Financing Sustainable Development

IDEAS *for* ACTION

2016

Edited by
Mahmoud Mohieldin
Djordjija Petkoski

WORLD BANK GROUP

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Wharton University of Pennsylvania | the Carol and Lawrence Zicklin Center for Business Ethics Research

I4A · Young Americas Business Trust · Y2Y Youth to Youth Community

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Overview

We are pleased to present the 2016 Ideas for Action (I4A) initiative, a youth competition on financing for development jointly launched in November 2014 by the World Bank Group (WBG) and the Zicklin Center for Business Ethics Research at Wharton School of the University of Pennsylvania. This year's winners were selected from among 309 proposals from 492 teams from 125 countries.

The Sustainable Development Goals (SDGs), adopted by the United Nations General Assembly in September 2015, are a set of 17 global goals, which seek to end poverty by 2030, promote peace, and preserve the planet for future generations. More ambitious than their predecessor, the Millennium Development Goals (MDGs), the SDGs cover a broad range of interconnected issues, from ending poverty to addressing inequality and creating sustainable economic growth, from governance to global public goods such as climate change.

In the first year of SDG implementation, youth engagement has been, and will continue to be, crucial to the successful implementation of the SDGs. For youth the SDGs provide an inclusive, transformative, universal framework towards a better world in 2030. The innovative ideas needed to tackle global challenges will likely come from youth. The I4A competition engages young people from around the world to encourage them to develop and share their ideas for financing solutions that can help achieve the 2030 development agenda.

In its inaugural year in 2015, the competition drew global interest, and the winning proposals were compiled in the book titled, *Financing Sustainable Development: Ideas for Action*.

This year, the competition attracted engagement from young people around the world, with about 11 percent of participants from Europe, 13 percent from North America, 21 percent Africa, 12 percent Asia, and 42 percent from Latin America.

The winners were selected through a vigorous three-stage selection process based on the creativity, significance, feasibility, and clarity of the proposals. Reviewers included young WBG staff and Wharton students, along with technical experts and senior executives from the WBG , Wharton, Master Card, PepsiCo, and the G-24 Secretariat. Other competition partners included: the World Bank Group Youth to Youth Community (Y2Y), Young Americas Business Trust (YABT), and the Organization of American States (OAS).

The 2016 winners will present their proposals at the WBG-IMF Annual Meetings in October 2016 in Washington DC and at other high level international events. The Wharton School will offer the winners training and knowledge exchange opportunities.

The 2016 I4A winning proposal by Team DLVR from Nigeria is an innovative yet practical approach to a peer-to-peer service for local communities in Nigeria that seeks to tackle logistical challenges for low-income people in emerging market nations. It would create an online technology platform that connects transporters and senders, to enable the completion of both scheduled and on-demand deliveries. This service focuses on logistics and supply chain bottlenecks, harnessing the knowledge of local communities to build an innovative distribution network at the "last mile" of the supply chain. It has numerous applications, including e-commerce, agriculture, and medical service delivery.

The second-place team, OINCS from Uruguay, describes a mobile crowdsourcing platform that enables users to quickly report and share information about crimes and vehicular traffic in their cities. OINCS promotes a better city life experience by helping people travel throughout the city faster and more safely. Community users inform and alert others of any adverse event or information that could be relevant to either traffic or citizen security, allowing users to react appropriately to events around them.

The third-place team, NaukriSearch from the United States, presents a dual platform employment service aimed at increasing transparency in the slum labor market of Mumbai by improving access to employment information and opportunities. NaukriSearch emphasizes the readily available technologies of each segment of the labor market. The system enables slum residents to receive accurate, up-to-date information concerning potential employment opportunities within their region.

The Her Life team, one of the three runners-up in the 2016 I4A competition, proposed a solution for the life insurance market for Chinese working mothers (CWMs) who need to protect their children from unanticipated financial risks and to enhance their ability to pay for long-term insurance products. The team proposes a partnership with a designated Chinese life insurance company to develop a term life insurance product called HerLife. The product uniquely caters to CWMs by providing education on life insurance, requiring a partner insurer to waive and fund premiums for three years based on contingent, women-specific life events (e.g., diagnosis of malignancies of female organs), and allowing CWMs to pay premiums suited to varying financial needs while staying within the insurance provider's policies.

Five out of Five, another runner-up, recommends the issuance of green bonds aimed at financing air pollution reduction initiatives including, but not limited to, technological upgrades, reconstruction of industrial composition, and air purification strategies in Shanxi province. The local government would be responsible for setting the coupon rate and face value, while cooperating with professional organizations in developing selection criteria and processes to access eligible green programs.

The final runner-up team, Wylde International, introduces an impact performance measurement and valuation tool ("Impact Units") that will enable impact creators such as local innovating companies, or non-profit or for-profit institutions running Community Social Responsibility (CSR) initiatives to develop social interventions that demonstrate real and measurable impact as measured and certified by the proposed Impact Units.

The I4A competition offers the winners a platform to share their ideas and encourages young people to take ownership over implementation of the SDGs. It also provides them access to some of the leading professionals in the global development industry and the private sector. Young adults must be the ones formulating and planning to reach goals like the SDGs, since their generation will be the most affected. Our hope is that the Ideas for Action competition will foster a sense of ownership while incubating some exciting ideas that can shape our shared future for the better.

The submissions included in this book, as well as the rest of the 309 submissions, have clearly demonstrated the innovative potential of youth empowered by technology and sophisticated social media networks. Young professionals are often the best equipped to think of creative solutions to tough global problems.

I4A is not exclusively just about being an "essay competition." As a corollary, this year, I4A has convened several workshops called "IdeasLab" as opportunities for interested young people to get information and share knowledge and ideas. Equally important was the creation of six I4A Clubs with the most active ones being from Wharton, Belgrade, and Hong Kong. These targeted activities have engaged both those young professionals who took part in the competition, as well as those simply interested in global development. In addition, this year's pilot—Ideas for Action 14–18—for high school students was successfully completed with an event at Wharton where the participants presented six winning proposals. While the inaugural year included only several high schools in the U.S., the I4A 14–18 initiative will expand to include international entrants for the upcoming year.

The goal of I4A continues to be engagement with leading schools of finance and management and connecting them with governments around the world. This helps redefine the global development conversation, and

helps the World Bank Group and other development organizations leverage their resources and convening power more effectively.

We hope this book and the I4A initiative will provide a space for creative and innovative thinking, so that the next generation of global leaders will think beyond the existing confines and approaches on development issues. Young professionals must be catalysts and "change-makers" within their organizations and schools in order to achieve lasting and substantial performance improvements. The 2015 version of this book was used as a teaching tool at undergraduate and graduate classes at Wharton as well as several other schools throughout the world. The students had the opportunity to comment on the winning proposals and directly shared their ideas with the winning teams. We hope that the 2016 book will be used more broadly as a teaching tool in schools around the world. To facilitate the use of the book, teaching notes will be made available to interested academics.

Finally, we hope that I4A will help the World Bank Group and other development organizations and partners across the world to recognize young people with bright development ideas so they can participate fully in solving the world's greatest challenges—as they become the leaders of tomorrow.

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Acknowledgments

The Ideas for Action (I4A) was launched jointly by the World Bank Group (WBG) and the Wharton Business School in partnership with the World Bank Group's Youth to Youth Community (Y2Y) and the Young Americas Business Trust (YABT) at the Organization of American States. This is the second year of this initiative and it would not have been possible without the interest and entrepreneurship of young professionals from these organizations, as well as several other champions of the initiative.

We would especially like to thank: the World Bank team of Arunima Dhar and Farida Aboulmagd from the Senior Vice Presidency for the 2030 Development Agenda, UN Relations and Partnerships (SVPMM); the Wharton team of Marie-Louise Wiegert, Halle Abraham, Walid Beramdane, Jeffery Chen, Nelson Dong, Melissa Jassir, Joseph Kupferberg, Sue Mohieldin, and Kami Stavreva; the WBG Y2Y partner colleagues including Stathis Anagnostou, Renzo Sotomayor, Jemi Lacle', Minhae Choi, Mphatso Matenda, Busayo Odunlami, Annabelle Libeau, Ermal Vila, Nadia Bashnin, Slavena Georgieva, Stephane Chi Detchou, Adnan Sirajee, Claudia Koerbler; and the YABT team led by Luis Viguria and Isabella Troconis.

Ned Shell also provided valuable inputs towards this initiative.

The selection process was done in three phases. First round reviews were conducted by: Farida Aboulmagd, Nicholas Bian, Lisa Castro, Arunima Dhar, Victoria Flamant, Lisa Marie Johnson, David Kuijper, Veronica Piatkov, Halle Abraham, Walid Beramdane, Jeffery Chen, Nelson Dong, Melissa Jassir, Joseph Kupferberg, Sue Mohieldin, Kami Stavreva, and Marie-Louise Wiegert.

The 30 English Language proposals that were chosen for the second round were reviewed in two working groups, reviewing 15 proposals each, chaired by Jos Verbeek, Adviser, WBG SVPMM and Mike Kelleher, Adviser, WBG SVPMM. The working group participants were: Steven Dimitriyev, Lead Private Sector Development Specialist, WBG; Alexander G. Sotiriou, Investment Manager at MicroVest Capital Management; Jeffrey French, Managing Director North America, The Do School; Mia Adelberg, Associate Principal, Higher Education Corporate Strategy and New Ventures at The Advisory Board Company; Steven Shalita, Manager, Africa Region, WBG; Stoyan Tenev, Senior Manager, IEG, WBG; Christian Eigen-Zucchi, Senior Economist, WBG; Sara Haq, SH International LLC; and Djordjija Petkoski, Lecturer and Senior Fellow, the Wharton Business School.

The eight Spanish language proposals that were chosen for the second round were reviewed by Christopher Juan Costain, Lead Financial Sector

Specialist, WBG; and Gabriela de la Garza, Latin America Sustainability Manager, PepsiCo.

In addition, the I4A team received advice and input from Heike Reichelt, Lead Financial Officer, WBG; and Raghav Narayanan, Evaluation Officer, IEG, WBG.

The final ten proposals were reviewed by an expert panel comprising ofLuis Montoya, President, Latin America Beverages, PepsiCo; Marilou Uy, Director, G24 Secretariat; Tara Nathan, Executive Vice President, Public-Private Partnerships, MasterCard; Sir Paul Judge, Businessman and Education Supporter; Kelly Widelska, Global Head, IFC; and Prof. Djordjija Petkoski, Lecturer and Senior Fellow at Wharton Business School. The panel was chaired by Mahmoud Mohieldin, Senior Vice President for the 2030 Development Agenda, UN Relations and Partnerships, World Bank Group.

Finally, very special thanks go to the young people who contributed to the 309 submissions. It is also important to recognize the involvement of over 26,000 individuals who in many different ways, both online and in-person, engaged in the I4A initiative.

Chapter 1

A Peer-to-Peer Hyperlocal Approach to Last-Mile Delivery in Nigeria

Team DLVR
Simi Oguadowole, University of Aberdeen, Class of 2015
Emeda Nnodu, New Jersey Institute of Technology, Class of 2014
Udon Okoh, University of Aberdeen, Class of 2014

Abstract

Logistics and supply chains are the wheels of trade, commerce and economic activity around the world. However, in developing economies and emerging markets there are numerous challenges that make access difficult. Most prominent are the lack of standardized addressing systems, and inefficient or inadequate countrywide postal infrastructure that raises the cost of logistics, especially in delivery at the last mile.

Our proposal recommends a low cost peer-to-peer delivery system where senders are connected to local transporters who can carry out scheduled or on-demand deliveries. This system will be executed by means of a technology platform that facilitates this interaction between the different customer segments. There is significant opportunity and potential in establishing this service in emerging economies around the world that face similar problems. Because of the large market opportunity and its significance in the West-African region, Nigeria is our target for the solution. Our plan is to eventually expand this service regionally.

Problem and Context: Last-Mile Delivery Opportunities and Challenges

Logistics, especially last-mile delivery, is a challenge in emerging markets because of the absence of proper postal infrastructure and networks, and non-standardized address systems. These drawbacks, combined with other factors peculiar to the local environment have contributed to challenges in doing business for most companies, since they do not have

the resources or know-how to extend their value offerings to the customer at the last mile.

At this time, breakout successes like Alibaba and Amazon have increased awareness of how technology can change processes in a complex industry such as logistics and supply chain management. In Nigeria, logistics has become highly competitive, with traditional mass transit operations moving into delivery and logistics as well. In many cases, companies have had to build out their own logistics infrastructure and distribution network, radically increasing the cost of doing business in the country.

Industry insiders confirm that these operations are becoming increasingly profitable when compared to their existing mass transportation business. In the last year alone, over 10 logistics companies have commenced operation. Even the big global players (e.g., DHL) are expanding operations to develop the last-mile sector of the logistics value chain.

Solution: A Multi-sided Platform to Facilitate Interaction between Senders and Transporters

DLVR intends to innovate in the logistics space by creating a line of products and services to tackle logistics problems that are commonplace in emerging markets and likely to worsen with population increases. The company is primarily focused on the Sub-Saharan African region, rolling out service in Nigeria.

DLVR's flagship service is a multi-sided platform that facilitates the interaction between senders and transporters, two distinct but interdependent customer segments of our business model. The DLVR platform is designed to enable the earliest form of courier service between these customer segments.

The solution is in two parts: the platform and the logistics operation.

- The flagship platform serves the purpose of aggregating demand for deliveries in a central location. This means that organizations or individuals with delivery needs (senders) can place these orders through the platform.
- On the logistic operations end, transporters will be empowered to fulfill these orders through the use of our platform and its mobile application.

Relevance

Our solution creates an enabling environment for business creation and growth, and improves the business environment in developing economies. Logistics are a significant part (and cost) of operations in the region, and many businesses and organizations are limited in their reach due to a lack of a solution for last-mile delivery. By building out the infrastructure, we allow companies to focus on their core business, while we expand the "rails" of commerce in Nigeria.

What is new about it?

By crowdsourcing delivery using local transporters, we are creating a shared economy—an aggregated pool of resources and assets that outweigh any one operator. This creates an efficient distribution network, even at (especially at) the local level.

Also, our model uses the transporters' specific knowledge of their local environment. By synthesizing and documenting this knowledge, we can better understand some of the unique issues that are prevalent in the region.

Through our approach to partner with schools by co-location we reduce our costs, and we benefit from the economies of scale that schools are uniquely positioned to enjoy in emerging economies (steady power supply, large labor pool, functional infrastructure, etc.). In synergistic parallel, we provide hands-on education (both in operations and technology) to the demographic that forms over 60 percent of the country's population and create a steady pipeline of employment for those people.

Implementation Plan

The DLVR project is already being implemented. We conducted pilot testing and are currently in the intermediate stages of product development.

By Who?	What?	How?	When?
DLVR	Pilot testing	Engaging our prospective customers to test key assumptions and understand their most important needs	First phase completed February 2016
DLVR	Application development:	Iterative development: building out the functionality of the platform	In progress
DLVR & Financial institutions	Recruitment	Security screening and background checks for transporters Recruitment of key personnel	Quarter 3 2016

(*continued on next page*)

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By Who?	What?	How?	When?
DLVR	PR, Marketing & Advertising	Referrals, online and print media	Quarter 3 2016
Financial institutions, investors and Development & Public Sector Partners	Funding for product and service development and scaling	Innovative mix of grants, low-interest loans and other concessions	In progress
DLVR	Market research	Desk and field research to understand the landscape	May 2015–January 2016

Expected Impact

The impact of this service will be felt in multiple sectors of the economy.

1. Medical: Our platform can help expedite delivery of essential supplies and vaccines in case of emergencies or epidemics, which are of current concern in the region's political/socio-economic climate. Also, the platform can facilitate movement of essential health workers and specialists to underserved locations.
2. Agricultural: Food security in the changing environment is a global issue, with special relevance to the West African region at large. A major issue in the Nigerian food value chain is the cost of getting produce to the market. Much product is lost due to inefficient transportation and storage options. Our platform will open up these segments of the value chain to optimization, and help transport food from the producer to consumer.
3. Consumer: The consumer, who is increasingly becoming a global citizen with access to information from around the world, can benefit from a wider reach of products and services that will satisfy their unmet needs.
4. Trade/Commerce: Logistics infrastructure forms the rails of trade and commerce in any economy. Developing DLVR will spur network effects that will aid trade and commerce by providing access at the last mile.
5. Energy saving: The platform will enable the combining of resources in geographic areas, saving on the energy needed to carry out these processes if they were in disparate locations. This reduces the environmental footprint and allows both senders and transporters to save energy that would otherwise be expended on individual transportation and logistics.

6. Education: Involving students and their institutions in this multifaceted operation provides valuable skills, both digital and operational, which are priceless in today's economy. This knowledge transfer helps strengthen institutional capabilities for research and training, and provides students with opportunities and employment after graduation.

Comparable Product Offerings

Companies around the world have implemented similar shared economy businesses. One of the better-known brands is UBER, which used a similar model for ride sharing. They are active in Nigeria as well as other emerging markets, and several other new entrants into this space, such as Metro Africa Xpress and ACE have adapted their ride-sharing model.

Globally, several other outfits have successfully employed similar models for package delivery such as Roadie, Postmates, Deliveroo, etc.

