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Comparing internal and external impacts of sustainable innovation: an exploratory study



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Abstract

Sustainable business impact is growing within the field of impact assessment, however, the field, specifically in regard to Entrepreneurship, would benefit from theory based on comparisons of external and internal impacts of environmental and social innovation. This exploratory study bridges this gap by analyzing an aggregate of case studies of sustainable innovation. Significant differences were found in comparing forms of innovations where product focused innovations favored the environment and service or new business usage innovations favored society. Significant differences were also found in comparing external impacts where either a reduction of waste or an increase in clean energy favored environmental innovations while benefits for under-served populations or improvements in markets favored social innovations as expected. The comparison with the internal impacts showed an increase in revenue and sales favored both types of innovations yet a significant difference was still found between the two. Suggested theories for future research are provided.

Keywords: Sustainability, Impact assessment, Corporate social responsibility

Background

Interest in sustainability has been on a rise in recent years, most notably among small and medium business managers, corporate executives and other practitioners alike (Center for Corporate Citizenship at Boston College 2005; Economist, 2005). With this increasing interest for practitioners, researchers have an opportunity to study a relatively impactful field within business. However, along with this comes the problem of measuring the impact of sustainable ventures (Pope et al. 2004). What are lacking are guiding theories needed to understand both the impacts of sustainable innovation on the environment or society and how these innovations benefit Small and Medium Enterprises (SME) to help managers with strategic decision-making.

This study attempts to develop these initial theories of impact assessment through a comprehensive look at themes across 141 case studies of sustainable innovations. Using thematic analysis to identify trends, comparisons are then made between two types of innovations, environmental and social, within three thematic areas: the forms of innovations, the external impact on society or the environment and most importantly the internal impact on the business.

Research on sustainability practice has been limited to single case studies, which limits outcomes to those specific situations and cannot provide a general understanding of sustainable impacts (see Holliday, 2001; Mirvis & Googin, 2006). For example, an environmental company that has reduced costs may provide a good example of a sustainable business but cannot tell us if this is typical of environmental companies or unique to this one instance without comparing it to other environmental and social companies. That comparison is what can yield useful theories of sustainable impact for managers and a stepping-stone for future research into the field.

For this reason, this study takes a large picture view of sustainability by looking at an aggregate of case studies, which highlight social or environmental benefits that have produced business benefits in the process. However, no hypotheses are made as this study is meant to be purely exploratory as a means to map out what is being done in practice. Theories are developed from an analysis of the results.

Given the emphasis placed on the environmental factors in sustainability literature it is important to clarify the distinction made here between environmental and social sustainability. When looking at sustainability impact assessment, having a clear understanding of the differences between environmental and social sustainability is critical as it provides the context within which the assessment and comparison takes place. To address this, this study begins by providing a direct comparison of what is being practiced in each area of sustainability. This will inform the latter half of the study where the impacts of each are identified and assessed for the purpose of providing a better understanding of the outcomes of those practices.

Sustainability and entrepreneurship strategy

When discussing Sustainability and Entrepreneurial Strategy it is important to understand the increased significance it has for SME's but before that we must understand what is Sustainability. Sustainability's early definition was often associated with just the preservation of the environment (Anderson, 1998; Hart, 2007; Hart & Milstein, 2003; Hawken, 1993; Schmidheiny & Zorraquin, 1996; Winsemius & Guntram, 2002) and societal concerns have been associated more with Corporate Social Responsibility (CSR) (Burke & Logsdon, 1996; Wood, 1991), a concept that the commonly accepted and more current model of sustainability includes as part of its definition (Laszlo & Brown, 2014); the so called Triple Bottom Line (TBL). The TBL model of sustainability places equal importance on three factors in strategic decision-making: the environment, society and the economy (Elkington, 1994; Gibson, 2001). Given that the economic needs of all stakeholders can be served when companies act in harmony with society and the environment (Bright, Fry, & Cooperrider, 2006; Laszlo, 2008; Laszlo & Brown, 2014) sustainability brings about two areas of interest specific to entrepreneurs.

The first is the essential benefit to the business. Economic profitability is imperative as it ensures the continued prosperity of the business (Jackson & Nelson, 2004). When Sustainability and/or CSR becomes part of a company's strategy, it has to support core business activities as well as contribute to the effectiveness of accomplishing the company mission (Burke & Logsdon, 1996; Flammer, 2015). To do this, it must contribute to value creation, what Burke and Logsdon believe to be the most critical objective of any business and its strategic decision-making process (1996). They identify five dimensions along

which this should take place. The first of these is Centrality: the degree to which a CSR program fits with the company's mission and objectives (Ansoff, 1977). It provides direction and allows entrepreneurs to see if a given action or decision is in line with the company mission, goals or specific objectives (Laszlo & Zhexembayeva, 2011).

The second dimension, Specificity, looks at the degree to which an organization can capture and internalize the benefits of CSR. This dimension focuses on the competitive advantage created or captured by a CSR initiative (Santos, 2012) as opposed to creating a collective good that anyone in the industry can use (Porter, 1985; Rumelt, 1980). It is this dimension that the comparison with internal impacts attempts to explore in identifying exactly what benefits SME's can and are internalizing. The third dimension, Proactivity, is the degree to which CSR activities are planned in anticipation of economic, technological or political trends (Andrews, 1980; Cooper & Schendel, 1976). Early recognition of changes in the business environment will allow companies to choose CSR programs that will better position the company to take advantage of those changes. It is expected that the guiding theories developed from the results of this study will aid in the proactivity of businesses.

Voluntarism is the fourth dimension and it deals with the scope of discretionary decision-making available to a company absent of any externally imposed regulation or compliance requirements (Burke & Logsdon, 1996). This means that SME's are able to take on CSR activities willingly and thus are able to control the implementation of the activity so that it conforms to their missions and goals. There is a link to Proactivity as well since in order to be proactive companies must also be able to anticipate potential regulations as well as control their own ability to implement future plans.

