The University of Michigan
School of Natural Resources & Environment
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Sustainable Enterprise: Plastic Waste Recyclying in Jakarta

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THE UNIVERSITY OF MICHIGAN SNRE MASTER'S PROJECT

A 12 to 18 month long interdisciplinary problem-solving engagement conducted by a team of six Master's degree students as the capstone of their academic program.

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Sustainable Enterprise: Plastic Waste Recyclying in Jakarta

The project sought to understand and address the environmental and social impacts of the plastic waste stream and its associated stakeholders in Jakarata, Indonesia.

http://www.snre.umich.edu/current_students/masters_projects

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Executive Summary

99%. That is roughly how much of the recyclable plastic waste produced in Jakarta is ultimately recycled. This phenomenon has little to do with an environmentally friendly ethos or a convenient recycling program. Recycling rates, in fact, have very little to do with consumers at all. Even a plastic bottle tossed from a moving vehicle along the highway will likely end up being processed into a polyester t-shirt or a plastic knick-knack. Plastic waste in Jakarta doesn't make it to the land fill because in a country like Indonesia, where the majority of the socioeconomically stratified population is economically marginalized, the marginal value of a single plastic bottle can mean the difference between hunger and a meal.

Jakarta, Indonesia is one of the fastest growing emerging-market mega-cities in the world. Unfettered growth predicated largely upon resource extraction in Indonesia has led to a fast expanding upper- and middle-class population that increasingly drives the country's economic expansion. This growth brings with it all of the amenities that the Western world has regarded as normal for years: cars, LCD televisions, smart phones, and disposable consumables. The city itself, though haloed by shanty ghettos, prides itself on some of the most opulent modern amenities to be found in the world. And on street corners where small vendor carts hawking traditional foods are ubiquitous, common too are inexpensive bottled beverages. In fact, in Jakarta, where tap water is not potable, bottled water is perhaps the most important consumable – across all economic levels and all population groups. And increasingly so, the result of this is massive waste production: Indonesia produces over 167 thousand tons of trash each day.

It was to address this very issue that in late 2010, the UM Master's Project team began working with PepsiCo, a leading food and beverage industry aiming to grow its business in emerging markets such as Indonesia. In an effort to drive the company's sustainability strategy, PepsiCo contracted the UM Team to develop a project pilot that would increase the amount of plastic waste being recycled in Jakarta. Due to the direct connection between their most popular products and the waste issue in emerging markets like Indonesia's, there was a clear and obvious justification for the project from the start. It wasn't until the summer of 2011, during the initial field research, that the UM Team discovered that 99% of recyclable plastic waste was already being recycled. Early in the project, it seemed as though, the project goals had already been accomplished.

By integrating adaptive and iterative strategies, however, the team, in collaboration with the PepsiCo Advisory Board redesigned its project scope. Instead of increasing recycling rates, PepsiCo and the UM Team began to focus on the pressing socio-economic issues associated with the post-consumer plastic waste recycling (PCWR) stream in Jakarta.

Juxtaposed against the marvels of a burgeoning metropolis are over 600,000 impoverished waste collectors known as *Pemulung,* which translates to "scavenger" in the local Bahasa Indonesian language. From the cool pre-dawn hours of the morning into the warm evenings, the *Pemulung* work for between two and five USD a day sweeping the streets for plastic bottles. Given the nominal value of a single plastic bottle, it goes without saying that the *Pemulung* find themselves in a Sisyphean cycle of poverty.

Given the reality of the PCWR stream in Jakarta, PepsiCo and the UM team developed the following question: What type of initiative can be developed that will allow a large beverage and food manufacturer to positively impact the *Pemulung*? Moreover, is there an opportunity for PepsiCo and its customers to strengthen their brand recognition and awareness in Indonesia while also making a positive impact on the *Pemulung*?

To resolve these questions, the UM Team spent 126 total field days in Jakarta conducting ethnographic research primarily through stakeholder interviews, participatory observation, and surveys. Between the summer of 2011 and spring of 2012, the team developed meaningful relationships with a number of international and regional organizations as well as a number of knowledgeable individuals. Desktop research and supplemental interviews

from the U.S. allowed the UM Team to develop a number of initiatives with which the team hoped to ameliorate some of the negative aspects of the Pemulung community.

Armed with the results of numerous field surveys and secondary research, the UM Team identified this project as an opportunity where empathy, innovation, and adaptive strategy could create a positive social impact. So, through a highly iterative design process, the UM Team narrowed their project initiatives down to two primary projects: an SMS text message based communication tool (P-Mobile) and a Business Plan Competition (BPC).

P-Mobile is an initiative is premised on the idea that by crowd sourcing frequently updated pricing information and, in turn, making that information immediately available to Pemulung throughout Jakarta, the initiative would deliver collective bargaining power into the hands of its users. By leveraging an already pervasive technology, the common cell phone, which has a greater than 100% penetration rate in Jakarta, the software solution links Pemulung with a centralized service center. This virtual information center can both aggregate and disseminate relevant information. After testing a number of prototypes in Jakarta and receiving user feedback, the team determined that P-Mobile could best serve the *Pemulung* as an information dissemination tool for the Pemulung Union (IPI) one of the key partners that the UM Team developed over the course of the project rather than as a price transparency tool.

Due to physical and political limitations, P-Mobile, at least during its pilot phase, is best served as an information exchange platform. The service could enable IPI to share health, education, and legal services, amongst other forms of information, with the *Pemulung*.

It quickly became apparent to the UM Team that a local problem such as the socio-economic marginalization of the *Pemulung* in Jakarta is best addressed by local, market-based solutions. More importantly, the team, in this case, recognized its limitations – because the team is geographically and culturally removed from the site, there was a possibility that the solutions that the team developed would not be truly valuable to the *Pemulung*. In order to resolve this, the team developed a project plan for a Business Plan Competition (BPC). The BPC will identify a triple-bottom-line business that idea that improves the condition of the Pemulung in Indonesia. To do this, the Team proposes partnering with the Global Entrepreneurship Initiative, Indonesia (GEPI) to host a entrepreneur-centric competition that invites innovative thinkers to develop and pitch ideas that address the competition's criteria. The winner of the BPC would in turn be supported with small amounts of seed capital as well as large doses of training, education, seminars, and mentorship from resources facilitated by the UM Team, PepsiCo, and stakeholders.

We developed an "expert network" of partners and stakeholders and created a robust knowledge bank related to waste management in Indonesia and the environmental, economic, political, behavioral, cultural, social dynamics associated with the deficient municipal waste management infrastructure and the vast informal economy that has sprung up around waste recycling in Indonesia. Our solution suite was refined and vetted by numerous stakeholders with intimate knowledge of the driving factors of this complex system. Ultimately, our team has created a roadmap for a sustainable solution that addresses a number of the problems in this system. We have identified the leverage points in the system and have provided our client with the knowledge, strategy, and relationships to implement our proposed solutions.

Acknowledgements

Plastic waste and the social impacts of post-consumer plastic waste recycling in the Jakarta Capital Region of Indonesia has been the focus of our work. We have labored to make sense of a complex problem that exists at the interface of human and natural systems. Understanding the context and extent of the problems associated with this system has been an exciting, but often, daunting challenge. Working to develop what we believe to be sustainable solutions for this system has been an iterative process and one that has translated into a memorable journey. Numerous individuals and organizations have supported us at various points along the way, while others have been steadfast champions of our project and team throughout. We would be remiss not to acknowledge all of these individuals and organizations, and make every effort to recognize them here.

Without the School of Natural Resources and Environment (SNRE) at the University of Michigan, this project would not have been possible. The six of us that formed a team have benefitted tremendously from a learning experience that will undoubtedly add new perspective and more robust and refined skill-sets as we each blaze new career paths. SNRE has served as an enabler in a fundamental way. We also thank SNRE for the additional financial support they provided to us to bolster our research efforts related to climate change adaptation.

Judy Byington from the Office of Academic Affairs was prompt to reply—and always cheerful—in our correspondence with her regarding administrative matters. Similarly, Jennifer Taylor, the Academic Registrar for SNRE has helped us to smoothly navigate a number of administrative issues. Lisa Yee-Litzenberg and Saundra Auerbach were also helpful at various stages of the project. The courtesy and professionalism of these women is truly first-rate, and reflects upon the quality and class of SNRE as a globally respected institution.

The Fraser Residence was our home during three trips to Jakarta. The staff members were extremely courteous, and we thank them all for making us feel welcome and cared for during our exhausting trips.

We owe our thanks to Rick Bunch, the Managing Director of the Erb Institute at the University of Michigan, and Cyndy Cleveland, the Program Coordinator for Erb. As a member of our Advisory Board, Rick was a helpful resource, particularly in the early stages of the development of our relationship with our client. Cyndy has thoughtfully kept us in mind and connected us with contacts, while also helping with logistical issues. Dominuque Abed, Stephanie Judd, Sara Howie, and other members of the Erb community were of great help in coordinating and smoothly handling a visit and public talk by David Walker, one of our clients and the Senior Director of Environmental Sustainability at PepsiCo, in September 2011. We thank them all for their support.

Steve Percy and Ming Xu, our academic advisors, have consistently been outstanding resources to our team. They have offered both tactical and strategic advice and guidance, and have challenged us to strive for excellence. Their collective experience and wisdom has benefitted us tremendously, and we owe them a great debt of gratitude for their willingness to make themselves available to us.

The Piaget Academy's National High Jakarta School has been one of our key stakeholders and as an institution has been of tremendous help to us. Foo Pau Choo, Yayuk Wahyuni, Wesley Bullock, Colin Pereira, Daisy Yiu, William Yiu, and others went above and beyond ordinary hospitality during our trips to Jakarta. We hope to create a long-term relationship between the University of Michigan and Piaget Academy, as it is a fantastic institution that educates some of the brightest young minds in Asia and is led by talented and dedicated staff, teachers, and administrators.

Olivier Pouillon is not only a thought-leader on waste management, but is directly addressing the challenge of waste on the island of Bali, Indonesia through his venture, Bali Recycling. During our visit to Bali in March 2012, Olivier took us on a "Tour de Trash" through the areas of Kuta and Ubud on the island. He helped us to see, understand, and document the tragedy of waste on the island of Bali. Olivier also illuminated for us what sustainable waste management might look and work like. We also got an opportunity to see some truly amazing and beautiful sites with Olivier, including a Buddhist temple and breathtaking landscapes. We also shared a

number of delectable meals together. We hope to see Bali Recycling thriving and changing the face of waste management on Bali and beyond. We thank Olivier from the bottom of our hearts for generously taking three full days of his time away from his business and family to share his experience, knowledge, and perspective with us. We also thank his beautiful family for welcoming us into their lovely home.

Jalal, a man with only one name, is a guru of the world of corporate social responsibility and sustainability. He is an exceptionally kind and generous soul to boot. He transferred prodigious amounts of knowledge to our team during our several visits to Indonesia, and was able to arrange once-in-a-lifetime opportunities for us. With Jalal's guidance, our team was able to glean an understanding of the complex system that exists within the informal economy of waste recycling in Jakarta in particular and Indonesia more broadly. As the founder and leader of A+CSR Indonesia, Jalal continues to make progress on embedding sustainability into corporate DNA in Indonesia and the Asia Pacific region. We wish for many years of continued friendship with Jalal, and are extremely grateful for all that he is done for our team and the development of our project. We wish him great success on his mission.

Mark Wang, the Executive Director of Global Entrepreneurship Program Indonesia (GEPI) has been a supporter of our project from the instant we initiated a relationship with him. Mark has made himself, as well as his staff and high-profile Board of Directors available to us to discuss and co-develop one of our main project initiatives. We thank him for encouraging and promoting the development of our ideas. It is our steadfast intention to maintain a healthy and enduring relationship between the University of Michigan and GEPI, and to help see that GEPI's mission—"to catalyse Indonesia's entrepreneurship strategies by working in partnership with existing programs and linking aspiring Indonesian entrepreneurs to global developments and investment prospects"—is achieved.

Our clients from PepsiCo have provided us with a tremendous opportunity and valuable professional and life experience. At every point along the way, they have pushed us to think both strategically and analytically. It has been truly unique and enriching experience to have direct exposure to a variety of executives within a multinational corporation. Their perspective and insights have benefitted us and this project tremendously. They have also brought us together as a cohesive team, and helped us to learn an incredible amount from one another. We will cherish the memories of working on this project for a lifetime.

Introduction and Methods

Project Description

PepsiCo charged the University of Michigan Master's Project Team with developing innovative solutions to positively impact the plastic waste stream in Indonesia. The initial goal of the project was to understand the plastic waste stream in developing economies and the role of critical stakeholders within that stream to increase recycling rates. Research quickly revealed that recycling rates are extremely high, particularly in Indonesia, because of an informal economy that developed based on the value of recyclable post-consumer waste. Given these findings, a critical paradigm shift within the project scope occurred. The focus of the project evolved from increasing recycling rates to making positive impacts on the environmental and social elements that are a part of this informal waste management infrastructure. To do so, the project would require an immense amount of data collection to fully understand this infrastructure. Food and beverage companies would in turn use this data to develop corporate social responsibility (CSR) initiatives that would ultimately improve the condition of the waste collectors (known as *pemulung*) in Indonesia.

The ideal initiative would be environmentally and socially conscious and would create positive impacts on the livelihood of *pemulung*. Another critical objective was to create a model that could potentially be adapted to markets in various countries with similar waste issues. PepsiCo charged the team with identifying potential partners that were immersed in the local market and possessed local knowledge that would increase the likelihood of developing a successful initiative. It was also critical that the initiative support a positive brand position for PepsiCo in this market. A key tenant of CSR initiatives is that they appropriately address environmental, social, and economic goals of an organization. This is what makes creating successful CSR initiatives challenging, but also potentially more resilient and rewarding than an exclusively profits oriented approach.

Primary research was conducted over the course of several trips to Indonesia. Stakeholders throughout the value chain were engaged and interviewed during multiple field trips, conference calls and face-to-face meetings. Primary research from partners exploring this subject matter was also collected and reviewed as a relevant secondary research source. Literature reviews on this topic and publicly available information from competitors in the food and beverage industry provided relevant secondary research.

This project involved related activities including engaging teenagers in Indonesia to explore this topic and presentations to Ross School of Business graduate students by the Sr. Director Environmental Sustainability at PepsiCo, David Walker. The major project activities and timeline are shown in Figure 1.

Research Questions

This project was intended to answer the following questions:

Initial Questions:

1. What is the plastic waste disposal processes in Indonesia and what is each stakeholder's role in the process?
2. Is there a way for the *pemulung* to derive more equitable value from the role they play in waste management?

Refined Research Questions:

1. What type of initiative can be developed that will allow a large beverage and food manufacturer to positively impact the *pemulung*?
2. Is there an opportunity for PepsiCo and its customers to strengthen brand recognition and awareness in Indonesia, while also making a positive impact on the *pemulung*?

Project Methods

Site Visits

From July 2011 through March of 2012, five trips were made to various sites throughout Southeast (SE) Asia for primary research purposes, stakeholder engagement, and partnership development. Site locations included PepsiCo customer locations in SE Asia and several visits within the *pemulung* community. Field research was conducted on each trip that directly engaged *pemulung* and others managing and studying the waste stream in Indonesia.

Table 1: Investigative Trips

Date	Location	Purpose
July 22 - August 1, 2011	Hong Kong, China; Jakarta, Indonesia	Project Scoping; Kick-off Meetings
August 16 - 26, 2011	Singapore; Jakarta, Indonesia	Primary Research; Stakeholder Engagement
October 24 - October 28, 2011	Jakarta, Indonesia	Primary Research; Stakeholder Engagement
January 1 - 6, 2012	Hong Kong, China; Jakarta, Indonesia	Primary Research; Stakeholder Engagement; Pilot Exploration
February 24 - March 2, 2012	Jakarta, Indonesia; Bali, Indonesia	Primary Research; Stakeholder Engagement

PepsiCo Employee Interviews

Initial interviews and lengthy discussions were held with employees holding operational, marketing, sales, sustainability, and management positions in PepsiCo from the global, regional, and country levels of the company. The team began with interviewing individuals that have worked on Corporate Social Responsibility and Operational initiatives with in the company and then expanded to involve individuals with experience in the Southeast Asian region. These initial and continual engagements were a central part of developing and refining the project.

Table 2: PepsiCo Employees Engaged

Name	Role
Ms. Ada Shen	Director, Corporate Social Responsibility, PepsiCo Greater China Region (no longer with PepsiCo), Beijing, China
Mr. Amit Bose	General Manager, PepsiCo Indonesia, Jakarta, Indonesia
Ms. Jennifer (Jennie) James	Regional Director - Corporate Affairs, PepsiCo Asia Pacific, Hong Kong

Mr. David Walker	Senior Director, PepsiCo Global Operations, Purchase, New York (Global Headquarters)
Ms. Laurie Hoffman	Modern Trade Channel Regional Development, PepsiCo, Bangkok, Thailand
Ms. Lynette Ryan	Regional Director - Corporate Affairs, PepsiCo Asia Pacific, Hong Kong (No longer at PepsiCo)
Mr. Brian Miller	Sales Director, Recycling Program, PepsiCo USA
Ms. Meagan Smith	Program Manager, Recycling Program, PepsiCo USA
Mr. Gary Horsfield	Vice President Supply Chain, PepsiCo Asia Pacific, Sydney, Australia
Mr. Robert Taylor	Sales Director, 7-Eleven Account, PepsiCo USA
Ms. Gabriela de la Garza	Sustainability Manager, Latin America Beverages, PepsiCo, Miami, Florida

Non-governmental Stakeholder Engagement

Several discussions and interviews were conducted with non-governmental entities working on waste and social issues in Indonesia. These organizations provided insight on the history and current situation of the *pemulung*. Several experts on the handling of waste in Indonesia were included in these organizations. Groups also focused on social as well as economic development in Indonesia were also engaged. Meetings were held at PepsiCo offices, onsite at the organization, or at pertinent field locations. Teleconferences were also held with individuals from these organizations.

Table 3: Non-Governmental Organizations, Businesses, and Academic Institutions Engaged

Organization	**Purpose of Engagement**
Full Life Community	Intimate introduction to p*emulung* community and those working on social issues within the community
Ikatan Pemulung Indonesia (Pemulung Union)	Connect with *pemulung*, understanding related issues
A+CSR Indonesia	Understand waste landscape in Indonesia; CSR initiatives, and connecting with p*emulung*
La Tofi School of CSR	Connect with *pemulung*, understanding CSR in Indonesia
World Wildlife Foundation	Understand waste issues in SE Asia
Business for Social Responsibility	Understand waste issues in SE Asia and

	approaches to CSR; scope project
Global Entrepreneurship Initiative - Indonesia	Identify partner with local knowledge to launch initiatives
Bali Recycling, Inc.	Understand approaches to waste issue outside of greater Jakarta and Union efforts
University of Indonesia	Identify students to possibly support project
National High Jakarta School	Educate and engage future leaders as well as members of PepsiCo target market

Pemulung Interviews and Observation

Thorough primary research was essential to this project; well over 150 man-hours were spent in the field interviewing and observing the *pemulung*. Communication was facilitated through the use of translators and local guides that were familiar with the *pemulung* communities. Photographic and rhetorical data was collected. These field visits involved participating in the actual collection and processing of waste, as well as engaging with various levels within the value chain.

Table 4: Pemulung Locations

Date	**Location**	**Purpose**
July 26 -27, 2011	Jakarta, Indonesia	Initial Primary Research with *pemulung*
August 23 - 24, 2011	Depok, Bintan, and Jakarta, Indonesia	Initial Primary Research Higher in Waste/*Pemulung* Value Chain
October 24 - October 28, 2011	Tangerang, Indonesia	Observe Danone's currently operating Pemulung Empowerment Program
January 1 - 6, 2012	Depok; Bintaro; Jakarta - Indonesia	Primary Research; Piloting
February 24 - 28, 2012	Ubud, Bali, Indonesia	Primary research on *pemulung* outside greater Jakarta

PepsiCo Advisory Team Regular Review Meetings

Bi-weekly and monthly meetings were held with the PepsiCo internal advisory board to discuss findings and guide the evolution of the project and end-goals. These meeting involved the key stakeholders from within PepsiCo from various levels within the organization. These meetings allowed the University of Michigan team and the PepsiCo representatives to strive toward building alignment and consensus.

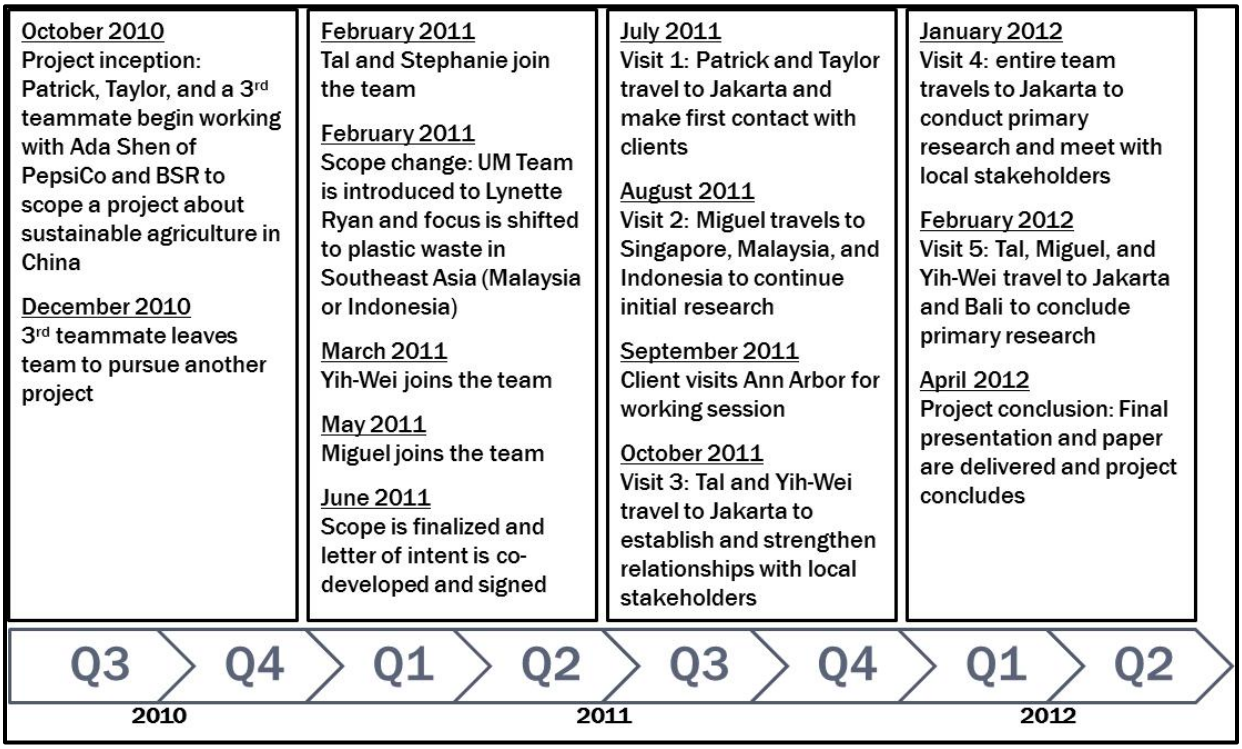
Table 5: PepsiCo Advisory Team

Name	Role
Mr. Amit Bose	General Manager, PepsiCo Indonesia, Jakarta, Indonesia
Ms. Jennifer (Jennie) James	Regional Director - Corporate Affairs, PepsiCo Asia Pacific, Hong Kong
Mr. David Walker	Senior Director, PepsiCo Global Operations, Purchase, New York (Global Headquarters)
Ms. Laurie Hoffman	Modern Trade Channel Regional Development, PepsiCo, Bangkok, Thailand
Mr. Gary Horsfield	Vice President Supply Chain, PepsiCo Asia Pacific, Sydney, Australia

Literature Review

A literature review was conducted using online databases available through the Ross School of Business library. Search parameters consisted of the terms such as “plastic waste”, “Southeast Asia waste issues”, “beverage industry”, “waste management”, “trash collectors”, and “corporate social responsibility”. Peer-reviewed journals were used when possible. Valuable research and information was also available from non-profit, governmental, and non-governmental organizations focused on these issues or related issues. These sources were also used to guide our efforts and as secondary research.

Figure 1: Time Table of Major Events



Internal Advisory Board

The project's internal advisory board developed quite organically as the project took shape. Faculty advisors were first recruited based on their familiarity with the region, their experience with private sector clients, and their functional expertise.

Mr. Steve Percy was recruited as an advisor due to his extensive background working in multi-national corporations. The team identified him as an individual who was both interested in supporting students at SNRE as well as a professional who deeply understands the private sector. His frequent check-ins and insightful advice allowed the team to decipher potential internal bureaucratic issues within our corporate client and how to navigate them as consultants.

Dr. Ming Xu was recruited as an advisor based on his empirically based understanding of Asia Pacific. Ming provided an in-depth understanding of Asia that remained pertinent despite our project focus shifting from China to Indonesia.

Dr. Laura Edinger of BSR based out of Hong Kong joined our Internal Advisor Board due to her previous experience with our client. Additionally, she was able to provide insight into corporate social responsibility engagements in the region.

Mr. Rick Bunch, Managing Director of the Erb Institute, was recruited as an advisor to both support our effort to engage the client as well as to build a lasting partnership between PepsiCo and the University of Michigan. In David Walker's visit to campus, Rick lent his deep knowledge of corporate engagements to, in turn, deepen our relationship with our client.

Dr. Tom Gladwin is the Max Mcgraw Professor of sustainable enterprise, and he holds a joint appointment with the Ross School of Business and the School of Natural Resources and Environment. His current and future research centers on establishing and promulgating a science of sustainable enterprise, a new transdisciplinary field addressing relationships among ecosystems, social systems, economic systems and organizational systems. Ongoing research topics include transformational leadership for sustainable development.

Dr. Marina Whitman is Professor of Business Administration and Public Policy at the University of Michigan. From 1979 until 1992 she was an officer of the General Motors Corporation, first as Vice President and Chief Economist and later as Vice President and Group executive for public affairs, which included the economics, environmental activities, industry-government relations and public relations staffs. She also serves or has served as a director of several leading multinational corporations.

Waste in Asia and the Food and Beverage Industry

Post-Consumer Waste from the Industry

This project sought to map the end-of-life impact and path of plastic food and beverage packaging. Our client PepsiCo is the second largest food and beverage company in the world (PepsiCo, Annual Report, 2011). As a manufacturer of food and beverage products, their offerings are delivered in single or multi serving containers which are designed for easy post-consumption disposal. Given this fact, the UM Team explore whether a company such as this can mitigate the impacts of the consumption given that the goal of this business is to increase consumption of its goods.

PepsiCo is very interested in understanding the entire lifecycle of their products in Indonesia. One important component of this understanding of course, is the waste production and the handling of plastic – consider the innumerable amount of plastic bottles that deliver their bubbly drinks. Material flow and the intertwined stakeholder relationships is critical to fulfilling PepsiCo's pledge to perform with purpose as it grows in the Indonesian market.

To do this, it is first useful understand the landscape of the food and beverage industry's waste impact on Indonesia.

Indonesia's consumption rates of food and beverages from multinational consumer packaged goods companies (CPGs) is increasing. Consequently, so are the environmental implications of post-consumer product waste. Indonesia is the fourth largest country in the world with a population of 238 million in 2010 (Unit, 2012). Current per capita food consumption is lower than in other emerging markets, but analysts believe Indonesia is on the brink of a spending increase. As affluence in the lower and middle classes increases rates of tertiary spending on snacks and sugary drinks will increase as well. Per capita consumption rates are positioned to grow 6.9 percent per year between 2012 and 2016 (Business Monitor, 2012). In response, food and beverage companies are positioning themselves to capture this growth in consumption. Ultimately as more products are consumed, more post-consumer waste will result.

Waste is on the rise in Southeast Asia despite the fact infrastructure is not in place to handle the increased consumption and corresponding waste. The World Bank estimates that urban areas in Asia are generating between 450,000 to 760,000 tons per day with the expectation of reaching 1.8 million tons per day by 2025 (Chin, Carmody, & Le Breton, 2011). Economic growth, population growth, and urbanization are all driving the increasing waste volumes and putting pressure on existing infrastructure. The projection of the effect of this increased consumerism is particularly evident in Indonesia. Across Asia, per capita rates of waste generation are increasing and by 2025 Indonesia will be one of the Asian countries that has seen the greatest increase in per capita waste production (Chin, Carmody, & Le Breton, 2011).

Post-consumer food and beverage packaging compose a significant amount of the plastic waste produced in Asia. Our field research revealed that much of the post-consumer plastic in Indonesia is from bottled beverages, particularly bottled water. Globally, bottled water demand has doubled from 1999 to 2004 and continues to increase. This translates into over 2.7 million tons of water bottle plastic being consumed annually (Bottled Water Statistics, 2012). Globally, more than 60 billion tons of plastic are produced annually and less than 5% is recycled. Much of the plastic waste that does not enter landfills ends up in the oceans (Walsh, 2009). Formal recycling programs are nearly non-existent in Indonesia.

Consumer product companies are aggressively investing in Indonesia and trying to beat out the competition for market share, as the addressable market increases in size due to increased population and higher levels of per capita consumption. Multinational firms like Nestle and Unilever are investing several hundred millions of dollars

in Indonesia over the next couple of years to create new products and earn customers (Business Monitor, 2012). These CPGs and their competitors are going to offer more products in the price range of the middle and lower class consumers, which ultimately will mean even more post-consumer waste entering the system. Companies are fervently figuring out how to work around the poor transport infrastructure of the country in order to affordably and efficiently distribute products around the country (Business Monitor, 2012). Unfortunately, the same fervor is not being applied to figuring out how to work within this deficient infrastructure to handle the products after they are consumed.

Addressing the Increase

While Indonesia has a quarter of the population of China, it has only one tenth of the infrastructure (Statistik, 2010). Municipal waste management is minimal and at times non-existent in peripheral and rural areas. Approximately 60% of this population is on the island of Java and 10% of the overall population resides in the nine largest cities, six of which are on the island of Java (Statistik, 2010). Modern and sanitary waste management practices are lacking in urban and rural areas alike.

Municipalities large and small are struggling with the influx of post-consumer waste and they are beginning to take action that could eventually extend to impact the food and beverage industry directly. These local bylaws are only beginning to address managing a portion of the plastic waste stream. The Regional Environmental Control Agency (BPLHD) conducted a study on the municipal waste break down of the city of Bandung, which produces 1,500 tons of waste per day. The majority of the waste (70 percent) was organic. The remaining 30 percent consisted of inorganic waste, with plastic representing 10 percent of the aggregate total (Suwarni, 2012). This daily production of 150 tons of plastic has led to several environmental problems including the clogging of the sewer system, causing flooding (Suwarni, 2012). Consequently, the Bandung municipality is drafting bylaws that would ban markets from using plastic bags for customers. Local government is not the only sector of government that is beginning to formally address plastic waste.

Given that the existing waste management infrastructure struggles at current waste volumes, companies are feeling the pressure to address the issue. In North America, industry leaders like Nestle and Coca Cola are starting to publically support extended producer responsibility laws for post-consumer packaging similar to laws that already exist in Europe and Canada (Bruce, 2011). These governance ideas are slowly infiltrating Indonesia as well. In 2008 the Indonesian federal government introduced a bill that would make businesses responsible for the packaging waste that is not biodegradable and would require companies to use recycled materials in the production of their products (Mattalatta, 2008). To date, strict regulations have not been adopted, but the government continues to consider similar policies.

Internal Industry Waste Initiatives

Apart from stricter regulations, beverage companies are beginning to embrace principles and programs that internalize environmental externalities and set fees that producers include in the price of products and are paid by producers and administered by industry that encourage the handling of post-consumer products (Bruce, 2011). Food and beverage companies are also making commitments to implement aggressive, industry-wide container recovery goals (Bruce, 2011). If these ambitious and industry wide changes are to become the norm rather than the exception, increased stakeholder engagement, education, and integration is imperative (Bruce, 2011). This University of Michigan master's project sought to engage those stakeholders and foster those critical discussions and engagements. If recycling and reuse rates are going to achieve a near-zero waste goal, coordination between all stakeholders in the waste cycle is imperative.

Companies can also invest more in designing products and packaging with end-of-life purposes in mind. Packaging can be designed to work in a full-scale, industry wide closed loop (Bruce, 2011). This means products and packaging will be able to be completely recycled or repurposed in an economic and environmentally friendly capacity. CPGs should conduct life cycle assessments of products across the different brand portfolios and markets.

Awareness of these design principles and waste management policies are resonating at the industry level. For example, the American Beverage Association now espouses these principles regarding packaging:

- Use recyclable or reusable packaging whenever feasible
- Design packaging for recyclability
- Design packaging that requires less material to conserve natural resources
- Explore ways to incorporate recycled materials into packaging and other products
- Label packaging in a manner that helps educate consumers on proper waste management (American Beverage Association, 2012)

These principles are being adopted by multinational corporations that are producing products in the U.S. and abroad. Plastic waste from food and beverage products can be reduced at both the beginning of the product cycle through design and at the end of the product cycle through end of life product management. PepsiCo has pledged to reduce the plastic in their products and is taking action by being an industry leader in incorporating food-grade rPET (reused PET) in beverage containers in the U.S. By 2010, ten percent of the material in beverage containers was rPET (PepsiCo, 2010). Nestle Waters does not have a company-wide rPET policy, but it does use 50 percent recycled ePET in re-source bottles (Bruce, 2011). Other major brands such as Coca-Cola have adopted similar 10 percent goals. In 500mL non-carbonated drink bottles, PepsiCo developed a design that both pleased consumers and saved 20 percent of the resin required to build the bottle, saving 20 million pounds from the waste stream. Reduced plastic designs must meet the challenge of maintaining shelf life and withstanding the manufacturing and distribution process with less bottle (Life Science Weekly, 2008). Actions like this will have a visible impact on plastic waste streams in Asia as well.

One of PepsiCo's beverage brands achieved 100 percent post-consumer recycled plastic in a popular selling size of the bottle. PepsiCo has commented that it would use 100 percent reused PET in all of its bottle production if it were available. Increasing recycling is essential to reaching this goal, which is why PepsiCo is beginning to experiment with reverse logistics to collect post-consumer bottles abroad (PepsiCo, 2010). Additionally, PepsiCo has created a plant-based resin that makes the world's first 100 percent plant based bottle that can be recycled within the existing PET recycling stream (PepsiCo, 2010). Industry leader actions like these are essential to reducing the plastic waste impact around the world.

Waste from developed nations is sometimes shipped to developing nations for repurposing or disposal. Plastic reduction actions may start in North American, but these initiatives have impact abroad as well. Eventually, these innovative practices will infiltrate production practices around the globe. For example, the reduction of the weight of beverage containers and new closures in a new bottle design for PepsiCo North America saved 40 million pounds in packaging material. Following this success the new design was applied in other regions. Similar achievements were made in markets abroad, which saved an incremental 12 million pounds in plastic resin consumption, which included 3.2 million pounds in Asia (PepsiCo, 2010). While consumption is steadily increasing in the food and beverage industry, which will translate to increasing quantities of post-consumer waste, industry wide efforts are beginning to occur that will lessen the impact of this increased consumption.

Waste Management Infrastructure – Indonesia

Introduction

Waste Management in Indonesia

Waste management in Indonesia is similar to that in other developing economies – it is largely managed by an informal sector. In Western nations a formal waste management infrastructure began in the 19th century as a response to public health issues (D.C., 2007). While this is also a primary concern in emerging markets, the resources are often not present to build a more robust waste management infrastructure. The infrastructure in Indonesia is an amalgamation of a formal and an informal sector. The government in Indonesia has historically been rather disengaged from improving waste management and encouraging recycling in civil society. Consequently, local communities are left to manage their waste on their own.

Municipal and domestic waste is often dumped in illegal sites or in open landfills outside of large urban centers as well as in rural settings. Even as of a decade ago in the U.S., local, small municipal dumpsites were common. Recycling and source-separated recycling is nearly non-existent in the Indonesian infrastructure. This is not the exception in emerging markets, rather the norm. To add to this waste volume is waste imported from developed countries, whether scrap from industry, e-waste to be recycled, or municipal waste a country does not have capacity to landfill or burn. Many emerging markets are inundated with trash from outside of their own populace (Humes, 2012). While this is an accepted source of income, it comes with social and environmental impacts as does the lack of a more formal, regulated waste management infrastructure. Indonesia already has difficulty managing domestically generated waste and has considered instituting fines to eliminate imported waste (See Figure 5) , but to date these bills have not turned into law. This lack of regulation and enforcement has led to illegal dumping being the most common form of waste management in Indonesia as illustrated by the table below.

Table 6: Disposal Methods in Indonesia (United Nations Environment Programme, 2011)

Country	**Disposal Methods (%)**				
	Composting	Landfilling	Open dumping	Incineration	Others
Indonesia	15	10	60	2	13

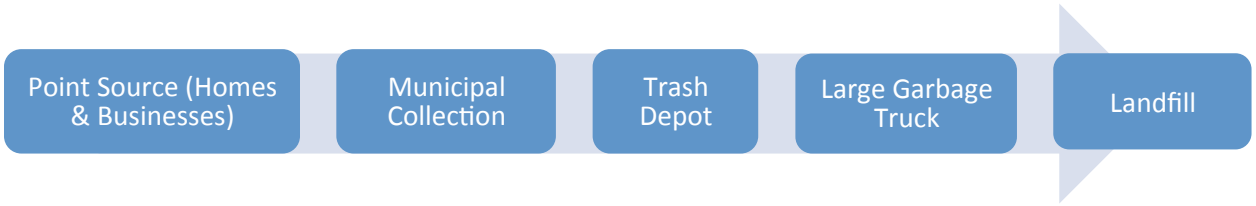
Source: United Nations.

