness is to decouple economic success from resource consumption to reduce the environmental impacts of production and consumption while enabling businesses to make profits and offer livelihood to customers. This has been effectively practiced, for example, in the motor industry through lean manufacturing, reducing the amount of resources used to produce each vehicle as well as negative environmental impacts. The results of this approach are benefits through resource and impact decoupling (see Figure 1). In resource and impact decoupling, economic growth is achieved through use of fewer resources and producing less environmental impacts (UNEP, 2011). Adopting strategies such as lean manufacturing, and developing capabilities towards sustainable business model innovation can enable manufacturing companies in Botswana, who are usually resource constrained, to grow in non-high production volumes related measures.

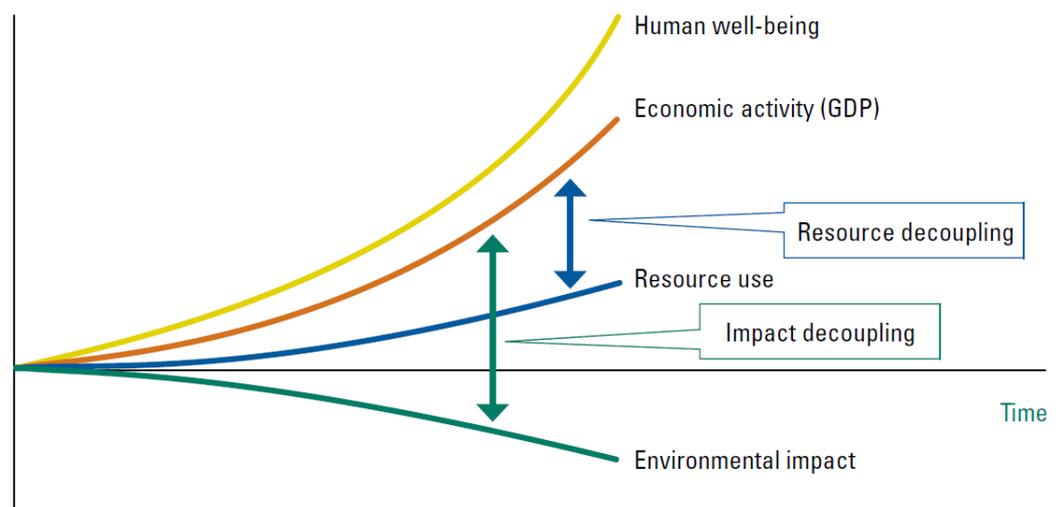


Figure 1. Resource and impact decoupling (UNEP, 2011).

The following three sustainable innovation business models support this argument on growth which is not based on high volumes of production, but on business sophistication led by design.

### **Social Innovation Business Models**

Social value can be created by solving social problems through new ideas that work at meeting social goals (Mulgan, 2006). All human needs have a social dimension to them. This includes needs met through profit making ventures. For example, Facebook is one of the largest and successful social innovations for networking and sharing life events with friends and loved ones. However, Facebook has over the years grown its revenue stream through various types of advertising (O’Neill, 2010). The benefit to millions of its users still stands, hence the definition for social innovation by Phillips (2009) - “Any novel and useful solution to a social need or problem, that is better than existing approaches (i.e., more effective, efficient, sustainable, or just) and for which the value created (benefits) accrues primarily to society as a whole rather than private individuals”. This definition implies there is some creative approach in order to make the solution better than existing ones. The edge in social innovations emanate from co-creation of value by all stakeholders for mutual social benefit rather than profit and the mere fact that the driver to innovate is social needs rather than opportunities to make money.

Social innovations such as metshelo, burial societies, lethafula and poverty eradication programmes, which exist in Botswana can be competitively organised. The services and functions offered through these social ideas can be improved and transformed through design. The idea behind design for social innovation is to develop and use new design processes, and co-design tools to scale-up, consolidate, replicate and integrate these small initiatives ‘with larger programs to generate large-scale sustainable changes’ (DESIS, 2016). In the process, new initiatives can be stimulated by proposing new visions and solutions for the future. These solutions can be co-produced and prototyped by designers, design students, design faculty and local communities who have a good grasp of social issues in their context.

