Marketing Engineering Services

for the National Fire Department of Costa Rica

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for the National Fire Department of Costa Rica

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Abstract

Recent legislation in Costa Rica has required the Benemérito Cuerpo de Bomberos to privatize its engineering services. Our deliverable was a marketing plan for two engineering services: Fire Systems Testing and Fire Risk Assessments. The objective of the marketing plan was to increase awareness of these engineering services and revenue for the Cuerpo de Bomberos. A situation analysis and SWOT analysis assessed the current market position of the Cuerpo de Bomberos and identified competitive advantages. Methods to collect data for the analyses included personal correspondence, interviews, and written questionnaires. Marketing strategies pertaining to the Product, Price, Promotion, and Distribution and Supply Chain Management of the engineering services concluded the marketing plan.

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Executive Summary

Thriving businesses need to generate sufficient revenue and rely on strategic marketing for their continued success. In recent years, governments have pressured publicly funded agencies to transition into the private sector. This trend is driven by the need to reduce government spending. The Benemérito Cuerpo de Bomberos de Costa Rica is an example of a service-based organization that has recently become semi-privately funded. The Benemérito Cuerpo de Bomberos do not currently have a marketing strategy for their engineering services, specifically Fire Systems Testing and Risk Assessments. This has contributed to financial instability within its Engineering Department.

Project Goal and Objectives

The goal of this project was to develop a marketing plan for the Benemérito Cuerpo de Bomberos' Fire Systems Testing and Fire Risk Assessment services in order to increase awareness and yearly revenue of its Engineering Department. The primary objectives of the marketing plan were to:

- Increase the size and variety of the client pool.
- Increase income of the Engineering Department.
- Increase awareness and stress the importance of having fixed fire systems tested.
- Increase awareness and stress the importance of conducting Risk Assessments.

Methodology

To begin our marketing plan, research was completed concerning the Benemérito Cuerpo de Bomberos and fire prevention engineering services, specifically Fire Systems Testing and Risk Assessments. The research necessary for the marketing plan was collected through personal interviews, written questionnaires, and independent investigation. Personal interviews were performed with Cuerpo de Bomberos engineers, clients of the Control de Proyectos subdivision of the Engineering Department, fire systems installation companies, competition for Risk Assessments, and the national insurance agency, Instituto Nacional de Seguros (INS). Written questionnaires were also sent to clients of the Control de Proyectos. Independent investigation consisted of research about services the Bomberos de Costa Rica currently provide, competition, NFPA standards, and the relationship between Cuerpo de Bomberos and INS. This process involved establishing a situation analysis, evaluating strengths, weaknesses, opportunities, and threats (SWOT analysis) for the Benemérito Cuerpo de Bomberos, and developing recommendations based on the two analyses. Recommendations were aimed towards the target market and made by developing strategies concerning the Product, Price, Promotion, and Distribution and Supply Chain Management of the engineering services.

Situation Analysis

The situation analysis consists of three main environments: Internal, Customer, and External. The purpose of analyzing these three environments is to fully understand all parts of the market in which the Benemérito Cuerpo de Bomberos operates.

The Internal Environment established general knowledge of the marketing goals and objectives of the Cuerpo de Bomberos' Engineering Department, current marketing strategy, review of human and financial resources, pricing structure of Fire Systems Testing and Risk Assessments, and financial information regarding the Control de Proyectos division of the Benemérito Cuerpo de Bomberos Engineering Department. The Internal Environment information was based on interviews with the Benemérito Cuerpo de Bomberos Engineering Department and conversations with Señor Núñez.

The Customer Environment evaluated the responses we received from clients of the Cuerpo de Bomberos' engineering services, specifically Fire Systems Testing and Risk Assessments, through personal interviews and written customer questionnaires. We profiled current clients, when they purchase Fire Systems Tests and Risk Assessments, why they purchase these services, and the process involved to procure a test or assessment. Through these interviews we also identified potential customers, and why potential customers may not purchase Fire Systems Tests or Risk Assessments.

The External Environment considered the influence of fixed fire system installation companies, and the competition of the Benemérito Cuerpo de Bomberos Risk Assessment service. Information was gathered through conversations with Señor Núñez, independent research, and personal interviews with INS. We also investigated regulation requiring Fire Systems Testing and Risk Assessments, and the relationship between Instituto Nacional de Seguros de Costa Rica (INS) and the Bomberos de Costa Rica. Fire insurance, inspections, and insurance incentives offered by INS were the subject of focus for our investigation.

SWOT Analysis

Once the situation analysis was completed, we began our strengths, weaknesses, opportunities, and threats (SWOT) analysis for Fire Systems Testing and Risk Assessments. A SWOT Analysis Quantitative Assessment Matrix, or group of rated attributes, was generated. Next, we determined the magnitude (how strongly the attribute effects the organization) and importance (how crucial each attribute is to the organization) of each attribute using a numeric rating system. A total rating of the element was determined by multiplying the magnitude and importance values. Elements with the highest ratings had the greatest influence on the final marketing strategy. The SWOT Quantitative Assessment enabled us to identify competitive advantages and develop the best possible marketing recommendations.

Results

By investigating the three environments in the situation analysis, we learned about the Control de Proyectos' current situation within the Cuerpo de Bomberos, customers' opinions of the Engineering Department, and competition for the Control de Proyectos. For example, we learned from the personal interviews and written surveys that fixed fire system installation companies recommend that their clients get further inspected and tested by the Engineering Department, creating clients for the Benemérito Cuerpo de Bomberos. Risk Assessments competition consists of consultants of health and safety. These consultants conduct assessments and provide Risk Assessments reports in a similar manner to the Benemérito Cuerpo de Bomberos

Based on findings in the situation analysis, we determined the strengths, weaknesses, opportunities, and threats (SWOT analysis) for the Benemérito Cuerpo de Bomberos Engineering Department. Examples of strengths include: reputational resources, service quality, and cost for services. Weaknesses include: lack of marketing strategy and communication, transportation, and number of employees and efficiency. Opportunities include: discounts and market gap. Threats include: competition, open market, and lack of legislation.

Our recommendations for the Control de Proyectos division of the Benemérito Cuerpo de Bomberos Engineering Department were derived from the results of the SWOT Analysis Quantitative Assessment Matrix. The elements with the highest ratings were: Service Quality, Test Exclusivity, and Lack of Marketing Strategy and Communication. The elements with the highest value became the focus of our recommendations. Elements of lower value were not of focus, but influenced additional recommendations.

Marketing Strategies

Based on findings from the situation analysis and SWOT analysis, we produced marketing strategies to publicize and financially stabilize the Benemérito Cuerpo de Bomberos Engineering Department. The strategies fell under the following categories: Product, Price, Promotion, and Distribution and Supply Chain Management. The recommendations were influenced by the results of the SWOT Analysis Quantitative Assessment Matrix. The recommendation section concluded with alternative marketing strategies that require further investigation before possible implementation.

Product Strategy

We recommend the Benemérito Cuerpo de Bomberos engineers strictly meet report submission deadlines and provide more precise details in their reports. Our results showed that the engineers have been missing report deadlines and providing inadequate information regarding specificity of recommendations within Risk Assessments.

We recommend regularly evaluating the overall quality of Fire Systems Tests and Risk Assessments through service quality surveys. Sending thank you notes to clients can further increase the Benemérito Cuerpo de Bomberos' positive image with its client base. Reminders of annual Fire Systems Tests or Risk Assessments can also be sent out to clients to emphasize that the Benemérito Cuerpo de Bomberos care about their clients' continued safety.

We recommend creating a more simplified application process to procure a Fire Systems Test or Risk Assessment. Two options are for clients to apply and submit the application online, and to have a printable version of the application online if the client prefers to fill out and hand in a written copy.

Price Strategy

We recommend restructuring the current service price and charge more for Fire Systems Tests and Risk Assessments. Economic inflation and the need for experienced engineers justify the need for moderately increased prices.

We recommend the Engineering Department provide payment plans over a set amount of time with interest for companies who cannot afford to pay in full before a service is completed. The Engineering Department loses potential clients by requiring payment upfront and in full from enterprises that cannot afford these services. A payment plan would make paying for these services more affordable and generate extra revenue through interest for the Control de Proyectos subdivision.

Promotion Strategy

We recommend the engineers give informative presentations to potential clients and audiences, such as at business expositions, to promote safety and advertise their services. The Benemérito Cuerpo de Bomberos could invite potential customers to their Communications Center for an Inquiry Presentation to learn more about what the engineers can do for their companies.

We recommend the Benemérito Cuerpo de Bomberos create a specific link on its official website for the Engineering Department and utilize professional networks, such as LinkedIn. Currently it is very difficult to find the engineering services on the Benemérito Cuerpo de Bomberos' website. The page should include information about the range of engineering services, how to apply for the services, typical price quotes for its services, and contact information for the Engineering Department.

We recommend the Benemérito Cuerpo de Bomberos advertise its engineering services in business periodicals to reach potential clients. Technical magazines such as the EKA, Summa, El Financiero, and La Republica represent a way to reach business owners and those conscious of the business environment.

We recommend encouraging companies that utilize the Engineering Department's services to display the Benemérito Cuerpo de Bomberos' logo on their company website or within their building saying, "Benemérito Cuerpo de Bomberos Approved." Ideally, this advertisement would improve the reputation of the company that received the services and the Benemérito Cuerpo de Bomberos.

Distribution and Supply Chain Management

We recommend the Benemérito Cuerpo de Bomberos engineers increase the efficiency of completing Fire Systems Tests, Risk Assessments, and their final reports. To do this, the Benemérito Cuerpo de Bomberos engineers could set aside dedicated blocks of time at regular intervals to complete all Fire Systems Tests and Risk Assessments in a certain geographic area of Costa Rica. The purpose would be to save travel time and expenses by completing all tests and assessments far away from their office in San José during a specified period of time.

We recommend hiring qualified personnel to help the engineers write and edit reports more efficiently. The turnaround time of ten days for a report is not always met. If the engineers receive help with writing the reports, the reports could be produced in a shorter period of time, with the same level of quality.

Conclusions

Our marketing plan is an excellent first step for the Benemérito Cuerpo de Bomberos Engineering Department, Control de Proyectos Division, in spreading knowledge of the services they provide. If implemented, our hope is that it will increase the client pool, generating more business and revenue. Our marketing plan will enable the Benemérito Cuerpo de Bomberos to stress the importance of Fire Systems Tests and Risk Assessments and further promote public safety.

Introduction

Thriving businesses need to generate sufficient revenue and rely on strategic marketing for their continued success. In recent years, governments have pressured publicly funded agencies to transition into the private sector. This trend is driven by the need to reduce government spending. Supporters of privatization claim that service providers operate most efficiently in the private sector (Chamberlain, 2007). The Benemérito Cuerpo de Bomberos de Costa Rica is an example of a service-based organization that has become semi-privately funded.

The Benemérito Cuerpo de Bomberos de Costa Rica is the national fire department of Costa Rica. Its mission is to "provide protection to the Costa Rican society when life, property, and the environment are threatened by fires and emergencies" ("Benemérito Cuerpo de Bomberos de Costa Rica," 2014). Composed of volunteers and full-time employees, the Benemérito Cuerpo de Bomberos is known for its high standards of quality and effectiveness ("Benemérito Cuerpo de Bomberos de Costa Rica," 2014). In addition to firefighting, the Benemérito Cuerpo de Bomberos Engineering Department offers preventative and training services, which have the potential to generate income for the organization. The Benemérito Cuerpo de Bomberos is required by Costa Rican Law 8228 to generate a portion of its income independently. The organization has determined that an effective marketing plan is essential to promote the engineering services of the Benemérito Cuerpo de Bomberos.

The customer is at the core of any successful marketing strategy (Hiam, 1997). Marketing plans must evolve as the customer, technology, and societal norms change (Hiam, 1997). Marketing a service, such as those offered by the Benemérito Cuerpo de Bomberos, is different from marketing a tangible product. Currently, the Benemérito Cuerpo de Bomberos does not have a marketing plan in place for its engineering services.
A strong marketing plan, however, appears to be vital to the financial success of the Benemérito Cuerpo de Bomberos. Our objective was to create a marketing plan for two engineering services provided by the Benemérito Cuerpo de Bomberos: Fire Systems Testing and Risk Assessments. The goals of the marketing plan are to increase the number of clients who utilize these engineering services, income of the Engineering Department, and awareness within the target market of Fire System Testing and Risk Assessments provided by the Engineering Department.

Background

This background section provides information regarding privatization in Costa Rica, legislation pertaining to the Benemérito Cuerpo de Bomberos, services offered by the Bomberos de Costa Rica, a description of the Benemérito Cuerpo de Bomberos' Engineering Department, a multi-nation comparative service analysis, competition research, and current marketing efforts of the Benemérito Cuerpo de Bomberos' Engineering Department.

Privatization in Costa Rica

Privatization can be defined as the denationalization of a business or service, or the transfer of a company from national to private ownership ("Privatization," 2007). The regulation and privatization of services are two means to gradually move the management of traditional government services to the private sector. Privatization is a worldwide trend and is driven by tightening government budgets ("Privatization," 2007). Many proponents of privatization believe that private businesses and free markets operate most efficiently. Through multiple attempts to restructure the Costa Rican economy during the late 1980s and 1990s, various government services became candidates for privatization (Chamberlain, 2007). When a business becomes private, however, the government can still exert control over that entity.

Due to recent privatization efforts in Costa Rica, the Benemérito Cuerpo de Bomberos was required to become semi-privatized. In other words, the Cuerpo de Bomberos is partially reliant on funding from Instituto Nacional de Seguros de Costa Rica (INS), but also generates a portion of its own income. With its headquarters in San José, the Cuerpo de Bomberos administrates its own organization. During the transition from public to semi-private funding, entirely new departments were added to the Bomberos de Costa Rica, including Human Resources and Finances. The Benemérito Cuerpo de Bomberos now has more autonomy (Núñez Montes de Oca, 2014). In 2008, Law 8228 was passed to specify all the funding sources of the semi-privatized Cuerpo de Bomberos.

Benemérito Cuerpo de Bomberos Financial Legislation (Summary of Law 8228)

Law 8228, "Ley del Benemérito Cuerpo de Bomberos de Costa Rica", dictates that the Benemérito Cuerpo de Bomberos is a "fully decentralized body, attached to the Instituto Nacional de Seguros (INS)" (Ley del Benemérito Cuerpo de Bomberos de Costa Rica, 2008). INS is a governmental insurance agency in Costa Rica that sells various types of insurance, including fire insurance. INS works closely with the Benemérito Cuerpo de Bomberos and provides partial funds to the semi-privatized organization. These partial funds add to the

Fire Corps Fund (Ley del Benemérito Cuerpo de Bomberos de Costa Rica, 2008). The Fire Corps Fund is supplemented by INS financial contributions, a percentage of the sale of INS fire insurance premiums, trusts, prevention service revenue, donations, and taxes.

The Benemérito Cuerpo de Bomberos work under the direction of a Board of Directors. The Board is comprised of five members; a president, three INS representatives, and one other representative elected by the Cuerpo de Bomberos (Ley del Benemérito Cuerpo de Bomberos de Costa Rica, 2008). The purpose of the Board is to ensure that all operations, regulations, and services are being performed effectively and properly. The members of the Board also approve budgets and define rates charged for certain services.

Benemérito Cuerpo de Bomberos Services

Both volunteers and full-time employees staff the seventy-three Benemérito Cuerpo de Bomberos de Costa Rica fire stations. The stations offer protective services, and the Engineering Department in San José offers preventive and training services.

Protection Services

The Benemérito Cuerpo de Bomberos offers a plethora of protective services, including fighting structural, vehicular, aircraft, boat, and electrical fires. It is equipped to handle flood, collapsed structure, vehicular, and confined space rescues. The Benemérito Cuerpo de Bomberos is trained to deal with hazardous materials and can provide riot control ("Benemérito Cuerpo de Bomberos de Costa Rica," 2014).