Today environmental and public health issues are an impetus for waste management in developing countries, but waste management is also driven by another force, entrepreneurship. The importing of waste is just one example of this, but another pervasive example is that of the informal waste management infrastructure is composed of multiple levels of entrepreneurs and workers. It may not be a glamorous industry, but it is providing a critical civil service and a source of income for nearly 3 million individuals nationwide in Indonesia. Until a formal private sector develops or the government intervenes and provides more support, this informal infrastructure will dominate the landscape of this industry. Additionally, this informal infrastructure provides the platform for recycling in emerging markets. Unless, one is focused on imported e-waste being recycled in China, recycling of post-consumer products will be minimal, if not absent, in emerging Southeast Asian countries. The exploration of the waste cycle in Indonesia revealed an extensive recycling infrastructure and an entrepreneurial network of individuals that work in the most common waste disposal sites and find a way to make an income.

Formal Waste Management Infrastructure

The UM team researched waste cycles and infrastructure in both the urban center of Jakarta, Java, Indonesia and in the more rural setting of Bali, Indonesia. The formal waste management infrastructure in Indonesia is expectedly familiar in structure, but is exceptionally weak outside of the large capital area. The formal infrastructure in Jakarta begins with industry, residences and businesses as point sources for waste and then moves to the government or government contractors collecting the non-sorted waste at point sources. The trucks then bring the waste to a local depot within a network of depots where it is then consolidated and brought to a large landfill on the outskirts of the city, the largest of which is known as *Bantar Gebang* in eastern Jakarta.

Figure 2: Formal Waste Management Structure



The Indonesian Ministry of Environment estimates that the country generates 167,000 metric tons of trash on a daily basis and only five percent of that trash is reusable (Sirait, 2008). The majority of that trash comes from households, and the remaining point source generation is as follows:

Table 7: Waste Point Source Breakdown

Indonesian Waste Source Breakdown	
Percentage of Total Waste	**Point Source**
52%	Household trash
17%	Commercial waste
15%	industrial
10%	public markets (farmers markets, etc. designated by government for trade)
5%	temporary markets (pop-up markets on sidewalk)
1%	from street waste

Source: (Sirait, Household Solid Waste Management Presentation, 2008)

Large Urban Center Formal Waste Management

Trash from homes is often deposited on the curb where a garbage truck or municipal collector will pick it up and then bring it to a trash depot for consolidation from where it travels to a landfill via large garbage trucks. Other trash is deposited at local trash dumpsters or at dumpsites from which it is moved to a depot and then ultimately the landfill. The trash going to the landfill may find its way there through slightly varied paths, some travels through more intermediate collection and transportation points, but all trash in the formal waste stream ends up in landfills (See **Error! Reference source not found.**. The municipal government either directly handles the removal

f the trash through municipal employees or contracts the work out to garbage collection companies. None of this trash is source-separated, so recycling is inhibited (Sirait, 2008). In addition to not source separating trash there is no formal infrastructure for recycling or repurposing waste. Most trash from Jakarta is hauled around 40 km, which makes for an extremely costly end-of-life cycle and time- and energy-intensive endeavor in Jakartan traffic (Sirait, 2012).

The largest landfill in Indonesia, *Bantar Gebang*, sits on the East side of the capital city of Jakarta. It was established in 1989 on mostly forested land, but now is a sprawling 125 hectare landfill that is covered in mountains of trash (Santa Aguila, 2012). Jakarta produces approximately 28,000 cubic meters of trash per day. Of this total, 26,000 is carried by approximately 757 garbage trucks and eventually ends up in landfills and the remaining 2,000 cubic meters of trash never enters this formal waste management stream and end up in the community (Sirait, 2008). In terms of metric tons, approximately 6,500 metric tons of trash are deposited at Jakartan landfills every day, with about 70 percent going to *Bantar Gebang* and the rest going to the *Sunter* landfill in North Jakarta (Miller, 2011). This is only 3.6 percent of the waste being produced in Indonesia each day.

In addition to the volume of waste being deposited in these landfills, the human element is staggering. It is estimated that 5,000 *Pemulung* also live at the *Bantar Gebang* landfill (Santa Aguila, 2012). These workers are a part of the informal waste management infrastructure rather than employees of the municipal system.

Photo 1: Pemulung in Bantar Gebang *Source:* (Demotix, 2012)

In an effort to address the overflow of trash from Bantar Gebang, the government created a series of temporary landfills that were not properly built and leeched toxins into the surrounding water and environment (Santa Aguila, 2012). This describes the waste management infrastructure in Jakarta, but in the rest of the country the formal infrastructure is not much more than a network of poorly managed municipal landfills, illegal dumping sites, and disenfranchised workers. Most of the landfills and dump sites visited on this trip were woven in amongst once virgin and pristine forested areas or amongst living quarters within urban centers.

Rural and Smaller Urban Center Formal Waste Management

During field visits to the more rural setting of Bali, the UM team worked with local waste expert Mr. Olivier Pouillion, founder of Bali Recycling in Ubud, Bali, Indonesia and Mr. Peter, the on-site Manager of Bali Recycling. The UM Team was able to explore how waste is managed outside of the relatively more robust management infrastructure found in Jakarta. The divide between properly managed waste and informal waste management is even more blurred in most of Indonesia were incentive and funds for properly managing waste are in short supply. The *Pemulung* living in these locations are relegated to the fringes and are even more disenfranchised than their more urban counterparts.

At the municipal waste landfill in Sanur, Bali, Bali's government is making strides to improve landfill management, but the lack of investment in municipal

waste services, community education, and illegal dumping enforcement, will make alternative dumping methods preferable for decades to come. Payment is not required to dump at the site, so there is little incentive to manage what goes into the landfill. The landfill is currently situated in the middle of fragile mangrove forests and one of the region's largest watersheds and just two to five kilometers north of large tourist hubs in Kuta and Legian. Access to the landfill is via dirt road, which when flooded during rainy seasons, makes access virtually impossible for most local garbage trucks. Hazardous wastes are not treated before entering the site and are aggregated with both organic and inorganic wastes in the current site. Small fires are used around the landfill to burn trash, and trash is collected from as far as 200 kilometers away.

Also common to these sites is the unhealthy integration with local agriculture. Local livestock use the landfill as a feeding ground, and a pig farm is located just west of the landfill border. *Pemulung* are not encouraged at the site and are relegated to sifting through trash that falls off the trucks en route and in the polluted riverbeds that are filled with trash around the site. This description is indicative of the average municipal landfill in Indonesia. Facing pressure from tourism and subsequent garbage growth over the last two decades, the Balinese Government has finally begun a multi-year project to convert the current unsanitary landfill to a plastic-lined, concrete walled, sanitary site. This type of outside stakeholder pressure is not present in most of Indonesia, though, and most landfills remain poorly managed and polluting the surrounding environment.

In addition to landfilling, incineration is another common practice in much of Indonesia. At the municipal incinerator in Sanur, Bali hazardous materials, including inorganic wastes, will continue to enter air and water systems as long as they are not first separated from waste before disposal and incineration. The incinerator is primitive with coal used to light the fire and a team of unprotected waste collectors moving organic and non-recyclable inorganic waste to the incinerator by crude baskets. *Pemulung* visit the site to collect recyclable waste and to drop off non-recyclable waste from the area. Hazardous materials, such as asbestos, are also burned in the incinerator, converting chemicals to toxic smoke that travels to nearby communities, including shanty-towns created next to the incinerator for the workers. The practices seen at these sites are extremely unhealthy for both the people and environment around these landfill and incineration sites.

Informal Waste Management

Illegal Landfills and Dumpsites

While municipal governments have invested in some formal waste management infrastructure, the majority of waste is handled through an informal waste structure in Indonesia. Illegal dumpsites and landfills comprise a significant portion of this infrastructure. While in Bali, the UM team was able to observe these sites outside of the Jakarta urban area. An illegal site in Sanur, Bali is located less than 200 meters from a local division of the Indonesian Department of Forest Protection and Restoration and is situated atop a clear-cut mangrove preserve. Garbage truck drivers revealed they simply prefer the illegal dump site due to its closer proximity to main roads. Illegal sites are often conveniently placed as people choose to make this necessity as easy as possible, but this means sites are often in very close proximity to residential areas or temples. The UM team discovered that vital environmental sanctuaries and water systems will continue to be transformed into illegal landfills and play home to the *Pemulung* as long as safe and convenient alternatives and legal enforcement do not exist.

In addition to illegal dumping being a symptom of convenience, there are also has cultural factors that perpetuate this behavior. Countless dumpsites were observed at or near temple structures or in once pristine areas (see Site Visit 5 for more details). For the Indonesians this is not troublesome because they believe that light and dark always co-exist, and this juxtaposition is the proper state of things in the world. Similarly, illegal dumpsites are scattered in the Jakartan landscape in the backyards of residential areas, along aqueducts, and in empty lots

between buildings. Additionally, the lack of enforcement of waste laws only encourages waste disposal companies servicing unaware customers to dump illegally. Illegal dumping saves money, and without a culture demanding proper disposal these habits will not change.

Photo 4: Plastic Waste Being Burned at Landfill

Source: UM Team

Photo 3: Local Balinese Man with Young Daughters Fishing in Water Polluted by Leachate from Kuta Landfill

Source: UM Team

The conditions that lead to the creation of illegal dumpsites are pervasive and consistent across Indonesia:

- Traditional trash was historically all organic, so burning or burying it was a proper way of handling it. This cultural norm has translated into burning and burying harmful, inorganic waste
- Consumption rates of inorganic products is rapidly increasing, resulting in increased amounts of inorganic waste.
- Municipal waste facilities and services do not exist or are inadequate to handle this increased waste.
- Government agencies do not invest in waste due to other priorities or charge so much that villagers cannot afford disposal fees.
- Waste management is extremely fragmented, which leads to dumping in hazardous sites.
- Landfills grow at rates that lead to infringement in forested areas or proximate waterways; burning is an accepted way of managing the growth of landfills.
- The *Pemulung* migrate to these areas to scavenge for valuable recyclables.
- *Pemulung* become squatters on land near dumpsites to increase efficiency and ability to collect the 'best' trash first.
- *Pemulung* are consequently exposed to the hazardous effects and carcinogens because of their close proximity to waste.
- Remaining illegal landfills are never sealed, leaving local communities exposed to decades of toxic impact.

Recycling

Plastic Focus

The body of our research was focused on the plastic moving through this system. In developed markets, post-consumer products and packaging dominate the waste stream, sometimes constituting as much as one third of the non-industrial waste stream (Environmental Protection Agency United States, 2012). Indonesia's waste stream follows a similar composition. Consequently, plastic is a pervasive, but valuable part of the post-consumer waste stream. Working for a major CPG to improve the end-of- life impacts of its products meant thoroughly understanding how plastic is managed and recycled in Indonesia.

Recycling - The Informal Infrastructure

Experts in Indonesia estimate that of all the trash going to landfills, with properly recycling only 12 percent of that trash would need to actually be landfilled (Miller, 2011). The within the informal system in rural areas and in urban centers the *Pemulung* dominate the informal waste management infrastructure and provide the only form of widespread recycling in Indonesia. The *Pemulung* do not discriminate in types of waste they will handle. Observations and interviews in the field, as well as a review of secondary resources revealed that *Pemulung* will collect any material from bone, to metal, to vinyl. If any post-consumer waste has value, it is collected and sold into the informal recycling sector that has come to dominate the post-consumer waste landscape. This practice is not unique to Indonesia, but is pervasive across emerging markets (Rogerson, 2001). An estimated 3 million people or nearly 1 percent of Indonesia's populace works at the base of the informal recycling and waste management system as Pemulung (Danone, 2011). The UM Team field work revealed in Jakarta along the estimated number of Pemulung working in the urban area is around 600,000 people. On top of the *Pemulung* there is an entire network of entrepreneurs that are creating jobs and generating income from this informal system. Still many do not advocate this recycling system. One head of a Jakartan household and corporation-targeted recycling initiative called the Green Project, says that Pemulung are not an enduring solution. They cite that 40 percent of materials collected by the Pemulung are already too dirty so be processed, so if volume to landfills is to truly be reduced, source separation at point sources is critical to making a significant impact on recycling in Indonesia (Hodal, 2011).

Figure 3: Informal Recycling Infrastructure

Before the garbage trucks move house to house or as the garbage trucks approach a local landfill, recyclable waste is mixed into the refuse or is falling to the ground. At every point along the formal waste management stream there are *Pemulung* waiting to pick through the trash and pull out anything of value. After it enters the *Pemulung's* hands, the waste moves through a recycling rather than a disposal stream. The Pemulung aggregate their waste and separate it according to type at their shanty homes. *Pemulung* collect bone, paper, glass, plastic of many types and metal scraps to then sell to their *Lapak* or *Bandar*.

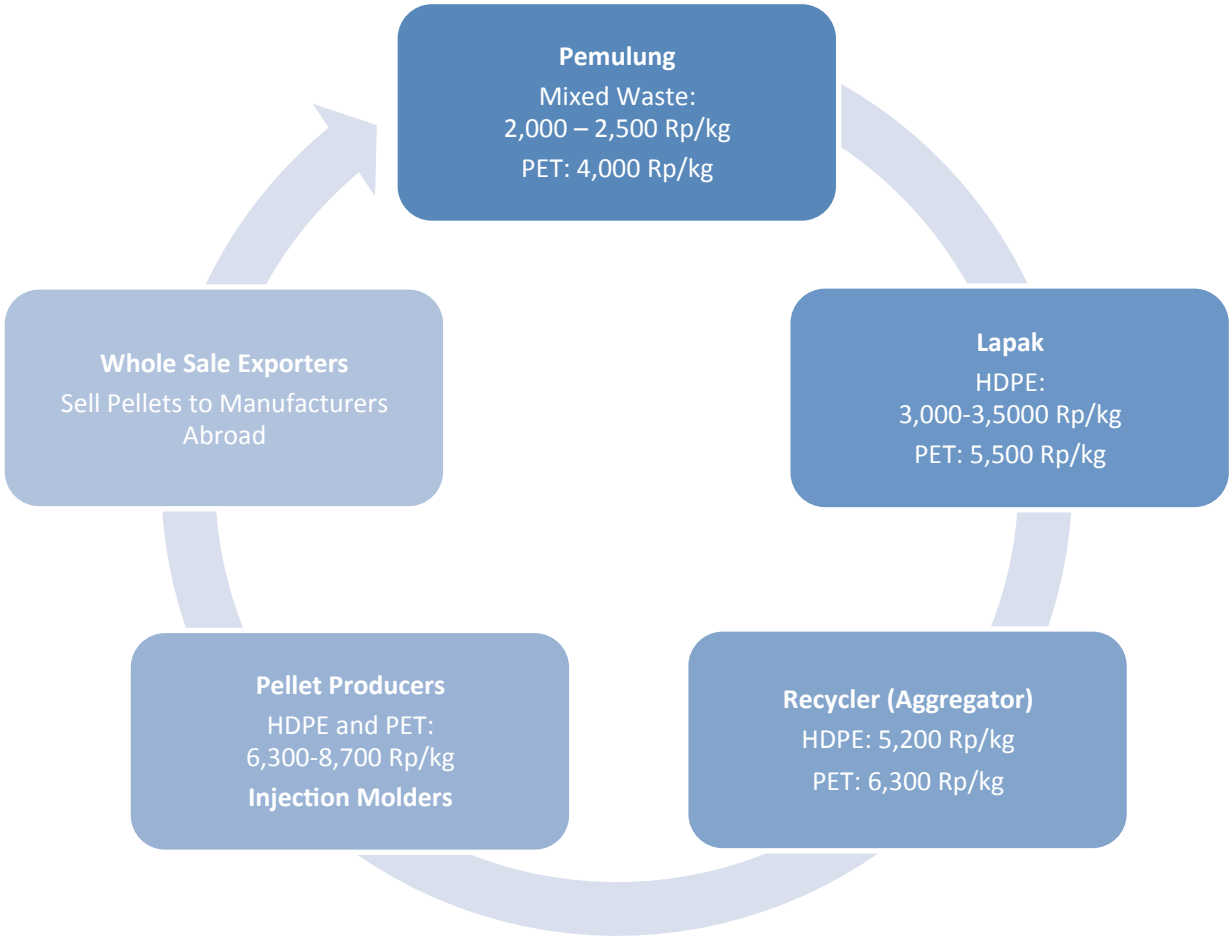
Some *Pemulung* are beholden to their *Lapak* or *Bandar* and depend on them for monthly loans and are required to sell only to them, while other *Pemulung* sell to different individuals every day. Each *Lapak* has on average 30 *Pemulung* selling to him, but some can have as many as 100 (Bakri, 2012). The *Pemulung* remove anywhere from 70 – 90 percent of recyclables from municipal solid waste before it reaches a landfill (Siriat, 2012). After the waste arrives at a landfill Pemulung scour it again, ripping open trash bags and climbing up piles as trash is poured on

them to find and remove anything of value from the waste stream. The *Pemulung* walk anywhere from a 2 to 5 km radius to collect trash and on average collect about 5 kg of plastic per day each (Bakri, 2012). This means Pemulung handle about 3 million kg of plastic each day in Jakarta (approx. *600,000* Pemulung residents).

After this step nearly 99 percent of recyclable plastic is removed from the waste stream according to waste experts and NGO workers in Indonesia. Estimates of recycling in the formal waste stream are drastically lower, only around 6.5 percent of the total plastic in the Jakarta waste stream according to a World Bank study (Febrina, 2009). After the waste is sold to the Lapak, it is sorted and consolidated at a finer level. The Lapak then sells the plastic to a plastic recycler or *Bandars.* There are many of these facilities around Jakarta, but no more than 300. These recyclers employ several employees to sort the plastic again by specific type, remove labels and rings, wash it, shred it, and then package it in sacks that weight upwards of 80 kg each (Bakri, 2012). These recyclers do not need to sell in order to eat the next day or support a community, so they can hold the material and sell when the market is more favorable. They watch crude oil prices to determine when demand for recycled materials may go up. Other astute recyclers watch the cotton market because when cotton prices increase, the demand for polyester will go up, again making the prices they are paid are more favorable (Bakri, 2012) . These recyclers are the individuals largely setting the price for those downstream from them in the recycling chain. The following figure shows estimated prices each stakeholder in this recycling chain is paid (Bakri, 2012).

Photo 5: Recycling Worker at Mr. Bakri's facility, Jakarta. Source: UM Team

Figure 4: Plastic Prices in Recycling Stream


Pemulung
Mixed Waste:
2,000 – 2,500 Rp/kg
PET: 4,000 Rp/kg
Lapak
HDPE:
3,000-3,5000 Rp/kg
PET: 5,500 Rp/kg
Recycler (Aggregator)
HDPE: 5,200 Rp/kg
PET: 6,300 Rp/kg
Pellet Producers
HDPE and PET:
6,300-8,700 Rp/kg
Injection Molders
Whole Sale Exporters
Sell Pellets to Manufacturers Abroad

After leaving the local recycler, the plastic then enters a more formal industrial stream again. It is sold to plastic pellet producers who then sell melted pellets to exporters that supply the recycled plastic to manufacturers throughout Asia. At times the plastic chips are sold directly abroad by exporters (Febrina, 2009). There are also domestic injection molders that a recycler may sell to directly for the manufacturing of new plastic bottles or containers. Some plastics have limited buyers, on Java there are only seven processors of Polypropylene, while

Photo 6: Final Stage of Separated Plastic Before Sale to Pellet Producers and Manufacturers

other plastics have many more potential buyers. Still there are only ten pellet producers on the island so supply sometimes exceeds supply and prices deflate (Bakri, 2012). Indonesian manufacturers produce 2.1 million tons of raw virgin polymers per year, but are producing 3.8 million tons of final plastic products. The balance of consumed plastic polymers is partially filled by this informal recycling sector (Febrina, 2009). The informal waste management system is dynamic in the respect that it is not necessarily a trap in a cycle of poverty. There are rags to riches stories (Nas, 2003). Still these are the exceptions. While the above model dominates the informal recycling infrastructure in Indonesia, some are working hard to change this model.

Recycling - The Informal Infrastructure Alternatives

Pumulung are heralded by some as "the heroes of cleanliness" (Bakri, 2012) their daily lives hold no parallel to that name. While many choose to migrate to higher population centers to work as *Pemulung* (Hodal, 2011) the reality of their daily lives is grim. At illegal and legal landfills *Pemulung* sift through hazardous waste, spoiled food, human waste from hotels, and livestock to collect valuable plastic waste and other inorganic materials. The *Pemulung* also live in illegal landfills or surrounded by trash, making makeshift homes out of plastic covers, tarps and other cast off materials. Their work is performed without proper footwear, clothing, or often access to clean water, leaving *Pemulung* and all whom they come in contact at risk for exposure to diseases, especially malaria, avian flu, and other water-borne parasites. Many the organizations working with the *Pemulung* to empower them and create tangible, positive change are working toward social impact that has multiple essential elements (see Figure 8).

One organization working toward changing the model is the Danone *Pemulung* Empowerment Program, which removes the middleman from the recycling chain and provides *Pemulung* with a more safe and dignified working environment. This is a hybrid partnership aiming to mitigate the social inequalities and environmental impacts of the post-consumer plastic. This project is sponsored by Danone and Ashoka with the goal of creating a social business model that will improve the economic status of and provide educational for the children of *Pemulung.* The hope it that within four years 4500 Pemulung will be working with these new centers and will have access to social services such as health insurance, children education, micro credit through plastic and carton recycling and transformation activities. This project also may help sourcing high quality flakes for Danone AQUA rPET suppliers (Danone, 2011).

Another example is the long standing Kampus Diakonia Modern's Green Project, began in 1972, which employs workers to go through the already deposited trash at Bantar Gebang to salvage recyclables. Anything from old furniture, rubber, glass, plastic, discarded electronics, paper, and metal are removed by this group (Santa Aguila, 2012). Through this program the children have access to resources and education they might otherwise not have (Febrina, 2009). Most of the workers at Bantar Gebang are not a part of an organized operation.

Even outside of the capital individuals are striving to make a positive impact on the disenfranchised *Pemulung*. Bali Recycling, Inc. has set up a proper waste processing and safe facilities. The goal is to create within Indonesia safe and semi-sustainable employment opportunities for existing *Pemulung*. Organic waste is collected for composting at the back of the site or added to a bio-digester where it is then turned to usable fuel. Hazardous materials are separated and tagged for removal to appropriate municipal waste sites in southern Bali. Inorganic wastes that cannot be recycled are aggregated and either sent to local municipal landfills or are collected for multipurpose inventions that can be sold for a profit. Recycled materials are repackaged, weighed and sent to recycling centers for profit. However, this is not a scalable solution without capital investment or government partnership. Without that support this operation may one day be driven out if municipal waste programs are implemented and takeover waste removal and recycling.

Key Insights

Food and Beverage Consumer Packaged Goods Implications

In developed nations consumer goods producers that are taking the most progressive stance toward waste management are now evaluating solutions that "close the loop" or have "end of life" adaptations. The idea is that waste is a resource that should not go unused and that every product should be designed to be repurposed or recycled into another usable object or material. In many respects the informal recyclers in Indonesia are already handling some waste in the manner. The scavenger and sorter entrepreneurs that have arisen in developing nations are essentially taking this approach to materials. Any CPG that is serious about managing the full-life of their product needs to address the impact the product's post-consumer waste is having on waste management infrastructures. Financial resources are required to make an impact, but on the ground stakeholder engagement is also just as critical. If changes to the infrastructure are going to successfully be implemented all stakeholders must be engaged (see Figure 9).

Local Practice Implications

Waste observed was not source separated unless there was a business or large enterprise that had large amounts of one material they were using, such as cardboard boxes at a grocery store. Better functioning institutions, enforcement of waste policies, and education are necessary for businesses and households to abide by improved waste management techniques, such as source separating recyclables and compostable materials. Active education and awareness campaigns should be deployed to increase the mantra of "Reduce, Reuse, Recycle." More centralization of waste management is also necessary. The disparate conglomeration of community landfills and dump sites on promote the existing waste system.

Waste Infrastructure Overall Learnings

While the UM team was able to make detailed logistical, social, and economic information about the waste infrastructures in Indonesia, there were a few overarching learnings that informed the development of recommendations and the selection of stakeholders. These insights were:

- Waste management in developing economies cannot be viewed through a developed economy lens
- Solutions that work in the U.S. will likely not be effective abroad
- Informal economies are critical to survival for many individuals
- Short-term survival takes precedence over long-term goals

- Entrepreneurial ideas beyond what those in the informal waste infrastructure already know is limited, but entrepreneurial spirit is prevalent and respected
- A Sense of community, working together, and respecting each other appears relatively strong in Pemulung communities

Figure 5: Translation of Key Points From Proposed Waste Management Bill (Mattalatta, 2008)

BILL 18, 2008, Indonesian Waste Management

Legal Briefing on Waste Management 2008

Minister of Law & Human Rights
Mr. Andi Mattalatta

President
Dr. Susilo Bambang Yudhoyono

General bill all-encompassing regulations.

Local ordinances

Separate roles of Central Government

Everyone has the right to receive waste management servicing from the government or other parties contracted by the government.

The central and provincial governments have an obligation to fund waste collection using their own budgets. If they have to relocate people due to waste management, such as building landfills, then they have to compensate the folks. They have to compensate people for illness as well resulting from poor waste management.

VERY HIGH LEVEL SUMMARY OF BILL

Article 2

Definitions of waste:

Household

Commercial- Waste that comes from commercial and industrial producers

Article 12

A call to action that people should work together to handle waste in an environmentally friendly way.

Article 13

Every company that has a public or social facility must provide a facility for trash disposal and sorting.

Article 14

Every producer of food or goods has to put labels on their products about how they could reduce waste that results from this product.

Article 15

Every producer of goods has to manage the packaging that cannot be naturally decomposed.

Article (Chapter) 16

Further regulations will be given regarding Articles 13-15

Article 20

Part 3: Every business must try to reduce their own waste by using recyclable materials or naturally decomposable.

Article 39 (Deliberately importing waste into Indonesia)

(1) HOUSEHOLD WASTE: A minimum of 3 years in prison up to 9 years; Fine of at least R 100 Million ($11,000) to R 3 Billion ($300,000) for corporations or individuals that import HOUSEHOLD waste to Indonesia
(2) TOXIC WASTE: Cannot be processed in normal facilities, such as mercury, asbestos, etc. A minimum of 4 years to 12 years in prison with a fine of R 200 Million ($20,000) to R 5 Billion ($500,000)

Article 40

(1) Waste companies that work for the government to collect waste and do not abide by safety protocols that result in human or natural damage, will be held to prison time and financial penalty.
(2) If negligence results in death or injury, the waste company will be held to even greater prison and financial penalties.

Article 42

1) All acts will be treated as corporate crimes within the Indonesian Regional Judicial System.

Figure 6: Household Solid Waste Management in Jakarta (Sirait, 2008)

HOUSEHOLD SOLID WASTE MANAGEMENT PRESENTATION

Slide 1: Facts about trash; data is from Environmental Ministry (KLH)

FROM 2008: Indonesia generates 167,000 tons / day of trash and only 5% is reusable

52% is household trash
17% is commercial
15% is industrial
10% public markets (farmers markets, etc. designated by government for trade)
5% temporary markets (pop-up markets on sidewalk)
1% from street waste

Slide 2: Jakarta Facts

2007: 28,000 cubic meters of trash per day, of which 26,000 is carried by 757 garbage trucks directly to landfills

The remaining 2,000 cubic meters of trash per day are not disposed of and enter the community

Slide 3: Shows how trash is collected today

Pemulung are part of the solution today

Slide 4: Issues with Current System of Waste Collection

1. Trash is not separated, reducing ability for recycling
2. Heavily relies on waste transportation, making trash collection more expensive

Slide 5: Solutions

1. Change approaches from community landfills to centralized facilities
2. Separate trash: Offer every house separate bins to push trash separation and collection
3. Introduce REDUCE, REUSE, RECYCLE (Save what you use, reduce what you consume, and minimize your personal waste production, and donate what is still reusable to others, and do not throw away what can still be used)
4. Use Biogas

Figure 7: Flowchart of Waste to Main Landfill in Bantar Gebang (Sirait, 2012)

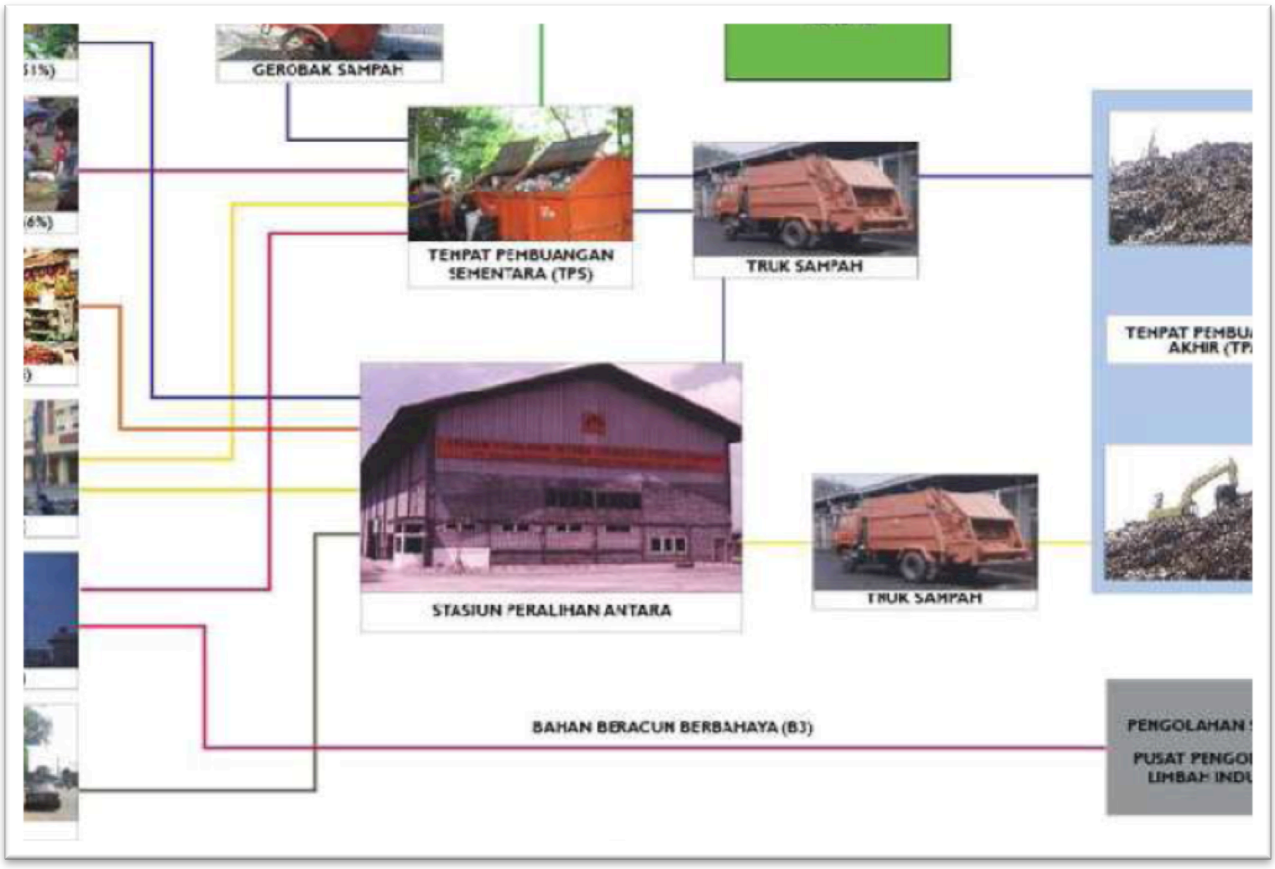
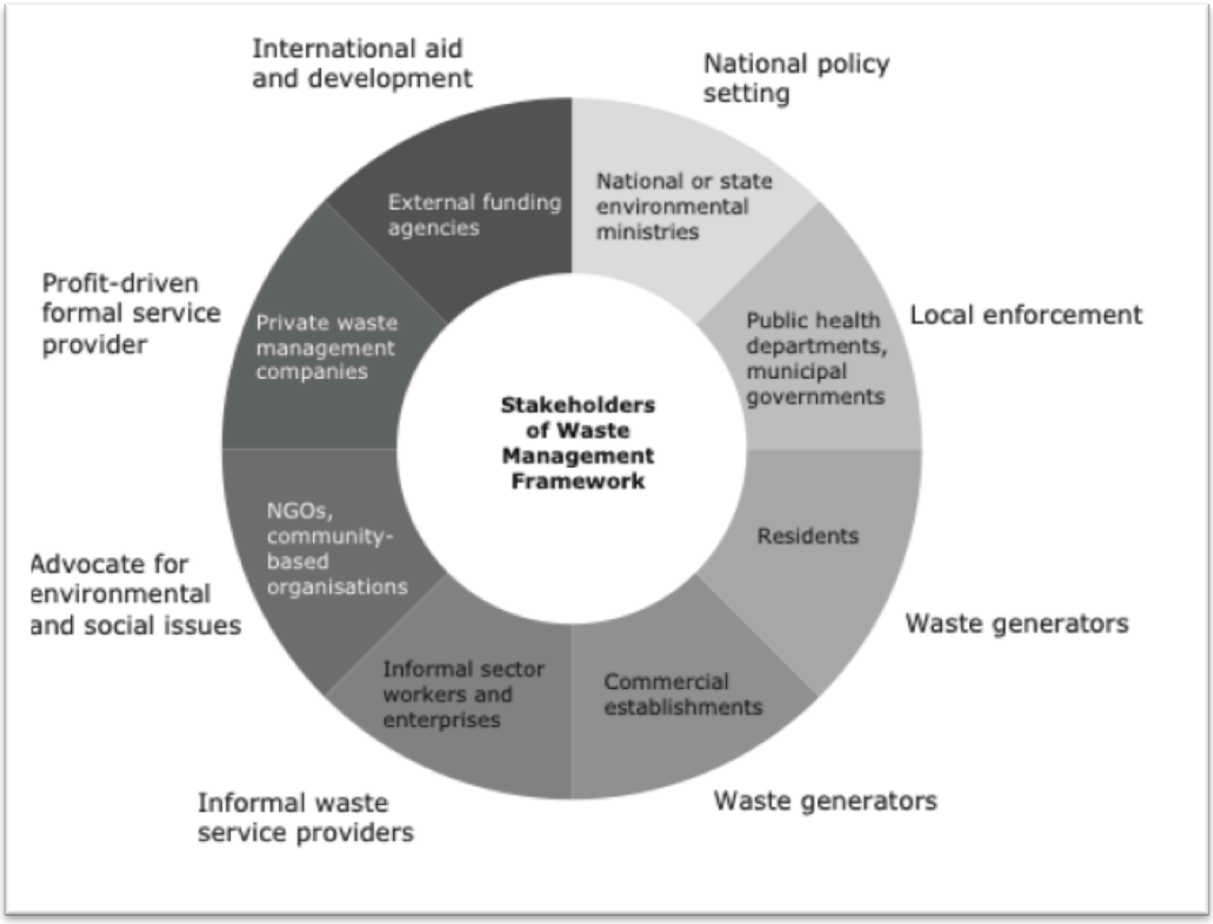


Figure 8: Social Impact of Improved Waste Management (Chin, Carmody, & Le Breton, 2011)

Figure 9: Key Stakeholders in Waste Management (World Bank (Chin, Carmody, & Le Breton, 2011))


International aid and development
National policy setting
External funding agencies
National or state environmental ministries
Profit-driven formal service provider
Private waste management companies
Public health departments, municipal governments
Local enforcement
Stakeholders of Waste Management Framework
NGOs, community-based organisations
Residents
Advocate for environmental and social issues
Waste generators
Informal sector workers and enterprises
Commercial establishments
Informal waste service providers
Waste generators

Pemulung

Introduction to the Pemulung

According to industry sources and expert research, roughly 1% of Indonesia's population of nearly 240 million people survives from waste recycling activity (Danone Ecosystem Fund). This translates to almost 3 million people nation-wide, and in the capital city of Jakarta, the estimated number is 600,000 individuals. This segment of the Indonesian population operates as an informal economy, with no official government oversight or regulations, taxes, nor formal statistics or record-keeping. This informal economy of waste recyclers is comprised of waste collectors (*pemulung*), small-scale aggregators (*lapaks*), larger-scale aggregatros (*bandars*), processors of varying size and importance, and a small number of exporters. The Bahasa Indonesian word *pemulung* translates directly to "scavenger," and is used to describe the sub-segment of waste collectors who perform the physically demanding, and oftentimes dangerous, work of collecting recyclable material. *Pemulung* make up the largest share of this informal economy, and yet their share of economic rents derived from waste recycling is considerably lower than other players in the value chain.