Potential Challenges

Challenge	Mitigation
Infrastructure and cultural barriers to technology adoption	Our technology deployment needs to be a hybrid solution that combines high- and low-level technology solutions for effectiveness in our target market.
Trust	We will overcome the trust barrier by marketing through referrals and trusted peer reviews. In addition, social media channels, which are favored by our target demographic, will be relied on heavily to advertise as well as convey the "voice of the company." Awareness of our internal security measures will also reassure prospective users.
Funding to scale	Financing is actively being sourced from various public and private institutional funds.
Coordinating supply and demand	Platform optimization. By use of advanced technology on the back end of our operations, our platform is designed to be convenient for both sides of the market, linking people who need service with people who can provide it locally.
Security	Changes in policy by the government are seeing more regulatory intervention, with several schemes being rolled out to reduce fraud and aid identity management. These changes allow us to design a more secure business with bank-authorized verification. Our business rules have also been designed with low tolerance for failures—unfulfilled orders, late deliveries, stolen packages, damaged packages. Our standard is that over 93 percent of all orders must be successfully completed.

Chapter 2

OINCS: Using a Collaborative and Community Driven Approach to Citizen Mobility and Security

Team:
Marcelo Wilkorwsky, CEO and co-founder
Rafael Cavestany, creative director and co-founder
Ignacio Bazzano, chief technology officer

Abstract

Oincs is a mobile platform that aims to look after its users by keeping them alert to everything that is going on in the streets. It works thanks to the cooperation of the community itself, which shares and updates information in real time to the benefit of all.

To address rising security concerns in Latin America, community users themselves can use OINCS to inform and alert others of any adverse event or information that could be relevant to traffic and citizen security. This means that any citizen consulting our mobile app or web platform can be informed and attuned to events going on around them, saving them time, money, and risks to security.

Problem and Context: Security and Safety

Security is a major problem for the population of Latin America. According to Latinobarómetro, concern about crime in Latin America has grown by 360 percent from 1995 to 2015.

This study also indicates that one in four people responded that "crime" is their greatest concern; the perception of 63 percent of those surveyed, is that their countries are increasingly unsafe.

It is not easy to precisely calculate levels of theft in a society, as many such crimes are not reported to the authorities. A quarter of Mexico's population indicates having been a victim of crime, but 93 percent of victims fail to file a report. Of the seven percent of reported crimes, less than one percent ends in conviction, creating a lack of confidence in the capacity of law enforcement authorities.

According to Gerardo Rodriguez Sánchez Lara, an expert specializing in crime from the Universidad de la Américas Puebla, when populations feel that they are living where there is little accountability for crime, violence feeds upon itself: criminals know that they will not be punished, which encourages them to continue criminal behavior.

The Latin American and Caribbean region is the least safe in the world. The latest data show that in 2012 there were 437,000 murders worldwide, equivalent to a world rate of 6.2 homicides per 100,000 people (United Nations Office on Drugs and Crime). Although Latin America and the Caribbean accounts for less than 9 percent of the planet's population, 33 percent of homicides occurred in the region. While the murder rate is just one manifestation of the problem of violence, it is the most reliable indicator because it involves an act that is generally reported; this contrasts with robberies, kidnappings, domestic violence, and other offenses, which are often not reported and which lack standardized definitions. Nonetheless, the reported incidence of these acts in Latin America is disproportionately high, and has grown significantly on average over the last two decades. Lastly, there are other types of issues that directly affect citizens—including infrastructure, hooliganism, and climate-related factors—that need to be solved in order to improve the quality of life in cities.

Major cities face the additional challenge of traffic congestion. According to a study sponsored by IBM, the intense traffic conditions of major cities has a negative effect on health and professional performance. For example, in Mexico it is estimated that people lose 2.4 years of their lives due to time spent in traffic. Urban conditions directly impact a community's productivity and quality of life on a daily basis. When governments do not provide a solution, people look for other options. Oincs provides the solution to these problems through a collaborative tool which helps its users take control of traffic and safety issues in their communities.

Solution

Oincs is attempting to solve traffic and citizen security problems using a collaborative approach, with the help of the community.

Community users themselves inform and alert others of traffic and citizen security concerns. Our mobile app or web platform allows citizens to be informed and attuned to events going on around them, and it has the potential to save users time and money, and to lessen risk.

Every day, thousands of people check the information reported on Oincs to find the safest and fastest route for their journey, just as thousands of

people share information every day with the sole objective of assisting and alerting their fellow citizens to incidents of this nature.

The media also use the information shared via Oincs to produce their own informational content, thus creating a virtuous cycle in which all citizens unite with the objective of getting around the city in a safer and more efficient manner.

Product Design and Implementation

The product is a free mobile app available for iPhone and Android. The app can be downloaded directly from the official Apple and Google stores.

It is simple to operate: users simply download the app and register, and are then able to check reports for their local area and/or create reports to share with the community.

Oincs is a mobile platform that makes it possible for its users to be alert to both crime and traffic in the surrounding area. The key component is the cooperation of the community itself, which shares and updates information in real time. Two years after its conception, Oincs has more than 150,000 registered users, making it the most downloaded app in Uruguay. It ranks in the App Store's top three apps in 11 countries in Latin America and the Caribbean, and has received numerous national and international distinctions and prizes, including Best Software Product in 2014 and Best App in 2015 from the Cámara Uruguaya de Tecnologías de la Información (Uruguayan Chamber of Information Technologies; CUTI). In addition, Oincs received the highest number of awards at the Demand Solutions event organized by the Inter-American Development Bank in Washington D.C., where it won three prizes: Startup with Highest Potential Growth, Most Innovative Concept, and People's Choice Award.

Innovation

We see two sources of innovation: the first comes from using technology to help ensure that the members of any community have free, real-time access to information about local conditions, thus allowing them to make better decisions and improve their quality of life (getting home faster and more safely, helping other members avoid areas in which robberies are taking place, etc.). Secondly, the information is provided and maintained by the community itself, which collaborates to make mobility better and safer.

Market opportunity

The mobile market in Latin America is the fourth largest in the world today, with almost 326 million unique subscribers and 718 million connections in

September 2014. Just over half of the region's population now has a mobile subscription. This figure is expected to reach 60 percent by 2020, in line with the world average.

Latin America is experiencing a marked acceleration in data traffic growth, driven by the rapid migration to high-speed connections that is taking place across the region. At the end of 2013, more than two-thirds of connections were 2G. It is anticipated that by 2020 almost 80 percent of will take place using faster 3G and—increasingly—4G networks.

The region is projected to have a total of 605 million smartphone connections by 2020, equivalent to almost 70 percent of total connections. At that point, Latin America will have the second highest number of smartphone connections in the world.

Investment in digital advertising is also expected to grow more rapidly in Latin America than in any other region in the world through 2019.

Scalability and Replicability

Our primary business model is based on the Oincs subscription freemium[1] service. Having received and analyzed hundreds of messages with feedback from users and conducted dozens of customer interviews, we've identified a need (and opportunity) to provide a subscription-based model paid for on a monthly basis. With this service, every subscribed user will have a access to a personalized virtual traffic and security assistant before and during excursions in their city. In this way, subscribers can receive messages and intelligent alerts to help them make better decisions in order to save time and feel more secure.

There are also secondary revenue streams for Oincs such as through media channels and advertising. Media channels are already using the Oincs platform to integrate real time crime and safety information on their websites and newscasts. In addition, potential advertisers would target audiences of men and women aged 20–50 who are often active in social networks, are gainfully employed, own smart phones with internet access, and commute daily using personal vehicles as opposed to mass transit. Our main advertising clients in the future may include auto companies, insurance firms, pharmacies, convenience stores, alcohol companies (with road safety messages), service stations, etc.

Although not yet implemented, there is also potential to monetize sale of data to transport providers or other clients seeking historical and predictive traffic and safety info (e.g., Airbnb overlaying Oincs data on

[1] Freemium is pricing strategy used for many digital applications, in which the basic product is free, but a premium is changed for proprietary features, or specific functionality.

their app for customers to identify the safest location to rent a room). Additional future revenue streams may also include product licenses for the media and/or institutions, commissions for leads, and sponsorships.

With respect to scalability and replicability, our platform is based on its crowdsourcing nature, insofar as all reports are created by our users and for the benefit of the community. This feature is the key to a platform that is easy to scale up. As we are already integrated with global geo-positioning technology, all we need to operate in a new market is a community of users. The technology can scale on its own, both for live reporting and for our new on-demand model, which is powered by artificial intelligence and goes beyond an app, as an omni-channel freemium service. Therefore, the marginal costs for every new market are reduced to the cost of creating a marketing campaign and a sales team (if the market is not Spanish-speaking, we may need to translate the platform's user interface as well, which is fairly easy and inexpensive to do).

Another feature of our replicability is our white-label-based[2] model, where every city or municipality in the world can license the platform and customize it to the needs, preferences, and tastes of its population. As long as the basic structure of geo-positioned reports is respected, we can provide city-by-city customized user reports, tracking, and methods of communication with users. We can also customize the look and feel of the platform for each city or municipality. This last point is what we believe will be the key of our replicability strategy: it allows municipal governments to sustainably invest in technology to improve their constituents' safety and lives.

These models are synergistic insofar as every report and data generated by the users, be it through live reports, on-demand services, or municipal government licenses, feeds the same platform and database. This synergistic approach allows the platform to learn from a larger pool of data due to machine learning and artificial intelligence. This, in turn, helps our mission to provide people around the world with reliable data to make better decisions, live safely in their cities, and save time in their daily commutes.

Future Outlook

Our main strength is the enormous engagement that exists in the community. As indicated previously, our apps have more than 150,000 registered users. More importantly, repeat users accounted for 96 percent of sessions in the last month.

[2] A white-label product is one that is developed and produced by one company, who then allows other companies to rebrand and market the product as their own.

Users share information in real time (crowdsourcing) about criminal activity, security, and traffic.

We are creating a rich database with extraordinary potential for analysis by different public and private sectors and institutions.

Growth has been largely organic, with word-of-mouth playing an essential role in spreading information about the venture.

The media's effective use of the information generated by the community has also had a major impact, together with the potential that exists for establishing partnerships with municipal governments to help improve cities.

Chapter 3

Increasing Transparency in Indian Slum Labor Markets: Providing Access to Employment Information

Team NaukriSearch
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Kent Hutchison, The Wharton School, Class of 2018
Robert Levinson, The Wharton School, Class of 2017
Daniel Kwak, The Wharton School, Class of 2017

Abstract

NaukriSearch is a dual platform employment service. Its goal is to reduce unemployment through increased transparency in the slum labor market of Mumbai by improving access to employment information and opportunities. NaukriSearch is unique from other attempts at unemployment reduction because it emphasizes use of technology that is readily available to each segment of the labor market: Internet-enabled computers for employers, and cellular SMS messages for employees. This system enables slum residents to receive accurate, up-to-date information concerning potential employment opportunities within their region.

The majority of slum residents are employed informally. NaukriSearch will provide crucial structure this economic informality. This proposal demonstrates the appropriateness of a dual platform system for a highly asymmetric Indian labor market in which employers enjoy disproportionate access to information. Through the implementation of electronic marketing campaigns easily accessible to slum populations, our team seeks to attract marginalized workers to NaukriSearch, thereby reducing frictional unemployment in the informal economy.

Problem and Context: Lack of Mobility, Large Slum Population, Low Work Participation Rate

In Mumbai, there is a three-fold challenge to reducing unemployment: the lack of mobility in a large slum population with a low work participation rate. In 2011, 93 million people lived in slums in India, which is expected to grow to 104 million by 2017 (Slums in India 2011. See Table 1.). The highest percentage of slum population is in Mumbai, where 54 percent of the city population lives in slums (WDR 2009). The work participation rate of the Indian slum population is only 36.4 percent (Slums in India 2011), representing a large amount of untapped human capital. Adding this population into the mainstream economy would lead to an increase in India's economic efficiency and productivity.

Currently, most slum dwellers are employed in the informal sector, which consists of jobs such as construction workers, house helpers, tailors, and taxi drivers. Though this sector is responsible for 90 percent employment of India's population, these workers have no formal recognition from the Indian government, and have to rely on word of mouth to find jobs and negotiation skills to secure pay (Yardley). Most slum dwellers lack certification, access to employment offices, an enforced minimum wage, and other protections of their rights.

From a consequentialist perspective, we expect utility to be maximized due to increased labor market participation and upward social mobility, which in turn will create an upward development spiral. From a deontological perspective, we believe that slum dwellers should have the right to information about possible employment opportunities and that it is our social and moral obligation to reduce poverty, especially when it constitutes over a 100 million people with poor living conditions. Human nature ethics would suggest that this platform would allow for slum dwellers to fulfill their capabilities. Moreover, it would be in line with the Sustainable Development Goals, such as "promoting sustained, inclusive and sustainable economic growth."

Table 1 **Projected Slum Population to 2017** (in million)

	Projected Slum Population for the Years						
Country	2011	2012	2013	2014	2015	2016	2017
India	93.06	94.98	96.91	98.85	100.79	102.73	104.67

Source: Report of the Committee on Slum Statistics / Census, 2010.

Solution: Dual-Platform System

NaukriSearch seeks to create a dynamic online- and SMS-based platform to facilitate the connectivity of employers and employees. This will effectively and comprehensively address the inefficiency in the labor market of marginalized Indian communities, This solution will take into consideration both the needs of the employers and the minimal technological and financial resources at the disposal of the employees. Through the implementation of a dual platform system, NaukriSearch hopes to maximize ease of use while minimizing barriers to entry.

Platform One: Online Database

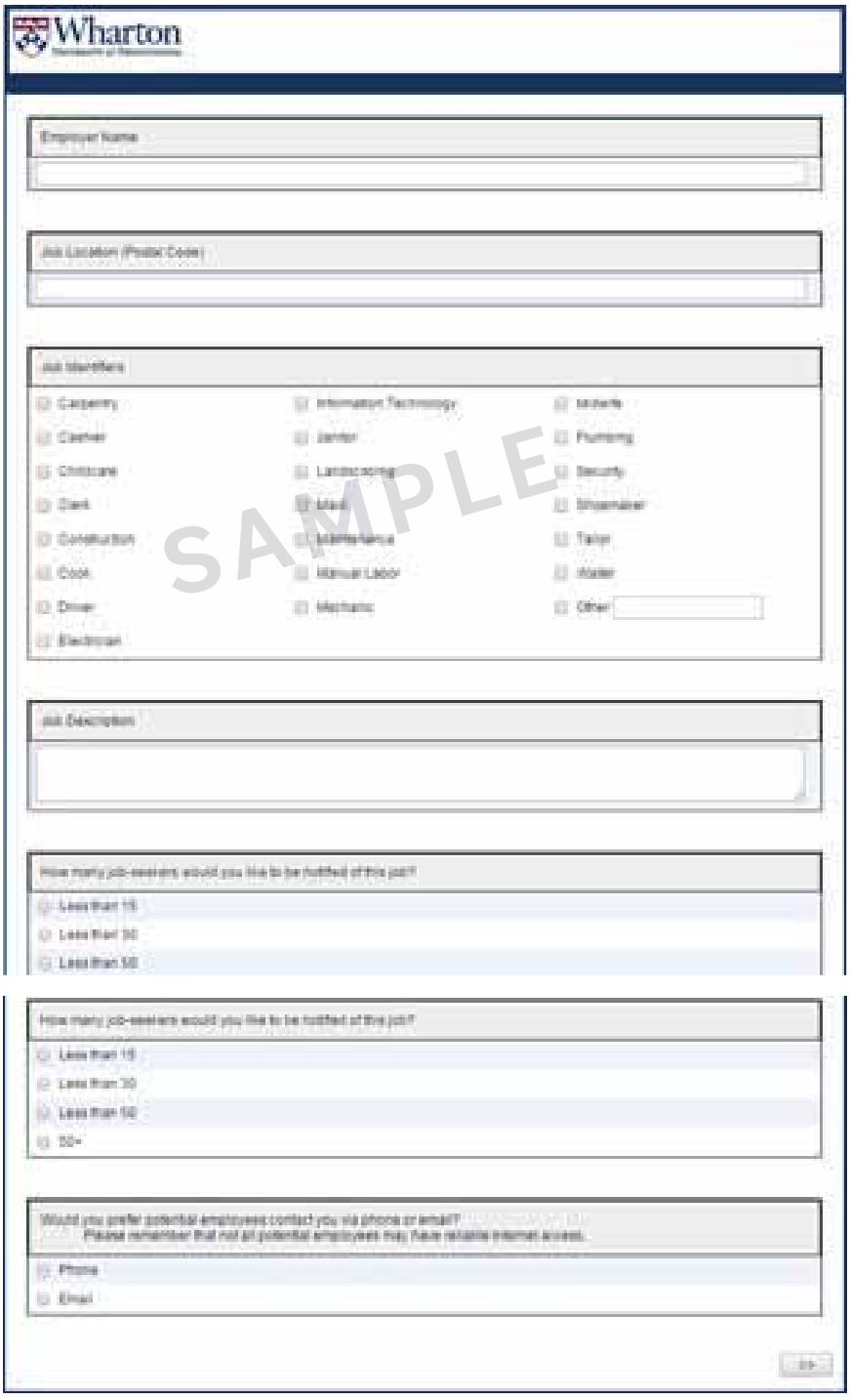
Our solution targets a specific employer market: middle- and upper-class households and the businesses their occupants manage. This market enjoys widespread connectivity to the Internet for both personal and professional use. Access to the Internet is essential for the success of our first platform, an online job-posting database. This database will stress functionality, with a strong emphasis on ease of use. It should be noted that our solution is not intended to serve employers based in slums, but rather employers located in other nearby areas in an attempt to diversify slum dwellers' options for employment.

After accessing our website, employers will be prompted to enter key information about their future job openings. This brief questionnaire will serve as a one-stop-shop for employers in reaching potential employees. First, employers will enter their name or the name of their company. Then, the location of the job is requested.

The next section of the questionnaire is critical to the functioning of our project. Employers will indicate which "Job Identifiers" describe the employment opportunity. NaukriSearch has chosen the identifiers shown in Figure 1 based on common occupations in the informal Indian economy. Employers must choose at least one, but may choose more. The design of the questionnaire is crucial: by asking a multiple-choice query, we effectively standardize responses into sortable buckets. This sorting of identifiers will prove essential to project implementation in the SMS-based phase of the project.

