

PONTIFICIA UNIVERSIDAD CATÓLICA DEL PERÚ

ESCUELA DE POSGRADO



Consulting Report - SIMA PERU

**THESIS FOR THE DEGREE OF MASTER IN
BUSINESS ADMINISTRATION**

**GRANTED BY THE
PONTIFICIA UNIVERSIDAD CATÓLICA DEL PERÚ**



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Surco, August 2017

Dedications

I dedicate this Master Thesis, first and foremost, to God Almighty, without Whom, nothing of this amazing experience would have been possible. Also, I dedicate this Thesis to my father Ivan Traverso, for his love, guidance and advice; and my mother Pamela Tacuri, for her patience and constant support.



Acknowledgements

My greatest appreciation to Aleksey Tsoy, Meaghan Smith and Nuha Elgindi; who fully participated in the investigation of the consulting project and without whom I would not have been able to present such an outstanding quality Thesis. Moreover, I would like to thank Carlos De Izcue, SIMA's Commercial Manager and its representative, for his support and trust along the project's development. Finally I want to express my gratitude to Professor Sandro Sánchez for his supervision, guidance and continuous encouragement development of this master Thesis.



Abstract

The current report is a consulting project that has been elaborated for Servicios Industriales de la Marina S.A (SIMA). The motivation behind the study is to analyze the current issues within the company in order to assess and recommend a list of possible solutions for the client. At present, the main problem plaguing SIMA is its low levels of competitiveness within the metalworking sector. The report therefore conducted a thorough analysis to remedy the issue through the recommendation of both short and long term solutions. The report also took into consideration the immediate opportunity available to SIMA through the Reconstruction Plan in the wake of the El Niño Southern Oscillation System this past summer. It is therefore pertinent that SIMA act on the recommendations given in this report so that they may enhance the competitiveness of their metalworking sector and become an industry leader.

The report highlighted four root causes that have hindered the success of the metalworking line, and has therefore created four strategic implementation plans that will help SIMA to build up their heavy metal industry from 2017 until 2020. In the short-term, SIMA will focus on building up its marketing abilities through CSR initiatives, whilst simultaneously creating strategic alliances with civil practices and large-scale clients. The former refers to the utilization of the *Obras por Impuestos* framework, which will allow SIMA to build alliances with companies with large amounts of taxes in exchange for work, thusly being mutually beneficial to both parties. Furthermore, strategic alliances will help SIMA to create a more well-rounded portfolio when bidding for projects, that will increase their probability of winning contracts.

In the long-term, SIMA must look to focus on technological modernization and strategic human resource management. The former can be broken down into three separate areas of focus, where the client must update its obsolete metalworking equipment, create the capacity for modular bridge construction, and develop an engineering division specific to

new engineering software programming. The latter is composed of strategies related to employee recruitment and employee retention, and are utilized to help reduce the issue of staff turnover within SIMA. When integrated into one master plan, both the short and long term strategies will aid in improving the competitiveness of SIMA's metalworking sector, and will help it to achieve leadership status within the Peruvian market.

Both group of strategies, the short term and long term plans, compose what it is named the Industry Leadership Plan. The total cost related is estimated in US\$ 3,363,553 and disbursed in a time-lapse of four years, which makes the plan feasible in the actual financial conditions of SIMA. The plan suggested would benefit SIMA enhancing their Public Image and Brand awareness with an affordable investment that represents positive Net Present Values (NPV). Moreover, The Industry Leadership Plan would allow SIMA to increase their Market share in their actual targeted market and, even more, suggest them to tackle the niche of projects under the contract modality of *Obras por Impuestos*. Finally, the plan is a shared-value proposal because it represents a win-win situation that benefits the company, the State, the Suppliers and, the Community; by developing the capabilities to generate very necessary projects focused on the National Reconstruction of the Country due to the effects of the last El Niño.

Resumen Ejecutivo

El presente reporte es un Proyecto de consultoría elaborado para Servicios Industriales de la Marina S.A. (SIMA). La motivación detrás del estudio fue el analizar los problemas actuales dentro de la compañía para así evaluarlos y recomendar una lista de posibles soluciones. En el Presente, el principal problema que aqueja a SIMA son los bajos niveles de competitividad dentro del sector de construcción metal mecánico. Este reporte desarrolla un análisis completo para remediar el problema a través de recomendaciones de corto y largo alcance. Este reporte también toma en consideración la inmediata oportunidad disponible para SIMA en el marco del Plan Nacional de Reconstrucción a consecuencia del Fenómeno del Niño sucedido el verano pasado. Por tanto es pertinente que SIMA tome las recomendaciones brindadas para así poder mejorar la competitividad de su línea de negocios en Metal mecánica y convertirse en el líder de la industria.

El reporte resalta cuatro causas raíces que han dificultado el éxito de la línea de construcciones metal mecánicas y, de este modo, se ha creado cuatro planes estratégicos de implementación que ayudaran a que SIMA mejore esta línea de negocios desde el 2017 al 2020. En el corto plazo, SIMA se enfocara en mejorar sus capacidades de marketing a través de iniciativas de Responsabilidad social al mismo tiempo que crea alianzas estratégicas con empresas de construcción civil y clientes de gran envergadura. Lo anterior se refiere a la utilización del marco legal de Obras por Impuestos, que permitirá a SIMA el construir alianzas con compañías con grandes sumas de impuestos que intercambiar a cambio de proyectos, de modo que sea mutuamente beneficioso para ambas partes. Más aun, las alianzas estratégicas ayudaran a SIMA a crear un elaborado portafolio para cuando licite para proyectos incrementando su posibilidad para obtener contratos.

En el largo plazo, SIMA deberá enfocarse en la modernización tecnológica y la gerencia estratégica de recursos humanos. Lo primero puede ser dividido en tres áreas de enfoque, en las que el cliente deberá mejorar su equipamiento obsoleto de construcciones

metalmecánicas, crear la capacidad para la construcción de puentes modulares y finalmente desarrollar una división de ingeniería específica al diseño a través de software de ingeniería. Lo segundo se compone de estrategias relacionadas al reclutamiento de empleados y a su retención. Estas estrategias son utilizadas para reducir el problema de retiros voluntarios entre los empleados de SIMA. Integrados en un plan maestro, ambas, las estrategias de corto y largo alcance ayudaran a mejorar la competitividad de la línea de negocios de construcciones metalmecánicas de SIMA y ayudarán a alcanzar un status de liderazgo en el mercado peruano.

Ambos grupos de estrategias, las de corto y largo plazo, componen el denominado Plan de Liderazgo de la Industria. El costo total relacionado es estimado en US\$ 3,363,553 y desembolsado en un lapso de tiempo de cuatro años, volviendo el plan factible en las actuales condiciones financieras de SIMA. El plan sugerido beneficiaria a SIMA mejorando su imagen pública y reconocimiento de la marca, a través de una inversión viable que representa positivos Valores Actuales Netos (VAN). Más aún, el Plan de Liderazgo de la Industria permitiría a SIMA incrementar su participación de mercado en el mercado actualmente enfocado y, además, sugiere el enfocarse en el nicho de proyectos bajo la modalidad contractual de Obras por Impuestos. Finalmente, el plan es una propuesta de valor compartido dado que representa una idea beneficiosa para todas las partes involucradas tales como la compañía, el estado, los proveedores y la comunidad; al desarrollar las capacidades de generar muy necesarios proyectos enfocados en la Reconstrucción Nacional del País a consecuencia de los efectos del último fenómeno del niño.

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Chapter I: General Situation of the Organization

1.1 Presentation of the Organization

1.1.1 History.

Servicios Industriales de la Marina (SIMA) is a Peruvian state-owned company which operates as a private organization under the General Command of the Navy and the National Fund for Financing State Enterprise Activity (FONAFE) since 1845. SIMA also follows the strategies of the Ministry of Defense as it provides the Peruvian navy with shipbuilding and maintenance services. The main shipyard was built in 1845 in the Callao Constitutional Province in Lima. Then, in 1864, SIMA constructed a smaller shipyard located in the city of Iquitos on the banks of the Amazon River. Later, SIMA developed a third shipyard in the city of Chimbote, located 425 kilometers North of Lima; an area considered to be a main fishing port in Peru (SIMA, 2016).

All three units have the capability to provide the essential shipbuilding and ship maintenance services for its clients. SIMA's facilities include ship building areas, repairing docks, maintenance and workshop space. In the 1970's, SIMA developed a solid reputation in the shipbuilding industry within the region, producing one large ship yearly, which was a very competitive building period. Furthermore, a substantial alliance between SIMA and Servicio Industrial de Iquitos (SIDI) improved the ship building competence for the corporation. Over 2000 people are employed as technical and administrative staff in SIMA Peru and human capital is perceived as the organization's main asset. (SIMA, 2015).

For SIMA to guarantee the efficiency of its operations, SIMA created an integrated management method based on the three global standards: ISO 9001 for continuous quality control and improvement, OHSAS 18001 for occupational health and safety management, and finally, ISO 14001 for environmental management. In addition to these, SIMA applied

the Business Agreement for Secure Commerce in all its goods and services to ensure that they meet the Secure Commerce Certification (SIMA, 2016).

1.1.2 Vision, mission and objectives.

SIMA's vision is to be recognized as the best shipyard in Latin America, and to become the pride of the Peruvian Industry (Servicios Industriales de la Marina, 2016).

Furthermore, the mission of Servicios Industriales de la Marina SA is to be recognized as a hardworking family of Peruvian people who work to contribute to the National Defense as well as to the socio-economic and technological development of the country. SIMA aims to lead major projects in both the naval and metalworking industry whilst holding themselves to stringent quality standards that will help them to modernize their shipbuilding and metal mechanic industries (Servicios Industriales de la Marina, 2016).

Through continuously exercising integrity and competence, SIMA's primary objective is to serve the interests of the Peruvian Navy as well as other state entities by developing the naval industry and complementary businesses. Furthermore, SIMA continues to invest in its community by designing projects, such as the Huaros Project, that offers sustainable solutions with an immediate social impact that improves the quality of life of the Peruvian peoples. SIMA remains committed to forward thinking objectives, and looks forward to the development of the mega project for the construction of the Multipurpose Vessel and the completion of the expansion of the southern port of SIMA in the Callao Constitutional District of Lima. Furthermore, SIMA is committed to developing its field of research and technological innovation in Arms and Electronics, and hopes to grow this industry further in the coming years (Servicios Industriales de la Marina, 2016).

1.1.3 Business units.

Shipbuilding and ship repair. Shipbuilding and ship maintenance have a degree of strategic importance for Peru. Within the country, shipbuilding is mainly represented by

SIMA, who acts as a great source for taxes, employment and foreign currency. Moreover, SIMA has indirectly contributed to business and knowledge spillover within other industries involved with SIMA in its business operations (Benzaquen, n/a).

The shipbuilding and ship repair industry has experienced ups and downs from the beginning of its creation in 1845 until the present due to the world economic recession, the fleet market crisis, and other negative conditions for the shipbuilding industry. In particular, Decrees No. 644 and 683 from June 22, 1991 to November 2, 1991, released cargoes and levied at 30% on vessel acquisition costs (McBride, 2013).

As previously stated, the main shipyard of SIMA is located in the Callao Constitutional province and is the only shipyard within the country with the capacity to build high and low boats, small and large sized commercial ships, and first-rate naval units. The shipyard consists of dry and floating docks with the ability to develop and build ships up to 50,000 DWT, as well as to provide maintenance, and repair services in dock to ships of up to 25,000 DWT (SIMA, 2017a). As mentioned earlier, the other two subsidiaries are located in the cities of Chimbote and Iquitos, and are in charge of the production of smaller ship vehicles, such as motor boats, tanker barges and aluminum and steel ships (Servicios Industriales de la Marina, 2012).

Ship repair services are one of the main income generating sources of SIMA due to its short-term operation and fast payment period. Apart from the Peruvian government, who is the company's main client, SIMA provides its maintenance services to international vessels from Chile, Colombia, Ecuador, USA, Panama, China, Korea, Japan and Russia (SIMA, 2017a).

Metalworking. SIMA is a Peruvian industrial leader in metalworking. A portfolio of the company's activities includes the design, manufacture and assembly of all kinds of metal structures, such as bridges, tanks, fishing vessels, heliports and tugboats (FONAFE Annual

Report, 2011). The combined processing capacity of all three operating facilities exceeds 15,000 tons of steel per year and is supervised by highly qualified engineers and technicians (SIMA, 2017a).

As a part of the diversification of business activities, metalworking has become an important business unit for SIMA within civil engineering- related works. The company has gained great experience and knowledge in constructing steel bridges, gates, and other steel structures (Servicios Industriales de la Marina, 2012). SIMA has, in fact, constructed around 90% of the country's bridges, where the metalwork related to erecting said bridges has become the second most profitable line of business for the company (SIMA, personal communication, 2017).

Weapons and electronics. The Weapons and Electronics division is the most innovative division of SIMA amongst all its business units. Its competitive advantage and leading role in this sector is due to the Weapons and Electronic Design Center of Microelectronics located in the Callao region of Peru. SIMA provides a full range of services inclusive of manufacturing, installation and repair of weapons and electronic systems equipment. Since its inception in 1999, the division has gained experience in sonars, radars, automated control systems, electronic cards and modules, radio systems and electricity transmission lines (SIMA, 2017a). Furthermore, by being recognized as an industry leader, SIMA's Weapons and Electronic division represents Northrop Grumman-Sperry Marine company, and is entitled to perform maintenance of radars, pivoting, and all types of navigation equipment with the proper certifications (SIMA, 2017a).

1.1.4 Structure.

SIMA is principally a government-owned company with its main objective being to serve the country and society in general and the Navy of Peru in particular. Despite being controlled by the National Fund for Financing State Business Activity (FONOFE), SIMA

continues to operate under a private administration and has its own organizational, economic and financial autonomy. Furthermore, the company is directed by a board directors which is mainly represented by Peruvian Naval Officers. Consequently, the organizational structure is strictly hierarchical and the officers generally engage in a contract with SIMA for two years, which makes it difficult to manage and make changes within the company (Servicios Industriales de la Marina, 2015). Furthermore, many managers lack the expertise and technical skills required within the shipbuilding industry, which obstructs the ability of the company to develop its long-term strategies and goals.

1.1.5 Industry information on metalwork and ship repair.

Ship repair industry. The global marine port and service industry has been forecasted to grow at a compound annual growth rate of 4.7% from 2015 to 2020. The main drivers of this future growth are related to the increase of freight transportation, increasing of global exports and the expansion of new regional trade hubs. As it can be appreciated in Figure 1, there is a high correlation between the sea borne activities and the ship repair industry. Asia currently has the largest share of world tonnage of sea borne loaded goods with 38.8 %, followed by North and South America with 22.1% (UNCTAD,2007). The Asian repair market is also the largest in the world and the continuous growth of its GDP will assure next year's ship repair industry progress.

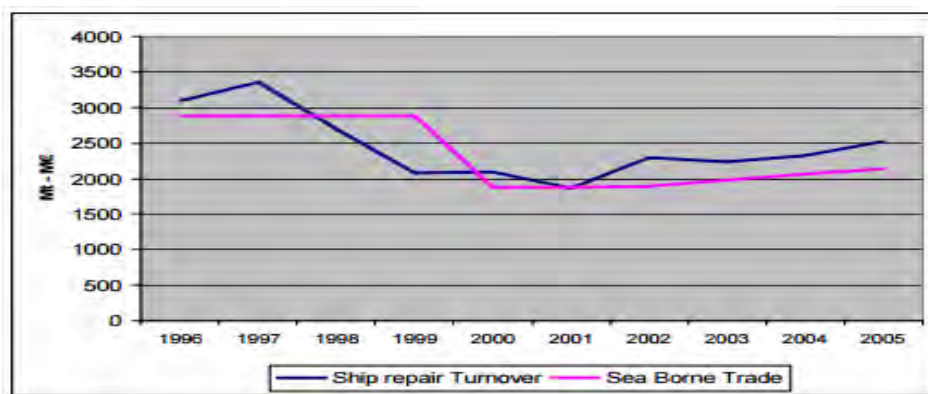


Figure 1. European Ship Repair, Turn Over & Sea Borne Trade. “Ship repair Competition: drivers and opportunities,” From Castrillon R. (2007). World Maritime University

Scheduled ship repair and maintenance. According to many international associations such as International Association of Classification Societies (IACS) and the International Maritime Organization (IMO), class surveys are determinant factors on planned ship repairing and maintenance (BIMCO, 2006). These class surveys are made by classification societies in order to review a ship's status and are often scheduled together with dry dock revisions, which are mandatory at least twice in a five-year period. Therefore, demand of scheduled ship repairing and maintenance is determined in high degree by the coordination of the ship owners and the classification societies (Castrillon, 2007).

Unscheduled ship repair and maintenance. According to Drewry (2001), there are five core features that determine the demand of unscheduled ship repairs. Those aspects are (a) casualties involving ships, which are referred to as accidents that force ships to perform an unexpected repair process; (b) port state control, which is the foreign ships inspections in order to verify proper conditions for maintaining port safety, (c) sale dry-docking, which refers to the inspection market created while trading second-hand ships; (d) the reactivation, which is the process of restoring ships that have passed through a temporary inoperative period; and lastly (e) the demolition of the ship market created due to the inefficiency costs associated with old ships that can lead to the final decision of stopping a ship's operations.

Competitors. SIMA faces global competition in the Ship-repair industry. Figure 2 lists the ship repair companies and locations near SIMA's headquarters. Some of the main companies in the Ship Repair industry in South America are MEC and DAMMERS. MEC is a company that has been working in Balboa, Panama since 1999. The company is certified for developing underwater services in addition to having three dry docks able to attend Panamax-Size ships (MECPanama, 2017). DAMMERS is a company located in The Netherlands Antilles, established in 1964. With two large graving docks, one floating dock

and a crane with a capacity of up to 75 tons, it is one of the largest and best equipped ship repair facilities in the Caribbean (DAMMERS, 2017).



Figure 2. Other South America Ship Repair Companies. Retrieved from <http://ww2.shipyards.gr>

In Peru, the metalwork industry is highly related with the mining and construction industry since many metalworking companies have directed their services towards mining corporations. It is estimated that 50% of the metal supply in Peru is destined for the mining sector, and that the rest of the demand is directed to other industries, with the fishing industry being of primary importance (Di Natale Hernandez, Picon, Quezada & Toro Huaman, 2017). For years, the mining industry has been the main contributor to Peruvian economic growth, where it is estimated that the mining industry accounted for 60% of the Peruvian GDP in 2016 (Peru21, 2017). Moreover, the mining industry promotes the construction of infrastructure such as bridges and other heavy metalwork projects.

The Minister of Economy and Finances as well as the Prime Minister of Peru made mention that economic reactivation is a prime objective of the present government. In the second semester of 2017, there will be an awarding of projects from ProInversión in the amount of US\$4 billion. The Prime Minister further commented that the 2018 estimated

budget for projects would be around US\$9 billion. Moreover, he has tagged 12 mining projects to assure that there will not be any administrative obstacles for them in order to reactivate the Peruvian extractive industry. This presents a positive panorama for the metalwork industry; a market that faced a contraction of 5.85% in the year 2016 due to a downturn in sectors related to the production of tanks and recipients to the USA and Indonesia in which SIMA has no strategic focus.

According to Maxime Consultant S.A. in Peru, there are over 23 thousand metal mechanic companies, 52% of which are operating in Lima and Callao. The distribution of the company's units according to its main economic activity is presented in Figure 3. The 25-main metalwork and metal mechanic companies responsible for generating almost US\$1 billion in yearly sales have joined to form the Association of Private Metal Mechanic companies in Peru or AEPME [*Asociación de Empresas Privadas Metalmecánicas del Perú*]. This is a powerful association that is directed mainly by engineer executives. AEPME's primary focus is on the promotion of their industry's products while representing the interests of private metalwork and metal mechanic companies (Di Natale Hernandez, Picon, Quezada & Toro Huaman, 2017).

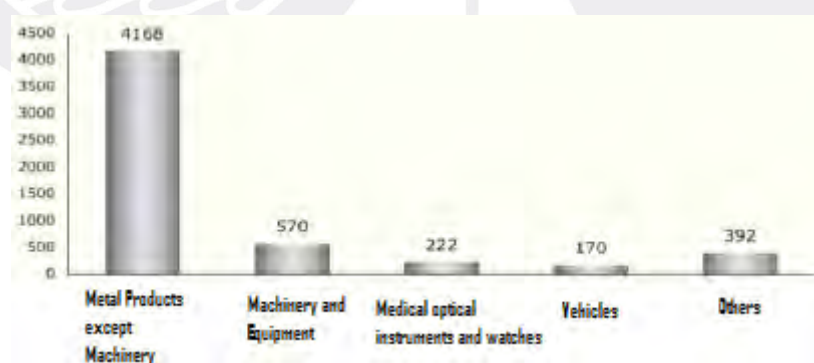


Figure 3. Metal Mechanic units in Lima by economical activity, 2013. Based on “Plan Operativo Exportador del Sector Siderometalúrgico Metalmecánico,” by MINCETUR, 2006. Retrieved from: <https://ww2.mincetur.gob.pe>

1.1.6 Key Success Factors (KSFs).

There are several key success factors that characterize the metalworking industry. One of the most important market factors within this line of business is that of cost efficiency.

Considering the capital-intensive nature of the metalworking industry, successful companies must continuously improve their technology, workforce skills, management experience and maintenance practices to increase their overall efficiency and productivity. Cost efficiency is predominantly driven by the investment in new technology, which, in the long term, will enhance productivity and lower labour costs associated with each project.

The strong relationship between the metalworking industry and the construction sector can be considered as the second KSF (Pefindo, 2016). Construction companies help to strengthen the success of metalwork through such activities as marking out, cutting, assembling, repairing and maintaining steel structures for buildings, bridges and lifting equipment. The construction sector in Peru has started to recover in 2016 after its decline in 2015, due to the government's focus on developing the manufacturing sector and reducing its reliance on mineral and metal ore exports. It is forecasted that the government will increase its support and investment into the construction sector, and a consequence, increase its compound annual growth rate (CAGR) of 1.66% (2012–2016) to 2.36% over the forecasted period of 2017-2021 (Construction in Peru Key Trends and Opportunities, 2017).

A third KSF within the metalworking industry is to have access to a pool of skilled and affordable labor. Labor cost is, in fact, one of the key determinants of the competitiveness of a metalworking industry (ETM, n/a). The ability to attain cheap labor has allowed for new global players to dominate the metalworking market and has permitted nations such as China and Japan to seize market share from previously leading American companies. Cheap labour must not be confused with bad quality, however, as the latter is a very integral demand for all companies involved in the metalworking industry. Both quality and reputation are instrumental in any metalworking company's success, and is often associated with ISO certifications and reputable metalworking.

Finally, companies involved in the metalworking industry have limited bargaining power over the supplied raw materials due to the large volume of their purchases. Industry access to low cost suppliers can help companies achieve a competitive cost position. Lower cost of raw materials, in conjunction with high quality can help companies to minimize scrap products. Furthermore, companies can reduce raw material costs by allocating their production site close enough to a sufficient supplier of raw materials. This kind of strategic step contributes to the reduction of transportation costs. Ultimately, companies involved in multiple steel-making operations or vertically integrated operations benefit from being less dependent on costly raw materials or semi-finished products (ETM, n/a).

1.2 Industry Analysis: Porter's Five Forces

In the following paragraphs, this report will analyze the competitiveness of SIMA's environment by utilizing the framework of Porter's Five Forces as seen in Figure 4. This context will allow us to develop a more thorough understanding of the actions of other competitors, as well as additional factors that impact SIMA's business environment. The framework consists of five key elements that help to illustrate the competitive landscape of the industry, as well as its overall health and impending challenges. This report will therefore analyze the following key factors as they pertain to SIMA: threat of new entrants, threat of substitutes, bargaining power of suppliers, bargaining power of buyers and industry rivalry.

1.2.1 Threat of new entrants.

A company's position within an industry can be affected by a potential incumbent's ability to enter the market. If an industry becomes saturated by competition, it is possible for certain firms to be edged out by more powerful and innovative players. It is therefore necessary to assess the ease of entry into the metalworking sector as it pertains to SIMA.

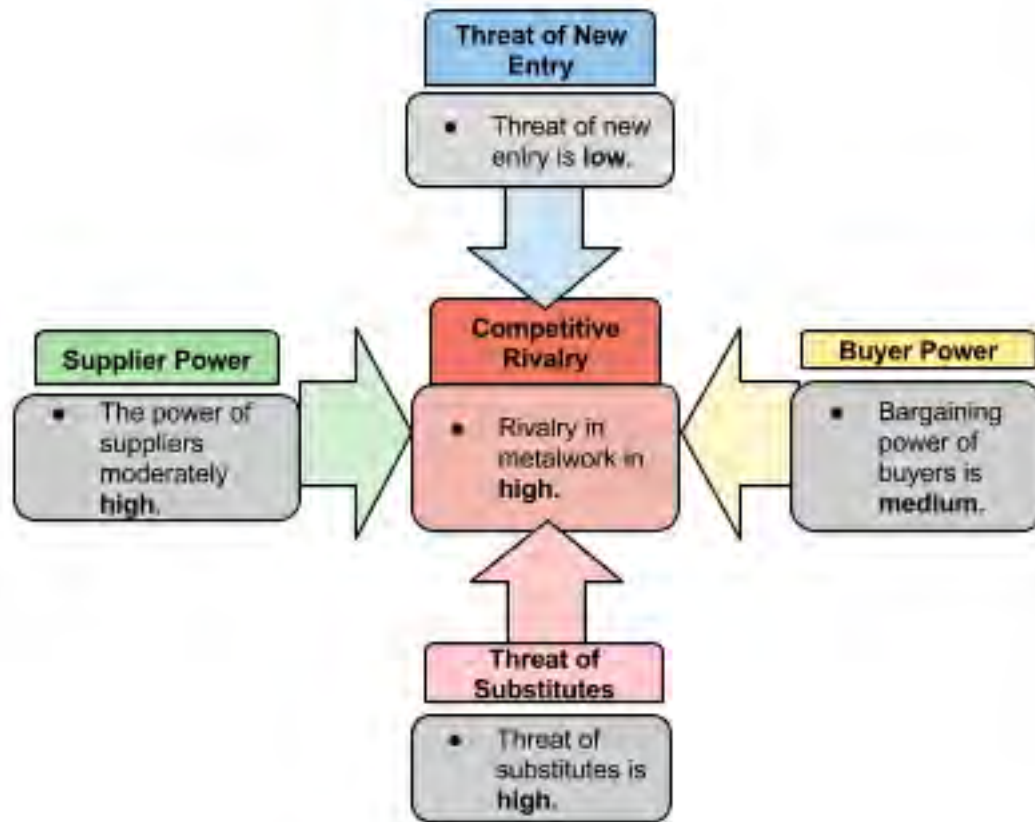


Figure 4. Porter's Five Forces as it Pertains to Metalworking.

Utilizing Porter's Five Forces framework, this report has classified the threat of new entrants to the market as low. The ability of an incumbent to enter the market will depend on two things: the reaction from existing competitors, and the barriers to entry into the industry. The latter can further be broken down into smaller components as it pertains to metalwork: capital needs, economies of scale, skilled labour requirements and access to distribution channels. The report will therefore analyze each of these as they relate to SIMA's metalworking division.

The metalworking industry is characterized by high entry barriers, due in large part to the huge capital requirements needed to start such a business. The initial cost of purchasing specialized equipment for working within heavy metals is extremely high, which may deter potential entrants from entering the metalworking sector within Peru. In an interview with Carlos De Izcue, the Commercial Manager for SIMA Peru, it was noted that it would cost the

company US\$6 million to update its machinery and equipment. Moreover, it is estimated that to set up one mtpa capacity of an integrated steel plant, it requires between US\$400 and US\$450 million depending on the location and technology used (Equity Master, 2008). Furthermore, the purchase of new and innovative equipment is pertinent for potential entrants to be profitable and competitive, as productivity gains are achieved through the investment in capital equipment (Kline, 2016). Figure 5 highlights the main reasons for metalworking units to invest in capital equipment to ensure their competitive edge.

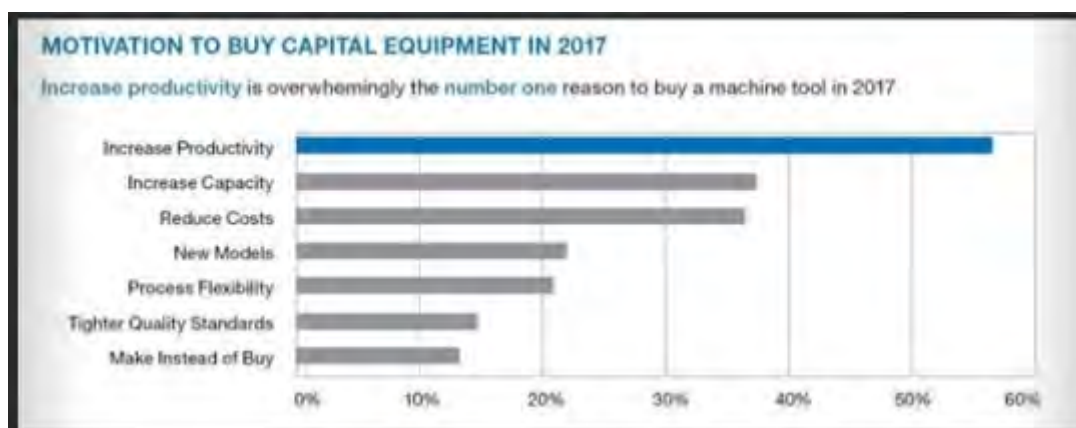


Figure 5. The Motivation to Buy Capital Equipment in 2017. “The 2016 Capital Spending Survey”. By Kline, S. (2016). “Modern Machine Shop”. Retrieved from: <http://www.mmsonline.com/articles/the-2016-capital-spending-survey>

Economies of scale are important for the metalworking industry, as larger scale operations allow for many benefits such as lower costs, better bargaining power when sourcing raw materials and higher R&D expenses (Equity Master, 2008). Furthermore, those metalworking companies that have become more integrated, in that they have their own mines, have better access to key materials such as iron or coal, which grants them substantial protection from potential new entrants. Operating on a small scale would therefore reduce the ability of new incumbents to reap the benefits of operating with lower unit costs and volume increases per period.

Labour is of special consideration in the metalworking industry, as competitive firms are primarily those that have access to a knowledgeable and specialized workforce.

According to a Manpower study done in 2013, 52% of employers in Peru were having difficulties finding skilled workers (Martinez, 2013). Having limited access to necessary talent acts as a large deterrent for potential entrants, who would have difficulty finding enough skilled labour to actively compete with already established companies. Furthermore, new entrants would need to offer competitive salaries and benefits to workers in order to motivate those who are already employed to leave one company for another.