When the UM Team originally created a scope for an Indonesia-based project with the client, PepsiCo, both parties approached the project under the premise that we would be working to provide a solution for plastic waste that ended up in landfills in Indonesia's population centers, landscapes, waterways and oceans. However, during the initial discovery phase on our first site visit to Jakarta, we quickly learned that the reality on the ground was quite different from what we had assumed. Although large volumes of plastic were discarded, only a small share of recyclable plastic ended up in landfills or the natural environment. Instead, the informal economy successfully capturing the vast majority through collection, aggregation, sorting, processing, and eventual sale to exporters, who in turn sold small plastic pellets used as feedstock for the remanufacturing of bottles and myriad other plastic-based products, including nylon fabric.

Social Impacts

The scope of our project shifted. We began to focus instead on the social impacts of waste recycling, and we began formulating solutions that might address the plight of the *pemulung*, who often work grueling hours in poor conditions for meager sustenance and little opportunity for socio-economic and personal advancement. Many survive off of US$3 per day or less; they generally lack access to political rights, healthcare, education, and even very basic social services. Should they become injured or sick, the only "safety net" options generally available to them are friends and family, as they have no access to government support. They often face either discrimination or harassment as they go about their daily routine of collecting recyclable material, as our primary research and observational research in the field indicated. Indeed, they are a marginalized and stigmatized segment of Indonesian society.

A large share of Jakarta's *pemulung* are migrants from rural areas, who come to Jakarta in pursuit of improved standards of living and a means to support themselves and their families. This has led to tension between ethnic groups. One expert on waste management in Indonesia suggests that Maduran people (from the island of Madura, off the northeastern coast of Java) have been particularly successful in the waste recycling industry on the island of Java. Madurans are reportedly more entrepreneurial and aggressive in their pursuit of opportunities to lay claims to sources of recyclable material. They have been known to start in small numbers and develop large, profitable operations in short periods of time that employ large numbers of *pemulung*. (Pouillion, 2012)

In the capital city of Jakarta, we observed and visited several *pemulung* communities. Living conditions are extremely basic and poor. If electricity is available, it is typically used exclusively for lighting and even still, only for short periods of time. It is not unusual to see *pemulung* live very close to sources of recyclable material. At Bantar Gebang, Jakarta's main landfill, an estimated 2,000 families and more than 6,000 people live near the dump site. (Guardian, 2011).

Photo 7: *Pemulung women (above) and a man (below) sorting recycled plastic material at processing facilities in Jakarta, Indonesia. Source: University of Michigan Master's Project Team*

Interview Questions

To better understand the workings of *pemulung* culture and to understand their behavior, our team performed extensive primary research spanning five (5) separate site visits to Jakarta, Indonesia. We sought an understanding of what solutions we could develop and how they might take shape. Below is a sample of some of the research questions we aimed to answer through interviews with *pemulung*.

Pricing:

- How much are you able to negotiate for the price you are paid?
- How often does the price you are paid fluctuate and by how much? Do you know why that is or isn't?
- Would it be helpful to know the price that different aggregators are paying for the plastic on a daily or weekly basis?
- Where do you get information about the price you should be paid for your materials?
- Do you receive different prices for different types of plastic?
- What other factors, if any, influence the price you are paid for your plastic (quantity/type/frequency/etc)?
- Do you know the price the aggregator is selling the plastic at to pellet producers?
- Do you know what price pellet producers are paying for plastic?

Selling:

- Do you always sell to the same aggregator and/or pellet producer?
- Do you have the freedom to choose who you buy and sell from?
- How do you determine the territories from where you can collect plastic?
- Would you go to a different aggregator if you knew he was paying more?
- Do the aggregators compete for your plastic (such as offering a better rate)?
- Are you dependent on your aggregator for more than buying your plastics, i.e. food/shelter?
- Is there a daily quota for the amount of plastic you deliver?
- What is the average amount of plastic that you sell in a week?

Photo 8: Pemulung Sorting Plastic; Bottom photo Lapak pemulung community, who work for one small-scale aggregator, with teammate Miguel Sossa.

Source: UM Team

- If you could get to a pellet producer yourself, would you sell directly to them?
- What prohibits you from selling directly to the pellet producers?
- Would you ever coordinate with other Pemulung so that some can continue collecting while others make the journey to sell plastic consolidated from many Pemulung working together?
- Do you ever collectively negotiate with other Pemulung for the price you are receiving for your plastic?
- If you had information about the price that different aggregators were paying for plastic would that impact who you sold the plastic to?
- Do you think more pricing information could help you negotiate a better price for your plastic?

Collection:

- What is the competition like amongst fellow Pemulung?
- How many other Pemulung are collecting in the same territory? Does that cause conflicts?
- How far do you travel in a day to collect plastic?
- What is your mode of transportation?
- How much plastic can you carry at a time?
- How much do you collect in a day/week?
- What is the maximum amount of plastic you can collect and deliver in a day?
- What if you could collect more plastic, could you sell it?

Technology:

- Do you know how to send and receive SMS texts with a mobile phone?
- Do you have a mobile phone? Does your family have a mobile phone?
- Do you use text messages?
- How much do you pay for text messages? (Does the sender or receiver pay for a text?)
- Can you afford to send and receive SMS texts? How many can you afford?

Pemulung Key Takeaways

There are a number of key takeaways from our primary and observational research:

- Typical income of a *pemulung* ranges from 40,000 to 100,000 Rupiah per day (~US$4.50-10) from collecting 8 to 20 kilograms of plastic.
- *Pemulung* typically live in one of three types of situations:
    - close-knit communities of related families in which a single leader, often an elder, is responsible for handling the business operation and finances on behalf of a group of collector
    - a community as small as 3 or 4 *pemulung* or as large as more than 50 is beholden to a single *bandar* or *lapak* (large and small aggregators, respectively), is obligated to sell their collected recyclables to him exclusively, and rely on the shelter, food and clothing that he supplies in exchange
    - independents who bargain prices each day and sell to various aggregators.
- Mobile phone penetration among *pemulung* is in the range of 75-80%; it is typical for a family to have at least 1 mobile phone.
- SMS texts are the most widely used form of communication among *pemulung* due to its lower cost relative to calling.
- Trust is key among Indonesians and general, and it is no different for *pemulung*.
- *Pemulung* recognize brands and exhibit brand affinities. The Danone brand is pervasive in Indonesia, and the PET plastic used in Danone bottles is highly coveted by *pemulung* due to its higher resale volume relative to other forms of plastic.
- They are interested in advancing their lives, and feel particularly strong about providing education to their children to allow them an opportunity to secure another means of making a living.
- *Pemulung* would be keen to receive information via an SMS-based text platform, including information related:
    - health and hygiene, prenatal care, nutrition, etc.
    - pricing information

- Indonesian and world news
- happenings in Indonesian society
- job opportunities
- legal services
- meetings of the *Pemulung Union*

Site Visit 1 – Hong Kong and Jakarta, Indonesia

Logistics

DATES: Friday, July 22 – Monday, August 1, 2012

TEAM ATTENDEES: Patrick Lord, Taylor Samuelsen

KEY STAKEHOLDERS/EDUCATORS VISITED:

- PepsiCo
  - Mr. Gary Horsfield, Vice President Supply Chain, PepsiCo Asia-Pacific, Australia
  - Mrs. Lynette Ryan, CSR Director, PepsiCo Asia-Pacific, Hong Kong S.A.R., China
  - Mr. David Walker, Senior Director, PepsiCo Global Operations, Purchase, NY
  - Mr. Sigit Wijanarko, Sales Manager, PepsiCo Indonesia, Jakarta, Indonesia
  - Mr. Amit Bose, General Manager, PepsiCo Indonesia, Jakarta, Indonesia
  - Ms. Laurie Hoffman, International Account Manager, 7-Eleven
- CSR Asia
  - Ms. Jill Chin, Project Manager, CSR Asia, Singapore
  - Ms. Jenny Costelloe, Country Director, CSR Asia, Singapore
- BSR Asia
  - Dr. Laura Ediger, Environmental Manager, BSR, Hong Kong
- World Wildlife Fund
  - Ms. Karen Ho, Business Engagement Leader, WWF, Hong Kong
- University of Indonesia
  - Dr. Cindi Priadi, Professor Environmental Engineering, Jakarta

LOCATIONS VISITED:

- PepsiCo Indonesia Headquarters, Jakarta, Indonesia
- Numerous Recycling Agregation sites, Jakarta, Indonesia
- Plastic Processing Site, West Jakarta, Indonesia
- Points of Sale of PepsiCo Products (Various Markets: 7-Eleven, Indomart, etc.), Jakarta, Indonesia
- British Coalition Event

TIMELINE:

July 23 (HK)	Meeting with Lynette
July 24 (JKT)	Travel
July 25 (JKT)	Field Research
July 26 (JKT)	Field Research
	British Coalition Event
	Meet with Deasy
July 27 (JKT)	Meet with CSR Asia
	LAUNCH meeting with PepsiCo/CSR Asia/UM Team
	All Team Site Visit – Agregator Site
July 28 (JKT)	Launch meeting with PepsiCo/CSR Asia/UM Team
	Meet with University of Indonesia

Logistics

July 29 (HK) Meet with BSR Hong Kong

Meet with WWF

Methods for Analysis

- Observe, evaluate, and record current methods of plastic disposal
- Interviews with participants, trash collectors, etc.
- Develop relationships with Jakarta organizations that have direct and/or indirect contact with this space

Purpose Statement

This trip represents the project launch. The goal of this site visit was to meet directly with PepsiCo stakeholders to co-develop the project's mission statement, goal, timeline, and management strategy. At the point of this meeting, the UM Team had conducted several initial interviews with global representatives of PepsiCo's recycling and CSR initiatives and begun initial background research that formed the basis for conversation with the PepsiCo team.

A profound change in scope and purpose came at the end of the day on July 25. The UM Team identified and would later confirm with the PepsiCo team, that the project had begun with a false premise – that plastic waste recycling was not happening in Jakarta. Through their field research, the UM team members uncovered the realities of the plastic waste value chain, one that is credited with aggregating over 90% of all plastic waste in Jakarta.

The UM team split the week between field research and meetings with the PepsiCo team.

The week concluded with a *soft* mission statement, project goals, and a unified vision of how the UM Team would move forward.

Observations – Hong Kong and Jakarta Site Visits

Saturday, July 23, 2011, Meeting with Lynette
Location: Hong Kong
Guide: n/a

MEETING NOTES:

- Introduction
- Overview of PepsiCo Asia Pac Operations and Structure
- Overview of Launch Meeting participants
- Plan timeline for Launch Meeting

Monday, July 25, 2011, Field Research
Location: Jakarta Central – various grocery stores, trash aggregation sites, processing sites
Guide: Sigit (PepsiCo)

FIELD NOTES: Carrefour, 7-Eleven, Indomart, etc.:

Observations – Hong Kong and Jakarta Site Visits

- Field observations to understand points-of-sale and consumers of PepsiCo products
- Carrefour is a large and typical modern supermarket in Jakarta
- Noted that PepsiCo beverage products sparse compared to Coke products (1 / 7)
- 7-Eleven is a modern convenience store
    - young and middle class clients
    - free internet, clean, no recycling receptacle
    - PepsiCo is dominant brand

PEMULUNG & SUB-AGGREGATOR:

- UM Team noticed a trash picker collecting bottles in front of Carrefour and began interview process.
- Learned details about earnings, route, process, etc.
- Pemulung interviewed all earn less than 4 USD per day and utilize large bags and metal poles to collect trash.
- Pemulung interviewed are migrants from rural communities on Java – earning money to send home to families.
- Introduction was made to a nearby "sub – aggregator".
- Extensive interview process reveals understanding of Plastic Waste Recycling Value Chain (see flow chart below)
- Pemulung collect plastic waste from the street; sell it in small quantities to neighborhood aggregators: who, in turn, sell to regional aggregators. Regional aggregators sell to large aggregators who process plastic bottles into plastic flakes which are then sold to plastic recycling factories in the Greater Jakarta area.
- Pemulung:
    - Overview
        - No formal organization
        - Peasant class
        - Nominal earnings
    - Role
        - Comb streets/garbage collection for recyclables
    - Process
        - Collect bottles in bags
        - Deliver and sell to neighborhood aggregators
    - Numbers
        - Collects between 8 – 20 kgs / day
        - Earns between 800 – 5000 rupia / kg
        - Depends on type of plastic
        - ~USD 3 - 5/ day
- Sub-Aggregator:
    - Overview
        - Service a neighborhood
        - Peasant class
        - Nominal earnings
        - May hold loans
    - Role
        - Aggregation of bottles
    - Process
        - Receive plastic in bags from collectors
        - Remove labels/lids and sort plastic – label is garbage, everything else has value

Observations – Hong Kong and Jakarta Site Visits

- Sell to processor
- Numbers
  - Employs between 2 – 15 on sight sorters/cleaners
  - Earnings unknown
  - Price/value of plastic determined by buyer

AGGREGATOR/PROCESSOR:

- Sub Aggregator put UM Team into touch with the region's Aggregator/Processor
- UM Team interviewed and toured the large Aggregation/Processing Facility
- Aggregation facility is one of 100+ in Jakarta, sophisticated business, 20-30 onsite employees
- Large volumes
- Plastic arrives in bottle form, is cleaned, shredded, cleaned again, dried, packaged and sold to factories
- Through interview process, UM Team learned about the pricing schemes, how/when people are paid, and value of different plastics.
- Aggregator/Processor
  - Overview
    - 100+ in Jakarta
    - Employs Peasant class
    - Substantial earnings
    - Sophisticated business
  - Role
    - processing of plastic
    - Sell to factory or exporter
  - Process
    - Receive plastic in bags from aggregators
    - Pre –cleaning (removal of lids and labels)
    - Shredding of plastic into flakes
    - Washing of plastic (caustic fluid and lots of H2O)
    - Dry and sort cleaned flakes
    - Sell to factory or exporter
  - Numbers
    - 20+ on sight sorters/cleaners/shreders/etc
    - Earnings unknown
    - Price/value of plastic determined by buyer
    - Large volume

Tuesday, July 26, 201, Field Research & British Council Event
Location: Central Jakarta
Guide: Ms. Yayuk, Personal Friend

NEIGHBORHOOD AGGREGATION SITE (Jakarta):

- Yayuk's driver was able to track down additional Sub-Aggregation sites throughout the city.
- UM Team toured additional Sub-Aggregator sites where site managers and pemulung were interviewed.
- The team gathered additional insight into the plastic waste value chain.
- The Sub Aggregators that were interviewed reported that they current use cell phones to determine the current prices for Plastic and other materials.

Observations – Hong Kong and Jakarta Site Visits

- The facilities lack sanitation, employees are barefoot, children are actively cleaning plastic bottles.
- It is apparent Pemulung earn around 3 USD per day for their efforts.

BRITISH COALITION, SOCIAL ENTERPRISE EVENT

- UM Team was invited to a large event put on by the British Coalition, which featured presentations from social enterprise start up organizations.
- The event featured displays from between 50 and 75 different enterprises with presentations made by roughly 15.
- The event demonstrated that there exists a burgeoning "start up" culture in Jakarta that is being supported by various large international development organizations.

Wednesday, July 27, 201, Meeting with CSR Asia, Launch Meeting & Site Tour
Location: PepsiCo Headquarters, Jakarta // Aggregation and Processing site #1

MEETING WITH CSR ASIA, (Marriot Jakarta):

- Jenny Costelloe and Jill Chin of CSR Asia met with UM Team to discuss their approach to project evaluation and design
- CSR Asia leverages the London Benchmarking Group's methodology to design project benchmarks.
- CSR Asia representatives expressed interest in partnering on the project – specifically they are interested in helping to ensure that the project is designed in a way that is culturally sensitive (to Jakarta stakeholders, PepsiCo, and UM)
    - What:
        - Specialize in CSR in Asia (duh)
        - Help private sector create sustainability benchmarks and reporting tools
        - Write CSR reports for organizations
    - Role this week
        - Offer Development and CSR experience based perspective
        - Facilitate Thursday meeting
        - Potential partner moving forward
        - Can help design the project evaluation/success metrics & accounting
        - Use the London Business Group (LBG) CI scorecard model

LAUNCH MEETING (PepsiCo Headquarters, Jakarta):

- Meeting was the first "in-person" introduction to Gary Horsfield, David Walker, Amit Bose, Laurie Hoffman, and Lynette Ryan. CSR Asia Representatives were in attendance as well.
- UM Team began with a project background presentation, which outlined the student team, purpose, etc.
- Gary Horsefield provided a presentation, which outlined PepsiCo's CSR initiatives as well as an overview of the operational structure of PepsiCo Asia Pacific. He also provided perspective on what a successful project will look like.
    - Big team – ensure that the team performs and doesn't finish with nothing but hot-air
    - MODEL: Right thing – creating a business
        - Micro-earning
        - Value of recycling is getting more significant? Why?
        - As a plastics recycling plant – can be profitable
        - Must make money through the supply chain
            - Market-based solution (Lynette)
        - Entrepreneurially – get right brains into the space
            - Get waste off the streets

Observations – Hong Kong and Jakarta Site Visits

- Replicable and scalable

- Amit Bose provided an in-depth presentation, which outlined PepsiCo Jakarta's business model and market position as well as an introduction to the relationship between PepsiCo Jakarta and both the Salim Group and 7-Eleven.
  - Stores
    - Different model than hyper/supermarkets
    - Small, fast, convenience, prepared food
    - Does not compete with Indomart (Salim)
    - Serves as a popular hang-out place for youth
    - One kid interviewed hangs out there all afternoon and evening Friday through Sunday
  - Trash
    - Fountain drinks, soda bottles, snacks
    - All stores have bussers that clear tables and take trash to cans in the back
    - ISS (?) manages trash, comes by at 10pm and takes to a trash pile somewhere
  - Business
    - Growing
    - Currently a good partner to PepsiCo – They give PepsiCo ½ of the fountain space
    - No current CSR Sustainability plan
    - This project as a movement in that direction
  - Jakarta
  - 1st new market in 13 years
    - Growing fast (6 stores a month?)
    - As 7-Eleven grows – PepsiCo grows.
- UM Team made a pre-lunch presentation which outlined the results of the first two days of field research

Site Visit WITH PEPSICO TEAM (Aggregation and Processing site #1):

- UM Team led the PepsiCo team and CSR Asia representatives on a site tour of the A&P site #1 in West Jakarta.
- Project team toured the site and interviewed the owner/operator of the facility
- PepsiCo Team was able to see first hand how the plastic waste value chain worked, who was involved, and the earnings that those involved in the process were receiving.

Thursday, July 28, 201, Launch Meeting, Meeting with University of Indonesia
Location: PepsiCo Indonesia Headquarters, Jakarta, Indonesia / Café in Southern Jakarta

LAUNCH MEETING DAY 2 (PepsiCo Headquarters):

- The UM Team and the PepsiCo Team reconvened in the morning to discuss the previous day's events and develop a Mission statement and next steps for the project.
- The group held a "now what/so what" discussion facilitated by CSR Asia in the morning. Comments included:
  - Major informal economy: informs next steps
  - Plastic as a commodity
  - Underlying issues: **health, equity, labor, environment, market, transparency**
  - Huge engagement potential in youth, consumers and education: 7-Eleven
  - Needs to be a business
- The group worked together to develop a *soft* Mission Statement:
  - Creating a project that focuses on plastic "waste" as a pilot, that is used as efficiently (economically and socially) as possible.

Observations – Hong Kong and Jakarta Site Visits

- Develop a line of sight into an ecologically acceptable end life for the products.
- To make positive ripple effects of project implementation on the "informal economy".
- That this is a sustainable (acceptability, longevity), to our partners, the market in question and translatable to other markets/waste streams. Create a sustainable system (model) involving various stakeholders and empower the communities (skills and education) which touch it.

- The group worked together to develop project Tenets:
  - The project addresses the issue of waste (plastic as a pilot)
    - Processed as efficiently and equitably as possible
  - The project will empower the communities which touch waste
    - Build Skills
    - Education
  - The project considers plastic management that is Ecologically acceptable
  - The project is designed with replicability in mind
    - Success is a pilot that can be adapted to other cities, countries, waste streams
- The group worked together to develop next steps:
  - Talk to PepsiCo (India, Vietnam) about India
  - (Amit's team unavailable in August)
  - 7-11
  - Find NGOs and NPOs (U-Mich; Lynette)
  - PWCR commodity market
  - Existing Green initiatives in Jakarta
  - Entrepreneurial network (explore social enterprise options)
  - Salim partnership (Amit) when/*if ready*
  - Education (outreach to academic inst. Etc.)
  - Research structure and execution
  - Identify local project manager
  - Plan calls and touch points to update PepsiCo

MEETING WITH UNIVERSITY OF INDONDESIA (Jakarta, Indonesia):

- Dr. Cindi Priati is a professor of Environmental Engineering at the University of Indonesia. The UM Team was put into touch with her by way of a colleague at the WWF. Dr. Priati speaks English and was very enthusiastic about the meeting.
- Dr. Priati's program is relatively small but does host students focusing on waste related issues.
- She expressed a great interest in developing a relationship between the UM Team and the University.
- Some initial ideas included partnering with students to manage some of the on-the-ground research pieces of the project. It was discussed that the students have to fulfill a research requirement to obtain their degrees – this project presents a good opportunity to focus some of the student's research.
- UM Team and Dr. Priati agreed to continue developing the relationship with plans to communicate after the UM Team returned to the US

Friday, July 3, 2011, Meeting with BSR & WWF
Location: Hong Kong

MEETING WITH WWF

- The UM Team met with Ms. Karen Ho, the Business Engagement Director in China for the World Wildlife Fund.
- The UM Team and Ms. Ho discussed her experiences with engaging the Private sector with specific focus on CSR and Sustainability initiatives.

Observations – Hong Kong and Jakarta Site Visits

- Ms. Ho shared her experiences and suggested that while CSR/Sustainability is becoming increasingly important, Asia Pacific remains slow to catch up to the initiatives/incentives/policy/etc. of the "west".

MEETING WITH BSR

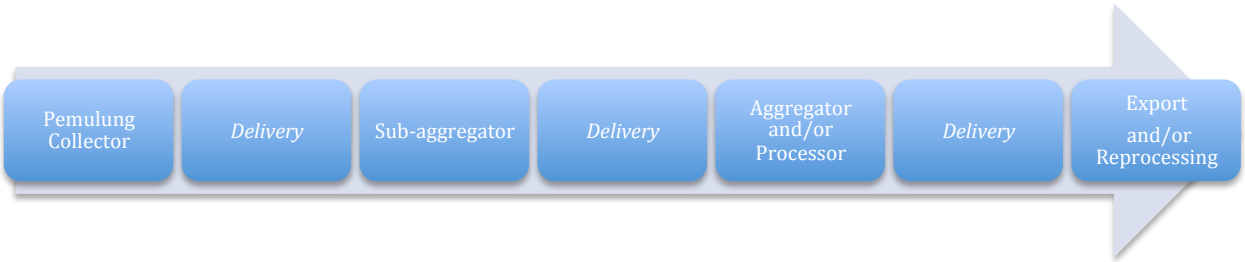
- The UM Team met with Dr. Laura Ediger of BSR Hong Kong.
- Laura has extensive experience as a Public/Private consultant in Asia and has helped the UM Team to develop the project.
- Laura provided some perspective and strategies on how to engage PepsiCo from a geographically and culturally different place.

Results - Takeaways

PLASTIC WASTE VALUE CHAIN IN JAKARTA

- Space
  - Product indiscrimination: those that collect trash don't care about brands – plastic is plastic
  - Retail POS disconnect
  - Those consuming don't think about the collectors nor destination
  - Those that collect don't think about consumers
- Informal economy
  - Recycling by urban poor
  - 100's of large aggregators
  - Clear efficiencies, norms, players
  - Marginal profits throughout value chain, captured by economically marginal population
  - Business operating conditions
- Value transparency:
  - Collectors don't know true value of plastic, i.e., subject to buyers discretion (middlemen)
  - Those weighing plastic not accountable for scale accuracy
- Land squatting: both aggregator sites pay rent to landowner intermediary
- Poor accounting:
  - Capital constraints
  - Mafia influence/risk

Figure 10: Pemulung Value Chain



PEPSICO TEAM PROJECT ALIGNMENT:

- After visiting the waste processing site, the PepsiCo Team and the UM Team discussed the important and careful steps that needed to be taken to ensure that the project be successful and respectful of the marginalized stakeholders.

Results - Takeaways

UNIVERSITY OF INDONESIA

- Holds great potential as a future partner. Students are deeply familiar with waste issues in Jakarta and could provide mutually beneficial project support.

Site Visit 2 – Singapore and Jakarta, Indonesia

Logistics

DATES: Tuesday, August 16 – Friday, August 26, 2011
TEAM ATTENDEES: Miguel Sossa
KEY STAKEHOLDERS/EDUCATORS VISITED:

- Mrs. Yang Hong, Manager, Singapore National Environmental Agency, Ministry of Waste Minimization, Singapore
- Ms. Wong Bick Guan, Singapore Director, Piaget Academy (NationalHigh Jakarta School, NHJS, Oversight), Singapore
- Mr. William and Mrs. Daisy Yiu, Founders, Piaget Academy (NationalHigh Jakarta School Oversight), Jakarta, Indonesia
- Ms. Wong Bick Guan, Singapore Director, Piaget Academy (NationalHigh Jakarta School Oversight), Singapore
- Mr. Colin Pereira, Principal, Piaget Academy's NationalHigh Jakarta School, Jakarta, Indonesia
- Ms. Foo Pau Choo, Assistant Principal, Piaget Academy's NationalHigh Jakarta School, Jakarta, Indonesia
- Ms. Cindy Priadi, Faculty, University of Indonesia – Environmental Engineering Department, Depok, Indonesia
- Mr. Jalal, Founder, CSR Indonesia, Depok, Indonesia
- Mr. Asan Bakri, Owner, Plastic Recycling Facility, Jakarta, Indonesia
- Mr. Retno Hapsari, Staff, XS Foundation, Cilandak, Barat
- Mr. Sonny Sukada, Director Corporate Social Responsibility, Danone Indonesia, Jakarta, Indonesia

LOCATIONS VISITED:

- Singapore National Environmental Agency, Singapore
- University of Indonesia, Depok, Indonesia
- NationalHigh Jakarta School, Jakarta, Indonesia
- Plastic Waste Recycling Facilities, Depok, Bintan, and Jakarta, Indonesia
- Danone Pemulung Empowerment Program Site, Jakarta, Indonesia
- XS Foundation, Cilandak, Barat
- 7-11 Store, North Jakarta, Indonesia

Site Visit Question to be Answered / Corresponding Hypothesis

QUESTION: How and by who is plastic waste collected in and around Jakarta, and does plastic waste remain in Jakarta's landfills, or do other stakeholders process it?

HYPOTHESIS: If Jakarta's municipal waste collection department cannot collect all of the city's post-consumer plastic waste, and plastic waste has value through recycling, then no plastic will remain in landfills, and a sub-economy for plastic waste processing employing non-government stakeholders will be created.

Methods for Analysis

- Examine and record current post-consumer plastic waste stream from consumption to landfill or recycling facility
- Conduct visual plastic bottle count in Jakarta's central landfill in Bantar Gebang to validate whether plastic stays in landfills or is collected by another stakeholder
- Conduct primary research via meetings with post-consumer waste recycling stakeholders to evaluate if plastic

Methods for Analysis

has value, it if has post-consumer uses in Indonesia and abroad, and if there are opportunities for non-government stakeholders to control pricing

- Observe and record other methods for plastic waste collection, their scalability potential, effectiveness, and socio-economic impact on the *Pemulung*

Observations – Singapore and Jakarta Site Visits

Wednesday, August 17, 2011, Meeting
Location: Singapore National Environmental Agency (NEA), Singapore
Guide: Mrs. Yang Hong, Manager, Singapore National Environmental Agency, Ministry of Waste Minimization

BEST PRACTICE Observations:

- Singapore's National Environmental Agency shared that while the population of Singapore has doubled in the last 40 years, the amount of waste (trash) produced has multiplied 6 times over
- In 2010, Singapore disposed of over 2.76 million metric tons of trash, the daily equivalent of 1,000 garbage trucks
- Prior to 1979, all of Singapore's waste was landfilled
- Since 1979, 90% of waste is converted to heat for electricity production via incineration, with the incineration ashes and other 10% of non-incineratable materials heading to landfills
- By 1999, all landfills were full and closed leaving only the remote island landfill of Semakau
- Due to the high cost (approximately $610 million), limited life-span (30-45 years), and limited availability for constructing new landfills, Singapore recently initiated a country-wide waste strategy focused on minimizing landfill use
- Singapore's strategy focuses on four areas of treating waste (in order of preference):
    - Waste minimization
        - Singapore's NEA partnered with industry leaders and NGOs to set voluntary packaging and ingredient targets to minimize product waste, one of the largest contributors to landfill waste in Singapore
        - The NEA also instituted "bring your bag" requirements for grocery stores, which now charge consumers to use plastic bags
    - Recycling / reducing landfill waste
        - Singapore NEA collaborated with academic institutions, residential owners, and corporate owners to provide recycling bins and collection services throughout the country
        - Singapore's Ministry of Waste Minimization also launched multiple recycling and environmental education campaigns to combat decades of anti-conservation and anti-recycling behavior
        - Mrs. Hong acknowledge that one of the most challenging components of implementing Singapore's waste strategy was changing the country's sentiment toward waste ownership and minimization
    - Waste-to-energy via incineration
        - Singapore continues to invest in new technologies to reduce air pollution and maximize waste-to-energy efficiencies within incinerators, a policy that greatly differs from the very polluted community incinerators found in Jakarta
    - Landfill dumping
        - Singapore's NEA has projected that the Semakau landfill will last until 2050 at the

Observations – Singapore and Jakarta Site Visits

current rate of use, forcing the country to explore worst case scenarios of reclaiming land for landfill extension purposes

- As part of the overall waste strategy, Singapore's NEA implemented the use of third party waste collectors to more efficiently manage collection. Waste collection companies must bid on the government contract every 2 years, and must include both a method and service level agreement for separating and collecting recycled waste
- Finally, Singapore's plastic waste consumption has increased over the past 30 years. Yet, due to the continued enforcement of strict anti-littering laws and ample municipally driven waste collection throughout the country, very little plastic waste enters streets or other areas open to the public. Thus, and also due to a higher standard of living, there have been few observations and very limited concentrations of *Pemulung* within Singapore

Tuesday, August 16, 2011; Monday, August 22, 2011; Thursday, August 25, 2011, Meetings and Youth Presentation
Location: Piaget Academy, Singapore and NationalHigh Jakarta School, Jakarta, Indonesia
Guides: Mr. William and Mrs. Daisy Yiu, and Ms. Wong Bick Guan, Piaget Academy; Mr. Colin Pereira and Ms. Foo Pau Choo, Piaget Academy's NationalHigh Jakarta School

ACADEMIC AND YOUTH RECYCLING PARTNERSHIP Observations (Singapore and Jakarta, Indonesia):

- The Piaget Academy is known throughout Singapore and Jakarta, Indonesia as one of the top charter schools for grades K-12 and was developed to deliver top-level British and Singaporean education to high-performing youth
- The Piaget Academy entered Jakarta through the development of the NationalHigh Jakarta School, which finds that most of its students come from higher socio-economic backgrounds and from families with larger corporate influence
- The UM Team began its partnership with NationalHigh Jakarta School to ascertain what levels of environmental and recycling focus is shared with students, and to what degree can these future business leaders be brought in to the plastic recycling equation earlier in their formative years
- Additionally, given the high caliber of the NHJS students, the UM Team also sought to invite a group of students to participate in a future business plan competition aimed at reducing plastic waste, increasing recycling, and improving the livelihood of the *Pemulung*
- During multiple visits to Piaget Academy headquarters and NHJS itself, the UM Team concluded that students are exposed to environmental science and understanding at all grade levels via science projects, social initiatives, and in-house recycling art projects
- Each year, Piaget Academy hosts one of the most innovative multi-disciplinary science fairs in SE Asia. For example, NHJS students in 2011 designed a bio-digestor, chairs made of recycled tires, and mechanisms to calculate happiness and sadness based on environmental factors
- Given the very strong science focus, the UM Team hypothesized that students would potentially be a catalyst for improving plastic waste issues in Jakarta
- However, interviews with NHJS' top administration indicated that the school is still in the early stages of implementing a recycling program within the school, largely due to not having anywhere to send recycled material. NHJS indicated that given the lack of large-scale municipal recyclable waste collection, it is very difficult for the school to implement a recycling program. Additionally, the school has not yet investigated partnering with *Pemulung* programs like Danone's *Pemulung Empowerment Programme* due to lack of program knowledge, coordination access, and potential security concerns from school parents
- Additionally, student interviews indicated that while recycling seems like the right thing to do, the constant viewing of recyclable waste on streets, within parks, and near homes, as well as the viewing of friends throwing away such things as plastic bottles, does not entice students to want to actively recycle

Observations – Singapore and Jakarta Site Visits

- Given the slow transition to in-school recycling and social influences to discard recyclable waste versus recycling it, the UM Team revised its hypothesis to state that if students did not have a large catalyst to promote recycling in their daily lives, that their generation would also be part of the plastic waste issue in Jakarta
- The UM Team met with Piaget Academy and NHJS administrators who concurred with the above hypothesis and pledged to identify additional mechanisms to proactively reverse this trend amongst its students
- The UM Team, Piaget Academy, and NHJS met multiple times in August to begin work on a long-term plan to incorporate recycling curriculum, external education, school-to-school student partnerships around recycling, and to offer students access to the University of Michigan's School of Natural Resources to work on large scale business plans to address waste. As noted by Piaget Academy founder, Mr. William Yiu, bridging such a partnership would enable students to build a sense of ownership to defining plastic waste solutions, as well as enable students to push such thinking to their parents, who have the corporate and government influence to begin shaping Jakarta's view on recycling from the top down
- The UM Team's Miguel Sossa held a workshop with middle-school and high-school students and faculty on August 25, 2011 to begin building long-term relationships as well as to gauge actual interest on plastic waste recycling
- The results were impressive, as over the course of a few hours, students generated powerful calls to action and marketing campaigns for increasing student-body recycling such as "*I recycle. Do you?*" and developing plans for creating plastic bottles out of bio-degradable materials as well as fuels from existing plastic bottles
- Given the strong display of interest and motivation to pursue plastic waste recycling initiatives, the UM Team revised its final hypothesis regarding student involvement as follows: If students are provided a creative platform to pursue plastic waste recycling initiatives that is complimented by in-class education, a supportive school system, and government/corporate partnerships that seek such talent, then plastic waste recycling will increase
- The next phase of hypothesis testing, *Pemulung* exposure, and student partnerships is scheduled for September and October 2011 in preparation for NHJS' partnership in a PepsiCo sponsored business plan competition to be held in 2012

Monday, August 22, 2011; Friday, August 26, 2011, Meeting
Location: University of Indonesia, Environmental Engineering Department
Guides: Ms. Cindy Priadi, Faculty – University of Indonesia; Ms. Niknik Bestar, Ms. Nurul Badina, and Mr. Yudi Thia, Students – University of Indonesia, Environmental Engineering Bachelor Degree Program

RESEARCH ON PLASTIC WASTE'S SOCIAL AND ENVIRONMENTAL IMPACTS (Depok, Indonesia):

- While the UM Team was initially able to find secondary research regarding the high-level social and environmental impacts of waste, we were unable to locate specific information regarding Indonesia
- The UM Team pursued a connection that team member Taylor Samuelsen made with Ms. Cindy Priadi, Professor of Environmental Engineering at the University of Indonesia to explore the issue further and to identify if future research partnerships with the University of Michigan's School of Natural Resources and Environment would be beneficial
- The University of Indonesia's Environmental Engineering Department has forged multiple partnerships with municipal waste landfill officials throughout Indonesia as well as with the *Pemulung* that scavenge within these locations
- Given the overabundance of plastic consumption in Indonesia, the UM Team as well as PepsiCo initially hypothesized that plastic waste was the primary or secondary contributor to local landfill accumulation
- Per the University of Indonesia's year long research project, including conducting waste sampling at

Observations – Singapore and Jakarta Site Visits

Bantar Gebang, Jakarta's largest landfill, plastic waste is rarely if ever seen

- Per student and faculty research, the reason that the abundance of plastic waste in landfills has fallen to near 0% in the past few decades, is that a new sub-economy involving recycled plastic has immerged throughout Indonesia and other parts of the world
- This sub-economy has been formed as a result of the convergence of multiple cultural and economic factors. Specifically, since Indonesians typically throw away plastic waste, long considered trash for cultural reasons dating back centuries, and since municipal recycling programs are far and few between and largely inadequate, an abundance of raw plastic waste has emerged throughout the country. This plastic waste holds value for large-scale manufacturers of plastic bottles and other goods that have seen their raw material costs from virgin plastic increase substantially as a result of the continued increase in oil prices. However, since no simple mechanism exists in Indonesia to extract plastic waste and convert it to recycled plastic pellets for production, manufacturers have become reliant on a new recycling stream. This involves *Pemulung* who collect plastic waste from streets, toxic landfills, home backyards, etc., who then send waste to aggregators, who then clean the waste, send to processors, who then create plastic pellets, which are then finally sold to top-level manufacturers throughout the world
- Given this research, the UM Team forged a hypothesis that if plastic is a material developed from oil, and if oil is a commodity that has high price fluctuation, then the demand for recycled plastic will fluctuate, creating an unstable stream of income and subsequent sub-standard of living for the *Pemulung* and those involved in the recycling process
- The UM Team sought to test this hypothesis in unison with the University of Indonesia's students, however initial discussions indicated that such social studies would not completely fall in line with the engineering project requirements dictated by the university. As such, the UM Team will continue to pursue relationship development with the University of Indonesia to identify where synergies exist to research the plastic waste chain and its social impacts, while conducting field research to ascertain the livelihood of the *Pemulung*