Prevention Services

The five subdivisions within the Benemérito Cuerpo de Bomberos Engineering Department responsible for fire prevention are Visados de Planos, Control de Proyectos, Investigación, Salud Ocupacional, and Hidrantes. Through demonstrations, activities, and explanations, the Engineering Department provides educational programs that teach fire safety to schoolchildren ("Benemérito Cuerpo de Bomberos de Costa Rica," 2014). Visados de Planos are permits the Cuerpo de Bomberos engineers create for businesses by assessing the blueprints of a proposed building for fire safety and hazards ("Benemérito Cuerpo de Bomberos de Costa Rica," 2014). A fire investigation, a necessary process after any fire, determines the cause of the fire that has occurred ("Benemérito Cuerpo de Bomberos de Costa Rica," 2014). Salud Ocupacional encompasses general public health and safety, while Hidrantes is the inspection of fire hydrants (Cornejo Quintana, 2014).

The subdivision of focus for this project was the Control de Proyectos. The Control de Proyectos subdivision offers three specific services: Fire Systems Testing, Risk Assessments, and Fire Simulation Evaluations. A Fire Systems Test is the test, diagnosis, and analysis of the current stationary fire systems within a building, such as the sprinkler system or standpipe. The operational status of the fire system is assessed based on codes set by the U.S. National Fire Protection Association (NFPA) ("Benemérito Cuerpo de Bomberos de Costa Rica," 2014). A Risk Assessment is an inspection that identifies fire hazards and evaluates fire escape routes of a building. Systems inspected include: electrical systems, smoke detectors, handling and storage of potentially harmful gases and liquids, portable fire-fighting equipment, etc. A Fire Simulation Evaluation measures the efficiency of an existing fire escape plan. Fire Systems Testing and Risk Assessments were the two engineering services of focus for this project.

Training Services

The Fire Academy, established in 2001, was created to educate and train the Benemérito Cuerpo de Bomberos staff in the technical, operational, and administrative areas of firefighting ("Benemérito Cuerpo de Bomberos de Costa Rica," 2014). An introductory course, offered by the Academy, is a requirement for all prospective firefighters ("Benemérito Cuerpo de Bomberos de Costa Rica," 2014). The Fire Academy also offers training services for both private and public companies. The training sessions teach prevention and emergency management techniques. These courses are available in a variety of levels and time commitments ("Benemérito Cuerpo de Bomberos de Costa Rica," 2014).

Multi-Nation Comparative Service Analysis

The United States and Australia are recognized as international leaders in fire protection services and regulations (Llewellyn, 2014; Meacham, 2014). A comparison of their engineering services will provide ideas for potential improvements to the engineering services of the Cuerpo de Bomberos and the fire protection regulation environment of Costa Rica.

United States

In the United States, state law mandates building and fire codes. The codes state that the design, installment, and maintenance of fixed fire systems need to follow NFPA standards (Meacham, 2014). Private consulting firms perform Fire Systems Tests and Risk Assessments in accordance to state regulation. The private consulting firms are NFPA certified and are contracted by companies periodically in accordance to state law. The fire department itself reviews and approves designs for fire systems, much like the Visados de Planos division of the Bomberos de Costa Rica (Meacham, 2014). Private sector consultants are able to review fire

system design plans for the fire department. This is vital because not all fire departments in the United States have engineers, and do not have the capacity or expertise to perform reviews themselves (Meacham, 2014).

Australia

In Australia, the federal and state/territory government determine the fire regulations. Contractors who install the fire systems also perform Fire Systems Tests. Unlike the U.S. or Costa Rica, an accredited building certifier witnesses this process to ensure that a system is indeed safe. For some system tests, such as non-routine type systems, the fire department will send its own personnel to witness the tests. The fire department personnel do not perform the tests, they only act as a specialized witness (Llewellyn, 2014). Independent contractors normally carry out Risk Assessments. However, if a Risk Assessment involves "dangerous goods" or hazardous materials, then the fire department is involved in terms of witnessing the process (Llewellyn, 2014). Much like both the U.S. and Costa Rica, fire departments are very involved with building approvals. For example, the Queensland Fire and Rescue Service (QFRS) provide advice on building work. In fact, under the Sustainable Planning Act 2009, assessment managers are required to refer to the QFRS for advice regarding any building work application. This is necessary for buildings that involve a fire safety system and also require both special fire services or propose a unique solution for fire safety (Queensland Fire and Rescue Service, 2014).

Benemérito Cuerpo de Bomberos Marketing

Marketing for services is very different from marketing physical products. The standardization and quality of services is more difficult to control, unlike when a product is sold (Gilmore, 2003). The engineering services provided by the Benemérito Cuerpo de Bomberos are highly specialized. Thus, the services need to be marketed in a way that caters to a narrow customer base and highlights benefits for this group. Currently the Bomberos de Costa Rica does not have a marketing plan in place for Fire Systems Testing or Risk Assessments (Núñez Montes de Oca, 2014). The marketing plan produced for this project is a necessary first step for the future success of the Engineering Department (Núñez Montes de Oca, 2014).

Methodology

The Benemérito Cuerpo de Bomberos' Engineering Department offers numerous fire prevention engineering services. The focus of our project was on two engineering services: Fire Systems Testing and Risk Assessments. Our deliverable to the Benemérito Cuerpo de Bomberos was a document containing a marketing plan for these specific engineering services. The first section of the marketing plan included a situation analysis that assessed the current market position of the Benemérito Cuerpo de Bomberos. The situation analysis included background research regarding the engineering services. We then evaluated the collected information using an analysis of strengths, weaknesses, opportunities, and threats (SWOT analysis). This analysis assisted in developing known information about the business structure into an effective marketing strategy for the Benemérito Cuerpo de Bomberos. Project and marketing plan goals were set in coordination with the Cuerpo de Bomberos. Marketing strategies for each of the two engineering services were developed and presented to the Benemérito Cuerpo de Bomberos. The deliverable concluded with recommendations for marketing implementation strategies. (Ferrell & Hartline, 2011)

Situation Analysis

To create an effective marketing plan, knowledge of all parts of the market is required (Ferrell & Hartline, 2011). For the purpose of this analysis, the market can be divided into three main environments: Internal, Customer, and External. Each environment was thoroughly researched to determine the most effective marketing practices for the Benemérito Cuerpo de Bomberos' Engineering Department. The data was acquired from research, interviews, and surveys. This information was organized into lists and descriptions to summarize the major concepts and key points for each environment.

The Internal Environment section reviewed the marketing goals and objectives, current marketing strategy, and resources pertaining to Fire Systems Testing and Risk Assessments. We received information regarding the current internal environment of the engineering services from representatives in the Benemérito Cuerpo de Bomberos' Engineering Department. Structured interviews were conducted with two Benemérito Cuerpo de Bomberos engineers, Ulises Cornejo Quintana and Nancy Cascante González. The interview transcripts, relaying the line of questioning and responses from the interviews are included in Appendix A. The purpose of the interviews was to obtain the engineers' opinions, knowledge, information about the services they perform, and suggestions to improve the current marketing strategies for each engineering service. Information regarding the pricing structure for Fire Systems Testing and Risk Assessments, acquired through the engineer interviews, was included in the situation analysis within the Review of Resources section.

The Customer Environment included information concerning the clients' opinions of the Benemérito Cuerpo de Bomberos' Engineering Department, Fire Systems Testing, and Risk Assessment services. The information

was collected in the form of written surveys and personal interviews. Our sponsor, Señor Paul Núñez, sent twenty-two written surveys via email to clients of the Benemérito Cuerpo de Bomberos. The survey instruments can be found in Appendix C. Various types of clients in the industry, repeat clients versus clients who have utilized the services only once for example, were contacted to ensure that the large potential market had been investigated. We received and evaluated two written survey responses from medium to large sized businesses. Señor Paul Núñez also selected twenty clients for personal interviews in hopes that at least ten clients would respond. We were able to interview two clients of Fire Systems Tests, both from medium to large companies, and one client of Risk Assessments. All of the interviews were conducted with the purpose of obtaining opinions regarding the effectiveness, quality, and general perception of Fire Systems Tests and Risk Assessments provided by the Benemérito Cuerpo de Bomberos. The interview protocol and transcripts can be found in Appendix B.

The External Environment refers to the competition, economic growth and stability, laws, legal issues, cultural trends, and technological advances concerning the Benemérito Cuerpo de Bomberos (Ferrell & Hartline, 2011). For the sake of time and resources, we focused on installation company influence, competition, regulation, and the role the Instituto Nacional de Seguros (INS) plays regarding the Benemérito Cuerpo de Bomberos' engineering services. Prior interviews with engineers identified the positive influence of installation company recommendations and the threat level the competition presents to Risk Assessment services. We conducted personal interviews with representatives from three competing Fire Systems Testing installation companies: Salvavidas, Ingelectra S.A., and GlobalTec. We also received answers to written questions sent to one competing Risk Assessment company, SHPI Ingeniería. To supplement this information, we included questions in our personal client interviews and written questionnaires regarding the competition of the Benemérito Cuerpo de Bomberos.

SWOT Analysis

Once the situation analysis was completed, we began our strengths, weaknesses, opportunities, and threats (SWOT) analysis for Fire Systems Testing and Risk Assessments. A SWOT Analysis Quantitative Assessment Matrix, or group of rated attributes, was generated. Next, we determined the magnitude (how strongly the attribute effects the organization) and importance (how crucial each attribute is to the organization) of each attribute using a numeric rating system. The rubric used to substantiate our rating decisions is located beneath the SWOT Analysis Quantitative Assessment Matrix. The SWOT matrix helped us discover competitive advantages the Benemérito Cuerpo de Bomberos has, and develop a strategic focus for the marketing plan (Ferrell & Hartline, 2011).

Recommendations and Additional Strategies

After the SWOT analysis, we compiled recommendations for marketing strategies and alternative strategies that would require further investigation. Our recommendations for the Control de Proyectos follow these four marketing strategies: Product, Price, Promotion, and Distribution and Supply Chain Management. The recommendations were influenced by the results of the SWOT Analysis Quantitative Assessment Matrix. The elements with the highest value became the focus of our recommendations, following the four strategies. Elements of lower value were not of focus, but influenced additional recommendations. The goal for these strategies is to increase the number of potential clients for the Benemérito Cuerpo de Bomberos. Communication with the Engineering Department of the Benemérito Cuerpo de Bomberos and our sponsor Señor Paul Núñez was key during this portion of our study. It was essential to keep their goals and objectives at the forefront of all of our decisions. By fully understanding these goals and objectives in great detail we determined an appropriate marketing implementation strategy (Ferrell & Hartline, 2011).

The final piece of the marketing plan, marketing strategies, included an outline of the target market and the following strategies: Product, Price, Promotion, and Distribution and Supply Chain Management (Ferrell & Hartline, 2011). When the marketing implementation strategies were created, the first step was to identify the target market, that is, the specific clients of the Fire Systems Testing and Risk Assessments. We focused on the target markets when we developed our marketing strategies. The Product Strategy included suggestions for how value can be added into the services offered by the Engineering Department. The Pricing Strategy identified potential methods of increasing the clientele of the Cuerpo de Bomberos through adjustments to the current pricing scheme. Since the Benemérito Cuerpo de Bomberos need to independently generate a portion of their income, an important concept for consideration was profit margin of the engineering services. The Promotional Strategy involved suggestions to utilize various methods of advertising the engineering services to the target market. These methods were aimed at increasing the awareness of the engineering services of the Bomberos de Costa Rica. The final strategy, Distribution and Supply Chain Management, involved recommendations as to how the engineering department can deliver its services in a more efficient and cost effective manner. Each of these strategies, along with the situation analysis and SWOT analysis, contributed to the final marketing implementation plan that was presented to the Benemérito Cuerpo de Bomberos.

The Marketing Plan

Marketing strategies were produced to publicize and financially stabilize the Benemérito Cuerpo de Bomberos Engineering Department. These strategies were based on findings from the situation analysis and SWOT analysis, and fell under the following categories: Product, Price, Promotion, and Distribution and Supply Chain Management. The recommendation section concluded with alternative marketing strategies that require further investigation before possible implementation.

Situation Analysis

The situation analysis divides the market into three different environments: the Internal, Customer, and External environments. The purpose of analyzing these three environments is to fully understand all parts of the market in which the two services we examined, Fire System Testing and Risk Assessment, operate.

Internal Environment

The Internal Environment is an overview of the marketing goals and objectives, current marketing strategy, Fire Systems Testing and Risk Assessment specifics, and a review of the resources of the Engineering Department. The review of resources highlights human and financial resources, and the engineering service pricing structure. The following Internal Environment information was based on interviews with the Benemérito Cuerpo de Bomberos Engineering Department and conversations with Señor Núñez. Interviews with the engineers are located within Appendix A.

The Engineering Department

Figure 1 is a diagram detailing the organizational structure of the Engineering Department. The Engineering Department consists of twenty-four engineers, all located in San Jose. Five engineers lead the subdivisions of the Engineering Department. The five subdivisions are Visados de Planos, Control de Proyectos, Hidrantes, Investigación, and Salud Ocupacional. All other engineers work within each subdivision. Six engineers work closely with the head of Visados de Planos. Seven trained engineers work in Control de Proyectos. One engineer works with the head of the Hidrantes subdivision, and three fire investigation engineers work for Investigación. The head of the Salud Ocupacional division currently works alone. An additional engineer divides his time between the Control de Proyectos and Investigación subdivisions. The Benemérito Cuerpo de Bomberos engineers work within their specified departments and do not shift between them if workloads vary.

Figure 1: Organizational Profile of the Unidad de Ingeniería

Engineers are required to have a bachelor's degree relating to fire protection, at least two years of experience in the field of fire protection, and pass a certification test based on the NFPA fire protection manual. Experience in the field is gained by shadowing more experienced engineers. All of the engineers are NFPA certified. To remain NFPA certified, there is a recertification process every two years. The process includes training courses that last two to three days and finish with an exam. The courses are specific to each standard. The engineers starting salary is ₡512,000 (approximately $928) per month. (Cornejo Quintana, 2014)

Marketing Goals and Objectives of the Engineering Department

The marketing goals and objectives of the Engineering Department, as stated by Señor Núñez, are as follows:

1. Increase the size and variety of the client pool.
2. Increase income generated by the Engineering Department.
3. Increase awareness in the business community and stress the importance of having fixed fire systems tested by the Cuerpo de Bomberos.
4. Increase awareness in the business community and stress the importance of having a Risk Assessment completed by the Cuerpo de Bomberos.

Current Marketing Strategy

The Engineering Department currently does not have a marketing strategy for Fire Systems Testing or Risk Assessments (Núñez Montes de Oca, 2014). Instead, to maintain and increase its client base, the Engineering Department relies on recommendations and word of mouth. Companies that perform installations of fixed

fire systems refer their clients to the Engineering Department to verify the proper installation of these systems (Cornejo Quintana, 2014). In addition, the principal insurance company of Costa Rica, Instituto Nacional de Seguros (INS) requires inspections if the client wishes to receive a policy discount. The engineering services of the Benemérito Cuerpo de Bomberos fulfill this requirement (Casco Redondo, 2014).

Funding of the Engineering Department

The marketing budget of the Bomberos de Costa Rica is what will ultimately enable the engineering services to be marketed. Multiple sources of capital fund the Bomberos de Costa Rica. The organization pools all sources of income, such as prevention service revenue, INS funding, and donations. This income is then distributed to different departments as needed. The Control de Proyectos division is currently running on a deficit. The organization as a whole, however, is financially stable, and generating enough revenue to cover the expenses of the engineering services. The objective of marketing the engineering services is to cover operational costs, not to generate a profit (Núñez Montes de Oca, 2014).

Fire Systems Testing and Risk Assessment Services

The Control de Proyectos division is responsible for the Fire Systems Testing and Risk Assessment services, as well as Simulation Evaluations. The division is capable of performing four to six Risk Assessments, and two to three Fire Systems Tests per week. These numbers reflect the department's service capacity with the current resources, not the number of tests that are performed currently (Cornejo Quintana, 2014). Before a service can be marketed, it is critical to know exactly what goes into performing the service. This section describes the steps and tests the engineers take to complete Fire System Tests and Risk Assessments.