Employers may then write a description of the job. This open text field caters to a wide range of employer preferences. For example, Employer A may include a description of expectations, hours per week, pay range, and age or gender preferences. In contrast, Employer B include only a description of expectations, leaving discussions concerning pay range and hours per week open to negotiation.

Figure 1 Online Database Platform (for employer use)



Source: Authors.

In order to address concerns of employer response overload, NaukriSearch has included in the survey an option that limits the number of job seekers that will be informed of the posting. Should an employer choose "Less than 30," a maximum of 29 unique subscribers will receive SMS notifications alerting them to the new job opening. This feature is intended to minimize the potential for spamming of employers.

Finally, employers are asked to indicate their preferred method of contact. Employers may choose to be contacted either by phone or email. As the majority of potential employees lack access to reliable Internet, NaukriSearch has included subtext so as to encourage employers to list a phone number for job inquiries. Our website will use survey logic to prompt employers for the indicated information.

Upon completion of the survey, the data will be moved to a secure online database. In this database, each entry will receive a unique Job Number, which will be used in coordination with the SMS-based platform.

Platform Two: SMS Service

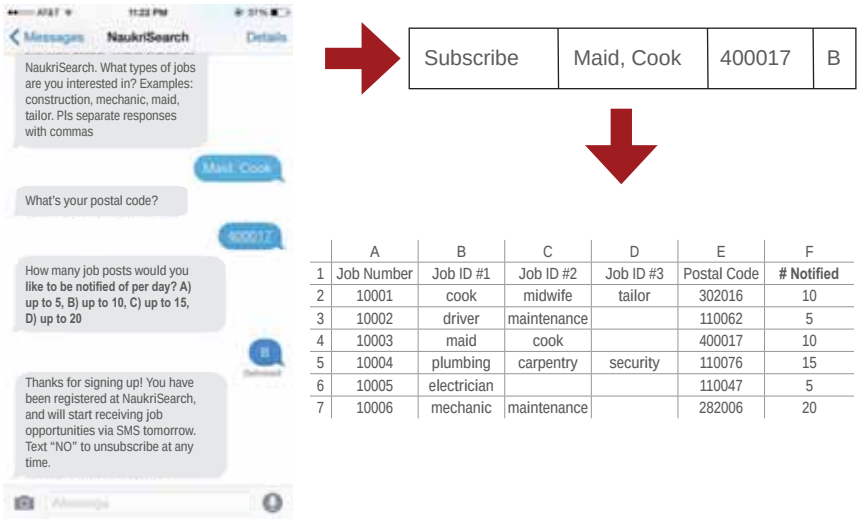
As indicated, NaukriSearch seeks to connect employers with the marginalized populations of Indian slums. Accordingly, NaukriSearch proposes a unique integration of online database (for employers) and SMS service (for employees).

Automated SMS systems are a well-established part of life in the developed world. They are perhaps best known for their role in sweepstakes: media outlets often run contests in which listeners' text a predetermined word or phrase to a specified number in order to gain admission to a raffle for tickets or experiences. NaukriSearch plans to emulate this concept, expanding it significantly so as to make an impact on the employment prospects of marginalized India.

In NaukriSearch's automated SMS system, job seekers will be asked a short, user-friendly series of questions to obtain the most relevant matches with employers. After completing the survey, job seekers will, in effect, have created an applicant profile, from which they will receive information concerning job availabilities (Figure 2).

Information will be dispersed in the form of simple, user-friendly text messages. When an employer posts a job opportunity with a given tag (such as "carpentry") that the job seeker has indicated an interest in, that job seeker will receive a text. The text will contain essential information for the job seeker, pulled from the unique Job Identifier number in the database. Such information would include the job description, the location of the job, and the potential employer's phone number.

Figure 2: SMS to Database Process



	A	B	C	D	E	F
1	Job Number	Job ID #1	Job ID #2	Job ID #3	Postal Code	# Notified
2	10001	cook	midwife	tailor	302016	10
3	10002	driver	maintenance		110062	5
4	10003	maid	cook		400017	10
5	10004	plumbing	carpentry	security	110076	15
6	10005	electrician			110047	5
7	10006	mechanic	maintenance		282006	20

Source: Authors.

This SMS-based platform improves the job seeker's chances of employment by increasing access to information concerning the job and by providing immediate connectivity to the potential employer. This represents a marked improvement over traditional interpersonal channels of communication, which can often confuse job details and lead to dead ends for employment. It also opens job seekers up to a wide array of employment opportunities, effectively increasing their power to choose satisfying and empowering work.

After making contact the employer and employee will arrange further details concerning duration of employment, wages, and other benefits. It is important to note that NaukriSearch does not seek to directly impact such negotiations, but rather to serve as a facilitator of connectivity between employer and employee.

NaukriSearch's proposed solution is also unique in its ability to provide access to job opportunities outside of traditional boundaries. Labor markets in slum communities in India can often suffer from an excess of labor, without the corresponding job opportunities. Our team hypothesizes that a significant portion of the lack of job opportunities stems not from a lack of need for productive labor, but rather market friction that results from inadequate communication between employers in relatively well-off communities and job seekers in slum neighborhoods. Potential employers may, for example, be uncomfortable searching out labor in slums, or unsure of how best to begin the search for new employees. Our team's proposal has the

potential to reduce that friction significantly, through connecting employers directly with employees via phone or email. In such a way, employers can reach new labor markets while job seekers are provided with the opportunity to work and gain skills outside of their immediate locale.

Expected Impact

We expect NaukriSearch to achieve significant market penetration in the Indian informal economy within three years of launch.

Our platform will provide slum residents access to opportunities outside of their local vicinity in a way that is, for the first time, simple and accessible. With more high-paying jobs and access to areas outside of the slums, these residents should be able to provide long-term benefits to their family for generations to come. Either slum residents will be able to relocate because of newly found consistent pay, or their improved personal economic condition may stimulate the slum's local economy so that it is no longer designated as a slum.

NaukriSeach will also give employers access to labor resources they would otherwise be unaware of, providing an opportunity to hire from a larger group, and more easily fill positions that suit candidate qualifications.

By linking the two otherwise incompatible parts of the labor market, NaukriSearch will improve on local economies and also bring into balance information between job seekers and potential employers. We expect that impact measurements in the early years to show that this platform can change the lives of residents in many slums across India by ultimately reducing the informational disconnect within the labor market.

Comparable Product Offerings

Maid in India

Decimal Foundation, a non-profit organization based in Mumbai, manages this employee network specifically geared towards the domestic services industry. Maid in India first vets potential maids, administering background checks to ensure reliability. When an employer requires a maid, he or she may access an online portal to complete a short job-posting questionnaire. Crucially, Maid in India fulfills a social mission beyond providing employment: for each job accepted, Maid in India designates a portion of the salary to maids' "vocational training, health and savings benefits, insurance, and job security" (Kamal and Mishra).

NaukriSearch takes Maid in India's central concept and expands it far beyond the scope of the domestic services industry. NaukriSearch is geared towards greater inclusion of all members of the informal economy, including both men and women. Furthermore, while Maid in India limits possible employment locations to a short list of broad options (Delhi, Colaba, etc.), NaukriSearch more effectively identifies locations via the use of postal codes, thus better matching employers with potential employees.

Challenges in Computerized Job Search for the Developing World

In their report, *Challenges in Computerized Job Search for the Developing World,* Medhi Thies et al. consider the functionality of a computerized system of job posting for marginalized Indian communities. Their report concludes that, before the advent of a computerized job search system can be realized, a paper-based system that connects employers to potential employees must first be implemented.

At NaukriSearch, we believe that the use of SMS-based services can power a jump past paper-based systems. In much the same way that mobile banking enabled impoverished African societies to leapfrog traditional forms of banking, NaukriSearch's dual platform will provide laborers with access to real time, accurate job listings. Furthermore, our SMS platform will enable job seekers to immediately contact potential employers, greatly reducing the market friction that would exist in a paper-based job posting system.

Potential Challenges

Revenue Model

We believe that by working closely with locals, NGOs, local government, and city governments from the start of the venture, we can incorporate all the stakeholders to effectively address the needs of all involved. This includes generating revenue from those that are best equipped to sponsor our mission and needs.

Because we realize that our objectives align with various NGOs looking to reduce impoverished regions in and around prominent cities, we will be seeking subsidization for the first few months not only from NGOs, but also government and business competition and foundation grants. These grants will be the main source of income that will jumpstart our business in the first year. The first year focus is building a user base for both job seekers and employers, effectively improving our services according to the

users' needs. With less than 100 jobseekers and less than 50 employers the infrastructure costs will be light. We plan to seek a contract with telecommunication companies to potentially reduce the cost of dispersing text messages. Both private and public telecommunication services will be approached, but BSNL and MTNL (both government telecommunication companies) may be the best option to providing the necessary subsidies. The primary costs in Year 1 will be with the contracted work of creating and maintaining the website. We know that these costs will be generated primarily during the first year, and that in subsequent years we will only need to continue to update our site and make minor changes. Other costs will be associated with onboarding of users through marketing efforts such as radio broadcasts, ads, and other tactics.

In the following years, we will begin to grow into other neighborhoods after we secure the platform in Mumbai. We anticipate that by this time we will have enough employers interested in using our site to justify a (not-yet determined) premium level of subscription for those that hire more than ten employees a week (actual number can be altered based on base level after first year findings). At this point costs should still focus around maintaining a bare minimum number of full-time employees (FTE) and a low overhead cost from the site and a possible office space. These FTEs will focus on customer relations, administrative work, marketing efforts, and general maintenance of the entire business. Because of the web-based nature of the business, we will only need to scale the number of workers slightly as we expand to other locations. Once expansion to nearby cities reaches a critical mass, we will begin to explore corporate impact sponsorships, especially from companies such a private telecommunication companies that align well with our services and interests. Furthermore, such corporate sponsorships may either provide funds or services to further lower our costs. As a possible alternative, FTE can be effectively replaced by reaching out to local communities for volunteers that would be trained and brought in as full-time volunteers with certain benefits, such as food and training. Our revenue efforts will be focused on trending away from grants and corporate sponsorships to ads and premium users. As the years go on, we hope to be fully sustainable without relying on corporations, foundations, and grants.

Initial Launch Strategy

To help NaukriSearch gain initial traction, we will implement a beta program, which will not only raise awareness about our product, but also serve as a testing and feedback tool. We hope to run the month-long beta program 2–4 times. This timing will allow implementation of the quantitative

Table 1 Financial Projections for NaukriSearch's First Five Years

5-Year Financial Projections (in thousands of rupees)

	Year 1	Year 2	Year 3	Year 4	Year 5
Revenue					
Grants	300	300	200	100	0
Corporate Sponsors	0	500	1,000	2,000	2,000
Ads on Site	0	50	200	500	1,000
Company Usage Fee	0	100	300	500	1,000
Total Revenue	**300**	**950**	**1,700**	**3,100**	**4,000**
Expenses					
Personnel	0	600	1,200	1,800	2,400
Contract Services	100	30	30	30	30
Other Direct	30	30	30	30	30
Overhead	0	400	500	600	700
Onboarding	80	80	80	200	500
Total Expenses	**210**	**1,140**	**1,840**	**2,660**	**3,660**
Net Income (Loss)	90	–190	–140	440	340
Net Assets, end of year	90	–100	–240	200	540

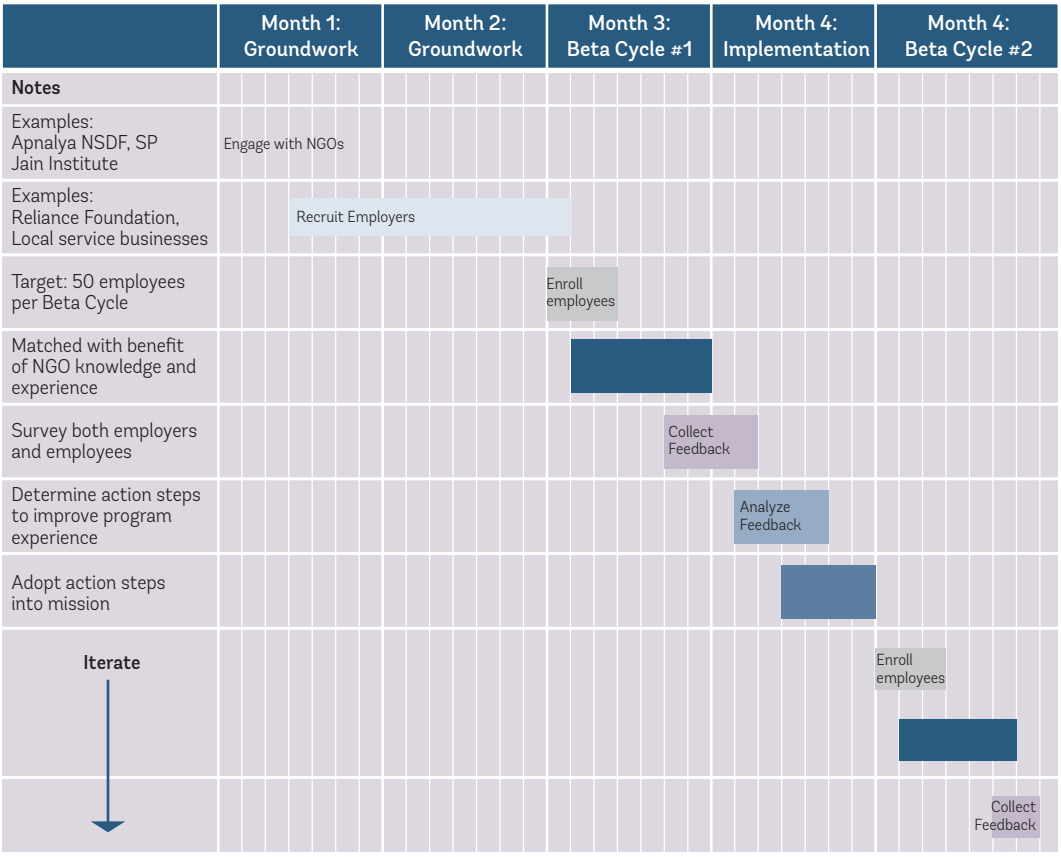
Source: Authors.

and qualitative feedback received from participants. Our goals include overall employer/job-seeker satisfaction with the platform (measured via frequent feedback surveys), a 0.7 job/jobseeker ratio, and platform ease-of-use for both sides of the informational divide. To kick-off our beta program, we hope to build essential partnerships with both sides of the market—employers and jobseekers. During a two-month period, we will reach out to telecommunication companies (which we hope to work with on the platform development), and will target charitable foundations of large corporations as well as government agencies that are looking to fill job positions quickly. We will also connect with local NGOs that support slum populations of Mumbai, and through them encourage slum dwellers to use our platform. Examples of organizations include Apnalya, SP Jain Institute of Management and Research, and National Slum Dwellers Federation, which already work toward the goal of sustainable employment.

To measure goal attainment at the end of each month, the team will require a feedback form from each of the employees and employers at the conclusion of the beta cycle. This survey will include questions to measure the usability of NaukriSearch and rating the interactions between employees and employers. Through pointed questions about the quality of the program with rankings of 1 to 7 for each measure, the survey will

serve as a benchmark for two of the goals. Through this feedback form, we will also ask each employer and employee to recommend three potential NaukriSearch users. This way, we can easily transition to the actual launch. The third goal, a 0.7 job/jobseeker ratio (i.e., for every 10 job seekers on the site, there will be seven jobs available), will be measured just by analyzing the counts of each set. During the implementation period after the beta program month, we will analyze and internalize the feedback received. This period of time will be dedicated to recruiting and gathering a new batch of employers and employees. Some from each group may continue from the previous beta period if they didn't get a job or find an employee. Otherwise, the rest will be recruited for the next cycle. During the same timeframe, we will make changes to NaukriSearch according to feedback received, and logistically prepare for the next pilot round. (Figure 3).

Figure 3 NaukriSearch Traction Timeline



Source: Authors.

After the beta program one of the most important challenges our project will face is attracting new users from both sides to make the platform self-sustaining. We will follow the pattern developed in the beta program, again working closely with NGOs, and the partners to expand into a live release. We will incorporate feedback into testimonials, and give beta testers the opportunity to refer friends and family for the program. This will create a self-propagating method of bringing in users.

Moreover, to expand our user base, we will also design a comprehensive marketing campaign that targets both potential employers and job seekers. The first part of our marketing campaign is advertising to users who do not have Internet access. This effort is of crucial importance—only 3.3 percent of Indian slum residents have Internet connection (Slums Census Data). This means NaukriSearch must reach them through new and innovative methods. One way we can spread the word about the product is by sending mass texts encouraging subscription. This effort will be aided if we develop a good working relationship with several telecommunication providers.

We will reach out to potential employers by maintaining active social media campaigns using services such as Facebook, Twitter, Instagram, and YouTube. These tools are high reach/low cost forms of advertising that can help us build a loyal online community. We also hope to design and maintain a website that could provide important information to potential employers. This site will also give users the option of signing up to receive future email communications and updates, ensuring that all potential employers stay connected to our organization. As the platform grows, we also aim to hold workshops on interview skills, career analysis, and other job-oriented lectures to attract locals to NaukriSearch and promote the cause of sustainable employment. We are confident that these integrated efforts will help us spread the word about NakuriSearch, allowing us to acquire an initial customer base.

Future Outlook

Impact Measurement

In order to continue the projected growth of our venture, it is important to have a key performance indicator. Given that our core mission is to reduce the friction between potential employees from the slums and employers in the city, the focus of most of our metrics should revolve around the connections that we help forge and those that we directly impact.