### **Service Innovation Business Models**

The manufacturing sector has fully developed to a point of saturation globally, albeit stagnant in Botswana. Pressure to innovate towards sustainable development has led to manufacturers shifting their business focus from products to services (Mont, 2002; Roy, 2000). This has increased the domination by the service sector in most parts of the western economies (Baines et al, 2007), whose development and economic prosperity is still largely historically remembered as a result as the industrial revolution. Currently, the global economy requires radical transformation in services. Service design is increasingly becoming important for organisations that wish to transform or improve services they offer to their customers. Service design is commonly defined as “Design for experiences that happen over time and across different touch points” (ServiceDesign.org). Touch points are very crucial in designing services as they are the points of interaction between customers and service

providers (Clatworthy, 2011). For example, food restaurants operating across Botswana require a welcoming space, warm staff, ordering counters and pay points, dining tables, chairs and sometimes toilets. These are some of the important things that when well-arranged and organised, often lead to positive customer experiences. With the current use of mobile devices and electronic gadgets, some restaurants also offer free WiFi services to enhance the work and eat experience attractive to nomadic workers and socialites. The flexibility and controllable convenience in service innovations facilitates creation of new markets (Berry et al, 2006). Solutions such as eBay can be flexibly consumed outside the boundaries of time and place of where they are being produced. A recent development in this redirection in Botswana has been the promotion of eCommerce. This still need contribution from design to ensure the traditional strength of design in investigating and understanding user needs (Manzini and Vezzoli, 2003; Olyyn, 2015) is harnessed, thus safeguarding against failure of eCommerce interventions.

Focus on service experiences by society puts pressure on manufacturing companies to re-direct their innovation activities towards service-oriented differentiation. Service-oriented differentiation has increasingly been viewed to be “analogous with the shift from a manufacturing to a service economy” (Vargo and Lusch, 2008). A service differentiation strategy for manufacturing companies means value is now defined in less tangible terms and more in intangible and dynamic services produced and consumed simultaneously (Neu and Brown, 2005; Oliva and Kallenberg, 2003). This strategy makes services the core offering supported by enabling products rather than being add-ons to products as was the case in traditional product oriented strategies (Gebauer et al, 2011). Service differentiation depends on capabilities companies develop over time with their stakeholders (Matthyssens et al, 2006). A stakeholder relationship approach also means that revenue can be generated at different life cycle stages of the offering (Manzini and Vezzoli, 2003; Tan et al, 2006).

### **Product Service System Innovation Business Models**

Product Service Systems (PSS), also widely discussed alongside servitization (Morelli, 2003; Baha et al, 2014, Baines & Lighthouse, 2013) can be viewed as an integration of new product development and new service development (De Lille et al, 2012). By simultaneously addressing product and service components of value creation, PSS aims to shift the business focus “from designing (and selling) physical products only, to designing (and selling) a system of products and services which are jointly capable of fulfilling specific client demands, while re-orienting current unsustainable trends in production and consumption practices” (Manzini and Vezzoli, 2003). PSS is generally categorised as product-oriented (ownership of the product is transferred to the customer and additional services such as repair and maintenance, advice and consultancy and provided. An example is when a vehicle manufacturer sells to customers under

warranty and provides repair and maintenance within the warranty period), use oriented (ownership of the product remains with the provider and the customer pays for using the product. Car rental models are an example in this case. The customer pays for using the provider's car for certain hours or kilometers) and results oriented (the provider retains ownership of the product and the customer pays for final satisfaction. Dry cleaning services are a good example in this case. The customer pays for clean clothes and does not have to own a washing machine) (Roy, 2000; Mont, 2002; Manzini and Vezzoli, 2003; Tukker, 2004).