Lastly, it is essential to consider the current competitors within the heavy metal industry, as well as the intensity of their response to possible new entrants. First, it is crucial to note the importance of established business connections within Peru in general, and within the area of construction in particular. Many of the heavy metal jobs within Peru must be won through tender, and while price may be a determining factor in choosing a bidder, established networks also play an integral part in winning contracts. This is due to Peru's adoption of a multi-criteria bidding system that considers an average priced bid, as well as factors like reputation, quality and price (Liu, Lai & Wang, 2000). The metalworking sector within Peru is already home to a set of established firms, such as SIMA, FIMA or Haug S.A, all of whom have quality designations that would make it difficult for incumbents to take away market share. Moreover, in a study done in 2014, it was noted that seven out of every ten contracts materialize from established business connections. Establishing connections and distribution networks are therefore crucial to the success of a business hoping to win bids for various projects; an objective not easily attainable due to the prevalence of existing connections within the metalworking sector in Peru.

1.2.2 Threat of substitutes.

In considering the threat of substitutes within the metalworking industry, one must consider both short and long-term time horizons. Currently, much of Peru's metalworking industries are importing metal and steel products from China, where, in 2016, imports totaled

US\$382.7 million (OECD, 2016). In a country where natural resources are quite abundant, it may seem nonsensical for Peru to be importing materials that exist within their own nation. The overproduction of steel within China has, however, resulted in such goods being sold on the international market for competitively cheap prices. Table 1 highlights the steady increase of steel production within China, which has resulted in a minimization of domestic sales of steel commodities within the Peruvian market (Illmer, 2016). Therefore, due to its current affordability within the international market, alternatives to steel may not be a primary consideration for metalworking industries.

Table 1
China's Incremental Growth in Steel Production

China's Steel Production	
Year	Output (million Tonnes)
1990	66.4
2000	128.5
2010	638.7
2014	822.7

Note: Adapted from "What's behind China's cheap steel exports?" By Illmer A. (2016). From BBC News. Retrieved From: <http://www.bbc.com/news/business-36099043>

In the long term, however, steel may become more interchangeable with other products, such as plastic or aluminum. A recent report by Ernst and Young indicated the rising threat of aluminum as a viable alternative to steel, although the price differential is still too high for such an alternative to manifest itself in the current market (2016). Furthermore, such factors as environmental concerns, advances in technology and regulatory changes will influence potential future threats of substitution of steel (Ernst & Young, 2014).

1.2.3 Bargaining power of suppliers.

The bargaining power of suppliers within the metalworking industry has been identified as moderately high. This is largely due to the diversity of goods and services required in the industry, such as beams or steel plates, or services of inspection and welded joints (Casas, Casapia, Tamashiro & Valladares, 2011). Such differentiation of products and

services has allowed suppliers to have increased bargaining power over metalworking companies, who must currently buy in bulk, and thusly cannot negotiate favorable sales times or prices. Furthermore, there are a relatively large amount of powerful steel input suppliers compared to the relatively small amount of metal producers within Peru, which makes it hard to achieve economies of scale from their inputs and engage in effective bargaining. Lastly, it is worth noting that the “Metalworking and Metal Articles industry is often the largest or second largest customer of the basic metals sector” (ECORYS, 2009, p.19), and as such, the weak bargaining position reflects the industry’s disjointed environment. In order to regain control within the bargaining process, metalworking industries must consolidate to strengthen their position relative to basic metals suppliers.

1.2.4 Bargaining power of buyers.

The bargaining power of buyers within the metalworking industry is medium in strength. Porter has identified several key characteristics that help to establish the power of end users: If the group buys in large volumes in comparison to supplier sales, if the sub-sector caters to various industrial sectors, if the buyer has access to all available information, and if products in the industry are standard or undifferentiated (1998). Figure 6 outlines an exhaustive list of all factors affecting a buyer’s bargaining power, but for the purposes of this report, only the four most pertinent to the metalworking sector will be analyzed below.

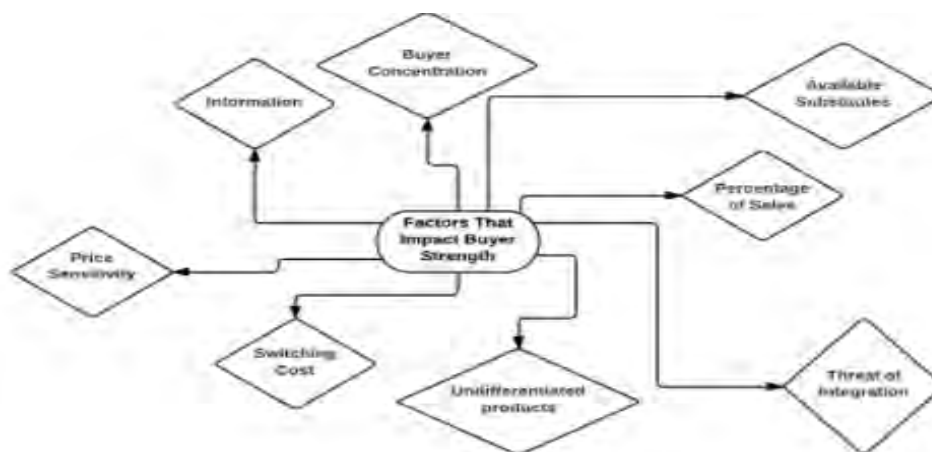


Figure 6. Factors that Impact Buyer Strength. “Bargaining Power of Buyers: Porter’s 5 Forces Model” (2014).

First, it is essential to identify if buyers purchase large volumes of a product, as this will establish the importance company's place on particular end users. Within Peru, the majority of heavy metal work, such as the construction of steel bridges, are purchased by the state in bulk. The end user is therefore a very important client to many metalworking companies, who wish to win bids from the list of projects listed by the government. Take, for example, the upcoming proposal projects for bridge reconstruction after the El Niño. The government will be looking for Peruvian metalworking companies to bid on such projects, which is not only important due to the large volume of available contracts, but also for the social responsibility attached to rebuilding Peruvian infrastructure.

Within the metalworking industry of Peru, many of the current competitors cater to multiple and differing industrial sub-sectors, such as shipbuilding, electronics and weapons, or boiler making. Having differentiation in the range of product offerings allows such companies to have several alternatives within their portfolio of clients, thereby diminishing the bargaining power of the buyer within the metalworking sector (Casas, Casapia, Tamashiro & Valladares, 2011). SIMA is one such example of a diversified company with various industrial sub-sectors within Peru. While it is beneficial for the company to win bids for metalworking projects, they are not solely reliant on these contracts, as they have an influx of cash from other such areas as ship repair or naval fleet construction.

The next factor to consider when analyzing the bargaining power of the customer is if the end user has access to all the available information. Michael Porter (1982) explains that when the customer knows perfectly the demand, the market, and even the costs of the supplier, it will give the buyer almost complete power over the negotiation process. Regarding the metalworking industry within Peru, the buyer is usually the state, who has access to information on the cost of steel imports, as well as other pertinent building information. Moreover, the government is a knowledgeable customer that has defined

information on the state of technology and technical standards within companies, which is especially true for State Owned Enterprises such as SIMA. The government can, in fact, put a ceiling on prices for those projects which they control, which places the bargaining power in the hands of the state over the hands of the suppliers.

The last component to consider when analyzing the bargaining strength of customers is if the products sold are standard or undifferentiated. While heavy metallic structures are not generally standard, the norms that rule their fabrication are, and thus if all participants of the subsector have the capacity to fulfill the required norms, then there should be no difference when choosing between one company or another (Casas, Casapia, Tamashiro & Valladares, 2011). There is therefore an intensity of competition between firms that build heavy metal structures, which diminishes their capacity to bargain with buyers over price.

1.2.5 Industry rivalry.

Porter argues that there are several key factors that interact with one another to determine the intensity of rivalry within an industry: slow industry growth, lack of differentiation or change, diverse competitors and strong barriers to exit. Each of these components will therefore be analyzed as they pertain to the metalworking industry in Peru to determine the market intensity between metalworking incumbents.

First, the metalworking industry has shown a steady increase in growth, which can be measured by the rise in domestic demand for various metal structures. This trend has been evident since 2007, where the sector saw significant growth rates of 22.5% compared to the previous year (Maximixe, 2008). Furthermore, due to the catastrophic damage done to Peruvian infrastructure after the 2017 El Niño, the demand for the reconstruction of heavy metal structures has skyrocketed, which has consequently intensified industry rivalry.

The second and third factor can be analyzed together as the diversity of competitors and the level of differentiation between products seemingly go hand-in-hand. Within heavy

metalwork, while the structures are not standard, the regulations of manufacturing such products are. Therefore, if all competitors can meet the standards, there should be no difference in choosing one manufacturer over another (Casas, Casapia, Tamashiro & Valladares, 2011). While many of the main rivals within the industry abide by the same building regulations, there is, in fact, differentiation in the way in which the structures are built. The intensification of competition within the metalwork industry is largely dependent on the availability of technology and innovative capacity. Take, for example, the case of a steel bridge being built by two Peruvian firms: SIMA and FIMA. According to Carlos De Izcue (2017), FIANSÁ was able to complete its half of the bridge in the time that it took SIMA to complete 30% of theirs; a time difference created by the access (or lack thereof) of new equipment and technology. Therefore, rivalry between competitors is largely dependent on the availability of new resources that a firm may have, as it will allow incumbents to differentiate in terms of price, time and overall quality.

The last topic to consider within the metalworking industry is the strength of barriers to exit. The metalworking industry is characterized by very high barriers to exit, as the capital investment to enter the market is incredibly high, and as such, many firms remain in the industry despite their lack of competitiveness in the arena. With a saturated number of competitors within the Peruvian market that continually bid on projects, the intensity of rivalry within this industry continues to be characterized as high.

1.3 External Analysis (PESTE) of Opportunities and Threats

1.3.1 Political.

Current political climate. The political climate within Peru towards the metalworking industry is, at the moment, quite tense due to the Odebrecht bribery scandal making waves across Latin America. In 2014, the bidding process for the *Gasoducto Sur Peruano* (GSP) natural gas line was rumored to be won unfairly through the process of bribery from a

Brazilian builder. In the unveiling of the scandal, Odebrecht admitted to paying “\$29 million in bribes between 2004 and 2014 which has forced the Peruvian government to lower its economic growth forecast from 4.8% to 3.8% for 2017” (Bowen and Gray, 2017, P.1). The resulting consequences of these unfair actions have caused many projects in Peru to be put on hold or cancelled altogether, as infrastructure projects have come under increased scrutiny by the Peruvian government. Furthermore, the state has become stringent in reallocating projects from Odebrecht to domestically based firms, stating that “even if we suffer on the economic side, we are committed to transparency” (Bowen and Gray, 2017, P.1). Therefore, the current political climate around the topic of metalworking is quite contentious, with many firms vying for re-contracted work from a very cautious and weary government.

Political connections. Within Peru, much of the metalworking industry is inherently political, as many of the infrastructure projects are offered by the government. Furthermore, state owned enterprises are quite common within this sector, as the industry is characterized by high barriers to entry and capital intensive requirements. Moreover, in the age of the third industrial revolution, innovation and technology have become essential for metalworking companies to sustain continuous improvement and remain globally competitive (KPMG, 2015). Therefore, considering the business size and amount of investment required, most of the leading companies involved in the metal industry can be divided into two main groups: The first are state owned corporations such as China Baowu Group, or SIMA S.A Peru, while the second are Multinational Corporations that operate on a global scale and in multiple locations (POSCO, Arcelor Mittal). To demonstrate, Table 2 outlines the top ten world steel producers by tonnage.

Such groups benefit from having large government subsidies that help to fund major company expenses, such a renewing equipment and technology. SIMA, as an example, is categorized as a state-own organization that has privileges in the form of tax benefits,

Table 2
Top Ten World Steel Producers

Rank	Company	Tonnage
1	ArcelorMittal	95.45
2	China Baowu Group	63.81
3	HBIS Group	46.18
4	NSSMC Group	46.16
5	POSCO	41.56
6	Shangang Group	33.25
7	Ansteel Group	33.19
8	JFE Steel	30.29
9	Shougang Group	26.8
10	TATA Steel Group	24.49

Note: Adapted from “World Steel Figures 2016” by the World Steel Association (2016) Brussels, Belgium.

subsidies, government contracts and access to natural resources. In comparison to its local competitors, SIMA belongs to a diversified type of company with political clout that can be used for easier access to capital markets, as well as obtaining more sympathetic treatment by politicians.

Ultimately, state-owned enterprises within the metalworking sector have become largely reliant on government subsidies, which reduces a company’s competitiveness within areas such as innovation and market research. Therefore, considering the Peruvian government’s intention to move towards a more open economy, it is expected that in the long term, SOEs will face fierce competition while struggling for government contracts (FEAD, 2015).

1.3.2 Economic.

According to the Investment Bank of JP Morgan (2017), the risk indicator of Peru is one of the lowest in Latin America, where the indicator of EMBI, as of 2017, denotes that Chile is the only country within the region that presents more optimal investment opportunity than Peru. The EMBI is used for measuring the probability of a country not fulfilling their dues regarding external debts. Table 3 shows the EMBI scores of some Latin American countries over the past four years.

Table 3
EMBI of Main Latin American Countries

Year	Peru	Argentina	Brasil	Chile	Colombia	Ecuador	Mexico	Venezuela
2014	162	787	235	143	167	510	183	1337
2015	201	590	361	186	250	995	251	2775
2016	200	476	395	201	279	998	304	2747
2017	149	452	278	137	200	634	277	2171

Note: Adapted from "Peru Systematic Country Diagnostic," by World Data Bank (2017). Retrieved from <https://www.worldbank.org>

According to the World Data Bank (2017), Peru has been one of the region's fastest-growing economies, with an average growth rate of 5.9% in a context of low inflation (averaging 2.9 %). The main reason is related to the Mining Extracting boom that nowadays is losing its strength. Gross Domestic Product (GDP) has been growing in rates that varies from 1% to 5 % per year. Inflation rates have been low and the exchange rate has been relatively stable. Table 4 summaries these macroeconomic indicators retrieved from the World Data bank (2017).

Table 4
Peruvian Macroeconomic Indicators

	2014	2015	2016	Projected 2017-2019
GDP growth (Billion USD)		201	189	192
GDP growth	2.4%	2.5%	3.8%	4.7%
Inflation	3.2%	3.7%	2.8%	2.3%
Exchange rate (USD)	2.96	3.3	3.35	3.4

Note: Adapted from "Peru Systematic Country Diagnostic," by World Bank Group (2017). Retrieved from <https://www.worldbank.org>

The Free Trade Agreement signed with the United States has generated large scale interest from Brazilian, Colombian, Chinese and Japanese companies for establishing headquarters in Peru. This dynamism is very favorable for the metal mechanic industry, which is the main producer of industrial goods. Currently, some of the most demanded goods in the country are compressors, spherical tanks, cauldrons, bombs and machinery for the agro and irrigation industries. Biofuel projects have helped to promote revenue that can be utilized

for more construction equipment for distillation plants of ethanol and biodiesel in Lima and the north coast of the country (Gestion, 2008).

In the year 2004, the global consumption of steel achieved the highest level ever recorded. Global production surpassed one billion square tons, which was generated by the rise in demand from both the USA and China. As a result, steel prices have risen globally. In 2005, prices stabilized when steel production and the demand equalized, and eventually started to fall due to an increase in Chinese metal production. During the 2008 financial crisis, the prices of steel plummeted due to the deceleration of the economy in many developed countries. Henceforth, the price of steel has remained relatively low, which has had implications for the Peruvian economy, who are highly dependent on prices of metal commodities and mining (Benzaquen De las Casas, Casapia, Tamashiro & Valladares, 2011).

1.3.3 Social.

In Peru, informal jobs account for 70% of the total employment (World Bank, 2017). The high informality represents a big challenge for formal companies, which pay taxes and labor law expenses while still having to compete with their informal peers. As it can be appreciated in Figure 7, the high informality rate is also reflected in the construction industry, in which the metalwork business line of SIMA is involved.

According to a World Bank report focused in Peru (2017), the country has effectively been combating poverty insofar as that it has responded strongly to growth. “For each percentage point increase in GDP growth, poverty fell by 1.4 percentage points. Thus, from 2004 to 2015, 9.3 million Peruvians escaped poverty, moderate poverty fell by more than half, from 58% to 22% and extreme poverty fell from 16% to 4%” (World Bank Group, 2017, p.167). Furthermore, unemployment rates have been relatively low, varying between 4 to 5% of total employment. The report also indicates equality in gender conditions, where

many women's socioeconomic human development outcomes are remarkably similar to those of men.

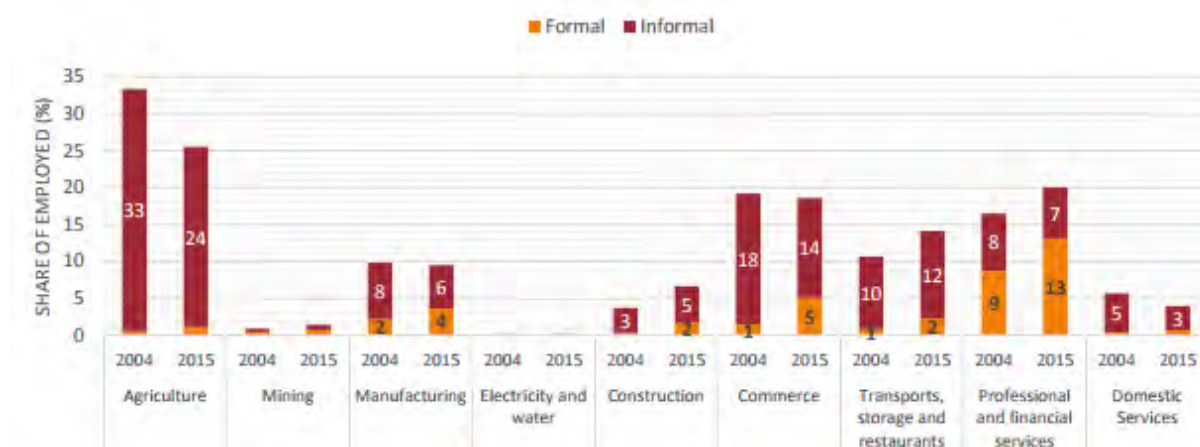


Figure 7. Employed distribution and informal work by sector in Peru, 2004-2015. “Peru Systematic Country Diagnostic,” by World Bank Group (2017). Retrieved from <https://www.worldbank.org>

While the unemployment rates within Peru continue to fall, the supply of skilled labour continues to be disproportionate to its demand. According to a report by the Organization of Economic Cooperation and Development, Latin America has the widest skills gap in the world, where 50% of firms do not find the workforce with the skills they need, compared to 36% of firms in OECD countries (OECD, 2016). As outlined in Figure 8, this issue is particularly pressing for countries such as Peru, Brazil and Mexico. This becomes highly problematic when considering the labour demands of the metalworking industry, as increased automation of production has created an accompanying increased need for engineers over manual workers within this sector (ECORYS, 2009). This issue will further be exacerbated due to the lack of funding in technical and vocational education in skilled work, where public spending accounts for only 0.02% of Peru's GDP. Consequently, skill shortages will lead to major negative impacts on the competitiveness of this industry.

Social responsibility. Corporate Social Responsibility has been on the rise in Peru due to the lasting impact of globalization on the country's political and economic development. As of late, a new “economy of reputation” has started to take hold in Latin American

countries, where “society will be highly connected through networks, and organizations will operate in an ecosystem of permanent influence from their groups of interest” (Feldman, Bahamonde & Bellido, 2014, p.56). Corporations within Peru are, in fact, starting to feel the pressure from ethical consumer groups, and as such, many industries have begun to adopt socially responsible operations to bolster their reputations. A study on Corporate Reputation in Peru found that the attributes that the Peruvian public values the most in organizations are not necessarily the same as those where they perceive organizations have a better performance (Feldman, Bahamonde & Bellido, 2014, P.56). Table 5 and Figure 9 outline the discontinuity between these two ideas, and show the need of Peruvian corporations to remedy such disparities.

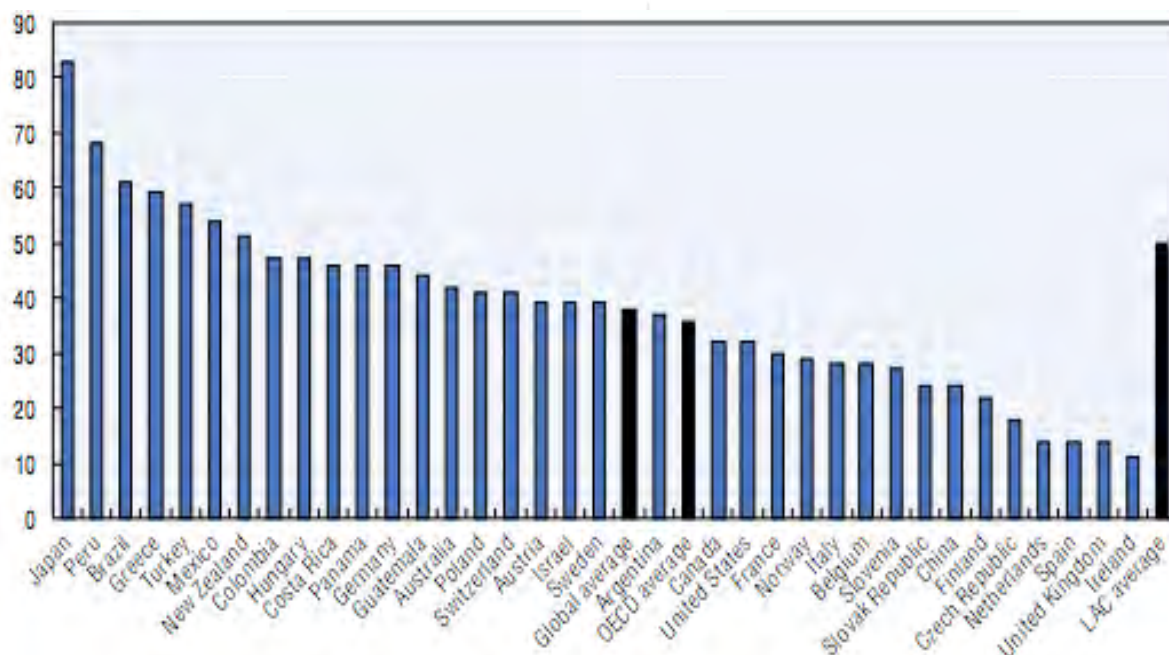


Figure 8. Firms Reporting Difficulties Hiring in Latin America, China & OECD Countries 2014. “Latin America Economic Outlook 2017” by OECD (2017) Retrieved from: <https://www.oecd.org>

Investment alternatives for Corporate Social Responsibility. In Peru, there is an interesting modality to finance Sustainability and social programs through a governmental mechanism called *Obras por Impuestos* [Projects per Taxes]. Through this initiative, companies can execute public investment projects in exchange for 50% of their tax income.

These projects are mainly related to public infrastructure, such as transportation, roads and bridges, as well as water sanitation, both of which are certainly very necessary for the country (Huaruco, 2014).

Table 5
Ranking of Importance of Public Attributes

Attributes	General Public Attribute Ranking
Generating positive feelings in people	1
Discretionary social responsibility practices	2
Good workplace environment	3
Practice Standards in ethics	4
Good relation with consumers	5
Having good products and services	6
Leadership and innovation	7

Note: Adapted from “A New Approach for Measuring Corporate Reputation” by Feldman, Bahamonde and Bellido (2014). Retrieved from <http://dx.doi.org/10.1590/S0034-759020140102>



Figure 9: General Public Perceptions about Organization's Performance on Seven Index Attributes. “A New Approach for Measuring Corporate Reputation” by Feldman, Bahamonde and Bellido (2014). Retrieved from <http://dx.doi.org>

The Peruvian Government has prepared a group of measures in response to the disastrous effects of El Niño that took place in the early months of 2017. One of the measures is to enhance the investment related to *Obras por Impuestos*. This mechanism proves to be important for the Peruvian government since 37.5% of the projects are planned to be

facilitated in 2017 through the legal framework of *Obras por Impuestos*. Fernando Zavala, the Peruvian Prime Minister and Minister of Economy, indicated that they expect to expend a budget of four billion Soles in 2017 related to reconstruction projects. Moreover, he added that from this budget, 1,500 million Soles should be offered as *Obras por Impuestos* (El Comercio, 2017).

The Peruvian legal framework also allows companies to justify 10% of income tax as part of a disbursement made to a non-profit association with purposes related to cultural, scientific, artistic or social welfare oriented endeavors. It is important to remark on cases in which mining companies applied these mechanisms as part of their measures to relieve social damage in communities. The companies were then questioned about the reasoning of such measures as truly altruistic. Such questioning has led to ensuing conflicts with the Peruvian tax entity (Córdova & Barrenechea, 2013).

1.3.4 Technological.

Technology is a dynamic and ever-changing platform within the metalworking industry that has the potential to further growth and expansion. It requires a high degree of investment and skilled human capital, but in return, companies can obtain innovative technology that will help them to better meet the demands of knowledge savvy customers (Deloitte Technology Industry Outlook, 2017). A technologically friendly company can increase productivity, efficiency and reduce time required for performing labor intensive work (Burke, 2015).

Machinery renewal within Peru has become increasingly important due to the context of the free trade agreement with the USA, which was implemented in 2009. The agreement will encourage companies to become more competitive in order to sustain a healthy share of the market. The main assets required in the metal mechanic industry are motors and

automatized control equipment, which allow fabrics to work in sequence (Benzaquen De las Casas, Casapia, Tamashiro & Valladares, 2011).

The World Bank remarked on the importance of future investment in technology for Peru, stating that “the lack of technology adoption and integration into global value chains further limits productivity growth. Low productivity, in turn, constrains firms’ export diversification, their ability to adopt new technologies, and their demand for better-paying jobs, likely contributing to Peru’s high labor informality,” (World Bank Group, 2017, P.10).

Additionally, it's important to consider for the development of the metalworking industry, the energy costs in Peru, which is one of the lowest in the region. Peruvian energy is 30% lower than the average of all other Latin American countries. This is explained by the use of natural gas of the *lote 88* (a Peruvian area of fuel extraction) for thermal production of electricity, which represents half of the total national production.

1.3.5 Environmental.

El Niño. El Niño Southern Oscillation is a cyclical hydro-meteorological event that happens in different times ranging from 2 to 7 years. The El Niño phenomenon is characterized by warmer surface waters off the coast of Peru (WMO, 2017). The 2017 El Niño crisis has had devastating consequences for Peru, as much of the country’s infrastructure was damaged by the disaster. According to the Central Bank, rain-swollen rivers and landslides have left 106 dead, and 155,000 homeless, and has caused US\$3.1 billion in damage to houses, schools, hospitals, roads, bridges and railways (Emery, 2017). Furthermore, the government will have to invest US\$9 billion in reconstruction of infrastructure due to the El Niño phenomenon. Such investment is already underway, with a 5.5 billion soles stimulus package being provided for the rebuilding of damaged infrastructure. The resulting disaster has thusly created an opportunity for metalworking companies to rebuild structures that were damaged during the floods, as more than 325

bridges were destroyed in the wake of the incident (Edwards, 2017). Additionally, as climate change is expected to make El Niño events more frequent and intense, Peru will need to increase its resilience against extreme weather events by investing in sustainable infrastructure. The government will therefore be looking for companies who offer quality services to rebuild various structures around Peru, giving way to opportunity for companies such as SIMA S.A.

Sustainability. More and more companies nowadays are accountable for environmental sustainability when doing business. In accordance with studies by Ernst and Young (2011) 68% of all respondents confirmed that investors and clients are attracted by company sustainability. In other studies, described in United National Global Compact Accenture Industry, 93% of industry CEOs believe that sustainability issues are critical to the future success of their business.

The assessment of 127 empirical studies made by Margolis and Walsh confirmed positive relationships between environmental sustainability and financial performance. Therefore, Peruvian companies have an opportunity to increase their reputation and investment attractiveness by adhering to global business trends in preserving the environment (Margolish, Walsh, 2003). By doing so, the company can be environmentally proactive, and will be able to reduce the cost of complying with present and future environmental regulations, and enhance firm efficiencies to reduce operating costs (Carrol, Shabana, 2010).

The external analysis has studied the different ways in which varying factors can affect how business is conducted within certain regions. Table 6 presents a synopsis of the Opportunities and Threats of the external analysis developed for SIMA, as well as an External Factors Evaluation Matrix that can be appreciated in Table 7. Both Tables give a breakdown of some of the most important external factors affecting the metalworking industry in Peru, and thusly are important influencers for SIMA to consider.

Table 6
Opportunities and Threats

<i>Opportunities</i>	<i>Threats</i>
<ul style="list-style-type: none"> - Politically friendly bargaining power. - Strategic location and access to Panama region. - Increasing demand in large shipbuilding. - Low energy cost. - Low inflation rate and stable exchange rate. - FTA with US. - <i>Obras por Impuestos</i>. - El Niño reconstruction projects - Access to a pool of technical graduates. 	<ul style="list-style-type: none"> - Dependence on government policy and subsidy. - High dependence on global economy condition. - Peru low investment attractiveness - Bribery scandals in the construction sector. - High degree of capital investment into technology. - Lack of highly skilled professionals in the market. - The industry's absence of CSR strategy in the long term will reduce its competitiveness and investment attractiveness.

Table 7
External Factors Evaluation Matrix (EFEM)

	Key Success Factors	Weight	Value	Score
	Opportunities			
1	Politically friendly bargaining power	0.05	2	0.1
2	Strategic location and access to Panama region	0.05	3	0.15
3	Increasing demand in large shipbuilding	0.1	1	0.1
4	Low energy cost	0.05	3	0.15
5	Low inflation rate and stable exchange rate	0.05	2	0.1
6	FTA with US	0.05	1	0.05
7	Obras por Impuestos	0.05	3	0.15
8	El Niño reconstruction projects	0.1	4	0.4
9	Access to a pool of technical graduates (Professionals)	0.05	2	0.1
	Threats			
1	Dependence on government policy and subsidy	0.1	2	0.2
2	High dependence on global economy condition	0.05	2	0.1
3	Peru low investment attractiveness	0.05	1	0.05
4	Bribery scandals in the construction sector	0.05	3	0.15
5	High degree of capital investment into technology	0.1	3	0.3
6	Lack of highly skilled professionals (technicians and Welders)	0.05	2	0.1
7	The industry's absence of CSR strategy in the long term will reduce its competitiveness and investment attractiveness	0.05	1	0.05
	Total	1.00		2.25

Note. The “Weight” represents how important is each factor for the industry. The “Value” indicates how effective the firm’s current strategies respond to each factor. Finally, the final “scores” represent the company’s ability to respond to external factors.

