



Center of Science, Technology, and
Society



Research Project Overview

ILUMÉXICO

PRENDE LA LUZ DE MÉXICO

November 2014

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The Global Social Benefit Fellowship



The Global Social Benefit Fellowship is a comprehensive program of mentored, field-based student action research as part of the Global Social Benefit Institute (GSBI) through Santa Clara University's Center for Science, Technology, and Society. For the past 12 years, GSBI has sponsored more than 200 social entrepreneurs around the world in a mentorship program that aids social enterprises in strengthening their business plans and enhancing their social impact in local communities. As a part of the Fellowship program, students conduct two quarters of academically challenging research and a seven-week in-field experience in order to find practical solutions for poverty and environmental problems in the developing world.

Iluméxico Profile

Iluméxico is a social enterprise that strives to eradicate energy poverty in Mexico by using a mix of last-mile business strategies and community development activities to introduce clean technology solar systems to marginalized communities. By integrating last-mile marketing, distribution, micro-finance, and maintenance methods, Iluméxico has achieved a presence in 11 Mexican states, including four rural branches. Since its inception in 2009, the enterprise has installed over 3,500 solar systems, resulting in the assistance of over 11,000 people.



Background and Project Reports

Iluméxico is a social enterprise that strives to end energy poverty in Mexico by offering clean-technology solutions that provide access to renewable energy. Through last-mile marketing, distribution, and maintenance strategies, as well as an independent micro-finance program and collaboration with local governments, the enterprise fosters social and sustainable development throughout rural Mexican communities.

Since its beginnings in 2009, Iluméxico has expanded its presence to 11 Mexican states, as well as established rural branches (called ILUcentros) in four Mexican states that provide more localized service to its customers. While the enterprise has been successful throughout this rapid growth phase, it hopes to continue to improve by strengthening its organizational structure and gaining a better understanding of customer needs. After a seven-week in-field research project, as well as a nine-month critical analysis of the enterprise, the industry, and rural customer satisfaction evaluation methods, we have generated four project reports to aid Iluméxico in increasing its customer satisfaction levels and accelerating its rate of growth. These include *Measuring Customer Satisfaction in the Base-of-the-Pyramid*, *Customer Feedback and Potential Solutions*, *ILUcentro Strategy and Development*, and *Product Development: Solar Refrigeration*.

The four reports encompass research completed during the seven-week field experience in two of the four Mexican states where Iluméxico has established local branches. First, *Measuring Customer Satisfaction in Base-of-the-Pyramid* focuses on the customer feedback from over 260 solar system users in the states of Campeche and Oaxaca, which was systematically collected in survey format using Net Promoter Score methodology. The collection process and all modifications made to the methodology are included in a manual, which concludes with the pros and cons of using this methodology in rural areas, as well as suggestions for future use. This report is intended to be posted on the GSBF webpage.

In the second report, *Customer Feedback and Potential Solutions*, survey answers were analyzed and categorized in order to reveal the most pressing issues regarding the satisfaction of Iluméxico users. Along with a detailed list of customer concerns and direct quotes from both ILUcentro locations, we have also included possible solutions and their viability potential. This report is for internal use by Iluméxico only.

After observing a drastic difference between customer concerns in Campeche and Oaxaca, we generated a third report, *ILUcentro Strategy and Development*, that directly compares the progress and improvements of each ILUcentro in order to better track the development of local branches. The customer surveys also provided insight into customer interests of the future.

While the project is still in the beginning phases, our fourth report, *Technology Development: Solar Cooler*, describes the addition of a small-scale solar-powered refrigerator in order to deepen customer engagement, which includes the challenges that must be considered when bringing this product to rural markets. An appendix, which is written in conjunction with senior students from the School of Engineering at Santa Clara University, can be found at the end of the report that details the current progress, logistical challenges and successes, and plans for product research.

Project Overview

The research process began with Iluméxico's desire to build a stronger customer-product relationship. In order to more efficiently and adequately evaluate the user experience with products and the organization, the enterprise sought to measure customer satisfaction levels throughout various Mexican states. The process chosen to collect and analyze customer satisfaction and feedback is known as the Net Promoter Score methodology (NPS), a metric that serves to measure the loyalty between a provider and a consumer. It is detailed in the report titled *Measuring Customer Satisfaction in the Base-of-the-Pyramid*. The methodology is based on the perspective that all customers can be divided into three categories (a Promoter, Passive, or Detractor) based on their numerical response to a 0-10 Likert scale question: *How likely is it that you would recommend the company to a friend or colleague?* Customers are then asked an additional question: *Why did you provide this rating?* The percentages of each category rating (Promoter: 10-9, Passive: 8-7, Detractor: 6-0) are then calculated based on the total number of responses. The percentage of Detractors is subtracted from the percentage of Promoters to provide the NPS score of the company. These two questions aim to adequately measure customer loyalty and satisfaction by providing a qualitative number to compare to other competitors in the industry, while also providing a quantitative open-response for feedback that can help improve satisfaction levels. We also included additional questions at the end of the survey, including *In what ways can Iluméxico improve?*, *How did you find out about Iluméxico?*, and *If Iluméxico were to offer other solar-driven products, what would you like to see next?* While NPS is a popular methodology used in Westernized business spheres, it

is less common in other business environments, including enterprises that work in the rural sector.

