Sustainability and Business Model Innovation at the Bottom of the Pyramid: A Graduate Business Project

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ABSTRACT

This study proposes a workable approach in the business curriculum to prepare business students to have a global perspective and act creatively and innovatively to develop sustainable solutions for the business community. A course project was developed to educate MBA students about multifunctional, multidisciplinary perspectives of sustainability, innovation, and emerging markets. Teams of students incorporated entrepreneurial and innovate skills to identify and provide services and products for consumers and business partners at the bottom of the pyramid (BOP).

Keywords: business education, business modeling innovation, sustainable operations, bottom of pyramid

INTRODUCTION

The business community needs strong professionals capable of leading business organizations ethically and responsibly into the future. Yet, there appears to be a disparity between the needs of business and the products of today's business programs. A scan of the curricula of the business programs shows that the emphasis of these programs is on sustaining the operational effectiveness of businesses. While this is absolutely necessary, the graduates of business programs ought to be also able to create new products and services that meet the needs of the underserved segments of the market. This training would stand the graduates in good stead whether they decide to choose an entrepreneurial path or realize their professional goals within larger organizations. Some business schools have started offering programs that provide this skill set such as Stanford University (Datar et al., 2010), but more remains to be done.

Business leaders have expressed their concerns regarding the MBAs curriculum. One of their concerns is that MBA graduates need to be taught a multifunctional, multidisciplinary perspective that helps them address current issues of sustainability, innovation, and the global market. Canen and Canen (2002) encourage innovation in management education sensitive to cultural diversity. They argue that the development of cross-cultural approach is very important for success of innovation management globally.

Maritz et al. (2014) has identified innovation education as the major contributor to enhancing the innovation by individuals and organizations. They discuss the inadequate literature on the development and assessment of innovation education programs in the higher education. Maritz el al, propose a conceptual framework of a multi-dimensional innovation education program based on a successful collaborative international innovation management program. This educational program is a joint Master of Science in Global Innovation Management that has been designed and delivered by a consortium of four universities: University of Strathclyde (Scotland), Aalborg University (Denmark), Hamburg University of Technology (Germany) and Swinburne University of Technology (Australia). This graduate program launched in 2008, admits students with degrees in engineering, science and technology. Students learn skills to develop and manage the innovation process globally with industrial engagement and a rich cultural experience by studying at two different universities. The Maritz et al (2014) framework consists of seven components: context, outcomes, objectives, audience, content, pedagogy and assessment.

The silo approach taken in the business programs limits the graduates' ability to solve business concerns that span functional disciplines or boundaries. With businesses decreasing their financial support for employees attending part time and executive business programs (Datar et al., 2010), it is imperative to prepare the business professionals before they move into decision-making roles in the workplace.

Further, majority of business opportunities are occurring in the emerging and developing economies, a market space that gets limited attention within the business curriculum. According to The Conference Board Org (2016) the projected GDP growth from 2016 to 2020 in the developing and emerging nations is 4.6%, while the GDP growth of

matured nations is about 2.1%. In the developing and emerging economies, business professionals need to go beyond applying their skills and talents in the traditional ways and means to adapt existing products and services and create innovative products and services to meet the needs of the local markets. Datar et al. (2010) in their book, "*Rethinking the MBA: Business education at a crossroads*", report that business schools need to review and reassess the theoretical aspect of the course material and place more emphasis on the practical component. In addition, they identified eight unmet requirements which are

- gaining a global perspective
- developing leadership skills,
- honing integration skills,
- recognizing organizational realities
- implementing effectively,
- acting creatively and innovatively
- thinking critically and communicating clearly
- understanding the role, responsibilities and purpose of the business
- understanding the limits of models and markets

Employers' opinions match the findings of Datar et al. (2010) as they rank imagination and creativity highly among the top ten skills for an MBA graduate. (Ghannadian, 2013). Acknowledging the demands placed by global business realities and the need to prepare graduates to meet such challenges, a semester-long project that combined the principles of common good, innovation to produce customer value, and sustainability in business operations was created and assigned to students in a graduate business program. The bottom of the pyramid (BOP) business model offers one means of poverty alleviation, and thus was selected as a valuable perspective to create awareness of conducting business to address the common good.