Tuesday, August 23, 2011, Field Visit
Location: Plastic Waste Aggregation Facility, South Jakarta, Indonesia
Guides: Mr. Jalal, Founder of CSR Indonesia and Mr. Asan Bakri, VP of Pemulung Union and Plastic Aggregator

PLASTIC WASTE AGGEGATION Observations (Depok, Indonesia):

- The UM Team's Miguel Sossa traveled to Depok Indonesia to meet with Mr. Jalal, one of Southeast Asia's most recognized leaders in corporate social responsibility consulting, to understand how plastic scavenging works in Jakarta
- Jalal, who is a long-time reader of the Erb Institute's Andy Hoffman, took the UM Team to meet Mr. Asan Bakri, who in addition to owning multiple plastic waste aggregation sites, also serves as Vice-President of the Indonesia's Pemulung Union
- Mr. Bakri's plastic waste aggregation sits on a 4-10 acre site of land located within a small urban community outside of Depok's city center
- Mr. Bakri earned his degree in business and used to work in accounting before deciding that there was both money and social improvement to be made within the post-consumer plastic waste recycling cycle
- On average, Mr. Bakri processes between 4-8 tons of plastic a day at his site, one of hundreds located throughout the greater Jakarta area, and one of many locations that a scavenger network of 600,000 *Pemulung* feed into daily
- Mr. Bakri provided a snapshot of the full plastic waste cycle, indicating that he has been in the business for over a decade
- First, *Pemulung* collect plastic waste very early in the morning through mid-day, along an often 5 mile path that includes city streets, landfills, and other public areas

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- Next, *Pemulung* wash their waste when possible, load it into a large wooden cart the size of a pick-up truck bed with large walls, and then carry the 2-wheel cart upwards of 3-5 miles back to the aggregator site. The UM Team had the opportunity to pull the cart, and even empty, the weight is incredibly heavy, roughly 60-100 kilograms or ~120-220 pounds. Both men, women, and teenagers take part in collection and transport of plastic waste, often living in very poorly constructed shanty towns funded by overlords known as *Bandar* who trade food and living for indentured servitude. Note that Mr. Bakri is not a *Bandar*, as he does not house his staff, which includes over 20 waste separators, plastic chip processors, accountants, and truck drivers, many of whom are either very young or quite old
- The *Pemulung* know where to take their plastic waste for payment based on long-established relationships with local aggregators. Mr. Bakri had recently entered new communities with existing aggregators, and indicated that in addition to spending multiple weeks building relationships with *Pemulung*, he also offered higher prices per kilogram of plastic and helped empower lower-level *Pemulung* to become aggregators to show his commitment to the community
- Next, plastic waste aggregators weigh the *Pemulung's* plastic haul, pay them based on a daily rate calculated by either upstream pricing or established rates, and then begin the process of sorting plastic for processing
- The *Pemulung* return home in the late afternoon or evening, often to a community of *Pemulung* that remain together for years
- Aggregators then sort plastic by color, often an indicator of the plastic used and quality, and then package in baskets for shredding
- Plastic is then shredded on site and stuffed in large plastic bags, similar to bags used to store rice or coffee, each weighing close to 40kg or ~80 pounds
- In addition to shredding plastic waste, Mr. Bakri also sorts, packages, binds, and ships out blocks of plastic bottles (all blocks are of the same type of plastic bottle, often *Danone Aqua*, the most commonly purchased water in Indonesia
- Mr. Bakri's team then stacks the bundled plastic waste and bottles into a truck and ships it to the plastic pellet fabricators who pay him for his delivery. The cost per kilogram of plastic increases along the waste chain as more labor is involved to reach the final customer
- Mr. Bakri noted that he has three main concerns regarding his business:
    - First, he is not able to compete with the influx of foreign plastic waste from the Netherlands, U.S., Japan and other global markets, that send their waste to Indonesia for free. Pellet creators seek after this abundance of large-scale, pre-cleaned and bundled plastic over Mr. Bakri's, because of its cheap costs and ease of processing. Mr. Bakri is worried that this growing supply of foreign waste will one day put him out of business, and is thus partnering with the *Pemulung* Union (IPI) to petition governments to not accept foreign waste
    - Second, Mr. Bakri is worried that if the market for plastic waste recycling grows too fast, that the government will finally centralize recycling with municipal waste collection. This practice is commonly seen throughout Indonesia where government may not become involved in municipal servicing until such time as it is actually profitable for the government doing so. If the government does start a municipal program for all of Jakarta, then Mr. Bakri's entire business may go under due to lack of local demand for aggregator services
    - Finally, Mr. Bakri is concerned for the health and security protection of the very *Pemulung* that provide him with the raw materials he uses daily. Most *Pemulung* work in toxic environments such as landfills or are treated as second-class citizens due to their occupation. Additionally, most *Pemulung* are foreign migrant laborers that have little protection from the law. Thus, when health is poor or legal issues force *Pemulung* to stay out of Depok, Mr. Bakri loses supply and cannot meet his clients' supply demands.
- Given these concerns and observations, the UM Team concluded that the current *Pemulung* plastic waste

collection model did not promote a healthy, sustainable method for alleviating poverty or providing opportunities for long-lasting economic growth

Tuesday, August 23, 2011, Field Visit
Location: *Danone Pemulung Empowerment Programme*, South Jakarta, Indonesia
Guides: Mr. Jalal, Founder of CSR Indonesia and Mr. Sonny Sukada, Director of Corporate Social Responsibility, Danone Indonesia

DANONE PEMULUNG EMPOWERMENT PROGRAMME Observations (Curug 2 Bogor, Indonesia):

- Mr. Jalal took the UM Team to meet Mr. Sonny Sukada, Danone Indonesia's Director of Corporate Social Responsibility, and co-founder of CSR Indonesia, to understand how Danone is working to improve the livelihood of *Pemulung* in Jakarta and Bali
- Per Danone, the organization feels that it is responsible for helping to improve the livelihood of those who touch the plastic waste that Danone produces. As the leading producer of bottled water in Indonesia Danone also produces one of the largest amounts of plastic waste in Indonesia. Given multiple direct observations of how *Pemulung* are treated and Danone's feeling that *Pemulung* are a critical part of the recycling solution, Danone developed their own recycling pilot
- Known as the *Pemulung Empowerment Programme (PEP)*, Danone setup a small plot of land with a local NGO to serve as a pilot for socially-conscious plastic aggregation
- With substantial seed funding and local marketing, the *PEP* site is intended to provide both a center for fair plastic pricing and a pipe-line for Danone to source its raw materials, as well as a center for education, job training, food sharing, and most importantly, micro-loan and co-op development
- *Pemulung* attached to the *PEP* appeared legitimately happier than at Mr. Bakri's site, and their children go to an on-site school that is taught by NGO participants as well as Danone volunteers
- *Pemulung* sign-up with the site's co-op, where they are allowed to trade plastic for food in-lieu of money, and are given the opportunity to open up small savings accounts that then fund other *Pemulung* purchases such as motorcycles to more quickly move plastic throughout the city
- Danone's ultimate goal is to scale up the *PEP* to a size that one day provides all of its recycled plastic needs
- The UM Team recognizes the *PEP* as one solution toward addressing *Pemulung* living conditions and plastic waste issues, but will continue to assess the following hypothesis: Programs such as the *PEP* exist because of a symptom of plastic waste collection, and do not necessarily address the much larger issue of plastic waste recycling education and inefficiencies. Thus, if plastic waste is to be completely eliminated from landfills, ecosystems, etc. and the *Pemulung* are to truly be empowered, then a much larger government/corporate partnership employing the *Pemulung* may be a better solution in the long run

Wednesday, August 24, Field Visit
Location: 7-Eleven, North Jakarta and XS Foundation, Cilandak Barat, Indonesia
Guide: Mr. Retno Hapsari, Staff, XS Foundation

7-ELEVEN WASTE COLLECTION Observations (North Jakarta, Indonesia):

- 7-Elevens in Jakarta do not separate store waste into recycled versus un-recyclable waste. Thus all store waste is sent directly to landfills. No formal interview took place due to language barriers and out of respect to direction from PepsiCo to not engage 7-Eleven at this point in the project. Additionally, a full assessment of where 7-Eleven's trash ultimately ends up was not completed for logistical reasons, though it is expected that the waste ends up at Bantar Gebang, Jakarta's largest landfill
- Additional research at 7-Elevens will be conducted as needed to understand opportunities for waste

Observations – Singapore and Jakarta Site Visits

separation, long one of the largest challenges to effective recycling in Indonesia and across the world

Wednesday, August 24; Thursday, August 25, Meeting
Locations: XS Foundation, Cilandak Barat, Indonesia and Greeneration, Jakarta, Indonesia
Guide: Mr. Retno Hapsari, Staff, XS Foundation and Zulfikar and Christian Taylor, Staff, Greeneration

UP-CYCLING OPPORTUNITY Observations (Cilandak Barat and Jakarta, Indonesia):

- The UM Team visited a non-descript house in Cilandak Barat, a town nearly 2 hours south of Jakarta to understand how plastic is being used outside of the traditional recycling market
- Founded by environmental activist and American, Ann Wizer, the XS Foundation provides *Pemulung* with living wages largely above average aggregator pricing for specific plastic waste, which is then up-cycled into products ranging from purses to *iPad™* cases
- XS staff have spent several years building relationships with *Pemulung* in the area who bring discarded banners, car seat covers, and other unique waste items to be assembled into products that are shipped to high-end boutique stores in Europe, the United States, and Japan
- The foundation's mission is to improve the livelihood of *Pemulung* across Jakarta, and sale proceeds are used to provide food, education, and health opportunities to supporting *Pemulung* communities
- Unlike the *PEP*, XS Foundation does not face a scaling challenge, but rather one of demand, as its niche market is considered a fad and short-term trend in the industry. As a result, the model's sustainability is unclear. However, the visit offered the UM Team an additional perspective of how to approach marketing and integration of plastic waste into product delivery and customer pull throughout Jakarta

- The UM Team also visited with staff members of Greeneration, a small start-up that manufactures reusable plastic bags, similar to those found for purchase at Whole Foods Market™
- Per Zulfikar and Christian Taylor, Greeneration staff members in their early 20s, the demand for reusable bags has increased in countries such as Singapore, and in more environmentally-focused countries in Western Europe
- While Indonesia has been slow to adopt plastic bag reductions, Greeneration has been quickly developing ties with large grocery chains to position itself for the likely shift over the next few years
- While the reusable bags are themselves made with mostly virgin plastic, the organization is hoping to shift to fully-recycled based bags that emerge from partnerships with local plastic producers
- The visit also helped the UM Team validate its hypothesis that entrepreneurs are abundant in Jakarta and very willing to apply business acumen to address plastic and other waste issues

Results – Takeaways

BEST PRACTICE Observations – SINGAPORE NATIONAL ENVIRONMENTAL AGENCY (Singapore):

- Singapore's government faces the incredibly difficult challenge of changing decades of waste thinking and non-recycling culture to pursue its financially and environmentally-driven goal of reducing landfill dumping to ~0%
- Singapore's National Environmental Agency believes that this will occur through a three-pronged partnership between corporate, government, and NGO partnerships that jointly identify and enforce the legal, financial, and educational mechanisms that will make recycling and zero-impact construction, packaging, and living possible

ACADEMIC AND YOUTH RECYCLING PARTNERSHIP Observations (Singapore and Jakarta, Indonesia):

Results – Takeaways

- Jakarta's top students posses the skill-sets, motivation, and connections via social media to begin driving home the importance of recycling and zero-impact living amongst the next generation of Indonesians
- However, without the support of sustainable academic partners and without proper incentives and guidance to stay focused, the growing consumer culture in Jakarta may prove too difficult to overcome with respect to waste production

RESEARCH ON PLASTIC WASTE'S SOCIAL AND ENVIRONMENTAL IMPACTS (Depok, Indonesia):

- Despite both PepsiCo and the UM Team's hypothesis that plastic accounts for a substantial portion of landfills, the University of Indonesia and onsite interviews confirm otherwise
- A growing global demand for recycled plastic has driven plastic from landfills into a quickly emerging recycling sub-economy of *Pemulung*, aspiring local businessman, and large-scale manufacturers
- The reduction of plastic waste in landfills has come with its tradeoffs however, as those directly involved with plastic collection are subjected to toxic environments, unstable wages, legal challenges, and a livelihood threatened by market changes outside of their control

PLASTIC WASTE AGGEGATION Observations (Depok, Indonesia):

- Visiting Mr. Asan Bakri's plastic aggregation and its hundreds of plastic piles offered visual confirmation of the sheer size of the plastic waste epidemic
- While aggregators offer a hand in plastic recycling, they are poorly equipped to deal with long-term issues of price commoditization, advances in costly processing automation, and market fluctuations that jeopardize their businesses each day
- If Indonesia's municipalities begin to collect recycled waste and mandate that organizations by from the government directly, then aggregators will likely cease to exist in current form
- However, if aggregators proactively develop partnerships with government officials to process municipal waste and employ *Pemulung* as full-time employees with benefits, then perhaps a truly sustainable solution addressing plastic waste may be formed

DANONE PEMULUNG EMPOWERMENT PROGRAMME Observations (Curug 2 Bogor, Indonesia):

- Corporate Social Responsibility has the potential to make a significant difference in the lives of those involved with plastic waste
- Additionally, if corporations collectively push for recycled plastic over virgin, then they can help programs such as Danone's *PEP* create a large-scale impact across the world
- However, if CSR efforts focus solely on the symptoms of plastic waste and not the entire problem, then it is unclear how the ill environmental effects created by plastic waste will be fully solved
- Grass-roots involvement and community relationship building are the key to launching any program of importance within Indonesia

7-ELEVEN WASTE COLLECTION Observations (North Jakarta, Indonesia):

- Without proper municipal infrastructure, corporations will be unable to recycle waste even if in-store plans are developed
- Waste separation will aid municipalities in creating such services, as separation is one of the largest challenges preventing effective recycling systems from moving forward
- Recycling by itself may not drive customers to 7-Eleven, but if 7-Eleven offers a visible platform for young students and adults to discuss and tackle socially-pertinent issues and embraces its communities, it will undoubtedly drive traffic to its stores

UP-CYCLING OPPORTUNITY Observations (Cilandak Barat and Jakarta, Indonesia):

Results – Takeaways

- Upcycling is a multi-million dollar business throughout the world, and Jakarta is slowly taking part of that production market
- As long as demand grows and access to raw materials remains possible, organizations like XS Foundation and Greeneration will offer positive alternatives to using plastic intended for landfill disposal

Final Conclusions – Hypothesis Determination – Takeaways

QUESTION: How and by who is plastic waste collected in and around Jakarta, and does plastic waste remain in Jakarta's landfills, or do other stakeholders process it?

ANSWER: Plastic waste is not often found in landfills, because Pemulung, who in turn sell plastic and other wastes within a growing post-consumer waste recycling sub-economy, often scavenge directly within landfills.

HYPOTHESIS: If Jakarta's municipal waste collection department cannot collect all of the city's post-consumer plastic waste, and plastic waste has value through recycling, then no plastic will remain in landfills, and a sub-economy for plastic waste processing employing non-government stakeholders will be created.

CONFIRMED OR DENIED: Confirmed. Given the complexities and costs of establishing a Jakarta-wide waste processing, separation, and recycling program, municipalities do not have the capacity to properly handle post-consumer plastic waste properly. As such, plastic waste either heads toward landfills or is dumped by consumers throughout Jakarta's landscape. Due to growing global demand for recycled plastic, 600,000 *Pemulung* have taken to Jakarta's streets and landfills to collect this discarded plastic waste in the hopes of generating enough income in the recycling economy to forge a basic livelihood. However, without much larger-scale programs and a conscious alignment of environmental focus amongst corporations, government, and education-focused NGOs, plastic waste will remain a social and environmental burden on Jakarta's residents for decades to come.

Site Visit 3 – Jakarta, Indonesia

Logistics

DATES: Monday, October 24 – Friday, October 28, 2011
TEAM ATTENDEES: Tal Avrahami, Yih-Wei Chien
KEY STAKEHOLDERS/EDUCATORS VISITED:

- Ms. Cindy Priadi, Faculty, University of Indonesia – Environmental Engineering Department, Depok, Indonesia
- British Council - http://www.britishcouncil.org, Jakarta, Indonesia
- Ms. Mita JS, Jakarta, Indonesia
- Ms. Foo Pau Choo, Assistant Principal, Piaget Academy's NationalHigh Jakarta School (NHJS), Jakarta, Indonesia
- 10+ students from the Piaget Academy's National High Jakarta School, Jakarta, Indonesia
- Mr. Jalal, Founder, A+CSR Indonesia, Depok, Indonesia
- Mr. Eko Budi Santoso R, Officer, Global Entrepreneurship Program Indonesia (GEPI), Jakarta, Indonesia
- Mr. Giuseppe Nicolosi, CEO, Ernst & Young – Indonesia; Vice Chairman and Founder, Global Entrepreneurship Program Indonesia (GEPI), Jakarta, Indonesia
- Mr. Amit Bose, General Manager, PepsiCo Indonesia, Jakarta, Indonesia
- Ms. Laurie Hoffman, Modern Trade Channel Regional Development, PepsiCo, Bangkok, Thailand
- Ms. Jennifer (Jennie) James, Regional Director - Corporate Affairs, PepsiCo Asia Pacific, Hong Kong (via teleconference)
- Mr. Sonny Sukada, Director of Sustainable Development Department, Danone Indonesia, Jakarta, Indonesia
- Ms. Annie Wahyuni, Program Manager, Pemulung Empowerment Program, Jakarta, Indonesia

LOCATIONS VISITED:

- PepsiCo Indonesia office, Jakarta, Indonesia
- Universitas Indonesia, Depok, Indonesia
- British Council – Jakarta Offices, Jakarta, Indonesia
- Ernst & Young – Indonesia Offices (GEPI meeting), Jakarta, Indonesia
- 7-Eleven site visit, Jakarta, Indonesia
- Piaget Academy National High Jakarta School, Jakarta, Indonesia
- Danone Pemulung Empowerment Program Site, Tangerang, Indonesia

Site Visit Question to be Answered / Corresponding Hypothesis

QUESTION: Can sustainable business ideas be crowd-sourced from local entrepreneurs to deliver impact to *Pemulung*? Can an SMS-text based pricing application that delivers information to *Pemulung* increase their bargaining power? Will the 7-Eleven consumer base recognize the value of a post-consumer waste recycling program, and will it increase the brand equity of both PepsiCo and 7-Eleven?

HYPOTHESES: Provided an understanding of the social, environmental, and business challenges associated with post-consumer plastic waste recycling, local entrepreneurs are best suited to create market-based solutions that are appropriate and tailored for the Jakarta, Indonesia market. Access to pricing information increases transparency and can empower *Pemulung* in such a manner. 7-Eleven consumers in Jakarta, Indonesia are generally young, educated and of higher socioeconomic status. These consumers also tend to be

Site Visit Question to be Answered / Corresponding Hypothesis

concerned about environmental and social issues in their country and beyond, and will align their spending habits with businesses working to drive sustainability into their business activities.

Methods for Analysis and Collaboration

- Interviews with experts in corporate social responsibility, social empowerment, entrepreneurship and innovation/business plan competitions, and experience in managing corporate sustainability projects
- Strategic planning and discussion with PepsiCo Leadership Team
- Strategic planning with environmental engineering educators and students
- Strategic planning session with leadership from Global Entrepreneurship Program Indonesia (GEPI)
- Conduct primary/observational research at 7-Eleven store location
- Meeting with educators and administrators from NHJS

Observations – Jakarta Meetings and Site Visits

STRATEGIC PLANNING SESSION WITH PEPSICO LEADERSHIP TEAM
Monday, October 24, 2011
Location: Indofood Tower, Sudirman Plaza, Jakarta, Indonesia
Attendees: Mr. Amit Bose, General Manager, PepsiCo Indonesia; Ms. Laurie Hoffman, Modern Trade Channel Regional Development, PepsiCo, Bangkok, Thailand; Ms. Jennifer (Jennie) James, Regional Director - Corporate Affairs, PepsiCo Asia Pacific, Hong Kong (via teleconference); Tal Avrahami, UM Team; Yih-Wei Chien (UM Team)

- The UM Team visited the PepsiCo Indonesia offices for a meeting with Amit Bose, Laurie Hoffman, and Jennifer James (via teleconference). The purpose of the meeting was to discuss the scope and goals of the project
- The UM Team proposed a model to understand the overarching project framework, which includes: Create Social and Environmental Value Locally, Marketing Campaign, Retailer/Supplier Relationship
- PepsiCo Leadership Team made it abundantly clear that the leaders of tomorrow are consumers of 7-Eleven today
- The PepsiCo Team requested a single point of contact from the UM Team for ease of communication
- PepsiCo Indonesia has a total of 12 employees locally; human capital resources are stretched thin
- Jennie James raised the question of whether or not the project scope is too broad – should we simplify the scope to make the project more easily manageable?
- The group collectively discussed the idea and logistics of hiring a local headcount to serve as a Project Manager and first point of contact for the UM Team
- Jennie James questioned whether we are discussing structure before discussing strategy
- The group discussed the prospect of a joint meeting of PepsiCo Indonesia, 7-Eleven International, 7-Eleven Indonesia, and Salim Group (majority owner of PepsiCo Indonesia, a joint venture with PepsiCo, Inc.)
- Salim Group has a track record of corporate social responsibility projects. For example, the company has played a leading role in establishing schools in rural villages. More broadly, Salim Group focuses on developing youth and increasing knowledge base in the nation of Indonesia
- Previous discussions between 7-Eleven Indonesia leadership and Amit Bose revealed that 7-Eleven management recognizes that large volumes of waste its stores produce. They are interested in exploring opportunities to handle waste more responsibly and sustainably

Observations – Jakarta Meetings and Site Visits

- There are numerous information gaps the UM Team must fill
- The UM Team and PepsiCo Leadership Team collectively need to establish a realistic timetable by which tasks and milestones can be recorded and monitored
- Next steps: Progress call on Friday, October 28 at 1:30 PM Jakarta

UNIVERSITAS INDONESIA FACULTY MEETING Observations (Depok, Greater Jakarta Capital Region, Indonesia): Monday, October 24, 2011
Location: Fakultas Teknik, Department of Environmental Engineering, Universitas Indonesia, Depok, Greater Jakarta Capital Region, Indonesia
Attendees: Assistant Professor Cindy Priadi (U of I); Yih-Wei Chien, Tal Avrahami (UM Team)

- Our team members met with Professor Cindy Priadi of the Department of Environmental Engineering at Universitas Indonesia
- We discussed the framework for a collaboration between our team from the University of Michigan with 3rd- and 4th-year students in the midst of performing research projects
- Professor Priadi discussed the expertise and capabilities of the department and its students in developing management systems, standards of procedure
- Professor Priadi raised the idea of leveraging the strength of student associations on campus, one of which is focused on "green" initiatives
- Our collaboration with Universitas Indonesia must include a scope of work that enhances the experience of the students involved
- Accordingly, It must include larger objectives that integrate the students in the development of a solution
- The students with whom we engage would benefit from presenting their findings at conferences/seminars
- We can create a leadership team of "student managers" to take ownership of the effort of the Universitas of Indonesia student team
- These students can engage other students from the Universitas Indonesia
- We must establish a timeline with well-defined milestones
- We must create a scope of work that includes detailed responsibilities on the part of Universitas Indonesia as well as the UM Team

STRATEGIC PLANNING SESSION WITH LAURIE HOFFMAN
Monday, October 24, 2011
Location: Indofood Tower, Sudirman Plaza, Jakarta, Indonesia
Attendees: Ms. Laurie Hoffman (PepsiCo); Yih-Wei Chien, Tal Avrahami (UM Team)

- Following the meeting at Universitas Indonesia and the morning session with the PepsiCo Leadership Team, the UM Team held a recap session with Laurie Hoffman
- We elaborated the ideas of the project initiatives in detail (Business Plan Competition, P-Mobile, academic partnerships)
- We discussed the distinction between shopper research versus consumer research, as pertains to affinity purchases
- We further discussed the role of our various stakeholders
- We developed a plan for 7-Eleven engagement in late November and established a timeline and information needs for such a pitch. We highlighted the need for including an emotional aspect to the pitch to pull at the heartstrings of 7-Eleven leadership
- We discussed the need to develop an estimate for the number of waste pickers in other markets where 7-Eleven operates, including nations such as Thailand and Mexico

Observations – Jakarta Meetings and Site Visits

- We established criteria for an NGO partner. The key expectation for a partner is a successful track record of managing sustainability initiatives with sound financial management capabilities, and an organization whose reputation and actions would carry limited downside reputational risk to the PepsiCo and 7-Eleven brands
- We discussed the timing for the Business Plan Competition and P-Mobile and the need to identify which parties are responsible for which aspect of development and implementation.
- One idea that was floated was to have 7-Eleven and PepsiCo match rupiah for rupiah the contribution of customers to support the proposed project initiatives
- We discussed the possibility of incubating business ideas (for the Business Plan Competition) at 7-Eleven store locations
- One item that may be necessary is a "program launch handbook," which provides detailed training to 7-Eleven staff for hosting events
- We must investigate which aspects of a Business Plan Competition excite consumers at 7-Eleven, but must be careful in managing any observational research and survey design and execution
- Laurie posed the question of whether we must delay the meeting with 7-Eleven because we lack comprehensive details about the P-Mobile initiative and in which form it takes shape
- We revisited the need for a dedicated Project Manager from the PepsiCo side to facilitate communication, development, and eventual implementation

UM WORKING SESSION
Tuesday, October 24, 2011
Location: Sultan Hotel, Jakarta, Indonesia
ATTENDEES: Yih-Wei Chien, Tal Avrahami (UM Team)

- The team conducted a working session to develop a more robust framework for the UM-UofI research collaboration
- We made further preparations and arrangements for meetings with stakeholders and partners later in the week

CORPORATE SOCIAL RESPONSIBILITY THOUGHT LEADERSHIP
Tuesday, October 24, 2011
Location: Plaza Indonesia, Jakarta, Indonesia
ATTENDEES: Mr. Jalal (A+CSR Indonesia); Yih-Wei Chien, Tal Avrahami (UM Team)

- We provided Jalal an update on our project as it had developed since Miguel's initial meeting with Jalal in August 2011
- We discussed sustainability challenges in Indonesia and globally
- We vetted our suite of solutions, including the Business Plan Competition, P-Mobile, and academic partnerships
- We discussed our progress with stakeholder engagement, as well as our next steps
- Jalal provided an overview of the NGO ecosystem in Indonesia in general and Jakarta in particular. We inquired with Jalal about which organizations might be suitable partners based on our project scope, what NGOs expect when forming partnerships with academic institutions and/or corporations, and what might be expected of NGOs
- Jalal made arrangements for us to meet with Ms. Annie Wahyuni, a program manager for the Danone Pemulung Empowerment Program, and Mr. Sonny Sukada, the Director of Sustainability for Danone in Indonesia

Observations – Jakarta Meetings and Site Visits

- We inquired with Jalal about arranging meetings with Mr. Asan Bakri, the VP of the Pemulung Union, as well as with plastic pellet manufacturers and distributors in Jakarta

GLOBAL ENTREPRENEURSHIP PROGRAM – INDONESIA (INTRODUCTION MEETING)
Wednesday, October 26, 2011
Location: Ernst & Young Indonesia office, Indonesia Stock Exchange Tower, Jakarta, Indonesia
ATTENDEES: Giuseppe Nicolosi (CEO, Ernst & Young Indonesia; Vice Chairman, GEPI), Eko Budi Santoso R (Officer, GEPI); Yih-Wei Chien, Tal Avrahami (UM Team)

- GEPI was born out of a US State Department initiative to foster entrepreneurship and innovation in predominantly Muslim countries
- The UM Team met with one of GEPI's 13 founders, Giuseppe Nicolosi, as well as a GEPI officer, Eko Budi Santoso
- GEPI's board of directors is comprised of prominent business leaders in Indonesia who are passionate about fueling the growth and prominence of the entrepreneurial ecosystem in Indonesia
- GEPI has access to the entrepreneurship network, and is well-connected to a wide network of local and international business leaders, as well as diplomats
- GEPI has a relevant track record. They organized a large-scale entrepreneurship summit in Bali, Indonesia in Summer 2011, which featured several hundred local entrepreneurs competing for seed funding for their business ideas, as well as prominent business leaders and states people such as Eric Schmidt, former CEO of Google, and Hillary Rodham Clinton
- The main takeway from our meeting was that GEPI's leadership is excited about the idea of collaborating with the UM Team. We reached a verbal agreement to partner together and on planning and executing a Business Plan Competition in Indonesia
- We established next steps as the drafting of a Memorandum of Understanding (MOU), which would include a date for the event, timeline leading up to event, delineated roles and responsibilities for GEPI and UM Team
- Furthermore, we agreed to co-develop a detailed budget, including estimates for the cost of the event and an appropriately-sized seed fund for implementation of winning idea(s)/business plan(s)

BRITISH COUNCIL (INTRODUCTION MEETING)
Wednesday, October 26, 2011
Location: Ernst & Young Indonesia office, Indonesia Stock Exchange Tower, Jakarta, Indonesia
ATTENDEES: Ms. Sandra Winarsa, Ms. Ari Sutanti (British Council staff), Ms. Mita JS (British Council entrepreneurial fellow); Yih-Wei Chien, Tal Avrahami (UM Team)

- We met with staff members from the British Council's Indonesia office, as well as an entrepreneurial fellow, Mita JS
- The British Council is the United Kingdom's international cultural relations body and plays in a diverse array of activities, including education, science, the arts, and governance
- The British Council has active sustainability initiatives in Japan, South Korea, China, Thailand, Vietnam, Australia, and Indonesia
- British Council works with young, local entrepreneurs to create solutions for local problems
- Sandra, Ari, and Mita shared their perspective on our project initiatives, as well as their insights on creating social impact in Jakarta and Indonesia in particular
- Mita has developed a social enterprise to develop value-added products that are crafted using plastic recycled by *Pemulung*. In addition, Mita plays an active role in developing and carrying out social

Observations – Jakarta Meetings and Site Visits

empowerment programs with *Pemulung* communities

- Unfortunately, British Council was unable to commit to a formal partnership due to their evolving organizational structure under new leadership
- We exchanged contact information and have since maintained correspondence with Mita

DANONE PEMULUNG EMPOWERMENT PROGRAM (INTRODUCTION MEETING)
Wednesday, October 26, 2011
Location: Jakarta, Indonesia
ATTENDEES: Mr. Sonny Sukada, Director of Sustainability, and Ms. Annie Wahyuni, Project Manager (Danone Pemulung Empowerment Program); Yih-Wei Chien, Tal Avrahami (UM Team)

- Sonny and Annie shared their experience of developing and managing the Danone Pemulung Empowerment Program. They also shared their insights on pemulung culture and the dynamics of working to empower them
- We developed a greater understanding of the true complexity involved in addressing the plight of the pemulung, including unintended consequences
- We built an understanding of the volatility of the PET plastic commodity market. The market is largely driven by the price of oil and cotton

UNIVESITAS INDONESIA RESEARCH COLLABORATION
Thursday, October 27, 2011
Location: Hotel, Jakarta, Indonesia
ATTENDEES: Prof. Cindy Priadi, Niknik Bestar, Yudithia Chen, Nurul Madina; Meutia, Mahfut Ardi (U of I); Yih-Wei Chien, Tal Avrahami (UM Team)

- The UM Team met with the student managers from Universitas Indonesia. The lion's share of the time was spent on ice breakers and becoming acquainted with the students, as it was a useful means to the end of establishing a trusting relationship with the students who would play an important role in the collaboration
- We reviewed the expanded scope contained in the MOU drafted by the UM Team on October 24
- The students and faculty liaison were exuberant at the prospect of our research partnership

7-ELVEN Site Visit (OBSERVATIONAL RESEARCH)
Thursday, October 27, 2011
Location: Jakarta, Indonesia
ATTENDEES: Yih-Wei Chien, Tal Avrahami (UM Team)

- The UM Team performed observational research at a 7-Eleven store location in Jakarta, Indonesia
- At the time of day that the UM Team visited (late afternoon), the store was fairly crowded with shoppers passing through as well as with individuals and groups gathered at the tables set up both inside and outside on a patio
- We observed a group of perhaps 8 children aged roughly 9-13 years who were purchasing Slurpees and other snacks
- A number of young, well-dressed professionals were sitting and conversing with one another, while enjoying snacks and drinks. Others enjoyed their snacks on their own, with some occupied with an Apple iPad (note: 7-Eleven locations offer free Wi-Fi internet)

- We observed the shelf placement of PepsiCo products, and noted that in the cold beverage section, PepsiCo has limited shelf space relative to its competitors with larger market share

NATIONAL HIGH JAKARTA SCHOOL COLLABORATION
Friday, October 28, 2011
Location: Jakarta, Indonesia
ATTENDEES: Principal Designate Ms. Foo Pao Choo, 8 students (National High Jakarta School); Yih-Wei Chien, Tal Avrahami (UM Team)

- The UM Team met with Ms. Foo Pao Choo, Principal Designate of the National High Jakarta School, as well as roughly 8 students in their junior and senior year
- After a session of ice breakers to achieve a similarly trusting relationship with the students and our team, we discussed the scope of our collaboration
- Simply put, the UM Team's intention is to have the students of NHJS play an active and creative role in creating a marketing platform for the Business Plan Competition, as well as to participate in the event itself
- The UM Team and NHJS students exchanged contact information and established a single point of contact with the NHJS student team

PEMULUNG EMPOWERMENT PROGRAM Site Visit
Friday, October 28, 2011
Location: Tangerang, Indonesia
ATTENDEES: Ms. Annie Wahyuni; Yih-Wei Chien, Tal Avrahami (UM Team)

- The UM Team traveled to Tangerang, on the outskirts of Jakarta, with Ms. Annie Wahyuni, Program Manager of the Pemulung Empowerment Program.
- We toured the project site, one of several throughout Indonesia. The site includes recycled plastic processing facilities. In particular, the site has large receptacles for washing plastic, as well as a machine that is capable of chopping plastic bottles into pellets. The pellets are then laid out in the sun to dry, before being packaged into sacks for transport to an export facility

Results – Takeaways

STRATEGIC PLANNING SESSION WITH PEPSICO LEADERSHIP TEAM (Jakarta, Indonesia)

- Communication gaps still remain between the PepsiCo and UM Teams
- Establishing a single point of contact for the UM Team as a means to communicate to the various client stakeholders will help improve communication
- The UM Team must work to streamline the core strategy, timelines, and risks and opportunities that this project presents, and more importantly, communicate it effectively and cohesively to the PepsiCo Team

UNIVERSITAS INDONESIA FACULTY MEETING (Depok, Indonesia)

- Professor Priadi is excited about the potential for a collaboration between UofI students and the UM Team, but wants more clear expectations and roadmaps to be established up front
- UofI environmental and civil engineering students already possess a core competency in waste issues in

Results – Takeaways

and around Indonesia. They also possess a passion for applying this knowledge to solve social problems related to environmental issues

STRATEGIC PLANNING SESSION WITH LAURIE HOFFMAN (Jakarta, Indonesia)

- The suite of solutions that the UM Team has developed has potential, but still needs stronger strategic and tactical development
- The integration of 7-Eleven as a partner will be an important piece in executing the solutions that the UM Team has developed. Much planning and progress must be made first on the PepsiCo/UM side before pitching 7-Eleven as a partner in this project

CORPORATE SOCIAL RESPONSIBILITY THOUGHT LEADERSHIP (Jakarta, Indonesia)

- Jalal possess a wealth of knowledge about CSR and sustainability issues, especially in Indonesia and Southeast Asia
- The UM Team would be wise to maintain a strong relationship with Jalal, as he is the gateway to many of the NGOs that can potentially partner with the UM Team in the future
- Jalal has a hearty laugh

GLOBAL ENTREPRENEURSHIP PROGRAM INDONESIA (Jakarta, Indonesia)

- GEPI is the one stakeholder which possess the highest level of potential for a meaningful and fruitful partnership with the UM Team
- GEPI's track record of developing the entrepreneurial ecosystem in Indonesia and executing socially focused events in Indonesia is impressive
- GEPI is serious about partnering with the UM Team and developing a long-term sustainable relationship with the University of Michigan

BRITISH COUNCIL (INTRODUCTION MEETING) (Jakarta, Indonesia)

- The British Council has a strong track record of supporting social initiatives in many developing nations, but currently lacks the administrative and financial support to partner with the UM Team
- It would be wise for the UM Team to maintain an open dialogue with the British Council in case priorities change or there is an opportunity to obtain more local knowledge

DANONE PEMULUNG EMPOWERMENT PROGRAM (INTRODUCTION MEETING) (Jakarta, Indonesia)

- Waste and waste management in Indonesia is a complex system of interwoven relationships that many people, especially those not from Indonesia, do not fully comprehend
- Treat lightly and be cautions of the parties that may be influenced (both positively and negatively) by the initiatives that you wish to enact
- Danone has developed a solution to help empower *Pemulung* in the PEP. The impact has been significant but the scale is currently small

UNIVESITAS INDONESIA RESEARCH COLLABORATION (Depok, Indonesia)

- The students are passionate about environmental and social issues in their country and are excited to partner with the UM Team
- Looking forward in the partnership, consistent communication will be key, as will be the level of English proficiency of the students who volunteer to assist

Results – Takeaways

- A robust MOU will need to be developed and co-edited between the UM Team and Professor Priadi before the project begins

7-ELVEN Site Visit (OBSERVATIONAL RESEARCH) (Jakarta, Indonesia)

- PepsiCo has a much stronger representation of snacks in 7-Eleven than beverages
- Many young professionals choose to shop/eat and spend their leisure time at 7-Eleven, especially after the work day
- 7-Eleven is actively holding contests for prizes and other promotions. If the UM Team and PepsiCo is planning to utilize advertising space within 7-Eleven to promote CSR initiatives, it will have competition

NATIONAL HIGH JAKARTA SCHOOL COLLABORATION (Jakarta, Indonesia)

- The high school students at NHJS are bright, articulate, and possess strong initiative to learn and collaborate
- The administration at NHJS is also committed to exposing their students to globally significant initiatives that both educate and increase student perspective/awareness
- NHJS is a high potential partner moving forward in the project due to the two reasons highlighted above

PEMULUNG EMPOWERMENT PROGRAM Site Visit (Jakarta, Indonesia)

- Danone has developed a program that fits into the work-stream of the informal post-consumer waste recycling system in Indonesia
- The PEP is making a strong impact on one *Pemulung* community, providing micro loan programs, education, and other social welfare initiatives
- While the impacts of the PEP have been impressive, the infrastructure and human capital commitments have been significant, raising questions on the scalability of the PEP to other communities or markets

Final Conclusions – Hypothesis Determination – Takeaways

QUESTION: Can sustainable business ideas be crowd-sourced from local entrepreneurs to deliver impact to *Pemulung*? Can an SMS-text based pricing application that delivers information to *Pemulung* increase their bargaining power? Will the 7-Eleven consumer base recognize the value of a post-consumer waste recycling program, and will it increase the brand equity of both PepsiCo and 7-Eleven?