From the perspective of an employer, it is important to see that the time it takes to find an employee is not only short, but also the quality of employee is high. Measuring the time that it takes to find an employee is simply a matter of finding the time from when an employer submits a request to when it is fulfilled. On the other hand, quality of employee can hinge on a variety of measures. Our team believes that there should be quality assurance measures for both employers and employees. For employees this is a weighted average that takes into consideration the level of pay, hours worked, work done, and (to cross-reference the compatibility) the employer's evaluation of the employer. From the perspective of an employee a similar metric should be used, but more focused on the quality of the employer, how long it took to find an occupation, and the accuracy of the occupation in relation to the job queried.

We will measure our growth as an organization on performance targets such as the number of partner organizations, number of cities to which we expand our services, and the number of employees and employers matched. With these figures, we will be able to effectively understand our growth patterns, challenges, and which areas need more focus. Of these metrics, the number of employees and employers matched is the heartbeat of our service. Additionally, we will track the complaints that we receive, recording them in both electronic and physical form. In order to effectively address complaints, we have budgeted in a dedicated customer service professional starting in Year 2. Our goal is to be at 10,000 jobs matched within two years and expansion to four unique regions by Year 3. Tracking these metrics will enable us to scale properly and effectively, and also have a positive impact on the most people.

Access to employment opportunities and information will directly increase work participation rate—increasing both the number of people who are employed and the number of people who are aware and actively looking for employment. We aim to scale up our proposal by implementing the NaukriSearch platform in other major urban cities in India such as Delhi (about 49 percent of Delhi's population lives in slums), Chennai, and Bangalore. We also see the potential of offering our service in Hindi and regional languages such as Marathi to overcome language barriers. As the usage of our platform increases, we hope to increase the female work participation rate by encouraging females to use our platform. We also hope to improve community engagement in our project by hiring local workers and students, with an emphasis on hiring females.

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Chapter 4

HerLife: A Term Life Insurance Product for Working Mothers in China

Team HerLife
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Abstract

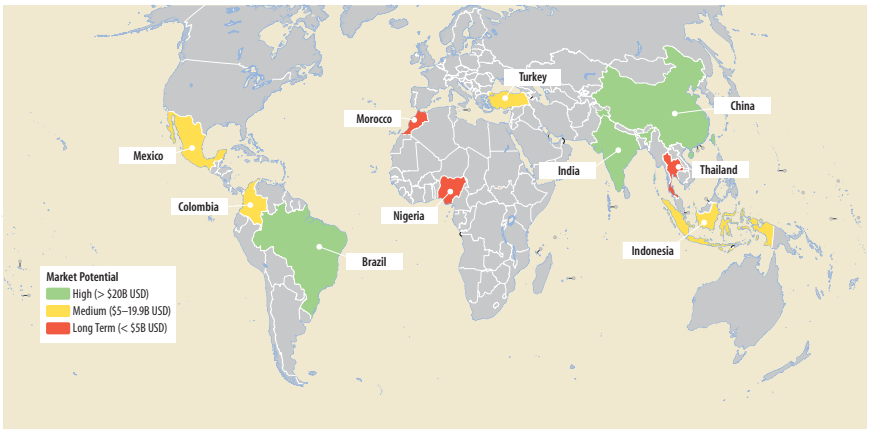
The life insurance market for women is large, growing, and underdeveloped. This is particularly true for Chinese working mothers (CWMs) who have a need to protect their children from unanticipates financial risks and enhance their ability to pay for long-term insurance products. The life insurance market growth for CWMs is accelerated relative to other markets: the estimated opportunity is $10.2 billion and will grow to over $60 billion by 2030.[3,4] Yet Chinese life insurance companies deliver generic life insurance policies that only consider gender as an actuarial factor.[5] The proposed solution is a partnership with a designated Chinese life insurance company to develop a term life insurance product called HerLife. HerLife uniquely caters to CWMs by providing education on life insurance, requiring a partner insurer to waive and fund premiums for three years based on contingent, women-specific life events (e.g., diagnosis of malignancies of female organs), and allowing CWMs to pay premiums suited to varying financial needs while accommodating the insurance provider's policies. HerLife is also a launch pad to which other women-specific insurance products can be added. It will enable CWMs to secure their families' futures while encouraging additional tailored insurance solutions for women to take part in the insurance market.

[3] IFC et al., 2015.
[4] CIA World Factbook 2015.
[5] McKinsey & Co. 2012.

Problem and Context

In China, the life insurance market for women is expanding rapidly and is largely untapped. The global market for the annual premium value of women's life insurance is expected to nearly double from $448 billion to over $825 billion by 2030.[6] China's growth rate is faster relative to other markets: the life insurance market for women is $36 billion and is projected to grow to over $205 billion by 2030 (see Figure 1).[7] The drivers for this anticipated growth are higher tertiary education of women, as well as an increase in female labor rates and household bargaining and purchasing power.[8]

Figure 1 China represents a large market for life insurance from 2013–2030, reaching an estimated value of over $205 billion by 2030



2013 Women's Life Insurance Market Size in the 10 Focus Markets (USD)		Growth from 2013–2030 (As a multiple of its 2013 size)		2030 Women's Life Insurance Market Size in the 10 Focus Markets (USD)	
China			6–9X		$205–315 B
Brazil	$5 B		8–12X		$41.8–64.5 B
India	$8.6 B		2–3X		$17.7–27.6 B
Mexico	$2 B		6–9X		$11.7–18.1 B
Indonesia	$700 M		10–16X		$7–11 B
Colombia	$1.1 B		5–8X		$5.7–8.8 B
Turkey	$500 M		8–12X		$4.4–6.7 B
Thailand	$690 M		5–8X		$3.6–5.4 B
Nigeria	$76 M		8–13X		$621–952 B
Morocco	$7.5 M		2–3X		$16.2–24.8 B

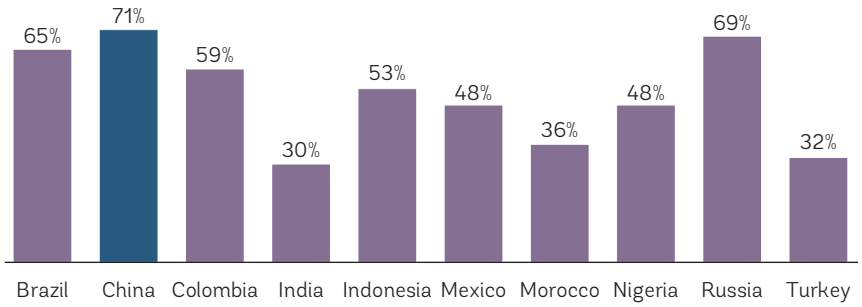
Source: IFC, Accenture, and AXA Group. "SheforShield: Insure Women to Better Protect All - Accenture." 2015. http://www.ifc.org/wps/wcm/connect/a2d8348049d01b0c82a5a3e54d141794/SheforShield_Final-Web2015.pdf?MOD=AJPERES.

[6] IFC et al., 2015.
[7] Ibid.
[8] McKinsey & Co., 2012.

Life insurance enables policyholders to provide financial security for their beneficiaries in the event of their death. Three players dominate China's highly concentrated life insurance market with over 53 percent of market share among them: China Life (30.4 percent), Ping An Life (13.6 percent), and New China Life (9.6).[9] Given their dominant market position, it is critical to partner with one of these firms to ensure widespread delivery of a life insurance product.

However, there are three gaps in serving Chinese women: non-gender specific life insurance policies, misalignment with female needs, and low awareness—all of which will be amplified by the growth of this consumer base. Chinese insurance companies currently deliver blanket life insurance policies that consider gender for actuarial rating purposes only. The industry implements a mass-focused sales approach with generic products that consumers opt out of due to misalignment with customer needs and lack of education on life insurance.[10] Mothers, for example, may be willing to invest in life insurance to protect children but are unaware of other financial benefits. CWM represent approximately 40 percent of Chinese women and have expendable income to protect their assets: China has a 71 percent female labor force participation rate, one of the highest compared with other emerging economies (see Figure 2).[11,12] Both tailored life insurance solutions and eduation on these products is unavailable to this consumer segment. Consequently, CWMs, the key target segment of HerLife,

Figure 2 The Chinese Female Labor Force Participation Rate is 71% and is High Compared to Other Developing Economies



Source: Authors. [Data from: World Economic Forum. 2014. "The Global Gender Gap Report."]

[9] Saldias & Grigaliunas, 2014.
[10] McKinsey & Co., 2012.
[11] CIA World Factbook, 2015.
[12] World Economic Forum, 2014.

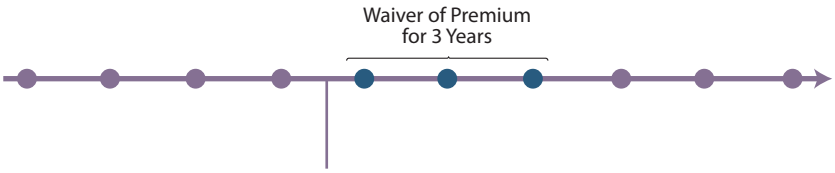
represent an untapped market opportunity currently worth $10.2 billion that will grow to over $60 billion by 2030.[13,14]

Given the robust market opportunity, lack of gender-differentiated solutions, and increased purchasing power of Chinese women, there is high potential for a term life insurance product designed for and marketed to CWMs.

Solution

The proposed solution to bridging these gaps in the growing women's life insurance market is a term life insurance product called "HerLife," specifically designed for CWMs aged 25–50 years. HerLife will provide 10–15 years of term life insurance with the requirement to waive and fund the premium for three years in the event of a pregnancy complication, birth of a child with a congenital disorder, diagnosis of malignancies of female organs, or death of a spouse (see Figure 3). HerLife premiums, costs, and benefits will be iterated through a partnership with a primary Chinese life insurance provider (e.g., China Life Insurance) to ensure adjustments based on risk factors and desired cash-flow generation. HerLife provides a solution for the current lack of products, awareness and education on life insurance among CWMs.

Figure 3 HerLife Example Product Option



	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Premium contribution paid from HerLife customer	10,000¥	10,000¥	10,000¥	0¥	0¥	0¥	10,000¥	10,000¥	10,000¥	10,000¥
Premium contribution paid from Insurance Partner				10,000¥	10,000¥	10,000¥				

● Year customer pays premium ● Year insurance partner waives and funds premium customer

Source: Authors. [With date from the source: HDFC Life. 2014. HDFC Life Smart Woman Plan, 2014. http://www.hdfclife.com/women-insurance-plans/smart-woman-ulip-plan.

[13] IFC et al., 2015.
[14] CIA World Factbook, 2015.

HerLife provides a simple, step-by-step "shopping" experience focused on meeting the CWM's financial needs (see Figure 4). It will offer high-level as well as optional deep-dive views of information when selecting products to provide education and transparency to the customer before choosing coverage. HerLife will provide details on how the CWM's premium was calculated, which risk factors/personal details contributed to its price, and which factors she can modify to change the pricing and payment of her plan.

After choosing her plan, the CWM will be given the option to select different payment plans, including micropayments by week, to make it more financially feasible some mothers. She can also add multiple coverage types to her "shopping cart," enabling her to compare policy options and pricing. She will be able to pay for her chosen HerLife plan through an integrated payment system that will include both Alipay and mobile text payments. HerLife aims to be a partner to consumers throughout their lives and to be adaptable to different life stages.

Once women have completed the HerLife shopping journey, they will adhere to any other standard processes and policies required by the insurance partner (underwriting, background checks, exclusions, etc.). HerLife and the insurance partner will use existing big data on CWMs and mortality to effectively model risk of life and life events and calculate price to guarantee success.

Product Development, Roll-Out, and Marketing

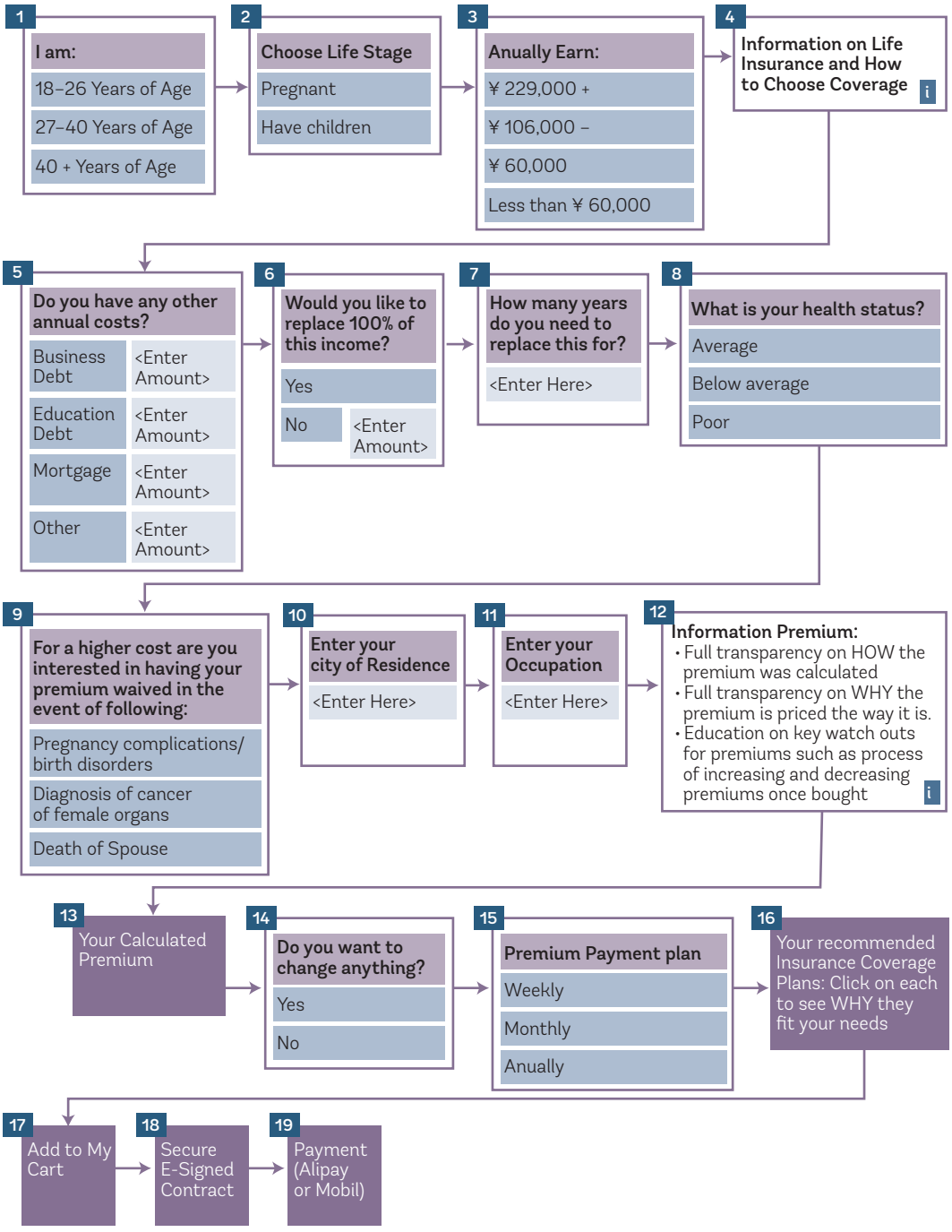
(Please refer to the Implementation Timeline in Figure 7 for additional detail)

After developing the product, HerLife will be piloted and adjusted before rollout to a larger consumer base. Because Chinese companies are not required by law to provide life insurance, it is necessary to use multiple channels in addition to employers.[15] In the pilot stage, HerLife will distribute the product across four main channels: 1) web sign-up; 2) mobile messaging; 3) sales agents (preferably female); and 4) public and private employers.

1. **Web Sign-Up**: The web will serve as the main platform through which all CWMs can purchase HerLife due to the prevalence of Chinese females aged 19–50 who have Internet access and engage in e-commerce.[16]

[15] Livermore, 2012.
[16] China Internet Watch, 2014.

Figure 4 HerLife Customer Education and Sign-Up Interface Example



Source: Authors.

2. **Text to Insure**: Because 89 percent of China's population has a mobile phone and China has the most mobile phone users worldwide, HerLife customers will be given a number they can text that will generate a series of text messages guiding them through the same prompts as the web interface.[17] This will facilitate the sign-up process for busy, working mothers and mothers who have non-smart mobile phones or limited data.
3. **Sales Agents for Pilot**: To gain a critical mass of users during the pilot, HerLife will use currently employed agents (preferably females) from the chosen insurance partner (e.g., China Life) to directly sell to new customers. It will also provide a transition period from traditional dependency on agents to using mobile and/or web technology to obtain HerLife.[18]
4. **Public and Private Employers**: HerLife will leverage the designated life insurance partner to provide this product as an option in benefits packages for both public and private employers. Employers will be able to promote and educate women on HerLife and life insurance, building HerLife's credibility and accelerating acquisition of new users.

For each distribution channel, the key messages for CWMs are that HerLife is a simple solution for her to protect the future of her children, prepare her to overcome potential future financial shocks, and empower her to decide how much life risk to cover.

Executing a strong pilot is critical to acquiring new customers, testing the product, and establishing a brand. The pilot will leverage the insurance provider's customer data and KPIs such as the number of CWMs, their average income, and their likelihood to invest in life insurance to identify and target early adopters. Because of the high prevalence of employed women in both urban and rural areas, HerLife will employ targeted marketing strategies for CWMs across rural and urban China.[19] In rural areas, sales agents already employed with the insurance partner will be trained on HerLife and go door-to-door to sell the product. In urban areas, these agents will set up education and policy sign-up stands in locations that experience high traffic of CWMs (e.g. children's health providers, family/maternal wings of hospitals, large retailers, and childcare service centers). This pilot program will provide initial results on HerLife's success and allow for adjustments and re-positioning prior to the full rollout.