In this paper we discuss a team project, with requirements of business model innovation, sustainability, and the bottom of the pyramid business model, was incorporated into the curriculum of a required core course in a traditional MBA program within a liberal arts university in the south central part of United States. The project aimed to educate students about multifunctional, multidisciplinary perspectives of current issues of sustainability, innovation, and emerging markets. Students had to develop entrepreneurial and innovative skills to find workable and sustainable solutions to solve the problems of the economically disadvantaged and underserved segments of the population. The evaluation of the projects by the industry judges and the feedback from the students suggest that this is an effective way to address the training needs identified by business practitioners and concerned academics.

In the following sections of this paper, we describe the key concepts that formed the core of the project: business model innovation, sustainable operations, and the bottom of the pyramid business model. We then provide the design and the rationale for the design that includes a detailed description of the project requirements and deliverables. This is followed by an overview of two team projects to illustrate how students handled the requirements of the projects including feedback from the students. Finally, we discuss the merits of this approach with suggestions for improvement, as business schools strive to meet the needs of businesses.

BACKGROUND (CONCEPTS REVIEW)

In designing the project, the goal was to engage and challenge students on the concepts of common good, innovation, and sustainability. To sensitize students to the notion of the common good and to set a common framework for all students, we decided to use the BOP as the target market due to the challenge of innovating product/service offerings for this segment. We also wanted students to use the business model innovation design framework for creation of products; we chose this approach to encourage a departure from the usual approaches to solving business problems. To add an additional level of complexity and ensure that students remain aware of the responsibility of protecting our planet, we required sustainable operations for producing the product/services designed by the student groups. In this section, we will describe briefly topics of business model innovation, sustainable operations and the bottom of the pyramid. Additional details on each topic are included in Appendix 1.

Business model innovation

Business model is the design for the successful operation of a business. Johnson et al. (2008) in their article "Reinventing Your Business Model" define a successful business model as having four interlocking elements:

customer value proposition; profit formula; key resources; and key processes that create and deliver value. The customer value proposition solves an unfulfilled need for a target customer. It is important not just to define what is sold, but also by how it is sold. The profit formula is very critical and it's based on what target customer are willing and able to pay as the price to fulfil their unmet needs. The revenue model is how much money can be made by multiplying price by volume. We also need to determine a profit margin to achieve a desired profit goal. The key resources are those resources such as people, technology, information, and alliances with other organization such as NGOs, to deliver profitably the customer value proposition. The key processes make the design, development, sourcing, manufacturing, marketing, financing, and distribution of the product (service) successfully. Johnson et al. discuss why companies have hard times to implement business model innovation. The difficulties are due to companies' lack of understanding their existing business model and also lack of understanding or training into the dynamics and processes of business model development. To resolve the problem, companies should uniquely integrate their key resources and processes into delivering perefct goods (services) for the target customers by focusing on the customer value proposition and the profit formula.

Business model innovation has the potential to fundamentally shift an industry. The business professional must tap into a new market (Novelty of market -demand) with a new solution (Novelty of solution in the supply process). Good examples are Zip car, Netflix, Zara (Fast Fashion), Apple IPod, and IKEA.

Cachon & Terwiesch, (2013) propose two means to generate business model innovation:
I. The Demand Side of Business Innovation - Change the way a product (service) meets customers' needs to increase the utility of their consumption. This could be accomplished by changing one or more attributes (price, preference fit, transactional efficiency, quality) of the product or service.