The final dimension, Visibility, is somewhat self-explanatory. It is the ability of a company to gain recognition from all stakeholders for either itself or the CSR program implemented. According to Burke & Logsdon (1996), CSR activities will tend to have less negative visibility than other business activities may, which can play into the strategic plans of a company related to good will, brand identity and employee attraction.

The second area of interest is the impact on non-shareholder stakeholders (Freeman & Phillips, 2002; Jackson & Nelson, 2004). Strategic CSR initiatives will incorporate long-term investment characteristics, like any other business initiative, that yield the highest total payoffs in terms of collective benefits to the company and its stakeholders (Burke & Logsdon, 1996). Here, environmental and social concerns are taken into account in these investment characteristics when forming strategic plans. This ties directly to entrepreneurial strategy in that it aids in resource acquisition, opportunity recognition and market creation.

Resource constraints are a hallmark of entrepreneurship and so Entrepreneurial Strategy is highly affected by the few resources with which entrepreneurs must begin (Hallen & Eisenhardt, 2012). Therefore, entrepreneurs find ways to deal with the lack of resources early on through several strategies including seeking partnerships to obtain financial capital (Katila, Rosenberger, & Eisenhardt 2008) or securing financial resources from outside parties (Martens, Jennings, & Jennings 2007; Zott & Huy, 2007). To increase their chances, entrepreneurial ventures must stand out and show strong potential. Having guiding theories based on an aggregate of cases identifying successful strategies would greatly benefit entrepreneurs in both time and decision-making.

Further, Entrepreneurship Strategy requires the creation of markets and the recognition of opportunities. The nature of entrepreneurship requires an understanding of how to create markets (Venkataraman, 1997). This often involves connecting with broader societal themes in order to open new markets (Rindova, Ferrier, & Wiltbank 2010). Sustainable innovation plays directly into this strategic decision-making by offering new markets and so an understanding of how that looks is imperative for SME's seeking to create markets or expand into new ones. This in turn connects with opportunity recognition in that seeing the potential opportunities as they have been capitalized on before may provide for better opportunity recognition in the contexts of other businesses. Effective entrepreneurial strategies require better-informed decision-making to adapt to often-ambiguous market conditions so entrepreneurs can exploit the most valuable opportunities (Rindova & Fombrun, 2001).

To do the above, companies must create shareholder and stakeholder value simultaneously or what is known as Sustainable Value (Laszlo & Zhexembayeva, 2011). Sustainable value is becoming indispensable in business operations because it takes advantage of new market realities. When businesses integrate both shareholder value and stakeholder value into their strategies they can reap the benefits through gaining competitive advantage in a marketplace that has changed to the point where both values are inseparable. Focusing only on shareholder value, as is most commonly associated with the purpose of business, will no longer provide any competitive advantage as the market has internalize the demands of civil society. Stakeholder value is increasingly becoming a driving force for economic development and thus needs to be integrated with shareholder value in entrepreneurial strategy (Laszlo & Zhexembayeva, 2011). Therefore, managers can benefit from understanding what has been successful before and what potential rewards they may receive.

Sustainable impact assessment

While environmental impact assessment has been around for over 40 years only recently has it been modified to include the concepts of sustainability and sustainable development (Esteves et al., 2012; Gibson, 2001; International Association for Impact Assessment 2002; Morgan, 2012; Pope et al., 2004; Verheem, 2002). Even with this new trend, sustainable impact assessment in its current form focuses on the impacts to society (Morgan, 2012), human health (Harris-Roxas et al., 2012) and/or the environment (Esteves et al., 2012; Pope et al., 2013; Rozema & Bond 2015; Verheem, 2002) but there is an important aspect of sustainability that requires deeper exploration: the internal, business outcomes of the sustainable initiative on the company. While some large companies mention how they have benefitted from sustainable initiatives in their annual reports, most discussions on internal business impacts are on the conceptual level in terms of economic indicators that should be focused on (Dyllick & Hockerts, 2002) rather than delving into the actual observed impacts. Sustainable impact assessments require, at minimum, equal focus on and clear articulation of social, environment and economic dimensions (Morrison-Saunders et al., 2014, emphasis added).

Impact assessment is relatively well known but Sustainability Impact Assessment requires some explanation. Verheem (2002) defines the aim of sustainability assessment as ensuring that "plans and activities make an optimal contribution to sustainable

development” (Sala, Ciuffo, & Nijkamp 2015: 314). Devuyt (2001) provides a better definition by stating that sustainability assessment is “a tool that can help decision-makers and policy-makers decide what actions they should take and should not take in an attempt to make society more sustainable” (pg. 9). While a good start, these definitions are somewhat vague in terms of what the process of assessment entails (Pope et al., 2004). The above simply provide a general image of what sustainability assessment should be but with something this broad more specificity is needed in terms of actual outcomes.

Pope et al. (2004) present two types of sustainability assessments adapted from current environmental assessments. The first is known as an Environmental Impact Assessment (EIA). EIA is an assessment that measures outcomes against some baseline. In this way, it is much like a base-line measure in accounting that heavily draws upon the TBL model (Pope et al., 2004). Goals are set for each of the three pillars and used as baselines for the assessment to compare against. While EIA has some merits, Pope et al. (2004) believe it is a limited view of sustainability assessment as it can assume competing interests among the three pillars of sustainability: environment, society and economics. In this way, one looks at the three as individual goals and in some cases must choose which of the three to optimize rather than acknowledging the interdependence among them.