Product Service Systems is a business strategy that is based on continuous life cycle improvement taking into account the product and service life cycles (Tan and McAlone, 2006). In this way, the concept is representative of a holistic approach to sustainable innovation. Through this strategy manufacturing companies can undergo servitization to redefine value creation in non-product terms (Baines et al., 2007; Tomiyama, 2001). According to Tomiyama (2001) the value of this process of servitization is in intensifying service contents of offers to arrive at environmentally conscious design and manufacturing and create more added value in future advanced societies. A view of the whole landscape of the problem, the environment in which the problem is being investigated, relationships between factors causing the problem and possible factors that might lead to a solution is necessary in this holistic view especially if looked at from the design perspective. A whole system design approach is necessary to aid such decisions (Fiksel, 2006) and move design away from its traditional focus on material products (Morelli, 2003). The position of product service systems in a systemic context can be articulated in terms of the tangible and intangible value that requires an environment, provider, consumer and a product to facilitate its provision (Tomiyama, 2001).

### **Success Factors for a Sustainable Business Model in Botswana**

This section answers the question; which factors determine success possibilities for a sustainable business model to grow the manufacturing industry in Botswana, contributing in the transition towards a sustainable society? Of the three business models discussed above, product service systems are the most promising path for manufacturers since there is still need to manufacture a product, which traditionally is the core value proposition in a manufacturing setting. Issues that determine whether a PSS strategy can work for the manufacturing industry in Botswana or not, are analysed. Since most manufacturers in Botswana are SMEs (Rapitsenyane, 2014), the analysis focuses on growing these small businesses. These should not be treated as panacea but could substantially grow the manufacturing industry in line with global developments in the manufacturing industry. However, the dematerialisation benefit of the PSS strategy is important in reducing the number of units to be manufactured for meeting customer needs. The benefits of PSS for

manufacturing companies are summarised in Table 1 and the analysis of success factors is presented in the remaining sub-sections.

Table 1. Benefits of PSS

<b>Benefits</b>	<b>Supporting literature</b>
Increased competitiveness	Besch (2004); Martinez (2009)
Low environmental impacts than product oriented models	Bianchi et al (2009); McAloone & Andreasen (2004)
Dematerialisation	Hernandez Pardo, Bhambra & Bhamra (2011)
Encourage creating collaborative networks	Sundin et al (2009); Moreli (2003)
Increased social responsibility	Morelli (2003); Hernandez Pardo & Bhamra (2011)
Intensified product use	Tukker (2004); Tukker and Tischner (2006)
Increased customer loyalty	Tukker (2004); Hernandez Pardo & Bhamra (2010)
High profits	Bianchi et al (2009)
Savings in time and costs	Hernandez Pardo & Bhamra (2010); Manzini & Vezzoli (2003)
Creates employment	Liu et al (2010)
Increased value through user experience	Clark et al (2009); Baines et al (2007)

***The value of understanding the context***

The motivation to adopt sustainable PSS in a predominantly product oriented environment depends on contextual dynamics. The collaborative nature of PSS means that there should be common goals between various actors, demonstration of win-win scenarios for partners and an effective common language to enable effectiveness of the development process. This joint enterprising impacts on and is heavily influenced by the socio-economic environment of the PSS provider and users. For a traditional product manufacturer novice working with this web of actors, redefining what a product means is the first headache. This is especially applicable in the case of SMEs, who usually operate in isolation. Defining relationships is among the biggest barriers for PSS adoption (Bianchi et al, 2009; Tan et al, 2006). Other barriers directly linked to the relationship definition problem include fear of customer reaction and communication of support materials for the transition from concept to practice. Building a relationship that can enable positive and welcoming reactions from customers require a lot of support firstly in developing strategies that can learn from the already existing service industry

and how the PSS concept is packaged and communicated to potential stakeholders.

Discussion of these issues is centred on understanding the socio-economic contexts in which these SMEs operate. Findings of a Delphi study conducted by Rapitsenyane and Bhamra (2013) have provided insights on this issue. The Delphi study extends the debate of suitability of Product Service Systems and its benefits especially competitiveness for manufacturing companies, particularly SMEs, in developing countries. The experts' contributions provided a holistic picture of what a competitive PSS strategy could comprise of in the context of small companies operating in a developing country such as Botswana. The need for a business strategy that not only commits SMEs in developing countries to their businesses, but also builds a dynamic culture of innovation resourced by multi-disciplinary knowledge from collaborations and partnerships seems to be a collective position of the experts. Kayawe (2011) shares the same view as he reports on the skills compliment benefits of an integrated approach to supporting SMEs in Botswana especially by government institutions and the private sector.