II. Solutions*: The Supply side of BMI* – Changes to process timing, process location, and process standardization.

Sustainable operations
Operations refers to the activities related to sourcing, production and distribution of products and services. Operations activities are important part of sustainability as they helps us to ensure that we are able to meet the needs of our customers over a sustained period of time. We should use renewable resources in our operations activities. Drake & Spinler (2013) on their paper on "Sustainable Operations Management: An enduring stream or a passing fancy?" discuss sustainable consumption of renewable and nonrenewable sources as "(i) Consumption of a renewable source is sustainable if it is no greater than the regeneration rate of that source; (ii) consumption of a nonrenewable source is sustainable if the economy substitutes an alternate material or technology at a sufficient rate that the nonrenewable resource is fully replaced before its reserves are exhausted; and (iii) the emission of pollution (or waste) is sustainable if it occurs at a rate no greater than the rate at which its sink (the ecosystem into which it is injected) can naturally assimilate it plus the rate at which the pollutant is actively removed" (Drake & Spinler p. 4) Drake & Spinler also discuss how Sustainable Operations Management could help with finite supply of natural resources and how efficiently these materials are used by reducing waste into ecosystems. Operations sustainability also refers to product design, choice of materials, design for recyclability, and design for supply chain. Using our resources more efficiently means we get much higher return from them that allows us to lower prices while maintaining profit margins, resulting into a sustainable source of revenue.

Kleindorfer et al. (2005) also discuss sustainable operations management, and argue that the growing pressure on businesses on sustainability, has resulted into a movement towards triple bottom line (profit, people, and planet) reporting. Now businesses are facing new challenges such as integrating environmental, health, and safety issues with green-product design, lean and green operations, and closed-loop supply chains.

There is growing demand for leaders who understand that planned growth, ethics, community, and the environment all impact business strategy, value creation, and shareholder return. Leaders in sustainability understand the goal of creating quality of life now and for future generations requires an integrative approach to achieving economic viability, social equity, and environmental impact. We could use tools of operations management (quality, lean, faster flow time, delayed differentiation, logistics/transportation, and packaging –lowering carbon footprint) to create and manage sustainable and highly profitable businesses (Cachon &Terwiesch, 2013).

The bottom of the pyramid
BOP refers to 65% of the world population who live below the poverty line, mostly rural areas of the world, with a purchasing power of less than $2,000 per year. Prahalad and Hammond (2002) stated that the bottom 65% of the world's economic population can be a viable market for multinational corporations who adapt the products and

services to the BOP's needs and create new business models and innovative technological measures that work with the BOP environment. While most of the BOP resides in rural areas, companies can develop access to the rural markets through creative and new strategies. There has been a lengthy discussion on theories surrounding the BOP. Organizations and scholars have examined the possibilities of tapping into the large BOP market, including the concerns, criticisms, examples of failure, and inspiring success stories. For more information see Prahalad (2012), Karnani (2007), and Jaiswal (2008).

PROJECT DESIGN

The purpose of the team-project was to develop a business model innovation using sustainable operations targeting the bottom of the pyramid. The project involves identifying a product or service and the development of processes to provide that product or service satisfying three conditions.

(1) Applies principle of business model innovation

(2) Mindful of sustainable processes (operations)

(3) Targets the market at the BOP

In response to businesses and the global trends few business schools are creating curriculum with hands on experience classes focused on tapping their graduate innovative and entrepreneur skills in workable solutions to issues affecting people and corporations as well as being challenged to create innovative products, services and companies. For instance, Stanford Creating Infectious Actions (CIA) course is geared to impart innovation and creativity thinking skills (Datar et al., 2010). The CIA approach is founded on design thinking. According to Tim Brown the president and CEO of IDEO "Design thinking is a human-centered approach to innovation that draws from the designer's toolkit to integrate the needs of people, the possibilities of technology, and the requirements for business success" (IDEO, 2016). Lastly, the CIA learning does not take place in a lecture hall instead students learn by engaging in projects and emergent problem solving in multidisciplinary teams. The CIA has four steps: the first step is to understand and observe, the next step is the brainstorming stage, the next step is the rapid, iterative prototyping and the last step is implementation. Lee and Benza (2015) has also applied design thinking in teaching innovation skills in a graduate marketing course at California State University. Gupta (2015) argues that innovation should be the central theme in teaching strategic management in business curriculum.