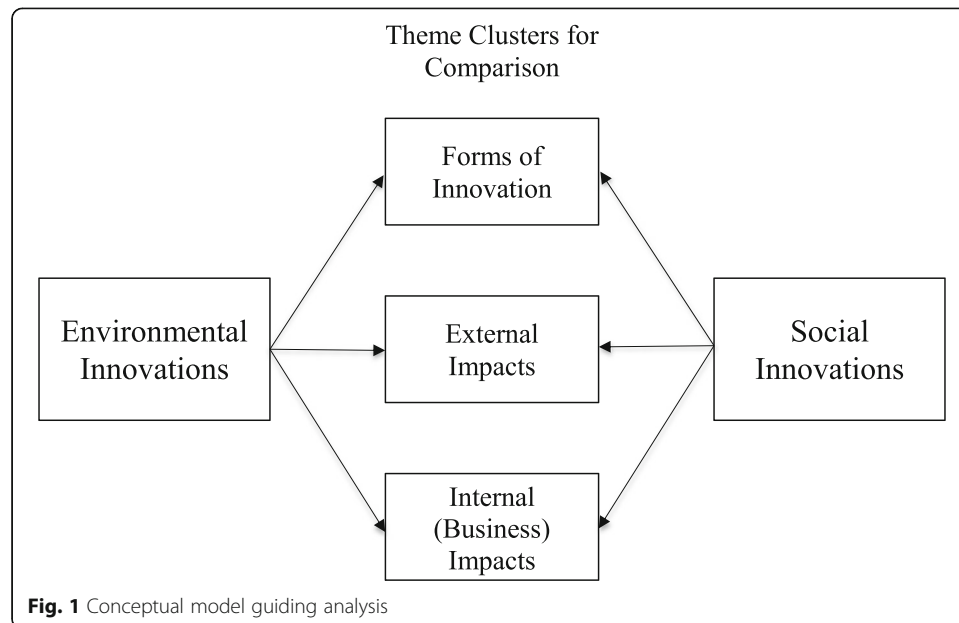
The second type they describe is a Strategic Environmental Assessment (SEA). SEA is more of an objective-led approach to assessment whereby certain aspired outcomes are set and assessments are measured against them. The difference here is that SEA “promotes the use of a principles-based approach” (Pope et al., 2004: 610) where criteria are derived from sustainability principles (Gibson, 2001). By maintaining sustainability principles in the assessment and not goals set in stone, interconnections between the pillars are emphasized rather than trade-offs between them. It is through this view of sustainability assessment that theories can be developed to guide both Entrepreneurs in strategic decision-making and researchers in further testing and refinement.

Stories of sustainable business innovations were examined using the thematic analysis methodology to explore the connections and relationships between environmental, social and economic impacts. The questions posed guiding the theory development are: what are the differences between social innovation and environmental innovation and, more importantly, what are the differences in the impacts associated with these types of innovation, both internally and externally? Answering these questions will add to the theoretical foundation of the field of sustainability assessment and further research into impacts of sustainable innovation through a study of practice. Figure 1 below presents the proposed conceptual model.

Methods

Data

It is impossible to draw substantive conclusions from comparing a single social innovation and a single environmental innovation as the findings will be too contextual. Rather than take a single case approach, this study aims to analyze multiple cases in order to expand our understanding of sustainable impact assessment on a level where theory can be developed. In this way, the pitfalls of “radical particularism” can be



avoided by providing a deeper, generalizable understanding and explanation beyond the specifics of a single case (Firestone & Herriott, 1983).

To this end, an aggregate of case studies are analyzed in order to better understand the phenomenon of sustainable impact assessment and not just a particular impact. A “cross-case analysis” is conducted in order to approach generalizability (Miles & Huberman, 1994) and to discover the applicability of the findings in real-world settings. Further, cross-case analysis is utilized to deepen our understanding and explanation of sustainable impact assessment, which can only be done with multiple cases (Miles & Huberman, 1994). Glaser and Strauss (1970) suggest that multiple cases help in understanding the conditions under which a finding occur and how those conditions may relate, which can then lead to theory.

Case studies were obtained from an existing database of innovations for the mutual benefit of business, society and/or the environment collected over a 4-year period (World Inquiry Innovation Bank). Cases specifically profile businesses that have implemented some form of business innovation that created a business benefit while also providing an environmental or social benefit. The latter two are common in the business world but the former, the business benefit, specifically excludes philanthropy. The reason for this is to highlight organizations that are creating business benefits through providing external benefits.

The database consists of over 3000 submitted stories of which 141 were approved for publication and thus serve as the data set for this study. Stories had to demonstrate both an environmental or social benefit as well as a business benefit. The low acceptance rate is mostly due to stories not specifying the latter. Stories come from interviews conducted with key individuals within the organizations who have direct influence over the sustainable innovation (i.e. business owners, sustainability managers, etc.). Submissions are written based directly on interviews, mostly as class/program assignments from several universities offering sustainability courses but open submissions are also allowed. The assignments themselves are to submit stories following the provided guidelines and

grades are not dependent upon acceptance and publication to the website. However, a standard interview protocol is provided so that all interviews are conducted utilizing the same set of questions with responses recorded accordingly. Stories are submitted via an online submission form with specific guidelines based off the specific topic areas covered in the interview protocol.

Further, to ensure uniformity of submissions beyond just a standardized protocol, an editorial board reviews the stories to ensure criteria for profiling are met. Board members are made of Graduate Students and a faculty advisor. Before joining, each member is provided a guideline for membership that explains responsibilities and is provided training on the process of choosing stories to ensure quality. Once agreed upon, stories are assigned to a member of the board to condense and summarize key points within each topic as well as correcting grammar and spelling errors in the initial submission. Summaries are meant to highlight key ideas by removing extraneous information, such as background information on the interviewee or industry information outside the scope of the specific organization. The summarizing process does not limit or bias the data as it is meant to clarify information, which actually helped in the thematic analysis. A final review of approved stories is conducted by a tenured faculty member before publication to the Internet. This two-tiered review approach allows for uniformity and consistency among published stories.

