THE PENNSYLVANIA STATE UNIVERSITY
SCHREYER HONORS COLLEGE

DEPARTMENT OF MARKETING

APPLYING MARKETING FRAMEWORKS TO SOCIAL ENTREPRENEURSHIP NEW PRODUCT DEVELOPMENT: A CASE STUDY

ERNIE LEHMAN
SPRING 2013

A thesis
submitted in partial fulfillment
of the requirements
for baccalaureate degrees
in Marketing and Film/Video
with honors in Marketing.

Reviewed and approved* by the following:

Min Ding
Smeal Professor of Marketing and Innovation
Thesis Supervisor

Lisa Bolton
Associate Professor of Marketing
Honors Adviser

* Signatures are on file in the Schreyer Honors College.

ABSTRACT

Social ventures are using business practices to combat some of the world's biggest problems. By capitalizing on entrepreneurial philosophies, these enterprises are able to create sustainable changes in the regions where they work. Unfortunately, there exists in these ventures a high failure rate due in large part to a gap between what the consumer needs and what the ventures are producing. This case study explores the use of frameworks developed for commercial firms to analyze the new product development processes in the iDE Treadle Pump social venture. The study made qualitative assessments on each proposition of these frameworks, examining them for their potential usefulness in evaluating social ventures. The study suggests changes to be made to these frameworks, as well as future research methodologies for examining the cross-organizational validity of these managerial tools.

TABLE OF CONTENTS

LIST OF FIGURES

ACKNOWLEDGEMENTS

I would like to thank my thesis advisor, Dr. Min Ding, for providing me with the direction and feedback necessary to make this thesis possible. I would also like to thank the Schreyer Honors College for making the decision to come to Penn State an easy one. Finally, thank you to Ernie and Debbie Lehman. Without you none of this would be possible.

Chapter 1

Introduction and Background

In 2002 the United Nations unveiled their Millennium Development Goals. Highlighting issues of poverty, health, equality, and education, these goals underscored the problems of the world's developing communities. With access to capital to make an effect on these goals, developed nations have begun to attack these goals as well as a myriad of other social issues. Many of these initiatives take the form of a product, some new idea that improves an aspect of life, makes it easier, more profitable, or more enjoyable. Governments, NGO's, educational institutions, and social enterprises all work to design technologies that will be the next great equalizer. And each year, a countless number of those designs fail. In 2004, the African Development Bank reported that 78% of the projects they funded were ultimately unsustainable. (Riddell, 2007) In 2011, the Independent Evaluation Group reported that World Bank funded Information and Communications Technology projects had as much as a 70% failure rate. (The Independent Evaluation Group, 2011) The same problem plagued the UN's "Health for All By 2000" health care initiatives, which mostly failed in the long term, despite their effectiveness and low cost. (Malkin, 2007)

Some of this failure is expected and even a positive indicator of innovation and risk-taking in the social development sector. But it also suggests a systematic problem with these ventures. There exists a gap between what the developed world is creating and what the developing world needs. This gap is exacerbated by an increased price

sensitivity and risk aversion in these developing markets, characteristics that amplify any disconnect between product offerings and customer needs. (Yesuf & Bluffstone, 2007) By focusing on technology before focusing on usage cases and target markets social ventures are allowing valuable resources, good engineering and product development is going to waste.

The prominent One Laptop Per Child (OLPC) program exemplified this concept of a gap between reality and design. Tremors of disappointment in the face of huge popular acclaim began to appear almost immediately when the laptop's price of $199 was unveiled, a huge disparity from the $100 laptop they had been touting. These issues became even more apparent as the laptop's distribution numbers trickled out, most of them far below expectations. (Kraemer, Dedrick, & Sharma, June) This bad news further piled on in 2012, when a report covering over 300 primary schools in rural Peru showed no evidence of increased Math or Language aptitude in students who had been provided with an OLPC laptop. (Christia, Ibarrarán, Cueto, Santiago, & Severín, February) And now OLPC's technology, its most unique asset, is at risk of obsolescence as developing countries undergo mobile phone revolutions and competitors introduce low-cost laptops and tablets to the market.

Many of the problems OLPC faces are elements of marketing: pricing, market analysis, and misunderstood product use cases. Attempting to find an effective way to integrate these marketing functions into new product development and distribution strategies is crucial to creating technologies and business strategies that are both available and appropriate for the intended end user.

Purpose of Research

The following research will explore how social development ventures integrate marketing into their new product development process, focusing on the beginning of the product's life cycle and extending into the early life of the product. Typical social ventures begin with a problem and an idea for a product that solves that problem, leaving marketing until later in the venture's development. While this strategy is an effective one in domestic, developed communities where intimate knowledge of the market is innate to the design team, it may not be the correct way to focus on problems centered on the developing world.

This research will investigate the effectiveness of using a more modern, integrated approach to evaluate and plan new product development procedures for developing communities. It will also use this business-focused approach to analyze the relationships between marketing and engineering as the venture works to finalize the design of the product. The hypothesis is that instead of beginning with an idea, ventures interested in targeting developing communities must begin with marketing activities geared toward understanding their future customers. By establishing market segments, understanding price targets, determining the selling strategies surrounding the problem that they seek to solve, and doing all of this early in the development process, social ventures can help focus their efforts and eliminate costly miscalculations like the ones OLPC is currently facing.

The idea that design should be integrated with other functions of business when creating products for the developing world is not a novel one. The unique perspective

this research offers lies in the use of new product development and cross-functional relationship management frameworks created for commercial enterprises to evaluate and critique the processes of social ventures. These business-oriented theses surrounding the design process will be examined via a case study of a social venture working on distributing products in neglected communities. The case study will provide a qualitative assessment of the social venture's compliance with these commercial frameworks, as well as an assessment of how the frameworks fit this alternative context. The research will use lessons learned from this case study to understand how NPD theories and the marketing function can be more effectively integrated into social ventures, as well as make recommendations for further research to validate this application of business metrics to social entities.

Chapter 2 : Definitions and Literature Review

Social Entrepreneurship

Defining the term "social entrepreneurship" is a more difficult undertaking than it would seem on the surface. The subject has sprouted frameworks, graphics, and even a fairly frustrated meta-analysis. (Dacin, Dacin, & Matear, 2010). When looking at the concept of social entrepreneurship, it's best to first understand the component parts then bring them back together to create a definition. This definition, published in 2007, did well to describe those two parts:

> *We define social entrepreneurship as having the following three components: (1) identifying a stable but inherently unjust equilibrium that causes the exclusion, marginalization, or suffering of a segment of humanity that lacks the financial means or political clout to achieve any transformative benefit on its own; (2) identifying an opportunity in this unjust equilibrium, developing a social value proposition, and bringing to bear inspiration, creativity, direct action, courage, and fortitude, thereby challenging the stable state's hegemony; and (3) forging a new, stable equilibrium that releases trapped potential or alleviates the suffering of the targeted group, and through imitation and the creation of a stable ecosystem around the new equilibrium ensuring a better future for the targeted group and even society at large.* (Martin & Osberg, 2007)

Identifying opportunity in unjust equilibriums and finding a way to bring a strong value proposition to fill that opportunity and create a new equilibrium, these activities take the core tenants of the entrepreneurial spirit and apply them to a social problem.