ANSWER: Unsurprisingly, the UM Team returned from Jakarta with more questions than answers. However, we were able to vet our ideas with experienced leaders in corporate social responsibility and social empowerment with pemulung communities. Our findings revealed that our ideas are indeed feasible, but may carry unintended consequences, such as reprisals for pemulung who make an effort to use a pricing app to increase their bargaining power with *Bandars* and *Lapaks* (aggregators).

HYPOTHESES: Provided an understanding of the social, environmental, and business challenges associated with post-consumer plastic waste recycling, local entrepreneurs are best suited to create market-based solutions that are appropriate and tailored for the Jakarta, Indonesia market. Access to pricing information increases transparency and can empower *Pemulung* in such a manner. 7-Eleven consumers in Jakarta, Indonesia are generally young, educated and of higher socioeconomic status. These consumers also tend to be concerned about environmental and social issues in their country and beyond, and will align their spending habits with businesses working to drive sustainability into their business activities.

Final Conclusions – Hypothesis Determination – Takeaways

QUESTION: Can sustainable business ideas be crowd-sourced from local entrepreneurs to deliver impact to *Pemulung*? Can an SMS-text based pricing application that delivers information to *Pemulung* increase their bargaining power, and what types of risks might be associated with such a technology platform?

CONFIRMED OR DENIED: Hypotheses neither confirmed nor denied.

Site Visit 4 –Jakarta, Indonesia

Logistics

DATES: Monday, January 2 – Friday, January 6, 2012

TEAM ATTENDEES: Tal Avrahami, Yih-Wei Chien, Stephanie Cheney, Patrick Lord, Taylor Samuelsen, Miguel Sossa

KEY STAKEHOLDERS/EDUCATORS VISITED:

Pemulung Social Empowerment Program

- Ms. Mita Sirait, Jakarta, Indonesia
- Ms. Maria Sumual, Full Life Community – Social Empowerment, Jakarta, Indonesia

Piaget Academy's National High Jakarta School

- Ms. Foo Pau Choo, Assistant Principal, Piaget Academy's National High Jakarta School, Jakarta, Indonesia
- Mr. Marcus – Teacher, National High Jakarta School, Jakarta, Indonesia
- Students from the Piaget Academy's National High Jakarta School, Jakarta, Indonesia

CSR Indonesia

- Mr. Jalal, Founder, CSR Indonesia, Depok, Indonesia

Global Entrepreneurship Program – Indonesia

- Mr. Mark Wang, Executive Director, Global Entrepreneurship Program Indonesia (GEPI), Jakarta, Indonesia
- Mr. Giuseppe Nicolosi, CEO, Ernst & Young – Indonesia; Vice Chairman and Founder, GEPI, Jakarta, Indonesia
- Mr. Chris Kanter and Ms. Shinta – Board Member, GEPI, Jakarta, Indonesia

PepsiCo

- Ms. Laurie Hoffman, Modern Trade Channel Regional Development, PepsiCo, Bangkok, Thailand (via teleconference)
- Ms. Jennifer (Jennie) James, Regional Director – Corporate Affairs, PepsiCo Asia Pacific, Hong Kong (via teleconference)
- Mr. David Walker, Senior Director, PepsiCo Global Operations, New York, NY (via teleconference)
- Mr. Gary Horsfield, Vice President Supply Chain, PepsiCo Asia Pacific, Australia (via teleconference)

Pemulung Union (IPI)

- Mr. Asan Bakri, IPI Vice President, Jakarta, Indonesia
- La Tofi, Union Leadership Role, La Tofi School of Corporate Social Responsibility, Jakarta, Indonesia
- Ms. Cathy Lengkong, IPI Founder, Jakarta, Indonesia
- Additional IPI officers, Jakarta, Indonesia
- Mr. Irwanto, IPI Member, Jakarta, Indonesia

Bali Recycling

- Mr. Olivier Pouillon, Founder, Bali Recycling, Ubud, Bali, Indonesia (via teleconference)

LOCATIONS VISITED:

- PepsiCo Indonesia office, Jakarta, Indonesia
- Piaget Academy's National High Jakarta School, Jakarta, Indonesia
- The La Tofi School of Corporate Social Responsibility
- Pemulung Union and Non-Union Communities
    - Depok, Jakarta, Bintaro
- P.D. Nusantara Jaya Plastik – Union Plastic Sorting and Consolidation Facility – Depok, Java, Indonesia
- Ernst & Young – Indonesia Offices (GEPI meeting), Jakarta, Indonesia

Site Visit Question to be Answered / Corresponding Hypothesis

QUESTIONS: What is the best environment in which local entrepreneurs might develop viable, self-sustaining business ideas that deliver positive impact to *Pemulung*?

What is the most beneficial information that can be provided to *Pemulung* via SMS-text based technology to improve their lives? Is it priced-based information that could potentially impact market power or are there other uses for this technology and knowledge sharing? What are potential risks with a SMS-text based information delivery system? What are possible methods of mitigating this risk?

Can food and beverage companies strengthen relationships with its customers by engaging in CSR activities aimed at benefiting stakeholders further down their value chain?

HYPOTHESES:
Crowd sourcing business plans from local entrepreneurs will generate diverse solutions rich with local expertise and knowledge with which to improve the lives of the *Pemulung*. Given observations from various stakeholder meetings, the UM Team hypothesizes that the entrepreneurial ecosystem in Indonesia is ripe with bright minds striving to positively impact their society. Tapping into entrepreneurial and student networks in the greater Jakarta region will likely unearth business ideas that empower *Pemulung* while also generate positive brand equity for PepsiCo and its customers and partners.

While pricing transparency platforms have positively impacted those lower in supply chains in other economies and industries, SMS-text price information sourced from this community and given logistical constraints may have unintended consequences or be more difficult than we first envisioned. There could be other information that is as valuable to the Pemulung that can be provided without the risks and possible manipulation exposure that pricing information would likely have given our research to date.

PepsiCo and its customers, such as 7-Eleven, can collaborate to design and support initiatives that create positive social impact within Indonesia. These initiatives will build brand equity for both parties by appealing to younger, affluent, and educated customers within the Indonesian consumer market.

Methods for Analysis

- Held strategic planning session with leadership from GEPI
- Conducted ethnographic and observational research at multiple *Pemulung* collection and living sites through interviews with *Pemulung* that have engaged in that work for varying periods of time and with individuals that are at the head of *Pemulung* communities
- Participatory observation of Pemulung on "Shadow Days"
- Observed and collected detailed data from waste sorting and consolidation facility to better understand points further up the waste value chain and the value of material as it moves through the chain
- Interviewed organizers of the Pemulung Union to better understand social history and outside perspectives on the Pemulung
- Interviewed experts working on waste issues to better understand formal waste collection efforts in Indonesia
- Recapped findings with PepsiCo Leadership Team to co-develop next steps crucial to project progression
- Conduct prototyping exercises with *Pemulung* to refine hypotheses and create recommendations

Observations – Jakarta Meetings and Site Visits

Tuesday, January 3, 2012

GEPI and Business Plan Competition Discussion
Location: Indofood Tower, Sudirman Plaza, Jakarta, Indonesia
Attendees: Tal Avrahami, UM Team; Patrick Lord, UM Team; Taylor Samuelsen, UM Team; Mark Wang, GEPI

- The UM Team visited the PepsiCo Indonesia offices for a meeting with Mark Wang of GEPI to discuss the possibility of partnering on a business plan competition
- Mark gave a review of GEPI's goals, competencies, and network
- Created outline of components necessary to hold a business plan competition
- Mark relayed resources GEPI could provide to support this project: location, network, advertisement, identifying judges, etc.
- Discussed presentation for GEPI board to see if they would support partnering with PepsiCo on such an initiative
- Emphasized that entrepreneurship should be a core tenant of the initiative if GEPI is to support it

Aggregator Mr. Asan Bakri Pemulung Union VP
Location: Depok, Indonesia
Attendees: Jalal, Yih-Wei Chien, UM Team; Stephanie Cheney, UM Team; Miguel Sossa, UM Team;

- Started his first aggregating business in 1984 with Rp 4.5MM seed money borrowed from his parents and was able to purchase first truck within 6 months of starting business
- He has been a part of the Pemulung Union (IPI) since 1991 because of his concern for the *Pemulung* and the environment
- The *Pemulung* were considered illegal until a letter from the government in the mid-1990s changed their status
- Mr. Asan's site sorts, cleans, chips, and bags plastic to then be sold on the market to pellet producers or bottle manufacturers
- Prices these plastic customers pay fluctuate with the market; there is not a specific plastic commodities price to track, but Mr. Asan tracks oil prices and will hold or sell based on demand for that raw material

Observations – Jakarta Meetings and Site Visits

that goes into making virgin plastics. He also watches cotton prices because cotton and polyester (plastic is one main input) are substitutes

- There are about 150 *Bandar* (lower level aggregators) working for him and that sell exclusively to him
    - Each *Bandar* has approximately 30 *Pemulung* collecting trash and selling to them (but can range from 10 -100)
    - If a *Pemulung* is in the union they usually sell their trash to the same *Bandar* every day
- *Bandar* that sell to Mr. Asan are also members of the IPI and submit lists of Pemulung for membership into IPI
    - This practice is how Pemulung without knowledge of the IPI or ability to connect with the IPI are enrolled
- Mr. Asan generally pays a higher price for his plastic, which makes *Bandar* more likely to enter a sales agreement with him
- He builds business through securing volume; the higher prices he pays allows him to do this and then sell his product more regularly at better prices
- Mr. Asan tells the *Bandar* that they must pass down the higher prices to the *Pemulung* working for him
- His interest in the IPI is due to the focus on the *Pemulung* and environment and the ability to contribute to future generations
- The IPI is currently in 23 of the 33 provinces in Indonesia
    - Mr. Asan stated this has a direct impact on the betterment of the environment
- The only actual waste managers in Indonesia are the *Pemulung*, as the formal infrastructure does not have enough capacity to handle waste, nor is there the formal man power employed to handle waste
- In March of 2011, the Federal Government (Ministry of Social Events) finally acknowledged the IPI as a partner for alleviating social problems
- IPI members have an obligation to take all waste, even if the waste is in too poor quality to sell/recycle
- The IPI also facilitates a closer relationship between *Bandar* and *Pemulung*, due to their promotion of trust and fair prices
- Mr. Asan believes that one shouldn't stay a *Pemulung* forever, and encourages his *Bandar* to provide "professional development" opportunities to those that work for them
- Since Mr. Asan has started his business he has helped 6 *Bandar* start their own aggregation businesses
    - Aggregation businesses can only extend so far because of the logistics of collecting the waste, so these *Bandar* start their business in areas that don't encroach on Mr. Asan's territory
- *Pemulung* will buy waste from their communities
    - There is a sub-economy for waste, even at the *Pemulung* level
    - *Pemulung* will consolidate waste between themselves – families often work together and only sell a few times a month to the *Bandar* after accumulating a critical mass of trash
    - Sometimes obtain *Pemulung* get "contracts" to regularly collect trash from certain places
- What are some of the advantages for *Pemulung* remain independent? Mr. Asan replied:
    - Staying independent means they have their own money, own cart, and the freedom to ask any *Bandar* about price
    - There is open communication about prices between *Bandar* and independent Pemulung over SMS-text
    - The *Pemulung* face strict physical restrictions with regards to how far they can push their carts – this severely limits the number of *Bandar* they can access to sell their waste
    - *Pemulung* also often have set collection paths they follow each day and there are informal agreements between *Pemulung* to stick to set territories
    - Switching to new territories to sell to different *Bandar* that pay more is more complicated than just finding the most competitive *Bandar* – this sometimes counts as territory encroachment
- Most *Pemulung* are only physically capable of walking 2-5km to sell their plastic

Observations – Jakarta Meetings and Site Visits

- Mr. Asan's *Bandar* provide slightly higher prices to the *Pemulung* who are also members of the IPI
- Mr. Asan does see communicating regularly with *Pemulung* from his level or at the level of the IPI as one of the major barriers facing the IPI today; often only *Bandar* have the phone numbers for their *Pemulung* and those numbers are not well organized or managed
- Mr. Asan estimates 70% of the *Pemulung* have IPI membership (mostly in and around larger cities)
    - In subsequent days we saw no hard evidence of that number, just anecdotal evidence from those involved with the IPI. Most of the *Pemulung* we met in subsequent days were not members of the IPI
- Mr. Asan would like to get the remaining 30% to join the IPI after the national waste seminar, scheduled for February 25th, 2012
- IPI was recently able to secure an agreement with the Indonesian government to provide health services support for IPI members
    - IPI members receive a maximum of Rp 150MM medical assistance per year
- If they go above 3M Rupiah they can get additional costs paid for if the IPI vouches for them
- Mr. Asan has a slogan for Pemulung: "HEROS OF CLEANLINESS"
- Challenges within Mr. Asan's business today:
    - There is increasing competition today from other aggregators/processors; maintaining volume can be a challenge
    - Price is Mr. Asan's competitive advantage, because he pays a bit more, he has been able to maintain volume
    - Interpersonal relationships are very important to establish; because he has such good relationships, he has a more secure supply
    - Sometimes he gives direct/advance payment to *Bandar* to secure volume
    - Development of his customers are difficult and very labor/resource intensive
- He earns new business by paying a higher price, he pays directly, and he opens many new businesses
- He is opening new locations and geographically expanding his business
        - Takes 6 months of due diligence to build relationships with local *Bandar* in new locations
        - Around month 4 the *Bandar* usually reciprocate interest and that's when he needs to build infrastructure to demonstrate his commitment to building a business in that area

Pemulung Union Meeting at La Tofi School
Location: Depok, Indonesia
Attendees: Jalal, Yih-Wei Chien, Stephanie Cheney, Miguel Sossa, Cathy Lengkong, La Tofi, IPI Members and Volunteers

- Cathy Lenkong was a movie star in the 1970s and 1980s with a highly public profile; she wanted to help *Pemulung* become legal citizens after she learned more about their situation
- There were many demonstrations where police clashed with the *Pemulung*
- *Pemulung* were treated as illegal squatters and often falsely portrayed as thieves, even though they were the only ones providing trash service; *Pemulung* are essentially second class citizens
- It was estimated that 400,000 *Pemulung* are in the IPI, although no hard analytics were presented to support this claim
- The IPI estimates there are a total of 600,000 Pemulung in Indonesia
- In 1991 Ms. LengKong and some prominent *Pemulung* leaders from the IPI
- Ms. Lengkong met directly with President Soeharto (one of the guys the airport is named after), asking him to sign a law to make *Pemulung* legal
- 1995 - *Pemulung* received rights to become legal citizens of Jakarta

Observations – Jakarta Meetings and Site Visits

- IPI's initial focus area was only on the greater Jakarta area
- After receiving letter recognizing IPI as partner for alleviating social issues in 2011, IPI made transition to a national level focus
- Ms. Lengkong campaigns for *Pemulung* rights across many tiers of the Indonesia government:
    - Visits mayors (5 of them in Jakarta alone) to create open dialogue about *Pemulung* and waste issues
    - Involved directly with *Pemulung* and helps represent them and their rights during police conflicts
- The IPI provides healthcare now and legal representation for the *Pemulung*
- *Pemulung* are allowed to make one phone call if they are detained. If they are in the union and have the phone number of their local *Bandar* they call the *Bandar* and the *Bandar* will call the IPI, who will then go down and get the *Pemulung* out of jail
- Most legal disputes that *Pemulung* are involved with are related to land/property
- There are many legal issues with the *Pemulung* because they are considered squatters. They typically live in one spot for many years without rights to the land
- The IPI has organized a national waste conference on February 25th, 2012 to garner more support and awareness for the *Pemulung* and waste issues across Indonesia
- Major challenges for IPI are in logistics - getting photographs for membership cards takes months (it takes time and money, of which Pemulung don't have much of either)
- The IPI is working to get more *Pemulung* who work at Bantar Gebang (Jakarta's largest landfill) to join the IPI because these *Pemulung* have the lowest standard of living and are even more disenfranchised than the *Pemulung* who work in Jakarta
- The IPI board is staffed by volunteers and doesn't have the bandwidth to figure out many of the logistical challenges surrounding increasing *Pemulung* membership (i.e. taking photos for I.D. cards and collecting cell phone numbers)

Wednesday, January 4, 2012

National High Jakarta School Planning Meeting
Location: Piaget Academy's National High Jakarta School, Jakarta, Indonesia
Attendees: Principle Foo Pau Choo, Mr. Wesley, NHJS; Patrick Lord, Taylor Samuelsen, Yih-Wei Chen, UM Team

- Further discussed ways high school students could engage with PepsiCo and learn about waste issues in their country
- Discussed with session professors an acceptable timeline for the proposed project
- Considered timeline restraints
- UM Team suggested that bi-monthly video conferencing with students would be a valuable way to maintain contact and project updates
- Piaget representatives discussed how previous projects have been managed and the results
- UM Team learned about a re-use/re-cycle program that Piaget had managed
    - Resulted in a chair made from a tire – won an award
- UM Team and Piaget representatives had a dinner and further discussed project potential

Pemulung Union Meeting and Visiting Pemulung Communities
Location: Jakarta, Indonesia
Attendees: Yih-Wei Chien, UM Team; Stephanie Cheney, UM Team; Taylor Samuelsen, UM Team; La Tofi, CSR

Observations – Jakarta Meetings and Site Visits

School Indonesia; Irwanto, working Pemulung

Irwanto, an IPI member, joined us for a discussion with IPI volunteers and leaders. The UM Team had the opportunity to ask him questions from the survey we used in the field with other *Pemulung*.

Irwanto Interview:

- *Pemulung* generally make Rp 40,000-100,000 from selling 8-20 kg/day (average ~5 kg) collected plastic
- *Pemulung* need to carry working capital to go to apartment buildings to buy trash; this is a regular occurrence that a *Pemulung* has a verbal agreement with large building or business to buy their trash. *Pemulung* will visit there a few times or once a week to pick up the trash
- Independent *Pemulung* – work full-time and are not working as family unit often, so they cannot afford to take time off
- *Pemulung* talk with each other and send SMS-texts about pricing, but populations are small and limited by logistical realities; even if they do find out about a better price, it is often not geographically accessible
- *Pemulung* have respect for each other routes; if they didn't their way of life would be a constant conflict with each other
- If too many *Pemulung* congregate in one part of the city there will not be enough trash to support everyone; the trash volume does not necessarily increase in an ideal area with *Bandar* with better prices if the density of the *Pemulung* population increases
- Most *Pemulung* are not bound, but are independent of a *Bandar*
- If they join the IPI, they are eligible for Rp 1.5MM worth of healthcare per year

Tour of First Pemulung community of non-Union Pemulung:

- Observed mixed recycling (cardboard, plastic, metals, etc.) operations
- This is a community that all lives under one *Bandar* and sell all of their trash to him
- There are about 20 permanent *Pemulung* working for this *Bandar* and living there that go to the same sites/routes every day. The *Bandar* has several Pemulung with carts that walk through the streets collecting trash
- The *Bandar* decides who can join the community based on the room that he has and the collection needs he has:
    - He told us he only is allowing *Pemulung* that have their own cart to collect trash in around the streets to join his community
    - Trash men – he takes more trash from men that don't live there, but sell to him regularly (independent *Pemulung*)
- The *Bandar* gives cost of living in advance, and end of month each family consolidates their waste to sell it to him to cover the cost of the living loan for the month
    - It doesn't seem they are indentured; just more of how the system works
    - Some *Pemulung* appear "bound" to the *Bandar*: by loan, family on the site, but La Tofi said this is not always the case
- All the *Pemulung* in this community are from the same village
    - The *Pemulung* take turns coming to Jakarta to work and send money home. Then after some time they switch out and someone else comes to be a *Pemulung*
    - Once a month someone from the *Pemulung* community goes back to the village and brings everyone's money for their families with them to distribute. They each take turns doing this
- Some of the really poor, older *Pemulung* only make around 150k per month, but the younger *Pemulung* can bring in 500k – 600k per month

Observations – Jakarta Meetings and Site Visits

- Both women and men went out to collect plastic; childcare and staying at home was not the primary responsibility of the women, although a few women we spoke to mentioned that they may go out for shorter periods of time than the men because they don't have the strength and stamina to work as long and haul as much waste as the men do
- Other women though were seemingly proud of the amount of waste and contribution they did make
- On average one *Pemulung* can bring in Rp 40 -50,000 per day or approximately Rp 1 -1.5MM per month. Of this, Rp 600,000 will be kept by the Pemulung for cost of living purposes and the remaining Rp 400,000 will be sent home to their villages
- Cigarettes cost Rp 10,000 per package. If Rp 40,000 is the average daily income, then 25% of total daily income is spent on cigarettes. Most *Pemulung* surveyed smoke one pack of cigarettes per day
- We met an elderly *Pemulung* couple, actively collecting and sorting waste. They had been living in this village for over 10 years and had the nicest house in the community. They stayed for that long because they always needed the loans
- Most *Pemulung* have access to cell phones and use SMS-texts when necessary. They did not really know much about the IPI or free healthcare services. They said they just pay for healthcare when they need it. Although, we saw an individual with a swollen arm who have no plans to see a doctor. They seemed content with the prices their *Bandar* was giving them. They were all from the same village in the country
- These *Pemulung* keep their money on them to use as working capital. Sometimes they use their money to purchase the rights to access waste from hotels, restaurants, or other sites
- Asked if *Pemulung* were interested in a IPI ID if they could get free healthcare and the general response was as follows:
    - *Pemulung* – did not understand value of the IPI ID or free healthcare services. Many *Pemulung* did not know value of healthcare and did not seem impressed with the promise of free healthcare as they were not concerned with going to the doctor. Very few *Pemulung* seemed to make the trip to the doctor even in the face of illness or injury
    - What other information would be valuable to the *Pemulung*?
    - Most important/valuable: "getting contract with a building", "getting a reliable apartment building" *Pemulung* were most interested in finding valuable, consistent customers
    - This community was set at the edge of a large park. There is a water pump in the park and the *Pemulung* in this community have access to clean water from that pump
    - This community also has access to electricity. One *Pemulung* is in charge of collecting money from the community to pay the utility bill every month

Second Site Visit – the community Irwanto was from:

- This community did not investigate other aggregator prices because they only sell to one factory
- They collected as much plastic as the factory was willing to take on a regular basis; this factory supported the entire community
- All of the Pemulung at this site were taken care of by one *Bandar*; there were many children and the site seemed to be quite family oriented
- *Pemulung* in this community were not interested in the IPI, free healthcare, or price transparency because they pay for the healthcare out of pocket when needed. They didn't think the hassle of getting a IPI membership card warranted the value of the free healthcare
- There was on older man that was in the IPI, but said it served no purpose. When his membership card expired he did not renew it. This attitude seemed to influence the perception of the IPI with the other *Pemulung*
- This group of *Pemulung* did not seem very entrepreneurial, as they were just content with the

relationship with one factory. The elderly *Bandar* that ran the community negotiates the prices for the plastic they sell each month

- The *Bandar* says he talks to other *Bandar* and uses SMS-texts to stay current on prices that others are receiving for their plastic and cardboard. He was content that this system provided him with sufficient price transparency

Thursday, January 5, 2012

Pemulung Shadowing in the Field Location: Bogor Landfill
Attendees: Patrick Lord, UM Team; Yih Wei Chien, UM Team; Taylor Samuelsen, UM Team; La Tofi, CSR School

Survey questions were developed to bring consistency to the interviews conducted with different Pemulung communities. The team used these survey questions to guide interviews with Pemulung during field visits (See Q&A Appendix).

Answers from Pemulung on this Field Visit:

- Why do these Pemulung choose to stay independent?
  - They don't have to work for one specific *Bandar*
  - They can work when they want
  - They can sell to anyone and often sell to many *Bandar*
  - This allows them to compare pricing and go to the most competitive bidder on a given day
- They get introduced to other *Bandar* through their independent *Pemulung* friends
  - This informal networking and word of mouth increases pricing awareness and transparency amongst both *Pemulung* and *Bandar*
- They prefer to use peer to peer SMS-texts as a mode of communication because it is the cheapest method of mobile communication
- They walk around two to five km max to sell their waste
- Within 2-3km of their location there are around 10 *Bandar*; two of these *Bandar* are considered "favorites" that they prefer to sell to regularly. They determine "favorites" by who gives the most favorable prices
- Face to face bargaining is a normal occurrence
- Before they go to sell their collected waste they:
  - Call friends to research price
  - Call *Bandar* to confirm price
  - Bargain to secure the most profit

Pemulung Meeting at Full Life Community
Location: Bintaro, South Jakarta
Attendees: Tal Avrahami, UM Team; Stephanie Cheney, UM Team; Miguel Sossa, UM Team; Ms. Mita Sirait; Ms. Maria Sumual, Full Life Community Founder

Survey questions were developed to bring consistency to the interviews conducted with different Pemulung communities. The team used these survey questions to guide interviews with Pemulung during field visits (See Q&A Appendix).

Observations – Jakarta Meetings and Site Visits

Full Life Community Field Visit

This community receives regular visits from volunteers that work primarily with women and children in the community. They work to build character, integrity, and a sense of responsibility. Since *Pemulung* are often treated as second class citizens, they begin to develop a character that fits that characterization. Volunteers work to teach the women how to read, start side business, basic English, and have a sense of self-worth and integrity that they can begin to pass down to their children.

The founder of this program, Maria Sumual, and volunteer, Mita Sirait joined us and served as interpreters and guides for this visit. We visited with 12 women, one man, the community elder, and several children and young women from the community.

- *Pemulung* that have volunteers come to work with them on a weekly basis; there is a small, one room building that was built by volunteers and is maintained as a school
- This is a community of 25 families living under one *Bandar*, more of an old man that is the 'chief' of the community
- There are 12 of larger family groups of 25 living in this area under 12 *Bandar* 'chiefs.' We met with one *Bandar*, one man, and about 12 women and 8 or so children/young women from the community. We were able to go through many of the survey question to test our hypotheses and our prototype ideas to identify how a pilot PMobile would work in this community
- What is most important to them on a daily basis?
    - Clean water, education, and food
- What is their average income?
    - Each family pools their incomes to support the community. They need about Rp 1.5MM per month per family. Individuals make on average Rp 500-600k per month. They collect plastic in about a 5km radius and sell it approximately every two weeks. The income of the community is then divided among families. Everyone works together so no one goes without.
- What is the daily workload for men and women?
    - Women and men work equally for about 6 hours per day collecting plastic. They only stop when they are tired or when there is a national holiday. The collective waste is sorted every 4 days and sold every second Wednesday by the *Bandar*
- How do they determine the pricing?
    - The buyer decides the price and the *Bandar* trusts the buyer because he has been working with him for a long time and they like him. The other *Bandar* in the area receive the same price. He knows this because he speaks with the other *Bandar* regularly, as they are all part of the same community. Everything is very relationship based. He does not really know what prices *Bandar* are getting in other areas of the city, but said he would like to know and would be willing to share his prices via SMS-text. Their knowledge of pricing is limited to their immediate contacts. He has no way of comparing what prices are in other parts of the city. They do not use any outside sources besides acquaintances
- Where do they collect plastic from?
    - They collect from the streets and shops. They do not have any contracts with large commercial or industrial sites to collect the waste regularly. They do buy cardboard once a month, sometimes from large grocery stores. They purchase the cardboard and then resell it to their *Bandar* at the recycling center
- What is the legal status of where they live?
    - They know the owner of the land and they collectively pay rent to him. The community has been there for 21 years. They have a steady and good relationship with him. They are not in fear of eviction. This community is located on the outskirts of town and not right in the city center

Observations – Jakarta Meetings and Site Visits

where land is scarce

- What do they do if they have medical needs?
  - They have major medical services provided by local mosques. Surgeries and births are covered by the mosque. They can also go to the mosque for more minor medical needs, so having insurance that was covered by the union was not a major concern of theirs
- Do they have SMS-texting and how do they use it technology?
  - They have SMS-texting and use it to communicate with family/friends in the area. A few had friends in other parts of the city in other *Pemulung* communities that they communicated with, but not many. The person who sends the text pays for it. They were all very open to receiving healthcare, educational, and current event information via SMS-text. They were open to sending information as well. Pricing information exchange wasn't a prime concern since they don't negotiate their prices. The elder that was responsible for selling all the plastic was open to participating in a pricing transparency SMS-text system. He said he would like to see what others are receiving and that he would be willing to communicate the price he is receiving in return
- What are their dreams for their children and themselves?
  - They would all like to improve their status in life, which for them means to have children receive a good education. Many aspired to higher education, citing going to University in Cairo, Egypt as a dream
  - They would like to have better jobs, which meant jobs as a taxi driver, working in a mall, an office job, and working as a cashier. One girl mentioned she wanted to be an Economist. Many mentioned wanting to own a home and no longer do this type of work
  - Families had better houses back in the village, but they could make more money as a Pemulung. Some of the women have small side businesses to earn extra money, like growing and selling potted plants

Bali Recycling Conference Call
Location: Teleconference from Fraser, Sudiman, Jakarta, Indonesia
Attendees: Mr. Olivier Pouillon, Founder, Bali Recycling; Tal Avrahami, UM Team; Miguel Sossa, UM Team

- The government is not willing to properly address the waste management problems in Indonesia
- *Pemulung* scavenging for recyclable waste is not a solution, but a symptom of a larger problem
- There is still so much mishandled waste that is dumped illegally
- *Pemulung* are living a unhealthy standard of living and often negatively impact the community around them due to the way they deal with non-recyclable material
- The government should implement a formal recycling program
- Although we are working to improve the lives of *Pemulung*, it may be the case that they are not in fact interested in changing their lifestyle
- *Pemulung* are not all upright individuals; many are involved with elicit activities, including theft

Friday, January 6, 2012

Meeting at GEPI with Mark Wang
Location: GEPI Offices
Attendees: Tal Avrahami, UM Team; Taylor Samuelsen, UM Team; Mark Wang, GEPI

- Reviewed project idea

Observations – Jakarta Meetings and Site Visits

- UM Team brought Wang up to speed on the progress of the overall project
- UM Team reviewed what they hoped to accomplish with GEPI, clarification of goals on both parts
- Prepared for afternoon presentation to the board of GEPI
- Discussed any concerns or questions the board might have about engaging in this partnership
- Discussed potential of a summer intern for GEPI to support their various initiatives
- Discussed future plans for GEPI- entrepreneur focused "Y-Combinator" like project

GEPI Board Meeting
Location: Ernst & Young Offices – Indonesia
Attendees: Yih-Wei Chien, UM Team; Stephanie Cheney, UM Team; Taylor Samuelsen, UM Team; Patrick Lord, UM Team; Miguel Sossa, UM Team; Tal Avrahami, UM Team; Mark Wang, GEPI; Mr. Giuseppe Nicolosi, GEPI Board Member; Mr. Chris Kanter, GEPI Board Member; Ms. Shinta, GEPI Board Member

Mr Nicolosi Comments:

- GEPI is looking for long-term partnerships, not just single projects
- GEPI would like to make this partnership sustainable and a growing collaboration over time
- Wants to sustain the corporate social responsibility initiative over the long term through associations with winners of the case competition
- Believes there is fantastic local ideas to address local difficult problems
- Wanted to know more about a timeframe for this project
- Saw potential for this program to have a major impact on Indonesian society
- We designed four phases for the initiative so we could implement over time and pass the project off to another team if possible
- He also wanted to learn more specific details about the education and mentorship component
- He suggested that only winners receiving education and mentorship is too limiting and doesn't create enough social value. We need to cascade impact down from winners to other participants to make a real social impact
- He suggested the World Bank could have potential involvement and contribution

Ms. Shinta Comments:

- There will be competition for candidates - who do you want to get? She really wanted us to think about what the ideal candidates would look like. What type of background? Expertise? Vision? Business experience?
- They wanted to invite a diverse group of people because they don't want the same people winning over and over again. She wanted to reach beyond the people that always participate in these events
- The mentorship and educational piece of the program is important to create social value
- She has connection with Chambers of Commerce, Environment, and Forestry, so she could also reach out to involve them

Mr. Kanter Comments:

- Another need is to convince UM and other sponsors to commit to partnership and to provide support
- Indonesia is twitter #2 in members and #1 in traffic, yet internet penetration is only 18%. There is huge potential to work with online media in Indonesia.

Observations – Jakarta Meetings and Site Visits

PepsiCo Update Call
Location: Fraser, Sudiman, Jakarta, Teleconference
Attendees: Yih-Wei Chien, UM Team; Stephanie Cheney, UM Team; Patrick Lord, UM Team; Miguel Sossa, UM Team; VIA Teleconference – Ms. Laurie Hoffman, Ms. Jennifer (Jennie) James, Mr. David Walker, Mr. Gary Horsfield

- Overall the PepsiCo team was supportive of the progress made
- They were interested in learning more about pending regulation in the Indonesian government that could have implications for businesses operating in Indonesia
    - Jennie James was going to reach out to trade associations to see if they had any knowledge of this pending regulation
- They were also interested in the fact that several competitors and key suppliers were meeting in an industry round table on waste (and more importantly that PepsiCo was not there)
- They tasked us with outlining the logistical details, costs, and a detailed plan for executing a business plan competition
    - Jennie very much liked the idea of running a small pilot and then seeing how it went
- Gary wanted to outline time for us to get together as a group again for them to see the reality of what the *Pemulung* community is like
- They also expressed interest in learning more about programs GEPI has run in Indonesia as part of an informal vetting of the organization
- They also asked for more frequent updates so they didn't have large amounts of information to digest at any one time

Results – Takeaways

Mr. Asan Bakri, Union Aggregator/Recycler (Depok, Indonesia):

- The informal waste management economy has many methods of operating that are ingrained in different socio-economic levels. While the *Pemulung* are treated as second-class citizens they are the only ones providing a vital service to the community
- At the recycler level there is a more sophisticated approach to selling, processing, and pricing their product
- This entire economy and infrastructure is heavily based on personal relationships, loyalty, and trust. Any significant positive change will not occur without having a foundation of these relationships

Pemulung Union Meeting at La Tofi School

- The social issues around the *Pemulung* even more significant than we anticipated
- The *Pemulung* are already doing all they can to increase negotiation leverage with the resources they have. They communicate about prices, but many choose to live a lifestyle where they are beholden to sell to only one *Bandar*. For independent *Pemulung* the logistics of collecting and walking waste to a point of sale limit their flexibility in who the can negotiate with and sell to

Pemulung Union Meeting and Visiting Pemulung Communities

- The communities typically composed of individuals all from the come from the same community in the country-side. The *Pemulung* are methodical in how they approach trash collecting. They have imposed order and discipline on an informal economy that has no regulation or parameters
- *Pemulung* function similarly to independent businesses, looking for contracts, carrying working capital,

Results – Takeaways

and networking among friends to find the best price available. At the same time, *Pemulung* are strongly tied to their habits and do not seem to change the way they operate. Group think dominates the groups and they take information at face value rather than search out their own answers or options

Pemulung Shadowing in the Field

- Independent *Pemulung* are more aggressive in their approach to selling their collected waste. They do not have a community to lean back upon, so they check prices and negotiate more frequently. From what we are told and what we observed most *Pemulung* are not independent

Pemulung Meeting at Full Life Community

- Minimal engagement, but consistent interaction with *Pemulung* communities can have significant impact. *Pemulung* embrace education, when available, and are willing to adopt new habits and practices. Full Life is a relatively trusting community that is open to sharing and exchanging information for the benefit of the whole

GEPI and Business Plan Competition Discussions

- Crowd sourcing ideas from a large group will solicit too many ideas that will not have the expertise or impact desired
- Entrepreneurs in this market often need additional guidance and mentoring. Local entrepreneurs need the education, guidance, and support to launch their businesses more than they need access to capital.
- The participants should ideally have expertise in the waste field. Information about the *Pemulung* should be provided to them because many Indonesians do not understand the inner workings of *Pemulung* communities and the information waste system

National High Jakarta School Planning Meeting

- The students are excited to engage in an opportunity to learn about business, engage with a multination corporation, and apply creativity to a problem facing their country

Bali Recycling Conference Call

- Maintaining a waste management system that depends on *Pemulung* is likely not the best end solution for Indonesia. But, changing the system would mean disenfranchising hundreds of thousands of people around the country that do not have a good alternative for income. Responsibly changing the infrastructure and creating an alternative would have to include finding alternate income for the *Pemulung* population
- Cultural norms in Indonesia about waste are based on religious and past cultural practices only dealt with organic waste. These norms have not adapted to the reality of dealing with increased consumerism and inorganic waste

PepsiCo Update Call

- A highly consumer-facing organization such as PepsiCo has a lot to lose. The proper risk assessments, strategic planning, and scenario analysis should be performed and discussed before moving forward with initiatives that can influence its brands

Final Conclusions – Hypothesis Determination – Takeaways

QUESTION: What is the best environment in which local entrepreneurs might develop viable, self-sustaining business ideas that deliver positive impact to *Pemulung*?