The University of Michigan Multidisciplinary Action Projects (MAP) course engages MBA students with organizations to work on projects to be completed in a specific time period. MAP projects are applied in four steps: the first step is definition of goals and project scoping, second step is student immersion into the project, the next step is developing a solution and the last step is the deliverables and recommendations (Datar et al., 2010).

In our study, projects were carried out in a required MBA class in Operations and Supply Chain Management (OSCM) in spring of 2013. Students were introduced to various topics related to OSCM such as strategy, operations analysis, operations planning and control, quality management, project management, lean operations, supply chain management. Besides the above traditional materials from OSCM, students were received additional presentations on BOP by another faculty who had extensive knowledge in that area. Students were also lectured on business model innovation and sustainable operations and were shown several videos and examples. Prior to choosing a subject, each student was required to do a minimum of three annotated bibliographies related to subject of their interests.

Projects' deliverables were proposal, product/service design and development, final paper, and presentation.

The proposal should identify a new product (service) that incorporate business model innovation using sustainable operations targeting the bottom of the pyramid. The proposal should also include a comprehensive literature search for uniqueness of the proposal.

The product/service design and development should provide the business model. Deliverables should include sourcing, operations, and distribution. Students could use business model canvas to help them with business modeling and presentation aid.

The final paper and presentation should provide detailed description of the project by outlining proposed company's structure, product/service offerings, market analysis, sourcing and fulfillment, pricing and promotion strategy, distribution strategy, and financial plan.

The above deliverables is evaluated by a metric (see Appendix 3). The key indicators (desired outcomes) for successful projects are addressing the following:

1. Business model innovation – Identify the innovation that you have applied in developing your product/service and making it available to your customers while having a financially sustainable business model
2. Sustainability - Environmental impact and social impact
3. BOP is the target market:
    a. How is the need of the BOP consumer met?
    b. BOP as producers
    c. Education needs of BOP

Appendix 2 shows details of projects deliverables.

STUDENT PROJECTS AND OUTCOMES

Water project

Product description

A simple ceramic water filter system that does not require any electricity, lasts three years, and does not require any maintenance.

Expected outcomes

Rather than come up with something altogether new, improve upon current products and make them available to new markets. Originally the water filter was tested in South Africa, but the student project adapted the product for The Philippines. This student aims to open a factory in The Philippines and begin production and distribution as soon as possible.

Realized outcomes

Students successfully fulfilled project expectations and moved into real-world implementation. One student traveled to the Philippines to conduct a feasibility analysis to examine profitability there, going as far as creating a legal entity to sell the filters as well as securing land for an eventual factory.

Conditions Satisfied

Sustainable Operations

This project adequately fulfills the sustainability requirement of the project because it is made with local materials including clay, sawdust, and plastic. However, it is not fully biodegradable due to the plastic component. If the factory producing this item employs locals at a livable wage or implements social programs that benefit stakeholders around the factory, it will fulfill the sustainability requirement further.

Target market-BOP

This product successfully reaches the BOP, as it addresses real, already present needs in the BOP community. In any country, the people who are always the most critically affected by natural disasters are at the BOP, because they do not have resources to protect themselves from incoming storms, and also lack the resources needed to recover. This often leads to increased hardship, such as malnutrition and lack of shelter. The Philippines is revealed to be an appropriate market for this product because access to clean water is limited due to Typhoon Haiyan's effect on local infrastructure.

Girls Clinic Project

Product description

A multi-tiered clinic system wherein the business, which produces 100% sustainable, biodegradable hygienic products, partners with local schools and doctors to provide sanitary feminine products and medically accurate information to Indian women and girls who live at the BOP. This system aims to fight the ignorance that causes stigma against women during menses. The purpose of reducing stigma is to allow women to feel safe seeking medically accurate information about their bodies, and to allow them to address their physical needs appropriately.