Thematic analysis

A tension exists when aggregating case studies between the unique aspects of each case and the more universal phenomenon that is the focus of the research (Silverstein, 1988). This study intends to explore the latter but to overcome the particularity of each case, a thematic analysis is conducted in order to foster cross-case comparisons along general themes found among the cases. By doing so, generalizable theories of sustainable impact can be developed from multiple, unique cases of sustainable innovation. In this way, a systematic means of observing sustainable phenomenon is achieved (Boyatzis, 1998).

Before analyzing the stories, a clear differentiation had to be made between what is considered an environmental innovation and what is considered a social innovation. The delineation was made in accordance to what the primary purpose of the innovation was. If the purpose was to benefit the environment then it was considered an environmental innovation. If the purpose was to benefit society or people then it was considered a social innovation. This may seem self-explanatory but for a number of stories this clear and direct method of discerning the type of innovation was necessary as some cases included both.

For example, one story highlighted a company that created an innovative method of providing investment opportunities in environmentally friendly companies. The investment company profits from investments the same as any investment company but by providing opportunities to invest in environmental companies, it is targeting a specific market while also looking to provide funding to other companies working to benefit the environment. This innovation, however, is considered a social innovation because the innovation itself is meant to provide a benefit to individuals looking for alternative investments. The primary purpose of the innovation is to benefit people and not the environment because the innovation itself has no direct effect on the environment.

Alternatively, another story describes a drycleaner that uses environmentally friendly cleaning supplies. Having to use a great deal of cleaning supplies in its business, the drycleaner sought environmentally friendly, and still cost effective, cleaning solutions that can be washed down the drain with little to no impact on the water supply. This innovation is considered an environmental innovation because the primary purpose is to reduce the harmful effects of synthetic solvents on the water supply. The service provided to customers is the primary business of the company but not the primary purpose of the innovation.

To conduct the thematic analysis a code had to be developed consisting of a list of themes that, for the purpose of this study, are simply patterns found in the stories that describe and organize observations (Boyatzis, 1998). There were a total of 141 stories, 59 of which were on environmental innovations and 82 were on social innovations. To create the code, a representative sample of five cases was drawn from each of the two categories of stories. Using the inductive, data-driven method (Boyatzis, 1998), a code was developed along three clusters: Form of Innovation, External Benefit and Internal Benefit. Through open coding, the code was further refined during the process of analyzing all the stories. Table 1 provides the code organized by cluster along with the definition of each theme.

The process of coding consisted of reading through each story identifying key information related to the three clusters. For example, the below excerpt was taken from a story on a shoe company that provides a pair of shoes to a child in need for every pair of shoes sold through the company. The items in bold indicate phrases signifying information used in the coding of this story.

The organization's undying commitment to help the children around the world and its unique shoe design form a potent combination that **uses the force of business for generating societal benefit**...In what the organization calls 'shoe drops,' **they match every pair of shoe purchased with a donation of a pair to a child in need.**

The first bold phrase, "uses the force of business for generating societal benefit", is an indication that the purpose of the innovation is to benefit society so this story was categorized as an example of a Social Innovation. The second bold phrase, "they match every pair of shoe purchased with a donation of a pair to a child in need", is an indication of the form of the innovation; in this case a new use of business. Since there was neither indication of producing a new type of shoe nor any indication that the shoes themselves provided the benefit, there was no coding for the theme "New Product". Rather, the normal function of the business, selling shoes, was used in a new way to produce the benefit and thus coded as a "New Use of Business." For coding of the external and internal impacts, the below excerpts were used.

Since TOMS was founded in May of 2006, **it has given over 100,000 pairs of shoes to children in Argentina and 50,000 pairs in South Africa.** The projected figures for 2008 are 200,000 pairs of shoes to children in need around the world.

Table 1 Themes and definition

Form of innovations	
Theme	Definition
New Use of Existing Product	Company found a new way of using an existing product
Production Process	Company improved on a production process in order to produce the same product but in a better way
New Service	Company offers a new service (as opposed to a new product) that was not previously available
Education	Company provides education in the form of classes or goes into the field and speaks directly with stakeholders
New Product	Company began offering a new product (as opposed to a new service)
New Partnership	Two companies or a for-profit and not-for profit enter into a working agreement
New Use of Business	Company is using its existing business in a new way without changing product or service
External impacts	
Reduction of Waste	Company reduced amount of environmentally harmful waste created or disposed
Increase in Clean Energy	Company provided a clean energy alternative to a population/area
Job Training	Company provided job training to group/population to increase likelihood of job placement
Benefit to Local Population	Company provided some benefit (jobs, markets, access to resources, etc.) to a group that would not have otherwise had access to or recently lost these benefits
Improved Market/Product	Company provided an improved product or opened a market for existing products to a group of people outside the company
Health Benefit	Company provided some good or service that reduced the risk of illness or improved the health of a group of people outside the company
Internal impacts	
Decreased Costs	Company costs were reduced
Increased Revenue/Sales	Monetary gain to the company in the form of increased revenues and/or sales
Reduction of Regulation	Company was able to avoid the need for government regulation
Recognition	Company received public recognition of some form or received an award
Education	Company provided education to employees to increase the quality of its workforce

Selling the shoes online helped the company grow rapidly. While the margins are still lower than a traditional shoe company, the publicity generated by the *raison d'être* of the organization has provided the impetus for the ever-expanding customer base.