What is the most beneficial information that can be provided to *Pemulung* via SMS-text based technology to improve their lives? Is it priced-based information that could potentially impact market power or are there other uses for this technology and knowledge sharing? What are potential risks with a SMS-text based information delivery system? What are possible methods of mitigating this risk?

Can food and beverage companies strengthen relationships with its customers by engaging in CSR activities aimed at benefiting stakeholders further down their value chain?

ANSWER: A competition that targets those with expertise in the content that our project aims to positively impact will be most effective. There should also be a strong education and mentoring component the competition so that the solution is as comprehensive as possible and does not have unintended negative impacts on the communities engaged.

The *Pemulung* are eager to receive information besides pricing information. There is potential to launch a pilot SMS-text system with education and health information rather than starting with the more complicated and delicate issue of influencing transaction prices. So many *Pemulung* are limited by distance and logistics that they are unable to reap the full benefits of this product, should it focus on price. Increased price transparency could increase negative competition between *Pemulung*.

It is still difficult to measure and estimate the impact a CSR initiative could have on customer relationships. The target customer groups continue to provide evidence that these types of initiatives excite and engage them and would improve a company's image in the marketplace.

HYPOTHESES: Proposed solutions to empower the Pemulung and improve their standard of living are best tested in a series of very small pilots. If any solutions are to be successful, stable, lasting relationships must be built with the *Pemulung* communities first. Changing their system too much will likely have unintended consequences. If competition and transparency is increased in the pricing, *Pemulung* have to have a mechanism to engage that knowledge and opportunity, i.e. better ways to transport waste so they can reach more points of sale.

CONFIRMED OR DENIED: Extensive field research, primary observation, and stakeholder engagement confirmed the validity of our hypothesis.

Site Visit 5 – Bali and Jakarta, Indonesia

Logistics

DATES: Friday, February 24 – Friday, March 2, 2012
TEAM ATTENDEES: Tal Avrahami, Yih-Wei Chien, Miguel Sossa
KEY STAKEHOLDERS/EDUCATORS VISITED:

- Mr. Olivier Pouillon, Founder, Bali Recycling, Ubud, Bali, Indonesia
- Mr. Peter, On-site Manager, Bali Recycling, Ubud, Bali, Indonesia
- Mr. Mark Wang, Executive Director, Global Entrepreneurship Program – Indonesia (GEPI), Jakarta, Indonesia
- Mr. Amit Bose, General Manager, PepsiCo Indonesia, Jakarta, Indonesia

LOCATIONS VISITED:

- Municipal Landfill, Seminyak, Denpasar, Bali, Indonesia
- Illegal Landfill, Seminyak, Denpasar, Bali, Indonesia
- Bali Recycling, Inc. Processing Facility, Ubud, Bali, Indonesia
- Illegal Landfill (Temple Location), Ubud, Bali, Indonesia
- Illegal Landfill (Rice Field Location), Ubud, Bali, Indonesia
- PepsiCo Indonesia Headquarters, Jakarta, Indonesia
- GEPI, Jakarta, Indonesia

Site Visit Question to be Answered / Corresponding Hypothesis

QUESTION: Are the *Pemulung* a solution for addressing or a symptom of the growing plastic bottle waste found in Indonesia?

HYPOTHESIS: If the *Pemulung* did not exist and collect waste, then Indonesia's landfills, water sources, city streets, rural areas, and living areas would be overrun with plastic waste.

Methods for Analysis

- Examine and record current points of system entry for plastic into the waste stream
- Observe and record current mechanisms for *Pemulung* to partake in plastic waste collection
- Observe, evaluate, and record current methods of *Pemulung* plastic disposal (e.g., recycling, waste incineration)
- Examine and record the health risks to *Pemulung* and society from the current method of *Pemulung* plastic waste collection and retrieval
- Observe and record other methods for plastic waste collection, their scalability potential, effectiveness, and socio-economic impact on the *Pemulung*

Observations – Bali and Jakarta Site Visits

Monday, February 27, 2012, Day Tour
Location: Municipal Waste Landfill, Illegal Landfill, and Municipal Incinerator, Sanur, Bali, Indonesia (15 kilometers from Bali Airport)
Guide: Mr. Olivier Pouillon, Founder, Bali Recycling

MUNICIPAL WASTE LANDFILL Observations (Sanur, Bali, Indonesia):

- The South Bali Municipal Landfill was created after decades of illegal dumping throughout Bali (date of

Observations – Bali and Jakarta Site Visits

development unknown but greater than 20 years)

- The landfill is currently situated in the middle of fragile mangrove forests and one of the regions largest watersheds, just 2-5 kilometers north of large tourist hubs
- Facing pressure from tourism and subsequent garbage growth over the last two decades, the Balinese Government has finally begun a multi-year project to convert the current unsanitary landfill to a plastic-lined, concrete walled, sanitary site
- Access to the landfill is via dirt road, which when flooded during rainy seasons, makes access virtually impossible for most local garbage trucks
- Hazardous wastes are not treated before entering the site and are aggregated with both organic and inorganic wastes in the current site
- *Pemulung* are not encouraged at the site and are relegated to sifting through trash that falls off the trucks en route and in the polluted riverbeds that are filled with trash around the site
- Landfill capacity is unknown, but visual inspection puts the site at a comparatively large 2-3 kilometers long by 1- 2 kilometers wide; the landfill can easily be seen from all around the local area as it is the largest structure within viewing distance
- Trash is collected from all local areas and as far as 100-200 kilometers away
- Several hotels and restaurants commonly dump in this facility
- Livestock use the landfill as a feeding ground
- Small fires are used around the landfill to burn trash, and a pig farm is located just west of the landfill border
- Payment is not required to dump on the site, nor is waste evaluated for hazardous material from observations
- Garbage trucks are cleaned onsite with water pumped from adjacent polluted rivers before driving back through city streets

ILLEGAL LANDFILL Observations (Sanur, Bali, Indonesia):

- An illegal dump site has emerged in the last two years less than a kilometer away from the municipal landfill
- The illegal site, located less than 200 meters from a local division of the Indonesian Department of Forest Protection and Restoration, is situated atop a clear-cut mangrove preserve
- The site was founded in front of a temple used by local villagers as part of a negotiated settlement with the Balinese Government; the settlement allowed the government to install an automated river trash removal system that is no longer in use in exchange for building a bridge across the river to give villagers access to their temple
- With a newly paved road and access to a common area, garbage trucks quickly diverted from traveling the extra distance to the municipal waste site, instead choosing to dump illegally
- Additionally, interviewing garbage truck drivers revealed they simply prefer the illegal dump site due to its closer proximity to main roads, and the paved landfill road itself as it causes less costly damage to the trucks themselves
- In less than a year, the garbage pile has covered an area larger than 3 football fields (300 meters wide by 500 meters long)
- *Pemulung* sift through hazardous waste, spoiled food, human waste from hotels, and livestock to collect valuable plastic waste and other inorganic materials
- *Pemulung* also live in the illegal landfill itself, making makeshift homes out of plastic covers, hotel amenities, etc.
- Both activities are done without proper footwear, clothing, or access to clean water, leaving *Pemulung* and all whom they come in contact at risk for exposure to diseases, especially malaria, avian flu, and other water-borne parasites

Observations – Bali and Jakarta Site Visits

MUNICIPAL INCINERATOR Observations (Sanur, Bali, Indonesia):

- Mr. Olivier Pouillon took The UM Team to one of Bali's incinerator sites located 20 kilometers north of Bali's airport
- The incinerator is primitive with coal used to light the fire and a team of unprotected waste collectors moving organic and non-recyclable inorganic waste from piles of trash to the incinerator by crude baskets
- *Pemulung* visit the site to collect recyclable waste and to drop off non-recyclable waste from the area
- A Municipal guard watches over the incinerator which during the UM Team's visit, was visibly producing both white and black smoke, all unfiltered
- Hazardous materials, such as asbestos, are also burned in the incinerator, converting chemicals to toxic smoke that travels to nearby communities, including shanty-towns created next to the incinerator for the workers

Tuesday, February 28, 2012, Day Tour
Location: Bali Recycling Tour, Temple Illegal Landfill Visit, "Hotel" Illegal River Landfill Visit, Ubud, Bali, Indonesia (42 kilometers from Bali Airport)
Guide: Mr. Olivier Pouillon, Founder, Bali Recycling

BALI RECYCLING, INC. BACKGROUND AND Observations (Ubud, Bali, Indonesia):

- NOTE: A full history of Olivier Pouillon's life in Bali and establishment of Bali Recycling, Inc. was written by Georgina Kenyon, author for the *Guardian, UK*: http://www.guardian.co.uk/world/2009/jun/21/bali-waste
- Olivier Pouillon created Bali Recycling, Inc. as a response to the vast amounts of waste that he witnessed along the roads, mangrove forests, water ways, and beaches of Bali, a location he first visited in 1991
- Olivier has tracked the dumping of illegal waste and its pervasive impact on Bali's environmental and human ecosystem for nearly 15 years in Bali
- Olivier acknowledged that during this time, the 2007 United Nations Climate Change Conference in Bali had the greatest impact on him, as he learned how disconnected most UN attendees were to where their hotel waste was going
- Olivier tracked hotel waste from dumpster to landfill and noted that specifically for the *Four Seasons Hotel* of Ubud, that trash removal trucks hired by the hotel were illegally bypassing municipal landfills and dumping directly into nearby riverbeds
- Olivier video recorded this illegal dumping and presented the findings to local hotels and restaurants, who initially did nothing
- In addition to illegal dumping, Olivier also documented the hazardous and terrible living conditions that the *Pemulung* who lived on these landfills were subjecting themselves to
- In particular, he counted and witnessed the deaths of multiple children and older adults, which he hypothesized was the direct result of over exposure to hazardous chemicals found in the trash, burning inorganic materials, and the local contaminated water
- As a result, Olivier formed Bali Recycling, a for-profit organization that serves as a certified environmentally-focused waste collector, waste sorter, recycler, and hazardous waste aggregator

BALI RECYCLING – WASTE PROCESSING

- Bali Recycling sends trucks to collect waste throughout Ubud, which then returns the waste to a processing center
- The processing center has a fortified security fence to protect against competing organizations who thrive on stealing intellectual property or the burning down competitor work sites
- Bali Recycling sits on a plot of old rice field that is no larger than ¾ of a football field (75 meters x 75

Observations – Bali and Jakarta Site Visits

meters), with a vaulted aluminum roof to keep sorted waste dry

- Once waste arrives in industrial strength trash bags, the waste is segregated by hotel/restaurant, weighed, recorded, and then poured into separate bins
- A staff of 4-6 men with protective masks, gloves, and eyewear separates the waste into organic, recyclable material, hazardous waste, and inorganic waste that cannot be recycled
- Organic waste is collected for composting on the back of the site or added to a bio-digester where it is then turned to usable fuel
- Hazardous materials are aggregated in a dedicated section of the processing center and tagged for removal to appropriate municipal waste sites in southern Bali
- Inorganic wastes that cannot be recycled are aggregated and either sent to local municipal landfills, or are being collected for multipurpose inventions (e.g., trash is being compressed onsite into building bricks that can be used to insulate homes instead of using fiberglass or other materials; wine bottles are combined with concrete to create building blocks that maintain a more stable temperature due to air flowing through the wine bottles, which are more robust than the standard cement blocks used)
- Recycled materials are repackaged and weighed, and are then sent to recycling centers for profit
- Bali Recycling is unique in that they track and record all amounts of waste and recyclable amounts by hotel/restaurant and then report back each month to those establishments
- This reporting is amongst the first of its kind in Bali, and is a rudimentary version of CSR waste reporting that hotels such as the *Four Seasons* can now use to track their impact locally
- While a total number of clients was not given, Olivier reports that he has received business due to his track record of creating waste processing transparency and actionable reporting
- However, as Bali Recycling grows, so to do their competitors
- In order to stay ahead, Bali Recycling will require a large influx of capital to procure even more trucks to collect waste, a larger processing site, and to help pay local government certifications
- Bali Recycling estimates that it is helping to divert 70% of local waste, some 6-10 tons a day, to proper waste processing, especially as they continue to educate local companies about the adverse impact of their waste

TEMPLE ILLEGAL LANDFILL Observations (Ubud, Bali, Indonesia):

- Ubud is known for its beautiful historic temples, which date back over the last century and older
- The UM Team visited one of the largest Balinese temple complexes, Samuantiga (cross-roads), which was constructed over several decades and is listed as an Indonesian protected cultural heritage site
- Samuantiga looks out over a small river that is used by locals for water, fishing, and to bathe, and animals and agriculture for water and irrigation
- Over the last few years, local villagers, companies, and hotels/restaurants have begun to dump waste illegally next to and into the river, no more than 100 meters from the temple complex
- Per Olivier, temple leaders explained that while most westerners would rebel against finding trash near religious sites, Agama Hindu Dharma, the major local religion, acknowledges the need for balance between good and bad. The trash symbolizes the bad, which without, good could not exist. Thus, temple leaders do not see trash as an eyesore nor do they or the villagers view such landfills as harmful to the environment, food chain, water supply, etc.
- Religion plays a major role in Balinese life, and despite the documented scientific harm of hazardous waste in water and food, villagers believe that spiritual deities protect them from waste's harm
- The illegal landfill spanned the size of half of a football field, and the UM Team documented plastic, and other inorganic/hazardous materials amongst the waste
- The UM Team also video recorded a man fishing in the trash-filled river to highlight the direct introduction of waste into the food stream

Observations – Bali and Jakarta Site Visits

ILLEGAL RIVER LANDFILL Observations (Ubud, Bali, Indonesia):

- Olivier pointed the UM Team to an illegal landfill no more than 400 meters down a small road off a major artery of Ubud's city center
- Note: Olivier was unable to accompany the UM Team as hotels that dump in the illegal landfill have become very aggressive toward him
- The landfill, dubbed the *Hotel Wasteland* by the UM Team, was once a lush rice field with a large river passing through it
- Remnants of the once active river bed, 30 meters in depth, still exist, but in less than 5 years, hotels and restaurants mainly have filled the riverbed with acres of trash
- Literally meters away from other rice fields and a community of modern houses, the 100+ acre illegal landfill is both an eyesore and a toxic time bomb
- During the rainy season, water, once emptying into the river, now floods the landfill, pushing leachate into the rice fields, water supply, and surrounding communities
- The landfill's history follows a pattern that the UM Team has observed across Indonesia:
    - Cultural upbringing and lack of education amongst local villagers promotes an ideology that waste can be burned or discarded wherever one chooses (This stems from a tradition of burying or burning organic waste over centuries)
    - Consumption rates of inorganic products grow as local economies grow, resulting in increased amounts of inorganic waste
    - Municipal waste facilities and services do not exist or are inadequate to account for the increase in waste
    - Government agencies do not invest in waste due to other priorities or charge too much that villagers cannot afford to properly dispose of waste
    - Local villagers and firms begin to dispose of waste in common areas such as rivers, forests, etc.
    - This "centralization" of waste attracts more villagers and companies, leading to a un-official landfill
    - The landfill continues to grow, spreading out into nearby fields, communities, etc.
    - The *Pemulung* migrate to these areas to scavenge for plastic, aluminum, glass, and other valuable materials that can then be recycled
    - *Pemulung* set up housing directly on landfills to maximize efficient use of time
    - *Pemulung* families are then exposed to all of the hazardous side-effects of being near the waste
    - As the landfills grow, fires are started to help burn the waste and curb the growth
    - Carcinogens then infiltrate the air that the *Pemulung* and surrounding community breathes
    - Landfills finally reach a tipping point, where no more waste can be left, forcing dumpers to find other locations, and the *Pemulung* to migrate, following the trash
    - Municipalities do nothing to seal the remaining illegal landfill, leaving local communities exposed to decades of toxic impact
- To date, the UM Team had observed multiple *Pemulung* collection sites and had witnessed some of the communities where the *Pemulung* live, but this illegal landfill was the most difficult to watch as children and families drank water from the site and ate food around the area

Thursday, March 1, 2012, Corporate Meetings
Location: GEPI Satellite Office and PepsiCo Indonesia Headquarters, Jakarta, Indonesia
ATTENDEES: Mr. Mark Wang, Executive Director, GEPI | Mr. Amit Bose, General Manager, PepsiCo Indonesia

GEPI (Global Entrepreneurship Program Indonesia) TOUCHBASE (Jakarta, Indonesia):

- The UM Team met with Mr. Mark Wang to further discuss the particulars of a future social-entrepreneur business plan competition aligned with PepsiCo

Observations – Bali and Jakarta Site Visits

- Mark shared that Indonesia is attracting thousands of investors from around the world who want to take part in Indonesia's rapid growth over the past decade
- Mark discussed the process that GEPI uses to attract applicants to its business plan competitions and the desire to create sustainable partnerships with the University of Michigan to help competition winners migrate their ideas to full-fledged businesses
- Mark also shared that GEPI competitions offer no intellectual property protection, and that all applicants acknowledge that trade secret protection is a personal task
- Mark applauded the idea of bettering all socio-economic levels of Jakarta and offered advice that if there was a clear business tie in, that this would lead to greater results for PepsiCo and the team

PEPSICO INDONESIA TOUCHBASE (Jakarta, Indonesia):

- The UM Team met with Mr. Amit Bose to discuss site visit observations, to further understand PepsiCo's market position in Indonesia, and to discuss the potential of implementing P-Mobile and a Business Plan Competition
- Note: Specific company strategies have been excluded from this report per privacy requests
- Amit shared that PepsiCo Indonesia's joint-venture partner, the Salim Group, is a big proponent of CSR related activities. The Salim Group is Indonesia's largest consumer of wheat and by some accounts water, as they produce a vast quantity of the snacks and foods consumed in Indonesia. As such, the Salim Group has focused on irrigation solutions and process solutions that vastly reduce environmental impacts from their operations
- Amit shared that most proposals for Indonesian-specific CSR initiatives would need to be reviewed in concert with Salim Group executives, and that successful proposals would need to include a component that specifically demonstrated how the initiative would positively impact community living standards and where possible brand image, costs, and/or revenue
- Amit looks forward to reviewing the work of GEPI to assess future relationship potential, as he is also excited about helping to grow PepsiCo's involvement with local entrepreneurs

Results – Takeaways

MUNICIPAL WASTE LANDFILL Observations (Sanur, Bali, Indonesia):

- Bali's government is making strides to improve landfill management, but the lack of investment in municipal waste services, community education, and illegal dumping enforcement, will make alternative dumping methods preferable for decades to come

ILLEGAL LANDFILL Observations (Sanur, Bali, Indonesia):

- Vitale environmental sanctuaries and water systems will continue to be transformed into illegal landfills and play home to the *Pemulung* as long as safe and convenient alternatives and legal enforcement do not exist

MUNICIPAL INCINERATOR Observations (Sanur, Bali, Indonesia):

- Hazardous materials, including inorganic wastes, will continue to enter air and water systems as long as they are not first separated from waste before disposal and incineration

BALI RECYCLING, INC. Observations (Ubud, Bali, Indonesia):

- Proper waste processing and safe facilities do exist within Indonesia with safe and semi-sustainable employment opportunities for existing *Pemulung*. However, they are not scalable solutions without

Results – Takeaways

capital investment or government partnership, and may one day be driven out if municipal waste programs are implemented

TEMPLE ILLEGAL LANDFILL Observations (Ubud, Bali, Indonesia):

- Illegal dumping is symptomatic of religious/cultural beliefs that condone the behavior and will not change without long-term and very personalized education programs

ILLEGAL RIVER LANDFILL Observations (Ubud, Bali, Indonesia):

- Without enforcement, there is no reason for waste companies servicing unaware hotels / restaurants to dump illegally. Illegal dumping saves money, and without a culture demanding proper disposal, will not change in the near future
- *Pemulung* are either unaware of the hazardous impact that living/working on landfills has to them, or they have no alternative to change their livelihoods

GEPI (Global Entrepreneurship Program Indonesia) TOUCHBASE (Jakarta, Indonesia):

- Financial capital exists to support large scale waste processing and recycling programs, but none of this capital will get to the Olivier's of the world without assurances that governments will support these companies, and that they can produce a profit quickly

PEPSICO INDONESIA TOUCHBASE (Jakarta, Indonesia):

- Both PepsiCo and the Salim Group want to continue helping the Indonesian people through CSR activities, but all solutions must be properly vetted to minimize all associated risks and to show positive impacts to the organization

Final Conclusions – Hypothesis Determination – Takeaways

QUESTION: Are the *Pemulung* a solution for addressing or a symptom of the growing plastic bottle waste found in Indonesia?

ANSWER: The *Pemulung* are a symptom of the growing plastic bottle waste found in Indonesia.

HYPOTHESIS: If the *Pemulung* did not exist and collect waste, then Indonesia's landfills, water sources, city streets, rural areas, and living areas would be overrun with plastic waste.

CONFIRMED OR DENIED: Denied. While the *Pemulung* serve a vital role in cleaning streets of litter and extracting precious recyclables from landfills, their actions also cause environmental harm. For example, *Pemulung* tear open plastic trash bags, which expose the contents, hazardous waste, to the air and water, which otherwise would have been protected for several years. This exposure of waste leads to spread of disease amongst *Pemulung* and surrounding communities. Additionally, *Pemulung* become land squatters, legitimizing the presence of illegal landfills, and thus adding to the focus of waste companies to dump in these sites. Finally, by performing their services for free and visually removing some waste from streets, neighborhoods, etc. the *Pemulung* are actually enticing municipal governments to do absolutely nothing to resolve the issue of illegal dumping.

Pemulung are highly skilled at waste sorting and collection, and while there are essential immediate needs for health, education, and social empowerment that must be addressed for them, the creation of a safe, full-scale waste management system that employs them would likely serve them better in the long run.

University of Michigan School of Natural Resources and Environment
PepsiCo PCWR Master's Project | Preliminary Internal Interview Guide

Background

- The University of Michigan's SNRE Student Team has begun a 10-month study surrounding Post-Consumer Waste Recycling and opportunities to promote such programs in SE Asia.
- The following interview guide will be used to frame initial internal discussions with PepsiCo personnel with the hopes of ascertaining applicable best practices, project goals, challenges, and potential opportunities for student support. These results will be utilized to advance the project into its on-site data-gathering discovery phase, but will be masked in final form to promote confidentiality pursuant to the Student/PepsiCo Contractual Agreement.

Department Information

1. Department Name: _____

2. Department Contact:

_____ _____
First Last

_____ _____
Phone Email

Interview Guide

3. Area(s) of Focus:

- ☐ Business Manager
- ☐ Business Development
- ☐ Brand Promotion
- ☐ Community Relations
- ☐ Operations
- ☐ Product Design
- ☐ Supply Chain
- ☐ Sustainability Efforts
- ☐ Others:

4. Areas Served:

- ☐ Africa
- ☐ Asia
- ☐ Australia
- ☐ Central America
- ☐ North America
- ☐ South America
- ☐ Specific Locations:

5. Provide Student Team Introduction

6. Capture Interviewee Introduction
(e.g., Role at PepsiCo, Background, Interests)

7. Solicit Interviewee Opinions/Input on the following topics over the course of the interview:

a. Project plan (the "how" part): action plan, potential risks/opportunities, and key deliverables.

b. Project technicalities (the "doing" part): specifics to post-consumer waste recycling, emerging markets work, multi-stakeholder engagement, etc.

c. How can we help provide specific knowledge gained in the field to this department?

General Questions

8. What are the cultural mindsets of the people that will be operating and participating in the PCWR program?

9. What were the major successes and challenges that had to be overcome in previous PCWR programs implemented by PepsiCo?

10. What opportunities for incremental or systemic improvement have been identified in existing PCWR programs? What are industry motivations for executing similar recycling programs?

11. Which strategies has PepsiCo most successfully employed for cultivating relationships with NGOs, community organizations and other civil-sector entities?

12. What methods does PepsiCo utilize for generating internal buy-in for sustainability initiatives? What best practices (i.e. incentives) can be borrowed for generating buy-in from employees at third parties such as 7-Eleven and other vendors?

Individual Questions
Mark Coakley – General Manager and Vice President NAPIM, PepsiCo
1. How are PepsiCo's brands performing on an individual and collective basis in AsiaPac? 2. Is the post-consumer waste from certain brands more easily recyclable than that of other, better-performing brands? 3. Which PepsiCo products do you foresee will experience the largest sales growth in the region over the next 3 – 5 years? 4. What role do recycling and positive corporate image play in your ability to grow market share? 5. What is the extent of PepsiCo's R&D efforts relating to innovative packaging and container design? 6. As a GM, are your clients specifically asking for more recyclable goods, and environmentally-friendly products, or is PepsiCo the driving force trying to promote sustainable design/materials in the marketplace? 7. As a GM, what are examples of the types of organizations or individuals on the ground that you would want to get involved with early on in a new venture?

Amit Bose – GM for PepsiCo Indonesia
1. What have been the most important trends or consumer preference shifts over the last two years that would influence a PCWR program? 2. What has the Sales and Marketing team discovered about consumers in Indonesia that our team should be aware of? 3. What are the best organizations to target for Indonesia-specific market research? 4. What does recycling mean for your business? 5. What is your personal view on Indonesians' sentiment about recycling? 6. How do you foresee the PCWR program helping your business grow? 7. Who now currently conducts informal recycling? What are their distinct mindset characteristics? 8. How is distribution and delivery arranged? If by vendor, what level of control or influence does PepsiCo have?

Annie Kishen, Manager of CSR for PepsiCo India
1. What has made Waste to Wealth successful in India? 2. What observable improvements have you seen within the communities where WTW has been launched? 3. How is PepsiCo measuring the success of WTW today, and are there certain lessons we should carry with us in trying to apply similar initiatives in Indonesia? 4. CSR often gets a bad reaction from community activists, who see it either as another form of profit-seeking behavior or mere greenwashing. How is PepsiCo working to shift this type of mindset? 5. What formalized structure is in place at PepsiCo to support new ideas such as WTW? Are ideas developed with a top-down or bottom-up approach, or some combination of the two? 6. What are other areas within recycling and waste that you plan on tackling going forward, and are you working backwards through the supply chain to decrease the need for recycling to begin with? 7. From a CSR perspective, how does India compare to Indonesia? 8. What are your greatest aspirations for what CSR at PepsiCo will be able to accomplish in a large-scale, impactful way?

Brian Miller – Sales Director, Recycling, PepsiCo
1. Can you describe the end-to-end recycling sales process at PepsiCo? 2. How is post-consumer waste captured and/or sourced? 3. What type of payment structure is in place with suppliers and/or collectors of post-consumer waste? 4. We recognize that PepsiCo and all food and beverage distributors must abide by safety regulations that normally require one-time use packaging. Has PepsiCo considered options for creating packaging that can be used more than once or developing a system to distribute food and beverages in a way that immediately serves other long-term purposes?

Gabriela de la Garza – Sustainability Manager, PepsiCo, Latin America Beverages
1. Latin America is entering a new realm of eco-tourism and "green" thinking. Has this positively influenced your ability to implement sustainability initiatives in the region? 2. Do your product partners see an increase in the demand for environmentally-friendly products? 3. What are some challenges that the region presents for implementing PCWR programs, and how have you overcome them? 4. Which best practices can you share regarding successful implementation of a PCWR program? Which components – consumer education, supplier education, and/or waste displacement – did you find were the most important to tackle first? 5. What barriers or challenges have you faced in conveying messages and communicating with different demographic groups?

Robert Taylor – Sales Director, PepsiCo for the 7-Eleven account
1. PepsiCo has a pretty unique relationship with 7-Eleven. Can you describe PepsiCo's relationship with 7-Eleven, and the mechanism for idea collaboration? 2. Although 7-Eleven has a relatively modest presence in Indonesia at present, they are expanding. In order to support our efforts in modeling the projected increase in post-consumer waste that could be captured by a PCWR program, what rate of growth does PepsiCo project for sales volume by 7-Eleven? 3. What differentiates 7-Eleven's business, and how would establishing a sponsored PCWR program bolster their business in the country? 4. What does 7-Eleven care about most with respect to the consumer and with respect to PepsiCo? 5. What operational capabilities does 7-Eleven have that could be leveraged in the implementation of a PCWR program? 6. Does 7-Eleven have a sustainability program or recycling program already in place in other markets in the AsiaPac region?

Meagan Smith- Program Manager for Recycling Program, PepsiCo
1. PepsiCo has a positive image in the food and beverage industry for leading sustainable innovation in product design and recycling. What do you think propels this mentality forward, and how does this focus on recycling aid PepsiCo to grow? 2. Which stakeholders play the most active role in advancing PepsiCo's recycling efforts? Which kinds of stakeholders do you envision could play a more active role? 3. Are PepsiCo's recycling efforts intended solely for processing PepsiCo packaging and containers? Or is PepsiCo agnostic to the source of post-consumer waste? 4. Recycling programs vary so much due to local legislation. What role does Pepsi play in shaping recycling policies? 5. What are your goals for global recycling by PepsiCo? How would this PCWR help you achieve those goals?

Stakeholder Engagement – PepsiCo

Summary

DATES: November 2010 – April 2012
KEY STAKEHOLDERS:

- Mr. Amit Bose, General Manager, PepsiCo Indonesia, Jakarta, Indonesia
- Dr. Laura Ediger, Environmental Manager, BSR, Hong Kong
- Mr. Al Halvorsen, Sr. Director of Environmental Sustainability at PepsiCo
- Ms. Laurie Hoffman, 7-Eleven, International Account Manager
- Mr. Gary Horsfield, Vice President Supply Chain, PepsiCo Asia Pacific, Australia
- Ms. Jennifer "Jennie" James, Regional Corporate Affairs Director
- Mrs. Lynnette Ryan, CSR Director PepsiCo Asia-Pacific, Hong Kong S.A.R., China (all non-China regions)
- Ms. Ada Shen, CSR Director, PepsiCo China, Beijing, China
- Mr. David Walker, Senior Director, PepsiCo Global Operations, New York, NY
- Mr. Sigit Wijanarko, Sales Manager, PepsiCo Indonesia, Jakarta, Indonesia

The University of Michigan Team began its stakeholder engagement process in November 2010, and would like to acknowledge and thank the above stakeholders for their tremendous support throughout the project's duration. During the 18 month engagement, the UM Team maintained project communication with stakeholders via multiple methods. For example, the UM Team sent 140 email streams to PepsiCo representatives and held 16 regularly scheduled conference calls. The team also extended its face-to-face interaction with stakeholders whenever possible, traveling to two in-person meetings in Hong Kong, as well as kick-off meetings in Jakarta.

The following timeline provides historical context as to when and how the UM Team engaged project stakeholders from partnership inception in November 2010 to phase completion in April 2012.

STAGE 1 – Exploring Master's Project Ideas

KEY STAKEHOLDERS:

- Dr. Laura Ediger, Environmental Manager, BSR, Hong Kong
- Ms. Ada Shen, CSR Director, PepsiCo China, Beijing, China

The University of Michigan Team agreed on pursuing two key components for establishing a Master's Project:

- First, the project would focus on an Asian country
- Second, the project would focus on aspects of sustainable agriculture or corporate social responsibility

In November 2010, Patrick Lord, MBA/MS 2013, began to explore project opportunities with initial team members, Cam Smith and Tal Samuelsen, as well as a personal contact in Ms. Ada Shen. During preliminary meetings, the UM Team outlined its learning objectives and capabilities with Ada, who in turn reviewed potential avenues for project exploration within PepsiCo Asia Pacific. Ada hosted numerous follow-up conference calls with the team to impart her deep knowledge of the current status of environmental and social issues in China and associated CSR programs, as well as to define a viable project scope opportunity. After carving out an early scope, Ada carried the team's project scope to PepsiCo

The SNRE Master's Project team & Ada Shen
Hong Kong, Jan 2012

decision-makers for approval, all with the explanation that funding considerations would be carried out post-approval and were not guaranteed.

During the PepsiCo approval process, the UM Team met with BSR in Hong Kong and Beijing to further develop their awareness of potential Asia-Pacific projects. Laura Ediger helped the team review other opportunities within PepsiCo and a few months later, connected the team with Lynette Ryan of the PepsiCo Asia-Pacific office in Hong Kong. Ada supported the team's exploration of this new project avenue and a new conversation began with Lynette and PepsiCo Asia-Pacific.

STAGE 2 – Solidifying a Project Opportunity

KEY STAKEHOLDER:

- Mrs. Lynnette Ryan, CSR Director PepsiCo Asia-Pacific, Hong Kong S.A.R., China (all non-China regions)

Lynnette Ryan shared with the UM Team that she had been formulating the beginnings of a CSR project for the Jakarta, Indonesia PepsiCo market. Specifically, the project focus combined plastic recycling and positively engaging PepsiCo's customer, 7-Eleven. Lynette co-developed the project with Laurie Hoffman, 7-Eleven customer lead, allowing for stronger internal alignment. The UM team familiarized Lynette with the Master's Project concept, objectives, and potential timeline. Given the distance between Michigan and Indonesia, the UM Team and PepsiCo spent multiple calls brainstorming on how work would be completed, particularly as a budget had yet to be discussed or approved. The UM Team expressed its ability to leverage University of Michigan research resources and knowledge centers around campus.

Following the demonstration of a solid support structure, the UM team prepared a letter of engagement (LOE) allowing for modifications based on project progress. Furthermore, the LOE outlined a project schedule including initial secondary research, several field visits, analysis phases, final deliverables, and a tentative budget estimate, including grant funding that the team had been awarded for its unique research.

STAGE 3 – Finalizing the Letter of Engagement

KEY STAKEHOLDERS:

- Dr. Laura Ediger, Environmental Manager, BSR, Hong Kong
- Mr. Gary Horsfield, Vice President Supply Chain, PepsiCo Asia Pacific, Australia
- Mrs. Lynnette Ryan, CSR Director PepsiCo Asia-Pacific, Hong Kong S.A.R., China (all non-China regions)
- Mr. David Walker, Senior Director, PepsiCo Global Operations, New York, NY

In April 2011, Lynette introduced the team to Gary Horsfield. In an introductory conference call, Gary sought to establish the following expectations for both PepsiCo and the University of Michigan with regards to a drafted Letter of Engagement (LOE):

- First, Gary wanted to ensure that the PepsiCo team had, "skin in the game", specifically encouraging the UM Team to make use of the PepsiCo team members
- Second, Gary he emphasized his desire to see that the UM team had a learning experience in working with a global firm on an international project
- Lastly, Gary stipulated that the project include the launch of a pilot program.

The team discussed this last issue in depth. A pilot launch likely required more time than the team had available given its other Master's degree requirements and internship schedules. Amid the team member's other time commitments, the team internally agreed to extend itself beyond the in-session academic schedule and utilize holidays to work on the project and travel to Jakarta. Even so, this stipulation would require another solution. The team replied to the client that a project of such a scale and scope would require dedicated a PepsiCo representative in Jakarta. This direct contact, perhaps a new hire, would work alongside the team and be responsible for frequent/weekly communication with the UM team, and implementing any recommended actions proposed by the team and agreed upon by the client. The client agreed to include this in the project scope while informing us that the process could take several months.


Patrick Lord & Lynette Ryan
Hong Kong, May 2011

To further discuss the LOE, Patrick met with Lynette in Hong Kong at the PepsiCo Asia-Pacific headquarters in May 2011. He presented the finalized LOE signed by all student team members and shared the team's excitement to begin work on project as well as its preliminary availability to travel to Jakarta. The result of this one-on-one meeting led to the scheduling of a kick-off meeting in July 2011. In addition, Patrick met with Laura to learn more about completed and publicized CSR projects in the region, hoping to garner additional insight for the SNRE team as stood on the cusp of kicking-off its own engagment. Furthermore, the team formalized the collaborative relationship with Laura and invited her to sit on the Master's Project Advisory Board due to her deep experience in the sector.