The definition does not, however, address the problem of showing us what a social entrepreneur's venture looks like. What kind of organizations are entrepreneurs creating to use business as a driver toward that new equilibrium? In order to understand that concept, we must consider both social and commercial ventures as existing on a continuum, with one end focused only on profits and the other only on social impact.

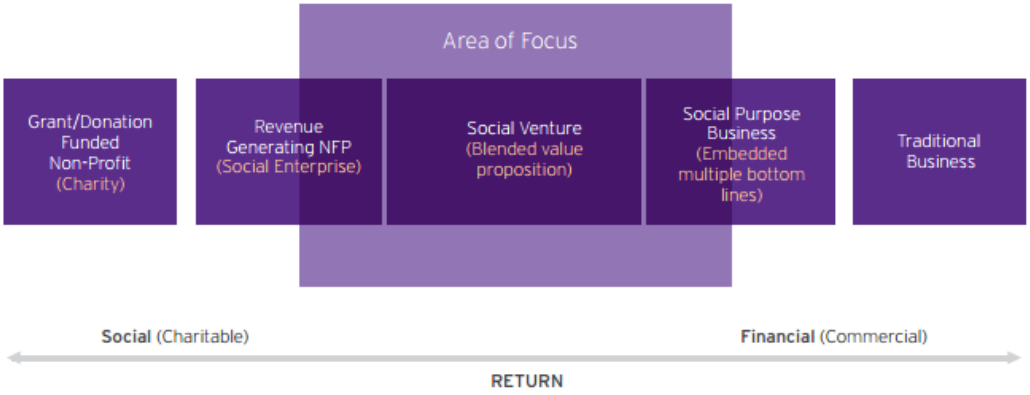

Figure 1-1 Social and Financial Return Continuum **(Golden, Hewitt, Lewkowitz, & Torjman, 2009)**

A company situated at the for-profit end of the spectrum is solely interested in generating revenues for the ownership interests of the firm, with any social outcomes seen as subordinate to commercial goals. A company on the opposite end invests all of its funds into the social mission without any interest in commercial exchange or self -sustenance. Throughout the center of the continuum resides a whole other range of entities, from enterprises participating in commercial exchanges but with exclusively social goals (Newman's Own, Grameen Bank), to enterprises with prominent social goals alongside commercial

ones (Ben & Jerry's). (Peredo & McLean, 2006) The different locations on the continuum have their own unique sets of problems: how to measure success, how to define a mission, where to seek their markets.

But with these differences also come similarities. The nonprofits on the most social end of the spectrum must understand the economics of their situation just as well as the most profit-hungry firm must understand the social environment that they operate in. (Austin, Stevenson, & Wei-Skillern, 2006) It is these similarities, especially in the center of that continuum where social enterprises make commercial exchanges to drive toward a new social equilibrium that drive the questions behind this paper. How can we utilize the massive body of research focusing around business management and design to make social ventures achieve their social goals? And how can these principles be leveraged to create long-term economic sustainability in the initial achievements of social ventures?

New Product Development

New product development (NPD) is defined as the complete process of bringing a new product to the marketplace. It includes responsibilities that span functions of marketing, engineering, supply chain, and production design. In the traditional model of new product development, activities are organized in a sequential order: identify opportunity, design, test, introduce to market, and manage the life cycle. (Zabala-Iturriagogoitia, 2012) Arranged linearly, different stages of the process were isolated

from one another, with each function operating independently of one another. Often referred to as a relay race, this approach came under scrutiny of many researchers and managers in the 1980's as fast-moving new industries began to demand new product development that was smarter and more collaborative.

Hirotaka Takeuchi and Ikujiro Nonaka outlined this fresh model of new product development in their 1986 paper *The new new product development game.* Using examples from the technology and auto industries, the two contended that the analogy had shifted from a relay race to a rugby match. The introduction of fast moving technologies stresses fast and flexible product development cycles. Instead of moving toward the final product in a linear fashion, handing off the baton between functions, research states that businesses need to move all of the business functions forward simultaneously, tossing the ball among team members as they work toward the goal. Marketing, engineering, finance, supply chain, all needed to interact and cross-support to ensure the product being developed was feasible, appropriate, and robustly designed. In this model multi-functional teams work in product groups, seeing their projects from conception phases all the way to final production. The development of new products in this system is no longer a rigid, step-by-step activity; instead it becomes a free-flowing team oriented practice.

According to Tekuchi and Nonaka, there are six characteristics that contribute to the "new" new product development: built-in instability, self-organizing teams, overlapping development phases, multilearning, subtle control, and organizational transfer of learning. The built-in instability begins when management gives a vague goal for the teams to meet, for example a Google product manager asking a team to develop a

better way for Internet users to look at the news. This challenges the teams and allows them the freedom to create the product as they would see fit. The next characteristic, self-organizing teams, comes as a function of the learning process. Due to the lack of formal positions, the teams organize out of utility, going to one another in order to find the information they need to move the project along. Overlapping development phases come as the team begins to sync up their activities. As the marketing arm develops the target market, the engineers may tweak the design to better serve their newly defined customers. This process places a huge emphasis on communication, but proves to pay off in speed and flexibility. Because of this close communication, teams begin to see the effects of the multilearning characteristic. Multilevel learning comes in the form of research from different sources: from experience or reading or anecdotes. And due to the large interaction between different functions of business, proficiency in more than one area of the product's development is born out of necessity. In spite of the nature of this free flowing process, managers still need to be in control of the system. Subtle control dictates creating a work environment that fosters peer-control and assumption of responsibility as a method for keeping the project on track. Finally, in order to ensure knowledge gained through this system is not gone to waste, implementing a system for transferring learning from between product groups and divisions is critical to the long-term effectiveness of this new system.

The Marketing/R&D Relationship

Critical to this new system of product development is communication between different functions of the product team. Notably, the relationship between marketing and engineering has been identified and empirically verified as a predictor for success in new product development. William Souder began studying this relationship in 1977 with an exploratory study on how the coordination between marketing and R&D (engineering) could influence the innovation process. Souder quickly followed this publication with an empirical study of data collected from 1959-1976 on project success related to the R&D/Marketing interface. After analyzing 117 projects in the consumer products, industrial products, and industrial components fields, it was determined that integration of marketing and R&D throughout the product development cycle contributed to both technical and commercial success in new products. (Souder & Chakrabarti, 1978) Souder then conducted a field study of 20 U.S. firms that spanned a multitude of industries and sizes and found that disharmony between R&D and marketing personnel severely hindered the successes of new products. (Souder W. E., 1981) Souder re-confirmed these findings in 1988 when he completed a review of 289 projects, evaluating them on the relations between the R&D and marketing functions between their product teams. Nearly two thirds of the projects analyzed saw disharmonies, which resulted in a statistically significant affect on the success of the projects. (Souder W. E., 1988) Souder's research, as well as other contemporary research on the R&D-marketing relationship focused mainly on firms operating in the United States. More recently, marketing-R&D relationship research has focused on validating these statistics in markets across the

globe. A study in 1992 provided statistical evidence for Souder's claims in Japan, and a 1997 study identified and ranked the importance for marketing and R&D collaboration across the U.S., European, and Far Eastern regions. (Song & Parry, 1992) (Kahn & McDonough, 1997)