Fire Systems Testing

During a Fire Systems Test, the engineers perform a series of tests to evaluate the functionality and design of fixed fire systems. The tests are generally directed at sprinkler systems and the flow of water to critical access points. Following a Fire Systems Test, the client receives a report including: detailed analysis of tests, graphs, written observations, measurements, and conclusions on the status of the system. If the system is not approved, an installation or maintenance company can be called to correct the system (Gonzáles, 2014; "Prueba Sistema Fijo de Protección Contra Incendio y Sistema de Detección y Alarma Contra Incendio Poder Judicial Anexo C," 2013).

An engineer tests the following items during a Fire Systems Test:

- Critical point at the remote site network
- Plot of pressure vs. distance from the pump
- Injection of water
- Suction within tank
- Transference (if there is an electric motor)
- Hydrant measurement in critical sites
- Evaluate fire detection and fire alarm electrical panel
- Inspection of the diagram of the pumping system and start-up tests
- Test controller floor valves (riser)
- Test of stationary fire systems within a building
- Flow test of standpipe using fire truck

Evaluation is based on National Fire Protection Association (NFPA) Standards (see Appendix G).

Fire Systems Testing Human Resources

Table 1 shows an estimate of the human resources necessary to complete Fire Systems Tests based on the total area of a building. Special fire-fighting systems are evaluated independently according to their features and areas covered. Similarly, cases like gas measurements and other special conditions are evaluated separately (Cascante González, 2014).

Table 1: Human Resource Allocation Estimates for Fire Systems Testing

Total Area	# of Engineers	System Type I Inspection Time	System Type II Inspection Time	System Type III Inspection Time	Report Completion Time
0 – 2,500 m^2	1	4–6 hrs	2–3 hrs	6–8 hrs	4 hrs
2,501–5,000 ^{2}	1–2	6–8 hrs	4–6 hrs	8–10 hrs	6–8 hrs
5,001–10,000 m^2	2	8–10 hrs	6–8 hrs	10–12 hrs	8–10 hrs
+10,000 m^2	+2	+10 hrs	+8 hrs	+12 hrs	+10 hrs

("Cálculos para Control de Proyectos", 2014)

The three fire protection system types are based on standards found in the NFPA 14 Edition 2010 or equivalent in the most recent versions (NFPA 14: Standard for the Installation of Standpipe and Hose Systems, 2013; "Manual de Disposiciones Técnicas Generales Sobre Seguridad Humana y Protección Contra Incendios", 2013). System Type I is considered an auxiliary network of automatic sprinklers and accessories to be operated by fire personnel only. System Type II is designed for operation by occupants of the building until fire personnel arrive and System Type III is a combination of the two previous systems. If the distance

between the fire truck responding to an emergency and the farthest point in the building is greater than 60m, System Type I features are combined with System Type II features to make System Type III. Buildings with automatic sprinklers require inspection by engineers with experience in these types of systems (Leiva, 2014).

Risk Assessments

The objective of a Risk Assessment is to provide recommendations to reduce a risk of fire within a building. Following a Risk Assessment, the client receives a report including: observations of the current situation, photographic evidence of hazards, recommendations for physical changes, and preventative measures to reduce risk ("Evaluación de Seguridad Humana y Riesgo de Incendio: Evaluation of Human Security and Fire," 2013).

The following general aspects are evaluated during the service:

- Electrical systems (risk of short circuits, insulation)
- Smoke detector functionality
- Handling and storage of flammable liquids
- Storage of chemical products
- Welding jobs
- Handling, storage, and distribution of liquefied petroleum gas
- Handling and storage of oxygen cylinders, acetylene, or other combustible liquids and gases
- Order and cleanliness of the workspace
- Lightning rod systems
- Boilers
- Portable fire-fighting equipment
- Alarm and fire detection
- Escape routes
- Emergency exits
- Emergency lighting
- Security zones

Evaluation is based on National Fire Protection Association (NFPA) Standards (see Appendix G).

Risk Assessments Human Resources

Table 2 shows an estimate of the human resources necessary to complete Risk Assessments based on the total area of a building.

Table 2: Human Resource Allocation Estimates for Risk Assessments

Total Area	# of Engineers	Light Risk Inspection Time	Regular Risk Inspection Time	Special Risk Inspection Time	Report Completion Time
0 – 600 m^2	1	4–6 hrs	2–3 hrs	6–8 hrs	4 hrs
601 – 1,500 m^2	1–2	6–8 hrs	4–6 hrs	8–10 hrs	6–8 hrs
1,501–6,000 m^2	2	8–10 hrs	6–8 hrs	10–12 hrs	8–10 hrs
+6,000 m^2	+2	+10 hrs	+8 hrs	+12 hrs	+10 hrs

("Cálculos para Control de Proyectos", 2014)

All single-level commercial buildings, educational facilities, and office spaces (stores, shoe stores, game rooms, etc.) are considered to be Light Risk. All buildings under four-levels, warehouses, libraries, wineries, motels, storage facilities, clinics, and public meeting places are considered Regular Risk. Any industrial facility, hospital, prison, power generation plant, major shopping center, airport, hotel, and other buildings with more than four-levels are considered Special Risk. Special Risk contracts require engineers with experience in the appropriate special fields, such as hazardous materials, for inspection (Leiva, 2014).

Application for Services

Potential customers request Fire Systems Tests and Risk Assessments by filling out an electronic copy of an application and submitting it to the Engineering Department. An engineer within the Control de Proyectos subdivision of the Engineering Department then approves the applications, sends the bill to the client, and expects full payment before the service is provided (Cascante González, 2014).

Pricing Structure

The Benemérito Cuerpo de Bomberos Engineering Department began charging for Fire Systems Tests and Risk Assessments in 2011 (Cascante González, 2014). The hourly rate that was introduced for engineering time was and still is ₡20,000 (approximately $36). The Engineering Department uses a basic algorithm for determining the charges for a performed service (Cascante González, 2014). The factors that contribute to the final bill are:

- Engineering Time

- Hours spent conducting test/evaluation
- Hours to complete the written report

– Travel Expenses
  - Travel time to company location
  - Vehicle mileage to destination
  - Engineer travel expenses (Ex: lodging, food, transportation, etc.)

Table 3 shows the cost for each of these factors. The table is based on two separate cost calculators to determine the final charge to the customer, used by the Engineering Department for Fire Systems Tests and Risk Assessments (Cascante González, 2014; Cornejo Quintana, 2014).

Table 3: Engineering Services Pricing Structure Calculator

Inputs	**Hourly Rate**	**Number of Engineers**	**Distance to Destination**	**Travel Time**
	A	B	C	D
	Evaluation/Test Time	**Lodging Expenses**	**Travel Expenses**	**Report Completion Time**
	E	F	G	H
			Total	
Factors	Hours spent conducting test/evaluation		A*B*E	
	Hours to complete report		A*H	
	Travel time to company location		A*B*D	
	Vehicle "kilometraje" to destination		C*₡253.15/km	
	Engineer travel expenses		B*(F+G)	

("Cálculo costo evaluación Centro Turistico Las Juntas," 2014)

The Engineering Department charges for the time required traveling to a building, and the time to inspect or test a building; larger buildings require more time to complete the task. For two equally sized buildings, a Risk Assessment would cost more than a Fire Systems Test because it takes significantly more time to evaluate all escape routes and fire hazards in a building than testing the fixed fire protection system. For example, a building that is 5,000 to 10,000 m^2 will cost approximately ₡400,000 (approximately $725) for Fire Systems Tests and ₡600,000 (approximately $1,087) for Risk Assessments (Cornejo Quintana, 2014).
A Fire Systems Test includes testing a building's standing pipe using a fire truck. The fire truck is provided by a fire station near the business being tested. This puts the area around that fire station at risk if a fire were to occur. In order to mitigate this risk, the Benemérito Cuerpo de Bomberos pull another fire truck from a different fire station nearby and place it between the two stations (Cascante González, 2014). The Benemérito Cuerpo de Bomberos absorbs the cost, about ₡500,000 (approximately $916), for sending the fire truck. The client is not charged for the fire truck because it would drastically increase the total charge (Cornejo

Quintana, 2014). If the fire truck cost were included within the example above, the cost would be nearly doubled.

Control de Proyectos Financial Information

In order to eliminate their deficit, the Control de Proyectos subdivision needs to reduce cost and increase revenue. Table 4 shows an approximate income of the Control de Proyectos services, Fire Systems Testing and Risk Assessments, over the last six months.

Table 4: Approximate Income of the Control de Proyectos November 2013 – April 2014

	Performed	Total Income (Colones)	Total Income (USD)
Risk Assessments	20	7.7 M	14.0 K
Fire Systems Testing	19	9.0 M	16.5 K

The information for this table was supplied by the Programa de Control de Proyectos excel spreadsheet. This document holds the invoices for the Control de Proyectos service inquiries. This information does not take into account the other engineering services provided by the Control de Proyectos division, and is based on all the financial information that was accessible for this project.

Table 5 on the following page shows an estimate of the major expenses of the Control de Proyectos division over the last six months. The salaries line item was determined by combining the salaries of the seven engineers (using a ₡512,000 (approximately $928) per month starting salary estimate), the supervisor salary, and the additional engineer salary in Control de Proyectos (Alguerra, 2014). The employee insurance line item is based on two insurance policies for each employee (Daniel, 2014). Additionally, approximately 42% of that salary is paid towards benefits for the employees (Alguerra, 2014). The training/instruction total is based on all training costs (certification classes, general instruction, etc.) associated with Control de Proyectos (Cascante González, 2014).

Table 5: Control de Proyectos Expenses November 2013 – April 2014

	Expense (Colones)	Expense (USD)
Salaries	32.3 M	58.8 K
Training/Instruction	1.9 M	3.6 K
Employee Insurance	0.8 M	1.4 K
Employee Benefits	13.8 M	25.1 K
Vehicle Maintenance & Fuel	1.2 M	2.1 K

The approximate total income from Fire Systems Testing and Risk Assessments over the six-month period was ₡16.7 M ($30.3 K). The approximate total major expenses for Control de Proyectos was ₡50.0 M ($90.6 K). This leaves the Control de Proyectos division with an approximate deficit of ₡33.3 M ($60.3 K) over this six-month period. This deficit calculation also does not recognize any overhead costs, such as office space and supplies.

Customer Environment

The Customer Environment summarizes information gathered from both internal and external sources. We spoke to INS in particular about its fire insurance policy, and its influence on the clients of Fire Systems Testing and Risk Assessments. For Fire Systems Testing, personal interviews were performed with the following clients: Fernando Gutiérrez (Safety Manager of an anonymous organization in Costa Rica working with open flames/welding) and Carlos Roberto Pino Q. (General Manager of DYCEL, a construction company that performs electromechanical work and construction on factories). For Risk Assessments, one personal group interview was performed with Silvia Montoya, Heiner Solis, and Erica Valerio (employees of Empresa de Servicios Publicos de Heredia (ESPH), a company specializing in water management, electricity, and telecommunications). We also sent out twenty-two written customer questionnaires and received two responses: Jessica Valverde Garcia (Coordinating Committee of Risk and Occupational Health of the University of Costa Rica) and an anonymous source. All four of these responses were from medium to large businesses. Transcribed interviews along with the written customer questionnaire responses are located within Appendix B and C. These responses enabled us to gain a general consensus of the customers' opinions regarding Fire System Tests and Risk Assessments.

Customer Identification

The current customers include medium to large sized companies with fixed fire systems in place (Cornejo Quintana, 2014), companies that handle large amounts of hazardous materials (Cornejo Quintana, 2014), companies that have foreign insurance policies that mandate regular testing (Gutiérrez, 2014), companies

with INS insurance and are receiving incentives (León, 2014), companies recommended by INS (Casco Redondo, 2014), and businesses motivated by fire prevention in general. The distribution of companies across the client base consists of medium to large enterprises, both public and private. Examples of companies include construction, those specializing in water management, electricity, and telecommunications, and risk and occupational health departments of various organizations.

Motivation

Customers are motivated to request services provided by the Bomberos de Costa Rica because it is an organization known for its authority on NFPA standards, quality of services, and prestige. Its engineers are well-trained, skilled, and NFPA certified (Arrieta V., 2014; Gutiérrez, 2014; Valverde García, 2014). Customers are motivated to purchase Fire Systems Tests to ensure their fixed fire systems are functional and reliable. They also purchase Fire Systems Tests after being recommended by an installer (Arrieta V., 2014; Roberto Pino Q., 2014; Gonzáles, M., 2014). After the fixed fire systems are in place, the installation companies refer the client to the Benemérito Cuerpo de Bomberos to ensure the fixed fire system is fully functional and properly installed. Customers are motivated to purchase Risk Assessments to identify fire hazards within their building and heed the recommendations provided by the engineers. Companies are eligible for INS fire insurance policy discounts after an inspection. An option for this inspection is the Cuerpo de Bomberos. Fire Systems Tests and Risk Assessments reports both qualify as viable information to determine a discount. (Jiménez, 2014; Casco Redondo, 2014; León, 2014). In addition, customers purchase Fire Systems Tests and Risk Assessments prior to a business opening to ensure that the building is safe (Arrieta V., 2014).

Service Frequency

Companies may request Fire Systems Tests and Risk Assessments if they feel it is necessary to ensure the safety of their employees, assets, and clients (Valverde García, 2014). Large companies, with multiple business locations, will request engineering services for each site. They are also most often repeat customers. Large companies are typically required by INS to have both Costa Rican fire insurance and international fire insurance. The international fire insurance policies usually require periodic Fire Systems Tests or Risk Assessments (Casco Redondo, 2014). In addition, some companies request engineering services for each construction project they are working on, for instance kitchen renovations. This can occur four to five times a year (Gonzáles, 2014). Small companies and businesses do not request the services as often as larger companies and businesses (Cascante González, 2014).

External Environment

The External Environment is a compilation of an installation company investigation, Risk Assessment competition research, regulation, insurance, and information regarding the Instituto Nacional de Seguros (INS) de Costa Rica. Information that pertained solely to the Engineering Department directly was selected and included. The following data were collected through conversations with Señor Núñez, independent research, and interviews with representatives from fire safety system installation companies, health and safety consulting companies, and INS. Please see Appendices D, E, and F for interview data from installation companies, Risk Assessment Competition, and INS, respectively.

Installation Companies

Fixed fire system installation companies provide installations, maintenance, and inspections of fixed fire systems. SALVAVIDAS, Ingelectra S.A., and GlobalTec are the three leading fixed fire system installation companies in Costa Rica. All three companies follow NFPA standards to complete their services (Arrieta V., 2014; Omar Lopez H. 2014; Gonzáles, 2014). Both installation companies and the Engineering Department perform functionality tests of fixed fire systems. However, the Cuerpo de Bomberos' engineers have the capacity to use a fire truck to conduct more tests than the installation companies.

The installation companies were investigated because they have a direct influence on the Fire Systems Testing engineering service. All fixed fire system installation companies recommend for their customers to the Benemérito Cuerpo de Bomberos Engineering Department for further inspection (Arrieta V., 2014; Gonzáles, 2014; Núñez Montes de Oca, 2014). A second inspection and positive approval by the engineers provides business for the Engineering Department, and instills confidence in the client of the installation companies' abilities (Arrietta V., 2014). The installation companies respect the knowledge, experience, and position within the community of the Benemérito Cuerpo de Bomberos and want to be associated with the organization (Arrieta V., 2014; Omar Lopez H., 2014; Gonzáles, 2014).

Health and Safety Consultants

Health and safety consulting companies perform and provide Risk Assessment reports in a similar manner to the Benemérito Cuerpo de Bomberos. Three consulting companies of Costa Rica are SHPI Ingeniería, ASOSI, and Futuris Consulting (Flores, 2014). SHPI Ingeniería is NFPA certified, provides recommendations within their reports, and produces the report within eight workdays (Ramos, 2014). The cost of the service is dependent on the size of the building, type of risk, travel time, and time required to complete the evaluation (Ramos, 2014). All of these traits make this company and its services comparable to that of the Engineering Department. We were unable to get in contact with ASOSI or Futuris Consulting, and do not have specific information regarding the scope of their Risk Assessment services.