Although some authors such as Baines et al (2007) note PSS as 'potentially valuable for manufacturers based in developed countries', the experts support for the concept in a developing country such as Botswana is in light of Manzini and Vezzoli's (2002) position about PSS in developing countries. Manzini and Vezzoli see PSS as a strategy that can contribute to industrial development in developing countries at a service-economy level. This is an interesting view on redefining development from the perspective of both manufacturers and consumers. For customers, there is an opportunity to perceive wellbeing defined in non-product ownership terms as opposed to the destructive unsustainable trend of more material product acquisition. For manufacturers, this 'new' position of development characterised by product ownerless users and services has potential to provide environmental and economic benefits for SMEs who often are resource constrained.

### ***The need for a mature service culture***

From this paper the service component of PSS can be viewed as an opportunity for SMEs to improve their competitiveness as differentiation through services becomes more important than through product offerings. A mind-set change is crucial as customers need to be convinced of the value of satisfaction through non-product ownership where it was previously achieved through owning a product. An understanding of users' values and behaviours is critical to enable manufacturers to channel their PSS ideas towards offerings that will be acceptable in a service context. This may not be a concern for countries in Europe such as Norway where a service culture is already at its maturity stage (Gloppen, 2009) or in developed countries as generally argued by Baines et al.,

(2007). From the manufacturers' point of view this is a cause for concern in contexts where a service culture is still developing. A feeling of scepticism about acceptance of their PSS offerings is a barrier for adoption.

Lessons from successful service industries both locally and internationally need to be populated then fragmented for SMEs to understand and appreciate PSS. From findings of a workshops-based study reported in Rapitsenyane (2015) this is an invaluable approach to win SMEs buy in of PSS, especially successful service scenarios they know. A skilful combination of these examples with other existing successful PSS examples where a service culture is still upcoming or already mature can help promote service oriented innovation. SMEs at the same time will also need a conviction of the economic benefits of PSS. The key driver for SMEs to adopt PSS is usually its economic value (Hernandez-Pardo et al, 2012). Even though the goal is to achieve sustainability across all the triple bottom line aspects, environmental and social sustainability benefits of PSS need to have significant economic benefits. This is because SMEs generally have financial difficulties and are easily distracted from developing a business strategy due to their need to make money. This is generally for the purposes of keeping the business surviving. Advocacy for PSS from influential bodies such as government, through policy interventions to promote servitization of manufacturing need to be a priority. This move will entice SMEs to promote a service culture for their customers through adoption of service oriented strategies such as PSS.

### ***A positive mind-set can be built through design***

The contextual difficulties described for example in Temtime (2008) about small businesses in Botswana outline topical concerns that require strategies to address the mind-set issue of manufacturers being service providers. Responsiveness of these strategies to these contextual dynamics is crucial for PSS to be effectively adopted, lest it faces the risk of rejection viewed as an irrelevant and foreign concept. In this paper, the role that could be played by design is proposed as pivotal for PSS adoption when used as a strategy to address competitiveness concerns of SMEs. The Systems Success Framework (SSF) presented by Rapitsenyane (2014) captures this approach also in the context of sustainable design, and is further explored in order to be able to identify how design can influence SMEs adoption of PSS through its capabilities. The main influence from the Systems Success Framework begins with availing designers with sustainable design capabilities.

Underrepresentation of design in SMEs has also been argued by Mozota (2002; 2006) and Acklin (2013), however with a particular focus on design management. In terms of competitiveness, there was complacency observed in SMEs as reported in Rapitsenyane (2014). When a smaller sample of the same SMEs was engaged in creative workshops reported in Rapitsenyane (2015), design engagement opened new opportunities for them and they began to see

that there was a lot they needed to do. This supports Mozota's view of design as transformer where design is used as a resource to create new business opportunities and improve the company's ability to deal with change. Acklin's notion of design leadership in SMEs was also demonstrated when SME participants were engaged with designers, they were able to combine their own expertise with newly acquired design expertise. In the process they were able to build capabilities such as defining new PSS business opportunities and working iteratively with designers throughout using design tools to support their decision making process (Rapitsenyane, 2015).