As the link between R&D/Marketing was clearly established as a predictor of new product success, these researchers began to explore the managerial implications of their findings. Attempting to bridge the gap between these two very different fields is a chief concern for managers in all product types across markets globally, a challenge that can define whether a new product launches as a success or failure. Across three studies spanning ten years, Souder established and verified eight key recommendations for managing the R&D/Marketing interface: Keep projects small; take a pro-active stance toward interface problems; eliminate mild disharmonies; promote dyadic relations; involve both parties early; establish interlocking taskforces; clarify decision authorities; and make open communication the responsibility of everyone. (Souder & Chakrabarti, 1978) (Souder W. E., 1981) (Souder W. E., 1988) By fostering strong communication, setting clear goals that emphasized teamwork, and mandating collaboration across functions, Souder argued that managers could directly affect the success of their new products. But these relationships do not come without major changes: Souder argues for the institutional integration of the marketing and R&D companies throughout the product development cycle. Only then will the two roles be able to combine or switch roles productively within the project.

Chapter 3 Research Design and Case Profile

Case Selection Criteria

Several criteria guided the selection of a case for this research. First, the venture must clearly state its primary organizational purpose be social, with no emphasis on profitability beyond self-sustenance. This allows us to clearly target the social end of the commercial enterprise spectrum. Second, the subject needed to be far enough along the venture lifecycle to clearly designate it as a success or failure, as this would be a chief validator of the frameworks' success as a predictor of proper business methodology. Third, the venture's product must be technically sophisticated enough to require considerable input from the engineering function in its development. This criterion also rules out ventures whose primary offering is solely a service (e.g. micro lenders). Finally, the venture's organization and new product development process must be adequately outlined in available literature and reference resources to fill the study's informational needs.

Analytical Frameworks and Methods

This study will analyze the subject's new product development process using a framework developed by Kahn et al that outlines best practices for new product development. Created in 2006 and updated in 2012, the elements of strategy, process, culture, project climate, research, metrics, and commercialization were identified as the defining dimensions of new product development practice. (Kahn, Barczak, Nicholas,

Ledwith, & Perks, 2012) A summary of these criteria and their best practices can be found in Appendix A.

After the case has been evaluated on these metrics, the study will focus specifically on how the case integrates the marketing and R&D functions in their new product development process. Using a framework developed by Gupta et al, the case subject will be evaluated according to 14 propositions, grouped in three categories: the venture's need for marketing-R&D integration, it's achievement of that integration, and how the integration affected the venture's eventual success. (Gupta, Raj, & Wilemon, 1986) These propositions appear in full in Appendix B.

Case Profile: International Development Enterprise Treadle Pump

The product selected for this study is the iDE (formerly International Development Enterprises) Treadle Pump. iDE was formally created in 1982 when three friends each chipped in $10,000 to start an organization that used business strategies to increase the incomes of dollar-a-day people. (Polak, 2008) Their first product came when the founder, Paul Polak, was spending time in a Somalian refugee camp. In the camp, Polak recognized a lack of transportation options for refugees to move goods around the region. He began collaborating with local workers to design and build affordable donkey carts, mostly using discarded car parts. Priced at around $450, iDE sold the carts on credit to refugees who used them to begin hauling goods on contract. Cart owners were able to increase their income to nearly twice the per capita average giving the investment a payback period of just two months. The carts began to sell quickly, and at the end of

three years over 500 carts had been sold. (Jones, 1990). The success of this venture did not go unnoticed. iDE began applying for grants to assist them with the donkey cart project and received funding from the United Nations as well as the Canadian government. Using these funds, iDE began to set up manufacturers on the ground in Somalia to begin building an industry that could survive without without outside involvement. By the end of the three-year period, iDE had successfully made itself irrelevant and left behind an industry that was sustainably shifting the equilibrium in this developing context. With this success, iDE was on its way toward becoming one of the largest conglomerations of social enterprise in the world.

Fast forward to the present: iDE has offices working on social enterprises in eleven countries across four continents. A registered non-profit in the United States, the iDE mission states simply that "iDE creates income and livelihood opportunities for poor rural households". iDE works to fulfill this mission by focusing around technologies that improve access to water for both human consumption and agricultural uses. With over 600 employees working internationally to bring these solutions to market, their products include drip irrigation systems, water storage systems, and pumping equipment, all designed to be affordable and accessible to the segment of the market they are trying to reach.

The product that will be the focus of this study is the iDE treadle pump. iDE's second undertaking, the treadle pump began development in 1984 in Bangladesh where Polak was focusing on finding a business to improve access to water for small-scale farmers. iDE worked with the Mennonite Central Committee, who was already in the area, to help create manufacturing and business plans for a rower pump they had been

developing. The rower pump became available for purchase in 1985. The product sold well, but after receiving some feedback from consumers the design was changed to a treadle pump version. Since then iDE has sold 1.5 million of the pumps in Bangladesh while helping open over 60 local manufacturing centers, making it their most successful product to date. (Polak, 2003) The program's success has also inspired other organizations to begin production of similar technologies in other developing markets across the globe, helping to increase progress toward iDE's social mission at an exponential rate.

The technology behind treadle pumps is simple: it is essentially a foot-powered version of the hand pumps common in the United States 75 years ago. Two treadles are attached to a framework that allows them to pivot at one end. Attached to the non-pivot end of the treadle are pistons housed within cylinders. As the treadles are rocked back and forth with the foot-power of the operator, the pistons slide in and out of their cylinders, creating suction. That suction is transferred through an inlet pipe, down a tubewell that is sunk down to the local water table (in Bangladesh that's about 25 feet). The suction draws the water up through the inlet pipe where it then ejected through a discharge pipe attached to the opposite side of the pump manifold. (Kay & Brabben, 2000) See Figure 3-1.