Regulation

Currently, businesses are not required by law to have their fire systems tested or risks assessed (Cascante González, 2014). In addition, businesses are not required by law to have fire insurance (León, 2014).

Insurance

INS controls 85-90% of the entire insurance market of Costa Rica (León, 2014). The other 15% is composed of smaller insurance companies, such as Mapfre. Both INS and Mapfre offer a variety of insurance policies, including but not limited to home, automotive, life, health, and fire (Mapfre, 2014; INS, 2014).

INS fire insurance policy holders have the potential to receive a maximum discount of 40% (León, 2014). INS does not publicly advertise discounts. It is up to the insurance sales representative to discuss the possibility of incentives during a sale of a policy (Jiménez, 2014). A discount is given if a building has a functional fixed fire system, fire protection measures (ex. accessible fire extinguishers), fire evacuation plans, or fire alert systems (ex. smoke detectors) (Casco Redondo, 2014). The level of protection or prevention is a factor in determining the overall discount amount.

The level of protection or prevention is determined through an inspection. An INS engineer, at no cost to the client, can complete this inspection (Jiménez, 2014). The INS engineers are not NFPA certified, but have studied NFPA codes and standards and do their best to follow them (Casco Redondo, 2014). An INS inspection does not involve any testing of fixed fire systems; it is solely a visual evaluation (Casco Redondo, 2014). A report is produced about eight business days following an inspection. The report includes recommendations to improve a client's fire protection and prevention methods, and potentially increase the discount on the client's insurance policy (Casco Redondo, 2014).

When evaluating a business for its level of insurance discount, INS will accept the observations provided in the form of a Risk Assessment or Fire Systems Test completed by an engineer of the Benemérito Cuerpo de Bomberos (Casco Redondo, 2014). INS will not accept a Risk Assessment or Fire Systems Test report from any other company, even if they are NFPA certified (Casco Redondo, 2014). INS recommends the Benemérito Cuerpo de Bomberos engineering services to its clients, especially if a client has a high risk of fire (Casco Redondo, 2014).

INS requires its clients to have Benemérito Cuerpo de Bomberos Fire Systems Tests, Risk Assessments, or INS inspections in order to keep a fire insurance discount (Casco Redondo, 2014). Inspections are completed on a yearly basis, unless a business has a high probability of fire. In this case inspections are completed more often (Casco Redondo, 2014). An inspection allows the inspector to categorize the business as Low Risk, Ordinary Risk I, Ordinary Risk II, Extra Ordinary Risk I, or Extra Ordinary Risk II. If a client falls under the Ordinary Risk II, Extra Ordinary Risk I, or Extra Ordinary Risk II categories, INS will highly recommend a Fire Systems

Test or Risk Assessment be completed by the Benemérito Cuerpo de Bomberos. After an initial inspection, the insurance policy agent will determine the discount depending on the risk category (Casco Redondo, 2014).

SWOT Analysis

The SWOT analysis section highlights the Strengths, Weaknesses, Opportunities, and Threats of the Engineering Department of the Benemérito Cuerpo de Bomberos from data collected for the situation analysis presented in the previous chapter.

The SWOT Quantitative Assessment Matrix

The characteristics of Fire Systems Testing and Risk Assessment were identified and sorted into the SWOT Quantitative Assessment Matrix. The matrix analyzes the magnitude (M) and importance (I) of each element (strengths, weaknesses, opportunities, and threats). The M-value is determined by rating how strongly each element affects the organization (Ferrell & Hartline, 2011). A magnitude scale ranges from 1 (low magnitude) to 3 (high magnitude). Negative magnitude values are given to weaknesses and threats. The I-value is determined by how crucial each element is to the organization. An importance scale ranges from 1 (low importance) to 3 (high importance) (Ferrell & Hartline, 2011). Positive importance values are given to all elements. Once magnitude and importance have been determined, a total rating of the element (R-value) is determined by multiplying the magnitude and importance values. Elements that will have the greatest influence on the final marketing strategy and recommendations will have the highest R-values (negative or positive) (Ferrell & Hartline, 2011). The SWOT Quantitative Assessment enabled us to identify competitive advantages and develop the best possible marketing recommendations.

SWOT Quantitative Assessment Matrix

Internal Strengths	**M**	×	**I**	=	**R**	**Internal Weaknesses**	**M**	×	**I**	=	**R**
Reputational Resources	2		3		6	Service Deficit	-2		2		-4
Test Exclusivity	3		3		9	Specialized Services	-2		2		-4
Service Quality	3		3		9	Lack of Marketing Strategy & Communication	-3		3		-9
Installation Companies	2		2		4	Centralized Services	-1		1		-1
						Number of Employees & Efficiency	-1		2		-2
						Fire Truck Expenses	-3		2		-6
						Marketing Budget	-2		3		-6
External Opportunities	**M**	×	**I**	=	**R**	**External Threats**	**M**	×	**I**	=	**R**
Discounts	2		3		6	Risk Assessment Competition	-2		2		-4
Market Gap	3		2		6	Open Market	-2		1		-2
Payment Plans	3		2		6	Lack of Legislation	-3		2		-6

Figure 2: SWOT Quantitative Assessment Matrix

SWOT Quantitative Assessment Rubric

The M and I-values were determined by the following rubric. Also, justifications for each strength, weakness, opportunity, and threat can be found in Appendix H.

Table 6: Analysis Quantitative Assessment Magnitude Rubric

1	Low impact on the organization • Low financial implications to the Benemérito Cuerpo de Bomberos • Low harm/benefit to the Benemérito Cuerpo de Bomberos
2	Medium impact on the organization • Some financial implications for the Benemérito Cuerpo de Bomberos • Some harm/benefit to the Benemérito Cuerpo de Bomberos
3	Large impact on the organization • Large financial requirements/benefits for the Benemérito Cuerpo de Bomberos • Large harm/benefit to the Benemérito Cuerpo de Bomberos

Table 7: Analysis Quantitative Assessment Importance Rubric

1	Not very important in marketing plan development • Unclear/non-existent competitive advantages • Minor threats/weaknesses that can/cannot be converted to opportunities/strengths • No financial resources for marketing • Difficult to transition into marketing strategies
2	Moderately important in marketing plan development • Clear competitive advantages • Significant threats/weaknesses that can/cannot be converted to opportunities/strengths • Financial resources for marketing • Somewhat easy to transition into marketing strategies
3	Very important in marketing plan development • Very clear competitive advantages • Serious threats/weaknesses that can/cannot be converted to opportunities/strengths • Good financial resources for marketing • Easy to transition into marketing strategies

Internal Strengths

Strengths were identified from data collected about the Engineering Department of the Benemérito Cuerpo de Bomberos that directly benefitted its clients or the name of the organization.

Service Quality

The Benemérito Cuerpo de Bomberos engineers are highly qualified, well educated, and NFPA certified (Cornejo Quintana, 2014; "How to Become Certified", 2014). NFPA certifications are a strength for the engineers because the rigorous certification process demonstrates that the engineers are qualified and have the knowledge to perform Fire Systems Tests and Risk Assessments. The INS engineers that perform the inspections recommend that INS clients have Fire Systems Tests and Risk Assessments completed by the Benemérito Cuerpo de Bomberos. This is stressed more for clients in high risk buildings and industries. The INS engineers are not NFPA certified, (Casco Redondo, 2014).

Reputational Resources

The Benemérito Cuerpo de Bomberos as a whole has a well-known brand name for its emergency response services. It has a recognizable logo, symbol, and image as a superior emergency first responder (Arrieta V., 2014; Cascante González, 2014; Gonzáles, 2014; Núñez Montes de Oca, 2014; Valverde García, 2014). The overall organization is considered reliable, trustworthy, and is very well respected by the general public. The three installation companies we have spoken with look up to the Benemérito Cuerpo de Bomberos and want them to approve their installed systems. Clients have said that “the Bomberos are the best in all of Central America,” (Arrieta V., 2014). According to our sources, the Benemérito Cuerpo de Bomberos’ reputation alone influences potential clients to choose them.

Test Exclusivity

The Benemérito Cuerpo de Bomberos is the only organization with access to a fire truck. The fire truck is used to test a building’s standpipe during a Fire Systems Test. Anyone who has knowledge of NFPA fixed fire systems testing standards and the necessary instrumentation has the ability to perform all other water related fixed fire systems tests (Cornejo Quintana, 2014). The exclusivity of the standpipe test ensures that a Fire Systems Test performed by a Benemérito Cuerpo de Bomberos engineer is the most thorough examination.

Work with Fixed Fire System Installation Companies

Fixed fire system installation companies refer their clients to the Benemérito Cuerpo de Bomberos' Engineering Department following an installation. The purpose of the Fire Systems Test would be to prove to the client that the fixed fire system is in working order, and has the approval of the Benemérito Cuerpo de Bomberos. A positive evaluation not only ensures the safety of the client, but also proves that the installation company has installed a high quality, functioning system. The competition enjoys working with the Engineering Department because there are no other fire systems testing companies that have the capability of performing at the same level (Arrieta V., 2014; Omar Lopez H., 2014; Gonzáles, 2014). Together, the installation companies and Benemérito Cuerpo de Bomberos promote fire safety.

Internal Weaknesses

Weaknesses were identified as facts about the Engineering Department of the Benemérito Cuerpo de Bomberos that negatively impact its ability to serve its clients efficiently or financially, and hinder the organization from achieving future goals.

Lack of Marketing Strategy and Communication

The Benemérito Cuerpo de Bomberos currently does not have a marketing strategy for their engineering services (Núñez Montes de Oca, 2014). Thus, potential clients may not be aware of the variety of engineering services the Benemérito Cuerpo de Bomberos can provide. (Gutiérrez, 2014). A lack of communication regarding the need for the Engineering Department to charge for services may also be inhibiting business growth. Costa Ricans grew accustomed to receiving free help regarding fire safety and prevention from the Benemérito Cuerpo de Bomberos prior to semi-privatization (Gutiérrez, 2014). When potential clients become aware that these services now cost money, they may not submit a request for engineering services (Cascante González, 2014).

Centralized Services

All seven of the engineers that work under the Control de Proyectos subdivision work within the San José office. Thus, if a client resides far away from the main office, the engineers are required to travel to that destination (Cornejo Quintana, 2014). The charge for travel is calculated and billed to the client. As travel time and distance increase, the final bill for the client increases. Efficiency is also lost in time wasted traveling. The engineers occasionally travel great distances to perform tests and evaluations. This may not be the best

way to operate because the Benemérito Cuerpo de Bomberos are looking to reach more clients in less time and at a lower cost.

Number of Employees & Efficiency

The Benemérito Cuerpo de Bomberos' Engineering Department wants to increase its number of clients (Cornejo Quintana, 2014). According to our observations and the supervisor of the Control de Proyectos, the current workload is sufficient for the number of engineers available (Cornejo Quintana, 2014). A successful marketing strategy will increase the number of clients and the resultant workload for the engineers. The Engineering Department will need to improve efficiency or expand to manage an increased number of customers and maintain their high level of performance. The Engineering Department needs to be careful because it is necessary to have the capacity to take on the work before marketing their services (Cascante González, 2014; Meacham, 2014).

Service Deficit

The Control de Proyectos subdivision of the Benemérito Cuerpo de Bomberos' Engineering Department is currently operating on a deficit (Núñez Montes de Oca, 2014). The deficit requires funds from other sources to allow the Control de Proyectos to continue to operate.

Marketing Budget

The Benemérito Cuerpo de Bomberos have a limited marketing budget, and therefore a limited number of marketing options (Núñez Montes de Oca, 2014). For instance, the Benemérito Cuerpo de Bomberos have allotted enough money to distribute fliers or publish newspaper advertisements, but they cannot afford to create television advertisements (Núñez Montes de Oca, 2014).

Fire Truck Expenses

The Engineering Department currently does not charge the client for the use of a fire truck during a Fire Systems Test (Cornejo Quintana, 2014). The Engineering Department feels that this would drastically increase the bill sent to the clients, and would discourage clients from having their fire systems tested (Cornejo Quintana, 2014). The cost for sending a fire truck is approximately ₡500,000 (about $916), and is absorbed by the Benemérito Cuerpo de Bomberos (Cornejo Quintana, 2014).

External Opportunities

Opportunities were identified from data collected about factors outside the Engineering Department of the Benemérito Cuerpo de Bomberos that could generate more business or attract potential clients.

Discounts

INS provides its clients with discounts of up to 40% on fire insurance premiums based on the quality and functional status of the client's fire protection systems and other fire safety measures (Casco Redondo, 2014; León, 2014). An insurance policy salesperson decides the amount of the discount. The decision is based on a report that is written after an inspection (Casco Redondo, 2014). The insurance policy salesperson can use a Benemérito Cuerpo de Bomberos Fire Systems Test or Risk Assessment report or an INS inspection to determine a discount (Casco Redondo, 2014). The insurance policy salesperson is responsible for advertising incentives as a way to increase insurance sales (Casco Redondo, 2014). If the salesperson promotes the insurance benefits of having a Fire Systems Test or Risk Assessment by Cuerpo de Bomberos, there could potentially be new clients for the Engineering Department.

Payment Plans

Smaller businesses may not have the same amount of financial assets available that large corporations do, and may need more time to pay for engineering services. An engineer with the Benemérito Cuerpo de Bomberos explicitly stated that some businesses will apply for Fire Systems Testing, but will not request the service upon learning how much it will cost (Cascante González, 2014). If the Benemérito Cuerpo de Bomberos provide payment plans for smaller businesses, this may help increase the number of clients utilizing its services.

Similar payment plans could be used to influence SMEs to purchase Risk Assessments from the Benemérito Cuerpo de Bomberos. Risk Assessments cost more than Fire Systems Testing, and may still be too expensive for smaller businesses to pay for up front.

Market Gap

The most apparent opportunity for the Benemérito Cuerpo de Bomberos Engineering Department is to try to close the market awareness gap between current and potential clients. Current clients of the Benemérito Cuerpo de Bomberos Engineering Department have identified a lack of awareness of the engineering services within the business community (Gonzáles, 2014; Gutiérrez, 2014). The potential clients that have not yet been in contact with the Engineering Department or know of its engineering services represent an important

part of the market. Outreach specific to the target market would increase awareness of the benefits and necessity of Fire Systems Tests and Risk Assessments, and therefore increase business.

External Threats

Threats were identified from data collected about factors outside the Engineering Department of the Benemérito Cuerpo de Bomberos that negatively impact the potential client pool.

Risk Assessment Competition

Three health and safety consulting companies that compete with the Engineering Department Risk Assessments service are SHPI Ingeniería, Futuris Consulting, and ASOSI (Flores, 2014). SHPI Ingeniería, for example, is NFPA certified and provides a report post assessment that has an overview of the current fire safety level and recommendations for improvement (Ramos, 2014). This is a threat to the Engineering Department because clients can receive comparable services from a competing company.

Open Market

The market is open and available for companies to provide Risk Assessments comparable to the Engineering Department. Anyone who has a background in occupational safety, fire protection, or has NFPA certification is qualified to perform a Risk Assessment (Cascante González, Cornejo Quintana, 2014). For example, Esteban Ramos of SHPI Ingeniería was a former Bombero who started his own health and safety consulting business. The market is also open and available for companies to provide Fire Systems Tests with all of the same tests, apart from those involving a fire truck (Cornejo Quintana, 2014).

Lack of Legislation

Currently, there is no legislation stating that businesses need to have their fixed fire systems tested or risks assessed (Cornejo Quintana, 2014). This lack of legislation is a threat because it is the property owner's discretion as to whether a Fire Systems Test or Risk Assessment is necessary.

Marketing Strategy

The following recommendations were developed through conversations with Señor Núñez, and by evaluating the information we gathered during our situation analysis and SWOT analysis. We created recommendations regarding the following strategies: Product, Price, Promotion, and Distribution and Supply Chain Management. The target market of the engineering services must also be examined, and will influence the specific marketing strategies.

Target Market

For a successful marketing strategy, it is essential to focus on one or more specific target markets to sell a product. To gain interest from these target markets, one must know about the market characteristics, such as lifestyle, product/service usage, firm size, etc. The target market and marketing strategy are dependent upon each other; if the target market changes, the marketing strategy changes, and vice versa. It is important to isolate characteristics that differentiate one or more segments from the total market (Ferrell & Hartline, 2014).