[17] The Statistics Portal, 2015.
[18] McKinsey & Co., 2012.
[19] Catalyst, 2012.

After the pilot and adjustment, the product will be rolled out and marketed to the full customer segment across multiple channels such as social media, partnerships, and video advertising. These efforts are expected to provide good results because there are a significant number of women on social media and Chinese women trust their social networks.[20] It will leverage existing users from the pilot and social media networks to institute product credibility and visibility. Additionally, partnering with retailers focused on families; healthcare providers focused on maternal care/babies; schools; and childcare services to spread the word is crucial to reaching the CWMs. Furthermore, because the Chinese female consumer is increasingly drawn to beauty and retail as her earning power increases, a partnership with a Chinese comestic brand that has broad brand appeal will enhance the HerLife brand.[21] This cosmetic brand could provide pamphlets on HerLife at point of sale or HerLife could offer free samples upon sign-up of the product. In return, the cosmetic company would benefit from increased advertising, brand awareness, and sales. HerLife can also use video advertising to demonstrate the ideal CWM with life insurance as having a happy, healthy family and lifestyle to visually depict the value of the product's benefits.

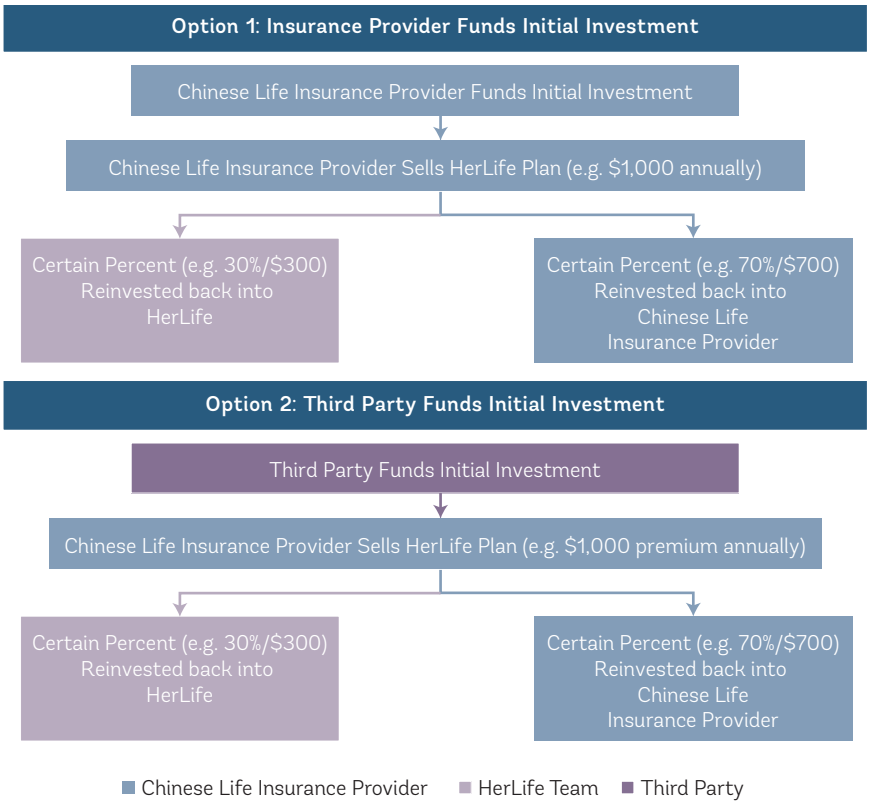
Product Pricing & Costs

Once HerLife is developed, there are two potential price models based on the type of partnership pursued. Option 1 would consist of a provider such as China Life Insurance developing HerLife in-house and paying the requisite investment and operating costs. Option 2 would entail a partnership with China Life Insurance (or similar firm) where HerLife would be developed and managed externally. For Option 2, an external funder (potentially the World Bank or a philanthropist) would pay the one-time investment costs for the start-up and build.

For both options, a negotiated set percentage of the annual life insurance premium will be reinvested back into HerLife for growth and adjustments. This will include additional investments as well as other selling, general, administrative and operating expenses (see Figure 5).

[20] IFC et al., 2015.
[21] Ni, 2012.

Figure 5 Sample HerLife Partnership and Pricing Options



Source: Authors.

Key Partners

In order for women's life insurance to be deployed, it is critical to form strong partnerships among several players: the HerLife team, life insurance provider(s), employers, CWMs, marketing partners, and the World Bank. Each stakeholder group has a different set of incentives that we believe will make them feasible partners for HerLife (see Figure 6).

Product Timeline for Implementation

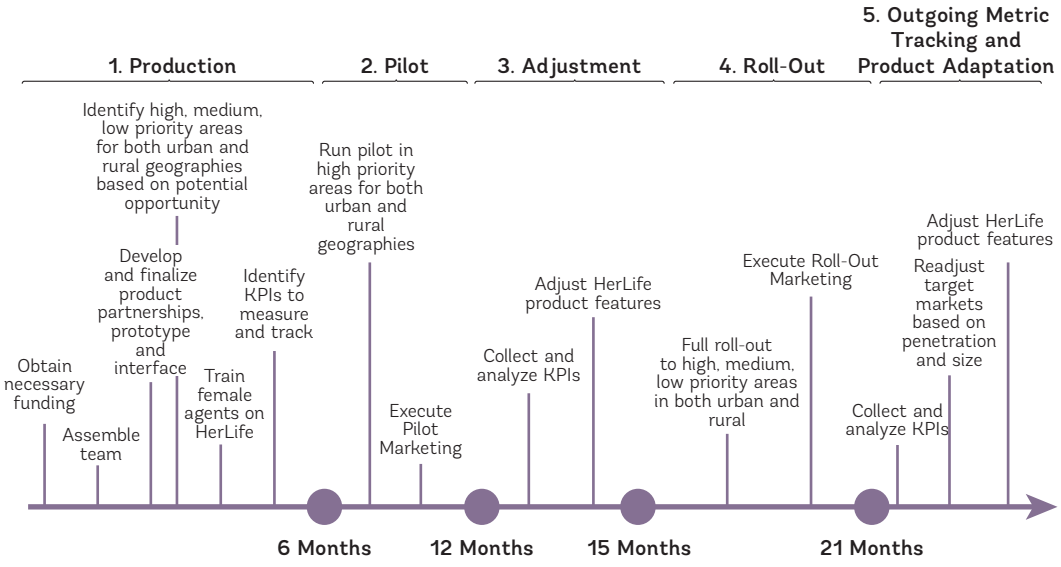
As shown in Figure 7, our prospective implementation timeline has five phases: product development, pilot, product adjustments, full product rollout, and ongoing metric tracking and adaptation.

Figure 6 Stakeholder Analysis

	Key Stakeholders					
	HerLife Team	**Life Insurance Provider (s) (e.g., China Life Insurance)**	**Employers**	**Chinese Working Mothers (CWMs)**	**Marketing Partners**	**World Bank**
Benefits	• 30% revenue from sales • Autonomy and ownership for new product • Ability to leverage model across multiple types of insurance and multiple countries	• Penetration of a new market and new customers • 80–90% revenue from sales • Ability to leverage model across multiple types of insurance and multiple countries	• Inclusion of women-specific benefits in compensation package • Brand image improvement • Potential cost savings based on calculated premiums and likelihood of payout	• Provides tailored access to life insurance • Allows for additional decision-making in the household • Helps families avoid poverty by better securing and smoothing the financial needs in the event of death	• Positive image for promoting women's life insurance • Potential revenue from number of policies sold	• Business plan integrates social protection and provides safety nets for Chinese children • This plan could integrate a longitudinal study to analyze the benefits of women signing up for the insurance
Risks	• Revenue changes with sales fluctuations • Adaptation to Chinese life insurer and Chinese government preferences	• Integration of product and distribution with current portfolio and channels	• Unwillingness to partner • Imbalance of power in pricing negotiations	• Understanding HerLife's product and benefits • Working women and women entrepreneurs are time constrained and have little time to invest in new products	• Lack of willingness to partner • Time and monetary investment in policy education and selling	• Funding initial investment
Risk Mitigation Strategy	• Identify and adjust potential revenue changes depending on sales fluctuations prior to product launch	• Identify integration points, bundling, packaging, and distribution that harmonizes with current product offerings	• Clearly understand pricing flexibility and necessities • Communicate detailed value proposition to incent employers to join the partnership • Connect and form deep relationships with partner employee leadership	• Ensure simplistic education of the product and benefits are tied into the product itself • Product will have user-friendly and quick education and sign-up will take less than 10 minutes • Leverage existing networks of working women and women entrepreneurs to share benefits of using the product	• Assess key desires of marketing partners and tailor partnerships to meet unique needs • Ensure simplistic education and payment of HerLife and benefits are tied into HerLife	• Provide detailed proposal and investment details with follow-ups • Provide monitoring and evaluation

Source: Authors.

Figure 7 Proposed Timeline for Implementation



Source: Authors.

Expected Impact

We believe our solution will positively impact the lives of CWMs and their families in three key ways. First, through the purchase of life insurance, Chinese women can prepare for events that leave their children without a mother, prevent the family from falling into poverty, and smooth familial financial shocks. Additionally, HerLife's product experience will provide education on life insurance and its benefits to guide the CWM in making the right life insurance investment. Finally, HerLife will increase women's decision-making power over their financial security, empowering them in other aspects of life.

HerLife can also stimulate the Chinese life insurance market by increasing demand for other insurance companies to market specifically to women, providing companies that do so with an opportunity to acquire up to millions of new customers and billions of dollars of sales. This can open the door to the development of new insurance products and companies tailored to women within and outside of China. Furthermore, several studies have found evidence that the development of the insurance sector leads to economic growth—developing HerLife can potentially lead to greater economic growth for China as well.[22]

[22] Beck & Webb, 2003.

Figure 8 Comparable Products in the Market

Insurance	Life Insurance Product	Women-Specific Benefits	Launched in Chinese Market
HDFC Smart Woman	✓	✓	✗
JASSUR	✓	✓	✗
ING-BOB	✗	✓	✓
HerLife	✓	✓	✓

Source: Authors.

Comparable Product Offerings

While there is not a life insurance product tailored and delivered via mobile technology to women in China, there are currently several life and health insurance products targeting women offered within other emerging markets as well as health insurance products designed for women in China. The examples below fall short in several ways: only one is offered in China (and it does not have a life insurance component), they do not leverage digital channels, nor have they achieved significant scale in sales. HerLife can leverage the power of the World Bank and cooperation with a Chinese life insurance provider to address a market gap in China and penetrate the market for CWMs (see Figure 8).

One example of an affordable, comparable product created and offered by HDFC India is called "Smart Woman." This life insurance and investment product provides a savings plan as well as coverage for key events in a woman's life. HDFC sold over 4,000 "Smart Woman" policies within the first month and has experienced strong continued sales within India.[23] Similarly, JASSUR, a woman-owned and operated life insurance firm in Morocco, provides tailored insurance advice as well as sales training to incorporate women into their sales force as agents. This model has proven successful and now approximately 50 percent of its agents are women.[24]

In China, there are insurers targeting women for select health insurance policies. For example, ING-BOB has launched an insurance policy for women, but similar to most insurance products in the Chinese market, it is tailored to women for health instead of life insurance. It includes insurance for some medical conditions specific to women (e.g. pregnancy and fertility costs) but lacks significant differentiations toward women with their life insurance offering.[25]

[23] HDFC, 2014.
[24] IFC et al., 2015.
[25] Towers Watson, 2012.

Figure 9 Potential Challenges and Mitigation Strategies

Potential Challenge	Mitigation Strategy
China has specific market regulations for pricing, monitoring, and disbursing life insurance policies.	1. Primary and secondary market research on dynamics of Chinese market and limitations on delivery and rollout of HerLife 2. Potentially assemble a team of experts on the Chinese market to help identify the most effective strategy for market entry and pitching/selling to key partners in China
Low awareness is a significant challenge to the success of the product—even older, more educated women fail to understand the benefits of life insurance and how to obtain it.[a]	1. HerLife's marketing plan and product experience focuses on educating women on the benefits of life insurance Please refer to the product description and marketing plan for additional detail.
Chinese women generally do not buy insurance outside of their employers' offerings due to insufficient assets and/or inexperience with the financial cost of loss.[b]	1. Leverage the designated insurance partner's current delivery of life insurance policies to employers of CWMs 2. Identify and form partnerships with high potential employers and offer HerLife as a preferred life insurance plan for CWMs. Create a compelling value proposition for both foreign and domestic employers that includes a better brand image and more productive employees 3. Partner with 3rd party employment agencies in China to offer HerLife to employers
There is an imbalance of power in negotiations between the HerLife team and potential Chinese life insurance partners, which may negatively impact the partnership.	1. Leverage potential network and expert sales team to conduct due diligence as well as demonstrate the financial feasibility and beneficial outcome for the insurance partner 2. Form relationships with key decision makers at partner firms

Note:
[a] IFC et al., 2015.
[b] Ibid.

Potential Challenges

HerLife recognizes four primary challenges: 1) a potential gap in knowledge of specific market regulations in China; 2) low awareness of life insurance products among CWMs; 3) the fact that CWMs generally purchase welfare benefits through employers; and 4) the imbalance of power in negotiations between the HerLife team and the designated Chinese life insurance provider. The HerLife team has addressed these challenges and provided mitigation strategies for each challenge in Figure 9.

Future Outlook

The future outlook for tapping into the global market potential of women's insurance products is bright, with the opportunity for life insurance estimated to be over $800 billion by 2030.[26] Accordingly, this product can be expanded internationally to secure women's life insurance markets in other growing markets such as Brazil and Mexico.

Additionally, while this initial plan requires at least one insurance partner, the HerLife team would hope to continue developing partnerships with multiple insurance providers with the objective of delivering life insurance catered to female consumers. HerLife is also a launch pad to which other types of insurance (e.g. health/car) can potentially be added and sold. The expected global growth for all types of women's insurance is estimated to double from approximately $770 billion now to over $1.4 trillion in 2030.[27] In the future, HerLife can potentially serve as a vehicle to help a woman choose insurance across all aspects of her life and encourage the entry of new insurance solutions for women into the market.

Overall, women's life insurance is an enormous and largely untapped market thus far both in China and globally, and we anticipate very positive growth for both HerLife and the market in the future.

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[26] Ibid.
[27] Ibid.

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Chapter 5

Innovative Floating Rate Green Bond for the Reduction of Air Pollution in China—An Application to the Shanxi Province's Case

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Abstract

Green Bonds combine fixed income financial instruments with the need to raise capital for low-carbon or green projects—assets or business activities and an environmental benefit.[1] With rising capital needs for funding green projects, a growing investor focus on green financial instruments, and mature corporations' awareness regarding social responsibilities, the volume of total green bonds has increased constantly in the past few years. There are many successes in financing sustainable programs and promoting green initiatives in a global context. However, China, both a major air polluter and a country that suffers from deterioration of air quality, still lags far behind in the development of green bonds.[2]

Shanxi province is among the regions most severely affected by air pollution. This area, the main provider of coal resources in China, is highly dependent on revenue from coal and mining and their affiliated industries, and is exposed to devastating air pollution challenges. However, the deceleration of economic growth and consequential lack of government funding hinder the local government's ability to support sufficient investment in air pollution reduction initiatives, especially within high-carbon emission industries.

[1] KPMG International, 2015.
[2] Kidney, Beate, & Oliver, 2015.

Our proposal recommends the issuance of green bonds aimed at financing air pollution reduction initiatives, including but not limited to technological upgrades, reconstruction of industrial composition, and air purification strategies in Shanxi province. The local government will be responsible for setting the coupon rate and face value and cooperating with professional organizations in developing selection criteria and processes to access eligible green programs. The key measurements and characteristics of each bond product will be released into the market in the same way as conventional bonds, to gain credit ratings and scrutiny. One of the most notable features of the bond is that the annually paid coupon rate will fluctuate negatively in correlation with specific performance indicators. Air quality improvement will lead to a more moderate coupon payment, while low effectiveness will result in a higher payment burden for the borrower. We believe that by using green bonds and linking the coupon rate with an Air Quality Index (AQI), the capital can be raised with the purpose of improving air quality while incentivizing the local government to maximize the effectiveness of the fund. Investors will also benefit from constant payments that are no less than conventional bonds with the same maturity.

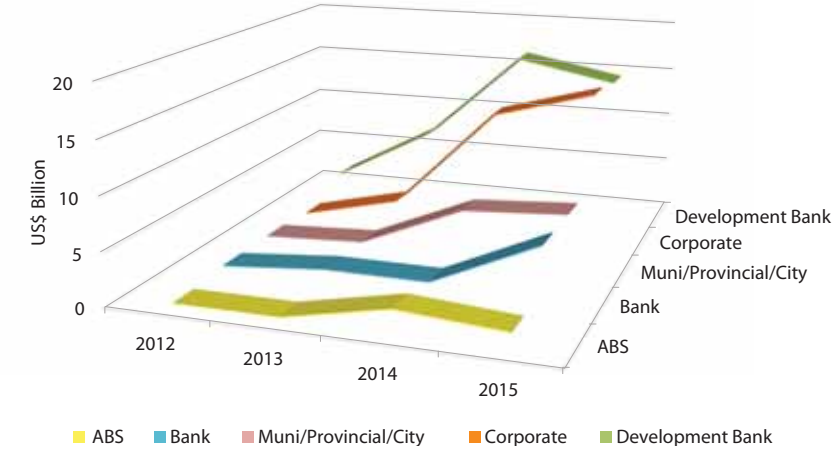
Problem and Context: Chinese Green Bonds Market and Air Pollution

The Global Market for Green Bonds

Green bonds have developed as a new investment channel that promotes sustainable development. It has grown speedily since first issuance in 2007. By 2015, global green bonds issuance has increased to more than US$40 billion.[3] There are two interesting properties about the current global green bond market. First, development banks and corporations remain the major issuers, while the role of local governments is limited (see Figure 1), indicating that local governments have great potential to enhance their impact in green bonds markets. Secondly, with diversity in the category of climate-aligned bonds, transportation and energy take up the largest percentage (Figure 2). Projects targeting waste and pollution, of significant concern to citizens and media in many countries, have a disproportionately small share of investment.