The first bold phrase here, “it has given over 100,000 pairs of shoes to children in Argentina and 50,000 pairs in South Africa”, indicates an external impact coded as a “Benefit to the Local Population”, because it mentions a benefit and indicates the populations where that benefit was provided. Here, there was no health benefit mentioned in the phrase nor any indication of an improvement in the market as these regions were not said to be markets for the shoes, just the regions targeted for the benefit provided by the company. The second bold phrase, “Selling the shoes online helped the company grow rapidly”, indicates an internal impact of “Increased Revenue/Sales.” Since there is mention of selling the shoes and rapid growth, an implied increase in sales and/or revenue is understood.

Coding was possible with the final summarized stories because submissions were taken directly from the interviews and summaries did not adulterate information as prescribed by the guidelines. As mentioned before, information removed during the summarizing process does not relate directly to the three clusters or to the purpose of this study and so no relevant information is overlooked in coding the final, published stories. Only information relevant to what the innovation is and what the impacts of the innovation are on the environment/society is included. Because Codes were developed and used by a single person, no inter-rater reliability test was conducted.

Once all the coding was finished, a basic frequency count was conducted for comparison between the two types of innovations, environmental and social, to see which themes showed up more for each innovation within each cluster. A chi-squared test was used to see if the two types of innovations were independent within each cluster. This was done for verification purposes only and was not meant to inform the conclusions.

Results and discussion

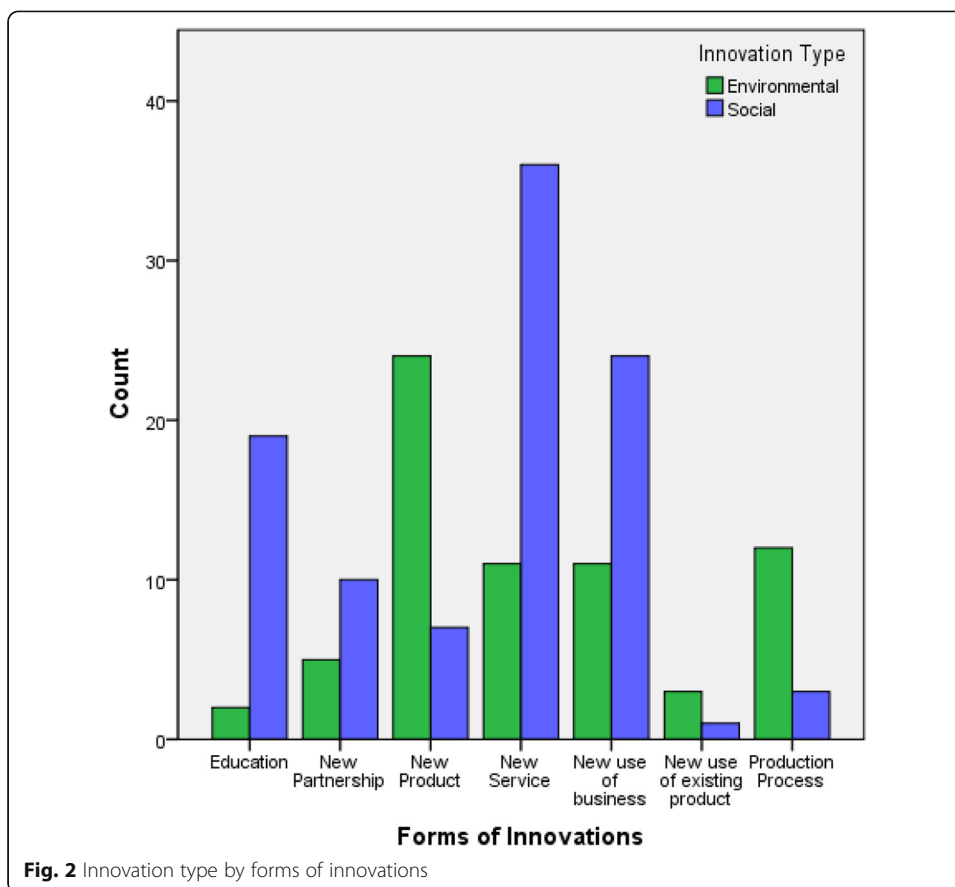
After analyzing all the stories, a varying number of themes were found for each cluster. This was mostly due to multiple themes showing up within the same story. This does not, however, affect the results as each cluster is analyzed by the types of innovations independently of each other. The unit of analysis here is thus the theme clusters. Below are the results of each cluster comparison with the two types of innovations.

Comparison with forms of innovation

In the first comparison a distinction is made between the types of innovations and the forms of innovations. The “types of innovations” refers to the primary focus or target of the innovation: either social or environmental. The “forms of innovations” refers to a cluster of themes describing the different business innovations themselves such as new products or new services.

A total of 168 forms of innovations were found within the 141 stories. This is due to the fact that some stories included more than one innovation. Of these forms of innovations, 100 were social and 68 were environmental. The most frequently occurring forms of innovations were “New Services” ($n = 47$), “New Use of the Business” ($n = 35$) and “New Products” ($n = 31$). In total, these made up 67.3% of all the forms of innovations found in the stories suggesting that sustainable innovations tend to take these forms over others. The following three forms of innovations, “Education,” “New Partnerships,” and new “Production Process” make up the majority of the last third of all the forms of innovations ($N = 21, 15$ and 15 respectively). The least frequent form of innovation, “New Use of Product,” only showed up 4 times out of the total 168 forms of innovations.

Of most interest is the separation between the two types of innovations among all the forms. Figure 1 shows the differences among the forms of innovations between environmental and social benefits. Each form of innovation favored one type of innovation over the other. “New Products” favored environmental innovations more with 77.4% of all new products found in the stories falling under this type of innovation. The next highest form of innovation that benefitted the environment was



“New Production Process” making up 80% of all instances of this theme. Combined, these two themes made up 52.9% of all the environmental innovations (Fig. 2).