The market for Fire Systems Testing has more specificity than the market for Risk Assessments. This is because Fire Systems Testing requires that a company has a fixed fire system in place. Risk Assessments do not require a company to have a fixed fire system in place, and any business can benefit from this service. Fire risks are present within any building and the Engineering Department can evaluate fire safety through a Risk Assessment.

With both Fire Systems Testing and Risk Assessments, the Benemérito Cuerpo de Bomberos should segment target markets based on service usage. Marketing efforts should be strengthened to attract new customers and increase business from companies that do not frequently utilize these services. It is also important to keep the frequent users satisfied because these companies will continue to utilize their services when served well (Ferrell & Hartline, 2014).

Product Strategy

The physical service and perceptual attributes of the Benemérito Cuerpo de Bomberos engineering services were kept in focus when developing the Product Strategy. In the case of Fire Systems Tests and Risk Assessments, the physical, or tangible attribute is the final report. The service, or intangible attribute is the service itself. The perceptual, or symbolic attribute is the assurance of safety after a positive report is

produced or recommendations are heeded. The three strategies developed are improving service quality, differentiation, and position within the market (Ferrell & Hartline, 2011).

Improving Service Quality

The Benemérito Cuerpo de Bomberos is known for the superior quality of its fire prevention services (Arrieta V., 2014; Cascante González, 2014; Gonzáles, 2014; Núñez Montes de Oca, 2014; Valverde García, 2014). Along with the ability to perform more tests with the fire truck during a Fire Systems Test, the approval and support of the entire community is what sets the Cuerpo de Bomberos apart from the competition. The general public thinks highly of the Cuerpo de Bomberos. In order to keep this high level of respect, the Control de Proyectos engineers need to deliver quality Fire Systems Tests and Risk Assessment reports on time. We have heard accounts of Control de Proyectos missing report deadlines, and providing inadequate information within Risk Assessments (Montoya, 2014; Solis, 2014; Valerio, 2014). To combat these problems, Control de Proyectos needs to keep to report deadlines, and provide more specific recommendations, to ensure that the customer will be satisfied and continue to view the engineers in a positive manner. The deadlines should also be tailored to the size of the building, as that will dictate the size of the report.

In order to have continued success and repeat customers, it is important for the Cuerpo de Bomberos to regularly evaluate the overall quality of their services. This can be completed through service quality surveys. Either online or on paper, the Engineering Department can send a client a survey following completion of a Fire Systems Test or Risk Assessment. This will allow the client to voice their opinions about their experience with the engineers. Along with the survey, a quick written “thank you” can further increase the Benemérito Cuerpo de Bomberos’ positive image with its client base. Reminders of annual Fire Systems Tests or Risk Assessments could also be sent out to clients to emphasize that the Benemérito Cuerpo de Bomberos care about their clients’ continued safety.

Customer Service

Clients have expressed the need for the Control de Proyectos engineers’ expertise aside from Fire Systems Tests or Risk Assessments. For example, clients may have follow up questions after a Fire Systems Test or Risk Assessment (Montoya, 2014; Solis, 2014; Valerio, 2014). A customer service direct phone line to the Engineering Department would be an easy solution to this problem. If engineers were available throughout the day to answer questions regarding fire safety, the engineers would be able to promote their own expertise and the Engineering Department.

The application process for a Fire Systems Test or Risk Assessment may seem daunting and time consuming to businesses. This is especially true because a business must first contact the Engineering Department via email or phone and request an email application. Control de Proyectos should create an easier application

process for the client to procure an engineering service. Having an online application and submittal would streamline the entire process. The majority of the engineers' clients are medium to large sized businesses that have internet access, so this process is feasible (Núñez Montes de Oca, 2014). In addition, continuing to have the email-in application creates options for the client.

Pricing Strategy

It is very important that the Benemérito Cuerpo de Bomberos' Engineering Department sets specific pricing objectives that are realistic, measurable, and attainable in its pricing strategy (Ferrell & Hartline, 2011). To improve the Control de Proyectos Pricing Strategy we recommend restructuring the cost for performing Fire Systems Tests and Risk Assessments, and implementing a payment plan for offered services.

Restructure Service Pricing

As mentioned in the situation analysis, prior to 2011, the Benemérito Cuerpo de Bomberos provided Fire Systems Testing and Risk Assessments for clients free of charge. In 2011 the cost of ₡20,000 (approximately $36) per hour per engineer was introduced. This price has remained fixed even though the value of these services has increased due to inflation.

A higher rate per hour should be used if a Fire Systems Test or Risk Assessment requires special knowledge. For example, a Risk Assessment with hazardous materials requires an engineer with experience in management and storage of dangerous substances (Leiva, 2014). The salary of an experienced engineer is greater than an entry-level engineer's salary. The extra cost for compensating the experienced engineer should be relayed to the customer through a higher rate per hour for the engineer's time.

Payment Plan

The Benemérito Cuerpo de Bomberos' Engineering Department requires payment in full for Fire Systems Tests and Risk Assessments prior to performing the service. The price is found using an estimate of the time required to perform the service based on the size of the building. This method for receiving payment requires the customer to completely trust the quality of the inspections. To split the risk, the Engineering Department should require half of the bill before performing the service and the remainder when the final report is delivered.

Also, the Benemérito Cuerpo de Bomberos Engineering Department has not implemented a payment plan program (Cascante González, 2014). The Engineering Department loses potential clients by requiring payment in advance and in full from enterprises that cannot afford these services in one payment. A payment

plan would make paying for these services more affordable and generate extra revenue through interest for the Cuerpo de Bomberos. By implementing a payment plan program, potential clients could spread the total cost of the desired service over a predetermined period of time. Interest should be added to the remainder because the Engineering Department takes a risk that the customer may default on the remainder. Interest provides compensation for bearing the coupled risk of default and the risk of inflation.

Promotion Strategy

Promotion is essential for the Engineering Department to reach out to both current and potential clients. It is recommended that the Benemérito Cuerpo de Bomberos have informative presentations, utilize online professional networks, advertise in technical and trade magazines, and utilize point-of-purchase promotion.

Informative Presentations

Consumers often need a product or service, but are uneducated as to why the service is important (Ferrell & Hartline, 2011). In order to increase business, the consumer needs to be educated on the need for the product or service and convinced that they want the organization's product or service over the competition (Ferrell & Hartline, 2011).

Companies often do not understand the need for the Benemérito Cuerpo de Bomberos' engineering services. To learn more about these services, the Benemérito Cuerpo de Bomberos should invite potential customers to its Communications Center for an Inquiry Presentation to learn more about what the engineers can do for their company. Inquiry Presentations can be given for free or for a small fee. The attendees would first need to be identified, which the Cámara de Industrias de Costa Rica (CICR) can potentially help with. If incentives are required to attract potential clients, then a discount on a Fire Systems Test or Risk Assessment could be offered for potential clients that participate. The Benemérito Cuerpo de Bomberos should include photographs and videos of the engineers performing services such as Fire Systems Tests and Risk Assessments within the presentation. The presenters should also hand out informative pamphlets with their contact information for further clarification. The potential customers would then be able to ask clarifying questions about what the engineers can do for their company, the benefits to applying for their services, how to go about applying for the services, why the services are necessary, etc. The pamphlets, as mentioned earlier, could also be sent out via mail or email to potential clients.

Another recommendation is for the Benemérito Cuerpo de Bomberos to attend industrial fairs and expositions hosted by CICR or similar organizations. CICR industrial fairs consist of meetings and themed conferences with entrepreneurs from all over Costa Rica and the world. The Benemérito Cuerpo de Bomberos is looking to create a relationship with CICR (Núñez Montes de Oca, 2014). These fairs would present an

opportunity to promote the Engineering Department's services, and to network and present to CICR's member companies and businesses (CICR, 2014).

Utilize Online Professional Networks

In the present day, a business community presence can be successfully established through online professional networks (Ferrell & Hartline, 2011). Numerous companies and businesses have profiles on professional network sites as a way to stay connected with their customers and colleagues. Sites such as LinkedIn can provide customers with up-to-date information about the Benemérito Cuerpo de Bomberos and its Engineering Department (Ferrell & Hartline, 2011).

The Benemérito Cuerpo de Bomberos currently has its own professional website. Our recommendation is to more clearly provide information regarding its Engineering Department on its website. Currently it is very difficult to find the engineering services. A link on the homepage should be added to lead to a specific Engineering Department page, providing easier access to information. The page should include facts about the scope of available engineering services, how to apply for the services, typical price quotes for these services, and contact information for the Engineering Department. Although keeping information up to date requires dedication, online networking is a way to reach out to current and potential customers on a small budget and keep them informed (Freeman, n.d.).

Technical Magazine Advertisements

The Engineering Department needs to utilize advertisements to make their department and fire prevention services better known. Clients of the Benemérito Cuerpo de Bomberos have said, "The people of Costa Rica know the Bomberos for putting out fires, not for their engineering services," (Gutiérrez, 2014). Technical, business, and finance related magazines specifically, like EKA, Summa, Financiero, and La Republica have subscribers within the Costa Rican business community (Núñez Montes de Oca, 2014). These technical magazines represent a way to reach business owners and other potential clients of the target market that may not know of the engineering services of the Benemérito Cuerpo de Bomberos.

Point-of-Purchase Promotion

Point-of-Purchase Promotion is comprised of displays that build traffic, advertise a product, or induce impulse purchases (Ferrell & Hartline, 2011). This concept is different for intangible services than physical products, but it can still be used to advantage. A recommendation for the Benemérito Cuerpo de Bomberos is to encourage companies that utilize its Engineering Department's services to display the Benemérito Cuerpo de Bomberos' logo on their company website or within their building saying, "We're Benemérito Cuerpo de

Bomberos Approved!" Large companies without public meeting places would be more likely to post the sticker on their company website. Small, public buildings, like schools, could post the sticker within their building. People would like to see and know that a company has been inspected by the Benemérito Cuerpo de Bomberos because its services are reliable (Núñez Montes de Oca, 2014). This advertisement would improve the reputation of the company that received the services and the Benemérito Cuerpo de Bomberos, because the employees and visitors will know that they are within a fire-safe building.

Distribution and Supply Chain Management Strategy

The Distribution and Supply Chain Management Strategy of the marketing plan dictates how the service is carried out from production to the customer. In this case both products are intangible services. To provide valuable recommendations, we examined how each service is carried out. The two final recommendations were to increase efficiency in servicing the clients, and hire additional qualified personnel.

Increased Efficiency in Servicing Costa Rica

The Benemérito Cuerpo de Bomberos Engineering Department provides services to businesses throughout the entire country of Costa Rica. To be able to reach all available clients, the engineers sometimes need to travel long distances. The cost for traveling is built into the final bill for the client, but traveling contributes to work time lost. The Benemérito Cuerpo de Bomberos should consider dedicating blocks of time at regular intervals to complete all Fire Systems Tests and Risk Assessments within specific areas of the country, for example, Guanacaste. This would allow the engineers to service clients far away more efficiently, and the cost per client could be reduced due to the decrease of travel fees. The Engineering Department could then service more clients, and attract more clients with the lower prices than the current situation.

Hiring Qualified Personnel

Another option for the Engineering Department to increase Fire Systems Tests, Risk Assessments, and report production is to hire more employees. The Engineering Department is already operating on a busy schedule, and multiple engineers have said that if the department is to take on more clients the department will need to grow (Cornejo 2014, Cascante Gonazales 2014). The Engineering Department needs qualified employees. If hiring more engineers is too expensive, another suggestion would be to hire capable technical writers to help produce the reports. The turnaround time of ten days for a report is not always met (Montoya, 2014; Solis, 2014; Valerio, 2014). If an engineer were to have help with writing the report, it could be produced in a shorter period of time with the same level of quality. The engineers currently working in the Control de Proyectos subdivision need to be freed of other responsibilities so that they can prioritize their tasks and work efficiently. Hiring more personnel is only a valid option if Control de Proyectos is operating at capacity

and cannot take on any more work with its current resources. When the engineers can complete the reports in a timely fashion, they will be able to gain more clients, customer satisfaction, and revenue.

Additional Strategies

The following strategies were developed through conversations with Señor Núñez and information gathered during our situation analysis and SWOT analysis. They have been labeled as Additional Strategies because they require further investigation by the Benemérito Cuerpo de Bomberos if they wish to implement these strategies.

Branding

Branding is a combination of brand name (words, letters, and numbers) and brand mark (symbols, figures, and design) (Ferrell & Hartline, 2011). The Benemérito Cuerpo de Bomberos currently has a very distinctive title and recognizable logo.

Figure 3: Benemérito Cuerpo de Bomberos Logo

The Benemérito Cuerpo de Bomberos logo can be found on numerous articles of clothing, fire stations, vehicles, and even Microsoft Office templates. The color scheme of red, yellow, black, and grey is consistent throughout the entire organization.

Currently, there are no unique logos or designs for the Benemérito Cuerpo de Bomberos Engineering Department. In order to differentiate the Engineering Department from the Benemérito Cuerpo de Bomberos as a whole, the engineers may want to develop their own specific logo. Our recommendation is to keep the Benemérito Cuerpo de Bomberos recognizable logo shape and design, but add a banner to incorporate the Engineering Department. This new logo with banner could be used on anything engineer related, for instance,

reports or clothing. This logo would need to be designed to meet the specifications and standards set by the management department (Núñez Montes de Oca, 2014).

Team Up with INS

A recommendation for the Benemérito Cuerpo de Bomberos is to promote their services as a team with INS. The Benemérito Cuerpo de Bomberos can advertise that if businesses purchase INS insurance and are inspected regularly, they can receive a discount for having a high quality, functional system. Likewise, the INS representatives that sell fire insurance could promote the importance of being inspected by the Benemérito Cuerpo de Bomberos in order to receive incentives. This partnership would ideally increase the client pool for both organizations. Clients would be influenced to choose the Benemérito Cuerpo de Bomberos for regular inspections when they have INS fire insurance.

Reallocation of Resources

The engineers in the Control de Proyectos division currently perform Fire Systems Tests, Risk Assessments, and write the reports that are presented to the client. To decrease the time required for each report, the engineers could delegate report writing to qualified Bomberos from other fire stations. To ensure that the quality of the report is not lost, it should be reviewed by a certified inspecting engineer.

Hiring More Engineers

To increase productivity, another option for the Engineering Department is to hire more engineers. Multiple engineers have already said that if the department is to take on more clients the department will need to grow, because they are already operating on a busy schedule (Cornejo 2014, Cascante Gonazales 2014). Further research needs to be completed to determine if the cost of hiring new engineers would be feasible with the current budget.

New Legislation

Unlike the United States or Australia, there are no laws in Costa Rica that require a business to have their fire systems tested or risks assessed (Cornejo Quintana, 2014). This lack of legislation restricts the necessity for the Benemérito Cuerpo de Bomberos to perform Fire Systems Tests and Risk Assessments for businesses. Legislation requiring inspections of any kind would increase the client pool of the Benemérito Cuerpo de Bomberos. Although creating new legislation is a long and daunting process, it would generate business and improve the overall public safety of Costa Rica.

Target New Businesses

The CICR has the resources and network of businesses to assist the Benemérito Cuerpo de Bomberos in their marketing efforts. If the CICR were to recommend the Engineering Department through networking events, potential clients would become aware of the importance of the engineering services. This would increase business for the engineers and also promote public safety.

Conclusion

The Benemérito Cuerpo de Bomberos IQP team has successfully completed our project goal of developing a marketing plan for two engineering services offered by the Benemérito Cuerpo de Bomberos de Costa Rica: Fire Systems Testing and Risk Assessments. The research necessary for the marketing plan was completed through personal interviews, written questionnaires, and independent investigation. This process involved establishing a situation analysis, evaluating strengths, weaknesses, opportunities, and threats (SWOT analysis), and developing marketing recommendations based on gathered information.