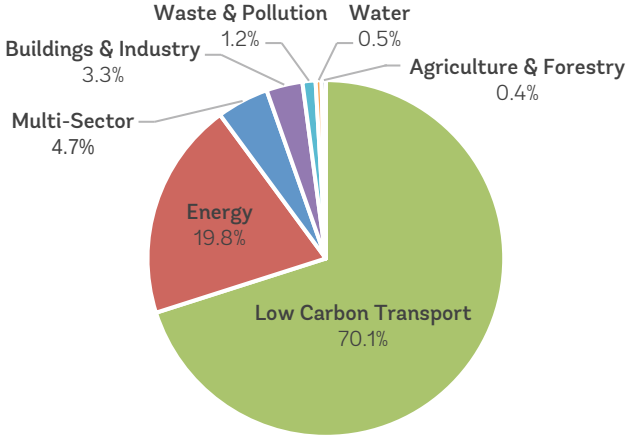
[3] Bloomberg News, 2015.

Figure 1 Trend of Major Issuers of Green Bonds, 2012-2015



Source: Climate Bonds Initiative, *Bonds and Climate Change: The State of the Market in 2015*..

Figure 2 Climate-aligned Bonds by Themes, 2015



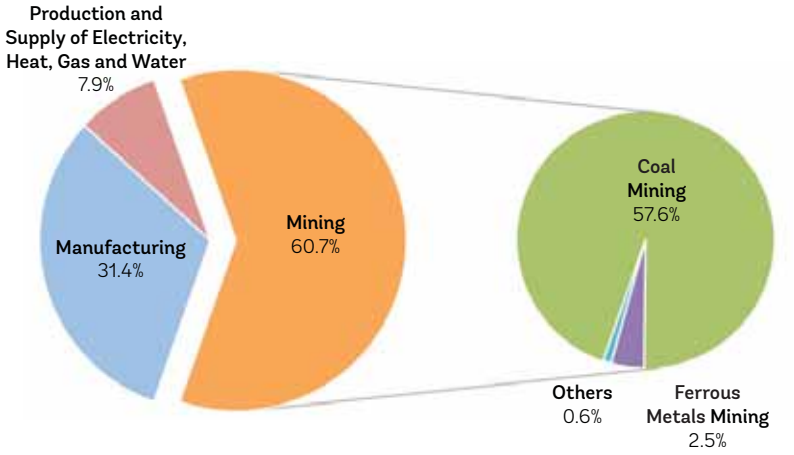
Source: Climate Bonds Initiative, *Bonds and Climate Change: The State of the Market in 2015*..

Air Pollution in Shanxi Province

Shanxi Province is located in a belt of coalmines in northern China, and has recently experienced stagnation in its economic growth. In 2015, the GDP growth rate of Shanxi was only 3.1 percent, ranked second to last among 31 provinces in the country.[4] The industrial structure of Shanxi Province relies heavily on the coal mining industry (Figure 3). The slump

[4] Sina Finance, 2016.

Figure 3 Value Added of Industry by Sector in Shanxi Province, 2013



Source: *Shanxi Province Statistics Year Book, 2014.*

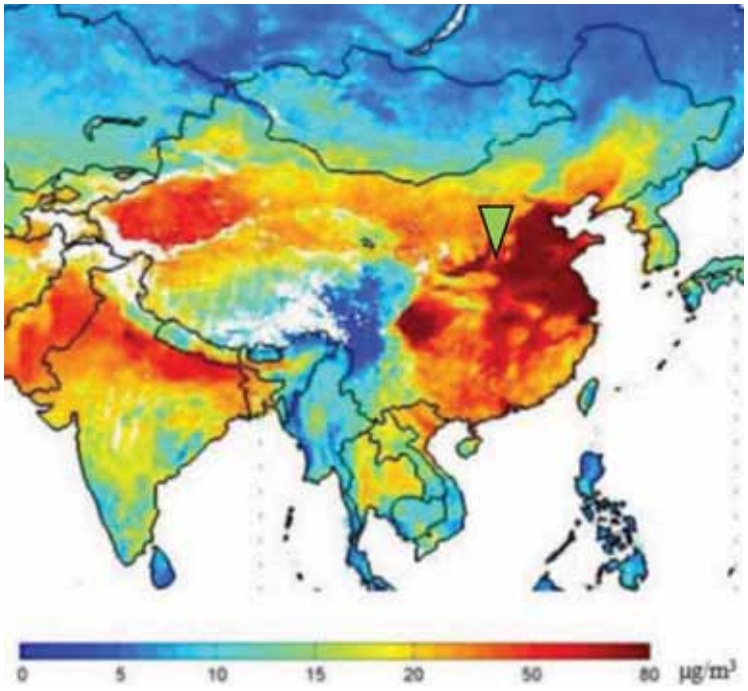
in the mining industry and the decrease in the price of coal are principal reasons for its economic stagnation.

In addition, Shanxi Province suffers from severe air pollution. Scholars have studied how coal mining and coal-related industries result in severe air pollution in the region.[5] The coal mining industry in Shanxi Province has led to ecological losses estimated to be 487.5 billion yuan since the 1970s.[6] Atmospheric pollution in the province is among the most severe in China (Figure 3). The major air pollutant indexes include sulfur oxides, nitrogen oxides, carbon monoxide, volatile organic compounds, particulate matter, and ozone.

Air pollution in Shanxi Province not only results in ecological damage but also widespread public and individual health impacts. According to a report issued by the World Bank and Institute for Health Metrics and Evaluation, ambient particulate matter air pollution is one of the leading causes of premature death and disability in East Asia and Pacific.[7] In 2013, Brauer et al. found that air quality in China was largely influenced by outdoor air pollution from burning coal, resulting in approximately 366,000 deaths in China.[8] Hazardous air pollution has pressured government institutions to improve the quality of the local environment.

[5] Haibin, Liu, and Liu Zhenling, 2010; Also see Xie Kechang, Li Wenying and Wei Zhao, 2010.
[6] Luna Lin, 2013.
[7] Institute for Health Metrics and Evaluation, Human Development Network, The World Bank. 2013.
[8] Brauer M, et al., 2013.

Figure 4 Map of Areas under Air Pollution based on Monitoring Data of PM2.5



Source: Li, Li, and Dong-Jun Liu, 2014.

The local government has realized the urgent need to resolve the issue and taken several steps to do so. In 2013, Shanxi Provincial Government released the Letter of Responsibility for Air Pollution Prevention and Control to prefecture-level cities and a corresponding implementation plan.[9] This effort has achieved only limited effectiveness, due in part to dependence of the Chinese energy sector on coal.

The Shanxi government has promised to shut down polluting factories and to close a large number of illegal mines, but no action has been taken to close the coal-burning power plants in the region that are responsible for more than half of the pollution, since coal produces electricity and runs industries, most notably supplying the capital Beijing.[10] Additionally, the local government lacks sufficient funds to enforce its environmental policy and boost green industry. Pollution control equipment is expensive, and once installed in factories, it is costly to maintain and expends a great deal of electricity that could have been sold to consumers.

[9] CCIED 2013.
[10] Bradsher and Barboza, 2006.

Emerging Green Bonds Market in China

Chinese policy-makers have placed more emphasis on environmental protection since former Chairman Hu Jintao proposed the notion of "scientific development." Developing the green bonds market is a promising channel to fund China's pollution-reduction policy. China, as an important player in the global investment market, has recently taken a great step forward. The Green Finance Committee of the China Society for Finance and Banking issued its "2015 Directory of Supporting Green Bonds Projects," aimed at improving China's ecological environment and alleviating pressure on resources.[11] At same time, the Central Bank officially announced the introduction of green financial bonds in the inter-bank bond market.[12] Following the policy encouragement, Shanghai Pudong Development Bank issued China's first domestic green bond on January 2016 and raised 20 billion yuan.[13] China's steps to develop a green bond market reflect China's demand for capital to build its environmental protection cause.

Solution

To address the issue, our proposal suggests the issuance of new kinds of green bonds which integrate the profitability of the bonds' products, the essence of sustainability empowerment, and the innovative idea of a floating coupon rate that is correlated to air pollution in the form of the AQI standard (Air Quality Index). According to our research, similar bonds have not yet been offered in China or other regions of the world.

Our proposal creates a new model that we believe can address the financial needs of investors and the environmental concerns of stakeholders. First, in line with the intrinsic characteristics of traditional bonds, green bonds provide investors with constant, low-risk, and secure yield payments and simultaneously fuel green projects in need of sufficient financial support for the relative long term in Shanxi province.[14] Second, because green bonds are targeted at air pollution reduction programs, investors' portfolios are diversified toward more socially responsible purposes. This innovative financial instrument adheres to the World Bank ideal to "make public funds available earlier for development via the issuance of bonds."[15] Additionally,

[11] Green Finance Committee of China Society for Finance and Banking, "Directory of Supporting Green Bonds Projects." December 22, 2015.
[12] Kong Yuling, 2015.
[13] Bloomberg, 2016.
[14] Gustke, C.. 2013.
[15] World Bank, 2015.

local people and industries will be the beneficiaries of improvements in air quality and sustainable resilience. Third, the floating rate, which is the most innovative aspect of our model, will fully reflect the outcome of investments and government execution capability in terms of the coupon rate. For example, if a ten-year bond fails to fulfill its initial air pollution goal in one year, the government will bear more coupon payment in the form of a higher coupon rate in that particular year. However, if the government succeeds in meeting the criteria the next year, the coupon will decline to the level stated when issued. This method avoids bureaucracy, corruption, and misuse of the fund, maximizing the externalities of the capital.

There were similar bonds issued by local or central government previously, which leads to less concerns regarding the issuing process. However, the selection of eligible corporations and the validity of the AQI measurements may need more expertise and scrutiny from the World Bank, academic institutions, and other professional NGOs

An Implementation Plan in Shanxi

Our innovative green bonds target air pollution reduction programs, including but not limited to enhancement of energy efficiency, transformation of traditional fuel sources, and reconstruction of environmental-friendly source structures. Stakeholders include local government, central government, corporations, and World Bank or other professional institutions with expertise in the domain of air pollution alleviation or evaluation. During the issuance of the bonds and using the money, the abovementioned stakeholders will play different roles to guarantee the goals of the bonds are reached.

There are three broad stages in our implementation plan: 1) compile selective criteria for green bonds recipients and evaluate potential recipients; 2) formulate systematic air quality indicators to which the coupon rate is correlated and issue the bonds; and 3) evaluate the effectiveness of the local government in combating air pollution and pay the coupon payments annually.

Stage One: Compilation of Selective Criteria and Evaluation of Potential Recipients

In order to select eligible corporations and valuable programs, the local government, the Ministry of Environment of China and the World Bank could compile the criteria. Since the selection procedures cover too many technical details that go beyond the financial spectrum, our proposal does not address this perspective in detail. Nevertheless, we suggest that the local government seek more expertise from external organizations, and adopt pre-existing guidelines for these procedures, which will enhance the objectivity and standardization of the projects.

The Shanxi government could negotiate with the regulators in bond issuance, specifically the Chinese Ministry of Finance and People's Bank of China, to guarantee that all steps in setting criteria and selecting recipients are conducted within a legal framework. Since the local government has an identified need to finance air pollution reduction, and since this is also of concern to the central government, getting permission for issuance should not be a primary challenge at this stage.

Since the Shanxi government has experience in issuing similar financial instruments and has a comparative advantage, as well as administrative power, in getting critical corporations' information, the local government should play a leading role in collecting data on the volume of the investments and the validity of each program's expected outcomes as a result the financial support. The recipient corporation should also be responsible for providing objective data and relevant information to accurately evaluating the actual need for green bonds and the possible air pollution improvement it can generate as a result of the investment.

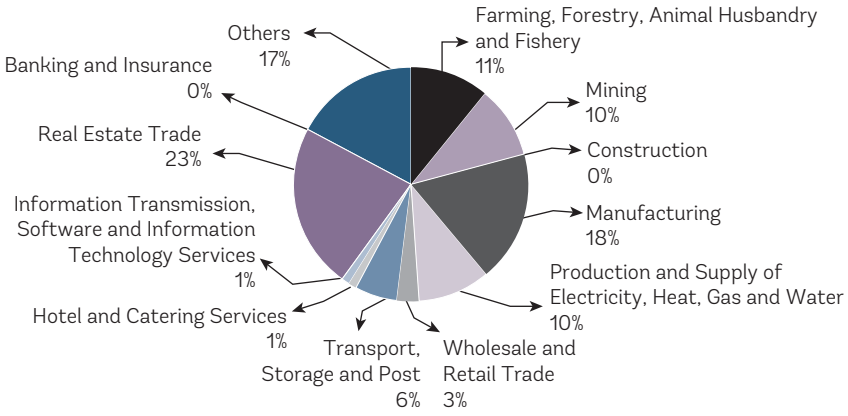
The World Bank, the Ministry of Environmental Protection of the People's Republic of China (which is the ministerial governmental organ responsible for environmental issues), and other NGOs should be involved at this stage. Their expertise will be effective in developing quantitative, systematic, and standardized methods to assess the "greenness" and applicability of the programs. Pre-existing criteria, such as *China Banking Regulatory Commission or the International Climate Bond Standards Scheme* can also be used as references. It is our belief that the role of NGOs and the World Bank should not be ignored; their expertise and neutrality will add creditworthiness to the bonds. It will be necessary for the local government to be open and transparent about the accessibility and accuracy of data.

After compilation of the criteria, the local government should seek eligible corporations and relevant programs within Shanxi. Since the coal and mining industry comprises over 30 percent of the provincial fixed investment (see Figure 5), there will be a huge and long-term demand for the bonds. We emphasize that the Shanxi government should be compliant to all previously set criteria.

Stage Two: Formulate Systematic Air Quality Indicators to which the Bonds are Correlated and Issue the Bonds

According to our research, there is no alternative air pollution indicator other than AQI to measure and objectively scale air quality. The index is globally recognized, which means that it will be understood by international investors. However, the Shanxi Province Environmental Monitoring Center, an Institutional Organization subject to the

Figure 5 Shanxi 2015 Total Investment in Fixed Assets by Economic Sector (rural households investment and trans-provincial investment are included) (Unit: 100 million)



Source: Shanxi Economic Statistics Year Book 2015.

guidance of Shanxi Environmental Protection Agency measures and announces the index. The existence of the conflicts of interests between the government interests and the conduct of air quality measurement make the index more vulnerable to human manipulation.

We will deploy two methods to maintain the objectivity of the index.

1. Involvement of a third-party partner

The Shanxi government should involve third party institutions, including the World Bank and Climate Bonds Initiative, in the daily scrutiny and report of the AQI. The methods, ranges and veracity of the index should be guaranteed under the cooperative framework between the government, governmental organizations, and NGOs to minimize possible manipulation of the index.

2. Cooperation with national-level environmental agencies

In the administrative structure, the Ministry of Environmental Protection of People's Republic of China and the Shanxi government should share parallel status. Direct cooperation with the ministry will create more impetus for objective and professional publicity, and avoid possible conflicts of interest.

After settling the technical details, the bonds will be marketed and priced in the same way as conventional bonds. Financial institutions, such as credit rating agencies or investment banks could evaluate the bonds and give specific ratings according to analysis done beforehand. Since these

bonds will retain the financial characteristics of conventional bonds, we believe they can also be traded in the secondary market in accordance with supply and demand in that domain.

Stage Three: Evaluate Effectiveness – Post Issuance Tracking and Monitoring

To guarantee the effective use of the funds raised by green bond issuance, a strict monitoring mechanism will be constructed at different levels. The Shanxi government will need to publish periodic reports of the impact of green bonds. Reporting needs to satisfy the requirements stated in the International Capital Market Association's Green Bond Principles 2015, which calls for full disclosure of the selection of eligible projects, the use of proceeds, and commitments of different sectors and regions. Since green bonds will primarily fund projects related to waste management and energy efficiency, the reduction in industrial waste and energy consumption should be specified in the report.

In addition to the overall report on the impact of green bonds, project-specific reports are also desirable. Detailed allocation of funding and environmental indicators such as sulfur oxides, nitrogen oxides, and particulate matter will be provided in separate reports that summarize the impact of one type or multiple types of green projects. Third-party audits from the National Environmental Monitoring Centre or Shanxi Environmental Monitoring Station will be involved to ensure the accuracy and the objectiveness of the reporting. The transparency and integrity in reporting and monitoring is the key to guarantee the smooth functioning and improve the effectiveness of green bonds. All the reports, publications, and documents will be made accessible to the public upon bond issuance.