Expected outcomes

In a country where 96% of the women do not use hygienic products during their monthly cycles – instead opting for items which can cause infections and infertility such as dirty cloths, ashes, and plant fibers – providing hygienic products will increase the percentage of girls who can attend school after the onset of menses. It will also increase productivity among mature women (a population which currently reports at least 3 days of work off a month due to discomfort brought on by menses).

Realized outcomes

This project fulfilled each item in the assignment – it addresses many real needs at the BOP in a way that is affordable to the people who need it, created an innovative business model, and produces an item which is 100% sustainable and environmentally safe.

Conditions Satisfied

Business model innovation

This project fulfilled the Business Model Innovation factor of the assignment in that it partnered with infrastructure that is already in place in the area to maximize access to consumers. The project company will be in contact with a school, as well as a medical clinic, to reach girls and women to distribute products and information.

Sustainable operations

The product created with this project is 100% biodegradable, made from cheap, locally-sourced ingredients. Currently the cellulose used in the sanitary napkins is made from lumber, which will become increasingly expensive over time due to slow regrowth rate. However, students from MIT produced a sanitary pad manufacturing process which used cheaper and locally available products such as banana fiber in their production (Aust et al., 2010).

Target market –BOP

This product addresses many needs at the BOP. According to the Self-Determination Theory outlined in the article "Life Satisfaction, Self-Determination, and Consumption Adequacy at the Bottom of the Pyramid" by Martin and Hill (2012). BOP consumers are not defined solely by their economic status. There are also important psychological components to living at the BOP, and any company that wishes to adequately serve the BOP needs to address these psychological traits in some way. These needs include intimate and long-lasting connection to important others, perceptions of individual control over one's own actions, and belief in one's capacity to perform essential tasks. The girls' clinic project addresses each of these needs individually. First, creating long-lasting connections to important others comes into play when the girls served by the project system are connected to the women who run the machines which make the sanitary pads. These older ladies can act as leaders in their community due to owning their own business (this project also contains a micro-loan component) and producing a necessary item that makes girls' lives better. In addition to the older ladies, the project also draws the girls into contact with local physicians (already a respected position), who administer medically accurate, age-appropriate information about the changes brought on by puberty, including the onset of menses. Second, perceptions of individual control over one's own actions will be addressed when girls no longer need to skip school or stop attending altogether due to menstruation. They will take control of their own bodies and destinies by using information to dispel ignorance and stigma in their own social circles. Women who participate in the project system will also benefit from this aspect as they will be able to attend work for more time, earn more money, and reach higher esteem in society. Third, the women who operate the sanitary napkin machinery will gain confidence in their ability to fulfill essential tasks by learning skills such as creating the actual product, distributing it to local clinics, and maintaining their own business.

Student Experiences

The following paragraphs are comments from a member of the "Girls Clinic Project":

"The Bottom of the Pyramid project was important to me for a few reasons. First, it allowed me to think outside the accepted "box" of how companies are usually founded, and for what purposes they usually operate in America. Second, the project helped me develop the outline of a company that inspired me to pursue a course of action that might bring it into actual fruition. Third, the Supply Chain class itself helped mold my idea of what kind of career I wanted to pursue after completion of my MBA. In all these ways, my experience of the BOP project changed my idea of what a company can do in the world, and what I can do with a company."

"Much of the reading I had to do to expose myself to BOP concepts opened my eyes to the real needs of the population that lives at the Bottom of the Pyramid, in terms of their needs beyond an economic lack. For example, the psychological components of poverty highlighted in "Life Satisfaction, Self-Determination, and Consumption Adequacy at the Bottom of the Pyramid" (Martin & Hill, 2012) opened my eyes not just to the work that remains to be done in the world of BOP services, but to the needs of all people in the world. This article also gave me a sense of how business that cater to the BOP can be more than just a profitable idea – by fulfilling those psychological needs, companies that serve the BOP can change the well-being of their customers in a much more holistic way. This is an incredibly invigorating idea to someone who is more used to Western consumer culture, where it sometimes feels like companies squabble over disposable income and do not care about the actual lives being impacted by their actions."