Over the seven-week period we learned how to communicate in an entirely different language and business environment. This language barrier often led to miscommunication and concepts lost in translation. Fortunately one of our group members was proficient enough to communicate with Señor Núñez, interviewees, and people throughout the community. To address these communication challenges, we asked for permission to record interviews. We then listened to the recordings after the interviews and meetings were complete to ensure we translated responses correctly. If we had prolonging questions following the interview, we simply contacted the interviewee by phone or email.

We met many people who were very excited about our project and the effect it would have on the Benemérito Cuerpo de Bomberos. Our marketing plan is a great first step for the Benemérito Cuerpo de Bomberos Engineering Department, Control de Proyectos Division, in spreading knowledge of the services they provide. If implemented, our hope is that it will increase the client pool, generating more business and revenue for the Benemérito Cuerpo de Bomberos. Our marketing plan will enable the Benemérito Cuerpo de Bomberos to stress the importance of Fire Systems Tests and Risk Assessments and further promote public safety.

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Appendices

Appendix A: Engineer Interviews

Ulises Cornejo, Supervisor of Control de Proyectos, Benemérito Cuerpo de Bomberos Engineering Department

March 27, 2014

1. Can you please describe the Fire Systems Testing and Risk Assessment services in great detail?
   Fire Systems Testing
   - Test flow rate of the water pump
   - Test the critical point of flow for the fire systems (i.e. read flow or pressure rate)
   - Tests with fire trucks (i.e. tests with a stand pipe that takes water from fire systems)
   - Test fire alarms
   - Follow NFPA codes 20 (Standard for the Installation of Stationary Pumps for Fire Protection), 24 (Standard for the Installation of Private Fire Service Mains and Their Appurtenances), 72 (National Fire Alarm and Signaling Code)
   - Usually industries such as factories, movie theaters, etc.

   Risk Assessment

   Evaluations look for:
   - Fire hazards (i.e. faulty wiring, short circuits, open flames)
   - Proper storage of hazardous/flammable materials (i.e. butane, propane, nitrogen, oxygen, flammable liquids, argon, correct garbage disposal)
   - Escape routes (emergency escape plan, exit signs, arrows, and emergency lighting)

   Very particular – the Bomberos give recommendations after tests and evaluations in the form of a report that must be completed within 10 days of the Fire Systems Test or Risk Assessment

2. How many engineers work within the department? How many are specific to Fire Systems Testing and Risk Assessment?
   - There are 24 engineers in the department, but we need more engineers because it is a lot of work.
   - Control de Proyectos = 7 people
   - Risk Assessments: have ability to do 4-6 evaluations per week
   - Fire Systems Tests: have ability to do 2-3 tests per week

3. What types of equipment/vehicles do you need to perform these services?
   - Risk Assessment Evaluations
     - Only need mind, clipboard, pencil, camera
     - If particular – use heat sensor (ex. electrical systems)
   - Fire Systems Tests
     - Use small flow and pressure detectors
     - Pitot tube, manometer, flow meters, nozzles

4. How far can you travel outside of San José for these services?
   - Drive from San José to anywhere in Costa Rica to perform services
   - Bomberos charge per kilometer driven outside of San José
   - Approximate cost = 200 colones/km = approximately $0.50/km

5. How many engineers are needed to complete each service?
   - Risk Assessment: only 1, unless it is a large building
   - Fire Systems Tests: only 1, unless there is a fire truck flow test involved, then 2-3 engineers are needed
   - Some weeks the department completes 3-4 services in a day
   - Could support a maximum of 7-8 services in one day if assessing small buildings

6. Please describe the cost of Fire Systems Testing and Risk Assessment.
   - Fire Systems Testing – most expensive
     - Requires the most people & usually uses fire truck
       - (ex. to test the flow of the water storage tanks that the fire trucks take water from)
     - Cost to the Bomberos: approximately $1000 or 500,000 colones for the fire truck to be there
     - Cost of fire truck is not included in the bill to clients because it is very expensive
   - Risk Assessment
     - Determined by the amount of time the engineers need to work

7. How much do the Bomberos charge for their services?
   - Wage for worker per hour = 20,000 colones = approximately $40
   - Travel and food costs if applicable

8. How is the relationship between the fire system installation companies and the Bomberos?
   - Competition = SALVAVIDAS and R&R
   - Competition work with clients, do installments and maintenance, and recommend clients to the Bomberos
   - Clients are not obligated to be further tested by the Bomberos
   - Competition can perform: fire pump flow test, cabinet hose flow test, and a sprinkler flow test, but normally do not do these tests
   -

9. What is the relationship between the Bomberos and INS?
   - For the past 3-4 years the Bomberos have been separate from INS
   - In the past if the Bomberos have money troubles INS gives them money but we are now trying to move away from this

10. What are the incentives that customers receive from INS after inspection?
    - "There aren't any incentives that customers receive from INS after inspection"
      Disclaimer: We, the Bomberos IQP team, feel that when we asked this question a bit was lost in translation. After speaking with an INS representative, it has been determined that INS does offer incentives.

Nancy Cascante, Engineer, Benemérito Cuerpo de Bomberos

March 31, 2014

1. What engineering services do the Bomberos provide?
   - 3 services in Control de Proyectos
     - Fire Systems Testing
     - Risk Assessment
     - Simulation Evaluation
   - The services are not required so businesses have to request the services. When they want the service they submit a service request form to the Bomberos. The businesses include basic information about the building in the form.

2. Do the Bomberos use "NFPA Tropicalized" standards?
   - Yes, we use NFPA codes. There are a few codes that are changed to better fit Costa Rica.

3. How often are services requested?
   - Every day – the Bomberos receive calls and emails every single day
   - The public doesn't know much about the Bomberos Engineering Department. They recognize the firefighters but not the engineers.
   - Not all of the companies that request the service actually receive it. Many don't realize there is a cost immediately, so some can't afford it and others don't want to pay for it.

4. Is there growth happening within the Engineering Department?
   - In the near future the Engineering Department needs to grow to be able to handle the demand for the services.

5. Do companies ask for any of the services multiple times?
   - Yes, very large companies like Walmart will request multiple times because they have different locations and have more of a need for numerous inspections.
   - Small companies and businesses do not request the services as often.

6. What is the relationship between fire system installation companies and the Bomberos?
   - Generally the Bomberos have a good relationship with companies that install the systems. The installation companies will call Bomberos to have them approve the installation and then say Bomberos have approved their systems.
   - SALVAVIDAS and R&R are the biggest companies
   - The competition can only run some tests; Bomberos performs full tests with water flow tests and the fire truck.

7. What is the relationship between the Bomberos and INS?
   - It is a good relationship between Bomberos and INS.
   - But there is uncertainty as to whether it makes a difference in insurance rates if the services are performed by Bomberos (i.e. insurance incentives)

8. Are the Bomberos currently running on a deficit?
   - Revenue generated from engineering services is pooled with revenue for the whole institution.
   - Income of engineering services is good; it is bringing in a lot of money but it is all going into the same pool.

9. What do the Fire Systems Testing reports look like?
   - An example report will be given to you to take a look at.

10. How is the cost of a service determined?
   - Determined the following factors:
     - Where is it?
     - Size of building?
     - There is a calculator used to determine final total
   - Bigger companies usually request these services because smaller companies may not even have the fixed fire systems.

Appendix B: Customer Interview Results

Fernando Gutiérrez, Safety Manager, Anonymous Organization, Costa Rica

March 28, 2014

1. Why have you chosen the Benemérito Cuerpo de Bomberos?
   - The Bomberos are well trained and certified by the NFPA. Every year we ask them to evaluate our plant for insurance purposes.
   - The insurance we use is part INS and part a separate corporate insurance.
   - When the Bomberos evaluate they do the full inspection, with fire truck and special instruments.

2. What is your opinion of the organization?
   - Fernando was a part of the Bomberos organization and thinks that they are a great organization and people.
   - The Bomberos have improved a lot from 30 years ago and have better preparation, knowledge, and training now. They are NFPA certified and now have better fire prevention, control, training programs, and have been continuously looking to improve.
   - "The people of Costa Rica know the Bomberos for putting out fires, not for their engineering services."
     - A survey proved that the Bomberos have the #1 most confidence out of any public service company in Costa Rica. This just supports the general respect the people of Costa Rica have for the Bomberos organization.

3. How did you hear about this engineering service?
   - Fernando already knew about the engineering services because he was a Bombero

4. When and how often do you receive this service?
   - Once a year
   - It is important for companies to have a good relationship with insurance.
   - We do receive some sort of incentive for insurance but not really sure about how that works or if it is with INS.

5. Do you feel the cost of the service was appropriate and worth it?
   - I don't mind paying for Bomberos because I know and can see where the money is coming from/being used to do.

6. Why do you feel more businesses are not using these fire prevention services?
   - "In Costa Rica we are used to getting help from the Bomberos without a cost. But after privatization, now the Bomberos sell their services. I think this is okay because I understand that people need to make money in order to manage a company, we're just not used to it."

7. What other services would you want the Benemérito Cuerpo de Bomberos to provide?
   - Bomberos offer training courses in Fire Academy but we did not take advantage of it. We use other companies to train our own fire brigade. We are not sure about Bomberos training programs and want to wait for them to build up the program.

- Recommendation: Training/educational programs – Some sort of camp to teach people to use fire extinguishers, or training for confined spaces, emergency escape routes for homes, etc. It is important so that people know what to do in an emergency situation. This could be used for schools, companies, etc. (My employees used to visit a refinery that burned diesel to practice with fire extinguishers). Especially important for industry because most fire accidents occur due to welding and sparks.
- Bomberos should have a Fire Marshal because in Costa Rica there is no one person to regulate everything.
- There should be new legislation regulating "Hot Works" (i.e. businesses who work with open flames/welding), and regulation pushing companies to get inspected once a year and utilize other prevention techniques.

8. In your opinion, what would be the most effective way to advertise these engineering services?
   - The Bomberos need to communicate their services better.
   - They should communicate to the general public via television, Internet, radio, and other means to better inform them about fire prevention and emergencies.
   - There needs to be further emphasis on prevention techniques: "more fire prevention equals less fire response." For example, having a call center so people with general fire prevention questions can ask the Bomberos for advice.

9. What are methods of promotion and advertisement that you pay attention to?
   - TV is a good option, such as a very short, informative commercial. An example for commercials could be what to do during a fire to escape. This might be a good prevention step.
   - Internet, radio

Customer Satisfaction:

1. How satisfied are you with the Benemérito Cuerpo de Bomberos engineering services?
   - Very satisfied

2. Would you recommend Fire Systems Testing or Risk Assessment services to others?
   - Yes.

3. Did the performance of the Benemérito Cuerpo de Bomberos meet your expectations for this service? Please explain.
   - Yes (see above)

4. Do you feel the Benemérito Cuerpo de Bomberos were knowledgeable and professional? If no, please explain.
   - Yes

Closing:

5. **Y** N Circle "Y" if we can anonymously mention your answers in our final report
6. **Y** N Circle "Y" if we can mention your full name in our final report

We are not allowed to mention the company that Fernando works for in our report, however we can mention his name.

Carlos Roberto Pino Q., DYCEL, General Manager

April 8, 2014

Background on DYCEL:

- Construction Company
- Construction for factories = 90%
- Electromechanic work = 10%

1. What engineering services do you utilize that are offered by the Bomberos?
   - Visados de Planos, Fire Systems Testing, very rarely Simulation Evaluations

2. Were you satisfied with the engineering services of the Bomberos?
   - Yes, very satisfied

3. Would you recommend the services of Fire Systems Testing or Risk Assessment to other businesses?
   - Yes

4. Did the level of testing meet your expectations? If not, please explain.
   - Yes

5. Were the Benemérito Cuerpo de Bomberos knowledgeable and professional?
   - Yes

6. Why did you choose the engineering services provided by the Bomberos?
   - Because the Bomberos are good and they are the only option

7. What is your opinion of the Bomberos?
   - They provide very good services. There is a problem in Costa Rica because there is no infrastructure to help and improve the Bomberos' services.
   - For example, there are not enough hydrants to actually fight fires better.

8. How did you learn about the engineering services?
   - The insurance company (INS) suggested that they contact the Bomberos

9. When and how often do you receive the engineering services?
   - 4 times a year

10. Did you feel that the cost of the services was appropriate?
   - Yes

11. Why do you believe that companies do not utilize the Bomberos engineering services?
   - They don't know about the Bomberos' engineering services

12. Do you know of other companies that offer similar engineering services to the Bomberos? If yes, please explain.
   - No, only Bomberos

13. What other services do you wish the Bomberos offered to your business?
   - Give Bomberos plans to design fire systems because they know everything already (how to build and make changes).

14. In your opinion, what is the best method to promote for the Bomberos engineering services?
   - Letters specifically to civil and mechanical engineers, architects, professionals
   - Technical magazines

15. Can we use your responses in our report?
   - Yes

16. Can we use your name in our report?
   - Yes

Additional Comments:

17. Do you recommend Bomberos' engineering services to your clients?
   - Yes – all clients follow through and get Bomberos' opinions.

18. Can you describe the services that your company offers?
   - DYCEL does install fire systems but they don't normally do maintenance.

19. Can you describe the testing of the systems?
   - Clients get fire systems if it's a new project, but if it's a remodel then probably not.

20. Who are your typical clients? Big or medium companies and activities?
   - Usually medium and large sized companies.

21. What percentage of the market do you have?
   - We did not ask this question.

22. Do you think it's important that your clients have a second opinion?
    - Yes – it is important to have a third party that is impartial.

23. How much do you charge for return visits?
    - We did not ask this question.

Silvia Montoya, Heiner Solis, Erica Valerio, Empresa de Servicios Publicos de Heredia

April 25, 2014

1. How satisfied are you with the engineering services of the Bomberos?
    - The experience was really good, because they are very experienced. We have contacted the Bomberos for the past two years for Risk Assessments and Fire Systems Tests. However, the Risk Assessment reports need more technical information, especially for electrical systems (Explanations as to why yes this is fine and no this needs improvement). The Fire Systems Tests reports are good though. It also took longer than 10 days for both of the reports to come in. We have had two reports for different offices with the same name on the document, leading to confusion as to which report was for which office. There needs to be more clarity in the original reports (one in 2012 and one in 2013). But, we have a lot of confidence in the Bomberos' evaluations.

    - A good point to make is that a lot of people have confidence in the Bomberos. We also like that the Bomberos can give extra insight. For example, if we want to install a kitchen they know the information about making it safe.

2. Would you recommend Fire Systems Tests or Risk Assessments to other companies?
    - Yes

3. Did the quality of services exceed your expectations? If not, please explain.
    - Yes

4. Were the Bomberos competent and professional?
    - The Bomberos are very prestigious and they have the highest authority for NFPA certifications and anything fire related. The Bomberos are the most competent.

5. Why did you choose the Bomberos engineering services?
    - The Risk Assessments were required by Costa Rican law

6. What law?
    - After 2007 Costa Rica adopted NFPA standards so from the point on businesses need to have a Risk Assessment completed yearly.

7. Do you have fire insurance?
    - Yes

8. Do you receive incentives from INS?
    - No, our policy does not include incentives; it is a fixed rate for this type of building.

9. How did you hear about the engineering services of the Bomberos?
   - We had been calling the Bomberos in Heredia for consulting and they referred us to the engineering department in San José.

10. When and how often do you apply engineering services?
   - We have contacted the Bomberos twice for Risk Assessments.

11. Do you believe that the cost of service was appropriate?
   - It is a little high for Risk Assessments for the level of detail that was given afterwards, but it is reasonable for a Fire Systems Test.

12. Why do you think that companies don't use the engineering services of the Bomberos?
   - They may not know about them.

13. Do you know of other companies that offer similar services to Risk Assessments? If yes, please explain.
   - ASOSI offers similar services to Bomberos. We chose Bomberos because ASOSI is not the same as Bomberos. The Bomberos have a better reputation/image. The Bomberos are the best.

14. What other services, in your opinion, could the Bomberos provide?
   - General training on how the fire system works would be nice.

15. In your opinion, what would be the best method of promotion for the Bomberos engineering services?
   - They should go to companies and explain all of the services they have because many people only know them for putting out fires.