Hypothetical Cash Flow Under Different Scenarios

Assumptions:

a. Issuance of green bonds with 1,000 face value, 5 percent coupon rate, paid annually, 10 year to maturity
b. Upper limit for coupon rate: 8 percent, the rate will be floated by 1 percent each year
c. Annual Air Quality Goal: 80 percent of days within a year with air quality index within the domain of " Excellent" to " Good"

Table 1 Projected Cash Flow of Green Bond

Year	Coupon Rate	Coupon Payment	Scenario
1	3%	30	Government reaches air quality goal
2	3%	30	Government reaches air quality goal
3	4%	40	Government fails to reach air quality goal
4	5%	50	Government fails to reach air quality goal
5	6%	60	Government fails to reach air quality goal
6	7%	70	Government fails to reach air quality goal
7	8%	80	Government fails to reach air quality goal
8	7%	70	Government reaches air quality goal
9	6%	60	Government reaches air quality goal
10	5%	50	Government reaches air quality goal
10	N.A	1,000	Principal Payment

Benefits and Risks

Table 2. Benefits and Risks to Issuers and Creditors

Categories	Local & Central Government (Green Bond Issuers)	Green Investors (Creditors)
Benefits	• Bond issuers can be leaders in what will become a huge market. • The government can demonstrate its commitment to social responsibility objectives and green credentials to citizens and investors. • Large-size bonds are more attractive to investors: Green bond allows issuers to integrate different environmental assets, such as solar, water and pollution cleanup investments into a larger bond. • Green bonds provide a technology-neutral tool to encourage the flow of capital to green projects by providing support through regulation, tax benefits, and credit enhancements. • Issuing green bonds costs less than implementing the government's direct policy in reducing air pollution. • Issuing green bonds minimizes the magnitude of inefficiency that can be caused when the government intervenes to eradicate air pollution.	• Green Bonds issued by the government has less default-risk • Institutional investors can address environmental, social, governance (ESG) mandates and corporate social responsibility (CSR) initiatives. • Privilege offered by the government may be available to green investors (e.g. tax advantages)

(*continued on next page*)

Table 2. Benefits and Risks to Issuers and Creditors *(continued)*

Categories	Local & Central Government (Green Bond Issuers)	Green Investors (Creditors)
Risks	• The government's criteria of identifying the green project may not be universally accepted among others • When the investment is not "green," the media reputation of the government will decrease • The government's administration expenditures for managing the increased amount of green bonds being issued	• Because the green bond market is relatively a small market, in which the investors hold the bonds until maturity, it lacks liquidity • Investors may not be able to track use of the money when the malfunctioning of transparent reporting occurs • Green bonds have relatively low yield • There is a lack of sufficient complex research available to make educated investment decisions

Expected impact

Pollution Alleviation

By providing sufficient funding for green projects, we expect an observable environmental improvement in the local community. A reduction in waste, gas emissions, and industrial sewage will be a direct outcome of the green bonds. The proceeds of green bonds will be primarily used to control the emission of sulfur oxides and nitrogen oxides as well as provide industrial wastewater treatment. The green projects will directly target the source points of pollution, providing financial resources and equipment necessary to reduce the level of pollutants in industrial discharge, leading to an improvement in air and water quality in Shanxi province. With more financial support in pollution reduction mechanisms for controlling industrial waste discharge, overall pollution will be reduced and environmental quality can be improved.

Energy Efficiency Improvement

In addition to the alleviation of pollution, green bonds will contribute to energy efficiency in Shanxi province by supporting energy-saving programs and the construction of new energy plants. The proceeds of the bonds can be allocated to the construction of wind and solar power plants as well as the installation of energy-saving equipment. As reported in the

"List of investment projects approved by the government of Shanxi province" (2015)[16] the government invested a substantial amount (0.93 trillion RMB) in the construction of a solar and wind power plant in 2015. A number of energy efficient programs are also in process. Programs that promote the combined use of heat and electric power, clean conversion of natural gas, and installation of energy-efficient facilities are all the projects that need sizable funding. Our green bond initiative can help the government finance the projects and achieve desirable energy-saving outcomes. The improvement in energy efficiency is expected to generate a number of positive impacts in a variety of production activities, including resource-exploitation, combustion of fuel and coal, electricity generation, and transportation of mineral resources. The result will be a significant reduction in energy consumption and numerous benefits to the industry sector in Shanxi province.

Transformation of Economic Structure

The impact of green bonds involves improvement of the environment, as well as the transformation of Shanxi's economic structure. The abundant mineral resources in Shanxi enable it to become the largest exporter of coal and coal-generated electricity in China. Shanxi's economic growth relies heavily on its mining industry and thermal power, with coal mining and metallurgy industries comprising more than 50 percent of the total output in 2015.[17] However, over mining results in the gradual exhaustion of coal resources. A slumping mining industry brings massive layoffs and slows economic growth.[18] The golden age of the mining industry has ended and Shanxi needs to seek new driving forces to boost its economy.

The issuance of green bonds can accelerate its economic transformation from an economy based on exporting raw materials and traditional energy to a modern economic center with a diversified, polymeric, and comprehensive energy base. Through financing green projects that promote the development and use of wind and solar power plants, our bond progressively transfers the economic structure of Shanxi and helps it achieve sustainable economic development. This is also in line with the aim of the Chinese central government to upgrade the energy consumption structure and boost the economic transformation of China. Shanxi's initiative to use green financing to drive economic transformation can serve as a reference and exert significant impact for the reform and development of the whole country. [19]

[16] Shanxi Government, 2015a.
[17] Shanxi Government, 2015b.
[18] Q. Q. Chen, 2016.
[19] Xinhua News, 2015.

Improvement of Government's Financing Ability

Through the issuance of green bonds, Shanxi's government can obtain a stable source of funding for environmental projects and expand its environmental practice. Bonds that specifically target green projects guarantee a minimum amount of money invested in environmental programs and reduces illiquidity risks. In addition, energy conservation and pollution reduction programs usually have long cycles. To finance projects with long cycles, banks and governments leverage funds using maturity mismatch, which increases the interest risks and limits their ability to manage liability.[20] Issuing green bonds that are tailored made for green projects significantly reduces the risks of asset-liabilities mismatch. Green bonds provide a stable source of funding and risk reduction for the government, thereby improving the government's ability to finance green projects.

Achievement of Government's Development Goals and Increasing its Credibility

As stated in the 13th five-year plan of Shanxi, many efforts are needed to meet the environmental requirements set by the central government. The government needs to tackle the problems of excessive pollution and the inefficient use of energy. Since there is a distinct parallel between the previously discussed benefits of green bonds and the development objectives of Shanxi's government, green bonds can effectively help the government reach its objectives.

Evaluation of the government's performance is largely based on its ability to meet its development goals, meaning that greater progress on the environmental and economic goals contributes to a better reputation for the government. Moreover, Chinese citizens will have a better perception of Shanxi's government because of its commitment to environmental protection. Combined with improved transparency brought by the establishment of a monitoring system, the credibility of the government will also be improved. From the government's perspective, green bonds can bring tremendous benefits by helping meet regional development goals and improving the government's image.

Impact on the Global Green Bond Market

The issuance of the proposed green bond does not simply enlarge the overall size of the global green bond market, but provides an innovative model for the structuring of green bonds. Distinct from the traditional green bond, the proposed green bond offers a floating return based on both financial and environmental indicators. The idea of "green" is further incorporated into the design of the product, combining the concepts of

[20] People's Bank of China, 2015.

"green credit" and "financial innovation". The creative coupon rate design can serve as a model for global green bond issuers, who aim to improve the environment at a low cost of financing. The flexibility of our products makes it adaptable for a wide range of markets.

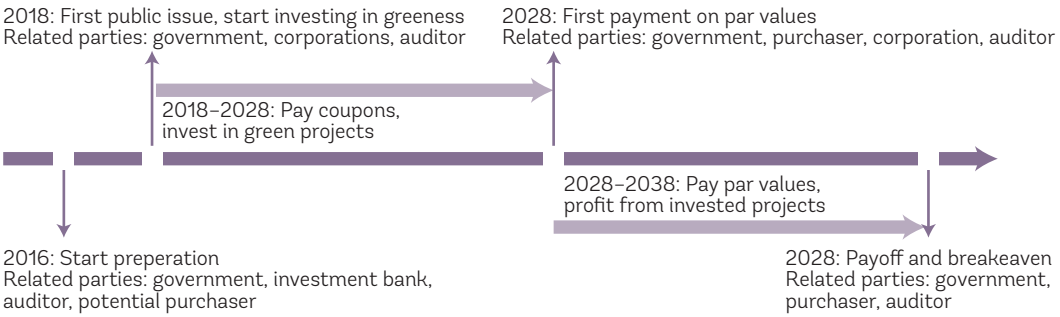
Timeline

Considering the extent of Shanxi's environmental issues and their current severity, an immediate start is strongly suggested. However, due to the complex implementation process and imperfect institutional mechanism, the first stage can last for two years. It is understandable that this time period is still too limited to build a well-functioning mechanism, however, it is necessary and possible to settle all necessary preparations for issuing a new financial instrument, such as negotiations between the issuer and underwriters, searching for independent auditors and other factors mentioned above. It is understood that such functionality will be constantly improved upon during the bond cycle.

Official issuance would likely be feasible in 2018, after a two-year preparation cycle. To allocate bond income and coupon payments more appropriately, bonds should be issued once every year with evenly distributed amounts by combining bonds with different maturities. Considering that most investments' ranges are relatively long, bonds with 10 or more years to maturity are preferred.

Coupon payments are started after one year and are regularly accumulated during the following nine years as the number of issued bonds increases. In 2028, after 10 years of paying coupons and investing in greenness, the government will need to repay par values with income generated from their investments. At the same time, governments should invest in profitable green projects to generate future cash flows and address environmental pollution. Thereafter, during 2028–2038, governments can ideally reach a breakeven point and finally pay off all debts at the end of 2038.

Figure 6 Projected Timeline



Comparable Product Offerings

The concept of green bonds is not a new one. Introduced by World Bank in 2008, green bonds have been effective financing tools for worldwide environmental development. The issuance of water bonds by Asian Development Bank, floating rate green bonds by World Bank, and climate bonds by International Finance Corporation (IFC) are all successful examples.[21] The green bond market in China also started attracting the attention of investors last year. The Agriculture Bank of China (ABC) issued a green bond targeting air pollution and energy efficiency in October 2015,[22] soon followed by a green bond issuance by Shanghai Pudong Development Bank in February 2016 that successfully raised 20 billion RMB to support environmental protection and clean energy.

Although our products are different in terms of structure and issuing purposes from these green bond products, we will review two similar products: IFC's Green offshore renminbi bond and the green bond by ABC for the reference of our target investors.

IFC Green Offshore Renminbi Bond

IFC issued RMB 500 million ($80.29 million) of green bonds in March 2014 to finance Chinese climate-friendly investments. It was the first multilateral green bond in the Chinese markets and was listed on the London Stock Exchange.[23] The bond aims to reduce greenhouse gas emissions by updating transmission facilities, installing solar and wind power, and providing funds for technology regarding efficient energy usage. By fiscal year 2015, the bond had financed climate-related investments of $3 billion a year.

Green bond of the Agriculture Bank of China (ABC)

The Agriculture Bank of China (ABC) raised US$ 1 billion in Oct 2015.[24] The proceeds of the bond will be used on both domestic and foreign investments in renewable energy, waste management, transportation and so on. [25] The issuance included US$ 400 million of 3-year bond (at 2.125%), US$ 500 million of 5-year bond (at 2.773%) and US$ 94.49 million (600 million RMB, at the exchange rate on the date of issuance) of 2-year bond (at

[21] GoldmanSachs, 2014.
[22] Chan, 2015.
[23] Klöpfer, 2014.
[24] China Daily. (2016). Green bonds issued for renewable energy,
[25] London Stock Exchange, 2015.

4.15%). These bond were rated as A1/A/A by Fitch and faced a 4 times oversubscription.[26] This implies an increasing interest of domestic investors and the confidence of green bond market. By January 2016, around 40 projects were approved under the selection of ABC green bond, with total loan of about US$ 1.52 billion (10 billion RMB, at the exchange rate of 18 Jan, 2016).[27]

Using green bonds together with other financing tools, IFC was estimated to finance the climate-related investments of US$ 3 billion by the fiscal year of 2015.

Potential Challenges

In addition to challenges mentioned in the section regarding the Implementation Plan, another potential challenge is the mechanics of attracting investors to consider green bonds. Green bonds have drawbacks that may reduce investment incentives of investors. First, there are no worldwide, unified criteria to evaluate the performance of green projects. Sometimes it is difficult for investors to distinguish how green a project really is. Second, green bonds generally have relatively low yields. According to Climate Change Initiative, the majority yield is less than three percent,[28] which may lead investors from green bonds to alternative financial products. Moreover, a common disadvantage of bonds is that they also lack liquidity. Green bonds take up a small proportion in investment market and most green bonds will mature in three to seven years, with very limited space for green bonds to be resold.[29] All these factors may discourage investors from investing in green bonds.

Several measures may mitigate the challenges and increase investor confidence in green bonds issued by Shanxi government. The government can increase transparency for green projects and make information open to the public. Additionally, the government can devote itself to establishing a more complete and rigorous evaluation system of its green projects. To increase yields, the government can reasonably raise the coupon rate of green bonds, as proposed in the previous section. Finally, Shanxi provincial government can also develop secondary trading market for green bonds, thereby increasing their liquidity.

[26] Fitch, 2015.
[27] Q. Q. Chen, 2016.
[28] Gustke, 2013.
[29] Ibid.

Future Outlook

The green bond we proposed is more than the regional issuance of a traditional bond, but an innovative fixed-income model that incorporates environmental indicators into the determination of the return. The creativity and flexibility of our products provides for the possibility of various adaptations across different regions for different environmental purposes. Other than Shanxi, any province in China might find solutions in our green bond model to fund their green projects. For example, the Guangdong government, which aims to alleviate water contamination in the Pearl River, can issue green bonds with a coupon rate linked to the levels of metal contaminants in the river. The proceeds of the bond can be used to subsidize the end-pipe treatment of industrial sewage, which can largely improve efficiency in wastewater management and reduce the government's financial burden in controlling water pollution. Another application of our model can be a green bond that protects the rainforest. If the public sector or NGOs in South American countries would like to raise funds to battle deforestation in the Amazon rainforest, they might issue green bonds that have the coupon rates pegged to vegetation coverage in a specific region.

If the pilot implementation plan in Shanxi is successful, various adaptations of our bond can also be promoted in the market. In addition to fixed-income securities, we can further extend the idea into green derivatives or other financial instruments. The innovative green financing model we proposed is far beyond a regional bond. It lays the foundation for the development of a variety of innovative financial products, which might contribute to the future development of the global financial market.

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Chapter 6

A New Model for Impact Investing: Application of Impact Units to Assess Feasibility of Social Investment Opportunities and Interventions in Kenya

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Abstract

An important driver of achieving Sustainable Development Goals, impact investing encourages social interventions that increase access to basic services such as finance, healthcare, education, clean water, and energy. Despite the growth in African economic activity, the need for high impact social interventions remains high.[1] The generally low level of development in Third World countries continues to provide opportunities for impact investing through the creation of products and services that contribute to improved social, financial, and environmental welfare of local beneficiaries.

East Africa is one of the centers of global impact investing, with a disbursement of more than US$9.3 billion over the past five years.[2] Kenya accounts for nearly half of the impact capital disbursed in East Africa. However, there is little evidence of differences that can be traced to specific impact investments. Results sometimes appear ambiguous, and many claims attributed to impact interventions are often unsubstantiated.

Our proposal introduces an impact performance measurement and valuation tool ("Impact Units") that will enable impact creators (such as local innovating companies, or non-profit organizations, or for-profit institutions running Community Social Responsibility (CSR) initiatives) to

[1] UNDP, 2015.
[2] Global Impact Investing Network, 2015.

develop social interventions that demonstrate real and measurable impact as measured and certified by our proposed Impact Units.

In summary, the impact creator (most likely an entrepreneur) develops interventions targeting social impact, we (Wylde International) convert the benefits of the interventions into Impact Units which then enables the impact creator to source for buyers of the Impact Units depending on the extent of the fit between the Impact Units buyers' objectives and the impact creators' interventions.

The resulting better fit between the impact buyers' objectives and the impact creators' interventions increases the possibility that the most deserving of beneficiaries get to benefit from creators of socially inclined interventions.

Problem and Context

Impact investments are investments made by individuals, communities, companies, organizations, and funds with the intention of generating measurable social impact.

It is difficult, however to assess the outcomes of their investments from a beneficiaries' point of view because actors in the sector usually adopt varied understandings and measurements of impact.

In order to address these challenges to accurate measurement of impact, Wylde International proposes a tool to that will provide an objective and reliable way of both measuring and assigning value to interventions that target social impact. This idea borrows from W+ Units' concept developed by Women Organizing for Change in Agriculture and Natural Resource Management (WOCAN) to track the changes to women's lives brought about by technology.

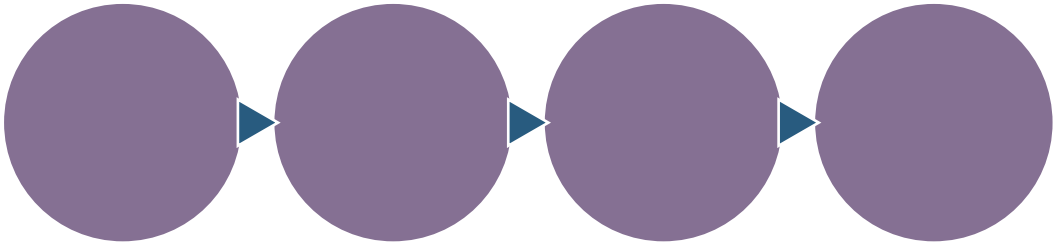
Solution

The Idea of Impact Units Explained

Impact Units (IUs)are the bedrock of our proposed model, whose overall aim is to bring together multiple collaborating partners into a beneficial network of investors, investees, and local beneficiaries.

IUs are a unique certification methodology that assigns higher impact value to projects that result in increased social and economic benefits for deserving beneficiaries such as marginalized communities, disaster prone groups, and communities living in hardship areas. These communities could certainly benefit from interventions such as access to renewable

Figure 1 Impact Units Cycle



energy technologies, time and labor saving devices, improved agricultural productivity, and access to improved water and sanitation.