1.4 Internal Analysis

1.4.1 Administration.

SIMA is a state-owned company with private rights. Consequently, the company's decisions are largely influenced by governmental and political judgments. Decision making is often hindered by bureaucracy due to the firm's dependency on the criteria of FONAFE; a regulatory agency in charge of Peruvian State-owned Companies.

The directory of the company is composed of six Marine Admirals in activity, two representatives from FONAFE and one in representation of the Minister of Economy and Finances. From the previous nine, the Executive Director is named on proposal by a minister level supreme resolution (Law - 23073, 1999). The Influence of the Peruvian Marine in the administration of the company is also reflected in their hierarchical vertical structure, which creates certain impediments in communication between areas and co-workers.

SIMA is a large company with a long-term vision focused on social development whilst simultaneously creating jobs and knowledge. Lasting knowledge, is, however, contradicted by the short period rotation of their main administrators, such as the Executive Director, whose contract expires every two years. Moreover, Marine officers are constantly seeking future promotions, which may influence their process of decision making in the company. The workers are represented by two Unions, one in Callao and one in Chimbote. They generate pressures on the administrative level since their claims impede meritocracy policies and differential salaries. Furthermore, the company has established dress codes, where employee's clothing is given to them by the company with the Logo of SIMA embroidered on them. Production workers wear security clothing that is inclusive of a helmet, reflective clothing and security boots.

Top management leadership style is autocratic, influenced by the ranges of the marine staff. Decisions are taken by the top management and followed by the rest of the

organization. The power is therefore concentrated between a few top functionaries which do not have much contact with the lower levels of the company. Figure 10 depicts some of the main functionaries of the organization.



Figure 10. Main Functionaries of SIMA. Retrieved from Annual memory. SIMA (2017)

At the administrative level, responsibilities are divided in departments, as it can be appreciated in Figure 11, which shows the organizational chart of SIMA. Each department is controlled by a specific manager. Since most of them also have a marine background, authority and delegation of responsibilities is also hierarchical. Communication is direct or through phone calls and emails. Delegation of authority is vertical and related to the internal organizational chart.

1.4.2 Marketing.

Clients contact the company through SIMA's webpage. The coordination is made mainly with the representative of the ship's owner. He is received without major attentions in a simple room in which the only facility is the Wi-Fi connection. Moreover, there are a lack of policies geared towards the treatment of the Captain of the ship; An influential figurehead who should be recognized throughout the decision-making process. Oftentimes, the Captain

stays onboard during the repairing process, which aids in undermining the importance of customer service within this industry.

Nevertheless, according to the last SIMA institutional plan, client satisfaction reached levels of 95%. This figure is a result of a survey developed by the company and measures the perception of their customers towards their operational performance (SIMA, 2015). The result of this survey has shown an increase from 2009, when levels were at 89% and the company objective is thusly to maintain said current performance. SIMA's main customers are listed in Table 8, which only considers its private clients.

The company suffers from segmentation, targeting, positioning and differentiation analysis (STP-D). Furthermore, there is no division in charge of developing market research or market intelligence. Due to government policies, promotion is restricted, limiting SIMA to engage in direct marketing promotions. The latter means that they are only able to promote through specialized spaces such as technological magazines or government national television channels. SIMA is, however, recognized for its quality and regularly promotes its four main Certifications: ISO 9000: 2008, ISO 14001:2004, OHSAS and BASC. The fulfillment of these certification procedures is verified by a specific area of the company.

Table 8
SIMA's Main Clients per Business Line

Business Line	Client	Project	Participation
Ship Repairing	Tecnológica de Alimentos S.A.	Diverse	15.51%
	Pesquera Exalmar S.A.	Diverse	9.37%
	Corporación Pesquera Inca S.A.C.	Diverse	7.78%
	Copeinca S.A.C.		
	Pesquera Hayduk S.A.	Diverse	6.45%
	Zhoushan Ningtai Ocean Fisheries Co	Diverse	5.42%
Metalworking	Banco de la Nación	Cashier Machines	98.91%
	Corp.Peruana Aeropuertos - Corpac	Pisco Control Tower	1.09%
Weapons and Electronics	Telemar (Uk)Ltd.	Radars	31.33%
	Servicios Ferroviarios S.	Electronic cards	30.07%

Note. Data is from "Memoria Anual año 2016," From SIMA. Retrieved from <https://www.Sima.com.pe>

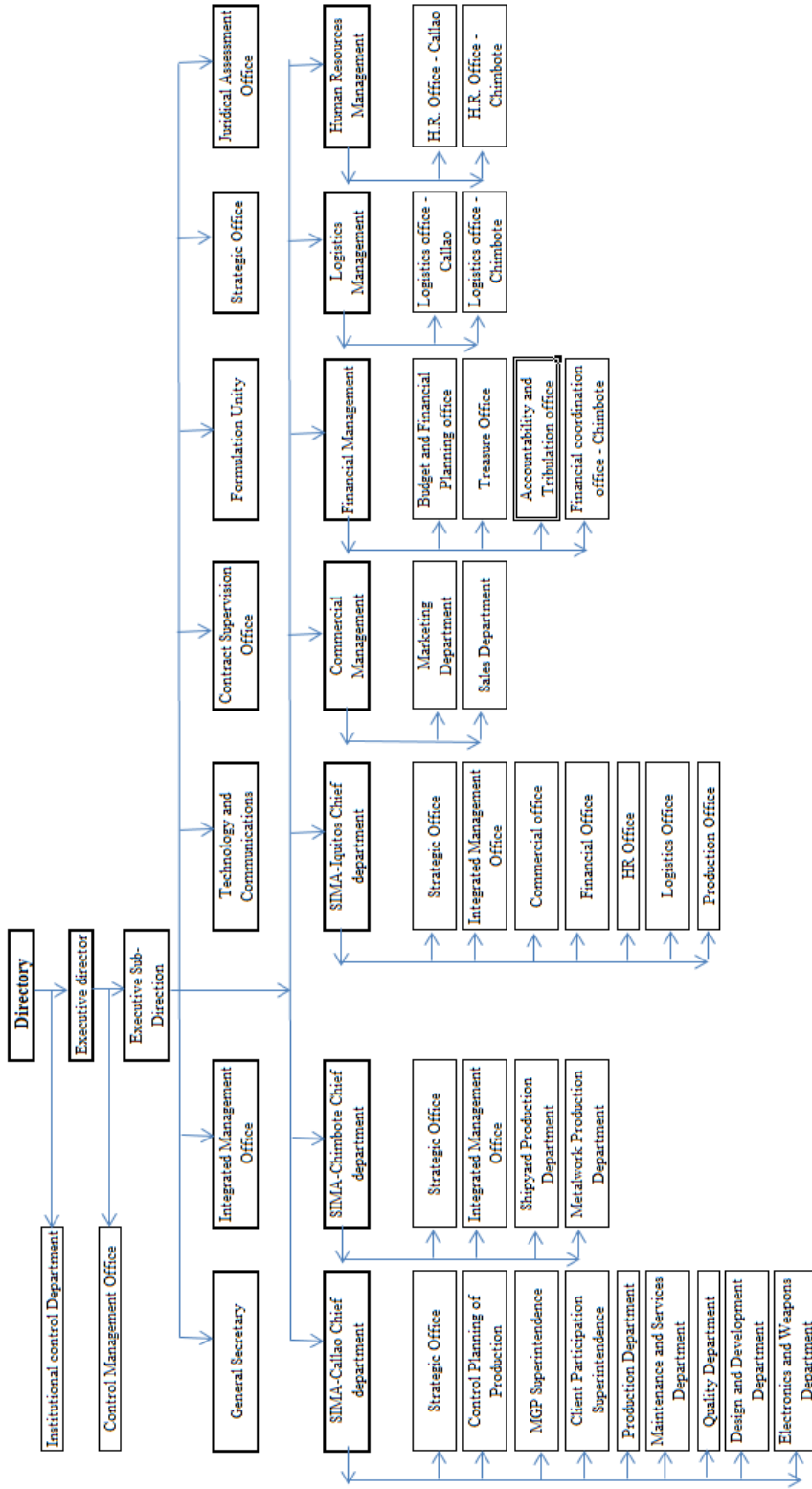


Figure 11. Organizational chart of SIMA

1.4.3 Operations.

As previously mentioned, SIMA has four main businesses lines, three of which are closely managed by the operations chief. The department of Weapons and Electronics is, however, controlled separately. This unit's operations have a prior order to attend to Peruvian Marine interests, where such tasks consume approximately 30% of the company's operations time (Cruzaco, personal communication, June 22, 2017). Therefore, the correct scheduling and planning of resource use is of high importance. The Marine influence further affects the Weapons and Electronics business unit, in that most of the sector's inventions utilize Marine rights and depend on them for their commercialization.

SIMA's operations are in three different locations: Chimbote, Iquitos and Callao, with the latter being the company's main Headquarters. Such strategic locations and vast-size of their installations has allowed SIMA the opportunity to operate with minimal direct competition within their two main business lines of ship repair and shipbuilding. Moreover, large scale projects such as bridge construction and civil infrastructure are also core competencies that SIMA exercises to gain competitive advantage, as many competitors are primarily focused on attending the requirements of mining companies. This lack of competition has powered SIMA's metalwork business line, allowing the company to gain market share within this sector. Nevertheless, the declining force of the mining boom has forced many metalworking companies to refocus their vision to concentrate on infrastructure projects, which has consequently intensified competition within this sector.

Operations within SIMA suffer from being outdated, where much of the machinery has been in use for over thirty years (Lathes and Metal Cutters). Furthermore, some large machinery has become obsolete, and is therefore of little use to the company's building endeavors. Take, for instance, the company's dock installations: SIMA has four docks, one dry and three floating. The biggest of these installations is the dry dock, which was built in

the 1930s. The lack of modernity in updating crucial elements of the company's cash cow has put SIMA at a major disadvantage, where the company is not able to attend 90% of the ships that arrive in the Callao Port since most ship dimensions surpass the capacity of SIMA's docks (SIMA, 2010).

SIMA has identified all of their processes, starting with the client requirement for a project until its final deliverable. Figure 12 shows the processes map of SIMA, in which it can be appreciated how all the processes interact: the support processes, the management processes and the production processes. For each project, SIMA names one Project Chief as responsible of its execution until its liquidation. The Project Chief oversees the coordination with production, quality, design, engineering, logistics and other functional areas according to the required necessities.

1.4.4 Finances.

Finances are strictly monitored by government agencies, which limits the authority the company can have over its own budget. Moreover, small margins stop SIMA from investing in larger projects, as well as limit their ability to reinvest funds into necessary updates. Nevertheless, SIMA counts with a positive credit score, which may allow them to ask for loans in national or international markets with competitive interest rates.

Exchange rates facilitate important effects within this industry, as the company's main resources and products are priced in US\$. According to the company's last audited income statement, in the year 2015 SIMA received a surplus of 21 million Soles due to the differences in the exchange rate. In the year 2016, however, this effect had a negative impact in the amount of 4 million Soles. The relation between Liabilities and total Assets is 80/100, which represents a high dependence on debts and can be observed as a bad finance indicator by banks (SIMA,2016).

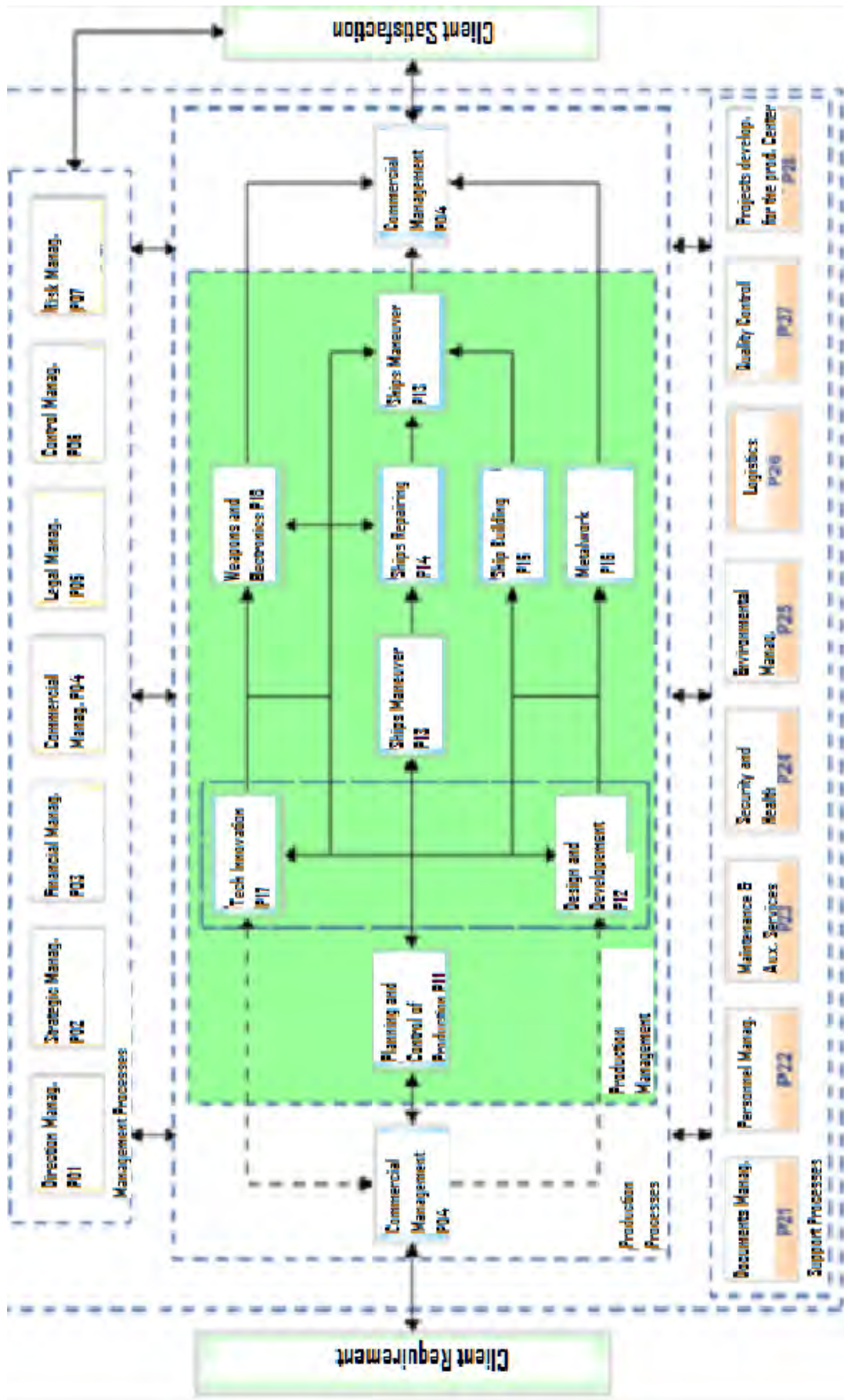


Figure 12. Processes Map of SIMA.

Appendix A and B show the balance sheet and the income statement of the company for the years 2015 and 2016. Appendix C shows some financial indicators of liquidity, solvency, rentability and management. Table 9 shows liquidity, solvency, returns and management financial indicators for the years 2013 to 2016.

Table 9
SIMA's Financial Indicators from 2013 to 2016

	2013	2014	2015	2016
Liquidity				
Liquidity	13.4	6.8	6.8	10.6
Acid-Test	12.4	5.9	5.9	8.9
Solvency				
Debt to Equity	5.4	6.8	6.8	4.2
Fixed Asset Coverage	0.3	0.2	0.2	0.2
Returns				
Net return of the equity	4.8	5.5	5.9	1.3
Return on Sales	2.4	2.4	2.4	0.8
Operative Margin	-2.4	-5.7	-5.7	1.9
Net Margin	2.4	2.4	2.4	0.8
Return on Investment	-0.7	-1.7	-1.7	0.6
Management				
Rotation of Accounts receivable	0.7	0.6	0.6	1.8
Inventory Rotation	4.7	2.3	2.3	2.2
Financial Expenditures	0.0251	0.0746	0.0746	0.2774

Note: Adapted from SIMA (2016, pg.68) SIMA (2017, pg.51).

Furthermore, Figure 13 shows SIMA's annual sales from the year 2005. Lastly, SIMA's annual memory indicates that they did not achieve their financial goals, as the company is below their desired rates of return over the equity and operative margins. Table 10 shows SIMA's financial goals for 2016 and their final obtained rates. Their returns indicators show a low return on sales, investment and equity, which is characteristic of the naval industry. The indicators of liquidity show how effective SIMA is at solving their commitments in the short-term; they are reflections of the stability of the company.

Year	Sales (PEN)	Net Margin
2005 a	106,661,417	0.18%
2006 b	108,730,636	-12.24%
2007 b	150,741,312	2.06%
2008 c	184,358,965	0.48%
2009 c	198,894,319	1.70%
2010 d	171,595,938	2.24%
2011 d	220,843,686	1.95%
2012 e	215,380,796	1.22%
2013 e	213,322,867	0.84%
2014 f	250,913,520	2.35%
2015 f	328,946,739	2.38%
2016 g	217,475,778	0.82%

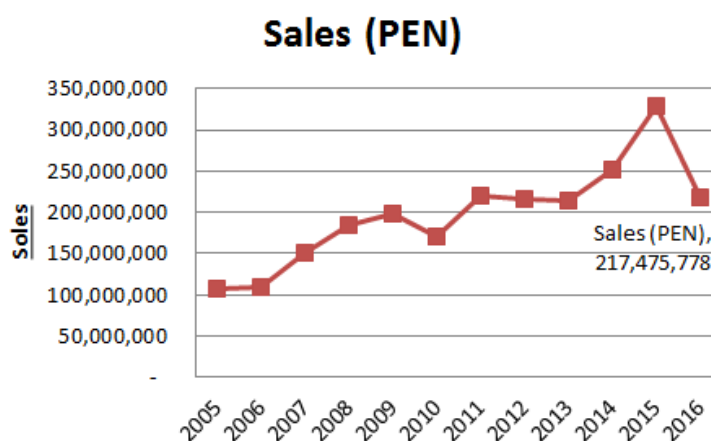


Figure 13. Annual Sales of SIMA. Retrieved from SIMA (2006, pg.65), b SIMA (2008, pg.65), c SIMA (2010, pg.65), d SIMA (2012, pg.65), e SIMA (2014, pg.65), f SIMA (2016, pg.65). f SIMA (2017, pg.48).

Table 10
Financial Goals for 2016

Indicator	Goal for 2016	Executed 2016
Return of the Equity	3%	1.30%
Operative Margin	2.95%	1.86%

Note: Adapted from SIMA (2016, pg.11).

1.4.5 Human Resources.

Until December of 2016, SIMA accounted for 1344 employees located in Callao, 435 in Chimbote and 198 in Iquitos, where 18.5% work in administrative positions. (SIMA, 2017a). The administrative area is excessive for a company whose focus is primarily within the technical field. Furthermore, the company disposes of a great advantage when comparing minimum wage salaries for low cost professionals and workers within the industry. SIMA's minimum wage is set around US\$259, which positions SIMA Peru's price of basic workforce below many of their main competitors: Ecuador's minimum salary is US\$366, in Chile US\$373 and in Panama US\$529 (FIAGH, 2016). Therefore, due to SIMA's uncompetitive salaries, the company faces a high turnover rate of most of its main employees, whereby 50% to 75% of skilled professionals leave the company (Cruzaco, personal communication, June 22, 2017). The company therefore faces immense challenges in maintaining optimal results,

in that personnel continuously demand higher salaries in a sector clinched by bureaucratic policy that makes the retention of top talent difficult to come by. Also, as it can be appreciated in Table 11, the company faces many legal labour procedures, which represents millions of US\$ in costs for the firm.

Table 11
Legal Human Resources Procedures against SIMA until December 31 of 2016

Description	In Favor			Against			
	Quantity	Soles	USD	Quantity	Soles	USD	Euros
Civil	14	4,396,807.91	1,169,691.25	4	7,071,296.49	24,159.00	209,600.00
Labor	1	-	-	177	24,729,987.92	-	-
Penal	1	-	-	0	-	-	-
Arbitral	6	13,361,927.99	-	5	34,969,943.73	-	-
Administrative	0	-	-	1	1,304,970.57	-	-
Total	22	17,758,735.90	1,169,691.25	187	79,621,125.09	24,159.00	209,600.00

Note. Data is from "Memoria Anual año 2016," From SIMA. Retrieved from <https://www.Sima.com.pe>

1.4.6 Information systems.

The information systems utilized within SIMA are, for the most part, old and outdated, causing there to be inefficiencies within the company. Take, for example, the company's reports, which are developed in excel, project and primavera programs. Furthermore, payroll is developed on paper, delaying the processes of approvals, payments and recording. Additionally, there are no Libraries of Learned processes and most of the procedures and approvals are made in paper formats, which reduces efficiency and causes delays to many of the company's procedures.

The company uses 75% of Microsoft Office programs for their software. Moreover, the company does not count with ERP software for operations (Salas, 2017). Some of the crucial operational tasks are followed by basic indicators on excel, followed by laptops and cellphones. The annual memory of 2016 shows that they have executed 97% of the planned information technology acquisitions for the year 2016 when their goal was 95% (SIMA, 2017a). This seems to be an indicator that does not properly reflect the real modernization requirements and is thusly evidence of the lack of planning over urgent IT necessities. The list of the projects identified and planned by the Information Systems area of SIMA is shown

in Table 12. For 2017, the total cost budgeted for these projects is around US\$300 thousand. Nevertheless, none of these attend to the necessities explained previously.

Table 12

List of Projects and activities for 2017 defined by the Information Systems Area

N°	Project/Activity	Total Cost (Soles)	Starting Month	Finishing Month
1	Renewal of the technological equipment for the different areas of the company	204,859	March	October
2	Implementation of the Software of Help table	-	March	September
3	Migration of the modules SIMANET to a new platform	40,000	October	December
4	Improve of new functionalities of the module of H.R of SIMA PERU	32,000	September	November
5	Improve of the module of cost distribution	16,000	August	December
6	Contingency plan implementation	50,000	March	December
7	Implementation of the Strategic plan of Information technologies	-	March	December
8	Personnel Training	4,000	May	July
9	Implementation of the plan of Information Systems	21,000	April	June
10	Acquisition of Blade Servers (renewal because of obsolesce)	158,000	April	May
11	Acquisition of licenses of software for the company	417,258	January	December
12	Unification of the Vigilance video systems SIMA Callao	-	March	June
13	Implementation of the System of external backup of the informatic systems	87,660	May	October
14	Implementation of the service of Contingency Internet	48,000	March	May
TOTAL		1,078,777		

Note. Retrieved from The Operative Information Plan of SIMA. SIMA (2017b)

1.4.7 Technology.

There is a lack of policy within Research and Development as well as proper cooperation and coordination with regional universities. Rather than seek out young and innovative talent from tertiary institutions, SIMA instead relies on the process of “technology transfer” for renewal and replenishment of company knowledge. This transfer of knowledge is a result of learning new skills from subcontractors, as well as meeting the expectations and demands of the clients they are serving. Partnerships with universities remain only for the hiring of new professionals.

The Weapons and Electronics department is the only sector within SIMA that invests its efforts in research and development. This sector utilizes R&D to develop many important innovations that have shown good return on investment for the Peruvian Marine. These innovations are developed at a half to a third the price of those built on the international market, which is a huge competitive advantage within this sector of SIMA. Nevertheless, as it can be

appreciated in Table 13, the Weapons and electronics business line is relatively small in terms of contribution to the total sales of the company. Finally, Table 14 shows the strengths and weaknesses of the company and Table 15 depicts the Internal Factors Evaluation Matrix (IFEM).

Table 13
Total Sales of SIMA for 2015 and 2016

Business Line	2015		2016		Variation
	Soles	% Total	Soles	% Total	
Ship Building	-	0%	-	0%	0%
Ship Repairing	123,225,636	77%	65,301,066	73%	53%
Metalworking	26,477,389	17%	1,147,628	1%	4%
Weapons and Electronics	6,034,937	4%	21,003,807	24%	348%
Others	4,224,212	3%	1,409,306	2%	33%
Total	159,962,174		88,861,807		

Note. Data is from “Memoria Anual año 2016,” From SIMA. Retrieved from <https://www.Sima.com.pe>

Table 14
Strengths and Weaknesses

Strengths	Weaknesses
<ul style="list-style-type: none"> - Workers feel pride working for SIMA because of the prestige of the company. - SIMA has four important certifications which gives them a competitive advantage. - SIMA has lower costs of workers and employees than other companies in Latin America. - SIMA’S facilities locations are favorable for the shipbuilding and ship repairing business lines. - Debt capacity. - Experience in infrastructure projects. 	<ul style="list-style-type: none"> - Dependence on FONAFE. - Old Machinery, equipment and IT systems. - High Turnover of skilled workers. - Large number of administrative employees. - Lack of CSR policies. - Lack of R&D policies. - Lack of specialized engineering software. - Limited Capacity for attending only small ships.

Table 15
Internal Factors Evaluation Matrix (IFEM)

	Key Success Factors	Weight	Value	Score
Strengths				
1	Workers feel pride working for SIMA because of the prestige of the company.	0.05	3	0.15
2	SIMA has four important certifications which gives them a competitive advantage.	0.05	2	0.1
3	SIMA has lower costs of workers and employees than other companies in Latin America.	0.05	4	0.2
4	SIMAS facilities location are favorable for the shipbuilding and ship repairing business lines.	0.05	2	0.1
5	Debt capacity.	0.05	2	0.1
6	Experience in infrastructure projects.	0.1	3	0.3
Weaknesses				
1	Dependence on FONAFE.	0.15	4	0.6
2	Old Machinery, equipment and IT systems.	0.15	4	0.6
3	High Turnover of skilled workers.	0.1	3	0.3
4	Large number of administrative employees. retained because of labor laws.	0.05	2	0.1
5	Lack of CSR policies.	0.05	1	0.05
6	Lack of R&D policies.	0.05	2	0.1
7	Lack of specialized engineering software.	0.05	2	0.1
8	Limited Capacity for attending only small ships.	0.05	3	0.15
Total		1.00		2.95

Note. The “Weight” represents how important is each factor for the industry. The “Value” indicates how effective the firm’s current Strengths or weaknesses respond to each factor. Finally, the final “scores” represent the company’s performance in regards to its internal features.

1.5 Conclusions

Drawing on the information from above, one can conclude that there is an immense opportunity for metalworking industries within Peru in the wake of the El Niño disaster this past summer. With over 240 bridges destroyed, SIMA is well poised to bid on reconstruction contracts that will allow them to demonstrate their expertise within this sector. In an interview with Carlos De Izcue (2017), it was noted that 300 bridges have been built by SIMA around Peru, all which withstood the destruction caused by floods and landslides. This statistic is a nod to the high degree of quality offered by SIMA’s metalworking division, and is a favorable attribute when the government looks for companies who can build sustainable infrastructure.

A primary concern within the metalworking division of SIMA pertains to its outdated technology and lack of innovation. While the company offers quality products, they cannot

offer it in a reasonable time frame, nor at a reasonable price. Domestic competitors have the advantage of having C&C machinery that helps to bolster their efficiency so that they can outbid competitors on price and time. In order for SIMA to remain a competitive entity in this sector, it will need to make updates to its equipment, which is currently 90% outdated.

An additional concern derives from the company's major strength, as well as its perceptible weakness. Being a State-Owned Enterprise has allowed SIMA to gain advantages by way of subsidies and tax breaks, but has also made the sector heavily reliant on government policies, economic forces and security considerations. The lynchpin in being heavily associated with the state, however, is that SIMA often generates low annual profits, which limits their ability to reinvest money into the modernization of their company. Moreover, SIMA also suffers from a lack of long term vision due to short term contracts held by their employees. Therefore, while the company enjoys many benefits through its association with the state, it is also hindered by its stringent policies and practices.

Taking everything into consideration, this report recognizes the outstanding reputation of SIMA as a result of its highly qualified labour force, diversified offerings and ISO certifications. Additionally, the company is known to deliver a high degree of quality that will help the company to win upcoming contracts for the reconstruction of infrastructure around Peru. These competitive advantages are critical to SIMA's strategic position, and need to be utilized to allow the company to differentiate itself from its competitors. Furthermore, because SIMA faces intense competition from other domestic metalworking firms, the company will need to refocus its energies on updating its technological readiness and innovation, as well as improving efficiencies in its workforce and seeking out opportunities to partner with universities.

Chapter II: Key Problem

2.1 Identified Problems

By utilizing the different frameworks to analyze internal, external and industry environments as they pertain to SIMA, the report has concluded on a subset of issues that are plaguing the operations of the metalworking division. Three of the following issues have been defined as being important in the resolving of company problems, but are not, in fact, the key issue of focus. They will therefore be presented as alternative courses of action that SIMA may choose to consider at a later point in time. The fourth topic to be considered is both a problem as well as an opportunity, and will thusly be the area of intended focus for this report. All four topics have been identified in Table 16, and are further elaborated on in the proceeding sections.

2.1.1 Problem 1: Marketing client services.

Through the collection of data from SIMA representatives, as well as in-depth research into the internal conditions of the company, the report has recognized a lack of attention being paid to marketing endeavors within client services. Most notably, it appears the company lacked the motivation to cater specialized services towards important clients, such as ship captains. Furthermore, upon visiting the site in Callao, such issues were reconfirmed, as the company seemed to focus its attention on quality of maintenance whilst neglecting the client in which the repairs were being done for.

The remedy to such a problem would be to invest both time and money into creating a space where ship captains and crew members could rest while maintenance is taking place. Presently, SIMA hosts its clients in a room devoid of Wi-Fi or access to warm beverages; even small changes such as these could help to bolster the reputation of their client services. Moreover, in order to stay globally competitive, it is crucial for SIMA to place emphasis on customer satisfaction.

Table 16
Identified Problems at SIMA

Alternative	Key Problems	Evidence	Comments
1	Deficient marketing policies towards client services	Lack of policies towards the treatment of ship captains	What is the percentage of repeat customers/ client satisfaction?
		Lack of positioning strategy	Is the current position one that focuses more on quality than client services?
		Lack of market intelligence studies	Helpful to conduct market surveys to increase client satisfaction?
2	Opportunity to increase competitiveness of the metalworking sector in context of El Niño consequences	Market opportunity (reconstruction due to Niño consequences)	Obras por Impuestos as main opportunity to increase competitiveness in metalwork division.
		Increasing competence	Highly skilled work needed.
3	Lack of Social Corporate Responsibility policies	High turnover of employees	% of employee turnover, social events and benefits, vacation and working hours
		Low public awareness of the company	CSR initiatives may help to develop SIMA's reputation through positive word of mouth.
4	Inefficient/old technology and machinery	Accuracy impact on works of old machines	90% of machines are outdated/inefficient.
		Technologically under competitive compared to rivals	Main rival is privatized, giving them a leading edge over SIMA.
		Inefficiencies in accounting and infrastructure sectors	Paper rather than online services- large scale inefficiencies and room for error.