"Another way that I learned about using business to positively influence the lives of stakeholders as well as shareholder profits was through the article entitled "Dynamic Capabilities and Base of the Pyramid Business Strategies" (Tashman & Marano , 2009) which outlines the concept of Peace Through Commerce. This theory points out that poverty and violence often go hand in hand for a multitude of reasons. While India is not always thought of as a "violent" nation, violence against women is pervasive. Part of this violence (which can be seen in reports of rape which has become a focus of news in this part of the world) is due to cultural attitudes that are based in ignorance. This ignorance is part of what my BOP project was aimed at, with the intent of spreading accurate information to dispel stigma associated with womanhood. The article also gives a different definition of poverty than is usually seen: "a deprivation of human capabilities or agency to exercise fundamental rights to survival, security, and freedom". The authors refer to capabilities such as education, employment, healthcare, sanitation, water, literacy, nourishment, women's rights, and security from violent conflict, and my team took care to address as many of these issues as possible in our project, including education, employment, healthcare, and women's rights."

"The BOP project also challenged my accepted norms of how a business should operate. In western culture, companies in the same sector often operate independently of one another because they see each other as competitors. When I read "Profitable Business Models and Market Creation in the Context of Deep Poverty: A Strategic View" by Seelos & Mair (2007). I saw that larger companies are not as agile and able to address the needs of BOP consumers, and smaller companies often do not have the sheer reach or material resources that is needed to cater to the large slice of the global population that comprises the BOP. This conundrum has been addressed in the past by companies in developing economies pairing together and using their relative strengths to better serve all customers while still achieving financial gain. In America, it often appears as though financial gains means compromising on real service, because the constant search for efficiency often means cutting out what corporations see as expendable factors of their business, including payoff to customers. The example posed by Seelos and Mair (2007) where a cell phone company that was aimed at social development partnered with a global telecommunications firm to enhance both businesses, gave me a new perspective on what was realistically possible with a small firm like the one I was trying to (hypothetically) create for my project. At first, my partners and I had resigned myself to a small, stand-alone clinic that had to create its own market, produce its own goods, and distribute the napkins all on its own, while still remaining profitable. This stumped me until I read the article mentioned above. Finally I realized that the teachers at the local school could reach the market we sought to engage by being established and trusted figures of authority for young girls, and doctors could provide a socially safe and acceptable place to distribute the sanitary napkins we produced. Because rural Indian culture carries deep stigma regarding menstruation (even to the point that women are told not to cook food or paint their nails during their periods for fear of ruining the results), a foreign company attempting to create a market in this arena would have insurmountable obstacles to success if this aspect did not function properly."

"Before taking this class, I – like many of my classmates – thought that I wanted to change the world for the better, but did not know how I would do it. Participating in the Bottom of the Pyramid project changed the way I looked at the responsibilities of the business world, and it deeply affected my view of what kind of change I can affect in the world as an individual. I would like to someday implement the Indian Girls' Clinics my group developed, but until then, I know I can use the principles learned in this class to make important changes here."

DISCUSSSION, SUGGESTIONS FOR FUTURE USE, RESEARCH AND IMPROVEMENT

We are hoping that the outcome of these projects as part of the MBA curriculum would produce graduates that have gained global perspective, developed leadership and integration skills, acted creatively and innovatively, and have integrated social goods in business models. Also their exposure and challenges of creating goods for the BOP, should make them much more innovative and creative for developing goods for emerging and developing markets as well.

We should emphasize that by expanding materials that were used for projects' preparation a standalone course could be developed with topics such as business model innovation or business sustainability and having prominent business people participate as mentors to teams. In our case, we used business leaders to be judges at final presentation and they also graded teams with our metrics. Another suggestion is to open these projects to students outside of business schools such as engineering, architecture, art, and science. Having teams with various background and expertise will enhance the quality of the projects.

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APPENDICES – are available upon request by contacting Shahram Taj at staj@flpoly.org