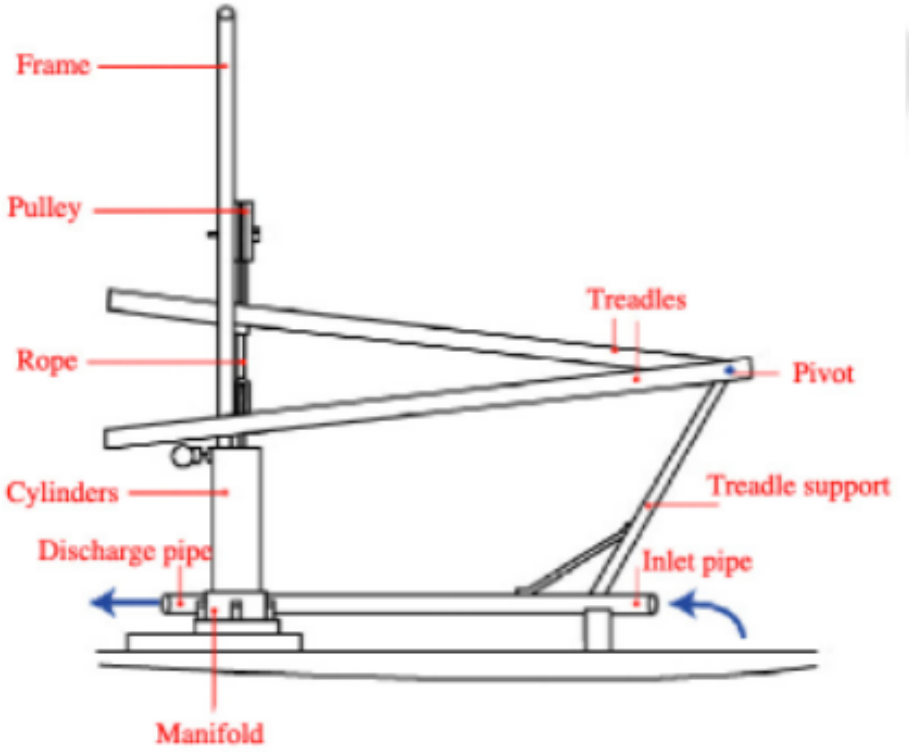

Figure 2 Treadle Pump Design **(Kay & Brabben, 2000)**

Farmers use these treadle pumps primarily for crop irrigation, especially in areas where regular rainfall is not a feature of the climate. iDE estimates that a treadle pump in shallow-water areas like Bangladesh can irrigate a half-acre field, earning a farmer between $100-$500 additional income per year, depending on how the farmer timed crops to the market. (Gloudeman, 2008) This represents a massive increase in income for the dollar-a-day populations this product targets. The treadle pump project was selected for this study after a thorough review of social ventures because 1. iDE's stated mission is purely social 2. The product is mature enough to clearly judge on success or failure 3. The pump involved serious engineering considerations in its design and implementation and 4. Because of iDE's prominence in the social entrepreneurship community several

books and reports are publicly available to gain a full understanding of the pump's new product development process and the role marketing played in making the iDE treadle pump a success.

Chapter 4 : Framework Analyses

New Product Development-Kahn et al (2006)

To begin, we will look at the treadle pump's new product development process through the lens of a framework created by Kahn et al in 2006. A collection of papers, interviews, and books based on the formation and design of iDE's treadle pumps were used to provide the information in this section. They are cited in their first instance in the text.

Strategy

In Kahn's framework, best practices surrounding strategy have to do with clear goals, viewing new product development and opportunity identification as a long-term endeavor, and ensuring all goals for new product development are aligned with the strategy.

iDE was confronted with strategic questions early in the life cycle of the product's development. The pumps the MCC originally manufactured were rower pumps. Instead of being operated through the legs in a pedaling motion, the pumps were operated from a seated position with the arms, much like rowing a boat. The MCC had already installed 2,000 of these pumps with good feedback from farmers, so after considering other designs (including treadle pumps) iDE decided to begin making plans around the rower pump model. (Polak, 2003)

iDE did well by Kahn's model in the initial stages; they held a two-day meeting in Bangladesh including all of the key players in the rower pump project to develop a three year strategy for the project. The goal was to install 20,000 rower pumps by the end of that period through a network of pump dealers and installers. iDE planned to gradually remove any subsidies from the project over those first three years to promote a sustainable marketplace. And, after much debate, the pumps would be manufactured freely on the market, with quality control completed by iDE field technicians. Finally, the product would be marketed through a billboard campaign, as well as leaflet and poster designs. This plan was clearly outlined and distributed to all members of the team from the iDE to the school on the ground in Bangladesh that would be working on the design of the product.

The strategy was largely a success, with over 1,000 rower pumps being sold per month in the third year of business. But before the three years were up, iDE faced a challenge to their strategy. In 1986, iDE offered a contract to product 75 rower pumps AND 75 treadle pumps for a program sponsored by the Bangladesh Tobacco Company to help support small scale tobacco farmers. iDE had the capabilities to produce the treadle pumps, and agreed to the contract. After a season of use, iDE received feedback strongly in favor for the treadle pump design. The pumps were cheaper, easier to use, and performed more efficiently.

This new market information tested the strategic goals iDE had outlined early in the development process. Polak wrote "We had seen ourselves as a Rower Pump organization, and even carried pictures of Rower Pumps on the sides of our vehicles. Were we a Rower Pump organization, or an organization dedicated to opening access to

affordable irrigation water to small poor farmers?" This decision is a critical one, especially under Kahn's framework of new product development. The fourth tenant of good strategic practice states that opportunity identification must be ongoing and be able to redirect the plan in real time. iDE understood the importance of this and decided to pivot the product, changing their focus from Rower Pumps to Treadle Pumps. It is interesting to note, however, that iDE continues to manufacture and sell around 5,000 rower pumps per year.

Process

In Kahn's framework process best practices are is defined as being cross-organizational with clear predefined go/no go criteria. The process is to be flexible and adaptable, well documented, and able to be circumvented without management approval. Organizations with good NPD processes are clear, with set stages and gates that move the product along its timeline.

The iDE NPD process is largely informal, but it is informed by a set philosophy Polak calls the "Don' Bother" trilogy. This philosophy states that iDE shouldn't bother if 1. You haven't had conversations with at least 25 poor people before you begin 2. Your product won't pay for itself in the first year or 3. You don't think you can sell at least a million units at an unsubsidized price. This process focuses heavily on marketing activities like price setting and market segment development, while placing a high value on prototyping and field-testing.

While this “don’t bother” principle guides the process, iDE lacks the clear gates and go-criteria Kahn talks about. There are no formal expectations for sales or acceptable break even points, which could harm iDE, especially when working with third-party organizations to manufacture and sell their product.

Culture

Culture was added to Kahn’s NPD framework in 2012 as a way to describe an environment where top management supports the NPD process and rewards and recognizes entrepreneurship. The very goal of iDE is to promote sustainable social growth through entrepreneurship, so Kahn’s criteria is part of their reason for being.

The concept of rewards for entrepreneurship in a development environment like iDE’s treadle pumps is one that must be translated a little differently than a traditional commercial venture. While companies like Google or IBM may offer bonuses or awards to employees who make entrepreneurial discoveries, a non-profit like iDE must offer incentives for entrepreneurship that are intrinsic to the product. By emphasizing free markets in the manufacturing, dealing, and maintaining service they created, iDE inspired a sense of entrepreneurship in its employees. A dealer that understood where the best marketing efforts could be placed in their respective town could sell more pumps and return more profit. That idea extended to the farmers, who could time their crops with the market to increase the return on their investment and potentially purchase more treadle pumps to irrigate more fields.

During the development of the treadle pump, Paul Polak was the driving force behind iDE. While his education was as a psychiatrist, a deep running set of entrepreneurial philosophies were what contributed to the culture of the product's development.