The use of design for PSS adoption in this paper is an extension of arguments advanced by McBride (2011) and Manzini and Vezzoli (2003) who still contend underrepresentation of design at a strategic level. Further, a close-up position is adopted following Gloppen (2009), in terms of design leadership in service industries. Developing design leadership capabilities for PSS in product-oriented SMEs is the pinnacle of a servitization strategy for manufacturing companies. These capabilities have been found to be useful at different stages of SMEs' innovation process.

The traditional interpretation of design creativity and imagination is in making products look nice and different. This is mainly from the ability of design to look for possibilities that may have not been explored before. Transferring this capability in the business context means not only focusing on the product but the entire innovation process, especially early stages where identifying business opportunities as an entrepreneur is critical. Scanning of the external environment requires some creative intelligence. Even though business tools are still needed for this process, a design attitude is needed to provide a unique mind-set to problem solving. The idea behind business innovation is to have customers who can buy and use the offering. This attitude aims to make the world a better place and using it in manufacturing SMEs to identify PSS opportunities is critical to instil the ability to think differently.

### ***Competitiveness and entrepreneurship development***

While cheap imports from Asia may be difficult to match through traditional manufacturing due to high manufacturing costs in Botswana, complacency could be addressed through fostering sustainable innovation in SMEs (Rapitsenyane et al, 2014). This could improve brand awareness as offerings from each SME begin to have different identities. Although the issue of competition and innovation has also been identified in entrepreneurship development approach of the local support network (LEA, 2009), there is no clear strategy of how these could be addressed. This type of support in LEA also marginalises micro SMEs who are referred to as social enterprises.

According to Gray (2006) competition, innovation and reputation are among some of the reasons why businesses get interested in triple bottom line. These reasons are in agreement with problems affecting market performance of SMEs (Temtime, 2008; Rapitsenyane, 2014). In addition to this congruency, the motivation for most businesses to engage in sustainability is usually economic in developing contexts. This has also been a view held by Maxwell and van der Vorst (2003) who argued that social and environmental sustainability were the motivation for sustainability in developed countries as opposed to economic sustainability in emerging economies. A positive perception of sustainability and embracement of sustainability practices such as remanufacturing, recycling, reuse of cut-off materials, and new non-product based value could be practical targets to drive competitiveness and general development of enterprises as innovation activities are centred on these sustainability initiatives. This approach could address SMEs' economic sustainability concern at the same time building environmental and social sustainability.

### ***The role of support intermediaries***

The relationship between SMEs and government through the support network administered by the government agency (Local Enterprise Authority (LEA)), has a lot of potential in supporting sustainability and PSS initiatives. The relationship between LEA and SMEs in Botswana has been ranked in the Delphi study among high priorities in strategies for achieving of PSS as a competitive strategy for SMEs in Botswana (Rapitsenyane and Bhamra, 2013). In Klewitz and Hansen's framework of sustainability oriented innovation (2011), such relationships have been categorised as mechanisms of influence, with such potential as fostering sustainable business models and process and product innovations. These mechanisms of influence provide an important link between knowledge transmitters and other value chain partners with SMEs. This approach has been used largely to promote sustainable design practice in SMEs in the UK (O'Connor and Cox, 2005). An extension of this role to sustainable PSS support needs definition of a path defining the stake of support intermediaries.

The role of the support intermediaries could be at three levels; infrastructural, institutional and in facilitating interactions and networking for member SMEs. This position is in line with the systems failure rationale suggested by O'Rafferty et al (2009) suggesting that it makes provision for addressing infrastructural and institutional deficiencies for ecodesign interventions. In this paper, the role of support intermediaries such as government institutions is proposed to be key in facilitating SMEs' innovation activities through provision of necessary support interventions for SMEs under their custody. An example of this facilitative approach has been shown in Rapitsenyane (2014) where government has provided financial support for SMEs on subsidy schemes of 85% to 15% for SMEs' training needs on development of their business. This is an example of an infrastructural support and it comes early as it provides for basic skills needed in

business development.