Many of SIMA's competitors are currently marketing their impeccable customer service to entice new clientele. According to Carlos De Izcue, a Commercial Manager at SIMA S.A Peru (2017), shipyards within Spain are vying for new business by marketing their accommodation and superior customer service experience. SIMA must therefore improve their offerings within this sector so that they too can utilize their marketing budget to bolster their international reputation of client offerings and services.

Low public awareness is therefore a large issue for the company, who presents quality work throughout the country, but lacks the recognition necessary to grow their business unit. The report thusly believes it necessary for SIMA to expand its marketing budget on increasing customer awareness using promotional tactics. Such consciousness would allow SIMA the opportunity to compete more readily in the area of metalwork, as they could then be recognized as a leader within this field, and therefore a reliable candidate for the job.

2.1.2 Problem 2: Inefficient technology and machinery.

The company is aware of the technology gap that they need to attend to in order to enhance the operational efficiency of their processes. SIMA's last strategic plan identified in their SWOT analysis listed the following weaknesses as it pertains to their technology problem: (a) having old machinery as part of their equipment has resulted in limiting the productivity and increasing the operation costs and maintenance; (b) a limited maximum capacity, which makes it impossible to attend Panamax size ships; (c) lack of policies that enhance the investigation and development of the company (SIMA, 2015).

The company has formulated strategies in order to invest in infrastructure and machinery that will allow them to improve their maximum installed capacity. One such measure is the project of a pier platform that will allow SIMA to attend more frigates and start the modernization of four Peruvian navy submarines. For the construction of this project, the Brazilian company, Mota Engil, was contracted in September of 2015. The project will count with a modern synchro-elevator of almost 3,000 tons of lifting capacity that will allow the company to develop ship hull cuttings (APAM, 2016).

Nevertheless, the previous project is directed at the capacity of the production rather than the efficiency of the company. There is a need for investment in renovating some of the actual machinery used for shipbuilding and repair, which are the cash cows of the company. The Callao facility's present equipment, still inside the plant, is presently out of operations and awaiting maintenance. Some Lathes still in operation have over 50 years of working life, creating accuracy issues that affects the company's efficiency. Moreover, the facilities rely strongly on manual welding, while some advanced shipyards employ automated processes, intelligent systems and robotics (SIMA, 2008).

2.1.3 Problem 3: Lack of corporate social responsibility measures.

Loyalty, high performance, efficiency and job satisfaction are the key objectives of CSR strategy. Tailored HR policy represents a company's goodwill and appreciation towards its employees. Investment in human capital is beneficial to a company because the talented pool of employees can, in return, generate innovative ideas which can create further value for the firm (Mehregany, 2013). Based on personal communication with SIMA employees, the corporate website and previous reports about SIMA, internal issues were identified pertaining to the turnover and satisfaction levels of employees within all four business units. The report therefore saw an opportunity in developing a CSR initiative for the company that would help to remedy the following internal issues:

a. Low job satisfaction levels: Due to the long working hours and unfair distribution of work, employees have become concerned with the overbearing amount of work. As a result, employees fail to reach company standards and thusly perform tasks at a lower level. The employer responds to these shortcomings by asking employees to report to work early or to complete their work during breaks, lunch time and/or overtime (Branham, 2005). The necessity to finish an unreasonable amount of work dramatically increases the employee anxiety and job dissatisfaction levels.

b. Low productivity levels: Low productivity could be caused by stress among the company's employees. Additionally, the absence of modern equipment and the time-consuming access to information required to produce or perform work can cause undue levels of tension within the workforce. At the same level, stress is further escalated because employees are expected to perform to a particular standard, yet can sometimes not attain such levels (Gregory, 2011).

c. High level of management turnover and lack of loyalty: The causes of high management turnover could be divided into two categories: controllable and uncontrollable.

Controllable reasons are caused by the company's lack of intrinsic and extrinsic motivators such as salaries, promotions, and benefit packages. Uncontrollable reasons are caused by FONAFE HR policy of management rotation. Upon completion of two years' duty, unless extended, management must change its work location. As a result, both causes lead to lack of management loyalty and adherence to SIMA's long term goals and visions.

2.2 Key Problem: Low Level of Competitiveness in Metalworking Sector

2.2.1 Substance.

The metal working unit of SIMA is a division with great potential. To date, the company has erected multiple bridges across Peru, and continues to bid on various projects throughout the country that pertain to this division. There is, however, a higher degree of competition within this sector, which has started to stifle SIMA's success within this area. Furthermore, in order to win bids, SIMA must compete with domestic rivals that are more technologically advanced, and therefore have higher productivity and efficiency rates that allows them to better compete on price and time. Beyond internal issues that plague the company's competitiveness within this sector, there is also an issue of low public awareness for the prevalence of SIMA built bridges throughout Peru. According to SIMA, roughly 90% of steel built bridges throughout the country have been constructed by SIMA; a staggering statistic that receives little acknowledgement throughout the region. In the wake of the El Niño that took place in the early months of 2017, the country suffered wide scale damage to much of its infrastructure. SIMA therefore has the potential to help rebuild its country through the promotion of its metalworking division, which can aid in reconstructing bridges throughout Peru.

2.2.2 Timing and magnitude.

According to the International Disaster Database (EM-DAT) every 5 to 10 years Peru faces significant damage and destruction from floods as a result of the El Niño phenomenon

or the so called El Niño Southern Oscillation (International Disaster Database, 2017). Moreover, massive damage has been inflicted on Peruvian infrastructure including roads, bridges and irrigation canals. Consequently, SIMA's metalworking division is well positioned to take advantage of the upcoming reconstruction projects, most notably within the bridge building sector. Furthermore, the country is in desperate need of finding contractors who are able to provide sustainable infrastructure; With over 300 bridges that withstood damage throughout Peru, SIMA delivers quality structures that are currently required throughout the country. It is therefore due time for SIMA to take advantage and promote improvement in business performance through the development of their metalworking division. At the same time, the market demand for steel processing and metalworking outweighs market supply. Subsequently, SIMA has the opportunity to distinguish itself from its competitors and increase the likelihood of winning more metalworking contracts throughout Peru.

2.2.3 Location.

The location of the opportunity has manifested itself within the metalworking sector of SIMA. Through multiple meetings with SIMA's management and employees, it has become evident that the company wishes to bolster its domestic reputation within its metalworking division, as they feel as though the shipbuilding and repair sector has overshadowed their other working units. SIMA has built many steel bridges throughout the country, but is not widely recognized for their quality work within this area. The opportunity to increase public awareness has made itself present in the large volume of reconstruction projects becoming available in the coming months, which will allow SIMA to compete for multiple bridge building contracts throughout Peru.

2.2.4 Ownership.

The ownership of the opportunity will primarily rest on the shoulders of the government, as SIMA is a State-Owned Enterprise (SOE), and must therefore abide by rules and regulations set forth by the state. Being an SOE can be both an advantage as well as a disadvantage in regards to the upcoming opportunity, as the government is generally the provider of public infrastructure projects within Peru. Having an established connection with the state may therefore help SIMA to win bids for bridges throughout the region. There is, however, the question of outdated technology and equipment within the company, which can only be renewed with approval from the FONAFE board of directors. This renewal would cost five to six million Soles, and would help SIMA to become more competitive amongst its rivals. The company is currently waiting on such approval, and this lag time could be detrimental when trying to win upcoming bids.

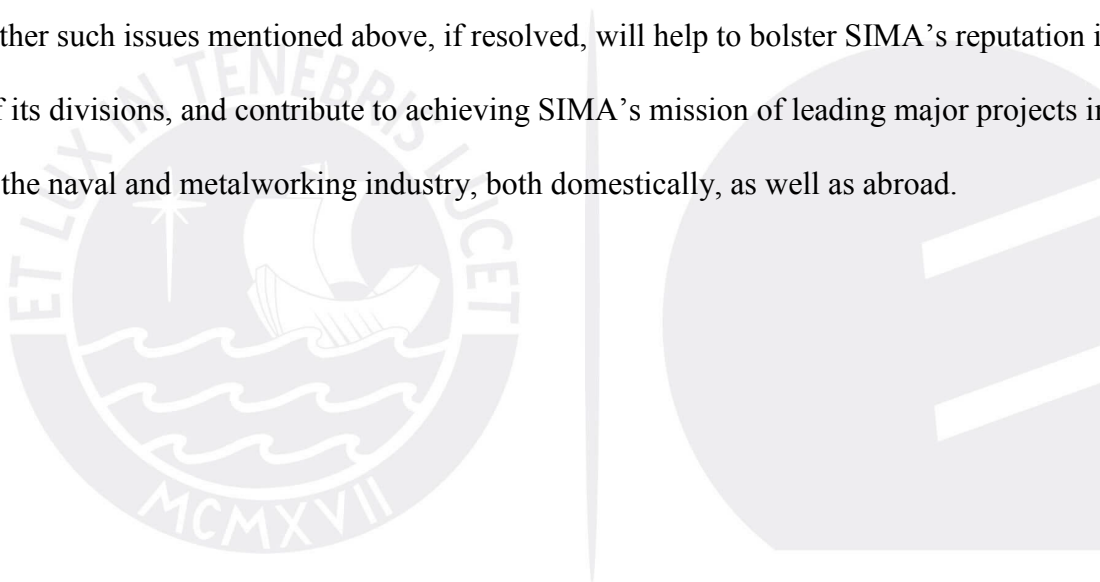
A secondary source of ownership for the opportunity can be placed on the marketing division of SIMA, who may be able to use its different outlets to disseminate more awareness and information about SIMA's metalworking division. While the marketing team is limited in what channels they can use, their image can be promoted in Peruvian news segments, which could help to raise public awareness about their heavy metal structures. SIMA must therefore make it known that they are vying for new bridge building contracts so as to aid in the reconstruction of their country's infrastructure, which has the potential to gain attention due to the socially responsible image being conveyed in helping to rebuild routes between communities.

2.3 Conclusions

In analyzing the key problems that have manifested themselves within the operations of SIMA, the report has isolated an essential area in which the company should focus its attention in order to maximize its future success. The insufficient level of competitiveness

within the metalworking unit of SIMA has started to impact the enterprise's ability to win contracts over and above other domestic rivals. In the wake of the El Niño, however, there are many opportunities for the company to help rebuild sustainable infrastructure throughout Peru. SIMA must therefore work quickly to strengthen its metalwork division so that it may have the ability to compete for the available bids in the upcoming reconstruction period of 2017. It will thusly be important to recognize both short and long-term goals for the restructuring of this division, so that SIMA's metalworking unit may build towards becoming the leader within the industry.

While there are several other identified problem areas within SIMA, it is crucial to recognize the opportunity that comes with solving the aforementioned problem. Nonetheless, the other such issues mentioned above, if resolved, will help to bolster SIMA's reputation in all of its divisions, and contribute to achieving SIMA's mission of leading major projects in both the naval and metalworking industry, both domestically, as well as abroad.



Chapter III: General Situation of the Organization

3.1 Literature Mapping

While the concept of competition has been around for centuries, its widespread popularization has been made significant through the omnipresence of globalization. The business world is no longer flat, but rather a set of interconnected supply chains that connect one end of the world to the other. Competition has thusly intensified, as rivalry is not only domestic, but global in scale. While developing nations were slower to adapt to such a phenomenon, they too are beginning to source out areas of competitive advantage in which to compete with global giants. Moreover, such widespread linkages have facilitated a diffusion of knowledge that has lent itself to a technological revolution that is changing the face of virtually every industry. Much the literature reviewed in this section will highlight the positive aspects of competitiveness, as well as the ways in which to become more competitive in an ever crowded world of rivals.

The following section analyzes literature related to the key factors that drive competitiveness. Figure 14 presents a synopsis of the topics and literature that are covered in this chapter. The themes to be discussed in the following pages are as follows: definitions as well as factors that contribute to competition inclusive of technology, strategic alliances, comparative advantages, marketing and labour. The chapter will begin by defining different concepts of competitiveness, followed by a thorough analysis of what key elements are necessary to promote competitive advantage over and above other enterprises. These factors take a widened perspective of what competition can achieve, and highlights the instrumentality of gaining an edge over another company. The literature will therefore help to form a more comprehensive understanding of the impacts of competition within the realm of business, as well as its monumental impacts within many different industries.

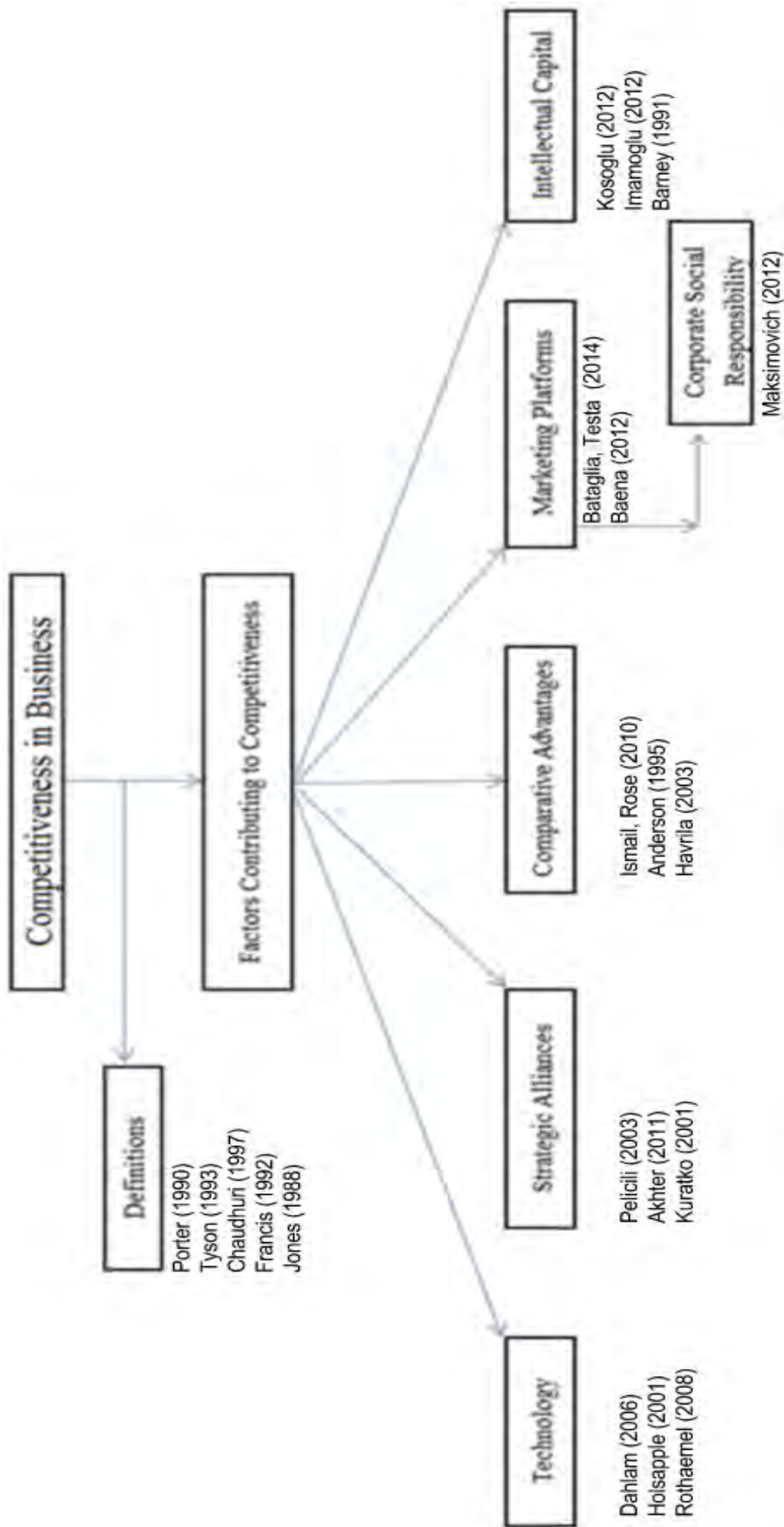


Figure 14. Literature mapping.

3.2 Literature Review

3.2.1 Definitions of competitiveness.

The term competitiveness has been subject to intense scrutiny in academic literature ever since its popularization in policy debates during the late 1980s (Porter, 1990). There are, in fact, many applications of the term competitiveness, as it can be defined economically, politically or managerially. Such divergence has led to many plausible definitions of the word, which range from national in scope to an industry and even firm level perspective. The former looks at competitiveness as a level to which a nation can, under free and fair market conditions, create goods and services that meet the needs of international markets while simultaneously maintaining or increasing the real income of its citizens (Jones & Teece, 1988). Scholars from the industry school of thought have given prominence to the role of government, asserting that governments of developing nations have nurtured newly built industries and have helped to shape their competitiveness (Amsden, 1989; Tyson, 1993).

Furthermore, this perspective disagrees with the notion that the rising share of Asian economies in world trade within capital intensive industries such as steel and shipbuilding, are the result of a natural catch up process. Instead, they assert that policy choices exercised by these governments have aided in such industries achieving competitiveness (Chaudhuri & Ray, 1997). A firm level perspective explores how a firm's competitiveness and competitive behavior is due partly to "its ownership of a set of attributes, involving institutional arrangements within the firm is built over a long period of time, and partly due to the exogenous factors attributed to the national environment (Francis, 1992).

3.2.2 Factors contributing to competitiveness.

It is important to identify sources that contribute to an industry or firm's competitiveness, as it can underscore both comparative and competitive advantages available to a company within a particular country. It is therefore pertinent to analyze factors that help

boost competitiveness of industries in general, and firms in particular. Integral elements of competition can be listed as follows: (a) The level of, and access to technology and innovation, (b) the ability to formulate successful strategic alliances, (c) access and proximity to key industry resources, (d) the utilization of successful marketing platforms, (e) the level and strength of human capital and experience and (f) the degree of corporate governance. The following section will thusly carry out an analysis of these four key components in an effort to ascertain its effects on industry and firm performance.

Deriving competitive advantage from technology. Today, technological innovation is one of the most important drivers to generate competitive advantages for a company. The reasoning behind the increased importance of innovation within business include deregulation, globalization, rapid technological progress and accelerated diffusion rates for technology based products (Rothaermel, 2008). The capacity to innovate is therefore crucial in many sectors of business, where obsolete technology is becoming the key differentiator between success and failure. Technological change has even been described as a great equalizer, where it can erode the competitive advantage of even well entrenched firms whilst propelling others to the forefront (Porter, 1985).

A further way in which to determine how technology can offer a competitive advantage is by analyzing its effects on the value chain of a business. Technology is, in fact, a vital component for a firm being able to achieve linkages amongst its activities, and can therefore impact both differentiation, productivity and cost structures (Porter, 1985). Porter explains that the aforementioned topics can be affected if technology influences the drivers of cost or uniqueness (1985). Take, for example, the case of Federal Express, who reconfigured its value chain to achieve faster and more reliable delivery. Implementing technological change allowed the company to differentiate in terms of its productivity, thus developing an opportunity for advantages in timing. Such a case was a nod to the fact that technological

advancement need not be outwardly scientific in design, but rather be used in such a way that brings about competitive advantage.

Researchers in the field of sustainable competitive advantage have linked the materiality of technology to the concept of knowledge, asserting that the one source of lasting competitive advantage is knowledge and its manipulation (Nonaka, 1991). To that end, a study conducted by Ernst and Young (1997) found that out of 431 U.S and European companies, all reported that more active management of knowledge is advisable; indeed, that it is critical if a firm is to gain and sustain a competitive advantage. It is therefore evident that in an increasingly innovative business climate, firms must acquire and internalize knowledge to maintain an edge over their rivals. Figure 15 outlines the phases in which knowledge must filter through a company in order to fulfill the competitive requirement. This Figure is referred to as the Knowledge Chain Model, and helps to outline how integral it is to implement and exercise knowledge at every stage of a company's development to attain competitive advantage.

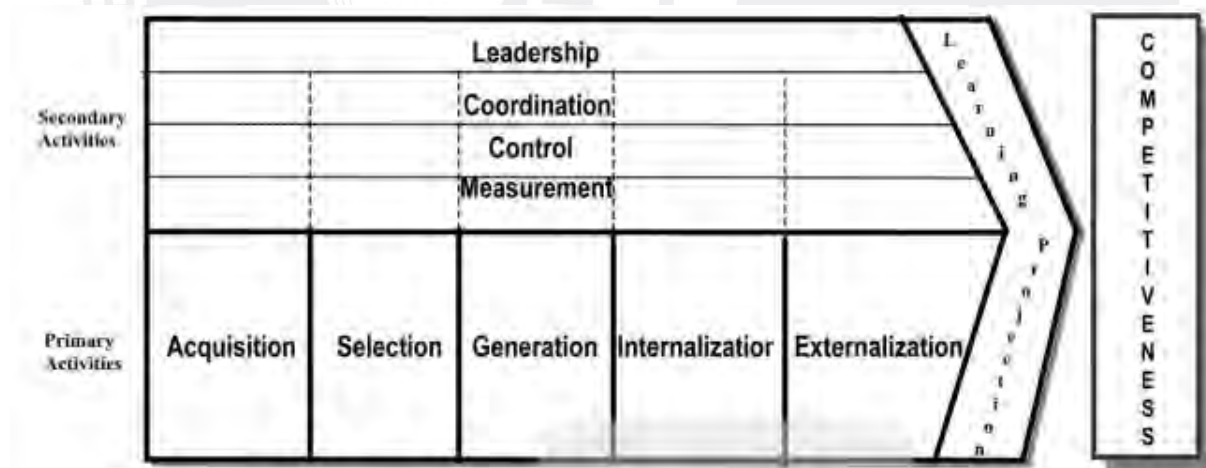


Figure 15. The Knowledge Chain Model. “The knowledge chain model: activities for competitiveness” by C. Holsapple & M. Sing (2001). From Expert Systems with Applications.

There are, of course, drawbacks to the constant revolutions taking place within the technological sector, not in terms of progress, but rather in terms of financing. The World Bank has identified that a common problem within value chains is the difficulty in accessing

financing for both working capital and investments, where a company can get stuck in low investment-low return production cycles (2007). This problem is especially prevalent within developing nations, where the necessary conditions for integrating new technologies into the economy, such as macroeconomic stability and good governance, are often lacking (Dahlman, 2006). Take, for example, the case of an Indonesian textile industry needing to make updates to their machinery. The study showed how the high cost of repairs and maintenance often led to obsolete plants and machinery, which significantly increased operating costs (World Bank, 2007). It is therefore crucial to note that while technology plays an instrumental role in boosting productivity levels and economies of scale, it can only be a competitive advantage if the firm has the ability to maintain and upgrade its equipment. Innovation and the ability to finance such initiatives has thusly birthed an undeniable tension, as all businesses involve the creation, dissemination, renewal, and application of knowledge toward organizational sustenance and survival in the face of increasingly discontinuous environmental change (Malhotra, 1998).

Deriving competitive advantage through strategic alliance. Strategic alliances are considered to be a type of agreement between companies in order to achieve a common set of objectives and interests. Alliances are amongst the several options that companies choose to take to attain their goals; they are based on cooperation and collaboration between firms (Pellicelli, 2003). Using a comprehensive interpretation, strategic alliances are contracts or deals between companies that remain self-governing or independent and are typically in competition (Harvard Business Report, 2010). In practice, they would relate to the connections and relationships between companies, with the following exceptions:

1. Transactions (sales, acquisitions, loans) based on temporary contracts, although a transaction from a multi-year contract between a buyer and supplier could be an alliance.

2. Contracts connected to activities that are not strategic or significant for the partners. For instance, a multi-year contract for a service provided such as outsourcing (Pellicelli, 2003).

Strategic alliances have the ability to create competitive advantages, as they help to facilitate cooperation in which companies combine some of their resources and capabilities. Studies on strategic alliances in the past few years have recommended that strategic alliance can improve competitiveness, as they contribute to ensuring multidimensional inter-firm system, economic value adding, and inter-organizational management. Furthermore, strategic alliances are a fundamental source of learning and resource-sharing and are therefore able to promote competitive advantage within a saturated marketplace through the strengthening of knowledge and cooperation (Akhter & Belal Uddin, 2011). One must note, however, that it is not entirely feasible for a company to achieve a comprehensive competitive advantage by itself, as it may not possess all the required resources and knowledge to be innovative and entrepreneurial in a highly dynamic competitive market (Kuratko, 2001). Likewise, Inter-organizational affiliations create the possibility to share capabilities and resources of firms whilst effectively working with partners through strategic alliances to develop additional capabilities, knowledge and resources and thereby enhance competitiveness of the firms.

The success of alliances is reliant on many factors, chief among which is persuasion amongst the partners for coordination and cooperation of activities regarding organizational behavior. Additionally, one needs to consider the decision-making process in order to identify suitable alliance structures that are needed for alliance development. (Tiessen and Linton, 2015). The overall objective of having a strategic alliance is the ability to share resources, reduce total risk and ensure the achievement of competitive advantages. A competitive advantage that has been created through a cooperative strategy is defined as a rational or collaborative advantage (Teng and Das, 2001). To illustrate, competitive advantages

considerably influence the organization's market success: by using financial or technological competencies, organizations can ensure competitive advantage and achieve customer value. Moreover, such things as educational and practical experience provide an essential dimension in competitive advantage, as knowledge becomes integral to facilitating improvements within the internal and external business environment (Belal Uddin & Akhter, 2012). Lastly, the ever-growing global economy and technological revolutions are example of factors challenging organizations to frequently upgrade and foster their current competitive advantages whilst they develop or discover new ones to sustain their strategic competitiveness (Harvard Business Review, 2014).

Comparative advantage as source of competitiveness. Based on Hecksher-Ohlin's theory, it is recognized that a country's comparative advantage is principally determined by its endowment ratios relative to the rest of the world (Anderson, 1995). For Peru, the ultimate factor of comparative advantage is its endowments of energy resources per capita, mineral and agricultural land in comparison to other countries (Havrila & Gunawardana, 2003). From this perspective, there is a mutually beneficial relationship between comparative advantage and competitiveness. In fact, both competitive advantage and comparative advantage have highlighted the importance of production factors in building competitiveness for industries and firms (Porter, 1990). The theory of comparative advantage emphasizes that companies should take advantage of their comparatively abundant resources in order to strengthen competitiveness and lower the overall cost and expenses of the company.

There is, however, an issue that arises when enterprises rely too heavily on their comparative advantage without taking the effort to differentiate the resource. In his report on trade intensity of comparative advantage, Vollrath (1991) noted that often times, many countries trade the same commodities with different countries, which is a nod to the fact that differentiation must exist if the same product is made attractive to different end users for

different reasons. Companies can differentiate on the basis of price, location, quality or design, amongst other things, which can help to make a comparative advantage more competitive. Companies must therefore identify a way to utilize their comparative advantage in a competitive way to gain an edge over other rivals that have the same access to such resources.

Utilization of market positioning to boost competitiveness. In today's media centric society, it is imperative that firms regulate and monitor their social image as it is perceived by their consumers, suppliers and key stakeholders. A company's actions can directly affect a firm's image and reputation, while simultaneously impacting the awareness and opinions that people may hold about the company (Mattera & Baena, 2012). Consumers expect firms to comply with their ethical and philanthropic endeavors over and above their expected compliance and obligations to legal constructs and regulations. Thus, by implementing CSR strategy, a firm can influence the way in which stakeholders perceive the company, and can try to encourage the positive perception of its brand.

The way a company chooses to conduct business and how it is related to key stakeholders can have a direct impact on corporate reputation. Implementing CSR into formal business practices can facilitate a learning process that stimulates stakeholders' interests in the innovative process. Such synergy can generate new products, services and innovative practices that then lead to a higher level of competitiveness. Companies who are committed to CSR initiatives and activities tend to foster a higher degree of public loyalty and trust. Any changes to an existing relationship between CSR and strategy-related elements can affect any of the other elements in their surroundings. Therefore, it can be concluded that CSR stimulates a positive ecosystem which is highly beneficial for companies seeking to improve corporate reputation and competitiveness.

The implementation of CSR strategy can directly influence competitiveness due to the latter being able to enhance the sustainable development of corporate goals through a corporate strategy (Ljubojevic, Maksimovic, 2012). Strategic CSR can be divided into three principal areas: value creation, resource-based view (RBV) and competitive advantage. Value creation for stakeholders and the company is created by considering the relationship between CSR and strategic interests of the company. The purpose of CSR is to create value for companies in terms of economic performance. From an RBV perspective, knowledge pertaining to the place and role of CSR in the light of its strategic resources and capabilities can become a source of competitive advantage. Moreover, CSR can serve as a tool to discover new sources of knowledge and can improve the process and the structure of the company to turn it into an additional source of company competitive advantage. Finally, companies seeking to achieve a sustainable competitive advantage should implement CSR, as such a strategy aims to secure business opportunities and effective management of internal operational processes. This kind of strategic step will help companies to comply with the demands of external stakeholders and groups pressuring the organization.

CSR activities that focus on sustainability can lead to the reduction of organizational costs and risks (Battaglia, Testa, Frey, 2014), as high initial investments will pay off over time due to the cost savings derived from more rational consumption of natural resources, lower expenditures on litigation and insurance costs. Cost and risk reductions can also be achieved if CSR is focused on sustaining good relations with the community in which they operate. Contributing to the overall improvement of community life can help to facilitate tax advantages and reduce the level of regulations imposed on a firm. Finally, CSR can be a driver for innovation through the use of social, environmental or sustainable values which can lead to the creation of new business models, products, services, processes and market opportunities.

Those customers who demand higher standards might be beneficial for a company who wants to become a leader amongst its rivals and is seeking to sustain the loyalty of its customers (Bent, 2013). If that is the case, the company should diversify production lines using fewer resources, as product diversification will provide a company with a new market to satisfy the unmet needs of customers at the bottom of the economic pyramid. Ultimately, if a company is able to treat the issue of sustainability as part of their strategic vision, they will discover both risks and opportunities associated with this factor. If an enterprise is able to envision an opportunity and incorporate it into their core activities as a profit-making exploit, they can strengthen their competitive advantage. Lastly, the current and future trends show that sustainability is a fundamental part of the operating context for any company; Businesses have a choice to either ignore it, or use it as an opportunity to build the best future for their business.

Deriving competitive advantage through intellectual capital. Competitive advantage is considered to be a part of the foundation for high-level performance (Ismail, Rose, Uli, 2010), which can ultimately be affected by such variables as age and size. Nevertheless, having examined the moderating effects of such variables, the regression analysis of Ismail, Rose and Uli (2010) confirms that the age of firms is the only significant moderator in the relationship between competitive advantage and performance. This outcome can be explained by the fact that experience comes with age, and organizations that have such experience are more able to improve their overall performance when given an equal competitive advantage level. When firms become older, their experience allows them to perform better than before, according to their own perceptions. Figure 16 shows how age can be considered a positive factor for facilitating more efficient manufacturing capabilities and processes which translates into higher returns on investments and performance.