Project Climate

Project climate best practices emphasize cross-functional teams with coordinated efforts through formal and informal communication. iDE's product development process is an interesting one to evaluate on this metric. Especially early in the development of the treadle pump, entirely different organizations were undertaking different functions of the NPD process. iDE was operating as the marketing function, as well as coordinating the efforts of other players. A local technical school, Mirror Agricultural Workshop and Training Services (MAWTS), was doing much of the engineering and manufacturing work. iDE was fortunate to be operating in the same geographic location as the other organization (Bangladesh) so the physical act of communication wasn't an issue.

The key for iDE's success in this project's development was the ability of key players in both organizations to work toward a collaborative goal, something that didn't always happen due to the multi-organizational nature of the partnership. An example of this was when iDE and MAWTS struggled to reach a conclusion about who should be manufacturing the treadle pumps. MAWTS wanted to make all of the pumps in either their facility or small workshops started by their students, while iDE's free market philosophy dictated that they open up the opportunity for manufacturing to third parties.

This debate took over a year and a half to resolve as iDE continued to use MAWTS as their sole supplier before other manufacturers were able begin working on producing the pumps.

Research

The role of research in the NPD process is one that Kahn considers to go hand in hand with the long-term evolution of strategy mentioned earlier. Working to constantly understand the evolving market, product imperfections, and concept through field testing and integrating research with the consumer is a core tenant of Kahn's NPD This is also one of the core tenants of the iDE philosophy. Inherent to Paul Polak's "don't bother " trilogy is the idea of market research: if you haven't talked to at least 25 poor people before beginning the design process, don't bother. The market research was also apparent early on when iDE was deciding between the rower pump and treadle pump designs. Only after hearing feedback from 150 Bangladesh farmers did iDE understand that the design they had been focusing on was not the most appropriate for the job.

Long-term research is also a part of the philosophy that drives the treadle pump design and business model. Polak makes it a priority to interview at least one hundred customers each year, using that data to inform any changes that should be made to the product. The practice of market research also was applied as iDE sought to expand the value it could offer to the farmers it served. Small agrarian communities often have a feast-or-famine cycle of food availability. During heavy harvesting periods, a surplus of food hits the local market, outpacing demand and leaving a massive amount of food to

spoil. Farmers miss out on valuable income as the high supply drives down prices. So, iDE expanded on its treadle pump business by doing market research to make recommendations to farmers on which crops to grow when. The information driving this training is obtained in each region through comprehensive interviews, market demand analysis, and input from regional and government agriculture experts. By applying these tactics, farmers can better utilize their resources and iDE can create a wealthier customer base that is able to purchase more pumps.

The role of research becomes even more important for a leading social venture like iDE because of the ventures that follow in its footsteps in other markets. Research and documentation becomes a blueprint for successfully bringing this technology and other agricultural technology to small-scale farmers in rural areas. Now more than ever iDE is publishing reports to validate the impact of its product, measuring the increase in crop yield, income, and the adoption process of treadle pumps as they enter a new market.

Metrics

iDE doesn't focus on specific metrics in its development process, instead using another one of the trilogy's points that "unless you can sell a million products unsubsidized, don't bother". The organization, in developing the treadle pump and after, has never developed clear metrics surrounding market potential or even some sort of metric for justifying the social side of any of their products. This is a common issue with social ventures: finding a way to somehow quantify the results of their social impact. For

iDE the customer decides the most important metric: what kind of profit returns must be demonstrated in order to attract the small-scale farmers that iDE is focused on serving?

Commercialization

Commercialization in the case of iDE differed significantly from the model that Kahn proposed. In Kahn's model, the product is "launched", with an emphasis on rolling out the new product in an entire market at once. iDE's "launch" didn't quite work that way. Because iDE needed those short feedback loops to develop their product further, they took an approach of design happening side-by-side with commercialization. And with a model based on setting up small dealers and installers within communities, the process of launching a treadle pump product was by definition incremental.

One key focus of Kahn's best practices that was lacking in iDE was the close integration of logistics and marketing in the launch process. After two years of selling treadle pumps, iDE did a survey of the market and realized that most farmers didn't know what treadle pumps were. They had been relying on word-of-mouth marketing thus far but their market needed a more formal introduction to the concept of treadle pumps as a product. iDE quickly began to focus on promotional strategies aimed at their customers, finally settling on some traditional methods like calendars and posters, and other unorthodox channels like hiring troubadours and giving demonstrations on the back of a moving rickshaw. iDE also worked to create demonstration plots with exemplary farmers where other potential customers could see the treadle pumps in action. While these mistakes were not especially costly because of the lack of a large-scale "launch", sales

could have been increased during those first two years, thus helping iDE get to their goal of subsidy free existence sooner.

Integration of Marketing and R&D

Using the previous framework gave a good background on the cross-functional integration and management of its new product development process. Now, using a method developed in 1986 by Gupta et al, we'll look closer at the relationship between R&D and marketing as iDE worked to create the treadle pump design. Gupta's model uses a series of survey questions to develop validated propositions based around a conceptual framework that asks 1. How much integration is required? 2. How much integration is achieved and 3. Does the degree of success of the product correlate with the degree of success of the integration between functions? Our discussion will be organized around these three questions.

Determinants of How Much Integration Is Required

The first proposition of this category is an analysis of how the firm's strategy is organized. A firm whose strategy is focused on leading into new markets and products increases the emphasis on a marketing-R&D integration. Inversely, as a company moves its strategy toward reacting to market forces, it becomes less necessary for integration across these two functions. In the case of iDE, the strategy focused clearly on leading into a new market territory. This emphasized the need for ample integration between the two

functions of the company as they worked to find a product at a price that was affordable to the small-scale farmer.

The second proposition deals with the stability of the environment where the company is operating in. In established markets and environments, the level of uncertainty dictates that prior research can be relied upon, de-emphasizing the need for integration. In the case of iDE, the market was relatively stable, but there was no certainty because it was an entirely new market being examined. Again, this stressed the need for marketing integration as the innovation process played out. The environment of the developing world underscores this need for integration. Rigid price constraints, limited promotional channels, and complex access-to-market problems make the relationship between marketers and engineers critical in the success of products based in this context.

Determinants of How Much Integration Is Achieved

The first trifecta of propositions in this section center around the structure of the organization being analyzed. As formalization and concentration of power increase and employee participation decreases, the lower amount of apparent integration is achieved by that organization. In the case of iDE, while the treadle pump was being designed the organization's structure was simple due to the size of the operation. Paul Polak was fulfilling the marketing function while a small team at MAWTS filled the engineering function. This small team allowed clear lines of communication between the functions. A certain level of concentration of power in iDE's organization was inherent to its small

size during the process, but the collaborative nature of the work across the two entities indicates a shared power structure. Finally, employee participation is crucial for iDE's pump development, as they rely on service technicians and sales people for a large majority of their feedback loops.