Through this vein, SMEs' problems associated with design reported by Rapitsenyane (2014) demonstrated an infrastructural deficiency which can be combated through collaborations with designers. The informal business structure of SMEs, lack of strategy and their financial constraints would impair them to handle these collaborations. In this case support intermediaries can operate as a hub of these collaborations by sourcing and supplying designers and other infrastructural needs. This may be a situation that requires prioritization between setting up infrastructural provisions and providing a supportive environment for collaborators involved. LEA already has similar institutional provisions (Rapitsenyane, 2014), which can be translated into the context of supporting SMEs towards sustainable PSS.

### Conclusions

A different perspective of developing the manufacturing industry in Botswana has been proposed in this paper as one that promotes strategy development in traditionally product oriented SMEs by encouraging a shift towards sustainable PSS. Understanding contextual priorities is key for this approach towards SMEs' competitiveness to be successful since a panoramic view of the whole systemic elements that can foster success defines the point of departure. The contributions from this paper should be carried forward within the framework of (1) Understanding the context of Botswana such as lack of self-drive and commitment to entrepreneurship by local SMEs, (2) Systems thinking such as providing clarity to essential communication networks and systems defining interactions between stakeholders, (3) Design thinking such as encouraging strategies to facilitate identification of outsourcing niches and product/service differentiation, and (4) Sustainability practices including exploring the use of locally available resources in developing PSS offerings.

These priorities should be explored across systemic categories such as infrastructure, institutions, interactions and networks, SME capacity and culture. This web of systems success highlight the significance of sustainability and an integrated approach to PSS development by bringing together among others infrastructural issues concerning design such as creating awareness of emerging design for sustainability trends, institutional issues concerning relationships such as developing structured and coordinated partnerships to engage designers, and SME capacity issues concerning PSS including exposing them to design tools and methods to aid PSS development. This systemic approach can promote development of a service oriented competitiveness strategy by SMEs with particular attention being paid to the significant role design capabilities can play in a traditionally product oriented non-design led organisation. The long term gains of sustainable PSS can then be realised as organisations become grounded in design leadership capabilities enhancing their ability to move to a more

service oriented business practice. These issues are strong recommendations for policy makers to consider. A policy environment could ensure mobilising resources appropriately and engaging relevant stakeholders in a structured and coordinated manner.

In conclusion, the proposals presented in this paper have allowed understanding of fundamental issues to be considered if the manufacturing industry is to grow in Botswana. This paper has also stimulates dialogue about the role of design in this journey. Using designers with sustainable design knowledge could promote principles of eco design, dematerialisation and life cycle thinking principles to cope with challenges of a small industry and a small market that Botswana is faced with. Competing in the global markets requires strong local industries and markets that operate at global standards. Finally, it can be concluded that the catalytic advantage of design lies in its flexibility to relate to the technical language of innovation and the non-technical language of business. However, caution should be taken in this regard to use design as panacea as other business development considerations still need to be addressed.

#### Guidelines for Applying Research to Practice

- **Develop design leadership capabilities.** Design leadership capabilities would come in handy early in the innovation process, when the organisation makes decisions of whether to manufacture a product to sell for ownership or not. Design capabilities should then be deployed with a deliberate intention to explore PSS opportunities early. This will encourage a product ownerless culture among consumers, leading to a more dematerialised society. Design leadership would encourage collaborations to contain competition and work with relevant stakeholders to add more value to the offering.
- **Identify priority niches in the market to build a business case for servitization.** Conduct user research using design research methods to understand and explore user needs in existing and new markets. This would help identify opportunities for servitization which make business sense over a long period of time.
- **Develop a design-led service oriented competitiveness strategy.** The innovation potential in a design-led strategy is high and keeps the strategy flexible, yet structured. The strategy would accommodate provisions for avoiding the rebound effect and designing out failure.
- **Create necessary knowledge for the strategy to be successful in a service and knowledge intensive economy.** PSS is a knowledge intensive strategy. It is also an opportunity to apply business sophistication with locally available resources and technologies. Create service/product development, differentiation, competition, consumption and lifecycle knowledge among employees, stakeholders and customers to maintain control on the entire life cycle of the service and associated products.

- **Create supportive policy frameworks.** At a company level, a rewards and incentives policy for employees, stakeholders and customers who drive the strategy and consume PSS offerings should be developed to encourage uptake and diffusion of the strategy and related offerings.

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