16. We may use your responses in our public documents
   - Yes

17. We may use your name in our public documents
   - Yes

Appendix C: Written Questionnaire Results

Jessica Valverde Garcia, Coordinating Committee of Risk and Occupational Health, University of Costa Rica

April 4, 2014

1. Why have you chosen the Benemérito Cuerpo de Bomberos?
   - Because it is the best option and I know that their knowledge is the best. I trust the work done by the Benemérito Cuerpo de Bomberos 100%.

2. What is your opinion of the organization?
   - I like and know that the Benemérito Cuerpo de Bomberos are very capable for the issue of fire and other relations.

3. How did you hear about this engineering service?
   - Researching online and then calling Engineering Services directly.

4. When and how often do you receive this service?
   - Still pending.

5. Do you feel the cost of the service was appropriate and worth it?
   - Of course, I find it super affordable.

6. Why do you feel more businesses are not using these fire prevention services?
   - Maybe lack of knowledge of the existence of this service.

7. Are there other companies that offer this engineering service? If yes, please explain.
   - Yes: Internally to the University of Costa Rica, which provides the Commission of Occupational Health, but it is lousy and I think they are not properly trained to perform this task. The Coordinator does not give me confidence.

8. What other services would you want the Benemérito Cuerpo de Bomberos to provide?
   - Talks, prevention activities, drills, etc.

9. In your opinion, what would be the most effective way to advertise these engineering services?
   - Maybe the Benemérito Cuerpo de Bomberos can visit to offer personalized services.

10. What are methods of promotion and advertisement that you pay attention to?
    - As I said, through visits.

Customer Satisfaction:

1. How satisfied are you with the Benemérito Cuerpo de Bomberos engineering services (on scale 1-5, 1 is low and 5 is high)?
   - 5: Very satisfied

2. Would you recommend Fire Systems Testing or Risk Assessment services to others?
   - Yes

3. Did the performance of the Benemérito Cuerpo de Bomberos meet your expectations for this service? Please explain.
   - Yes

4. Do you feel the Benemérito Cuerpo de Bomberos were knowledgeable and professional? If no, please explain.
   - Yes

Closing:

5. Y N Circle "Y" if we can anonymously mention your answers in our final report
6. Y N Circle "Y" if we can mention your full name in our final report

Anonymous

April 7, 2014

1. Why have you chosen the Benemérito Cuerpo de Bomberos?
   - The Bomberos are the highest authority of fire protection services.

2. What is your opinion of the organization?
   - Good.

3. How did you hear about this engineering service?
   - On the web page.

4. When and how often do you receive this service?
   - This was the first time.

5. Do you feel the cost of the service was appropriate and worth it?
   - Yes

6. Why do you feel more businesses are not using these fire prevention services?
   - Because of the lack of publicity.

7. Are there other companies that offer this engineering service? If yes, please explain.

Yes	No
X	○

8. What other services would you want the Benemérito Cuerpo de Bomberos to provide?
   - Installation of Fire Detection equipment.

9. In your opinion, what would be the most effective way to advertise these engineering services?
   - Press and Television.

10. What are methods of promotion and advertisement that you pay attention to?
    - Television.

Customer Satisfaction:

1. How satisfied are you with the Benemérito Cuerpo de Bomberos engineering services?

(1 being not at all, 5 being very)

1	2	3	4	5
○	○	○	○	X

2. Would you recommend Fire Systems Testing or Risk Assessment services to others?

Yes	No
X	○

3. Did the performance of the Benemérito Cuerpo de Bomberos meet your expectations for this service? Please explain.
   - Yes

4. Do you feel the Benemérito Cuerpo de Bomberos were knowledgeable and professional? If no, please explain.

Yes	No
X	○

Closing:

Y	N	Circle "Y" if we can anonymously mention your answers in our final report
Y	N	Circle "Y" if we can mention you in our final report

Appendix D: Installation Company Interviews

Marco Gonzáles, Ingelectra, S.A. Constructora Electromecánica

April 7, 2014

1. How satisfied are you with the Engineering Department of the Bomberos?
   - 90% satisfied with the Bomberos
   - Only dislike the long wait between receiving an inspection and receiving the report.

2. Would you recommend Fire Systems Testing and Fire Risk Assessments to other companies?
   - We mainly contact the Bomberos for Fire Systems Testing, rarely Risk Assessments.
   - We recommend our customers have new installed systems inspected one year after installation.

3. Does the quality of the services exceed your expectations? If not, please explain.
   - We are satisfied with the quality of the services.
   - There are multiple parts to customer satisfaction.
   - Availability and quality of personnel.
   - The Bomberos are always available, have high quality personnel, and they follow all regulations.

4. Are the Bomberos competent and professional?
   - When they perform the tests, Ulises explains what's going on thoroughly for other employees and the customer.

5. Why did you choose the Bomberos?
   - Costa Rica doesn't have other companies that can do what the Bomberos do.
   - Having the Bomberos inspect means higher quality.

6. What is your opinion of the Bomberos organization?
   - They are very knowledgeable about Fire Protection practices.
   - They are the primary institute for anything fire related.
   - Training
   - Teaching
   - NFPA Regulations

7. How did you hear about the Engineering Department of the Bomberos?
   - In 1998 we learned of the services of the Bomberos.
   - Not many people knew about Fire Protection System Testing.

8. How often do you receive services from the Bomberos?
   - We have about 4-5 projects per year. Each project gets an inspection.

9. Is the cost of service appropriate?
   - We think pricing is fair.

10. Why don't more companies use the services of the Bomberos?
    - Many companies don't know that the Bomberos offer these services.
    - Some think the cost is too high and/or not worth it.

11. Do you know of other companies that offer similar services to the Bomberos? If yes, please explain.
    - Some companies inspect themselves to high standards so they don't need the Bomberos.

12. What other services could the Bomberos provide your business?
    - We don't need any other services from the Bomberos other than Fire Systems Testing and Fire Risk Assessments.

13. In your opinion, what would be the best method for promoting the engineering services of the Bomberos?
    - Publicity! Bring guest speakers and presenters to Architecture High Schools.
    - TV ads and radio commercials not going to be useful for them because the market is very specific.

José Lopez, Globaltec Technologies, Project Consultant

April 8, 2014

1. How satisfied are you with the Engineering Department of the Bomberos?
    - I am satisfied with the services.

2. Which services do you contact the Bomberos for?
    - Globaltec doesn't usually directly contact the Bomberos.
    - We only recommend to customers.
    - It is the customers' responsibility to have the systems inspected.

3. Would you recommend Fire Systems Testing and Fire Risk Assessments to other companies?
    - Yes, we recommend their services to our clients.

4. Does the quality of the services exceed your expectations? If not, please explain.
    - They meet our expectations and focus on training people which is helpful.

5. Why did you choose the Bomberos?
    - The Bomberos can review building plans which is required by law.

6. What is your opinion of the Bomberos organization?
    - They are well-funded.
    - They are a large and well-known company.
    - The Bomberos can cover the whole country.

7. How did you hear about the Engineering Department of the Bomberos?
    - They are well-known.
    - It is general knowledge that the Bomberos provide fire protection services.

8. How often do you receive services from the Bomberos?
   - Every 3 months we use the Bomberos for reviewing building plans.
   - But more frequently we use them for consultation purposes.

9. Is the cost of service appropriate?
   - We think pricing is fair.

10. Why don't more companies use the services of the Bomberos?
    - Many companies do not know that the Bomberos offer these services.
    - Also, regulations are not always followed so to avoid self-incrimination some companies avoid the Bomberos.

11. Do you know of other companies that offer similar services to the Bomberos? If yes, please explain.
    - Ministry of Health (but they aren't direct competition).
    - There are no other companies that offer the same services.

12. What other services could the Bomberos provide for your business?
    - Servicing and inspection of fire hydrants.

13. In your opinion, what would be the best method for promoting the engineering services of the Bomberos?
    - Actually enforce regulations.
    - Attend or start fire safety conventions.
    - It is important that the Bomberos go to conventions without connections to other companies. All attendees should know that the Bomberos are impartial.

14. What type of companies do you serve?
    - We have a wide variety of clients.
    - Public companies
    - Private companies (large and small)

15. What other services could the Bomberos provide your business?
    - Servicing and inspection of fire hydrants.

Other Information:

- It is less common for us to install sprinkler systems than fire detection systems.
- We install sprinkler systems every 3 months.
- We install 1-2 fire detection systems per month.
- We test the systems after installation and return every 3 months for maintenance.
- Clients have the option for who they use for inspecting the system.
- We believe it is important for customers to have an impartial second opinion.

Additional Questions Asked and Answered Via Email

April 14, 2014

1. What do you charge your clients for installations? Is there a fixed cost or does the price differ for different buildings? Can you please give an example for a medium sized company? Can you possibly give an example for a building that is 3000 m^2?

   – Depends on the type of system, if suppression or detection. And specifically the amount of equipment, special valves, pumps, etc. For a building of 3000 m^2 it can be around $500,000 for a system of detection and suppression hoses.

2. How often do you perform installations? Do you perform one installation per company?

   – On average, 3 projects per month.

3. How much do you charge your clients for inspections? Is there a fixed cost or does the price differ for different buildings? Can you please give an example for a medium sized building? Can you possibly give an example for a building that is 3000 m^2?

   – On average, about $500 per inspection, if the site is large it may merit a couple of visits.

4. How often do you perform inspections?

   – At least 2 times per week.

5. How much do you charge your clients for maintenance? Is there a fixed cost or does the price differ for different buildings? Can you please give an example for a medium sized building? Can you possibly give an example for a building that is 3000 m^2?

   – Depends on system type and geographic location, which affects the per diem.

6. How often do you perform maintenance services?

   – 4 times a month on average.

Benedicto Arrieta V., SALVAVIDAS, Chief of Department of Maintenance

April 7, 2014

1. Were you satisfied with the engineering services of the Bomberos?
   - SALVAVIDAS only applies for Fire Systems Testing.
   - We are very happy with Bomberos' services.
     - They have NFPA certifications and understand all of the standards. They are very knowledgeable and professional.
     - Bomberos follow the Latin American Standard - Especialista Certificado en Proteccion Contra Incendios.

2. Would you recommend the services of Fire Systems Testing or Risk Assessments to other businesses?
   - Of course!

3. Did the level of testing meet your expectations? If not, please explain.
   - Yes

4. Were the Bomberos knowledgeable and professional?
   - Bomberos are very professional and knowledgeable; SALVAVIDAS are very satisfied
     - For example, Maikol Flores is a very good engineer and professional.

5. Why did you choose the engineering services provided by the Bomberos?
   - The engineers are very experienced.
     - For example, Ulises has been working there for many years.

6. What is your opinion of the Bomberos?
   - Excellent, very good.
   - Bomberos are best in all of Central America.
     - Constantly have new equipment.
   - A lot of companies in Central America offer installation but aren't at the same level/quality as the Bomberos. They don't have the same level of understanding as the Bomberos do.
   - Bomberos follow UL and FM standards as well, it shows how high caliber the service they provide is.
   - It is very important that the Bomberos' mark stands for something good. Bomberos should have a high quality of service.

7. How did you learn about the engineering services?
   - He has known the Bomberos for 14 years. When he started the company they began working with Bomberos.

8. When and how often do you receive the engineering services?
   - Every month we recommend client to work with the Bomberos. We do not work directly with Bomberos themselves.

9. Did you feel that the cost of the services was appropriate?
   - We think that the price is fair and the quality of the services more than justifies the cost.

10. Why do you believe that companies do not utilize the Bomberos engineering services?
    - We did not ask this question.

11. Do you know of other companies that offer engineering services similar to the Bomberos? If yes, please explain.
    - There are other companies that say they can do the same job as the Bomberos, but they actually cannot.
    - Only the Bomberos offer services like this.

12. What other services do you wish the Bomberos offered to your business?
    - SALVAVIDAS works next to Bomberos and they are satisfied with services they receive.

13. In your opinion, what is the best method to promote the Bomberos engineering services?
    - They do not need that much publicity because they are already very well known as a fire service provider.

14. Can we use your responses in our report?
    - Yes, no problem.

15. Can we use your name in our report?
    - Yes
    - Anymore questions, feel free to email.

Additional Comments:

16. Who are your usual customers?
    - Big businesses, such as hotels.
    - Bigger than 2500 m^2 should definitely have a fire system in place.

17. How often do you install fire systems?
    - 50-60 companies a month.
    - Not all of them are installations, some are maintenance/revision.
    - 1-3 projects in 1-6 months for installation.
    - 1 time per month they will inspect. Some are annual, and some are monthly basis.

18. Does SALVAVIDAS charge for inspections?
    - Yes, we charge for performing inspections.
    - Insurance rates are a major reason people tend to order inspections. If there is not maintenance, insurance rates have the potential to go up.

19. Is the turnaround time for a report (10 days) too long of a time?
    - No, the turnaround time for reports is fine.

Additional Questions Asked and Answered Via Email

April 24, 2014

1. What do you charge your clients for the facility? Is there a fixed cost or does the price differ for different buildings? Can you please give an example for a medium sized building? Can you possibly give an example for a building that is 3000 m^2?
    - Facilities are charged based on the number of sprinklers. This is very dependent on the design of the project but it is usually about $125 per sprinkler.

2. How often do you perform installations?
    - Projects are held throughout the year and depending on size, can take 3-6 months or a year.

3. How much do you charge your customers for inspections? Is there a fixed cost or does the price differ for different buildings? Can you please give an example for a medium sized building? Can you possibly give an example for a building that is 3000 m^2?

- Clients are charged for preventive maintenance programs per year, with billings and monthly visits, approximately $ 385.00 per month.

4. How often do you inspect?
   - Depends on the contract made, but typically monthly inspections.

5. How much do you charge your customers for maintenance? Is there a fixed cost or does the price differ for different buildings? Can you please give an example for a medium sized building? Can you possibly give an example for a building that is 3000 m^2?
   - All preventive maintenance such as oil changes, filters, gauges, or corrective maintenance, such as replacing some pipes or repairing leaks, are charged separately depending on the maintenance needed.

6. How often do you perform maintenance service?
   - There is usually a preventive maintenance schedule, according to NFPA standard 25 or recommendation from the manufacturer. If any damage or leakage during an inspection for instance is detected, we immediately fix it of course, charging for such services.

Appendix E: Risk Assessments Competition Interview

Esteban Ramos, SHPI Engineering, Director

April 23, 2014

Email Correspondence

1. Please give an explanation of how a Risk Assessments is performed.
   - Review requested site plans.
   - Use a guide based on what kind of occupancy a building will have: whether it is a university, residence, or industrial building.
   - There may be a qualitative or quantitative assessment.
   - Create technical report with the results.

2. Who are your typical clients (e.g. small, medium, or large companies, etc.)?
   - Medium and large enterprises.

3. Do you having clients that request Risk Assessments more than once? Or is it usually just a one-time evaluation?
   - So far clients have applied only once.

4. How long it takes to perform a Risk Assessments?
   - From 1 to 3 days depending on the size of the building.

5. How often do you perform Risk Assessments?
   - Our company has been operating for 1.5 years and we have made to date, 3 Risk Assessments.

6. Is there a report provided after a Risk Assessments is completed?
   - Yes

7. If so, what aspects do you include in your report? Do you have pictures, descriptions, etc.? Do you provide advice?
   - Overview, methodology, conclusions and recommendations.

8. How much time is needed to produce the report?
   - 2 to 4 days depending on the size of the building.

9. What are your certifications and qualifications? Are you NFPA certified?
   - Yes, I am NFPA certified.

10. On average how many Risk Assessments can be offered per week? Per year?
    - 1 per week at most per person.

11. How much do you charge your customers for Risk Assessments? Does it depends on the size of the building, the time it takes, etc.? Is there a fixed cost or does the price differ for different buildings? Can you please give an example for a medium sized building? Can you possibly give an example for a building that is 3000 m^2?
    - There is no fixed cost; it depends on the building area and the type of risk, and also where the building is located. For example, if the building is within the metropolitan area or if accommodation is required.