The next group of propositions deals with encouragement of risk-taking, joint rewards, integration at the senior level, as well as more harmonious R&D-marketing operating characteristics. iDE does well to promote risk-taking, although it is usually highly hedged to protect the tenuous position of the consumers. An example was when the organization began development of an animal-powered treadle pump a number of years after the human-powered one was developed. Marketing saw an opportunity to undercut Chinese-manufactured diesel pumps that retailed for about $500 with these new designs, and R&D immediately got to work on it. After a development period of about a year, the bullock pump was ready to go to market at a price of $150. Unfortunately, the diesel-powered pumps had fallen in price to about $150, destroying the competitive advantage of the iDE bullock pump. This failure was seen as a function of taking risks in the marketplace, and was promptly shelved.

Joint rewards are difficult to apply to a non-profit, but as was said earlier the incentive for innovation is built into all levels of iDE's value chain. Farmers with well-timed crop cycles grow more food, sellers with more effective promotion sell more greenhouses, and installation/maintenance workers with better reputations will earn more working on farmers' pumps.

The integration of marketing and R&D at the senior level is another hallmark of iDE's success. Paul Polak was the driving force behind the marketing of this treadle

pump design and he worked hand in hand with the pump's original designer, Gunnar Barnes, to ensure the product came at a price consumers could afford in form that they could readily use. This close partnership allowed Barnes to leverage the data from Polak to inform the ultimate design of the treadle pump, as well as make improvements as more feedback was collected.

The final grouping of propositions under this category deals with the similarities of the marketing and R&D managers at a sociocultural level. Making cross-functional comparisons related to bureaucratic orientation, tolerance for ambiguity, time orientation, and the types of products preferred, it is proposed that similarity across these metrics increase the amount of integration in the marketing-R&D relationship. The easiest of these propositions to attend to is the preference for product type. iDE's work surrounds water issues faced by small-scale farmers, and the organizations it worked with to engineer the product had that as their primary focus as well, lending itself to positive integration. This was tested early when the decision between rower and treadle pumps was made, but after realizing that water availability was a common denominator, integrating the two functions became natural.

The other three propositions are difficult to analyze from a third-party perspective, but we can make some assumptions surrounding them to infer a level of integration within their considerations. Bureaucratic integration refers to the desire to be identified with the employer. In all publications the author could find on iDE, no metrics or anecdotes could be found to either support or deny this proposition. The tolerance for ambiguity metric is an assumption that can be made about any organization operating in the developing world. Ambiguity is a constant consideration when dealing with a place

where resources and cultures can vary wildly from one region to another; this kind of tolerance is essential to iDE's success. Finally, time orientation describes the two functions' need for concrete or flexible schedules. Again, due to the uncertain nature of the developing world, iDE often took a "wait and see" approach with both sides of marketing and R&D, delivering a version of their product, waiting for feedback, then making changes as the feedback dictated.

Integration and Innovation Success

Finally, Gupta et al contends that the gap between the needed and actual integration of the marketing and R&D functions is an indicator for the probability of success in the innovation process. In the case of iDE, there were clear gaps in the marketing and R&D integration. While building the bullock pumps, R&D could have learned earlier of the new competing Chinese diesel pumps. This would have saved time and money, resources that could be applied to other projects in the iDE portfolio. The multi-entity organization of iDE's product development team certainly contributed to that disconnect, giving credence to the theory that organizational complexity is an indicator of poor marketing integration.

iDE also showed positive signs of marketing-R&D integration. An example, after marketing began researching methods to lower the price of the pump the idea of using a narrower tubewell was discussed(the pipe that descends into the water table). The R&D built prototypes using 1" tubing instead of the standard 1.5", and it was found that the narrower tubing was actually easier to use because the inertial forces that must be

overcome at each end of the pump's stroke were much smaller. This interplay between the two functions allowed them to identify an opportunity to improvement and apply it to their product quickly and effectively. The result increased the pump's functionality while decreasing the cost by 20%.

Chapter 5

Recommendations and Key Learnings

In the analysis of iDE's new product development process, satisfactory levels of compliance were found between actual practices and Kahn's best practices. Similarly, the integration of marketing and R&D was practiced throughout the product's design, following closely the framework set forward by Gupta et al. And the success of iDE's product development process is apparent in the data that support its goal for economic sustainability and social impact. Since its beginnings in Bangladesh, iDE has sold 1.5 million treadle pumps to farmers without subsidies. These pumps are estimated to have placed 750,000 new acres of land under irrigation, bringing food and income to these impoverished areas.

The key learnings of this research surround the application of these business-focused frameworks to the world of social ventures. While the different propositions and considerations set forward by these frameworks fit reasonably well within the social context, there are a few key areas where they can be improved for this new application through further research. We'll analyze the findings of each framework and then look at how this research has impacted the understanding of the marketing role in social ventures.

The main areas that need improvement and modification are commercialization and metrics. The commercialization criteria in Kahn's model focuses around a product launch, which necessitates a full-scale release in a short period of time. iDE's experience shows us that many social ventures don't have the capital to finance that kind of launch.

Additionally, the markets that social ventures operate in often do not have channels that support the inventory a one-day launch would require. Finally, promotion in these areas is often done via word of mouth, including the traveling demonstrations and troubadours that were mentioned before. Finding a way to reconcile this slow-build to commercialization with Kahn's ideas would improve the fit of this framework in the context of social ventures. The second major disconnect the research found was in the metrics evaluation of new product development. A major question for iDE and social ventures in general is the standardization of metrics that encompass both the economic and the social goals that the organization is attempting to accomplish. In the case of iDE, the answer to that question came in the form of estimated income generated by their end users. In the case of other ventures, such as low cost eyeglasses, the social impact could be harder to quantify. Finding a way to integrate those social metrics into the Kahn framework would help tailor the framework more thoroughly to the social venture.

Finally, further research similar to the work Kahn did to statistically validate the framework as a predictor of success in social ventures would solidify this as a tool for improving the understanding of social new product development. The nature of the research presented here is purely exploratory; the results show potential in these systems for further empirical investigation.

The framework Gupta et al formulated also proved to be useful in guiding analysis of the relationship between marketing and R&D, with a few exceptions. The model for determining the level of integration needed proved to hold true in the case of iDE as the business strategy and environmental complexity were key indicators of the level of integration that would be required for successful innovation to take place. This

was reflected in iDE's prioritization of market research due to the complexity of the market as well as the constant interaction between R&D and marketing to make incremental improvements in the product.

The model did not fit quite as well, however, when it turned toward the levels of integration that were achieved by the two functions, especially when it turned to the importance of joint rewards across the two functions. The nature of the social venture discourages large rewards for a central development team, instead seeking to reward the users and distributors who work to increase the spread of the technology. This proposal could be re-examined with further research to include more of a value-chain approach, ensuring that each step from manufacturing to final sale includes some incentive for the person in contact with the product. The tolerance for ambiguity and time orientation was another metric that was applicable to the social venture but could have been refined. When working in the developing context it is important to be on the same wavelength in terms of time and ambiguity, but it is even more important to know what to expect of your local partners. Including considerations for the interface between the indigenous people in the marketing and R&D relationship could increase the effectiveness of this proposition as a predictor of positive integration.