In contrast, the most frequently found form of innovation among the social innovations was “New Services” where 76.6% of all the instances of new services created a social benefit. This was followed by the “New Use of Business” theme constituting 68.6% of the new uses of business. Combined, these two themes make up 60% of all forms of innovations providing social benefits. “Education” and “New Partnerships” also favored social innovations constituting 90.5% instances of educational innovations and 66.7% of new partnerships. Combined, these two constitute 29% of the forms of innovations providing social benefit.

Results of the Chi-Square test ($\chi^2(6) = 44.800, p < .001$) indicated a significant difference suggesting that the forms of innovations do differ depending on if they are originally intended to be environmental or social. Table 2 provides the percentage of each type of innovation found within each form of innovation theme (i.e. 9.5% of the education innovations were environmental, 90.5% of them were social) (Table 2).

Comparison with external benefit

In the second comparison, a total of 175 External Benefits were found among the 141 stories, 102 of which were from social innovations and 73 from environmental ones. The most frequent external benefits were “Benefits to the Local Population” ($n = 67$), a

Table 2 Percentage of forms of innovation separated by type of innovation

Form of Innovation	Environmental	Social
Education (<i>n</i> = 21)	9.5%	90.5%
New Partnership (<i>n</i> = 15)	33.3%	66.7%
New Product (<i>n</i> = 31)	77.4%	22.6%
New Service (<i>n</i> = 47)	23.4%	76.6%
New Use of Business (<i>n</i> = 35)	31.4%	68.6%
New Use of Product (<i>n</i> = 4)	99.4%	0.6%
Production Process (<i>n</i> = 15)	80.0%	20.0%

“Reduction of Waste” (*n* = 45) and “Improved Market/Product” (*n* = 25) composing more than 78.3% of all external benefits found in the stories. This suggests that these are the mostly likely forms of benefits to either the environment or society. The remaining 21.7% of all external benefits is mostly comprised of “Health Benefits” (*n* = 21) and “Increase in Clean Energy” (*n* = 13). The least frequent form of external benefit is “Job Training” showing up only 4 times out of the total 175 external benefits found in the stories.

Just as with the forms of innovations, the separation of external benefits between environmental and social innovations was clear, as is shown in Fig. 2. More than half the environmental innovations (59%) created a reduction in waste and 95.6% of the total instances of waste reduction benefited the environment. The next highest external benefit for environmental innovations was “Increase in Clean Energy” making up 16.4%

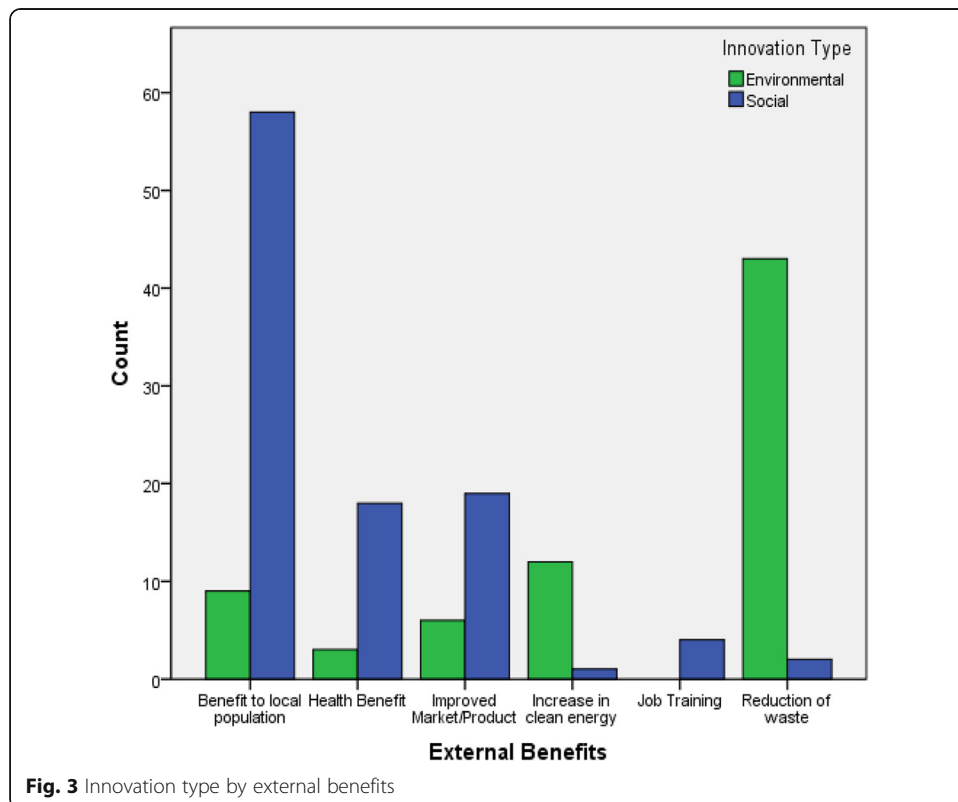


Fig. 3 Innovation type by external benefits

of the environmental innovations and 92.3% of all the instances of an increase in clean energy benefited the environment (Fig. 3).

“Benefit to Local Population” was found in more than half the social innovations (56.9%), which made up 86.6% of all the instances of a benefit to local populations. Also, for the “Improved Market/Product” and “Health Benefit” themes, social innovations were favored more than environmental ones as social innovations comprised 76% of the instances of improved markets/products and 85.7% of the instances of health benefits. Combined, these two themes make up 36.3% of the social innovations within this comparison.

Results of the Chi-Square test ($\chi^2 (5) = 101.968, p < .001$) indicated a very significant difference in the external benefits created by the two types of innovations. This suggests that social innovations tend to provide benefits to the local population and health benefits more than environmental innovations and environmental innovations tend to lead to a reduction in waste more than social innovations. Table 3 shows the percentage of each type of innovation found within each external impact theme.