In June 2011, Lynette introduced the UM Team to David Walker who would serve as our primary contact given his long experience at PepsiCo and managing student engagements with PepsiCo. The team scheduled several conference calls with David during which he requested a detailed work plan/timeline along with clarity regarding individual team member roles. The team formalized them and remitted documentation back to David and all other PepsiCo committee contacts. Meanwhile, David facilitated introductions to PepsiCo managers around the world including PepsiCo India, PepsiCo Latin America Beverages, and PepsiCo USA for the team to conduct a round of interviews to gather best practices and lessons learned. Finally, the team discussed with David how to make the upcoming July kick-off meeting most effective. David provided much insight into such a process, suggesting that it would be a critical meeting to gain consensus across the committee member—whom had various business priorities and had never met.

STAGE 4 – Kick-off Meeting with all Client Stakeholders

KEY STAKEHOLDERS:

- Mrs. Lynnette Ryan, CSR Director PepsiCo Asia-Pacific, Hong Kong S.A.R., China (all non-China regions)
- Ms. Laurie Hoffman, 7-Eleven, International Account Manager
- Mr. David Walker, Senior Director, PepsiCo Global Operations, New York, NY
- Mr. Gary Horsfield, Vice President Supply Chain, PepsiCo Asia Pacific, Australia
- Mr. Sigit Wijanarko, Sales Manager, PepsiCo Indonesia, Jakarta, Indonesia
- Mr. Amit Bose, General Manager, PepsiCo Indonesia, Jakarta, Indonesia

Taylor and Patrick represented the team at the kick-off meeting with the entire PepsiCo committee, which now included Amit Bose. Also, an invitation was extended to CSR Asia representatives whom acted as facilitators. As our first in-person engagement with all PepsiCo stakeholders our primary goal was to develop quick buy-in and a

fundamental agreement as to the direction of the project. With three days available with the committee, the first day served as an introduction with Amit sharing the basics of the Indonesia business and deep relationship with 7-Eleven. CSR Asia's supported the meeting with keeping the group on track to agree upon a mission statement. After the first meeting, Patrick and Taylor ventured on the team's first field research trip and quickly learned that the original scope of the project, recycling plastic bottles, was in fact run by an informal economy composed of processers, aggregators, and collectors: a clearly defined value chain. The most evident opportunity seemed to lie with the waste collectors, "*pemulung*".

To shift the project scope towards a new focus, the SNRE team members decided that the most effective tactic to create alignment with PepsiCo stakeholders was for the committee to see the recycling situation in Jakarta for themselves, rather than the students simply recounting a story in the boardroom. The following afternoon, Patrick and Taylor arranged to take the committee into the field and experience the recycling locations (often located on squatted land) and the families working on them. The following morning, in the final meeting, we invited each committee member to share his or her thoughts and feelings on the field visit. In short, the eye-opening experience made the committee members even more committed to the project than before—now, it was personal; one committee member had even emailed friends and family about the experience. To conclude the kick-off meeting the group formulated a "soft" mission statement that included a focus on improving the lives of the *pemulung*.

Patrick Lord & Taylor Samuelson, the PepsiCo Committee, & CSR Asia
Jakarta, July 2011

STAGE 5 – Project Recommendations Review

KEY STAKEHOLDERS:

- Mr. David Walker, Senior Director, PepsiCo Global Operations, New York, NY

Over the next couple months the team digested its PepsiCo interviews, field observations, secondary research, client goals, and the work conducted by NGOs in Jakarta. Meanwhile, Miguel Sossa travelled to Southeast Asia to uncover more information about CSR projects in the region. The team then went to the white board to develop recommended initiatives for a CSR pilot program.

In September 2011, David Walker visited Ann Arbor to meet with the team. The primary objective of the daylong meeting was for the team to deliver a comprehensive pitch of its recommendation.

The SNRE team and David Walker
Ann Arbor, MI September 2011

The team structured its presentation and meeting with David to first provide background with the objective of establishing a common foundation of understand. However, the team found that it could have better understood his perspective and expectations. After a morning meeting, the team quickly saw that David much preferred to hear the *new* and *substantive* analysis, strategy and recommendations that the team had been working on. Often utilizing the Innovatrium space for its brainstorming and concept development work, the team sought an atmosphere of co-creation with its key stakeholder at a critical stage of the project. Upon hearing our proposed ideas, we received an enthusiastic and supportive response from David. Together, we honed the recommended initiatives, especially paying close attention to tying a close connection to the benefit to PepsiCo and its customer, 7-Eleven. With this alignment and shared vision of implementable initiatives, the team went back to the entire committee with the proposed initiatives. Meanwhile, the team pursued partnerships in Jakarta to prepare groundwork for a CSR program.

STAGE 6 – Seeking Approval for Pilot Implementation

- Ms. Jennifer "Jennie" James, Regional Corporate Affairs Director
- Ms. Laurie Hoffman, 7-Eleven, International Account Manager
- Mr. Gary Horsfield, Vice President Supply Chain, PepsiCo Asia Pacific, Australia

The team experienced a significant change in committee members in September 2011 when Lynette announced that she would be leaving the company for family reasons and Jennifer "Jennie" James would take over in October. As the initiator and creator of our partnership and project, Lynette played a critical role as the internal champion that brought people together within PepsiCo.

Once Jennie picked up contact with our team, we hoped to gain her buy-in with regards to our proposed initiatives. After initial conference calls, Jennie clearly expressed hesitation towards the idea of quickly launching a pilot. Before giving her approval to the team, which would enable it to strike formal partnerships, she wanted to better understand the project goals and objectives as well as their connection to PepsiCo's business. While our ideas were designed as a pilot, the PepsiCo brand would be affected regardless. In these calls, we teased out specific, and therefore addressable, reasons preventing her issuing approval to implement the proposed actions. At Jennie's request, the team prepared a brand risk assessment document to show the potential negative consequences of the proposed initiatives. Although risk mitigants were included in this document, a misalignment persisted between the team and this client representative, preventing swift progress towards a pilot launch.

Simultaneously, Laurie Hoffman was hesitant to share the team's ideas with 7-Eleven at this stage in the development of a pilot. The team had yet to establish a clear enough connection and benefit to the customer. Amit Bose also did not readily express support for the project. Drawing upon local trends: including widespread social media adoption by the target market of 7-Eleven consumers and a youth movement regarding social and environmental entrepreneurship, the SNRE team proposed a business plan competition held in Jakarta focused on improving the lives of the *pemulung*. PepsiCo and 7-Eleven could sponsor the event and incorporate 7-Eleven locations into the marketing campaign. The team discussed the issue from all angles to describe the benefits to 7-Eleven in participating in such an event. Instead of replicating versions of other CSR projects launched by other multi-national corporations operating in Jakarta, the team wanted to develop an innovative solution for its client. However, the team began to see that its recommended actions were, perhaps, quite far from some committee members' expectations of a CSR program.

While David and Gary expressed support of our initiatives directly to the team, the team hoped to have their support in conference calls with the full committee to garner consensus. Some discussion concerning the applicability of the CSR project initiates occurred directly between committee members. To drive the conversation forward, the team called for a public vote of approval of the *conceptual nature* of the initiatives. Some alignment was achieved on this point to help mitigate some clarity issues.

Meanwhile, the team attempted but was unable to coordinate its next field visits to Jakarta with PepsiCo representatives for a stakeholder alignment meeting. In addition, we hoped to give Jennie the same opportunity to directly experience the recycling situation in Jakarta as other committee members had had, which could aid in developing a deep understanding of the formulation and pertinence of the project initiatives to the opportunity space for PepsiCo in the Jakarta market. However, due to scheduling constraints, the team met Jennie in Hong Kong in January 2012 and engaged in a full discussion of project initiatives. While, the parties agreed the in-person meeting achieved additional clarity of the project initiatives, a deeper vetting of the potential impacts to the PepsiCo brand was still needed, which seemed to require a longer process. Jennie informed the team that in any case, CSR projects of this type typically undergo a multi-year research and implementation period. This perspective distinctly differed from that championed by Gary and agreed upon by the original committee members and the SNRE team found itself in a predicament. Gary's continued participation through the project allowed him to offer a complete perspective on the project evolution and development; in a conference call, he recognized the turn taken from the original project goal—the team greatly appreciated his candor and expressed an understanding of a multi-year timeline for projects that involve *base of the pyramid* communities. Officially, the brakes were put on any further development of the initiatives. Thus, the team went into a holding pattern with its most viable potential partners.

STAGE 7 – Pursuing Alternate Implementation Possibilities

- Ms. Jennifer "Jennie" James, Regional Corporate Affairs Director

In the months after the SNRE team's January field visit, the team held conference calls with available PepsiCo committee members to debrief them as well as do a final effort to align client stakeholders. The team attempted to leverage existing PepsiCo initiates to relate the effectiveness of the team's proposal. The Pepsi Refresh Project in the United States allowed users to submit ideas for socially conscious projects and receive PepsiCo funding based on the most number of online votes—this engaged consumers and illustrated PepsiCo's support for

community-based projects. While this illustration of proof-of-concept seemed to have a positive effect on committee members, their final response was that the US-based PepsiCo perhaps had more resources available and familiarity than the Asia-Pacific organization to pursue such a project. While the Jakarta market presented a high-growth opportunity for PepsiCo global, it represented a fraction of the business of that conducted the US.

In addition, the team presented a pared-down version of the business plan competition to the client. In addition, a forum of partners, with PepsiCo as a sponsor of that group, could be an appropriate mechanism that PepsiCo could support. This pilot would minimize the impacts to the PepsiCo brand and participation from 7-Eleven would be deferred until a second iteration of the event that would benefit from lessons learned. Internal conference calls were held between PepsiCo representatives to consider the impacts and implications of this revised proposal. As a result, Jennie informed the team that she would seek funding from other sources within PepsiCo. With that, the team had a new hope to keep forward-moving progress.

STAGE 8 – Next Steps

- Ms. Jennifer "Jennie" James, Regional Corporate Affairs Director
- Mr. Al Halvorsen, Sr. Director of Environmental Sustainability at PepsiCo

The window on this Master's Project team's ability to engage identified partners and launch a pilot by the conclusion of the academic timeline established for Master's Projects was rapidly closing. Given the timing, the SNRE team began discussions of a long-term relationship with the client and the potential for a second team to carry the project forward. Therewith, the team submitted a project budget on behalf of a potential new team and began a search for candidates.

In April 2012, the team had a call with Jennie who informed the team that PepsiCo, due to corporate shift in focus on US operations and significant budget cutbacks, would be unable to support the implementation of a pilot project. She expressed a deep appreciate of the team's hard work and proposed a round of conference calls to "close the loop" on external stakeholders. The team then began planning to hold these with key potential partners at the end of the month.

Meanwhile, David had been reassigned and introduced Mr. Al Halvorsen. The team held a conference call with Al where the team debriefed him on the project. As this project was coming to a close, Al proposed the potential for other projects with the School of Natural Resources and PepsiCo's offices around the world. The team happily agreed to facilitate long-term relationship building.

FINAL CONCLUSIONS – Stakeholder Engagement Strategies

The team had many takeaways in stakeholder engagement strategies in working with a diverse set of committee members located around the world unfamiliar to each other. Balancing competing priorities of various stakeholders made for a challenging environment to create alignment around a single project. Fundamentally, the team utilized a co-creation strategy: the team continually sought input from the client to incorporate ideas into its proposal. In addition, it initially brought the client into the field, and later hosted a concept development session with Mr. David Walker to facilitate buy-in and mutual understanding. To communicate ideas, the team created

written presentations in various formats, a client-provided innovation evaluation form, a one-page summary, and a PowerPoint. The team also utilized consensus-building techniques including, building support one-on-one and calling for public voting. Addressing the common situation when liaisons change, the team took extra time to ensure that person gained as full an understanding as possible on the project status. In sum, the team had a deep learning experience regarding stakeholder engagement by working on a long-term consulting project with a multi-national firm.

Internal Master's Project Team Alignment

Student Team Members and Faculty Advisors

STUDENT TEAM:

- **Tal Avrahami:** MS 2012
  - *School of Natural Resources and* Environment
- **Stephanie Cheney**: MS/MBA 2012
  - *School of Natural Resources and* Environment
    Ross School of Business
    Tauber Institute for Global Operations
    Erb Institute for Global Sustainable Enterprise
- **Yih-Wei Chien**: MS/MBA 2012
  - *School of Natural Resources and* Environment
    Ross School of Business
    Erb Institute for Global Sustainable Enterprise
- **Patrick Lord:** MS/MBA 2013
  - *School of Natural Resources and* Environment
    Ross School of Business
    Erb Institute for Global Sustainable Enterprise
- **Taylor Samuelsen:** MS 2012
  - *School of Natural Resources and* Environment
- **Miguel Sossa:** MS/MBA 2013
  - *School of Natural Resources and* Environment
    Ross School of Business
    Erb Institute for Global Sustainable Enterprise

FACULTY ADVISORS:

- **Steve Percy:**
  - *Visiting Professor, Corporate Strategy and International Business at the University of Michigan Ross School of Business*
  - *Former Chairman and CEO of BP America, Inc. (1996-1999)*
- **Ming Xu, Ph.D**
  - *Assistant Professor, University of Michigan School of Natural Resources and Environment*
  - *Dr. Xu's research focuses on the environmental consequences of economic, technological, and social activities*

ADVISORY BOARD:

- **Rick Bunch:**
  - *Managing Director, Erb Institute for Global Sustainable Enterprise*
  - *Former Executive Director of the Bainbridge Graduate Institute (2003-2005) and Director of the World Resources Institute (1996-2003)*
- **Laura Ediger, Ph.D:**
  - *Environmental Manager, BSR Hong Kong*
  - *Dr. Ediger's research focuses on land use, water, climate change, migration, forestry, and agriculture in China and SE Asia*
- **Thomas Gladwin, Ph.D:**
  - *Max McGraw Professor of Sustainable Enterprise, Ross School of Business and the School of Natural Resources and* Environment
  - *Dr. Gladwin's research focuses on establishing and promulgating a science of sustainable*

Student Team Members and Faculty Advisors

enterprise that addresses the relationships among ecosystems, social systems, economic systems, and organizational systems

- **Marina Whitman, Ph.D:**
  - *Professor of Business Administration and Public Policy, University of Michigan's Ross School of Business and Ford School of Public Policy*
  - *Former Vice President, Chief Economist, and Group Executive for Public Affairs of the General Motors Corporation (1979-1992)*

Team Skills Inventory

Each SNRE Master's Project requires a unique set of skills to achieve success. The UM Team was formed with an awareness that having complementary skills would allow for greater solution development and enable strong on-the-ground relationship development. An advisory board was then created to further balance the team's skillsets and personalities. An overview of both the team's high-level skillsets have been provided below for review.

TEAM SKILLS INVENTORY:

CORPORATE
- Six sigma analytics for problem identification and efficiency analysis
- Reverse logistics understanding for plastic waste chain mapping
- Financial management for budget forecasting, tracking and solution development

ECOLOGICAL
- Life cycle analysis for plastic waste impact assessment
- Key performance indicator (KPI) development and metric analysis to track social impact from waste
- Risk assessment analytics to diagnose solution challenges for both corporate and social stakeholders

SOCIAL / CULTURAL
- Community-level project development background to appreciate local nuances for implementing successful and culturally sensitive projects
- Extensive global travel and corporate experience to enable rapid acclimatization to new geographic and work environments for maximum on-site field research effectiveness
- Stakeholder engagement understanding to provide frameworks for appropriate and swift engagement of corporate, NGO, and community stakeholders
- Knowledge of Mandarin language and other multi-cultural tools to ensure proper respect of local customs, traditions, and dialogue throughout SE Asia

PERSONALITY ASSESSMENTS

The UM Team also completed a team personality assessment to better understand learning, work, and communication preferences. Based on Ross School of Business Professor Jeff Degraff's *Competing Values Framework,* the team mapped out each individual, and then aligned work responsibilities based on areas of strength and areas of focus. The UM Team recommends this exercise for all Master's Project teams.

Project Management

PRODUCTIVITY TOOLS

Upon completion and approval of the initial Letter of Engagement, the UM Team met to develop the following productivity tools:

- Secure documentation repository
- Project plan
- Gantt chart
- Global budget
- Interview template
- Research repository
- Stakeholder engagement tracker
- Weekly recap template
- Photo repository
- Key takeaways repository
- Final presentation and paper checklist
- Regularly scheduled team meetings
- Team member(s) designated Project Manager
- Team meeting notes repository
- Team e-mail listserv

TASK ASSIGNMENT

The UM Team leveraged its skills, personal growth, and personality assessments to understand individual preferences for task responsibility, stakeholder engagement, and overarching learning pairing.

Once all assessments were completed, the team examined the entire project plan and stakeholder engagement tracker, and assigned ownership based on the following criteria:

1. Opportunity to capitalize on existing task knowledge (i.e., the Project Plan was co-created by a prior Project Manager)
2. Opportunity to capitalize on personality strengths (i.e., the UM Team deployed a team member with strong relationship development traits to Indonesia for each initial research visit to help quickly forge stakeholder relationships)
3. Preference to learn a new skillset (i.e., the UM Team Finance Lead had limited prior experience in budget management, but took on the role to develop a new skillset with the supervision of a team member with a finance background)
4. Logistical availability (i.e., due to a number of conflicting work and school related obligations, the team often assigned site visits, meetings with stakeholders, and other tasks based on availability)

TEAM COMMUNICATION AND TASK TRACKING

The UM Team ensured task completion and partner communication by implementing the following methodology:

- **Ongoing Partnership:** Each task's owners met regularly to complete tasks and research follow-ups
- **Weekly Team Meetings:** The UM Team met weekly for task tracking, discussion, and problem solving, as well as to revise scope changes, plan upcoming travel, interviews, and client meetings
- **Monthly Advisory Board Meetings:** The UM Team met with or corresponded with advisors each month to provide project updates, review problem statements, conduct hypotheses development, and ensure proper timeline tracking
- **Academic Meetings:** The UM Team met on an Ad-Hoc basis with faculty throughout the University of Michigan to understand best practices for interviewing, secondary research development, solution creation and testing, and cultural analysis

Project Management

- **Partner Meetings:** The UM Team met with PepsiCo on a re-occurring basis, typically monthly, to review research findings, provide project updates, discuss areas of immediate focus, and to coordinate next steps
- **On-site Meetings:** The UM Team traveled to Indonesia five times between July 2011 – March 2012 to conduct local interviews, collect data through primary research, document findings through digital media (photographs and video), solution proof-of-concept testing, and to foster relationship development with both PepsiCo and local stakeholders

Internal Alignment

Ongoing Internal Alignment / Teambuilding

In an effort to ensure that the UM Team maintained an open, candid, and productive communication stream, the team frequently held informal and non-work meetings. During these events, which often took the form of a lunch, dinner, or other type of outing, team members made time to relax and connect on a more informal level.

The UM Team made an effort to hold at least one of these types of outings each month during the academic year. In general, it was these teambuilding outings that enabled the team to maintain a productive and positive approach throughout this project.

Stakeholder Engagement – Partners

Summary

DATES: July 2011 – Today
KEY STAKEHOLDERS:

- University of Indonesia, Depok, Indonesia
- Piaget Academy's NationalHigh Jakarta School, Jakarta, Indonesia
- British Council, Jakarta, Indonesia
- Global Entrepreneurship Program Indonesia, Jakarta, Indonesia

This section highlights the major partnerships that the UM Team developed over the course of the project. A brief history of each organization will be provided, followed by a detailed recap of partnership details, and finally, a concise statement outlining the key learnings from each collaboration.

Partner 1: University of Indonesia (UI)

KEY STAKEHOLDER:

- University of Indonesia (UI), Department of Civil and Environmental Engineering, Depok, Indonesia

STAKEHOLDER BACKGROUND:
Established in 1949, UI is recognized as one of the most prestigious universities in Indonesia. With over 47,000 students, UI's campus is divided into two main locations. The Salemba campus, located in Central Jakarta, focuses on medicine and dentistry, while the Depok campus, located just south of Jakarta serves as the main campus for all remaining departments. UI is widely known for its strong "green" brand by its commitment to preserve the campus' natural resources. The university has invested heavily in infrastructural upgrades such as bike paths and an intricate public transportation system, and even maintains nearly 75 percent of the university's campus for reforestation. More notably, UI established the Green Metric Ranking of World Universities in April 2010 as a method to promote sustainable operations throughout the world's leading educational institutions.

ENGAGEMENT DETAILS:
The UM Team was introduced to Ms. Cindy Priadi through a mutual contact of Taylor Samuelsen's during the early stages of the project. First contact was made by Taylor and Patrick, whom had a preliminary discussion on the goals of her department and to explore a potential partnership with the Master's Project team. Cindy's department requirement included a project similar to the SNRE Master's Project, where students would conduct field research and sometimes develop implementable prototypes. During site visit 2, Miguel Sossa traveled to Depok to meet with Ms. Priadi and a few select students. The objective of the meeting was primarily to learn information about the waste management and informal recycling systems in Indonesia. The idea of a research collaboration between the UM Team and UI was further discussed during this meeting. Preliminary ideas of how this collaboration would be structured were brought to light, but finalization of the terms of the collaboration would be left to future correspondence.

The UM Team saw UI and its students as a good fit to help achieve project research goals. Likewise, UI saw the UM Team as a means to expose its students to diverse global perspectives and to further their academic experience through action-based learning. The UM Team furthered its relationship with UI when Tal Avrahami and Yih-Wei Chien met again with Ms. Priadi and select students during site visit 3. After these meetings, the UM Team began drafting a Memorandum of Understanding (MOU) to establish the terms of the research collaboration.

After 4-6 weeks of email and telephone correspondence focused on revising the MOU, communication with UI halted for two main reasons: (1) the UM Team could not ensure that the scope of project's research collaboration would include the depth of technical detail requested by UI, and (2) per request by the PepsiCo committee, the project scope shifted to focus more on the Business Plan Competition and PMobile initiatives.

No further contact was made between the UM Team and UI for the remainder of the project.

KEY TAKEAWAY:
While a research collaboration between the UM Team and UI appeared to be a natural fit, shifting project priorities ultimately prevented the relationship from materializing.

Partner 2: Piaget Academy's NationalHigh Jakarta School (NHJS)

KEY STAKEHOLDER:

- Piaget Academy's NationalHigh Jakarta School, Jakarta, Indonesia

STAKEHOLDER BACKGROUND:
The Programme for International Attachment, Global Education and Training (Piaget) Academy is known throughout Singapore and Jakarta, Indonesia as one of the top charter schools for grades K-12 and was developed to deliver top-level Singapoean education to high-performing youth. In 2002, The Piaget Academy entered Jakarta through the development of the NationalHigh Jakarta School. Three other sister schools have since been developed in Surabaya, Medan, and Solo. Today, NHJS remains the flagship school of the Piaget Academy group of schools and is still the only school in Indonesia certified as a partner school of the Singapore Examination Assessment Board (SEAB).

ENGAGEMENT DETAILS:

The UM Team was introduced to NHJS through a family contact of Patrick Lord's during the early stages of the project. First in-person contact was made during site visit 2, when Miguel Sossa traveled to NHJS's campus to meet with several school administrators. The meeting explored a potential partnership between the UM Team and NHJS and to gauge the level of student interest in participating in environmental and waste reduction projects. The UM Team quickly learned that the NHJS students were already exposed to environmental science at all grade levels and that the intrinsic diligence and passion for creating impactful, lasting change through their work was widespread amongst the student body. Miguel followed up with another visit to NHJS during the same site visit and ran an impromptu workshop for middle-school and high-school students as well as faculty focused on creating behavior change with regards to recycling. The event, an instant success, laid the foundation for a strong partnership between NHJS and the UM Team.

The UM Team returned to NHJS during site visit 3 when Tal Avrahami and Yih-Wei Chien met with 8 high school students to begin discussing project subject and scope. The students were eager to collaborate, even requesting homework assignments and readings to complete while the Memorandum of Understanding (MOU) was under development. The session was devoted to strengthening the trust between the UM Team and the students through ice breaker activities and other conversations. During the weeks following site visit 3, the MOU was developed, revised, and finalized. During site visit 4 the team presented the MOU to NHJS and also discussed a potential timeframe. By this time, the project scope had shifted to focus more heavily on the Business Plan Competition (BPC) and PMobile initiatives. Despite the scope shift, the UM Team still saw potential in the partnership with NHJS, as the students could potentially participate in the upcoming BPC. NHJS actually had its student participate in an annual international competition where one student from the school would participate in the Piaget Academy-wide round hosted in Singapore. The timing of the BPC and the Piaget competition seemed to align such that NHJS students could submit ideas to both the BPC and the Piaget competition. The team discussed with the educators the type of activities that could deepen students' understanding of the issues surrounding plastic waste. Additional partnership logistics were discussed including how often to communication, bi=monthly video conference calls with students, in addition to ad hoc email correspondence between the team and educators.

As the development timeframe of the BPC dragged on, the UM Team began exploring other ways to collaborate with NHJS and its students. There was preliminary discussion of organizing a case competition focused on environmental and waste issues for NHJS internally, but conversations diminished as the project neared its end.

KEY TAKEAWAY:
Similar to the UM-UI research collaboration, shifting project priorities prevented the UM-NHJS partnership from realizing its full potential.

Partner 3: British Council

KEY STAKEHOLDER:

- British Council, Jakarta, Indonesia

STAKEHOLDER BACKGROUND:
The British Council is an executive non-departmental public body, a public corporation, and a charity. Founded in 1934, the British Council operates at arm's length from the UK government and follows the Royal Charter as its constitution. Its objectives are to advance any purpose which is exclusively charitable and shall: (a) promote cultural relationships and the understanding of different cultures between people and peoples of the UK and other countries; (b) promote a wider knowledge of the UK; (c) develop a wider knowledge of the English language; (d) encourage cultural, scientific, technological, and other educational cooperation between the UK and other countries; and (e) otherwise promote the advancement of education. The British Council has active sustainability initiatives in Japan, South Korea, China, Thailand, Vietnam, Australia, and Indonesia.

ENGAGEMENT DETAILS:
The UM Team made first contact with the British Council during site visit 3. Tal Avrahami and Yih-Wei Chien met with two officers (Ms. Sandra Winarsa and Ms. Ari Sutanti) and one entrepreneurial fellow (Ms. Mita JS) to discuss the possibility of a collaboration between UM and the British Council with regards to waste issues in Indonesia. The UM Team identified the British Council as a high potential partner due to its current work with young local entrepreneurs focused on social enterprise. Ms. Winarsa and Ms. Sutanti were upfront and honest, and established early on that the British Council was unable to commit to a formal partnership due to shifting organizational structure and limited human and financial resources. Despite this roadblock, Ms. Winarsa and Ms. Sutanti continued to devote their time to educate the UM Team on social issues prevalent in Indonesia today and provide constructive feedback on the UM Team's ideas to create sustainable social impact. Ms. Mita also extended an invitation to the UM Team to visit her upcycling social venture and continued to share her experiences running empowerment programs for the *Pemulung*. The UM team would later leverage this relationship during site visit 4 to visit Ms. Mita's organization to conduct primary research for the PMobile SMS-text initiative.

KEY TAKEAWAY:
Organizations and individuals can still serve as unofficial partners despite the inability to enter into a formal partnership. It is important not to write-off local relationships too quickly, especially since time and effort has already been invested by both sides to build trust and good will.

Partner 4: Global Entrepreneurship Program Indonesia (GEPI)

KEY STAKEHOLDER:

- Global Entrepreneurship Program Indonesia, Jakarta, Indonesia

STAKEHOLDER BACKGROUND:

GEPI was formed in 2011 by a group of 13 prominent Indonesian business leaders with the aim to catalyze Indonesia's entrepreneurial ecosystem. GEPI is an umbrella organization that works in partnership with many other entities to connect aspiring entrepreneurs with the expertise, tools, and capital that they need to grow. GEPI is also part of a wider global initiative called the Global Entrepreneurship Program (GEP). Backed by the US State Department, GEP focuses on supporting and empowering entrepreneurs in 12 developing nations, 7 of which are Muslim majority countries. In July 2011, GEPI helped organize the ASEAN Regional Entrepreneurial Summit in Bali, where US Secretary of State Hillary Rodham Clinton and Google, Inc. Executive Chairman Eric Schmidt spoke to the importance of entrepreneurship in creating jobs, promoting innovation, and driving economic growth.

ENGAGEMENT DETAILS:

After extensive research into possible NGO partners in Indonesia, the UM Team reached out to GEPI in late-October of 2011 to begin a dialogue for a potential collaboration. First contact was made during site visit 3, when Tal Avrahami and Yih-Wei Chien traveled to the Ernst & Young – Indonesia offices to meet with Mr. Guiseppe Nicolosi and Mr. Eko Budi Santoso. The meeting was a success, with both sides leaving excited about working together to meet mutual objectives. Mr. Nicolosi tasked the UM Team to draft a detailed MOU and to work with Mr. Santoso on developing a rough budget estimate for the upcoming BPC.

Progress stalled briefly after the conclusion of site visit 3, but picked up shortly after Mr. Mark Wang joined GEPI as the new Managing Director. First via email and then in-person during site visit 4. The entire SNRE team met with Mark, Guiseppe and several GEPI board members to move forward with the original intentions to collaborate on the BPC. The UM Team saw GEPI as an organization with vast local knowledge, credibility, and access to an unparalleled network of Indonesian entrepreneurs. GEPI saw the UM Team as a means to establish a budding relationship with a world-class research institution in the University of Michigan (UM). GEPI's key focal point throughout all discussions was to create a sustainable and long-term partnership with UM.

As the evolving project scope diminished the scale and delayed the launch of the BPC pilot, communication with GEPI began to fluctuate. In order to preserve what the UM Team deemed its most important relationship, the UM Team began to explore other opportunities to bridge the relationship with GEPI while the team continued to pursue project approval and future funding from the PepsiCo committee.

Meanwhile, the UM Team was able to help GEPI submit an internship proposal to the William Davidson Institute (WDI) at the Ross School of Business. The posting proved a great success as interest in the GEPI internship was strong and immediate and GEPI secured an intern for the summer of 2012.

As the semester drew to an end and the UM Team finalized the last remaining deliverables for its project, it is still not fully prepared to relinquish the relationship that it has forged with GEPI. While unable to follow through with the necessary funding and corporate partnership for the BPC, the UM Team feels that a long-term and sustainable partnership between GEPI and UM is still possible. Future Master's Projects from SNRE and a wide array of opportunities at the Ross School of Business (Emerging Markets Club Consulting Project, MAP, WDI, etc.) all provide means to help GEPI gain the manpower and perspectives that it need to promote entrepreneurship in Indonesia. Likewise, these opportunities would be invaluable in providing unique and meaningful experiences to master's level students as well as another way for UM to strengthen its global brand.

KEY TAKEAWAY:
Constant and persistent communication is critical to maintaining strong relationships, especially when located at a distance.

PMobile Solution Development

Introduction

Information technology is increasingly leveraged around the world to provide the working poor with information and tools that enable them to improve their economic and general living situations. In India, internet kiosks are used to disseminate crop prices, weather information, and other agricultural information in order to ensure that rural farmers can grow crops more efficiently and negotiate for better prices (http://www.itcportal.com/sustainability/lets-put-india-first/echoupal.aspx). In Africa, SMS messages are sent to farmers in Kenya with daily crop prices, ultimately improving their position in the marketplace by providing them with greater value transparency (http://mfarm.co.ke/). As another example, FrontlineSIC uses SMS technology to connect rural inhabitants in Africa with healthcare workers and to allow the healthcare providers to exchange critical information about patients (http://wdi2011.blogspot.com/2011/07/frontline-sic-part-1.html).

A number of SMS and low-tech communication tools have proven they can increase social and economic sovereignty of the global poor. It is with this understanding that the SNRE Master's Project Team developed the P-Mobile initiative, an SMS-based platform that efficiently provides information transparency to waste collectors. P-Mobile uses an open source and free software to leverage an already pervasive technology, cell phones and SMS texting, to connect waste collectors (*pemulung*) with a variety of beneficial information streams.

The initiative provides a simple mechanism, which addresses a fundamental inefficiency in the plastic waste value chain. Currently, middlemen are needed to aggregate and transport regionally collected plastic waste. Because of an disparity in access to pricing information, *pemulung* are subject to whatever price the middlemen offer them. Through empirical research, the UM Team discovered that these middlemen (locally referred to as *lapak* and *bandar*), typically pay nominal rates to the *pemulung* and, therefore, capture a comparatively larger portion of the recycled plastic value. In effect, this creates a cycle of perpetual reliance on plastic recycling for food, shelter and other essential necessities.

P-Mobile is premised on the idea that by crowd sourcing frequently updated pricing information and, in turn, making that information immediately available to *pemulung* throughout Jakarta, the initiative would deliver collective bargaining power into the hands of the *pemulung*. Using P-Mobile, *pemulung* could send SMS text messages to both share and access relevant information and increase value transparency across the plastic waste value chain in Jakarta.

The status quo, a disparate level of access to plastic waste pricing information in Jakarta, present a significant opportunity to introduce a price transparency mechanism. However, the P-Mobile platform is an information communication tool at its core and can be used to share many types of information with the *pemulung* including: health, legal, education, and other social services.

Image: FrontlineSMS.org

Project Timeline

Fall 2011	Research SMS models Identify proof of concept with a number of similar initiatives
Winter 2011	Develop Prototype Identify appropriate coding language and Identify compatible cell phone providers in Jakarta Run domestic prototyping experiments
Winter 2012	Prototype Platform in Jakarta Prove/disprove developed hypothesis Identify focus priorities for pilot
Spring 2012	Test relevance and functionality of model with Pemulung Integrate Improvements Adapt new leanings into model Develop role of partner organization
Summer 2012	Pilot P-Mobile *[pending]*

Figure 11: PMobile Development Chain

Insight and Development

The conceptual framework of the P-Mobile initiative was developed through a year-long iterative process based on a needs assessment conducted in Indonesia. Desktop based research, analysis of case studies, and empirical findings led the UM Team to understand that access to various types of information represented an opportunity to address the many social, economic, and environmental issues *pemulung* face.

Coursework at the University of Michigan had exposed the UM Team to a variety of 'base of the pyramid' initiatives and technologies which addressed issues similar to those *Pemulung* faced. An especially inspirational

example is the MFarm Project in Kenya. MFarm connects geographically isolated farmers with pricing information from urban and peri-urban marketplaces thus providing bargaining power to small stake farmers. MFarm leverages cell phone-based SMS text messages to connect farmers with an information hub, which sources its information from a variety of regional markets. Information accessed through an inexpensive SMS message has allowed small stake farmers to demand higher rates from the middlemen buyers of their products. In addition to pricing information, a revolution in and of itself, MFarm now provides weather information and crop cultivation techniques.

Using MFarm as a proof of concept and a starting point, the UM Team began to develop a rough framework for how P-Mobile could work. The team deliberately created a skeleton prototype of the initiative to kick-start an iterative and ongoing process. Built-in structural adaptability from a programing perspective was especially useful during the prototyping phase as the team used user feedback to make instant changes.

It was this adaptive process that led to the final "pilot-ready" version of P-Mobile. As mentioned, P-Mobile was first designed to serve only as a price transparency tool by connecting live crowd-sourced pricing information to *pemulung*. Because of the fundamental need by *pemulung* for advances in pricing information, the significant impact on the value chain was apparent. Moreover, given the advantageous changes that MFarm and other similar products were responsible for, the Team was excited to bring this tool to the Jakarta market.

The field research component of this initiative's development took place over a series of trips to Indonesia and included around twenty-five (25) total field research days. In order to understand the critical pieces of information that could help the pemulung improve their position in the informal marketplace a survey of questions was designed. The team needed to clearly identify the willingness and ability of pemulung to use an SMS based tool; in addition, the team sought to establish whether or not an SMS tool would be the most effective tool, based on its ability to help *pemulung* coordinate amongst themselves, share pricing information, receive pricing information or sell directly up the plastic recycling value chain, for example, to plastic pellet producers. Furthermore, the UM Team looked for direction through empirical research to determine whether a different function would be more helpful to the *pemulung*.

For a sample of the survey, see the following Figure 12.

<u>Survey Questions: Pemulung</u>

Pricing:

- How much are you able to negotiate for the price you are paid?
- How often does the price you are paid fluctuate and by how much? Do you know why that is or isn't?
- Would it be helpful to know the price that different aggregators are paying for the plastic on a daily or weekly basis?
- Where do you get information about the price you should be paid for your materials?
- Do you receive different prices for different types of plastic?
- What other factors, if any, influence the price you are paid for your plastic (quantity/type/frequency/etc)?
- Do you know the price the aggregator is selling the plastic at to pellet producers?
- Do you know what price pellet producers are paying for plastic?

Selling:

- Do you always sell to the same aggregator and/or pellet producer?
- Do you have the freedom to choose who you buy and sell from?
- How do you determine the territories from where you can collect plastic?
- Would you go to a different aggregator if you knew he was paying more?