Similarly to the previous framework, this study was an exploration of the usefulness Gupta's work as a tool for social ventures to analyze and improve the relationship between their marketing and R&D functions. Statistical evidence across a large sample size of social ventures is needed to validate the framework as an application for the new context. Also, through feedback from social entrepreneurs, this framework could be altered and tailored even more closely to the needs of social enterprise.

The key piece of learning that crystalized after the analysis of these different functions is the concept that marketing must be the leading force behind new product development in the developing world. In these markets price constraints become greatly more important and sales channels are much less concrete, placing greater emphasis on marketing to create clear constraints for the engineering and distribution teams to develop within. In this context the marketing mix becomes a hierarchy for developing those constraints, with price taking the leading role, followed by place, product, and then promotion. Each component of the mix informs the next as social ventures seek to find the product that fits the market.

The price of the object is the first, most critical constraint. In the developing world, the idea of affordable is much more rigid than in traditional markets. Loans are hard to come by, credit cards are nonexistent, and family members don't have the money to lend. If you can't afford something, you can't afford it. Because of this, price takes the front seat before product. A product can return 1000% of the initial investment in the first day, but if the market can't afford that initial investment it is a lost cause. By finding pricing structures that work for the consumers, marketing creates the bounds that the product's design absolutely must stay within.

The place is the next consideration for marketing in these regions. In new product design for traditional markets, it is completely acceptable for firms to create a product and then find a channel to distribute it through. Whether it's the internet, big box stores, or mail order, the product is perfected then either sold by the manufacturer directly or pitched to distributers who use their infrastructure then get it into the hands of consumers. In the developing world the infrastructure simply does not exist to support that model of

development. Marketing must take a leading role again, finding sales opportunities on the ground where the product will be offered. Each region may have different transportation resources, different marketplaces, and different selling networks. Deciphering these resources to create an economic model becomes a key function of marketing both before and after the product has been designed as it works to develop the distribution strategy for the new product.

The product is the third consideration marketing must observe when social ventures begin to design for the developing world. Specific needs and wants can only be learned through extensive market research consisting of both personal interviews and mass surveys are crucial for understanding how these needs correlate to potential features and benefits for the product. The product also must be viewed as a function of price. What is the minimum priced product that remains functional? And from that minimum, is there a way to scale up the technology incrementally, letting each new piece fund its successor? All of these considerations are ones marketing need to understand and translate to the product development sphere.

Finally, when promoting the product, marketing must understand the relationships between members of their target market. In the case of iDE, they found exemplary farmers and used them as spokespeople for their product by setting up demonstration pumps on their plots of land. The marketers must also understand how information is conveyed in the culture, be it through writing, spoken word, songs, pictures, or any combination of those mediums. By utilizing these resources, a promotional strategy can be formulated to leverage the benefits of all of these methods.

The overarching theme of this marketing mix analysis is that the importance of the marketing function in the social enterprises is emphasized by the demands of the developing community. Rigid constraints due to limited resources call for marketing to take a leading role in discovering creative and innovative solutions to these global problems.

Appendix A
Dimensions for assessing new product development best practices (Kahn, Barczak, Nicholas, Ledwith, & Perks, 2012)

	Best Practice	Poor Practice
Strategy	Clearly defined and organizationally visible NPD goals	Most NPD projects fit with mission, but some pet projects that do not fit mission exist
	The organization views NPD as a long-term strategy	No NPD goals
	NPD goals are clearly aligned with organization mission and strategic plan	The organization views NPD only as a short-term tactical initiative
	NPD projects and programs are reviewed on a regular basis	Unclear NPD goals
	Opportunity identification is ongoing and can redirect the strategic plan real time to respond to market forces and new technologies	A portfolio management process is used to manage existing offerings
		All projects are aligned with the organization's mission/strategic plan
		No concern over types of NPD projects being developed
		No process for undertaking portfolio management
		NPD projects may or may not be aligned with organization's mission/strategic plan
		NPD projects are evaluated relative to other projects in a portfolio
Process	A common NPD process cuts across organizational groups	Criteria for evaluating NPD projects are not defined
	Go/no-go criteria are clear and predefined for each review gate	Limited documentation on the NPD process exists
	The NPD process is flexible and adaptable to meet the needs, size, and risk of individual projects	Minimal testing (concept, product, and market) performed
	The NPD process is visible and well documented	No NPD process exists
	The NPD process can be circumvented without management approval	There is no NPD process owner or NPD process champion
		An information technology (*IT*) infrastructure with appropriate hardware, software, and technical support is available to all NPD personnel
		Not all NPD personnel have access to the same IT tools (software and hardware)
		Knowledge of projects is stored and available to NPD personnel
		Project management software and techniques are used to manage projects
Culture	Top management supports the NPD process	The company actively works with customers to develop new solutions
	Management rewards and recognizes entrepreneurship	All NPD ideas come from within the company
Project climate	Cross-functional teams underlie the NPD process	No identifiable NPD group
	NPD activities between functional areas are coordinated through formal and informal communication	No project leader(s)
		Functional areas only support those ideas which they originated
		Interaction and knowledge transfer between functional areas is poor
Research	Ongoing market research is used to anticipate/identify future customer needs and problems	Customer/user is uninvolved in NPD process
	Concept, product, and market testing is consistently undertaken and expected with all NPD projects	Little if any market research is undertaken
	Customer/user is an integral part of the NPD process	No real evaluation of testing (concept, product, and market) results is undertaken
	Results of testing (concept, product, and market) are formally evaluated	No market studies are undertaken to understand marketplace
Metrics		No standard criteria for evaluating NPD projects exist
		No standard criteria for evaluating the overall NPD effort exist
		One person does all NPD project evaluations
		Projects are never killed
Commercialization	The launch team is cross-functional in nature	Marketing budget decisions can dramatically change up to the point of launch
	A project postmortem meeting is held after the new product is launched	Launch decisions are kept confidential by the launch team because of fear of public announcement
	Logistics and marketing work closely together on new product launch	
	Customer service and support are part of the launch team	
	A launch process exists	

NPD, new product development.

Appendix B
Criteria for evaluating marketing-R&D integration

Determinants of How Much Integration is Required

Organizational Strategy Requirements

Proposition 1: The need for R&D-Marketing integration will decline along the prospector-reactor continuum, i.e. from prospectors to analyzers, from analyzers to defenders, and from defenders to reactors.

Environmental Uncertainty Factors

Proposition 2: The greater the environmental uncertainty perceived by an organization, the greater the need for R&D-marketing integration

Determinants of How Much Integration is Achieved

Role of Organizational Structure

Proposition 3: The lower the lower the degree of formalization in an organization, the greater the degree of integration that will be achieved.

Proposition 4: The lower the concentration of power in an organization, the greater the degree of integration that will be achieved.

Proposition 5: The greater the degree of employee participation in the new product decisions, the greater the degree of integration that will be achieved.

Role of Senior Management

Proposition 6: The more senior management encourages risk-taking from both R&D and marketing managers, the greater the degree of integration that will be achieved.