Appendix F: INS Interviews

Alexander León, Centro de Servicios Técnicos Profesionales, Dirección de Operaciones

Friday April 4, 2014

1. Who should have fire insurance?
   - Everyone

2. Who actually has fire insurance?
   - Everyone who has credit within the bank has fire insurance, and it is required whenever you want to build a house. About 85% of businesses have fire insurance. It is not required for businesses to have fire insurance, but it will be soon.

3. What is the cost of fire insurance?
   - It varies, dependent on size, and activity. For example, if the company has open flames it has a higher risk of fire meaning it will have a higher rate than say a water park.

4. Does INS provide discounts if companies have fire systems in place?
   - Yes! They are for fire safety systems if they are functioning and have a high quality (ex. sprinklers, alarms, etc.).

5. Approximately what is the discount?
   - 5% minimum and 30-40% off maximum. The discounts depend on the types of protection.

6. Are there benefits for businesses that are inspected?
   - Yes and no. A business cannot get the discount until INS inspects them. If INS comes in and notices that the fire systems are not up to par, the business may not get the discount. Having the system inspected would ensure that the business would get the discount.

7. Do you recommend the Bomberos for inspections?
   - We recommend getting inspected by anyone who is a NFPA certified company.

8. How often do you recommend inspections?
   - A minimum of 1 inspection per year is recommended and it depends on the types of risks. Some places need to be inspected 2-3 times a year.
9. Does INS recommend a company for installation?
   - No, INS does not require any certain installation company. INS does not deal with it. They solely come back after the building has been completed.
   - If there are 2 buildings that are the same, one has fire systems and one does not, the building with the system has a lower rate.

10. Does getting inspected regularly add a discount to the fire insurance?

- Yes, you need to get inspected to keep the discount; it is part of the expectation of the fire insurance discount.

11. How much of the fire insurance market does INS control?
    - 85-90%
    - A lot of people who have fire insurance are foreign. They come from countries where insurance is required for protection.

12. Are there facts that show how often there are emergencies in buildings that have systems opposed to buildings that do not?
    - Ask the Bomberos.

Juliana Jiménez, Actuary, Fire Insurance Division, INS

April 25, 2014

1. How much is fire insurance if a company does not receive bonuses from INS? Is the cost of insurance different for types of businesses, such as homes or businesses?
    - Separate rates for commercial and industrial buildings. The rate is based on how safe the building is.
    - We were not allowed to see the rate because it is not public information.

2. How do you decide how safe a building is?
    - It depends on the category the building falls into.
    - There are 5 different categories that a building can fall into depending on the activity within the building and the risk, not based on size.
        1. Low risk (ex. offices, schools)
        2. Ordinary risk I (ex. building without flammable liquids)
        3. Ordinary risk II (ex. factories)
        4. Extra Ordinary I (ex. factories that have internal combustion)
        5. Extra Ordinary II (ex. gas stations, fire refinery, sugar production factories)

3. How much is fire insurance if a company does receive incentives from INS? Is the cost of insurance different for different types of businesses, such as homes or businesses?
    - If they only have fire extinguishers they will receive only about a 5% discount, but if they have more than that they will receive higher discounts.
    - You can get an incentive if you do not have a fixed fire system, you just have to have something in place, such as smoke detectors.
    - The more safety precautions in place the higher the incentive will be.
    - Incentives are determined when purchasing fire insurance.

4. Does INS advertise the incentives they offer? If yes, how?
    - It is up to the people who sell the insurance (people of INS) to promote why the businesses should choose INS.

5. Who determines the actual amount of the incentive?
    - All of the inspections that determine the incentive are performed by engineers of INS. The engineers of INS are not NFPA certified. They are graduated from an engineering school. Oscar Rodriguez is the head of the department of engineering at INS.

We later clarified this fact with Kattya Cosco Redondo, an architect with the INS engineers. She specified that INS will accept a Bomberos evaluation/report along with a INS evaluation/report to determine the amount for an incentive.

6. Does INS require or recommend regular inspections (tests of fixed fire systems) by a third party in order for businesses to receive incentives? If yes, do the people who provide the inspection need to be NFPA certified?
   - It is recommended that you get inspected by a separate company. There are 3 inspectors: INS, Bomberos, and other companies.
   - INS prefers that you use Bomberos or an outside company, but you could get inspected by INS only. INS recommends that the client use Bomberos, especially if the client is very big or has a lot of dangerous materials.
   - The client can contract the INS inspector for free.
   - Depending on how large of a company INS is insuring or if the company is determined to be High Risk (Category 3,4,5), INS will recommend a company to use Bomberos to be inspected.
   - INS only inspects if the Bomberos do not. The client has options. INS will accept a Bomberos report to get discount.
   - When it is a different company, the INS inspector will go to the inspection as well. But when it is Bomberos completing the test, the Bomberos report is sufficient.

We later clarified this fact with the Kattya Casco Redondo. She said that the "different company" is specifically an international insurance representative. INS will co-inspect with an international insurance representative if the company has dual insurance (INS and International Insurance).

7. How often does INS inspect companies in order to determine if they deserve a fire insurance discount?
   - Depends on the risk. They may not need inspections as frequently. If there is a big risk then it is on a regular schedule/yearly basis.

8. Does INS charge the client to be inspected by INS?
   - No, the cost is included within the insurance policy.

9. Does the person performing the inspection provide a detailed report to the client and/or INS if it is a third party person?
   - Yes, it is for INS and the client and it includes recommendations.

Kattya Casco Redondo, Architect, INS

April 25, 2014

1. What types of certifications do the engineers of INS have?
   - Some engineers take NFPA courses and study the standards, but they are not necessarily certified.
   - Little by little the businesses of Costa Rica are realizing how much more safe they need to be with their fire protection systems.
   - For the purposes of insuring, not being NFPA certified is fine.

2. How many engineers are in the engineering department of INS?
   - There are 6 engineers that work with INS, but we have a group of 45 engineers that are outsourced.
   - INS has architects, civil engineer, electrical and computer engineers, etc.
   - None of the outsourced engineers are NFPA certified. It is optional.

3. Is there a written report after the inspection?
   - Yes, it is produced after 8 work days, but the time it takes to produce depends on the type of business. Factors include: distance, size of the business, types of risks, etc.
   - Ex. Milk factory takes a long time to look at all of the parts of it.

4. Where are the INS engineers located?
   - All of the INS engineers are in the INS office in San José.

5. Please explain INS inspection.
   - There are 2 types of inspections:
     1. To evaluate/determine the risk (only the INS engineers)
     2. For insurance claims (after an accident/appraisals)
   - What to look for to determine level of risk and the level of discount:
     - Fire systems, electrical systems, "hot works", flammable materials, proper storage of gasses, etc.
   - There is no charge for INS to perform these inspections. It is included in your insurance rate.
   - Big companies have 2 insurers: INS and an international insurance company. Often the international insurance will require an international inspector to come and work with INS during the inspection. Both inspectors will create 2 separate reports.
   - If an international inspector performs the inspection, the Bomberos will not complete an inspection.

6. Do you have a higher insurance rate if you use the INS inspectors?
   - There is no charge to the client.

7. Can the Bomberos services be used instead of the INS inspectors?
   - Yes, there is the option to use Bomberos.
   - The Bomberos produce a report that is the same as an INS inspection and can be used instead of an INS report.

8. How do INS engineers inspect a building?
   - INS does not have the same equipment to perform the same tests that the Bomberos do.
   - INS inspections are only visual inspections. They do not conduct tests, such as flow tests.

9. Does INS provide recommendations in their reports?
   - INS provides recommendations and puts businesses into 3 categories
     1. Normal = Good, no risk
     2. Sub normal= little risk
     3. Super sub normal=high risk
   - The recommendations advise how to get to a normal level of risk.
   - The 5 categories are more for pricing and they are decided off of the reports.

Appendix G: Brief NFPA Code Overview

NFPA 14: Standard for Installation of Standpipes and Hose Systems to Deliver Adequate Water Supplies

- Provisions to cover all system components and hardware
- Piping, fittings, valves, pressure-regulators are all covered in this standard
- Installation, design, plans, calculations are also covered
- Water supply and system acceptance are explained

NFPA 20: Standard for the Installation of Stationary Pumps for Fire Protection

- Protects life and property
- Requirements for selection and installation of pumps
- Ensure systems will work as anticipated to deliver enough water in a fire emergency
- Applies to pumps in high-rise buildings, centrifugal, vertical shaft turbine-type, and positive displacement
    - High-rise buildings = "apartment buildings, hotels, office buildings and facilities that care for the sick," (Hall, 2013)

NFPA 24: Standard for the Installation of Private Fire Service Mains and Their Appurtenances

- Ensures water supplies are available in a fire emergency, with requirements for the installation of private fire service mains and their appurtenances supplying private hydrants and water based fire protection systems
- Requirements
    - Valves
    - Hydrants
    - Hose houses and equipment
    - Master streams
    - Underground piping
    - Hydraulic calculations

NFPA 72: National Fire Alarm and Signaling Code

- Safety provisions for fire detection, signaling, and emergency communications
- Focus
    - Fire alarm systems
- Rules
    - Application, installation, location, performance, inspection, testing, and maintenance of fire alarm systems
    - Supervising station alarm systems
    - Public emergency alarm reporting systems
    - Fire warning equipment
    - Emergency communications systems

NFPA 101: Life Safety Code

- Strategies to protect people based on:
  - Building construction
  - Occupancy features to minimize dangerous effects of fire and associated hazards (smoke, heat, toxic gases, etc.)
- Provisions and requirements
  - Leaving/getting out of a building – prompt escape from danger to safety
  - Features of fire protection, sprinkler systems, alarms, emergency lighting, smoke barriers, and special hazard protection
  - Safeguards: Protective features and systems, building services, operating features, maintenance activities, and other provisions

Appendix H: SWOT Quantitative Assessment Matrix Rating Justification

Strengths

Service Quality

M=3 I=3 R=9

Service Quality was identified as a strength because the engineers are highly qualified and have NFPA certifications. This element was rated a three for magnitude because poor service quality would greatly impact their reputation. This element was also rated a three for importance because offering high quality services increases their competitive advantage, making it easier to implement in a marketing plan.

Reputational Resources

M=2 I=3 R=6

Reputational Resources were identified as a strength because the members of the community look up to the Cuerpo de Bomberos as leaders of safety. The element was rated two for magnitude because although this reputation is important to uphold, we did not see it changing in the foreseeable future. The element was also rated a three for importance because it is the Cuerpo de Bomberos' reputation that gives them a large competitive market edge.

Test Exclusivity

M=3 I=3 R=9

Test Exclusivity was considered a strength because no other organization can use a fire truck for Fire Systems Testing. The element was rated a three for magnitude and importance because it gives the Bomberos de Costa Rica the biggest competitive advantage. No other organization will ever be able to provide a more thorough diagnosis of a fixed fire system.

Work with Fixed Fire System Installation Companies

M=2 I=2 R=4

Working with Fixed Fire System Installation Companies was considered a strength because it is a free source of advertisement for Fire System Tests and Risk Assessments. This element was given a magnitude of two because it help builds the positive reputation and client base for the Bomberos de Costa Rica. This element was given an importance of two because this system is already in place, but still gives the Engineering Department a slight competitive advantage.

Weaknesses

Lack of Marketing Strategy and Communication

M= -3 I= 3 R=-9

A lack of a Marketing Strategy and Communication was considered a weakness because it contributes to a lack of awareness of the engineering services within the target market. This element received a magnitude of negative three and importance of three because it is extremely influential for our future marketing strategies. A marketing plan that caters to the target market, increasing awareness of Fire System Tests and Risk Assessments, was part of the project description set by our sponsor.

Centralized Services

M= -1 I=1 R=-1

Centralized Services was considered a weakness for the Engineering Department because both time and efficiency are wasted when engineers have to travel great distances for clients. This was rated a magnitude of negative one because the majority of the clients of the Engineering Department reside in San José. This was rated an importance of one because decentralizing the services won't have a large impact on how the engineers operate, and would not be advisable until there are more clients outside of San José.

Number of Employees and Efficiency

M=-1 I=2 R=-2

Number of Employees and Efficiency was considered a weakness because it is causing the engineers to be constantly working. This was considered to be a magnitude of negative one because although the engineers are busy, they are not yet overloaded with work. However, this was considered to have an importance of two because if the workload were to increase, the number of employees or efficiency would also need to increase, directly effecting how the engineers operate.

Service Deficit

M= -2 I=2 R=-4

Service Deficit was considered to be a weakness because it requires the Control de Proyectos to pull funds from other sources. This element was given a magnitude of negative two because although it is detrimental to the Control de Proyectos department, the Bomberos de Costa Rica as a whole has enough funding to cover the costs. This element was given an importance of two because it is somewhat influential in determining marketing strategies that reduce the deficit.

Marketing Budget

M=-2 I=3 R=-6

The limited Marketing Budget was considered a weakness because it restricts the types of marketing strategies that can be implemented. This element was given a magnitude of negative two because of the effect it had on the Cuerpo de Bomberos' overall budget. Funds from other sources would be pulled and pooled together to create the marketing budget. This element was given an importance of three because it greatly influences the types of marketing strategies we could recommend.

Fire Truck Expenses

M=-3 I=2 R=-6

The lack of charge for use of the fire truck was considered a weakness because the Cuerpo de Bomberos absorbs the cost. This element was given a magnitude of negative three because it directly costs the organization money. This element was given an importance of two because it has the potential to influence a pricing marketing strategy.

Opportunities

Discounts

M=2 I=3 R=6

INS insurance discounts were considered an opportunity because it is up to the policy salesperson to promote discounts. If the salesperson were to promote the insurance benefits of having a Fire Systems Test or Risk Assessment by Cuerpo de Bomberos, there could potentially be new clients for the Engineering Department. This element was given a magnitude value of two because it is a viable method of promotion that would have a very large reach within the target market, but would require cooperation from INS. This was rated a three for importance because of how large a group of potential clients the INS sales staff would be able to reach.

Payment Plans

M=3 I=2 R=6

Payment Plans were considered an opportunity because potential clients of the Bomberos de Costa Rica have not purchased engineering services due to the current payment system. Payment plans were rated a three for magnitude because of their ability to bring in clients that would not normally be able to afford the services. They were rated a two for importance because they are a part of the pricing strategy, but are not incredibly easy to implement.

Market Gap

M=3 I=2 R=6

The Market Gap was considered an opportunity because informing the target market of the engineering services is critical in any marketing plan. The market gap represents the potential client pool, and was rated a magnitude of three. It is an important for the Engineering Department to reach a larger client pool in order to further increase the income generated from the services it provides. The market gap also provides motivation for many promotional strategies. Market gap was rated a two for importance because there will always be a market gap, and it is an underlying part of promotional strategies.

Threats

Risk Assessment Competition

M=-2 I=2 R=-4

Risk Assessment Competition was considered a threat because it can directly take business away from the Engineering Department. There are multiple fire protection engineering firms that offer risk assessment services. This was rated a negative two because the Bomberos de Costa Rica currently controls the majority of the market. The other companies, however, have the potential to pull clients away from the engineers. Risk Assessment Competition merited a two for importance because the Cuerpo de Bomberos needs to maintain its competitive advantage, but is not seriously threatened by the competition at this time.

Open Market

M=-2 I=-1 R=-2

The Open Market was considered a threat because the market has no restrictions on what firms can offer Risk Assessment services or install fixed fire protection systems. Open Market was given a magnitude of negative two because former Bomberos and people with occupational health backgrounds can easily enter the market as competition for the Engineering Department. This was not seen as an incredibly serious threat, and so was rated a negative two instead of a negative three. The importance of the open market was ranked a one, because there is nothing that can be done about the open market and it does not play a part in the marketing strategies.

Lack of Legislation

M=-3 I=2 R=-6

The Lack of Legislation was viewed as a threat because other nations have legislation mandating that Fire System Tests and Risk Assessments be performed periodically. Without the legislation, there is less motivation for the client to purchase the services. This was rated a negative three for magnitude because if there was regulation requiring inspections, the Bomberos de Costa Rica would not need to market Fire

System Tests and Risk Assessments as heavily. This was rated a two for importance because the Bomberos de Costa Rica should push for new legislation, but it is considered to be a long-term goal.