- Do the aggregators compete for your plastic (such as offering a better rate)?
- Are you dependent on your aggregator for more than buying your plastics, i.e. food/shelter?
- Is there a daily quota for the amount of plastic you deliver?
- What is the average amount of plastic that you sell in a week?
- If you could get to a pellet producer yourself, would you sell directly to them?
- What prohibits you from selling directly to the pellet producers?
- Would you ever coordinate with other Pemulung so that some can continue collecting while others make the journey to sell plastic consolidated from many Pemulung working together?
- Do you ever collectively negotiate with other Pemulung for the price you are receiving for your plastic?
- If you had information about the price that different aggregators were paying for plastic would that impact who you sold the plastic to?
- Do you think more pricing information could help you negotiate a better price for your plastic?

Collection:

- What is the competition like amongst fellow Pemulung?
- How many other Pemulung are collecting in the same territory? Does that cause conflicts?
- How far do you travel in a day to collect plastic?
- What is your mode of transportation?
- How much plastic can you carry at a time?
- How much do you collect in a day/week?
- What is the maximum amount of plastic you can collect and deliver in a day?
- What if you could collect more plastic, could you sell it?

Technology:

- Do you know how to send and receive SMS texts with a mobile phone?
- Do you have a mobile phone? Does your family have a mobile phone?
- Do you use text messages?
- How much do you pay for text messages? (Does the sender or receiver pay for a text?)
- Can you afford to send and receive SMS texts? How many can you afford?

<u>Survey Questions: Aggregator</u>

Relationship:

- Who do the Pemulung trust?
- How did he get started?
- What did he need to know to get started?
- How many Pemulung work for you? What is density of Pemulung he works with?
- What does he think of the PEP program?
- What are draw backs of a program like that?
- How do you reach Pemulung?
- How is your area determined? Territory definition.
- Is he collecting from Lapak?
- Does he compete for Lapak?
- Who are your competitors?
- Where do Pemulung live if they are not at the aggregator?

Additional Needs:

- What are the greatest needs of the Pemulung?
- Is there another type of information that you could

Pricing:

- How do you determine the price paid to Pemulung (quantity/type/frequency/etc.) for their plastic?
- Where does price information come from that you use to decide what price you are paying for plastic?
- How often does the price fluctuate and by how much?
- Do you negotiate with Pemulung about the daily or weekly price you will pay them?
- What are the prices differences that you may pay for different types of plastic?

Buying:

- Do you accept and buy all plastic that comes to you?
- Are you able to get new Pemulung to come and sell to you? If so, how?
- How many Pemulung bring you plastic on a daily or weekly basis?
- What is the average amount of plastic that you buy on a daily or weekly basis?
- How far do they come to deliver plastic to you?
- Would you outbid other aggregators to get more plastic on a daily basis from more Pemulung?

Selling:

- What is the maximum amount of plastic that you can deliver to pellet producers in a day? (Do you deliver daily schedule or on another schedule?)
- What is the average amount that you sell in a week?
- Do you sell to the same pellet producer consistently?
- Do you have the freedom to choose which pellet producer you will sell to?
- Do pellet producers compete for your business, i.e. do they compete with price so that you will sell to them?
- Do you know the amount that a pellet producer is going to pay you each time you deliver plastic? How much does the buying price fluctuate?
- How do you receive pricing information from pellet producers?

Technology:

- Do you know how to work a mobile phone to send SMS messages?
- Do you have a cell phone? Does your family have a cell phone?
- Do you text SMS message?
- Can you afford to send and receive SMS texts? How many can you afford?
- Would send text messages Pemulung with the price you are paying that day, if it would get more Pemulung to do business with you?
- Would you like to be able to compete with other aggregators to win over more of their business?

Collection:

- How would source separated plastic impact his business?
- Is the value of the type of plastic coming from Developed countries different than the type of plastic

<u>Survey Questions: Processor</u>

Pricing:

- How do they determine the price paid to aggregators/collectors (based on qty/type/frequency/etc)?
- How do they make the price they are paying known to potential sellers?
- Where do they get their pricing information?
- How often does the pricing change?
- Do they pay different prices for different types of plastic?

Buying:

- Do you negotiate with aggregators when they come to sell their plastic?
- Is there a limit to the amount of plastic they will buy in a day or week? (If so, what is it?)
- Is there consistent demand for the plastic that is being brought by aggregators to facilities?

- Is one type of plastic in higher demand than others?
- Would they buy plastic directly from Pemulung? Or do they already?
- From how many aggregators do they purchase their plastic?

Operations/Technology:

- Are they running at full capacity every day?
- What is the capacity of a facility: how many kg of plastic processed in a week/day?
- Could they use additional supply if it were available?
- What would happen if they had more individual Pemulung showing up with plastic?
- Would they be willing to send SMS text with pricing or demand information directly to Pemulung?

How quickly does a bottle pass through your facility? (purchase, processing, sale as pellets to manufacturers?)

Figure 12: Survey Questions: Pemulung

Development

Between October and December of 2011, the UM Team utilized the expertise of a Computer Engineering student at the University of Michigan to assist in the development of the software component of the program. In December of the same year and January of 2012, the UM Team returned to Jakarta to resume on-the-ground research. During this trip, the team utilized user-based design techniques to work with *pemulung* and other stakeholders to further develop the prototype. It was on this trip through conversations with the Pemulung Union that the emphasis of the P-Mobile tool began to evolve away from a price transparency mechanism.

By learning about the Pemulung Union, and spending more time conducting participatory observation research with *pemulung*, the team discovered that P-Mobile would be best suited as an information dissemination tool, at least at the outset. P-Mobile as an information platform would be positioned in such a way that would allow for future applications.

Pemulung Union

The Pemulung Union (*Ikatan Pemulung Indonesia*) is an initiative that aims to resolve the many justice issues that can be associated with the *pemulung* in Jakarta. Over the few years of its short existence, the organization counts among its accomplishments a number of social services benefiting the *pemulung*. In early 2012, the Pemulung Union was comprised of roughly 30,000 of the estimated 600,000 *pemulung* living and working in Jakarta. Membership to the Union brings with it access to free medical care totaling 1.5 million Rupiah, legal services and other social service support.

While the Union is a growing support group for the *pemulung*, it still lacks scale as an organization and needs to continue to advance its communication and service related capabilities. As such, the UM Team carefully shared the concept of P-Mobile with Union leaders. In order to ensure that the concept of P-Mobile did not become a "top-down" initiative, the Team developed a number of thought out interview and questioning strategies to first evaluate whether or not the organization would benefit from this type of tool, and then to evaluate whether or not the organization would be an appropriate partner to with whom launch the initiative. Through the many conversations with the Union, the team and the Union developed two principal foci to be incorporated into a prototype launch. The decided model would first focus on health-related information dissemination as well as membership enrollment information.

Programing and Software Function
P-Mobile can be thought of in three components: 1) the programing and development of the interface, 2) the sourcing of information and 2) the use and dissemination of information by Pemulung.

P-Mobile Programming and Interface
The P-Mobile initiative exhibits strong potential due to the many proof-of-concept cases delivered around the world and in developing countries. The notion of leveraging a simple technology as cell phone usage becomes ubiquitous has become accepted as a powerful communication mechanism; one organization, FrontlineSMS, built a growing and effective brand around this very technology. FrontlineSMS, a free and open source software, turns a laptop and a mobile phone into a central communications hub; in other words, an organization or individual can send, receive, and manage the resulting data with one simple interface.

Adding to its usability, FrontlineSMS does not require internet connectivity. It relies wholly on a GSM (Global System for Mobile Communications) connection; cell phone technology. Because cell phone service is more pervasive and inexpensive than broadband services, the tool is cost-effective for both user and operator. Additionally, FrontlineSMS offers a multi-lingual User Interface. Currently, versions exist in both English and Bahasa Indonesia languages, among others.

Using the FrontlineSMS software as a foundation, P-Mobile services can layered on top providing the precise communication stream desired. The simple User Interface (UI) allows the developer to create an SMS-based communication stream, which can incorporate smart analytics that respond to predetermined responses from users by using a series of "if" and "then" statements. Furthermore, FrontlineSMS can be programed to function fully-automated. To further explain this, we provide an example SMS dialogue in Figure 2 below.

Sourcing of Information
P-Mobile as an information dissemination device can be fueled by two types of information: either crowd-sourced information from its user constituency or from a back-end information provider.

Crowd-sourced information refers to information that is gathered from a wide constituency of users. P-Mobile can serve as an information aggregation hub. In such a scenario, pemulung users could self report information such as trash site location, price information, point of sale location information, along with other type of information. This data can be then processed using simple database processing software into a form that can then be sent out to users.

An example of how this might be applicable for the pemulung population involves crowd-sourcing prices received for sellable product. As mentioned, *pemulung* are subject to limited price information due to geographic isolation, information opacity, and a general lack of communication. Given that current situation, inherent value exists in understanding the various prices found across the city. If it is bought to the attention of a group of *pemulung* that a *bandar* in a nearby area is paying a higher price for plastic, that group may choose to travel the extra distance to sell to the higher paying buyer or, they may use the information to negotiate a higher rate with their local *bandar*.

Information provided by a "back-end" information provider refers to information added into the P-Mobile platform without the use of cell phone based SMS processing. In this scenario, the managing body would be responsible for updating the data that the service makes available to its users. This type of information may more often consist of information that is not as commodity-based as daily plastic bottle pricing. An example of "back-end" information might be applicable for the *pemulung* population could involve *pemulung* specific public health information. Very few prenatal services are available to the *pemulung* population in Jakarta, then consider that if, through a few SMS text messages, a pregnant mother could greatly increase the odds that her unborn child is born healthy. P-Mobile is a cheap and simple way for this type of information to be made available to all those who stand to benefit. Information on prenatal nutrition, postnatal care, etc. can be made available and programed into

a relatively automated system that is available to curious pregnant women at any time. A healthcare provider in this case could develop and customize the content that would be communicated.

P-Mobile, as a platform, will likely be most effective if it provides a suite of services to Pemulung users. Due to its multi-purpose capability, a hybrid source of information is most suitable for this program. Crowd sourced and frequently updated pricing information could be packaged with vetted health services information, and all be made available to Pemulung users.

Using P-Mobile

The importance of a service like P-Mobile to a Pemulung can be likened to a weather report given to a farmer. As a weather report provides the farmer with cardinal information that determines how he or she should proceed, P-Mobile can be a conduit of similarly critical information.

Using any activated cell phone to send and receive text messages from the service, *pemulung* using P-Mobile would have complete access to the various services that become a part of the initiative. Once a permanent phone number is selected, Pemulung can access an SMS-text based menu of services that are targeted at enhancing their livelihood and standard of living.

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Figure 13: Sample P-Mobile Interaction

Sample P-Mobile Interaction

Suppose that one of the features that was decidedly incorporated into the P-Mobile platform was a price information service. To create such a feature, and using the FrontlineSMS platform, a programmer would create automatic responses to the information that is sent to the service.

In the example below, sending a text "INFO" to the P-Mobile service, a user can initiate an information inquiry with the program. From the standpoint of the developer side, a code indicating that upon reception of a text message reading "INFO" it is programed to provide a particular response which would lead the user through a selection process to identify the type of information that the user is after.

P, stands for the SMS message received by P-Mobile and sent by the Pemulung user. **U**, stands for the message sent by P-Mobile and received by the Pemulung user:

***P**: INFO*

***U**: Hello. Please Reply INFO followed by two digit number, which service you'd like more information on: [INFO 02]*
Health Insurance
Women's health information
Childhood education
Pemulung workshops
Pricing Information for plastic
Contact P-Mobile representative

***P**: INFO 05*

***U**: PMOBILE provides current pricing for the following plastics, please reply with name of plastic for more information:*
bottles
cups
other

***P**: Bottles*

Risk Assessment

The UM Team utilized a number of criteria to evaluate the efficacy and risk to brand associated with all of the key initiatives. In the case of P-Mobile, the team did not identify a large number of direct risks. That said, the Team did identify the following three concerns as posing medium to high risk:

1) pricing information subject to corruption by bandar and information sources, 2) local mafias may see P-Mobile as a threat to the status quo, and 3) partnering with a reliable NGO/organization to take over P-Mobile. In response to each of the identified risks to the PepsiCo brand, the team also identified a number of mitigation strategies in order to ameliorate and manage the noted risk. Overall, the team is confident that true nature of the initiative could be best identified by way of a project pilot.

See Figure 14 for more detailed analysis of risks associated with this initiative.

Figure 14: P-Mobile Risk Analysis

P-Mobile Risk Analysis

Threat	Exposure	Mitigation
Pricing information subject to corruption by Bandar and information sources	**Med.-High** - Plastic Processors may view PMobile as a threat and act to manipulate numbers in their favor	Design a system which relies on pricing from agnostic sources; foster strong relationship with NGO partner and Pemulung Union.
Pemulung do not participate in price exchange program	**Med**. – Pemulung may not see value, face unidentified risks, or fail to understand the mechanism of PMobile	Incorporate other valuable information into messaging; design effective survey to understand needs/hierarchical risks. PMobile model has been proven in Kenya
Local mafias may see PMobile as a threat to status quo	**Med. –High** –Role of *mafias* is unknown and difficult to understand, relative importance/control over economy may be significant	Set up pilot with Pemulung at small scale and utilize Pemulung Union to facilitate appropriate relationships; identify role of *mafia* through surveys
Costs of SMS transmission/reception may be preventatively high	**Med**. – SMS costs are relatively low and use is pervasive, however demographic survives below the poverty line ($1-$2/day)	Explore cost offsets through built in subsidies within PMobile;
Reliable NGO/organization to take over PMobile	**High –** Distance and unfamiliarity with professionalism with NGO partners complicates adoption	Further develop strong relationships with local contacts in Jan.; co-development of PMobile to assure ease of infrastructure transfer
Exposure and brand risk to PepsiCo	**Med**. – Due to variable impact implications, PepsiCo faces unknown exposure to those involved in PMobile	Pilot PMobile with a small sample group sans public announcement to determine effectiveness prior to launch; empower
Local government may not allow interference in current system	**Low -Med**. – Role of government is currently poorly understood	Leverage GEPI contacts with US Embassy to build a case for allowing PMobile to local government.

Pilot Project and Next Steps

Piloting P-Mobile

Considering the results of the various prototyping and development engagements, the team is confident that P-Mobile has reached a point at which a project Pilot could be launched. The pilot would test the software functionality and the utility of the information both generated and dispersed. Having spoken closely with the Pemulung Union, the initial services utilizing P-Mobile in a suite of services should be disseminating health information and for Pemulung Union recruitment purposes.

Next Steps:

- Complete final software preparation component with IPI partner
- Train IPI partner to manage FrontlineSMS software
- Develop volunteer base to help implement and educate Pemulung on P-Mobile
- Work with cell phone service provider to determine a number for P-Mobile

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PepsiCo Business Plan Competition Description

Background

Primary research revealed that the majority of recyclable post-consumer waste in Indonesia is already collected and processed and that only a small portion of recyclable plastic waste makes it to the landfill. At the base of this waste management and recycling infrastructure is a vast informal economy. This informal economy and infrastructure is largely composed of "scavengers" or *pemulung* as they are called in the local language of Bahasa Indonesia. *Pemulung* collect the recyclable post-consumer waste from outside residences, businesses, as well as from litter on streets, roadways, in waterways, and trash deposited in landfills and illegal dump sites.

There are an estimated 600,000 pemulung in the Greater Jakarta region alone, and approximately three million in throughout all of Indonesia. Informal economies of waste pickers are not unique to Indonesia, but exist throughout Asia and elsewhere in the developing world. While the pemulung serve a purpose to society at large by collecting recyclable waste that would otherwise contribute to more pollution of the commons and increase the size of landfills, they are a disenfranchised group. Moreover, the very existence of these informal economies is a symptom of a greater problem: grossly deficient or non-existent municipal waste systems in developing nations. Innovations that have a positive impact on communities of waste pickers and their methods of achieving livelihood in Indonesia have the potential to be replicated in other developing nations where similar situations exist.

What is missing in Jakarta and Indonesia more broadly is not the capacity to turn waste into income. Rather, the challenge lies in creating environments and methods of operation where the welfare and earning potential of pemulung are increased. The reality is that *pemulung* impact both the end and beginning of the lifecycle for food and beverage products in Indonesia. *Pemulung* manage the post-consumer waste from these products and they provide material that is returned to bottle and container manufactures in Indonesia and other Asian countries. *Pemulung* are often referred to as "suppliers" by Indonesian businessmen that rely on their material inputs.

After several visits to Jakarta over the course of roughly 9 months to explore these issues, it became apparent to the UM Team that a local problem such as the plight of the *pemulung* is best addressed by local, market-based solutions. More importantly, our team recognized our limitations: we are far removed from Indonesia not only geographically, but also do not have an in-depth understanding of its culture and business landscape. We understood that applying a business model framed from looking at the problem with the lenses of citizens of the Western, developed world might lead to unsuitable or less effective solutions. Instead, the entrepreneurial potential of Indonesia can be leveraged to source sustainable business models that are appropriate to the Indonesian market. These models can be supported with small amounts of capital and more meaningful amounts of education, mentorship, and business acumen to create social benefit. Local entrepreneurs and subject matter experts have an understanding of local economies that is invaluable for creating viable business ideas that provide a fresh approach to managing post-consumer waste in socially and environmentally responsible manners. Local entrepreneurs are likely to articulate opportunities for operational improvements, product ideas, or profitable partnerships for PepsiCo.

Objective

The Business Plan Competition ("BPC") will provide an efficient, focused mechanism through which PepsiCo can identify opportunities for its operations and the growth of its business in Indonesia. This BPC will be a small-scale pilot program in the Indonesian market. The UM Team will determine best practices, develop partnerships with local stakeholders, and work with PepsiCo representatives for successful program implementation.

The goal of this Business Plan Competition is to identify a triple-bottom-line business idea that improves the condition of the pemulung in Indonesia. The BPC will identify an entrepreneurial plan that presents an operational and/or product concept that will enable PepsiCo, its partners, and its key customers to make a sustainable, positive impact on the entrepreneurial community in Jakarta. Holding a pilot business plan competition also provides a socially responsible platform on which PepsiCo can deepen relationships with customers and further expand its presence in the market. For the example of illustrating this opportunity the description of the BPC uses 7-Eleven as that exemplary customer partner.

BPC Outline

- Source ideas from a targeted pool of applicants for scalable, sustainable businesses that address the challenges of waste management in Jakarta and the condition of the *pemulung*
- Host a Business Plan Competition event and award prize money to one winner
- Support winning idea with education and mentorship through a network of partnerships (Global Entrepreneurship Program Indonesia and the University of Michigan)
- For more details on coordinating the BPC see **Appendix III**

BPC Projected Outcomes

The product or operational innovations will ideally provide profit potential, increase brand equity and awareness, provide a platform for partnerships with critical customers, and improve the daily lives of pemulung. Through the careful selection of partners and participants, PepsiCo will build valuable relationships and identify opportunities to support an entrepreneurial endeavor that will help to catalyze PepsiCo growth in the Indonesian market.

Outcome Summary

- Market-based solutions that address the social and/or operational issues of post-consumer waste from food and beverage products in Indonesia
- Solutions for which metrics/KPIs can be developed (e.g. income generation, waste reduction, process efficiencies, increased safety)
- Viable business opportunities for PepsiCo to positively impact the poorest members of Indonesian society
- Leadership from PepsiCo amongst its competitors in Indonesia
- Continued development of the entrepreneurial ecosystem in Indonesia
- Precedent for continued stakeholder collaboration
- Opportunity to engage strategic partners in supporting the winning idea and/or a proof of concept for holding larger events in the future

Audience

Participants: Young educated, entrepreneurial-minded individuals approximately between the ages of 18-35.

Broader Audience: Internet/social-media-savvy consumers who are passionate about the advancement of their communities through innovation. These are also target consumers of PepsiCo products.

Partners

Global Entrepreneurship Program Indonesia (GEPI): aims to work in partnership with the many organizations and companies focused on developing entrepreneurship in Indonesia, as well as with the Government of Indonesia, to create an ecosystem for emerging entrepreneurs. GEPI is also part of wider global initiative called the Global

Entrepreneurship Program (GEP), which grew from an initiative of President Obama and is now a core program at the US State Department.

Additional potential partners include CSR Indonesia, LaTofi School of CSR, and the Pemulung Union.

These partners have the infrastructure and knowledge to help hold this BPC and potentially support the implementation of the winning plan. Each core partner will have specific roles to fulfill **(Appendix I)**.

Judges

The judges will include a mix of business and subject matter experts, so the entries are evaluated from multiple angles by individuals that understand the different challenges associated with launching a business in Indonesia with social and economic impact.

Projected Panel will include:

- 2-3 Local business leaders with experience in related industries
- Waste and/or Pemulung Expert
- Corporate Social Responsibility Expert
- Successful Entrepreneur/Angel Investor
- PepsiCo Representative
- *Potential Judge*
- PepsiCo Invited Judge (i.e. 7-Eleven representative)

Benefits for PepsiCo

- CUSTOMER ENGAGEMENT: Engage 7-Eleven's (the customer's) target market which are represented by participants.
- BRAND AWARENESS: Engage PepsiCo & 7-Eleven community of consumers and increase the brand awareness of PepsiCo throughout socio-economic strata.
- BRAND EQUITY: Potential to increase brand equity in target consumer groups and among business and governmental leaders in Indonesia.
- SOCIAL IMPACT: Increased awareness and respect for the population of *pemulung*. Increase brand awareness amongst this potential customer segment.
- LEADERSHIP VISIBILITY: Engaging other prominent stakeholders in Indonesia and beyond.
- IMPACT: Focusing on environmental and social issues associated with plastic waste recycling in Jakarta.
- INNOVATION: Identifying business operations or product opportunities and foster entrepreneurial idea that embodies PepsiCo's "Profit With Purpose" initiative and mission.
- VALUABLE RELATIONSHIPS: Build relationships with prominent members of the business and corporate social responsibility communities and the Indonesian government.
- LOCAL KNOWLEDGE: Source ideas from knowledgeable local demographic.

Benefits for Partners

ACCESS: Master's students can help empower capable visionaries and connect them with UM resources.

- OPPORTUNITY: Enabling entrepreneurs to build businesses that offer sustainable, long-term solutions.
- LOCAL VENTURES: Create an opportunity space for young entrepreneurially-minded locals to make an impact on their local community.

- INTEGRATATION: Incorporate Pemulung into the event and engage them in the process of innovation to derive real impact pre-/post-event.
- VALUABLE RELATIONSHIPS: Build relationships with local CSR stakeholders and multi-national business.
- COMMUNITY DESIGNED: Pemulung participation will help ensure that solutions are valid.

Resource Requirements

GEPI and the University of Michigan team will manage outreach, logistics, and planning through GEPI's existing network and resource base. The UM Team will leverage GEPI's expertise from holding previous engagements of this type. Financial support for the BPC operational budget is estimated to be approximately $ 13,000 USD **(Appendix IV)**. This encompasses current cost estimates and a small buffer for unaccounted incidentals. This pilot scale was chosen because it allows for refinement of the process and risk mitigation **(Appendix II).**

Key Roles

University of Michigan Team

- Project planning guidance and support; subject matter expertise
- Knowledge from thought leaders for workshops with promising applicants prior and during the Business Plan Competition
- Mentorship by UM Master's Students, Entrepreneurs in Residence at University of Michigan, and Professors' support for winning entrepreneurs

PepsiCo

- Project Funding
- Judge Panel Support
- Guidance
- Project manager to facilitate planning and logistics as well as to serve as a representative of the organization during the event

GEPI

- Logistic/planning support
- Program office space
- GEPI's brand
- Public relations and social media assets
- Long-term strategic guidance and entrepreneur support

Risk Management for Business Plan Competition

This will be a pilot scale competition that will be targeted in its outreach. The invitation to participate will not go out to the general public. Advertisements to publicize the event will go out only to focused entrepreneurship websites, lists, and potentially specific university programs. This will help increase the quality of the participants by improving the likelihood that they possess business acumen and subject matter expertise.

Possible participants will be provided primer materials that describe the condition and culture of *pemulung*, waste issues in Indonesia, and elements that a winning idea should embody. This will help focus the efforts of participants and help entrepreneurs decide if this is an appropriate venue in which to develop their business ideas.

The ideas will be assessed by the panel of judges to identify innovations that do not dissipate the critical source of income post-consumer waste provides for *pemulung*, but rather increase the safety, dignity, welfare, and income these individuals are afforded.

PepsiCo could be targeted for claims of theft or misappropriation of intellectual property developed and presented by applicants in the Business Plan Competition.

Timeline

TIMEFRAME	TASKS
Week 1	Develop MOU, timeline, and challenge questions for BPC and send to PepsiCo and GEPI for revision
Week 2	Finalize MOU, timeline and challenge question and receive PepsiCo and GEPI approval
Week 3	Identify potential venues and catering service; Identify potential guest speakers; Identify outlets for targeting participants; Outreach to potential judge panelists; Outreach to sponsor organizations; Beging development of marketing materials
Week 4	Reminder email to all participants 1 month prior to event
Week 4	Launch marketing campaign to target participants and the general public
Week 5	Finalize selection of venue and caterer; UM sends draft outline of schedule for day of event
Week 6	Reminder email to all participants 1 week before the event
Week 6	Confirm venue, caterer, judge panel, reminder email to all participants and judges 2 weeks before event
Week 7	Final preparation for event; Email reminder to participants and judges 2 days before the event
Week 8	BUSINESS PLAN COMPETITION EVENT

Cost Estimate

RE-IMAGINING PLASTIC WASTE BUSINESS PLAN COMPETITION - BUDGET PLAN JAKARTA, INDONESIA 2012					
No.		Descriptions	Budget IDR (Indonesia Rupiah)	Budget (USD)	REMARKS
			9000	$ 1.00	NOTE: 1 USD = Rp 9,000
1	GEPI SECRETARIAL SERVICES BEFORE EVENT				
		Event Coordinator	0.00	$ -	May need temporary contractors to manage venue during event. TBD.
		TOTAL	**0.00**	**0.00**	
2	WORKSHOP EVENTS PRIOR TO BUSINESS PLAN COMPETITION				
		Venue (auditorium space near GEPI office) - included F&B	**20,000,000.00**	$ 2,222.22	This really depends on the space we are looking for and can potentially find partnerships
		Transportation for workshop hosts	**1,000,000.00**	$ 111.11	
		Materials (Some printed materials potentially)	**2,000,000.00**	$ 222.22	
		Potential Guest Facilitator	**1,000,000.00**	$ 111.11	In some cases optional and depends on who we find
		TOTAL	**24,000,000.00**	**$ 2,666.67**	
3	PRINTING OF INVITATION, STATIONERY & MAILING				
		Printing BPC Announcement		$ -	Potentially unnecessary line items if all outreach is electronic.
		a) Printing, A4 folded, Art Paper 200 pcs x Rp.10,000	2,000,000.00	$ 222.22	
		Singage (banners, backdrop, etc)	2,000,000.00	$ 222.22	
		Roll up Banner ; 2 x 300,000	600,000.00	$ 66.67	
			4,600,000.00	$ 511.11	
4	PERSONNEL SUPPORT DURING EVENT				
	1	Registration staff for event	400,000.00	$ 44.44	
	2	Floor assistant for BPC	200,000.00	$ 22.22	
	3	MC for Event	0.00	$ -	
		TOTAL	**600,000.00**	$ 66.67	
5	TRANSPORTATION				
	1	Transportation for Judges / Speakers	1,200,000.00	$ 133.33	
		TOTAL	**1,200,000.00**	$ 133.33	
6	MEETING ROOM & EQUIPMENT (February 2011)				
	1	Full day meeting package inclusive 1 Lunch & 2 Coffee Breaks	12,000,000.00	$ 1,333.33	
				$ -	
		TOTAL	**12,000,000.00**	$ 1,333.33	
7	JUDGE PANELIST + WINNERS				
	1	Fee for Judge Panels 6 x Rp.1.000.000,-	6,000,000.00	$ 666.67	0 if Judges volunteer their time
	2	Award for 1 Winner	50,000,000.00	$ 5,555.56	
		TOTAL	**56,000,000.00**	**$ 6,222.22**	
8	PARTICIPANT KITS				
	1	Delegate Bag 50 x Rp.70.000,-	3,500,000.00	$ 388.89	Estimated 50 participants
	2	Name tag, plastic pocket, Landyard 50 x Rp.25.000,-	1,250,000.00	$ 138.89	
	3	Program Book, A4, Artpaper 50 x Rp.75.000,-	3,750,000.00	$ 416.67	
		TOTAL	**8,500,000.00**	$ 944.44	
		GRAND TOTAL	**$ 106,900,000.00**	**$ 11,877.78**	

Conclusion

Despite a fundamental shift in the project goals, the UM Team and its PepsiCo partners were pleased with the results of this eighteen month project. After spending roughly 127 days in the field conducting research, developing critical stakeholder relationships, and developing a synthetic and broad understanding of the post-consumer plastic waste stream in Jakarta, the UM Team is confident that the initiatives that the team has proposed are of integral value to the PepsiCo Promise of ***Performance with Purpose***:

> *At PepsiCo, Performance with Purpose means delivering sustainable growth by investing in a healthier future for people and our planet. … we will respect, support and invest in the local communities where we operate… Because a healthier future for all people and our planet means a more successful future for PepsiCo. This is our promise.* (PepsiCo, 2012)

Fundamentally, this project uncovered the inherent complexity associated with the relationships between large multi-national corporations and their direct and tertiary stakeholders. PepsiCo recognizes that a scalable solution or initiative that is successful in the Indonesian ecosystem, may represent a viable model for other emerging-market urban centers – particularly those in Southeast Asia. While a project which is largely composed of social empowerment at its core does not offer immediate or obvious monetary returns to the company, CSR projects such as these provide a profound and timely demonstration on the part of the company that they are truly invested in the wellbeing of the communities in which they operate. Moreover, this type of project does not represent a single benefit to the company in the form of enhanced brand recognition, loyalty, or preference, more importantly; it provides a communication avenue between the company and its clients enabling an advanced degree of adaptability and understanding.

P-Mobile represents what can be considered a rising tide of technological solutions to the worlds broad and numerous social and environmental issues. Frog Design, one of the most highly recognized brand and idea consultancies in the world named mobile SMS based messaging as one of the top ten – changes to watch in 2012 (Chhatpar, 2012). Proof of concept has been demonstrated by organizations such as MFarm in Kenya, Grameen Foundation throughout Africa and India, ITC e-Choupal in India. Marginalized communities are now using inexpensive cellular technology to overcome what have historically been sticky development issues.

While the initiative has potentially positive and disruptive implications, it is unclear as to how readily adopted such a service would be. It's apparent from conversations with *Pemulung*, *Bandar*, and representatives from IPI that an information service platform would be very valuable, especially given that the focus of the service could start by amplifying the service capacity of what IPI is already busy doing. Additionally, during user based design processes, *Pemulung* indicated a genuine desire to help implement and grow such a service. One fundamental challenge however would be determining how to manage the relationship between a large multinational company and a grassroots social justice organization.

Overall, the UM Team advocates for the testing of the P-Mobile concept on the grounds that it has a great potential to catalyze positive change within the *Pemulung* community as well as create meaningful ties between PepsiCo and its customers.

The Business Plan Competition represents an honest and humble recognition that American educated graduate students are not fully equipped to design the most powerful solutions to the socio-economic and environmental consequences of the waste system in Jakarta. That said, a semi-open forum where Indonesian thought leaders can explore relevant ideas rectifies this knowledge disparity. The BPC leverages expertise from within Jakarta and broader Indonesia while utilizing the planning and scalar expertise that the UM Team and PepsiCo along with potential project partners can provide.

Business Plan Competitions are fairly ubiquitous around the world these days. One of the key partners identified by the UM Team, GEPI, has already held Business Case Competitions in Indonesia. GEPI, like hundreds of other organizations have proven that by backing organic and user developed social ventures, impact and successful execution is relatively ensured – especially when competition winners receive financial support as well as strategic guidance from the awarding organization. The strongest attribute to the BPC initiative is that like P-Mobile, provides a direct channel between PepsiCo and its customers. The BPC itself is an opportunity for positive exposure, but more important is the long term opportunity to see a winning idea implemented and enhance the stake that the *Pemulung* community has in their marketplace.

As this phase of this project concludes, the UM Team remains extremely appreciative of the opportunity that PepsiCo provided to allow it to co-develop a CSR solution with sustainable growth potential. To say that partnering with PepsiCo on this unique endeavor has been transformative is an understatement. Over the course of the past 16 months, our partnership and those of our advisers and myriad of stakeholders have made us privy to a multitude of life lessons. We have gained tremendous insights into our personal strengths and weaknesses, corporate dynamics across multiple regions, solution development in developing nations, communication and implementation management, local sociology, systems integration within waste streams, and, perhaps most importantly, the lives of a group of people who are often overlooked

Project Lessons Learned

Dear PepsiCo Leadership Team,

The School of Natural Resources and Environment (SNRE) began the Master's Project process several years ago with the aim of providing its students with a transformative learning experience. Specifically, SNRE educators hoped that students would develop an even stronger understanding of their global awareness and ways that they could positively shape the future of environmental strategy, policy, and associated community behavior.

To that end, we have been extremely appreciative of the opportunity that PepsiCo provided us to co-develop a CSR solution with sustainable growth potential. To say that partnering with PepsiCo on this unique endeavor has been transformative is an understatement. Over the course of the past 16 months, our partnership and those of our advisers and myriad of stakeholders have made us privy to a multitude of life lessons. We have gained tremendous insights into our personal strengths and weaknesses, corporate dynamics across multiple regions, solution development in developing nations, communication and implementation management, local sociology, systems integration within waste streams, and, perhaps most importantly, the lives of a group of people who are often overlooked.

We have equally appreciated getting to know you David, Gary, Jennie, Amit, and Laurie on a personal level and having the opportunity to learn from a group with a wealth of professional experience. We also appreciate your support in our sharing of new perspectives from our experiences at the University of Michigan and beyond. To that end, we have prepared this lessons learned document to examine the areas that worked well and those that could be improved in future engagements of this nature. We hope that this document serves as a guide in ensuring a robust framework under which to operate – one that both affords greater freedom to act while providing much more transparency in terms of guiderails.

We welcome your review and additions to this document and look forward to discussing soon.

Warm regards,

Miguel, Patrick, Stephanie, Tal, Taylor, and Yih-Wei
The UMICH Project Team

Areas of Project/Partnership Strength

- Having an opportunity to put faces with names, to flesh out initial project goals, and to level set on initial stakeholder expectations during the July 2011 kick-off session at PepsiCo in Jakarta; this meeting provided guidance on tackling the project's initial problem, "reducing plastic waste while increasing community recognition of PepsiCo and 7-11 branding"
- Collaborating with David Walker during his September 2011 working session in Ann Arbor; the UM Team appreciated fostering their relationship with David and PepsiCo, and having an opportunity to explore and redefine the project's focus toward addressing the new project problem, "How could PepsiCo help improve the welfare of the *Pemulung* while managing brand goals?"
- Learning from David regarding the complexities of CSR goal development during his speech at the Ross School of Business
- Spending time on-site in Indonesia, which offered extraordinary learning opportunities and brought to life problem and solution assumptions made prior to each visit
- Receiving PepsiCo's generous financial and on-the ground support that played a large part in making these trips, experiences, and key learnings possible
- Developing local relationships with key waste stream stakeholders of all backgrounds and organizational involvement that continue to add depth to our problem understanding and key solution opportunities; in total, the team spent over 1600 hours in Jakarta, which proved essential to forging and maintaining these partnerships
- Working in small team sessions via conference call or in person with various PepsiCo Leadership Team Members; this enabled productive exploratory and project re-shaping discussions
- Feeling inspired by PepsiCo Leadership Team direct challenges to think deeply about the implications and risks of the initiatives we have been working to develop. Additionally, being challenged to look at this project through the multiple lenses that our PepsiCo stakeholders use (dictated by their role/function within the organization)
- Having multiple perspectives inform the scope and direction of the project
- Receiving access to thought leaders in various levels within PepsiCo's organization (global, regional, affiliate) and understanding the span and complexities of CSR initiatives that have been tried within the organization
- Appreciating each individual's time, flexibility, and contributions during global calls that were scheduled at off-peak hours
- Conducting smaller conference calls with one or two individuals from the PepsiCo Leadership team often proved more effective in aligning goals than larger conference calls

Closing Reflections

Actively taking part in this long-term engagement has provided incredibly meaningful insights for the UM Team, particularly with respect to collaborating with new global stakeholders to solve a complex challenge abroad. While traveling to and from Indonesia was both mentally and physically challenging, the experience stretched each team members' thinking in ways that no local project could replicate. Additionally, the team's stakeholders echoed a shared sentiment that having foreign partners offered an unprecedented ability to disseminate thinking that offered the best of global teaching and learning.

In closing, future engagements will certainly benefit from the lessons learned during this project. At the same time, there is much to be said for the successful work all parties have completed in establishing a foundation for PepsiCo to evaluate CSR opportunities in Indonesia. The UM Team has thoroughly enjoyed the invaluable opportunity to work on a real project that weaves social impact, international development, global business, and strategy consulting together in one project. We hope that PepsiCo has found value from the UM Team's contributions and finds an opportunity to extend similar opportunities to future UM students and teams. Thank you for your support!

Location of SNRE team members throughout the duration of the Master's Project

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