Figure 16. Estimated Marginal Means of Performance (Age of Firms). *Ismail, A., Rose, R., Uli, J. (2010)*. The relationship between organizational competitive advantage and performance moderated by the age and size of firms (2nd ed., Vol. 15, Rep.). Selangor, Malaysia: Asian Academy of Management.

If a new firm enters the market, they must benchmark themselves against old firms to improve their level of competitive advantage as well as to establish a more efficient organizational culture and hierarchy. This benchmarking process ensures that new firms are not left behind in terms of their overall performance. Moreover, it is important to analyze an external environment before entering the market, as company's must be able to measure up and attain achievable levels of competitiveness amongst current rivals if they are to survive and thrive within the industry.

Competitive advantage is regularly associated with profit making and performance, whereby most organizations fail to recognize that competitive advantage is not limited to financial performance and shareholder values, as both are usually a short-term measurement. Today's globally competitive environment requires businesses to be more dynamic, responsive and flexible, shifting the objectives of the organizations from profit maximization to value maximization. Hence, the value of the organization can be generated through intangible assets such as intellectual capital which, in a knowledge fueled economy, has become more crucial than financial profit. Competitive advantage is built over time through

several aspects, chief among which are organizational image and integrity. Furthermore, considering that many organizations' economic and productive capacities rely more on their intellectual capabilities than tangible assets, it is widely recognized that the performance of any organization is heavily dependent on employee' knowledge. Such knowledge based value leads to the idea that intellectual capital represents an organization's inimitable and non-transferable resources as appreciated in Figure 17.



Figure 17. The relationship between firm intellectual capital and the competitive advantage. Kocoglu, I., Imamoglu, S., & Ince, H. (2009). The relationship between firm intellectual capital and the competitive advantage (2nd ed., Vol. 3, 2009318469 , Rep. No. 181-208). Journal of Global Strategic Management.

To become aware of an organization's sources of sustained competitive advantage, it is necessary to build a model that assumes that organizational resources have the potential to be heterogeneous and immobile (Barney, 1991). Nevertheless, not all organizational resources can sustain continuous competitive advantages. Instead, it is essential for an organization to have four main attributes: a) it must be valuable, in the sense that it takes opportunities and eliminates threats within an organizational environment b) organizations

must be unique amongst existing and potential competitors c) organizations mustn't be imitable, and d) there must be no equivalent substitute for valuable, rare and imitable resources that an organization may have. These attributes can be considered as empirical indicators of how diversified and immobile an organization's resources can be, and how they are essential to generate a sustained competitive advantage.

Competitiveness and State Owned Enterprises (SOEs). It is important to understand the degree to which state-owned enterprises can affect the level of competitiveness of a firm, so that one may discern the advantages of different forms of ownership. SOEs can be defined as “any corporate entity recognized by national law as an enterprise, and in which the state exercises ownership” (OECD, 2015, P.6). As such, the ultimate purpose of such enterprises is to maximize the value for society through the efficient allocation of resources (PricewaterhouseCoopers, 2015). Smith (2001) describes the rationales behind the development of SOEs that move beyond the mere transfer of revenue to the state to further create social benefits for the country in question:

- The creation of jobs in strategic sectors.
- Increasing capital investment, especially in terms of infrastructure.
- The control of inflation.
- The effective control of industries that are susceptible to natural monopolies so that consumers may be protected from inefficiently high prices, and to guarantee a reliable supply of said good or service
- The promotion of regional development within Less Developing Countries (LDCs).

In addition to the above rationales, one must consider that in most cases, SOEs are entitled to privileges and immunities from the government that are not made available to privately-owned competitors (OECD, 2009). These factors can help to increase an SOEs competitive advantage over their rivals. Nonetheless, such advantages do not consider such

factors as better performance, superior efficiency and technology or management skills, but are rather government-created advantages that cause a distortion of competition in the market. Preferential treatment by the government to SOEs may take the form of favorable lending rates compared to the private sector. This kind of treatment may have the same effect as an implicit subsidy. Governments may utilize public resources to provide SOEs with lower borrowing rates than market rates. SOEs also usually benefit from discriminatory regulation, tax discounts or may be immune from antitrust. A product diversified SOEs can use the economies of scale to create high barriers to entry that effectively decrease competition by efficient competitors.

While many of the above rationales behind the creation of SOEs were meant to boost economic efficiencies and effectiveness within a given nation, many theorists suggest that public ownership has, in fact, proven to be ineffective. Property Rights theory of firms supports this sentiment by postulating that public enterprises perform less efficiently and less profitably than private enterprises (Boardman & Vining, 1989). While SOEs may be able to offer positive social externalities, it does so at the cost of reducing competitive behaviour of a firm. Such inefficiencies are generated by what Smith (2001) deem as the “ownership effect” and “competition effect”. The former relays that public ownership typically translates into a reduction in incentives for good management performance, as well as minimal incentives to monitor such performance. In analyzing the key factors that contribute to this issue, one can determine that such things as managerial appointment through politics, rather than merit, can hinder the effectiveness of management. Moreover, as SOEs are owned by the state, each citizen acts as a key stakeholder within the enterprise, and therefore “the return to any one citizen as a result of monitoring would never be greater than the opportunity cost of the time invested in such activities” (Smith, 2001, p.221). In terms of the competition effect, it can be said that as monopolies, state-owned enterprises generally operate in the absence of

competition, as an enterprise is driven by social utility rather than profit maximization (Smith, 2001). Furthermore, competition generates productive efficiencies within firms, as price is controlled by the market rather than the firm. Therefore, as companies compete on the basis of price, they must find innovative and productive means to drive down costs in order to survive. SOEs, on the other hand, do not feel the pressure of being priced out of the market, and therefore do not have the same incentives to increase their productive efficiencies.

In analyzing the effects of state ownership on the competitiveness of firms, it can be concluded that public corporations are, for the most part, more inefficient than their privatized counterparts. There is, however, the question of suitable substitutes for such enterprises within developing countries, as successful privatization requires a particular environment that is often not available in LDCs. According to PricewaterhouseCoopers (2015), SOEs within developing nations are overly exposed to corruption, bribery and inefficiency. Furthermore, within developing nations, state-owned enterprises are increasing in popularity, as can be appreciated in Figure 18. Therefore, in the absence of a stable political system and an effective competitive private sector, SOEs must find alternative ways in which to become effective enterprises within their country.

In the interests of maximizing value creation for SOEs, the Organization of Economic Cooperation and Development (OECD) created a set of guidelines on corporate governance of SOEs. These guidelines are a set of internationally agreed upon standards for governments to ensure that state-owned enterprises operate efficiently, transparently, and in an accountable manner (OECD, 2015): The first principle is to establish a clear purpose and mission that is linked to a desired social and economic objective. Second, it is important that upper level management comply with the 4Cs of clarity, capacity, capability and commitment to integrity. Third, there needs to be transparency and accountability for financial and

performance indicators, and lastly, to synergize with other stakeholders in society (universities, citizens) who can provide guidance to the direction of the SOE (PricewaterhouseCoopers, 2015). By following these guidelines, public enterprises within developing nations may be able to exercise control and clout over and about their privatized counterparts, which will aid in furthering their level of competitiveness.

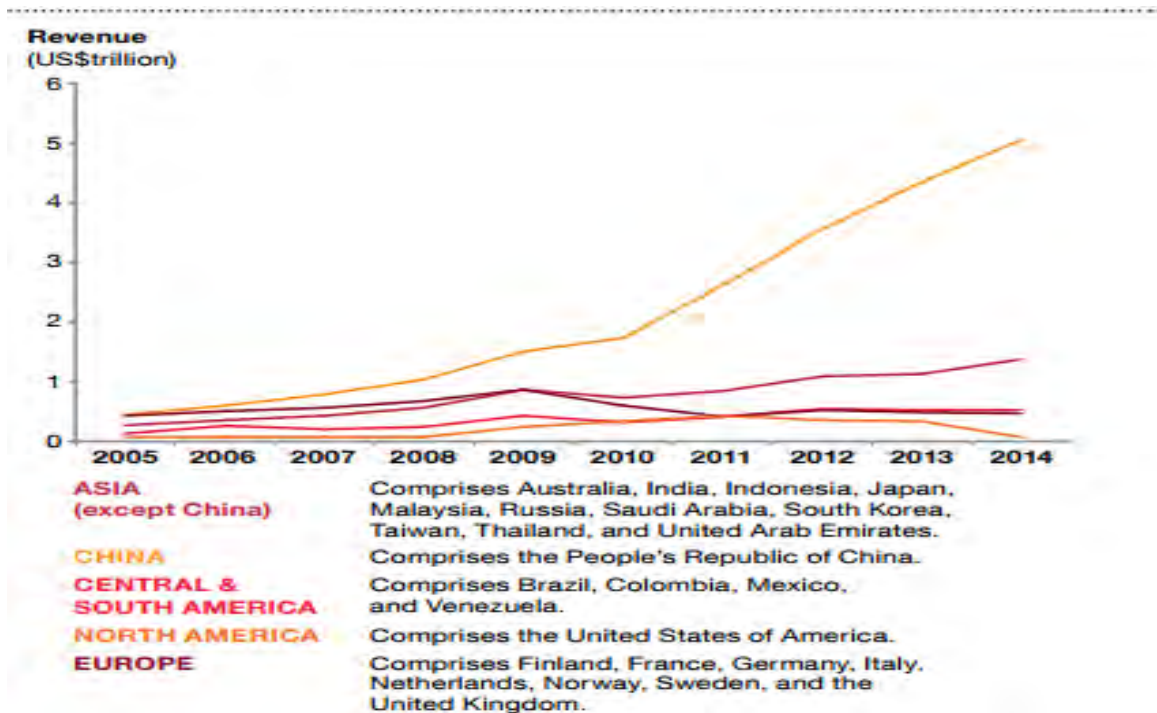


Figure 18. SOEs contribution to Fortune 500. Sturesson, J., McIntyre, S., & Jones, N. (2015). State-Owned Enterprises Catalysts for public value creation? (Publication). PWC. Retrieved from: <https://www.pwc.com/gx/en/psrc/publications/assets/pwc-state-owned-enterprise-psrc.pdf>

3.3 Conclusions

In summation, there are many different ways in which a company can become competitive in today's oversaturated marketplace. It is critical that an enterprise understand its strengths, as well as to evaluate its weaknesses so that it may be able to emphasize what it does well as well as to improve what is inadequate. Facets of competitiveness must therefore be individually analyzed as they pertain to a particular industry in order to ascertain the degree of importance of each given factor.

Firstly, in the wake of the third industrial revolution, technological advancement has become an important factor in attaining competitive advantage. Modernization of such things as machinery and equipment can become an equalizer amongst competitors, as it affords companies the opportunity to become more productive and efficient, as well as aid in achieving economies of scale. Second, strategic alliances are becoming a popularized vehicle by which companies can become more competitive, as they offer a fundamental source of learning and resource sharing to each of the players involved. Strategic alliances are therefore an efficient way to diversify offerings, and to learn new methods that will, in turn, boost competitiveness of the firms involved. A third factor contributing to competitiveness is comparative advantages, as they offer firms an opportunity to be competitive through means not created by the company, but rather through naturally occurring factors within a particular environment. In this way, companies are able to produce goods and services at a lower opportunity cost than other economic actors, which provides them a competitive edge within the sector in which they operate. A further consideration is the way in which marketing can affect competitiveness, especially as it pertains to CSR. The above studies have underscored how CSR can strengthen public visibility and boost brand image, and consequently boost overall competitiveness within an industry. Furthermore, it is important to acknowledge the importance of human capital and experience as it relates to competitiveness. Studies have indicated that organizational competitiveness is more dependent on intangible resources rather than tangible assets. Thus, organizations who are seeking competitive advantage within a highly competitive industry should recognize an opportunity to become leaders by improving their human capital, knowledge, and experience. As a final note, it is imperative to acknowledge the type of influence that ownership exercises over a particular enterprise, as there are vast differences in the competitive landscapes between privatized and publicly owned firms.

Chapter IV: Qualitative and Quantitative Analysis

4.1 Qualitative Analysis

As mentioned in Chapter I, although SIMA's image as a socially responsible company is greatly appreciated by its workers, it has not been used for promoting the brand properly. Moreover, increasing competence in the local market of metalworking will demand that companies exploit their capabilities and remark on their competitive advantages.

The dramatic and lamentable consequences of the 2017 phenomenon of El Niño presents an immense opportunity for construction companies. Much of Peru's core public infrastructure was damaged and will therefore receive priority attention from the government for their reconstruction. SIMA, as a heavy metalworking specialist, has not only the resources but the experience in metal infrastructure projects that will become heavily demanded in the coming months. Furthermore, being involved in reconstruction projects can have a positive effect on SIMA's image that can thusly improve their market position.

Private companies have already expressed interest in working on reconstruction projects for the state in an attempt to not only gain profits, but also to contribute socially to the country, which could subsequently boost the company's public image. Furthermore, these companies have the Peruvian legal framework of *Obras por Impuestos*, which allows them to work on the exchange of taxes, meaning an almost zero opportunity cost.

Many companies have already approached the Reconstruction Agency in order to offer their own bids in attending to the infrastructure damage throughout the country. Moreover, Pablo de la Flor has indicated that there has been one company that has demonstrated interest in building 40 bridges through the *Obras por Impuestos* framework (Gestion, 2017a). This demonstrates how companies are not only aware of the possibility to consider projects given by Proinversion, but to develop their own initiatives for presenting them to Regional Agencies of the State. Pablo de la Flor has also indicated that up until July

2017, 735 million of the total budget for prevention has already been transferred from the national government to regional governments (Gestion, 2017b). This budget should be quickly executed in the coming months of 2017 since they have the goal of preventing future damages from the quickly approaching rainy season that starts in December.

One must note, however, that the old machinery and equipment used within SIMA drastically reduces the competitiveness of the company. Competitors who do not have political support nor major constrictions, have chosen to invest their profits into the renewal of technology, which has increased their productivity and efficiency. The following rivals of SIMA have been identified and will be analyzed in Table 17 as follows: FIMA, CEMPRO TECH, HAUG, ESMETAL and TECNICAS METALICAS. It is important to mention that none of the aforementioned companies have the current capability of building modular bridges, which are temporary structures that are presently bought from China or the United States. Nonetheless, for the quantitative calculations, such structures have been taken into account since it is considered that companies in Peru will take the opportunity to develop the capability of building modular bridges due to its future demand.

4.1.1 The McKinsey 7.

The McKinsey 7 framework can be applied to a situation to evaluate if the implementation of a strategy is consistent with the day-to-day operations of a company. In the case that it is not, changes will have to be implemented to allow the strategy to align with reality. As can be appreciated in Figure 19, the framework is broken down into a set of hard and soft skills, where the former is comprised of strategy, structure and systems, and the latter is made up of shared values, skills, style and staff. The report will therefore analyze the aforementioned factors as they pertain to SIMA in order to assess the alignment of strategy to company operations.

Table 17
Description of The Main Competitors

FIMA.	
<i>Foundation</i>	1969
<i>Services</i>	FIMA specializes in engineering services and manufacturing, as well as installing and operating equipment and metallic components for the following productive sectors: mining, energy, gas and oil, hydrocarbons, fishing, agri-industry, metallurgy and construction.
<i>Facilities.</i>	Four plants, two in Callao, one in Lima and one in Arequipa
<i>Equipment</i>	Rolling bridge crane with different capacities for all ships (maximum combined capacity up to 64 Tons) and Auxiliary cranes in all the areas. One Blasting camera with a system for blast recovery, system cleaning, sleeve filters and others to ensure zero contamination. Vertical lathe with a capacity up to 6,300 mm. Horizontal CNC machinery with different capacities. CNC horizontal machining centers. CNC vertical machining centers. Generating machines for gear boxes. Radial Drills. Equipment for multi-purpose welding for GMAW, GTAW, FCAW and ASW processes. Equipment for submerged arc welding (SAW). Equipment for orbital welding. Manipulators, positioners, rotators Machine to cut and perforate CNC sheets. Sheers to cut CNC sheets. CNC bending machines. CNC rolling machines. Machine to cut and profile CNC pipes. Saws to cut materials that are not flat with programmed timing
HAUG.	
<i>Foundation</i>	1949
<i>Services</i>	Design of basic and detailed engineering, fabrication and erection of storage and process tanks, structures and mechanical metal parts of all types including plate works, spanning an ample array of engineering, construction and assembly services.
<i>Facilities.</i>	Two plants, one in Callao (30,000 m2) and another in Lurin (31,000 m2).
ESMETAL	
<i>Foundation</i>	1996
<i>Services</i>	Structural steel fabricator, focuses on mining and energy projects, infrastructure, commercial and industrial buildings. The company specializes on steel structures for mining buildings, on & off shore structures, gas liquefaction plants, hydro & thermal power plants, bridges, refineries, tanks and platework
<i>Facilities.</i>	Two plants, one in Callao (30,000m2) and another in Lurin (31,000m2).
<i>Equipment</i>	2 Peddinghaus CNC beams processing line. 2 Peddinghaus CNC base & connection plates processing line. 1 Peddinghaus CNC beam coping line 2 Automatic band-sawing machines for beams 2 Automatic shot blasting lines Airless-spray painting equipment, Ultrasonic equipment for quality control, Bar coding software, printers and scanners
CEMPRO TECH	
<i>Foundation</i>	1998
<i>Services</i>	Development of Conceptual, basic and detail engineering. Supply and fabrication of steel goods. Electromechanic Building, Civil infrastructure and specialized maintenance. The company has attended clients from the Mining, Energy and Construction industries.
<i>Facilities.</i>	One plant (50,000 m2) in Lima.
<i>Equipment</i>	Tower Crane of 10 Tons and 45 m of arm. For in-situ working Truck cranes of 12 Ton. 2 Cranes of 90 Ton Plate rollers of 3 inches thick. 600 Tons press. 4 Shot Blast Chambers with 8 painting chambers. 10 horizontal lathes (up to 9m long and 5.5m turning). 2 vertical lathes. Milling machines, Radial drills.
TECNICAS METALICAS	
<i>Foundation</i>	1979
<i>Services</i>	The company offers Metallic Fabrication for Mining, Commercial and Industrial Sectors. Their business lines are Modular Constructions, Electro Mechanic Erection and Installations, Telecommunications and Energy, Transportation and Bridges, and Hot Dip Galvanized.
<i>Facilities.</i>	One plant in Lima (52,802 m2).
<i>Equipment</i>	Profiles Cutting and Punching Automatic CNC Steel Plates Plasma Cutting and Punching line CNC Automatic Process for beamline, wide flange profiles and three plates built up sections Beam Automatic Process Module Production workshop in Lima Hot Dip Galvanizing Facility Superficial Treatment and painting area Shot blast automatic and semi automatic chambers Mounting Structure tools and equipment.

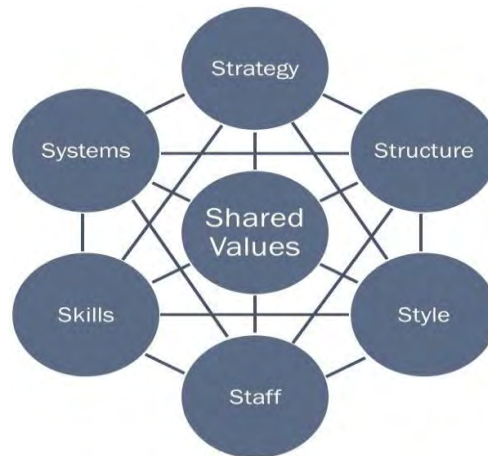


Figure 19. The McKinsey 7 Framework. Retrieved from: <https://whittblog.wordpress.com>

Style. Style relates to the company culture of the organization in question. In regards to SIMA, the company culture is quite rigid due in part, to the naval composition of management, as well as to the structure of ownership of the firm. Cunha and Cooper (2002) examine the differences in organizational culture between SOEs and private firms through the representation of competing values between market orientation and organizational integration, as well as people versus performance orientation. As a state-owned enterprise, SIMA's values are positioned towards organizational integration and performance-based orientation, which means that common goals and clearly defined responsibilities are of greater importance than competitiveness and performance based promotion. Therefore, SIMA's corporate culture becomes quite rigid in order to ensure equality amongst its workers, as well as to draw a clearly defined line between upper management and subordinates. Moreover, their lack of competitive vision reinforces the company's rigidity, as innovative practices and ideas are overshadowed by the social goals of the company.

Staff. The employees at SIMA act as the backbone of the organization, and are essential assets that contribute to the company's reputation. Human Resource Management is therefore an integral factor to consider when implementing any strategy, as it will inevitably have a trickle-down effect that will change the way in which workers perform their daily activities. In regards to SIMA, workers are underpaid comparative to similar countries within

the region, which significantly contributes to the high employee turnover rate of 50-75% (Cruzaco, personal communication, June 22, 2017). Results from a study by Abbasi and Hollman (2000) indicated that excessive employee turnover can have far reaching consequences that may jeopardize efforts to attain organizational objectives. Furthermore, profitability is often impacted by the consistent departure of workers, where employers cited “recruitment costs of 50-60% of an employee's first year’s salary, and up to 100% for specialized, high-skilled positions” (Ramlall, 2003, p. 64). SIMA must therefore work to increase employee retention so as to minimize the costs incurred from finding new hires, as well as to benefit from a more productive labour force. SIMA must look to provide its employees with benefits, as well as to provide training seminars and workshops. The company must also identify those employees who are critical to the success of organizational objectives, and be able to continuously understand and meet the needs of these employees. Furthermore, as part of their long-term strategy, SIMA will be looking to modernize their engineering and technical equipment, and must therefore focus on scouting highly skilled workers that are able to work within a specialized niche function.

Systems. As previously mentioned in Chapter I, SIMA suffers from a lack of modernization in terms of their information systems. Presently, SIMA’s capacity to implement strategic change in terms of competitiveness of their metalworking sector is limited, due in large part to the lack of sufficient engineering technologies and systems. In an interview with Carlos de Izcue (2017) it was noted that SIMA has not yet invested in 3D engineering software that would enable them to solve their client’s problems. Currently, SIMA receives blueprints from their customers in order to create heavy metal structures. The issue with this is, however, that SIMA should be providing solutions to their clients by creating their own blueprints, rather than having the solutions provided to them. This lack of IT equipment is severely impacting the competitiveness of the metalworking sector, as many

of SIMA's domestic competitors have adopted new technologies that enable them to efficiently and effectively design metal structures for clients.

Structure. SIMA's corporate structure is strictly hierarchical, as they are a state-owned organization that is monitored by the FONAFE board of directors. This centralized control has caused many issues within SIMA that have hindered their ability to become a competitive force within the metalworking sector. The social implications that come from being state-owned reinforce the company's tendency to want to serve the needs of the public above and beyond the desire to be competitive. When comparing privatized companies to state-owned ones, it is clear that financial motives and incentives drive the former, while social factors influence the latter. As a company that continually strives to create jobs for the economy, and to support the Navy of Peru, SIMA does not have the goal of profit maximization, which hinders its ability to make necessary technological updates or to pay their employees a competitive wage. Furthermore, management contracts are only given in two year increments, which dampens the long-term goals of the company. The structure of the company is thusly playing a large role in hindering the competitiveness of the firm. In order to be able to implement strategic change, SIMA will have to move towards a more decentralized form of authority, and to perhaps try to privatize their metalworking branch so that they can gain more control of finances and procedures.

Skills. The skills of a company refer to the central competencies or know-how of the corporation. When analyzing the skillset of SIMA's employees, it is pertinent to note that the company acts as a training facility in which knowledge is transferred throughout the company in order to sustain SIMA's reputation. As a company that is known to build quality structures and sustainable infrastructure, SIMA's employees are very skilled in the work that they do. The issue, however, is that productivity is very low within the company, which hinders their ability to be competitive amongst more efficient metalworking companies. SIMA does not

have the same technological capacity as most of its competitors, and must therefore employ a large amount of manual labour to complete tasks. Therefore, while the quality of the employee's work is seamless, it is done in a less productive manner than those who have fewer workers operating modernized equipment.

In terms of the skills of upper level management, SIMA often suffers from a lack of job specific knowledge from their senior level staff. With protocol enforcing that management positions be filled by ex-marines, SIMA fails to hire people with specialized training within a particular field that could help to facilitate better transfer of knowledge and skills. To become more competitive, SIMA needs to hire those individuals who can understand the totality of their particular sector, and thusly impart specialized skillsets to their workers to help facilitate better training and comprehension.

Shared Values. As a SOE, SIMA must integrate corporate governance as part of the company's DNA, which means that the firm must ensure that principles of transparency, accountability and ethics are all commonly shared amongst employees. These shared values are integral to how the company chooses to operate, as their primary goals are not to seek profits, but to be accountable to the country. While these values are, indeed, essential to helping a company sustain a competitive advantage, it does not encompass a major factor that helps companies to attain top status. Profit is an integral factor that motivates companies to continually innovate and improve, and must therefore be incorporated into the values of SIMA in order for their metalworking line to achieve competitive status. Without the drive for profit, SIMA will continue to lack the technological prowess that its rivals have achieved, and will thusly lack the marketability to win metalworking bids in the future.

4.2 Quantitative Analysis

4.2.1 Market analysis.

It is important to preface this particular section by noting that this analysis faced some limitations due to the recentness of the events. Proinversion, the investments projects agency of the state, only offers limited reconstruction projects due to El Niño. This is because, according to phone calls with the Transportation Ministry (2017), they are still developing a damage register for the offering of future projects. According to Pablo de la Flor, Director of the Reconstruction Project Agency, this register will be formally delivered to the public on September of 2017 (Gestion, 2017). The objective is therefore to calculate the size of the market of metallic structures (mainly Bridges) that SIMA will have available in the years spanning from 2017 to 2020 within the legal framework of *Obras por Impuestos*. It is thusly necessary to first estimate the future market of projects as a consequence of El Niño and then add them to the already existing projects in the Proinversion Data.

First, a calculation will be carried out about the possible size of the market for metallic bridges due to the reconstruction efforts. Second, an estimation will be made as to how many of those bridges could be offered in a *Obras por Impuestos* legal framework. Finally, calculations will be taken from the Proinversion Data to quantify the amount of metalworking projects already available in the affected regions of the country under the *Obras por Impuestos* contract modality.

Size of the reconstruction market for metallic bridges. Appendix E shows a draft obtained from Provias, which is a state agency in charge of national transportation roads, with highly strategic information. This appendix shows (a) the future bridge projects for the remaining months of 2017 until 2020 and their planned assigned budgets, (b) the regional location of the future bridges, and (c) general characteristics of the main future bridges.

Figure 20 shows the future bridge project budgets to be offered by the state from 2017 to

2020 as a consequence of El Niño. Moreover, modular bridges are normally developed with heavy metal structures. Nevertheless, in projects of this nature, profits are around 10% to 12% of the total budget and the tax over the sales is 18% in Peru. Therefore, it would be considered that only 70% of the proposed budget for modular bridges could be seen as a potential market for SIMA.



Figure 20. Future projected intervention budget in the National Reconstruction Project. Adapted from a Provias Draft on Appendix E

Definitive bridges budgets can be constructed with one of two main structural materials: (a) structural steel, or with (b) concrete. Therefore, it is first necessary to determine

the proportion of steel bridges related to the total quantity of bridges. According to Provias (2013) the total number of bridges in Peru was tallied at 2,227 until 2013, where 870 of them were artisanal provisional bridges. Therefore, the number of concrete and steel bridges totaled 1,357. According to SIMA's annual memory, 90% of steel bridges in Peru have been built by SIMA (SIMA, 2017a). Furthermore, SIMA has constructed around 300 bridges in total, which therefore brings the number of steel bridges to an estimated total of 330. Finally, with such figures, it can be estimated that around 25% of the bridges within Peru are built with structural steel.

For determining an estimate of the amount of metal work in bridge projects, two ratios were adopted for definitive and modular bridges in function with the quantity of steel demanded for each kind of bridge. Furthermore, the public budgets of two bridges shown in appendix F were analyzed to establish the proportion of metalworking costs to other labour and service values. In those, it can be appreciated that around 40% of the total budget of steel bridges is a direct cost of metalwork. This can be verified in Table 18. Definitive steel bridge budgets are composed largely of other materials and activities, and as such, it would be taken at a lower rate than modular bridges. Consequently, in the case of definitive bridges, there would be an estimated rate of 10% (40% of 25% because of the previous explained ratios) of the government's projected budget as SIMA's potential market size for definitive bridges.

Table 19 shows the final market size for SIMA for the years 2017 to 2020: 806 Million Soles.

Table 18
Analysis of Budgets of Definitive Bridges CHIVIS and PUELLAS

Definitive Bridges	Bridge Budget	Direct Cost of		(A/B)	(A/C)	(B/C)
	in Million Soles (A)	Metalwork in Million Soles (B)	Tons of Metal (C)			
CHIVIS	1.37994899	0.55423695	54.34	40%	39	98
PUELLAS	1.42076085	0.55446624	54.34	39%	38	98

Table 19

Total Market of Bridges of the National Annual Program of Investments

	Projected Reconstruction budget (Million Soles)				
	2017	2018	2019	2020	TOTAL
MARKET OF BRIDGES (METAL AND CONCRETE)					
Modular Bridges	250	331	120	24	725
Definitive Bridges	191	1381	1179	235	2986
Total	441	1712	1299	259	3711
MARKET OF METAL BRIDGES					
Modular Bridges *	175	232	84	17	508
Definitive Bridges **	19	138	118	24	299
Total	194	370	202	40	806
*Ratio for Modular Bridges : 70%					
**Ratio for Definitive Bridges :10%					

Size of the reconstruction market for metallic bridges in Obras por Impuestos. As outlined in the PESTE analysis in Chapter I, the Prime Minister made mention in an interview that 37.5% of the total budget for bridges would be offered through the mechanism of *Obras por Impuestos*. Therefore, the future market due to El Niño for SIMA can be taken at 37.5% of the calculated market for future metallic bridges. Finally, the total market size of metallic bridges in the framework of *Obras por Impuestos* is shown in Table 20.

Table 20

Total Size of the Market for Metal Bridges under the Contract modality of *Obras por Impuestos*

	Projected Reconstruction budget (Million Soles)				
	2017	2018	2019	2020	TOTAL
MARKET OF METAL BRIDGES - <i>Obras por Impuestos</i> Legal Framework					
Modular Bridges ***	66	87	32	6	190
Definitive Bridges ***	7	52	44	9	112
Total	73	139	76	15	302
***Ratio for <i>Obras por Impuestos</i> : 37,5%					

Size of the existing market of Obras por Impuestos. An analysis was developed through all the available information of projects for *Obras por Impuestos* in the affected Peruvian regions (until July of 2017) for identifying the projects of metalworking presently

available. The research results are shown in Table 21, and have identified a total of 116,220,748 million Soles in available projects, with approximately 49,303,399 million Soles of related metalworking as direct costs. It should be mentioned that this last amount should be taken as an indicator since it does not consider general expenditures, such as management costs, that the company could additionally charge.