In order to best serve Iluméxico's agenda while simultaneously gaining accurate customer feedback, we modified the NPS metric in order to conduct the survey process in rural areas. Of the seven-weeks spent completing research in Mexico, we spent two two-week research sessions in the rural communities of Campeche and Oaxaca. After our first day of surveying customers door-to-door in Campeche, we realized that we would have to modify the first NPS question in a manner that would be understandable to rural users who are not accustomed to rating their feelings toward an organization on a numerical scale. We created a graphic containing the 0-10 Likert scale with seven faces of varying expressions that corresponded with the numbers. By showing this scale to customers and using detailed examples of customer rating scenarios, we were able to conduct 156 solar system user surveys in 11 different communities. The surveying process was similar in Oaxaca, with a few exceptions. Instead of traveling house-to-house, we asked the users to convene at a pre-destined meeting place, and then separated them from the group individually for each interview. Due to the language barrier between our Spanish and the local indigenous language, we also further modified the graphical scale by reducing the number of faces to five and color-coding them. From 15 communities, we were able to conduct 106 user surveys.

After the data collection process, we calculated the NPS score for each ILUcentro branch, as well as more specific NPS scores for communities with a sufficient population. Although the NPS scores may be helpful when other competitors begin to utilize the metric, or Iluméxico continues to use it in the future, we found the numbers of little assistance in analyzing customer satisfaction levels. Instead, we focused on feedback garnered from the open response questions. We categorized customer feedback into phrases that represented various aspects of the company that raise customer concern, including employee attentiveness, system functionality, payment methods, and communication lines. We recommend that these aspects serve as the main focus for improving customer satisfaction levels throughout the user base.

Net Promoter Score was an effective foundation to begin the customer satisfaction evaluation process, yet the amount of modification and explanation required to convey the main point to the customer base led us to conclude that the first NPS question (with the Likert scale) is not adequate for evaluating customer loyalty and satisfaction. This assertion is demonstrated by the ratings of customers in both Campeche and Oaxaca, which do not correlate with their open response answers. In order to reach a greater level of efficiency when conducting

surveys, we recommend Iluméxico focus more on quantitative free responses and less on the numerical data that may be inaccurate because of cultural differences.

Drawing from the phrases that we had previously categorized into various company aspects, we were able to calculate the number of times that each phrase was mentioned and place them in order of customer concerns from the highest to lowest priority. We also categorized the phrases by community, so that the major concerns in each location would be more obvious and easier to address on a smaller scale. By dividing these key phrases into different combinations, we were able to identify which enterprise aspects could most benefit from improvements, which are laid out in the report titled *Customer Feedback and Potential Solutions*. While users in Campeche were concerned with the attentiveness and punctuality of the community engineers, Oaxacan residents worried more about the long travel distance on unreliable public transportation to make payments and purchase replacement parts at the ILUcentro branch in Oaxaca. To improve customer satisfaction and improve many of the current user concerns, we have provided suggestions for each identified issue based on customer recommendations and field observations. While not all of these potential solutions are immediately viable, we have included them for consideration in the long term and to spark more innovative and efficient ideas for solving current problems and avoiding future challenges.

The significant differences between the primary concerns of Campeche and Oaxaca customers allowed for a direct comparison of the establishment, major changes, and current status of each ILUcentro in the report titled *ILUcentro Strategy and Development*. Formatted in a table that includes the establishment date, past supplier models, major improvements/changes, the establishment date of the ILUcentro, and current processes and suppliers of each local branch, we provide a comparative analysis to allow Iluméxico to easily trace the development of the enterprise within each state. Since system users in Oaxaca claim to have a much higher satisfaction level than those of Campeche, it may also be beneficial to evaluate the services and products provided in Oaxaca in order to apply them to Campeche systems. There is, however, a large caveat in comparing the success and growth rates of the ILUcentros of Campeche and Oaxaca. While the branch in Oaxaca was opened as recently as the beginning of 2014, the ILUcentro in Campeche has been in operation for almost two years. Therefore, it could be assumed that the many customer concerns in Campeche are non-existent in Oaxaca because a newer and improved business model was implemented in Oaxaca when the center opened, whereas there still may be a few challenges to face in the older Campeche model. It could also be assumed that without much knowledge of future growth, challenges that Campeche faces will soon arise in Oaxaca as time goes on.

These two considerations may detract from the accuracy of the comparison table. The comparison may still be a useful tool to identify patterns that lead to future problems as new sites are established.

In order to continue to accelerate growth in Campeche and Oaxaca locations, as well as in other Mexican states in which Iluméxico has a presence, it is important that the enterprise anticipate future customer needs. From the results of a survey question regarding product interests, we know that the highest-demanded product (besides a larger system) is a solar refrigerator. In Campeche, 26.6% of customers who responded to the survey question were interested in a solar-driven refrigerator, while 18% were interested in a blender. While Oaxacan customers also participated in the survey question, their interests were drawn towards entertainment devices, with 33.3% interested in a television and 21.4% in a radio. While the needs of both customer locations are important, consumer electronic companies will likely create entertainment devices for these communities. This led us to evaluate a solar-powered mini-refrigerator for the Iluméxico product line, which is described in the report *Product Development: Solar Refrigeration*. Although such a device is in the early stages of research, design and viability testing, it might be a valuable first step in product diversification. Current challenges that have arisen during the planning include the difficulty of finding a solar system large enough to energize a small-scale refrigerator, as well as the amount of mobility the fridge/cooler should have, and the lowest and highest temperatures the device should reach. With this report find an appendix written by senior engineering students at Santa Clara University; this appendix describes the process of defining design requirements for the appliance, as well as logistical challenges to building a refrigerator for rural households.

The four reports contained herein aim to serve Iluméxico in improving customer satisfaction and accelerating growth. While there are certain variables of our studies which must be taken into consideration, such as the switch in graphic scales from Campeche to Oaxaca, and the fact that the ILUcentro and Iluméxico have been present in Campeche about a year longer than Oaxaca, the research findings provide as a solid foundation to formulate additional research focused on customer satisfaction and product offerings. We hope that the information provided here will support Iluméxico in its goals of positively impacting communities and encouraging sustainable development throughout Mexico.