Comparison with internal benefits

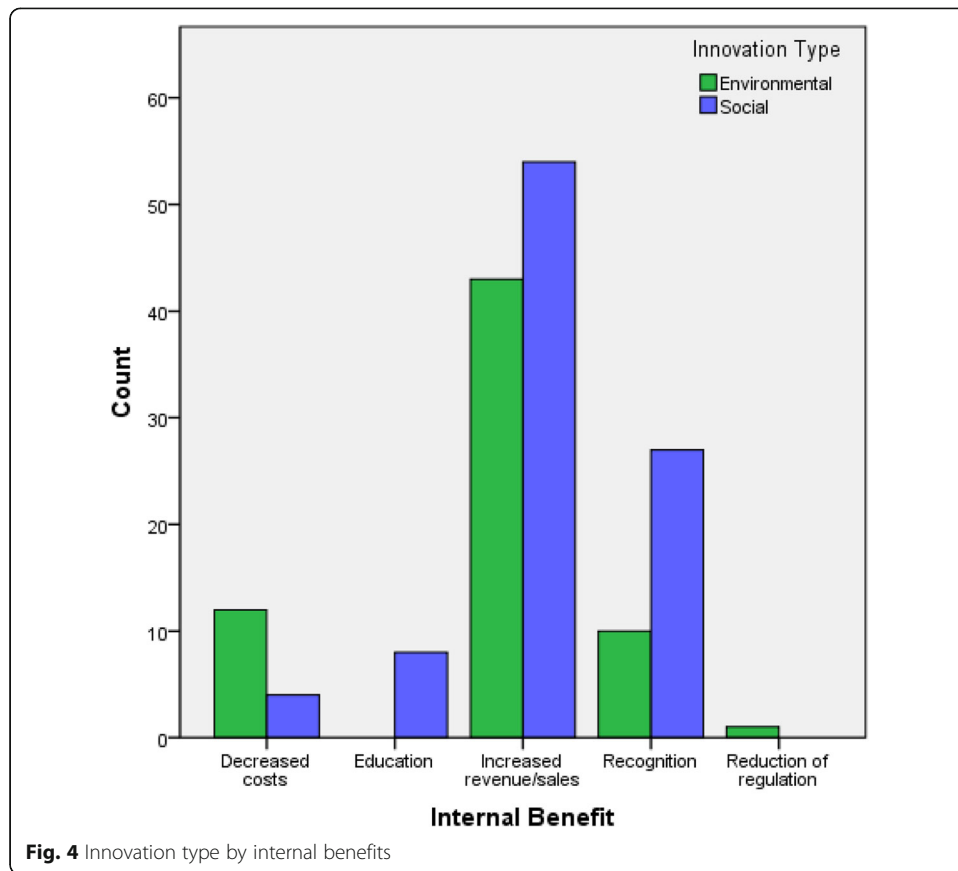
In the third comparison a total of 159 internal business benefits were found. Of these, 93 came from social innovations and 66 came from environmental innovations. The most frequently found benefit was “Increase in Revenue/Sales” ($n = 97$) comprising 61% of all the internal benefits. The next two most frequent were “Recognition” ($n = 37$) and “Decrease in Costs” ($n = 16$). All three together comprise 94% of the internal benefits. As can be seen in Fig. 3, there is less variance between social and environmental innovations in this comparison than in the previous two comparisons (Fig. 4).

“Increase in revenue/sales” was the most frequently found internal benefit theme associated with environmental innovations ($n = 43$) constituting 44.3% of all the instances of increased revenue and/or sales and 65% of all the internal benefits for environmental innovations. A decrease in costs also favored environmental innovations ($n = 14$), which comprised 75% of the “Decreased Costs” theme. The only two themes that were associated with environmental innovations more than social innovations were “Decreased Costs” and “Reduction of Regulation” though these combined only made up 10.7% of all the internal benefits.

An increase in revenue/sales was also the most frequently found internal benefit theme for social innovations ($n = 54$) but to a larger degree than for environmental innovations but this can be attributed to the greater number of overall internal benefits

Table 3 Percentage of external impacts separated by type of innovation

External Impacts	Environmental	Social
Benefit to Local Pop. ($n = 67$)	11.4%	88.6%
Health Benefit ($n = 21$)	14.3%	85.7%
Improved Market/Product ($n = 25$)	24.0%	76.0%
Increase Clean Energy ($n = 13$)	92.3%	7.9%
Job Training ($n = 4$)	0.0%	100%
Reduction of Waste ($n = 45$)	95.6%	4.4%



associated with social innovations. Social innovations constituted 55.7% of all instances of increased revenue and/or sales. “Recognition” comprised almost a third (29%) of the internal benefits for social innovations ($n = 27$), which made up 73% of the instances of recognition resulting from social innovations. Further, for “Education”, all instances of this theme showed up among social innovations even though this theme only represented 9% of all the internal benefits for social innovations. No environmental innovations were associated with the “Education” theme.

Even though both environmental and social innovations had a majority of their internal benefits in the form of increased revenue/sales the result of the Chi-Square test ($\chi^2 (4) = 17.992, p < .001$) suggests a significant difference in the internal business benefits of each. While both social and environmental innovations provide the business benefit of increased revenue and sales, the results suggest enough variation to conclude

Table 4 Percentage of internal impacts separated by type of innovation

Internal Impacts	Environmental	Social
Decreased Costs ($n = 16$)	75.0%	25.0%
Education ($n = 8$)	0.0%	100%
Increased Revenue/Sales ($n = 97$)	44.3%	55.7%
Recognition ($n = 37$)	27.0%	73.0%
Regulation Reduction ($n = 1$)	100%	0.0%

that there is a difference in the internal benefits between the two. Table 4 shows the percentage of each type of innovation found within each Internal Impact theme.