Furthermore, Table 21 summarizes the number of benefited individuals for each of the projects according to Proinversion data. Even though it does not provide an exhaustive list of information for every project listed, it generates certain indicators over the total cost of a project and the size of benefited users. This can be used as a reference for estimating the impact of a social project for marketing purposes.

Table 21
Identified Projects in the Framework of Obras por Impuestos offered by Proinversion until July 2017

Region	SNIP Code	Kind of Project	Total project Investment (Soles)	# Users	Investment of Metal building (Soles)	Time lapse (months)
ANCASH	264818	Metal Bridge	353,243	No info	353,243	2
AREQUIPA	260319	Metal Bridge	25,611,966	103,377	25,061,966	12
LAMBAYEQUE	205713	Metal Bridge	541,212	No info	541,212	2
AREQUIPA	172838	Mix Bridge metal/concrete	13,394,613	7,600	161,653	1
AREQUIPA	93130	Metal Bridge	4,089,625	1,530	3,201,861	3
AREQUIPA	191369	Metal Bridge	931,903	No info	931,903	2
AREQUIPA	245819	Mix Bridge metal/concrete	2,808,461	2,797	1,128,996	1
ICA	162525	Mix Bridge metal/concrete	241,135	318	430,389	2
ICA	155652	Mix Bridge metal/concrete	3,719,568	6,619	300,691	6
LA LIBERTAD	61430	Metal ceiling	15,372,184	47,846	2,819,097	6
PIURA	236644	Metal Bridge / partial part of the project	43,730,051	426,898	12,206,381	18
TUMBES	340868	Metal Bridge	1,030,371	No info	1,030,371	1
HUANCAVELICA	184384	Mix Bridge metal/concrete	3,657,357	No info	396,577	3
CAJAMARCA	211359	Metal Bridge	739,059	No info	739,059	2

Total market size of Obras por Impuestos. The final market of projects in *Obras por Impuestos* can be determined by adding the existent market to the market generated by the reconstruction project. Table 22 shows the total market size of *Obras por Impuestos* considering the present and future market created by the National Reconstruction Project.

Table 22
Total Market of Obras por Impuestos for the years 2017 to 2020

Total Market of Obras por Impuestos (Million Soles)					
	2017	2018	2019	2020	TOTAL
MARKET OF METAL BRIDGES - Obras por Impuestos Legal Framework					
Modular Bridges	66	87	32	6	190
Definitive Bridges	7	52	44	9	112
Existent Market	49				49
Total	122	139	76	15	352

4.2.2 Supply analysis.

Table 23 shows the production capacity of the main companies in the heavy metal mechanic industry. This is sensitive information and not every company shares it publicly. For this reason, it was not possible to obtain the maximum capacity, and instead such values were considered through the highest capacity reported by one of SIMA's competitors. SIMA's maximum capacity does not consider the naval construction capacity since it is solely centered on other business activities.

Table 23
Production Capacity of Metalwork in the Peruvian Industry

	Production Capacity (Tons/month)
ESMETAL	2,000
TECNICAS METALICAS	2,400
HAUGH*	2,400
CEMPRO TECH*	2,400
FIMA*	2,400
SIMA**	766
TOTAL per Month	12,366
TOTAL per Year	148,392

* Assumed as the highest competitor reported : Tecnicas Metalicas

**Doesn't count the Naval construction capacity of 944 Ton/month

4.2.3 Demand analysis.

For this analysis, the entire market of metal bridges was considered in regards to any contract modality since heavy metal mechanic companies will have the option to choose any desired public tender (it is not limited to the *Obras por Impuestos* market). Considering the ratios of tons of steel related to the budgets of the real bridge projects in Appendix F, two different ratios have been considered for modular (98 ton/Million Soles) and definitive

bridges (39 ton/million Soles). These ratio calculations are shown in the previous table, with the final demand capacity of metal bridges being shown in Table 24.

Table 24

Projected Public Demand in Tonnes per year due to the National Reconstruction Project

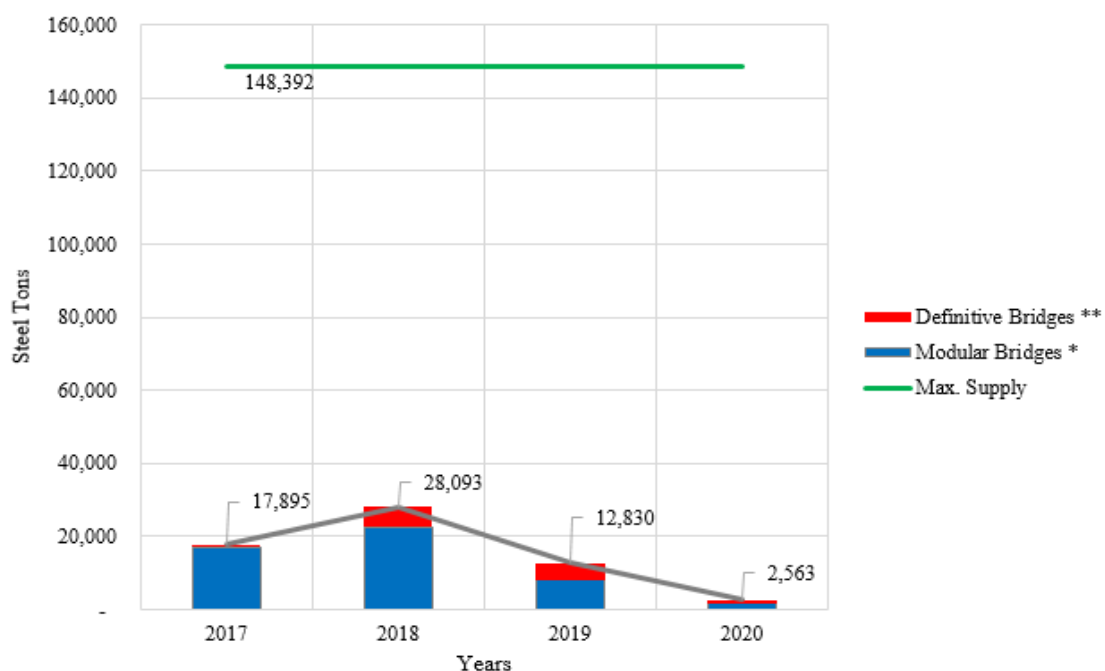
	Projected Reconstruction Demand (Tons)				TOTAL
	2017	2018	2019	2020	
MARKET OF METAL BRIDGES					
Modular Bridges *	17,150	22,707	8,232	1,646	49,735
Definitive Bridges **	745	5,386	4,598	917	11,645
Total	17,895	28,093	12,830	2,563	61,380
*Ratio for Modular Bridges : 98 Ton / Million Soles					
**Ratio for Definitive Bridges : 39 Ton / Million Soles					

4.2.4 Supply versus demand analysis.

The demand of steel bridges previously determined can be contrasted with the annual production capacity of the main companies in the sector for determining if the demand will be satisfied by the existent supply. The full capacity of the main companies was considered for determining how much of their capacity would be required by the National Reconstruction project. Figure 21 shows a comparison between the maximum supply of the industry and the demand generated by consequences of El Niño.

4.2.5 Future demand for bridge infrastructure.

Figure 22 shows the infrastructure gap in Peru, which is estimated to be around US\$87 billion. From this gap, 24% is related to transportation and almost US\$13 billion is related to roadways and bridges. This indicates that in the long-term, the total gap of infrastructure for the country will still demand more from metal mechanics companies. If the present relation between budget for roads and bridges is maintained, it represents around US\$6.2 billion for bridge construction in the next decade. With the same ratios considered in the calculations before, it would imply a demand of around US\$1.3 billion for metalwork in bridges.



Max Supply vs Demand (Tons)					
	2017	2018	2019	2020	TOTAL
Max. Supply	148,392	148,392	148,392	148,392	593,568
Demand	17,895	28,093	12,830	2,563	61,380
% Demanded Capacity	12%	19%	9%	2%	10%

Figure 21. Metal Bridges Demand vs Supply generated by the National Reconstruction Project

Sector	GAP (Million US\$)
Transportation	20,935
Airports	128
Ports	708
Railways	7,308
Roadways and Bridges	12,791
Water and Sanitation	5,335
Water	11,569
Sewage and Wastewater treatment	3,766
Hydraulic Infrastructure	8,682
Electricity	32,987
Electricity	32,297
Hydrocarbons	690
Telecommunications	19,170
Broad Band	11,852
Mobil phones	4,973
Telephones	2,345
Health	478
Education	388
TOTAL	87,975

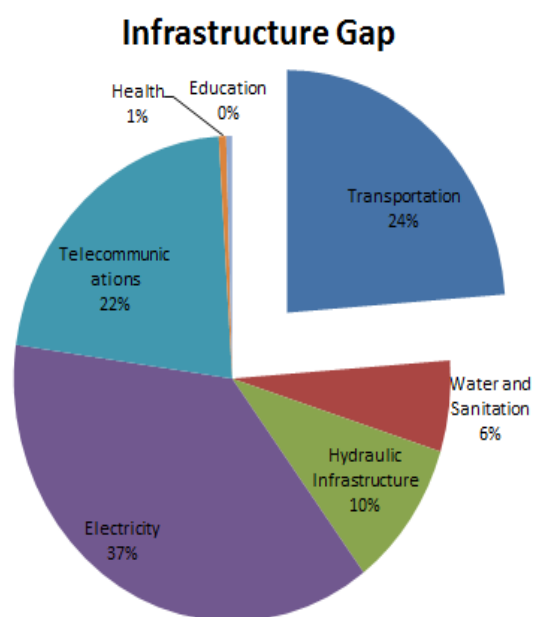


Figure 22. Infrastructure Gap in Peru.

4.3 Conclusions

According to the analysis developed, the national annual program of investments modified because of the last reconstruction projects due to El Niño will generate an increase in demand for metal mechanic companies in 12%, 19%, 9% and 2% in the years 2017 to 2020 respectively. Nevertheless, the country supply is large enough for supporting it. Even though the analysis considers the maximum capacity of the companies, the analysis is accurate since an increase in the demand that represent only 10% of the maximum capacity is manageable in terms of supply.

The market size calculation developed is conservative since it considers only a small part of the total amount of bridges as future metal bridges. It's highly probable that the State will give greater importance to steel bridges since their construction demands less time and often prove to be more sustainable. This situation will present an even better situation for SIMA since it means a larger market in which it can supply. If ratios are taken between the budget invested and individuals benefited, then the total market of *Obras por Impuestos* of 352 million soles represents a possible direct benefit to 325,000 individuals. Nevertheless, those that indirectly benefit from the future use of such projects in much larger in scale.

The previous analysis is meant to provide SIMA with general indicators of the actual state of the heavy metal mechanics market and the future effects of the National Reconstruction Project on their business. It has also provided strategic information about the future characteristics of the bridges required as well as their locations. The perspective demands for SIMA to take immediate measures to prepare an action plan for the future increase in demand on the national supply of metal mechanic infrastructure.

Chapter V: Root-Cause Analysis of the Opportunity

5.1 Identified Causes

Within SIMA, five underlying factors have been determined as the root causes contributing to the lack of competitiveness within the metalworking sector. They have been identified using a fishbone analysis, which aids in detecting the different problem areas within the company that contribute to the overarching issue. The report will therefore analyze how the following factors contribute to SIMA's weak competitiveness within the metalworking division of Peru: workers, management, technology, marketing and strategic alliances. The fish-bone analysis is shown in Figure 23.

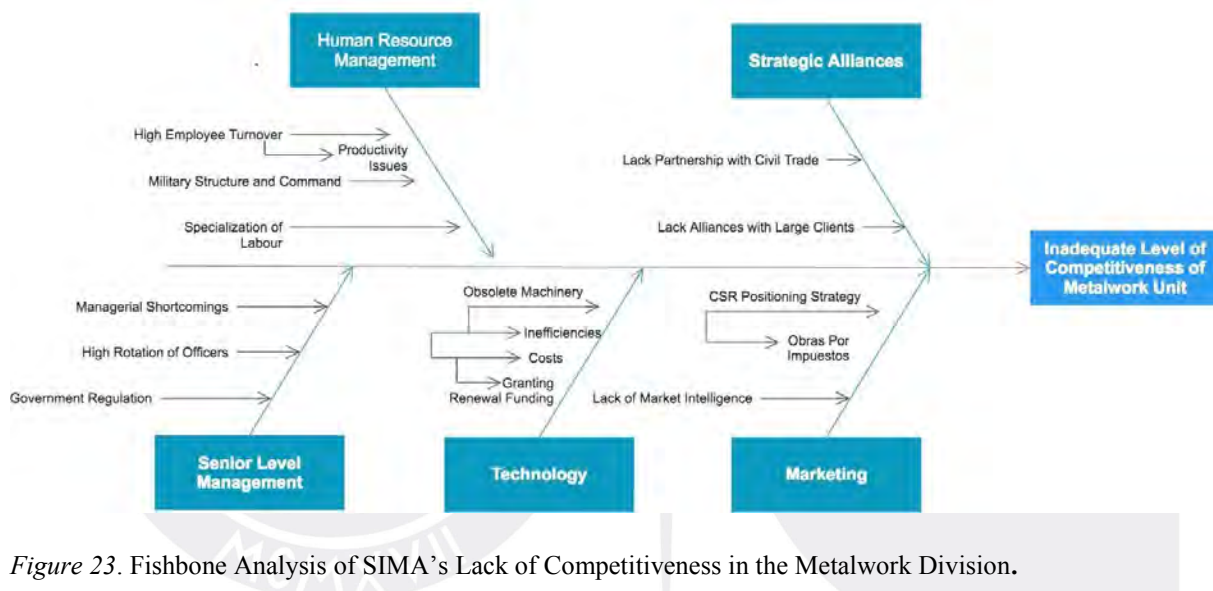


Figure 23. Fishbone Analysis of SIMA's Lack of Competitiveness in the Metalwork Division.

5.1.1 Human Resource Management.

High employee turnover. Employee turnover within SIMA is a highly pervasive problem throughout the company, where labour tends to be quite transient due to low wages and insufficient benefits or rewards. SIMA's minimum wage of US\$259 is, in fact, well below that of its other Latin American counterparts, where Ecuador's minimum salary is US\$366, in Chile US\$373 and in Panama US\$529 (FIAGH, 2016). Furthermore, SIMA does not have a large enough budget to be able to offer its employees extrinsic rewards or benefits that could help to motivate workforce productivity. In a meeting with an HR executive of

SIMA, it was noted that only small benefits, such as family programs, were given to those staff with the most loyalty, experience or seniority. SIMA therefore fails to consider other valuable indicators such as productivity or employee competency, which may help to encourage improved performance and foster a more constructive work environment.

Therefore, due to SIMA's uncompetitive salaries and rewards, the company faces a high turnover rate of most of its main employees, whereby 50% and 75% of skilled professionals leave the company (Cruzaco, personal communication, June 22, 2017). The company therefore faces immense challenges in maintaining optimal results, in that personnel continuously demand higher salaries in a sector clinched by bureaucratic policy that makes the retention of top talent difficult to come by.

One of the indirect consequences of high employee turnover is its negative effects on company productivity. Firm Specific Human Capital Theory (FSHC) proposed by Becker (1975) asserts that excess employee turnover has negative implications on productivity due to the loss of productive firm specific capital acquired by those who are leaving, as well as loss of time incurred by having to find replacements. Furthermore, a study conducted by Sheehan (1993) found that high employee turnover can have negative effects on morale, where excess turnover can alter the perception of quality of the firm, thereby affecting productivity levels. With alarmingly low rates of employee retention within SIMA, many of these indirect effects are plaguing the company's ability to bolster its performance through productivity measures. This issue has undoubtedly contributed to the lack of competitiveness of the metalworking sector, and thusly needs to be remedied to promote growth and development within this particular unit.

Military structure and command. The business structure within SIMA is quite hierarchical and rigid due to the firm being directed by marine officers. Workers must therefore receive and follow orders from people of authority, which may impact the level of

innovation or creativity used within the workplace. Hierarchies have, in fact, been found to be antithetical to employee involvement and engagement and oftentimes block the ability for rapid responses to ever-changing environments (Splitzer, 2015). This inverse relationship between hierarchy and innovation can be explained by Hofstede's (1980) power distance index, which indicates that there are five key factors that collectively work to discourage creativity: the importance of hierarchy, vertical communication patterns, centralization of power, control over subordinates, and resistance to change in the distribution of power. Peru in general, and SIMA in particular, are characteristically bound to the concept of power distance, and therefore many of the aforementioned factors plague the innovative capabilities of the company. Studies have shown that tight control reduces creative thinking, while the freedom from rigid rules and job definitions enhances idea generation (Shane, 1993). The idea of hierarchy is, however, a cultural construct that is deeply ingrained within many different environments in Peru, and is thusly hard to manipulate or change. Currently, the inflexibility between superiors and subordinates stifles the company's ability to innovate, which has negative repercussions for the competitiveness of the metalworking sector.

Specialization of labour. Within the metalworking sector, there is a rising need for specialized labour due to the increased automation of production and the subsequent need for engineers rather than manual workers (ECORYS, 2009). The demand for skilled workers vastly outweighs the supply in Peru, where the skills gap is widest for Latin American countries over and above OECD nations. Therefore, with the goal of increasing the competitiveness within the metalworking sector of SIMA, the company will need to invest in R&D and technology. The issue, however, will be the insufficient supply of newly acquired skills that complement new technologies, which will have a negative impact on the competitiveness of the metalworking sector.

5.1.2 Management.

Government regulation. As previously stated, SIMA is a public company with a private administration that is regulated by the Defense Ministry and the National Financing Funds for Public Companies (FONAFE). While State Owned Enterprises were once popular during the 1950s, the public ownership of enterprises has declined since the end of the 20th century (Forfas, 2010). Much of the world has chosen to embrace privatization as a result of the inefficiencies and poor performance levels of SOEs, as is depicted in Figure 24. It is important to note that out of the 27 countries, 17 have minimized state ownership, five have maintained it, and only six have increased it.

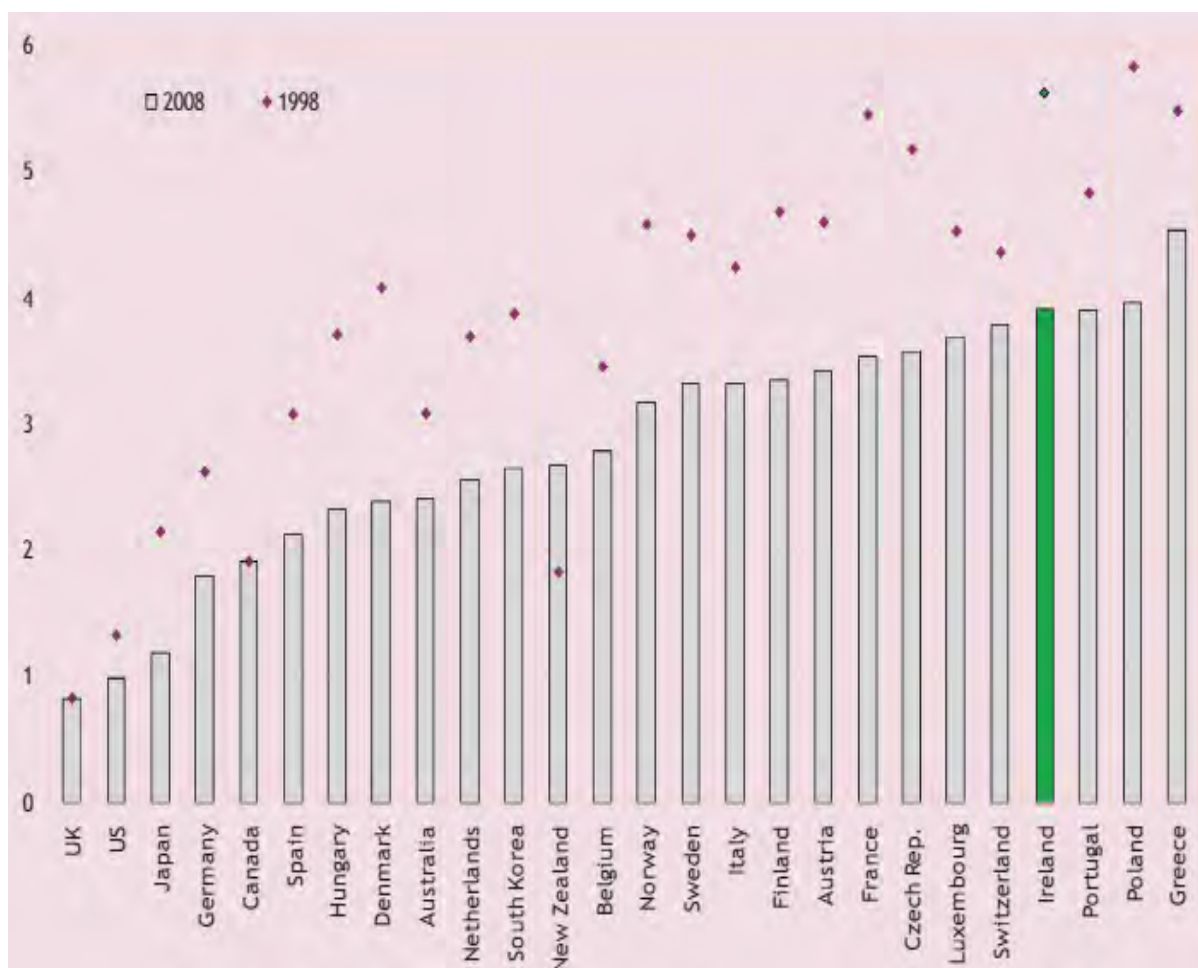


Figure 24. Scope of public ownership index 2008 (Scale 0-6). Data from “The Role of State Owned Enterprises: Providing infrastructure and Supporting Economic Recovery,” Forfas, 2010.

A large-scale issue that directly pertains to SIMA's management within the structure of corporate governance is the challenge to fulfill multiple and conflicting goals. The differences between the public and private sector are, in fact, the motivations and objectives of the industries. While private enterprises are primarily motivated by financial gains, public corporations are guided by social objectives. Public corporations must therefore stay financially sustainable and commercially competitive to continuously create value for society (PricewaterhouseCoopers, 2015). Therefore, management within SIMA is conflicted by the need to sustain social objectives for Peru, whilst trying to be the instigators of innovation and change. Such differing sets of intentions facilitate an unclear trajectory of company goals, which diminishes the capacity of managers to lead with clarity and purpose, which may, in turn, affect the laborer's perception of leadership.

High rotation of officers. As per company regulations, officers are obligated to fulfill two year contracts, after which they are either promoted, or called back to duty. Such short-term employment inhibits the continuity of stable management, while also inhibiting the establishment of strategic planning and the development of long term goals. The long-term vision of SIMA is thusly suffocated by the transient nature of upper level management, whose primary obligation is to fulfill short term duties for the company. In a 2005 report, Hill (2005) argues that changing managers will have a negative effect on the performance and productivity of an organization. This assertion stands to reason, as lower level workers within a company can suffer from a lack of consistent guidance or leadership, which lessens the motivation and commitment of subordinates to a company. Without the ability to formulate long term goals, SIMA suffers from a lack of long term vision that stifles the goal of creating a more competitive metalworking sector.

Managerial shortcomings. SIMA's managerial staff are composed of Peruvian marine officers that vary in their specializations. This type of recruitment, while mandatory,

can pose some challenges when it comes to having clearly defined knowledge and objectives within a given business unit. Many officers within the management team have had little to no exposure to the domain in which they now manage, which hinders the development of varying sectors within the company. The selection of individuals with appropriate skills and attitudes to perform specific tasks enables firms to integrate knowledge from diverse sources and stimulate innovative idea generation (Scarborough, 2003). By enlisting managers with unsuitable skill sets, SIMA suffers from a setback of having improper guidance and lack of knowledge transfer to lower level employees.

5.1.3 Technology.

Renewal funding. Outdated and obsolete technology is a key contributor in diminishing a firm's competitiveness. In a meeting with Carlos De Izcue (2017), it was noted that a staggering 90% of machinery and equipment is currently needing to be updated or replaced (2017). The company's roller bending machine is, for example, out of commission, which has resulted in a substantial loss of contracts in the metalworking sector. Therefore, in order to boost competitiveness within this area, the company needs to renew its equipment and technology; an investment of 5-6 million USD. This renewal must be decided upon by the FONAFE board of directors, which is a lengthy process that could potentially delay the ability for SIMA to compete against more technologically savvy metalworking rivals.

Costs and inefficiencies. As previously stated, the majority of SIMA's machinery is severely outdated, which has implications on both the costs and inefficiencies that the company incurs. SIMA's lack of machinery renewal has kept their labour costs high, as only those firms who have invested in new technologies have benefited from changes in required labour and subsequent boost in productivity due to automated processes. A report on the steel industry revealed that the increased complexity in machinery used in the steelmaking sector require craft and maintenance workers who are more skilled and highly trained than those

required for simpler equipment. Complexity does not, however, increase the number of workers required, and may in fact have the opposite effect (Holmes, 1980). Labour costs thusly remain high within SIMA, who must employ more people to operate old machinery.

In regards to the inefficiencies incurred by SIMA due to obsolete equipment, one must look at efficiency gains of newer CNC machines adopted by their competitors. Reports have asserted that gains due to new machinery are not so much due to the reduction in time it takes to complete a given task, but rather the variety and flexibility of operations of the new equipment to facilitate continuous processing (Bartel et al, 2007). Obsolete equipment is therefore preventing SIMA from gaining a competitive edge over its rivals, who are better equipped to finish a project on time and at a lower cost.

5.1.4 Strategic alliances.

Lack of partnerships with civil trade companies. To date, SIMA has not engaged in many strategic alliances with civil trade companies. Bridge construction is, however, a mix between metalworking and civil infrastructure, and SIMA is thusly lacking in finding strategic partners that can help them to finish the projects in which they are contracted for. Research has suggested that alliances between contractors and subcontractors are positively related to competitive performance in that they improve relationships amongst participants to produce better estimates and tender submissions, consequently increasing tender hit rate and market share (Kwok & Hampson, 1997). SIMA should therefore look to partner with civil trade companies within Peru that can help to bolster their services offered to be inclusive of specializations not offered by the company. If good relations are created between companies, the results of trust and cooperation can help guide future partnerships with these subcontractors to win further bids.

Lack of alliances with large clients. It would do SIMA well to enter into more cooperative arrangements with large clients, as this would help the company to realize their

mission statement in achieving their major goals and objectives. Currently, SIMA lacks the financial capability to help fund large scale projects for the country, which stops the company from being considered over and above more well-known competitors. Large scale clients, such as BCP or Telefonica del Peru S.A.A are companies with influence and power, as well as widespread public visibility within the country. Furthermore, the government is interested in the financial capabilities of such companies, and are highly sought after to fund other projects throughout Peru. SIMA would benefit from such alliances by having more access to future projects, as well as the indirect influence of having more widespread publicity being attached to a well-known company name.

5.1.5 Marketing.

Lack of market intelligence. As a company whose mission is outwardly social, SIMA's primary objective has not been to seek out economic opportunities. Furthermore, SIMA has relied heavily on receiving contracts from the government, which has discouraged them from utilizing their marketing division to proactively seek out work or gain new contracts. In the wake of the El Niño, however, there is ample opportunity for the company to seek out both public and private clients in order to help win contracts to build bridges. SIMA must therefore look to invest in market intelligence so as to analyze the current market and its competitors within the metalworking industry. Currently, the company suffers from a lack of positioning strategy, and thusly has no platform on which to establish itself within the sector. It must therefore gain a deeper understanding of the competitive advantages of its rivals, and build upon its own strengths in order to boost its competitiveness within the metalworking industry.

CSR positioning strategy. SIMA's ultimate purpose is inherently social in nature, as it exists to supply jobs to the country, and to build quality ships and structures for the state. While such objectives are honorable and pertinent to the overall perception of SIMA, they do

not help to achieve the common benefits that derive from a successfully implemented CSR strategy. SIMA must move towards a more comprehensive concept of social responsibility so that it may encompass both internal and external benefits to the company. In a study performed by Vogel (2005), CSR was said to boost an enterprise's reputation and legitimacy through the act of performing outwardly good deeds for society. Furthermore, a study was conducted to test the effects of CSR on employee engagement. The key findings of the conducted survey were that a staggering 44% of young employees would discount an employer with a bad reputation and almost half confirmed the necessity of CSR policy implementation (Gross, N.D). As a company that suffers from having a low level of public awareness within their metalworking division, SIMA would benefit from engaging in CSR strategies that may help to boost their image within the public eye.

Within the realm of CSR initiatives, SIMA has not taken advantage of an opportunity known as *Obras por Impuestos* (work for taxes). To date, SIMA has only engaged in this objective three times, despite the long list of construction projects listed on this database. This strategy would help to build partnerships between SIMA and a company with a large amount of taxes that could be used to erect new structures. Both sides would benefit from public recognition of new projects, which could help to build the metalworking brand of SIMA, and thusly boost competitiveness of this unit.

5.2 Main Causes of the Problem

In order to improve the competitiveness of the metalworking until of SIMA, it is important for the company to first focus on short term objectives before attempting to solve any long-term goals. It is therefore important for the company to look at the current opportunities available in *Obras por Impuestos*, as this database has multiple bridge building contracts that SIMA can attempt to win. Furthermore, it is important to synergize strategic alliances with CSR initiatives, as this will help to build partnerships with enterprises that can

help SIMA to win more contracts, which will simultaneously result in the company providing more jobs and helping to rebuild its country. Such socially motivated principals will help to promote awareness of SIMA's metalworking division, which, in turn, can help boost the overall competitiveness of this unit.

In the long term, SIMA may look at restructuring such things as employee benefit packages or investing in new technologies. The former is important in that SIMA needs to find a way to retain its skilled employees, as their turnover is far too high, which is costly for a company operating off limited profits. Furthermore, outdated technology needs to be replaced if the metalworking unit is to become a competitive force amongst other Peruvian rivals. Obsolete machinery is causing inefficiencies in both productivity and cost structures, which hinders SIMA's ability to make attractive bids for bridge building contracts. These alternatives will be elaborated on in the coming chapter to isolate a solution to the problem.

5.3 Conclusions

In this section, five different issues were analyzed as they pertained to the metalworking division of SIMA. It was concluded that of each of the five criteria can be further broken down as they relate to time, in that each factor has either a short-term or long term orientation. In the immediate future, SIMA will have to look to solve issues within the realm of strategic alliances, as well as problems within their marketing unit. These criteria, if fixed, can help to bolster the competitiveness of the metalworking division so that SIMA may be able to win bids within the *Obras por Impuestos* framework. As these problems can be addressed within a shorter timeframe, they need to be of primary focus for the upcoming reconstruction projects in the wake of the El Niño.