Proposition 7: The more R&D and marketing managers perceive that they are jointly rewarded for new product success, the greater the degree of integration that will be achieved.

Proposition 8: The greater the formal recognition of the need for R&D-marketing integration by senior management, the greater the degree of integration that will be achieved.

Proposition 9: The more harmonious R&D-marketing operating characteristics, the greater the degree of integration that will be achieved.

Role of Sociocultural Differences between R&D and Marketing Managers

Proposition 10: The greater the similarity between the R&D and marketing managers with respect to their professional/bureaucratic orientation, the greater the degree of integration that will be achieved.

Proposition 11: The greater the similarity between R&D and marketing managers with respect to their tolerance for ambiguity, the greater the degree of integration that will be achieved.

Proposition 12: The greater the similarity between R&D and marketing managers regarding their perspectives on time, the greater the degree of integration that will be achieved.

Proposition 13: The greater the similarity between the R&D and marketing managers with respect to the types of projects preferred, the greater the degree of integration that will be achieved.

Integration and Innovation Success

Proposition 14: The greater the gap between the degree of integration ideally required and actually achieved, the lower the probability of innovation success.

Bibliography

Austin, J., Stevenson, H., & Wei-Skillern, J. (2006). Social and Commercial Entrepreneurship: Same, Different, or Both? *Entrepreneurship Theory and Practice , 30* (1), 1-22.

Christia, J. P., Ibarrarán, P., Cueto, S., Santiago, A., & Severín, E. (February, 2012). *Technology and Child Development: Evidence from the One Laptop per Child Program.* Retrieved March 14, 2013, from IDB Working Paper Series: http://idbdocs.iadb.org/wsdocs/getdocument.aspx?docnum=36706954

Dacin, P. A., Dacin, M. T., & Matear, M. (2010). Social Entrepreneurship: Why We Don't Need a New Theory and How We Move Forward From Here. *Academy of Management Perspectives , 24* (3), 37-57.

Gloudeman, N. (2008, December). Q&A: Paul Polak. *Mother Jones* .

Golden, K., Hewitt, A., Lewkowitz, M., & Torjman, L. (2009). *Social Entrepreneurship: Social Venture Finance.* Toronto: MaRS Discovery District.

Gupta, A. K., Raj, S. P., & Wilemon, D. (1986). A Model for Studying R&D-Markeiting Interface in the Product Innovation Process. *Journal of Marketing , 50*, 7-17.

Gupta, A. K., Raj, S. P., & Wilemon, D. (1985). R & D and marketing dialogue in high-tech firms. *Industrial Marketing Management , 14* (4), 289-300.

Jones, L. (1990, June 28). Simple Strategies That Help Poor Regions. *The Christian Science Monitor* , p. 13.

Kahn, K. B., & McDonough, E. F. (1997). Marketing's Integration with R&D and Manufacturing: A Cross-Regional Analysis. *Journal of International Marketing , 5* (1), 51-76.

Kahn, K. B., Barczak, G., Nicholas, J., Ledwith, A., & Perks, H. (2012). An Examination of New Product Development Best Practice. *Journal of Product Innovation Management , 29* (2), 180-192.

Kay, M., & Brabben, T. (2000). *Treadle pumps for irrigation in Africa.* International Programme for Technology and Research in Irrigation and Drainage. Rome: Food and Agriculture Organization of the United States.

Kraemer, K. L., Dedrick, J., & Sharma, P. (June). One Laptop Per Chiled: Vision vs. Reality. *Communications of the ACM , 52* (6), 66-73.

Malkin, R. A. (2007). Design of Health Care Technologies for the Developing World. *The Annual Review of Biomedical Engineering , 9*, 567-87.

Martin, R. L., & Osberg, S. (2007). Social Entrepreneurship: The Case for Definition. *Stanford Social Innovation Review , 5* (2), 28-39.

Peredo, A. M., & McLean, M. (2006). Social entrepreneurship: A critical review of the concept. *Journal Of World Business , 41*, 56-65.

Polak, P. (2003). *how IDE Installed 1.3 Million Treadle Pumps in Bangladesh by Activating the Private Sector: The Practical Steps.* Berne: Swiss Agency for Development and Co-operation.

Polak, P. (2008). *Out of Poverty: What Works When Traditional Approaches Fail.* San Francisco, CA, United States: Berrett-Koehler Publishers, Inc.

Riddell, R. C. (2007). *Does Foreign Aid Really Work?* New York: Oxford University Press.

Song, X. M., & Parry, M. E. (1992). The R&D-Marketing Interface in Japanese High-Technology Firms. *Journal of Product Innovation Management , 9* (2), 91-112.

Souder, W. E. (1981). Disharmony Between R&D and Marketing. *Industrial Marketing Management , 10* (1), 1981.

Souder, W. E. (1988). Managing relations between R&D and marketing in new product development projects. *Journal of Product Innovation Management , 5* (1), 6-19.

Souder, W. E., & Chakrabarti, A. K. (1978). The R&D/Marketing Interface: Results from an Empirical Study of Innovation Projects. *IEEE Transactions on Engineering Management , 25* (4), 88-93.

Takeuchi, H., & Nonaka, I. (1986). The new new product development game. *Harvard Business Review , 64* (1), 137-146.

The Independent Evaluation Group. (2011). *An Evaluation of World Bank Group Activities in Information and Communication Technologies.* Washington DC: Independent Evaluation Group.

Yesuf, M., & Bluffstone, R. (2007, September 11). *Risk Aversion in Low Income Countries: Experimental Evidence from Ethiopia.* Retrieved March 4, 2013, from International Food Policy Research Institute: http://www.ifpri.org/sites/default/files/publications/ifpridp00715.pdf

Zabala-Iturriagogoitia, J. M. (2012). New Product Development in Traditional Industries: Decision-Making Revised. *Journal of technology management & innovation , 7* (1), 32-50.

ACADEMIC VITA

Ernie Lehman

321 W. Nittany Avenue
State College, PA 16801

Education

B.A., Film/Video, 2013, Pennsylvania State University, University Park, PA
B.S., Marketing, 2013, Pennsylvania State University, University Park, PA

Honors and Awards

- START Diversity Award, 2011
- Carmen Finestra Senior Film Scholarship, 2012
- Schreyer Honors College Academic Excellence Scholarship
- Runner up, CISCO Innovation Challenge, 2013
- Dean's List, 7/7 semesters

Student Activities/Leadership

Penn State Cycling Club
- 2011-Race Director
- 2012-13, President

Teaching Assistant
- Introductory Management for non-business majors (Spring '10)
- Business Ethics (Spring '11-Fall '12)
- Introduction to Management for business majors (Spring '13)

Research Assistant
- Completed literature review on student entitlement in Psychology, Education, and Sociology

Atlas Benefitting Penn State Dance Marathon
- Videographer and Webmaster

Professional Experience

Specialized Bicycle Components
- Inside Sales Intern, Summer 2012

Studio Now, Inc.
- Freelance Videographer, Fall 2011-Spring 2013