The Wylde International Impact Units model seeks to assess the feasibility of impact investment opportunities in Kenya by inviting impact creators to demonstrate the actual benefits of their interventions through pilot projects.

It empowers potential impact investors to make informed decisions on where best to deploy their financial and other resources to address the social issues that resonate best with their objectives.

The model in Figure 1 awards higher Impact Units based on the quality of the intervention and evidence of their successful implementation based on results of pilot studies.

Online Database Creation, Metrics Definition, and Weighting of Impact Interventions

In this first stage, Wylde International will provide access to a comprehensive and reliable set of social, economic, and environmental data such as (but not limited to) maternal deaths per thousand, the number of people with access to clean water, and the number of primary school enrollments.

Wylde International will then create an online impact scoring methodology that will use a three-stage ranking system; the first ranking based on regional metrics, the second based on sector ranking, and the third based on the in-sector priorities as detailed below.

Regional ranking

This metric will entail the ranking of Kenya's 47 Counties from the poorest to the richest. For instance, the Table 1 shows the ten poorest Counties in Kenya as at November, 2013 indicating that Turkana County was the poorest.

This first stage of the ranking system will facilitate the ranking of impact creators' interventions based on high need locations. For instance, the model will award more points to impact creators who direct their interventions to Turkana County (which is ranked the poorest), and fewer points to

Table 1 Kenya's Poorest Ten Counties

Ranking	Region(County)
1	Turkana County (poorest)
2	Mandera County
3	Wajir County
4	Marsabit County
5	Tana River County
6	Samburu County
7	Kwale County
8	West Pokot County
9	Isiolo County
10	Makueni County

Source: Kenya National Bureau of Statistics.

those who choose to direct their interventions to Makueni County (which is ranked as better off than Turkana County).

Sector ranking

This next stage will facilitate the ranking of impact creators based on the application of key sector metrics that take into account the main social issues for each of the 47 Counties, with less points going to interventions that target lower ranking sector priorities.

For example, Tables 2 and 3 (which use fictitious information) rank the main sector issues in Nairobi and Mandera Counties. Based on our model, impact creators whose interventions prioritize either education in Nairobi County or poverty solutions in Mandera County will be awarded higher points.

This ranking model is also applicable in other areas of the world provided that actual ground statistics are used.

Table 2 Sector Issues Ranking – Nairobi County

Sector	Ranking
Education	1
Health	2
Hunger	3
Water and Sanitation	4
Poverty	5

Table 3 Sector Issues Ranking-Mandera County

Sector	Ranking
Poverty	1
Water and Sanitation	2
Education	3
Hunger	4
Poverty	5

Intra-sectoral dynamics ranking

The goal of this stage is to help impact creators to focus their interventions to the most pressing needs within each sector.

For instance, based on data in Table 4, our scoring methodology will assign the highest scores to impact creators in the education sector in Nairobi if they target beneficiaries with no formal education.

Registration and Impact Scoring

Upon the successful creation of the database and ranking system, the next step will be to invite interested impact creators to provide specifics of their proposed projects, using our online platform to derive a score on their proposed interventions.

Once the impact creators are satisfied with their scores and indicate willingness to proceed with their proposed interventions, Wylde International will gather details such as the impact creator's name, the description and objectives of the proposed interventions, tax compliance and registration certificates, contact details, profiles of key personnel, and recent history.

This information obtained in this stage will be used by Wylde International to contact the impact creators, verify their data, and agree on the timetable and design of implementation of the pilot project.

Implementation of the Pilot Project and Impact Assessment

The primary goal of this step is to confirm if the impact creators' proposed interventions do in fact achieve their stated objectives, and confirm the relationship between the intervention and the changes witnessed among beneficiaries.

Wylde International will require impact creators to develop and share detailed work plans and other relevant details such as locations and timelines of pilot studies to enable full assessment and valuation of the impact of interventions.

Table 4 Education Levels in Nairobi County

Education Level	Percentage	Ranking
No formal education	11%	1
Primary education	38%	2
Secondary education and above	51%	3

Source: Kenya National Bureau of Statistics.

Wylde International will monitor the pilot projects by tracking the activities and outcomes and adjust the outcomes observed for the following factors as provided by the European Venture Philanthropy Association (EVPA).

a. Deadweight: What would have happened anyway, regardless on the impact creators' interventions
b. Attribution: What proportion of the outcomes can be attributed to action of other actors.
c. Drop off: How far the original outcome is likely to be reduced over time.
d. Displacement: The extent to which the original situation was displaced elsewhere and for unintended consequences.

Awarding of Impact Units

This is the final step in our model and involves the assignment of Impact Units based on the results of the pilot stage above.

For every pilot project successfully implemented and assessed, the impact will be quantified in the metrics outlined below.

a. The actual change achieved in an area as a result of the impact creators' interventions will be first metric to be considered.

   For instance, Wylde International could obtain data on the reduction in the number of maternal deaths directly attributable to an impact creator's intervention during the pilot phase.

   Other examples of metrics that Wylde International could use for the evaluation of interventions include the number of teenage girls that successfully evaded teenage marriage, or the number of new primary school enrollments resulting from completion of new classrooms or schools in a given location.
b. The costs incurred by the impact investors from the creation on the interventions for the pilot phase is yet another metric. The costs will be computed based on documented evidence provided by the impact creators.

Once the two steps above are completed, Wylde International will award certificates indicating the value of the interventions in the form of Impact Units.

In addition, the certificate awarded will indicate the scores attained by the impact creator in the three-step scoring process outlined in the creation of online data base creation and metrics definition step (Step 1 in our model).

Impact Units are, therefore, are used to monetize the impact of social interventions by matching the costs of creating and delivering interventions to observed changes in the status of beneficiaries.

A copy of the certificate awarded will then be posted online to provide potential impact buyers with an objective way of assessing the potential impact of their investments by providing information on the quality of the impact creators, defined here as those creators that deliver interventions that result in the highest changes where they are most needed.

Illustration

Suppose an impact creator spends US$10,000 to create and deploy an intervention that improves access to clean water to 1,000 beneficiaries in the arid parts of Kenya whenever the intervention is deployed.

Based on our methodology, Wylde International will award a certificate to the impact creator indicating that every US$10,000 invested with the impact creator (through the purchase of Impact Units) will translate to access to water for 1,000 beneficiaries in the arid parts of Kenya.

In our illustration above, the certificate will also provide a higher ranking (based on our model's location, sector, and intra-sector scoring methodology) for the clean water interventions since the target is the arid parts of Kenya where (presumably) access to clean water for residents is the top sectoral priority.

It is expected that the certification process will help those impact creators that generate higher quality interventions to attract more impact buyers and investors in much the same way a good commercial financial product attracts the attention of investors because of the prospects of superior returns.

Lastly, as the impact creators' interventions achieve their intended objectives over time, and the results (such as lower maternal deaths) are updated annually in our database, the initial high rankings awarded to some of their interventions will begin to fall. Wylde International expects that this reduction in ranking to act as a signal for both impact creators and Impact Units buyers that the time is ripe to target interventions to other deserving locations, sectors, or intra-sector priorities, or possibly to develop new interventions altogether.

Benefits for Impact Creators

a. The online presence provided by our database will provide a global audience for both impact creators and buyers, hence increasing the possibilities of matching impact creators with buyers with similar objectives.
b. The Impact Units system will remove the headache of adjusting project objectives to fit those of impact buyers by creating arms' length trading relationships based on the willing buyer (of Impact Units) / willing seller (of impact interventions) basis that underlies commercial transactions.

Benefits to Impact Buyers

a. The Impact Units methodology will simplify decision making on impact investment opportunities by providing an easy to understand, clear and measurable way of assessing the impact of every dollar invested in available interventions.
b. Impact Units will facilitate the impact buyers' comparison of similar impact creators and their interventions, and by so doing empower impact buyers to make informed choices about where best to direct their investments depending on their objectives.

Benefits to Impact Users

a. The Impacts Units principal gain for target beneficiaries is the much improved possibility that any interventions intended to create impact will resonate with the beneficiaries' specific contexts and priorities.

Potential Challenges

a. Interventions targeting human social development usually do not measure outcomes on the basis of a unit-based approach. It may take some time for our proposed unit-based metrics to be accepted and adopted by impact-sector actors.
b. Measurement of impact requires some level of research expertise and commitment to continuous field research to attest the veracity of impact creators' claims about their interventions. The research process is potentially time consuming and can stretch the resources of firms like Wylde International.
c. The Impact Units model may generate conflicts between impact creators and certification agents like Wylde International especially with regard to what costs or expenses should be captured as valid for the purposes of valuing impact, and what actually constitutes valid impact in the eyes of beneficiaries.

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Appendix

The Appendix presents abstracts of the submissions among the finalists that received honorable mentions. They appear below in alphabetical order of proposal title.

A Novel Practice for Mobile Money Payments: Using Fingerprints to Enable Real-Time Transactions in Nelamangala, India

Team Paysa
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Abstract

In order to improve business environments in developing economies via innovative private/public partnerships, Paysa will establish cashless payment systems using fingerprint authentication in rural India. We will connect people's fingerprints to their bank accounts and enable transfers from the customer's bank account to the merchant's bank account. We believe there is a large potential for growth because roughly only 50 percent of the global adult population holds bank accounts and the majority of this financially unserved adult population live in developing countries. Our proposed payment process can be accessible to illiterate people because it uses fingerprints as an identification method.

Our solution to enable acceptance of mobile money payments is to partner with a local bank to encourage users to switch from cash to cashless cell phone based transactions. We will develop a fingerprint authorization system connected with mobile phones or computers integrated with a biometric database to support cashless transactions between business owners and customers. In order to purchase items, the customer will place his or her finger on the fingerprint scanner, which is connected to a phone or computer. We will provide the scanner to the merchant. Our software will then go through a pre-existing database of fingerprints, Aadhaar, based in India and one of the world's largest biometric

identification systems, to verify the customer's identity, thereby enabling the transaction.

To narrow our focus for the pilot program, we have chosen the region of Nelamangala, with a population of 37, 232 (Census India 2011). Furthermore, we included the fingerprint concept because it is a creative and secure approach and it is unique to one's identity and difficult to alter. Using fingerprints as a form of identification meets our goal of ensuring user-friendliness by taking into account varying levels of literacy and cultural values in rural areas. Through our research, we have seen that using fingerprints as a form of signature is a norm in India. With the support of a grant from the Bill and Melinda Gates Foundation, we aim to execute our pilot at the beginning of next year by targeting the unbanked population to reduce poverty and increase financial mobility.

Agency Organization System: A Financing Model for Revolutionizing the e-Waste Recycling Business in Guiyu, China

Team Chinglish

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Chung Yin Kwok, Bachelor of Laws (year 4), The University of Hong Kong, Class of 2017

Eugene Oscar Yuen, Bachelor of Laws (year 4), City University of Hong Kong, Class of 2017

Kai Tim Timothy Chan, BBA Information Systems (year 4), The Hong Kong University of Science and Technology, will graduate in 2018

Chun Wai Chung, Bachelor of Laws (year 4), City University of Hong Kong, Class of 2017

Abstract

We observed that with the increasing popularity of electronic appliances, proper disposal has become a global concern. Unlike traditional waste, including plastics, paper packaging, and leftover food, e-waste usually includes a broad variety of materials, some of which are extremely valuable but require advanced technology to extract. Recycling costs for e-waste are extremely high, causing most producers to opt for a simple way out—shipping them away and disposing of them untreated.

Guiyu, where we base our research, is one of the final destinations for untreated e-waste. Pollution caused by e-waste has destroyed farmland, and

people living there have had to find alternative sources of income. By using crude methods such as burning and manual dismantling, they contribute to the recycling industry, yet this process creates even more hazards to the environment and to workers. Breaking this vicious cycle is the motivation for the Agency Organization (AO) system.

We determined that the current situation is caused by a deadlock in financial inefficiency: producers ship e-waste to Guiyu merely for disposal, without any value gained; established recyclers purchase locally dismantled parts through an exploitative "recycling business;" workers purchase necessities from vendors at an inflated cost. The AO system will address these problems in a sustainable manner.

The AO aims to replace all unnecessary "middlemen," thus reducing financial inefficiency. It uses a step-by-step approach: first, with help from the government, it attempts to establish relationships with recyclers and local workers, better clustering both the supply and demand sides' needs, and building a foundation for its further development.

Secondly, it organizes local workers through a membership scheme—this replaces the current freelance mode of production, and enables the AO to collect data concerning the local available workforce, as well as starting to form a systematic way of channeling e-waste to the local workers.

Thirdly, building upon the previous foundations, the AO can then work to increase the efficiency between recyclers and local workers, by providing training to members, increasing their specific dismantling skills, and making them capable of specialization. At the same time, the AO would serve as a center for daily necessities, using a credit system fueled by members' active participation in the scheme. This step replaces the middleman that causes inefficiency, i.e., the vendors who supply necessities to workers.

As a final step towards making the AO a sustainable device, we propose the usage of a "Green Dot" licensing scheme. End-product producers who use materials recycled through the AO would be granted a license to use the "Green Dot." The business incentive to obtain the "Green Dot" license would differ according to the ratio of materials recycled. If the ratio of expensive materials is higher, the "Green Dot" is intended to become a hallmark for luxury brands, signifying corporate social responsibility and awareness towards the e-waste problem; conversely, if the ratio of ordinary materials is higher, the "Green Dot" would serve as an official proof that the producers correspond with the "Go Green" policy by the government.

Improving the Quality of Life for Artisans from Rural Communities through Empowerment of Women

Team Tejiendo Comunidades
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Abstract

During the period from 2012 to 2014, the number of poor increased in Mexico in the from 53.3 to 55.3 million, which represents an increase from 45.5 to 46.2 percent of the country's population, according to the National Council for the Evaluation of Social Development Policy (CONEVAL 2014).

CONVEAL indicates many reasons that the number of people falling into poverty has risen:

1. Lower revenues.
2. Low economic growth.
3. Population dynamics and inequality.
4. Insufficient income to provide for basic needs

Further according to FONART (National Fund for the Development of Arts and Crafts) in Mexico there are more than 10 million people were employed in a craft or an activity related to a craft, although currently there is no national census that allows us to identify the exact number of artisans in Mexico by state.

Most of the people engaged in artisanal activity in the first quarter of 2011 had low incomes that put the artisans below the poverty line.

One of the main problems regarding Mexican crafts is the marketing process. According to Rafaela Luft Dávalos, few craftsmen export their products and there is a need to "promote a legal framework for the defense of handicrafts, mainly to combat piracy."

We proposed to create a development program that promotes community empowerment through projects that take advantage of the wealth of communities and enable them to integrate their social fabric, improve their income, and maintain harmony with the environment.

Our goals are to:

1. Identify areas of opportunity in communities through ethnographic studies, field visits, and identification of community leaders.
2. Work with community leaders in detecting needs and strengths of their group to be able to work toward the integration of a productive project.
3. Design a plan of implementation where we elaborate technical feasibility studies, both marketing and financial, as well as advice on structuring the project for searching and management of public funding for a link with social investors.
4. Support the marketing of products made by these groups, helping to connect them to national and international markets through our social platform, bringing them closer to potential market niches.

The program will empower rural communities in states like Yucatán, Guanajuato, Querétaro and Hidalgo. It can especially help women with microenterprise development and significantly improve the income of rural communities.

Reinventing Global Payment Processing for Migrant Remittances, Microenterprise Funding Infusions and Nationwide Direct Benefit Transfers (DBTs)

Team Shibe
Pramod Emjay
Jens Wiechers

Abstract

Centralized financial systems have formed the core of international finance for decades. The obvious advantage is that a financial institution acting as counterparty adds trust, and the provision of a singular, institutionally held transaction "ledger" obviates the need for third-party authentication. However, this centralization has added costs that are passed on to end-users: our proposal is an attempt to look at the value that can be added by switching to a decentralized payment processing system that can be currency-neutral, scalable, robust, and built on top of a system of publicly verifiable transactions. In order to understand the actual impact that such

technology can provide, we look at the benefits of implementing this system for international remittances by migrants, Direct Benefit Transfers, and national subsidy schemes, and in the funding of grassroots projects by international donors.

Contextually, staggering losses—as high as 50 percent—are observed in end-to-end transmission for aid programs. Broadly, there are three systemic causes:

1. Systemic corruption enabled by layered centralization;
2. Consolidation of control/access by middlemen, and distinct information asymmetry; and
3. Inefficiencies of transmission systems for smaller trade quanta.

The suggested implementation looks at Blockchain technology—the backbone of cryptocurrencies[1] such as Bitcoin, Dogecoin and Ethereum. The efficiency offered by this technology, together with its fully traceable nature presents a unique opportunity to tackle systemic corruption, distribution failures, and the onerous fees levied by monopolistic payment processors. This implementation is not seen presently in a holistic form, but is built up of individual components that are well established and whose efficacy has been verified empirically on a local and global scale.

Beyond our proposal, the exact technical decisions will need to be explored further. Options include "forking," which is building a custom copy of an existing cryptocurrency protocol, or building upon existing freeform systems such as Ethereum that allow programming smart contracts directly into the software. Since the recommendations in the proposal could essentially be assembled on top of existing and available platforms, the feasibility of the project is considerably high.

Given the nature of the gains made by this proposed system, it is observed that the most potential is for developing nations that often bear the brunt of institutional financial inefficiencies.

Considering the novelty of the technology discussed here, a few significant challenges pose themselves: low market depth for individual cryptocurrencies mean high volatility; lack of oversight is seen as inherently threatening by global governments, who also drag their feet when it comes to unexpected jumps in technologies with far-reaching consequences.

[1] Cryptocurrencies are digital currencies employing encryption techniques to regulate the generation of units of currency and verify the transfer of funds. They operate independently of a central bank.


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