In the long term, SIMA must look to solve criteria that are more deeply imbedded into the overall business culture. Shortcomings in human resource management have caused there to be massive employee turnover, and a consequent loss in productivity; these issues

contribute to the lack of competitiveness within SIMA as an entire unit, as well as within the metalworking division in particular. Moreover, problems within upper level management have caused there to be a disconnect between workers and leaders, as well as a lack of long term objectives and goals for the company. Lastly, issues with obsolete technology are hindering SIMA's ability to compete with privatized companies, who have more modernized equipment for which they can construct with. In order to become the leader within the metalworking sector, SIMA must look to solve the above long-term issues that are currently plaguing their efficiency and effectiveness.



Chapter VI: General Situation of the Organization

6.1 Alternatives to Solve the Problem

According to the analysis developed in Chapter V, it is necessary to develop strategies for the future to obtain contracts for *Obras por Impuestos*. The rainy season will start in December of 2017, which will accelerate the process of project decisions. For this reason, SIMA must adequately prepare a collection of strategies that emphasize their competitive advantages. Consequently, short term measures related to strategic alliances and marketing endeavors will need to be exercised before the end of 2017.

Due to the effects of El Niño, The National Reconstruction Plan will offer several construction tasks within the next four years, which will thusly add a multitude of infrastructural endeavors to the list. There is therefore an immense opportunity for Peru's most competitive heavy metal companies to take advantage of the upcoming increase in demand for such services. Consequently, the long-term measures being discussed in this chapter refer to the remaining years of the National Reconstruction Plan: 2017, 2018, 2019, and 2020.

6.1.1 Short-term alternatives.

Strategic alliances with civil trade companies. Strategic alliances will play a significant role in solving SIMA's insufficient level of competitiveness within its metalworking division. Therefore, SIMA must strive to build partnerships with civil trade companies to help them complete projects in which they are contracted for; most notably in terms of bridge construction. Thus, SIMA should invest more time in looking for strategic partners with EPC construction companies within Peru, as this can help SIMA strengthen their services and competitiveness in metalworking (Hinge Research Institute, 2012). Partnership could be achieved through the sharing of mutual benefits with other civil trade companies. For instance, SIMA has a vast array of experience within the construction of steel

structures, but does not specialize in such things as concrete pouring. By establishing a partnership with another company with unrelated know-how, SIMA will benefit from an enhancement of capabilities, technological advancement and economic expansion. The idea for SIMA is based on building a strategic framework that enables the company to have such partnerships for the short and long term (Lee & You, 2016).

The use of project alliances within the construction industry have, in fact, been growing by way of partnering, joint ventures, enterprise networks and alliancing (Walker & Hampson, 2003). Such cooperative agreements can be seen in the case study of construction firms within Australia, where, in 2001, the Australian National Museum was the first construction project to be procured through a Project Alliance within the country. Each of the parties involved were able to achieve a win-win situation due to their ability to work together to generate a successful input that earned them a competitive edge as a result of their experience within such a milestone project (Walker et al, 2002). Nguyen et al, (2004) defines success within the context of the construction industry as when a project is completed at or before the deadline, at or below budget, built to the required specifications and are able to fulfill the needs of the key stakeholders involved. In considering this definition in regards to the allied Australian construction companies, one can see that success was derived through the leverage of skills and expertise of the alliance partners that allowed them to drive down cost and improve value for money.

In applying the following case study to the current situation faced by SIMA, it is recommended that SIMA engage in strategic alliances that, through the shared commitment to a common goal, can allow each member to achieve a unity of purpose that derives the best value for both parties involved. Figure 25 outlines the process by which SIMA may be able to find a suitable, trustworthy and competent ally for which they can synergize with in the upcoming reconstruction projects in Peru. While this process may seem complex in nature, it

is imperative that SIMA find civil companies to partner with in order to diversify their offerings and bolster their competitiveness within the metalworking division of their business. Such alliances will help to reduce risk, cut costs and maximize expertise and knowledge.

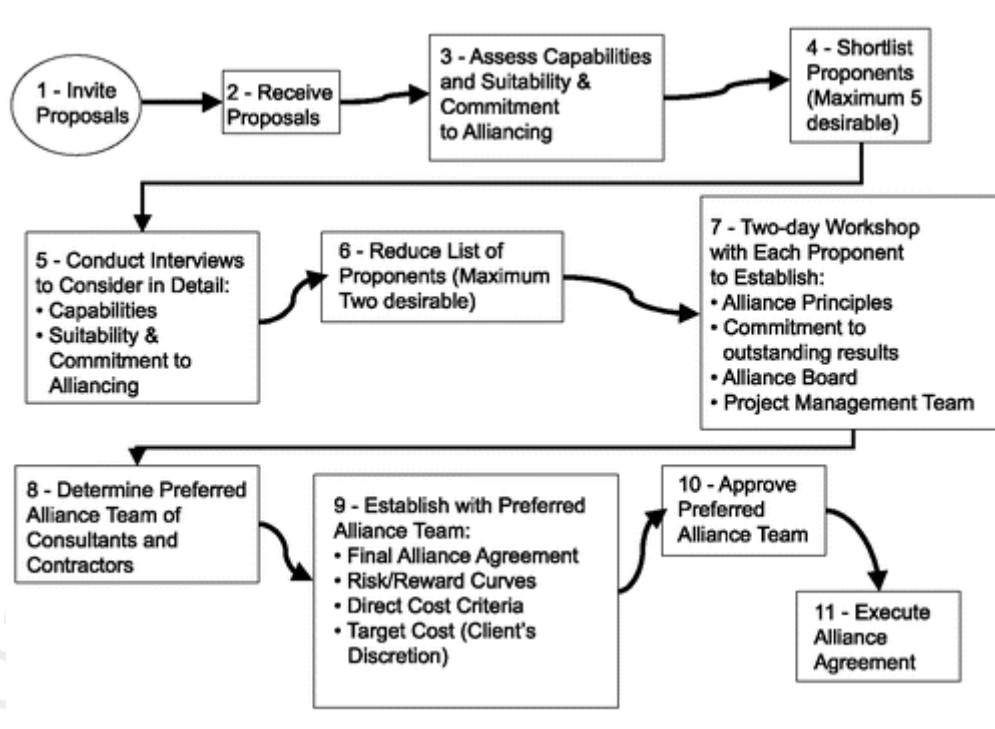


Figure 25. Alliance Selection Process. “Project Alliancing vs. Project Partnering: A case study of the Australian National Museum Project” by D. Walker, K. Hampson & R. Peters (2002).

Alliances with large-scale clients. Building alliances with large-scale clients or other prestigious public institutions such as universities or hospitals can help a firm to win important projects from the government and enhance the B2G side of the business (Hinge Research Institute, 2012). SIMA would gain a great advantage by entering into cooperative agreements with large-scale clients, as it would help the company to solve the problem of financial scarcity. The best solution for SIMA is to create strategic alliances with well-recognized companies that have both power and influence within the industry. To illustrate, SIMA can create cooperation with one of Peru’s leading large-scale businesses such as BCP or Compania Minera Antamina S.A. due to reasons outlined in Chapter VII, which will help SIMA to have more accessibility to future projects and contracts, as well as increase its

financial resources. Take, for example, the case of a strategic alliance between a Spanish gas company, Repsol and a fast-food company, Burger King. 50% of sales at gas stations in Spain come from gas and the other 50% corresponds to the high-value services and products offered to gas consumers. Business alliances in this sector are expected to increase profitability, as Repsol's strategic alliance allows them the exclusive access to place Burger-King franchises in all gas stations in Spain (Turiera & Cros, 2017). The goal of this alliance is to expand to 150 stations in a period of four to five years, with venture of some €50 million. Furthermore, Repsol has also created sales alliances with Nespresso and ONCE, which will help gas stations to increase their profitability and innovate through so-called "non-oil" products. Therefore, it is suggested that SIMA applies this concept of collaboration with large-scale clients to enlarge its contacts and have more access to future contracts and funds (Turiera & Cros, 2017).

Marketing through CSR. SIMA has greatly depended on receiving contracts from the government, which has resulted in a tendency to under-utilize their marketing division. Firstly, the recommended solution for SIMA is for management to take a genuine interest in being up-to date whilst safekeeping all items of information about the core competencies, sales data, and operation systems. Similarly, SIMA should be proactive in collecting information related to marketing activities such as internal records, marketplace opportunities, competitor's sales data and competitors' threats and risks, as this has a positive and significant influence on the company's competitive advantage in the long term (Ladipo, Awoniyi & Arebi, 2017). Again, SIMA's marketing division should analyze their competitors' sales data, as it is a very important mechanism of "marketing intelligence" and it signifies the continuous process of analyzing, understanding, and evaluating the external and internal environments linked to competitors as illustrated in Figure 26.



Figure 26. Model of Marketing Intelligence and Business Competitive Edge. Source: (Conceptualized by the Researcher, 2016) Ladipo, P., Awoniyi, M., & Arebi, I. (2017). The Influence of Marketing Intelligence on Business Competitive Advantage (A Study of Diamond Bank Plc). *Journal of Competitiveness*, 9(1), 51-71. <http://dx.doi.org/10.7441/joc.2017.01.04>

CSR Positioning Strategy. SIMA's fundamental purpose is intrinsically social, as it focuses on offering jobs to the country and supplying the state with naval ships, weaponry and heavy metal structures. SIMA must therefore put in place a CSR-strategy in both the short and long term. More specifically, if SIMA utilizes CSR-based strategies it can improve the quality of human resources through improved relationships, diversity, and worker satisfaction. It has been shown that companies that use CSR as a differentiation strategy can promote and reinforce a socially responsible reputation and consequently promote and create a comparative or competitive advantage. Moreover, SIMA must include the so called *Obras por Impuestos* framework as a CSR initiative so as to collaborate in socially responsible acts. *Obras por Impuestos* is a way of setting up a suitable and sustainable CSR framework which will enable SIMA to construct bridges in areas that have been impacted by El Niño. Consequently, by implementing this strategy, SIMA will be able to enhance the competitiveness of its metalworking sector through the winning of future bridge construction projects.

The case of TATA Steel company poses an excellent example of effects of implementing a CSR strategy, as well as the positive outcomes that ensue. The case showed how the company's group activities helped to fulfill its responsibility towards all

stakeholders: what specific activities, programs and strategies were implemented. The research found that initiatives implemented by TATA Founder, Jamsetji Nusserwanji, had been widely implemented by all subsidiaries and partners (Boulouta & Pitelis, 2015). TATA has implemented its CSR policy into its Code of Conduct to actively assist in improving the quality of life in the communities in which they operate. Moreover, CSR became one of the key business processes in TISCO, and was one of the eight key business processes identified by TISCO management and considered as critical to the success of the company. TISCO has introduced the TATA Business Excellence Model, Corporate Citizenship Index, and the TATA Index for Sustainable Development. 5-7 % of division profit after tax is spent on several CSR initiatives. SIMA can follow a similar strategy in CSR so as to achieve its goals within this sector (Boulouta & Pitelis, 2015).

6.1.2 Long-term alternatives.

Human Resource Management. Experienced and skilled employees are key to the success of any organization, and the retention of workers is therefore of top priority to competitive companies. High employee turnover within SIMA is an extremely critical issue within the company, as was mentioned in Chapter V. A possible solution for SIMA is to provide a competitive benefits package inclusive of incentives, healthcare, flexible working conditions and vacations. Additionally, recognition is essential for employees, and can be as modest as commending workers on a job well done, but can further include financial rewards or incentives to recognize good performance (Dhulla, 2012).

SIMA can benefit from the case of Siemens, where the company used motivation to keep their employees satisfied. Siemens is an engineering company that has been operating in the UK since 1844 and has more than 18,000 employees worldwide. The way in which Siemens attracts workers is by providing a unique work environment and an open culture that motivates its employees to be competitive. Siemens uses motivation to encourage its workers

and to stimulate them to put in extra effort. It is scientifically proven that well-motivated employees will feel happy and satisfied in the workplace (Napolitano, 2015). Furthermore, they are expected to be more dynamic and productive. Siemens offers the kind of atmosphere where workers can learn new skills and are able to provide the opportunity to grow within the business. This culture demonstrates that Siemens values its employees and helps to recruit the next generation of engineers. By emulating Siemens, SIMA would be able to increase its employee's satisfaction and subsequently its productivity would increase and the turnover level decrease.

The importance of specialization of labour in metalworking is dramatically increasing due to the technological advancement within the industry. It is therefore essential for SIMA to develop their laborers' skills in order to increase efficiency and ensure the quality of production, which will help to strengthen the company's competitiveness within the metalworking sector. Moreover, SIMA can achieve skill development through in-service training and well-designed training programs based on a needs assessment. For this process, provision of sufficient budget is crucial, particularly for addressing gaps related to R&D and technology (Matsui, 2007).

Management alternatives. A feasible solution for SIMA to solve the issue of high rotation of officers would be to extend the time in which marine officers are committed to their management contracts. SIMA should develop new human resource procedures that enable naval officers to have a longer work term within the company so as to facilitate a longer-term vision for the company. Consequently, marine officers will receive more experience to foster positive change within SIMA, which will enhance the company's overall competitiveness.

There is a notable absence of managerial skills amongst marine officers at SIMA, where managerial positions require advanced knowledge of a particular business domain.

SIMA must therefore provide management level training to develop the required managerial skills for marine officers. Moreover, capacity-building programs on business administration can be offered to the officer in order to improve managerial-leadership skills. In addition, it is important to issue diplomas or certificates to encourage the officers to attend the training programs.

New machinery for a new business line (modular bridges). SIMA needs to be more vigorously up-to-date with new technology and technological transfer, where it is crucial for the company to adopt a new technology in order to create a competitive advantage in the metalworking industry (Sexton, Barrett & Aouad, 2006). First, technology transfer is a powerful mechanism that will provide SIMA with new technologies that complement existing technologies to help design, construct and sustain better performance. Furthermore, this may result in establishing a new business line if it is adopted and implemented in the appropriate way. It is essential for SIMA to choose what will allow the company to have a “first-mover-advantage” within a new business line (Sexton, Barrett & Aouad, 2006). SIMA can attain said advantage by adopting a new technology or creating a component that is affordable, sustainable and disaster resilient which rivals within the industry lack. For instance, SIMA has experience in metallic and steel work, and through the adoption of new technologies to create modular bridges, SIMA would be able to differentiate itself from its domestic rivals. By adopting this type of business line, SIMA would consequently secure the first mover advantage and enhance its competitiveness in metalworking.

A successful example that SIMA can emulate is the case of Waagner-Biro; an Austrian based company that owns mechanical engineering and steel work firms throughout Europe, Asia and the Middle East. The company made a name for itself after its immense success within the realm of modular bridge making. This form of bridging system is ideal for the fast, simple expansion and provision of infrastructure (Waagner-Biro, 2016). Moreover,

Waagner-Biro specializes in creating modular bridges with high flexibility and simplicity to meet unexpected demand and service poorly built infrastructure that is vulnerable to natural disasters within developing regions (Waagner-Biro, 2016). Waagner-Biro designed the bridge's elements in such a way that each bridge can be built using the simplest processes by locals or unskilled workers. The ease of the construction is demonstrated by the fact that the components are attached and assembled together on site, thus no welding is necessary. Annually, Waagner-Biro supplies about 100 bridges of this form to the Philippines and Indonesia and is a selected partner of the local governments. SIMA can create a new business line like Waagner-Biro in South America and create a unique competitive advantage within the domestic market.

Renewal funding for obsolete machinery. As a long-term objective, SIMA should look at replacing its obsolete machinery for more modernized equipment. An estimation given by Carlos De Izcue (2017) conveyed that the total cost of renewing machinery is around US\$6 million. Nevertheless, by focusing the renewal of machinery to the metalworking line in particular, the budget should be around US\$1-2 million. It is recommended to focus on the specific sector in question, as the process of approval by FONAFE for such funding becomes more difficult as the budget increases.

As an example, during the construction of the Pachitea Bridge, the work was to be shared in two parts with another metalworking company. The competitor was able to finish their assigned part in half of the time that it took SIMA due mainly to the competitor's modern machinery. Investment in technology therefore has large positive effects on the productivity of a metalwork company. As shown in Chapter V, machinery of SIMA's main competitors are relatively updated. This would represent higher efficiency and lower prices to offer on tenders. Updated machinery also has a direct effect on the quality of work delivered and diminishes the amount of rework. For maintaining competitiveness in the long term for

the future projects of the reconstruction plan, SIMA must invest in the renewal of its machinery. As observed in Appendix B, the company's yearly profits are around two and seven million Soles, which makes it feasible to reinvest its profits into specific machinery that targets the metalworking sector without affecting the cash reserves of the company.

6.2 Assessment of Alternatives

A decision matrix was applied to assess the above alternatives, as well as to prioritize the factors in terms of short-term versus long-term feasibility. A decision matrix can be used in almost any decision-making process where there is no clear and obvious preferred option. In the case of this report, such a matrix was used to focus on the assessment of short-term and long-term goals rather than the assessment of alternatives.

The alternatives shown in the decision-making matrix shown in Table 25 are represented by five crucial activities: human resources, strategic alliance, management, technology and marketing. These factors have been assigned scores by measuring them in regards to their relationship with five factors: urgency, feasibility, government approval, commitment required and changes required. The factors should be interpreted as follows:

- Urgency: How urgent are the implementation of changes required?
- Feasibility: What are the economic viabilities of the implemented changes?
- Government approval: What degree of government approval is required to implement changes?
- Commitment required: How much effort does the organization require to implement changes?
- Changes required: What degree of organizational restructuring is required to implement changes?

Each factor is further assessed from the perspective of its short and long-term importance so as to avoid bias in assigning preferences to only one time horizon. The scores

are represented by numerical values from 1-6, where 1-2 have low, 3-4 medium and 5-6 high impact for the company. The values of scores are assigned by considering author assumptions on the identified issues, relevance to the desired goals and SIMA's general manager's opinion.

Table 25
Assessment of Alternatives and Priorities

No	Activity name	Urgency		Feasibility (cost)		Government approval		Commitment required		Changes required		ST score	LT score	Total score
		ST	LT	ST	LT	ST	LT	ST	LT	ST	LT			
1	Human Resource planning	3	5	2	5	5	5	2	4	3	6	15	25	40
2	Strategic alliance	6	6	5	5	5	5	3	4	5	6	24	26	50
3	Management	4	5	1	2	1	2	4	4	4	5	14	18	32
4	Technological modernization	3	6	2	4	2	4	4	5	5	6	16	25	41
5	Marketing strategy through CSR	5	5	4	6	4	5	6	5	6	5	25	26	51

Note. ST – Short Term, LT- Long Term, Scores: 1-2 (Low); 3-4 (Medium); 5-6 (High)

The distribution of alternatives with the highest total scores is as follows: Marketing (51 points), Strategic alliance (50 points), Technology (41 points), Human Resources (40 points), and Management (32 points). Considering that the management strategy attained the lowest total score, as well as issues with time constraint and inability to change FONAFE HR policy, the management alternative will not be assessed any further in later chapters.

The distribution of priorities with the highest scores in the short-term are as follows: Marketing (25 points), Strategic alliance (24 points), followed by Technology (16 points), Human Resources (15 points) and finally Management (14 points). The first two strategies are considered as top priorities in the short-term.

The distribution of priorities with the highest scores in the long-term are as follows: Strategic alliance and Marketing (26 points each), Human Resources and Technology (25

points each), and finally Management (18 points). Considering that strategic alliance and marketing strategies are areas of continuous improvement, workers and technology strategies are considered as top priorities in the long-term.

6.3 Conclusions

In this chapter, five alternatives were suggested and assessed in order to solve the issue of competitiveness in SIMA within their metalworking division. It was concluded that to make full use of the competitive advantages of SIMA, short-term measures of creating strategic alliances and engaging in marketing endeavors should be developed. Moreover, in response to El Niño, the National Reconstruction Plan offers several construction tasks within the next four years, which adds a multitude of infrastructural endeavors to attend to. This plan thusly presents a unique opportunity for Peru's most competitive heavy metal companies to take advantage of the upcoming increase in demand for such services. Additionally, in the long-term, developing the capacity and skills of employees is key to the success of any organization. Therefore, the maintenance and development of skilled workers should be a top priority of SIMA's to become a leader within the heavy metal sector. Moreover, maintenance and renovation of machinery has a direct effect on the quality of work delivered and further diminishes the amount of rework needed. To sustain its competitiveness in the long term for the future projects of the Reconstruction Plan, the company must invest in renewal of its machinery. Finally, these alternatives were assessed by the decision matrix to ensure the feasibility of the implementation of these alternatives for SIMA.

Chapter VII: Proposed Solution

7.1 Proposed Solutions

The outcomes of the assessed alternatives and priorities have revealed the changes to be implemented by SIMA within the short and long-run as shown in Figure 27. These identified alternatives have the highest importance and value for the company to sustain competitiveness in the metalworking industry. The short-term changes are considered as urgent and therefore focus on SIMA's immediate actions to seize an opportunity of receiving metalwork reconstruction contracts within the destructive consequences of El Niño.

Ultimately, the long-term changes consider SIMA's need to implement crucial organizational modifications to improve its competitiveness and become metalworking leaders within Peru.

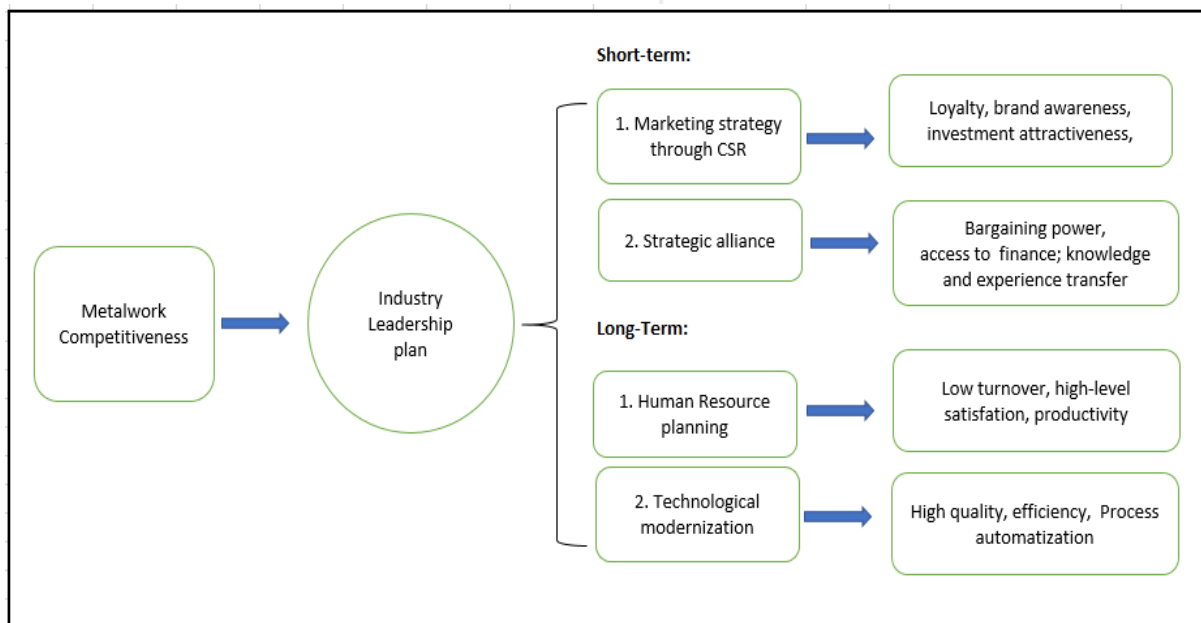


Figure 27. SIMA's short and long-term strategies, and their consequences on organizational competitiveness

SIMA's short-term changes require less investment and approval from FONAFE. Nevertheless, these changes require SIMA to take immediate actions to secure desired contracts for the reconstruction of destroyed bridges in the country. SIMA's market positioning in the short-term should utilize its competitive advantages such as experience and social image. Thus, the optimal opportunity for SIMA is recognized through the government

program of *Obras por Impuestos*, where several reconstruction projects will be listed by the end of August 2017. According to the market opportunities forecasted in Chapter IV, securing metalworking contracts through *Obras por Impuestos* is an opportunity for SIMA to sustain itself within the market in the short-term as well as to gain time for implementation of its long-term goals. Considering the time constraints, SIMA is expected to start the expansion of its network with government agencies in charge to show potential interest and intent in project execution. A strategic relationship with the right people at the right time will help SIMA to be well prepared before the announcement of upcoming reconstruction projects. The involvement of SIMA in *Obras por Impuestos* projects allows the company to reduce company expenditures on CSR activities since its contribution in restoring social facilities improves company brand awareness, social image, and staff motivation.

CSR through *Obras por Impuestos* is closely correlated with SIMA's second short-term strategy of forming strategic alliances. The amount of taxes paid by SIMA to the government is significantly less compared to international corporations such as banks, EPC construction companies, and mining companies seeking to improve their corporate image through *Obras por Impuestos* projects. Thus, the alliance of SIMA with above-mentioned partners could be a win-win situation for both partners and a background to engage in future mutually beneficial projects. Ultimately, SIMA's partnership with competing metalwork companies will increase both partners' bargaining power and ability to manage the scope of works to be completed.

SIMA's long-term strategies require substantial investments in its tangible and intangible assets. Both assets would require SIMA to put forth a great amount of effort and funds for its implementation, with the measurables for success being achieved in the long-term. Nevertheless, market conditions have shifted the trend from firms being simply experienced to having to be more innovative, productive and price competitive organizations.

SIMA's investment into new equipment and technology is essential for it to stay ahead of its competitors, increase its efficiency and high-quality production and reduce the time required for project completion. The metalworking market demand forecasted in Chapter IV shows substantial demand for prefabricated bridges until 2020. Such a lucrative market has only one domestic competitor: ESMETAL, who has the technology and experience to produce the required modular bridges. Thus, it's a favorable time for SIMA and the government to seize the right moment and upgrade its existing facilities to increase the competition within this niche as well as to reduce the dependency on import of prefabricated steel bridges from China.

Investment into ERP and CRM platforms in the long-run is a necessity to improve efficiency and communication between all SIMA divisions. An organization with ERP has an integrated view of all business processes, which in turns, allows the company to achieve efficiency and effectiveness in business goals. Business processes can be integrated into a single unified system and provide complete visibility and unified reporting systems. ERP will improve SIMA's employee's efficiency, reduce the time required for task completion and eliminate redundancy of tasks and data duplication.

Investment into technology coincides with investment into human capital. Investing in human capital is extremely important for a business to thrive in the marketplace, and to improve productivity. The advantages of human capital investment do not only include increased productivity but also increased loyalty. If SIMA employees feel that they are worthy of investment funds, they will feel an increase in motivation to bring success to the organization. Human capital is a primary asset which should be appreciated, managed and developed in much the same way as tangible assets. As a result, those investments will raise the most committed and talented people who will bring a business to the next level. Thus, as part of SIMA's long-term strategy, SIMA should avoid cutting the expenses on its training

budget. Investment in human capital can be as profitable as investment in technology, and will be needed as SIMA begins to implement technical engineering software to boost its competitiveness within the metalworking sector. The investment in acquiring and maintaining human capital is therefore vital to a company looking to increase its information systems and technological capacities, as workers will be needed to carry out the specialized tasks. The most important goals of any organization are great products, great service, and reputation. Without great people, none of these can be achieved.

7.2 Conclusions

Compliance of SIMA with its short and long-term goals is crucial for the organization to achieve its desired goal of becoming an industry leader. Both the short and long term goals are closely correlated and should not be implemented separately. SIMA's social image, combined with its future competitive advantages obtained after implementation of all changes, will push SIMA ahead of its rivals and provide the organization with an opportunity to become the most successful and desired company to work for. In the coming pages, the report will highlight the ways in which SIMA can achieve these goals so that they may reap the social and financial benefits available to them from implementing said solution.

Chapter VIII: Implementation Plan & Key Success Factors

This chapter is dedicated to a detailed description of the proposed solutions to be implemented by SIMA within both the short and long-term as per the Industry Leadership Plan. Section 8.1 will analyze the short-term solutions to be implemented by SIMA from September 2017, to the end of December 2017. This timeframe has been created due to the urgency of winning bids in the soon to be announced Reconstruction Plan, as well as to align with the upcoming rainy season in the beginning of the new year. Both aforementioned factors place an extreme amount of importance on SIMA strictly adhering to the agenda as it pertains to marketing through CSR, as well as developing strategic alliances. The former makes use of the *Obras por Impuestos* framework to bolster SIMA's public image, as well as to increase the likelihood of securing desired contracts. The latter solution of creating strategic alliances can be further broken down into types of alliances between large-scale clients as well as civil trade companies. Both partnerships will aid in helping SIMA win more projects within the Reconstruction Plan, and are thus essential to carry out within the coming months.

The report will then analyze the long-term recommendations for SIMA, which entail both technological modernization, as well as strategic planning in human resource management. The former is a three-part plan founded on the need to update obsolete metalwork machinery, the demand for new engineering design software, and the opportunity to create a new Modular Bridge division. The latter deals with strategies for optimal recruitment, as well as methods to maximize employee retention. Such recommendations will take place between January of 2017 and December of 2020 in order for SIMA to maximize its chances of winning reconstruction bids that will aid in helping them to win National project bids in the future. Moreover, although four years is a relatively short timeframe to be

considered long term within this industry, the notation will be used for differentiating the time differences of the suggested plans.

8.1 Short Term Plans (September/2017 – December/2017)

8.1.1 Marketing strategy through CSR.

In considering the financial and control restrictions imposed on SIMA's marketing strategy, it is of great importance for the company to increase its presence in *Obras por Impuestos* projects. This framework will allow for SIMA's metalworking division to improve upon its social image and brand awareness through its involvement in non-profit activities. Thus, involvement in *Obras por Impuestos* projects will help SIMA to substantially reduce its expenditures on marketing and CSR activities, secure desired contracts in metalworking, and gain time for implementing its long-term objectives. As mentioned in Chapter II, two of the main strengths of SIMA are their vast amount of experience and the social image of their brand. In analyzing how best to market such strengths, the report concluded that the framework that emphasized the importance of such values was that of *Obras por Impuestos*. The following section will thusly outline a strategic framework to conduct an *Obras por Impuestos* market analysis.

The first step in the marketing through a CSR strategy is to thoroughly prepare by becoming familiar with all aspects of the *Obras por Impuestos* metalwork market, which can be appreciated in Figure 28. This will allow SIMA to define a targeted niche and choose a positioning strategy, as well as to define the potential market within the *Obras por Impuestos* metalworking industry to develop estimates for the future business expansion. Moreover, the analysis highlights the forecasted weight that modular bridges will have in the *Obras por Impuestos* contract modality. The increasing demand of such bridges will make it necessary for SIMA to invest in developing the capability so as to create a competitive advantage above its domestic rivals.