Conclusions

This study's purpose is to ascertain trends among sustainable innovations with regard to their forms and more importantly their impacts, both externally and internally, in order to develop theories for managers looking to start a new venture or grow their current venture and researchers seeking to further the field of sustainable innovations. More importantly, it attempts to fill a gap in the literature by providing empirical evidence for theory development as well as a foundation for improved strategy development for SME's by looking at an aggregate of case studies analyzing variations between social and environmental innovations. From this analysis several conclusions can be drawn in terms of the difference between the forms of innovations, the external impacts and the internal impacts of both types of innovations.

In comparing the forms of innovations, there was a clear difference between social and environmental innovations. Environmental innovations tended to offer new products or improved a production process to produce the same product in a better way more so than social innovations. For example, a household products company produced a cleaning solution that is less harmful to the environment when it enters the water supply. Environmental innovations also tended to find a new way of using existing products more than social innovations did but to a lesser extent than offering new product or improving a production process, suggesting that managers seeking to start product oriented ventures should look toward environmental businesses and vice-versa.

Social innovations, however, tended to offer new services or found new uses for the businesses associated with them more so than environmental innovations. For example a retail company created a supply chain for local artisan workers to sell their products in the global market. Without this new service, the often poor artisans would never have access to larger markets and much needed revenue would not have come to areas afflicted by poverty. Social innovations also tended to provide education to stakeholders more than environmental innovations. For example, a healthcare company provided education on improved practices to local hospitals that eventually lead to a decrease in malpractice premiums. Agreements between organizations in the form of new partnerships also favored social innovations more than environmental ones. From this it can be concluded that environmental innovations tend to be more product oriented than social innovations and social innovations tend to be more service oriented than environmental innovations. This suggests that entrepreneurs that are product oriented may want to focus on environmental sustainability while those that are more service oriented should focus on social sustainability in making strategic decisions.

Looking at the comparison between the types of innovations and the external impacts associated with them it is clear that environmental innovations tend to provide benefits to the environment more than social innovations and social innovations provide benefits to populations more than environmental innovations. While these findings are obvious it is important to understand the specific ways in which each type of innovation provides benefits to either the environment or society. Environmental innovations tend to create a reduction in waste to a much larger extent than social

innovations. They also provide an increase in clean energy more than social innovations. This suggests that entrepreneurs interested in the energy industry will find more opportunity in the environmental sector.

Social innovations, on the other hand, tend to create a benefit to local populations, reduce illness or improve the health of a group outside the company or provide access to markets to groups who could not previously access them more than environmental innovations. While some environmental innovations do provide clean energy, the reduction in waste is far greater suggesting environmental innovations tend to reduce negative consequences more than provide positive contributions externally. Conversely, while some social innovations do reduce illness, more create benefits suggesting they tend to make positive contributions externally rather than reduce negative consequences.

In terms of the internal benefits, the findings are somewhat inconclusive, which can be attributed to a limitation of the study. Although the result of a chi-square suggests a significant difference between the internal benefits of environmental and social innovations, both types of innovations show a high percentage of increased revenue and/or sales as primary business benefits, which means further refinement is needed in order to clarify the internal benefits to organizations as discussed in the future research section. Another way of looking at this, however, is that it does not matter if entrepreneurs choose environmental or social innovations as both will likely lead to greater revenue. This means decisions of which one to choose should be based on the entrepreneur's expertise and the secondary business benefits where some clear differences can be drawn.

Environmental innovations tend to provide decreased costs more than social innovations. Social innovations tend to provide public recognition or awards more than environmental innovations. They also provide more education for employees though the difference is not as pronounced. These findings show that, in addition to an increase in revenue/sales for both types of innovations, environmental innovations provide more tangible benefits to SME's than social innovations while social innovations provide less tangible but perhaps more visible and direct internal benefits than environmental ones. This suggests that SME's looking to produce cost effective outcomes may want to explore environmental innovations but those looking to increase their public image may want to explore social innovations. This conclusion may change with a further refinement of the "increased revenue/sales" theme.

These comparisons resulted in findings that suggest some basic theory for future study. In summary, three key findings were found for each form of sustainability. Environmental innovations tend to be more product oriented, reduce negative external consequences and create tangible internal benefits, the latter associated with increased revenue. Social innovations tend to be service oriented, provide positive external impacts and intangible internal benefits, the latter also associated with increased revenue. Further avenues for research using these findings are offered in the next section.

Future research

Given the above conclusions and exploration of the topic, new avenues of study can be developed. This study examined the differences between types of innovations based on their impacts and origins. Further comparisons can be explored between the forms of innovations and the impacts as well as between the external

and internal impacts. Looking for patterns within these two comparisons will provide a more comprehensive view of sustainable impacts by showing the connections between each thematic cluster.

Further exploration can also be done into the characteristics of the organizations behind the innovations. Comparisons with the size of the companies measured by number of employees as well as comparisons with the annual revenues may provide a more comprehensive profile of the organizations behind the innovations and how these profiles relate to the innovations and their impacts. Other explorations into the regions of the world these organizations are working in are also possible to see if patterns emerge based on location. It would be expected that social innovations would be found more often in regions of the world with high poverty and social injustice as this type of innovation will tend to favor social impacts focusing on people more than the environment given the outcomes of this study.

Along with these future avenues, a further refinement of the final comparison is needed in order to better specify the monetary gain associated with the two types of innovations. As was noted, both innovations were associated with an increase in revenue/sales as a primary internal benefit. While an interesting conclusion for practitioners, future research should look at more precise delineation of such a theme to see if an increase in specificity would lead to more conclusive outcomes in terms of the internal benefits to organizations looking to implement sustainable innovations.

Abbreviations

CSR: Corporate Social Responsibility; EIA: Environmental Impact Assessment; SEA: Strategic Environmental Assessment; SME: Small and Medium Enterprise; TBL: Triple Bottom Line

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