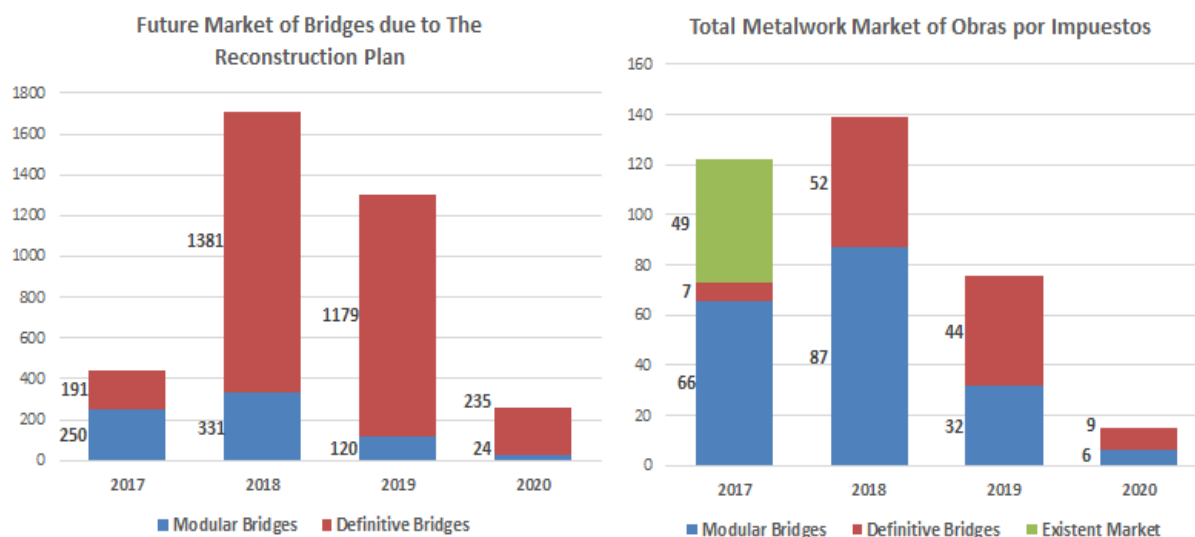


Figure 28. The Future and Total Market of Bridges due to the Reconstruction Plan and *Obras por Impuestos*

Understanding the market is instrumental in allowing SIMA to know the targeted niche to be defined. Market segmentation will help to narrow the scope of the total market through the concentration and assessment of a specific addressable market. Therefore, in considering SIMA's main metalworking locations within the Ancash region (Chimbote), a primary segmentation factor to consider is the geographic proximity of both the Piura and Ancash regions to the SIMA metalworking site. Furthermore, since the Department of Piura represents a large quantity in the number of definitive bridges, this should be considered as a primary target market as well. Figure 29 and Figure 30 show the locations of the affected bridges in the regions of Piura and Ancash.

By understanding the targeted geographic market in detail, the total feasibility of the market can then be determined. Considering SIMA's immense experience in building heavy steel structures, the total feasible market size for SIMA correlates to the amount of heavy steel structures required to be built in the targeted geographical area. Figure 31 shows the total market of bridges for different regions including that of Ancash and Piura. It must be noted, however, that only a portion of this investment is going to be directed into metalwork on bridges, with a programmed disbursement of around US\$125 Million for 2017 (or 444

Million Soles). As mentioned in Chapter IV, the isolated market of metalwork in *Obras por Impuestos* represents an opportunity of around US\$35 Million (or 122 Million Soles) for 2017.



Figure 29. Location of Damaged Bridges in Piura. Adapted from a Provias Draft on Appendix E



Figure 30. Location of Damaged Bridges in Ancash. Adapted from a Provias Draft on Appendix E

Step two of the marketing through CSR strategy is to conduct a site survey. The report recommends that a team of engineers be assigned to conduct site surveys in the regions of potential projects. A survey will help SIMA to develop a physical understanding of the demand and supply within each region, as well as the damage to the areas assessed.

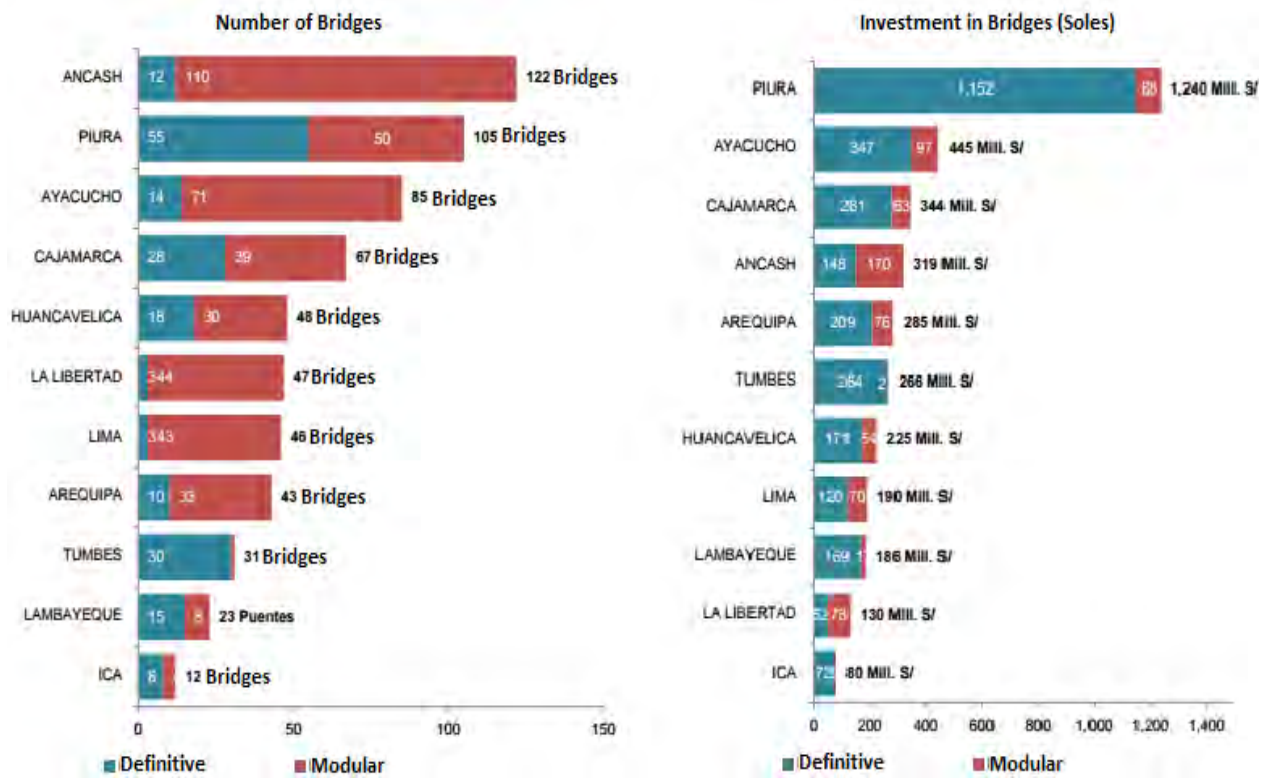


Figure 31. Market of Bridges due to the Reconstruction Plan

The survey should last about 15 days. It should culminate in an investigative drafted report. It is also pertinent to define the projects of interest, where the project management team will analyze the aforementioned site surveys, and upon its approval, draft a list of potential projects.

Step three is to network with governmental agencies, where business networking is considered to be a crucial tool in generating new business connections through referrals. The networking priority for SIMA within the short-term shall focus on the expansion of its business networks with all government agencies related to the construction and metalworking industry. The main objective of the government network expansion is to secure on-time information of *Obras por Impuestos* projects and to indicate SIMA's intentions to participate in such projects. Below outlines step-by-step guidance on how to reach out to agencies associated with the metalworking industry as indicated in Table 26.

Table 26
 Ministries Participating in Obras por Impuestos Projects

No	Organization name	Person in charge	Contact information
1	<u>Proinversion</u>	Denisse <u>Miralles Miralles</u> Director of Decentralized Investments	Email: dmiralles@proinversion.gob.pe
2	Ministry of energy and mines	Hugo <u>Sulca Sulca</u> General Director of the General Directorate of Rural Electrification	Email: hsulca@minem.gob.pe
3	Ministry of production	Enrique Fernández Paniagua General Secretary of Fondepes	Email: efernandez@fondepes.gob.pe
4	Ministry of Justice	César Hilario <u>Mansilla Aguilar</u> Head of Investments	Email: cmansilla@minjus.gob.pe
5	Ministry of transportation and communication	Omar Linares Quiroz General Director of the General Office of Planning and Budget	Email: olinares@mtc.gob.pe

1. Select a team of representatives to start networking. The team should be knowledgeable about facilitating network expansion.
2. Secure strategic meetings with people in charge. Open up a mode of communication to request to schedule a meeting to discuss opportunities regarding project participation.
3. Establish oral agreements. Incrementally build up business relations through a series of business meetings and discussions about opportunities for working together.
4. Gather information from the Agencies. Receive preliminary information about potential projects and prepare a detailed report.

Step four is to consider the project proposal, execution and deliverable through *Obras por Impuestos*. Considering the complex nature of the project proposal procedure, SIMA should start preparing necessary information and manpower resources in advance. Information provided in Figure 32 and Table 27 provides SIMA with essential information concerning *Obras por Impuestos* proposal time framework and activities composition.

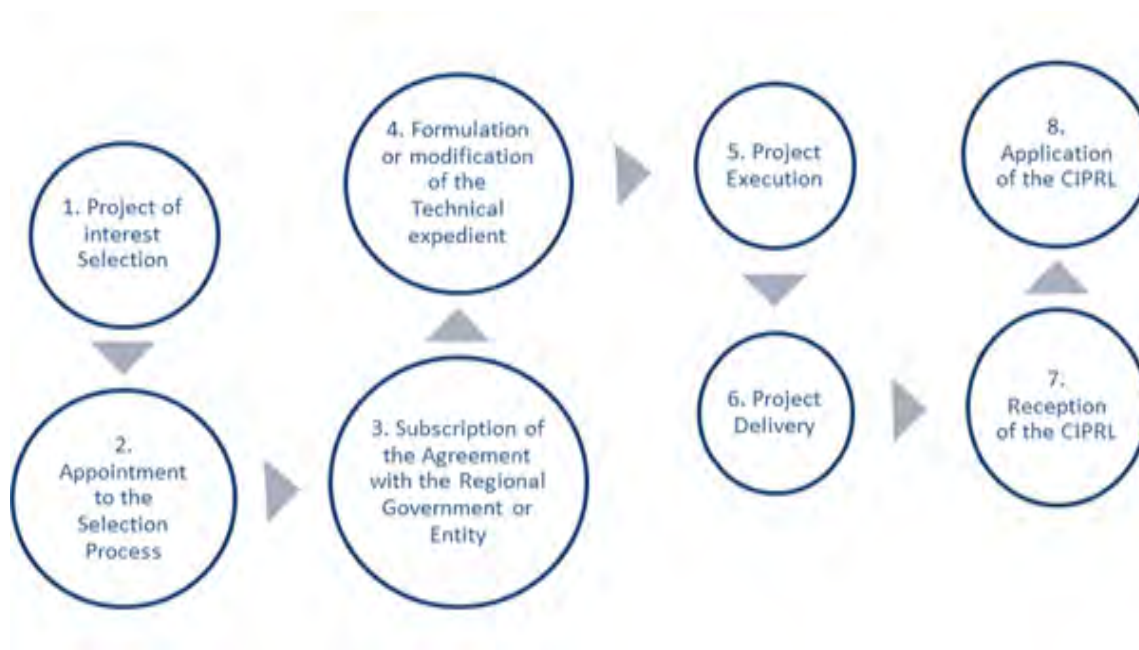


Figure 32. Steps for the Awarding of a Project of Obras por Impuestos

Table 27

Three Months Project Awarding Time Framework Through Obras por Impuestos

Procedure	Initial day	Final day
1. Project of Interest Selection	0	10
2. Appointment to the Selection Process	10	50
3. Subscription of the Agreement with the Regional Government or Entity	50	60
4. Formulation or modification of the Technical expedient	60	70
5. Project Execution	70	160
6. Project Delivery	160	180
7. Reception of the Certificates of Investment on a Public Region or local (CIPRL)	180	183
8. Apply of the CIPRL	183	End of the next Fiscal year

Table 27 is based on data provided by Proinversion and indicates the usual schedule of the awarding and delivery of projects of *Obras por Impuestos*. *Obras por Impuestos* project awards follows a shorter timeframe compared to other awarded projects and is executed in exchange for a Certificate of Investment of Public Regional or Local projects (CIPRL) which can be refunded in the form of companies' taxes in the following year. Proinversion's previous bridge project awards through *Obras por Impuestos* are posted in Appendix G and was used for the elaboration of Table 27.

In considering the above information, SIMA can start preparation for a proposal submission by following the steps below:

1. **Internal selection of projects.** Analyze the data received from the government agencies and select projects of internal interest.
2. **Elaboration of the proposal.** Appoint a coordinator with experience in tenders' proposals to manage the efficient proposal development. The coordinator will be responsible for the coordination of the overall proposal development, communication with potential clients and compliance of the proposal in accordance with the project requirements. The rest of the project proposal team will consist of experts with technical, planning and financial backgrounds. The proposal team will be assigned to prepare the Report of Company Qualifications o (Envelope 1), Technical Proposal (Envelope 2) and Financial Proposal (Envelope 3).
3. **Presentation of Proposal through *Obras por Impuestos*.** Follow the steps elaborated in Figure 28.: *Steps for the Awarding of a Project of Obras por Impuestos*
4. **Measuring the Impact.** Initiate a survey to measure SIMA's metalworking division's social image and internal performance. Conduct a second survey upon completion of one of the *Obras por Impuestos* projects to quantify the impact on the metalworking sector's social image and internal performance.

Step five is to consider the implementation budget, where Table 28 shows an estimated budget for the implementation of the previous strategy. The cost does not consider the execution costs of the awarded projects. The activities are detailed in the Gantt Chart at the end of this chapter.

Table 28
Estimated Budget for the plan of Marketing Strategy Through CSR

Actions	Necessary Resources		Estimated Budget US\$
	Quantity	Units	
Market Intelligence of Obras por Impuestos			11.614
Preparation			
Study of the information provided - Data analysis	5	Manager-Hours	107
Site Survey			
Prepare a team to travel to provinces targeted for a site survey	1	Manager-Hours	21
Travel of the investigation teams (site survey of 5 people)	1	Transportation costs	11.250
Preparation of report of evidences (Prepare site survey report)	10	Office Man-Hours	21
Defining Projects of interest			
Management study of the reports (approval of site report)	5	Manager-Hours	107
Listing of possible future projects (Draft a list of potential projects)	5	Manager-Hours	107
Networking with Governmental Agencies			171
Select a Team to start networking approach (4 people)	10	Office Man-Hours	21
Secure strategic meetings with people in charge	10	Office Man-Hours	21
Establish Oral Agreements	5	Manager-Hours	107
Report of the Gathered information from the Agencies	10	Office Man-Hours	21
Project Proposal, Execution and Delivery (Obras por Impuestos)			10.207
Internal Selection of Projects			
Study of all the information Gathered	5	Manager-Hours	107
Defining projects to present formal proposals	3	Manager-Hours	64
Elaboration of the proposal			
Selecting Proposal Team (10 people from SIMA)	2	Manager-Hours	43
Preparation of the Report of Qualifications of the Company (Envelope 1)	320	Engineering-Hours	1.371
Preparation of the Technical Proposal (Envelope 2)	1120	Engineering-Hours	4.800
Preparation of the Financial Proposal (Envelope 3)	320	Engineering-Hours	1.371
Presentation of Proposal (Obras por Impuestos)			
Appointment to the selection Process	1	Documentation	350
Subscription of the Agreement with the Regional Government or Entity	1	Documentation	350
Formulation or Modification of the Technical Report	1	Documentation	350
Project Execution (budget is independent)	1	Documentation	350
Project Delivery	1	Documentation	350
Reception of the CIPRL	1	Documentation	350
Application of the CIPRL	1	Documentation	350
Measuring the Impact			857
Conducting an initial Survey of Social Image	100	Office Man-Hours	214
Conducting an initial report of internal Performance	100	Office Man-Hours	214
Conducting an Final report of internal Performance	100	Office Man-Hours	214
Conducting an Final report of internal Performance	100	Office Man-Hours	214
DIRECT COST			22.850

8.1.2 Strategic alliance planning.

Competitive advantage and synergy are the main reasons why SIMA should enter strategic alliances. As compared to entering a market alone, the formation of strategic alliances will help to decrease the risks involved in expansion and reduce expenditure on research and development. By utilizing each partner's strengths, strategic alliances can bring synergy into the process that is hard to achieve if attempting to execute projects alone. In considering large scale company's bargaining power as well as construction companies' access to civil infrastructure projects, the following outlines a step-by-step strategy to be applied to establish strategic alliances with both parties.

Collaboration with construction companies. The first step in the strategy of allying with construction companies is to identify potential partners. SIMA must therefore assign a responsible team member to screen potential partners and analyze information of large civil construction companies in Peru. Such information can be appreciated in Table 29.

Table 29
Peru's Largest Construction Companies

Ranking Position of Building Companies	Company name	Sales (2013)	RankCompanies
		in mln US\$	2013
3	Mota-Engil Peru	411	89
4	Cosapi	408	90
5	San Martin Contrastistas Generales	324	119
6	ICCGSA	276	133
7	JJC Contrastistas Generales	260	139
8	Tradi	207	175

Note. It has not been shown other ranking positions because those companies were considered not relevant since they are currently involved in judicial issues. Retrieved from <https://rankings.americaeconomia.com>

The second step is to contact a partner from the list above and request an appointment to discuss opportunities of creating an alliance. Information about project opportunities, the scope of works, and the potential outcomes such as revenue, brand awareness, and social image should be sent prior to a meeting request. The meeting should encapsulate the major opportunities of working together by understanding each side's interests and business goals.

Discussion should include, but is not limited to: objectives, obstacles, expectations and time framework of alliance creation. Furthermore, companies should define the desired and minimum revenue goals of the alliance. Each party's goal shall represent the minimum acceptable revenue and assets to execute the project. Upon completion of negotiations, an agenda should then be prepared. An agenda shall include all activities to be executed over the next four months and include goals for each activity as well as strategies to obtain results and responsibilities of their implementation. Upon agreement of an agenda, a contract will be signed to legally establish the alliance between the two companies.

Step three will be to elaborate on the common plan through the assignment of project coordinators who will follow up with strategic alliance formation. Furthermore, it will be their duty to continuously review the plan to monitor progress and make changes when issues arise. Regular follow up will help to identify early risks and resolve them in their infant stages

Large scale company partnerships. The first step in establishing a large-scale company relationship is to identify potential partners. SIMA must therefore assign a team to screen potential partners and analyze information of companies involved in previous *Obras por Impuestos* projects as can be appreciated in Table 30.

Table 30
Ranking of Companies by Amount of Investment in Obras por Impuestos 2009-2017 (In millions of soles)

Ranking Position	Company name	Total investments executed from 2009-2017 (million Soles)
1	Banco de Crédito del Perú - BCP	987
3	Compañía Minera Antamina S.A.	376
4	Telefónica del Perú S.A.A.	185
5	Banco Internacional del Perú S.A.A. - Interbank	158
7	Turismo Civa S.A.C.	108
8	Unión de Cervecerías Peruanas Backus y Johnston S.A.A. - BACKUS	87

Note. Other ranking positions have not been shown because those companies were considered not relevant due to their work being located in other places.

The second step is to contact potential partners and request for an appointment to discuss opportunities of creating an alliance. Information about project opportunities, the scope of works, and the potential outcomes such as revenue, brand awareness, and social image are to be sent prior to the meeting request.

In step three, SIMA must consider its current alliances with civil companies and develop a synergized strategy for convincing the large-scale partner of the opportunity. Here, it is pertinent to brainstorm about the opportunities of working together, inclusive of public visibility and financial incentives, by focusing on common interests and business goals. Discussion should include objectives, obstacles, expectations and mutual commitment to be offered to the large-scale client.

Step four involves the negotiation with the large-scale partner, where desired and minimum revenue goals of the alliance will be determined. Each party's goals should represent the minimum acceptable revenue and assets used to execute the project. Furthermore, the parties will need to define opportunities of the upcoming project, determine the profit goals and make an agenda. An agenda shall include all activities to be executed over the next 4 months and include goals for each activity, as well as strategies to obtain results and responsibilities of their implementation. Upon agreement of an agenda a contract will be signed to solidify a legal bond between SIMA and its new alliance member.

Step five will be to elaborate on the common plan by assigning project coordinators to follow up with strategic alliance formation. This team will continuously review the plan to monitor its progress and make changes when issues arise. Regular follow-ups will help to identify early risks and resolve them on their infant stages.

Implementation budget. Table 31 shows an estimated budget to implement for the previous strategy related to strategic alliances. It must be mentioned that it only considers the actions and budget for one proposal project. The company should consider a budget similar to

these costs each time they form an alliance for a project. The costs take into consideration time spent by managers and administrative workers in SIMA, and therefore, the structure cost may appear in the general company structure of costs.

Table 31
Estimated Budget for the Plan of Strategic Alliances Planning

Actions	Necessary Resources		Estimated Budget US\$
	Quantity	Units	
Construction Companies (Collaboration)			1.121
Identifying the Potential Partners			
Select a Team to identify Potential Partners	3	Manager-Hours	64
Research Potential Partners	24	Office Man-Hours	51
Contact Potential Partners			
The First Call (start networking approach)	24	Office Man-Hours	51
Schedule a meeting (First steps to explain common objectives)	8	Manager-Hours	171
Selecting Partners			
Schedule future meetings	32	Office Man-Hours	69
Discussion with the Partners			
Identify Opportunities	4	Manager-Hours	86
Determine the Profit Goals	4	Manager-Hours	86
Develop an Agenda and Internal Contract	1	Documentation	500
Elaboration of a Common Plan			
Defining coordinators of both companies	2	Manager-Hours	43
Large Scale Companies (Client Partnership)			2.176
Identifying the Potential Partners			
Select a Team to identify Potential Partners	3	Manager-Hours	64
Research Potential Partners	16	Office Man-Hours	34
Contact Potential Partner			
The First Call (start networking approach)	24	Office Man-Hours	51
Schedule a meeting (First steps common objectives)	40	Manager-Hours	857
Selecting Partners			
Schedule future meeting	32	Office Man-Hours	69
Develop a strategy with the Civil Partnership to convince the Partner (client)			
Investigate the other side Priorities	4	Manager-Hours	86
Analyze Internal Priorities	4	Manager-Hours	86
Development of commitments to offer to the client	2	Manager-Hours	43
Negotiation with the Partner (Client)			
Identify Opportunities	8	Manager-Hours	171
Determine the Profit Goals	8	Manager-Hours	171
Develop an Agenda and Internal Contract	1	Documentation	500
Elaboration of a Common Plan			
Defining coordinators of both companies	2	Manager-Hours	43
DIRECT COST			3.297

8.2 Long Term Plans (September/2017 - December/2020)

8.2.1 Technological modernization.

Technology is one of the weakest internal points within SIMA's metalworking division. It requires gradual modernization of the heavy machinery to improve its productivity and time performance. SIMA's technological modernization plan can be divided into three main activities: (a) The renewal of the most crucial machinery required to improve efficiency, (b) investment into modular bridge technology, and (c) the creation of an engineering department with engineering software.

Table 32 shows the critical equipment needed to modernize as per a report provided by SIMA. The report also indicates that SIMA has a tendency to offer higher prices for clients at US\$1,100 per ton of processed steel, as opposed to their competitors, who offer the same tonnage at around US\$560. This indicates the higher efficiency of companies who have modernized their technology. Moreover, according to conversations with the machine producer Peddinghaus, the approximate price for acquiring the machines for being able to build modular bridges is around US\$1 million dollars.

Table 32
Necessary Equipment to Renew Machinery in SIMA's Metalwork Facilities

Necessary Equipment	Quantity (Soles)
Beams - Building and Welding Equipment	3,412,500
Shoot Penning - Equipment	1,411,920
Drill - CNC equipment	752,730
TOTAL	5,577,150

Renewal of the most crucial machinery required to improve efficiency. As outlined above, SIMA's outdated machinery requires significant modernization to achieve a higher performance in terms of power consumption and performance efficiency. These updates generally require the substitution of old machinery components with new technology not available to SIMA at the time of the original implementation. The following section will

thusly look at developing a machinery renewal plan to help SIMA improve its productive capacity.

The first step is to detail the necessary machinery updates by preparing a report related to the modernization of the critical machinery. The report shall seek FONAFE's approval of machinery modernization investment and must highlight the urgency of the renewal to seize an opportunity through participation in the National Reconstruction Plan. After the acquirement of said approval, SIMA will need to start sourcing out a suitable machinery supplier.

Step two will focus on the purchasing of the order. Here, it is important that SIMA discuss the price, terms of delivery, installation and startup activities. Upon agreement of all conditions, an order should be placed with the supplier to manufacture the required machinery.

Step three involves the installation of machinery, where SIMA should assemble a team to coordinate supplier's machinery installation and startup activities. Furthermore, the installation should co-align with training workshops for employees tasked with operating said equipment. The timeline of the training can be found in the Gantt chart in section 8.3, and will help to develop the necessary skills to derive maximum benefit from the modernized equipment.

Development of the capability to build modular bridges. Considering the lack of ability to produce modular bridges within the domestic environment, as well domestic rivals' dependency on modular imports from China, there is a profitable opportunity for SIMA to develop the capacity to build modular bridges through the adoption of heavy equipment technology. The development of modular bridge technology has the same implementation scheme as the modernization of existing equipment. It is recommended to present this report as an integrated investment plan with the renewal of existing equipment report to enhance the

likeliness of said project being approved. Nevertheless, the company can present this second option as a second investment plan.

The first step is to detail the necessary machinery updates by preparing a report related to the modernization of the critical machinery. The report shall seek FONAFE's approval of machinery modernization investment and must highlight the urgency of the renewal to seize an opportunity through participation in the National Reconstruction Plan. After the acquirement of said approval, SIMA will need to start sourcing out a suitable machinery supplier.

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Updating the engineering department. The primary purpose of an engineering department is to apply scientific knowledge to the solution of technical problems. Engineers can provide technical and aesthetic solutions, but to achieve these goals, the engineering department requires modern engineering software. Most of the existing software available today are complex and costly. It requires that engineers train to understand and utilize the benefits of the software. As a user-friendly alternative, however, it is recommended that SIMA acquire TEKLA 3D software, which has the ability to work simultaneously on the

same model for multiple users. Tekla software can produce drawings from a model, and if any changes are made in that model, they can be immediately revised in the drawings. In addition, the software contains many properties that can be altered to achieve the preferred style of drawing, which can be saved and kept for future use. The suggested dates for the software update can be appreciated in Figure 37 which is the general Gantt mapping developed for the whole Industry Leadership Plan. The following steps are required to be followed to update engineering department software:

The first step is to select and deal with the chosen software supplier. SIMA will need to contact a TEKLA software supplier to discuss the technical requirements and user plans. Upon agreement of all requirements, SIMA must purchase the software and licenses for all active users.

The second step is that of software implementation, where the supplier is to provide all necessary equipment and software required for software usage. Furthermore, running tests are to be completed upon software installation.

The third and final step is to provide training on the new software so that the engineering department can utilize the software to improve the efficiency of the engineering department for SIMA. The section regarding human resource strategies outlines specific training strategies to be utilized by this division can be appreciated within the Gantt chart in section 8.3.

Implementation budget. Table 33 shows the estimated budgets for the implementation of the technological modernization program. The human costs related to the engineering department will be appreciated in the long-term plan regarding strategic Human Resources planning processes. The suggested dates for the implementation can be appreciated in Figure 37 which is the general Gantt mapping developed for the whole Industry Leadership Plan.

Table 33
Estimated Investment for the Equipment of the Technological Modernization Plan

Actions	Necessary Resources		Estimated Budget US\$
	Quantity	Units	
Modernizing equipment	DIRECT COST		1.600.300
Detailing necessary machinery updates	80	Office Man-Hours	171
Generating report	40	Office Man-Hours	86
Including the renewal Plan in FONAFE's approval pendants	5	Office Man-Hours	11
FONAFE's Approval	1	Documentation	300
Selecting and dealing with the Machineries Supplier	75	Office Man-Hours	161
Purchasing Order (full cost)	1	Machinery cost	1.593.471
Machinery preparation from the suppliers	1	Documentation	50
Machinery dispatch	1	Documentation	50
Machinery Installation	1	Installation cost	3000
Workers Training (30 employees)	60	Total Hours of Training	3000
Development of the Capability to build Modular bridges	DIRECT COST		1.006.743
Detailing necessary machinery updates	40	Office Man-Hours	86
Generating report	40	Office Man-Hours	86
Including the renewal Plan in FONAFE's approval pendants	5	Office Man-Hours	11
FONAFE's Approval	1	Documentation	300
Selecting and dealing with the Machineries Supplier	75	Office Man-Hours	161
Purchasing Order	1	Machinery cost	1.000.000
Machinery preparation from the suppliers	1	Documentation	50
Machinery dispatch	1	Documentation	50
Machinery Installation	1	Installation cost	3000
Workers Training (30 employees)	60	Total Hours of Training	3000
Software Acquisition (TEKLA)	VARIABLE COST		101.288
Selecting and dealing with the Software supplier	17,5	Office Man-Hours	38
Software implementation (5 licenses)	1	Total cost per year	100.000
Workers Training (5 employees)	25	Total Hours of Training	1.250
DIRECT COST			2.607.043

The strategy will point to being able to compete with updated machinery and modular bridge equipment by 2019. According to the calculations done in Chapter IV, the

market availability of projects from *Obras por Impuestos* due to the reconstruction program will be US\$76 million in 2019 and US\$15 million in 2020. Moreover, with updated machinery, the company can easily point to other contract modalities in the market of metal bridges forecasted as US\$202 million in 2019 and US\$40 million in 2020 due to the Reconstruction Program. Furthermore, by the year 2030 the company will have enough capabilities to compete for other projects related to the big gap of infrastructure in Peru that is estimated for metal bridges of US\$1.3 Billion.

8.2.2 Strategic Human Resource planning processes.

Based on the strategic objective of becoming more competitive within the metalworking sector, SIMA must begin to analyze their current human resource capacity to be able to assess the gap between its present and future HR needs. According to SIMA's 2016 Memorandum, 80% of new hires met the majority of expectations in the competency assessment and thusly remained in the company. Furthermore, the expected goal of last year (93%) was exceeded, in that 99.61% of the workers met the minimum expectations. 1530 workers were assessed, of whom 1524 achieved positive results. There is, however, a generational issue within SIMA, where the average age of employees is estimated to be around 55 years (SIMA, 2008). Such workers, while proficient in operating older equipment, are not trained to carry out tasks with modernized equipment, thusly creating a tension between more seasoned workers and new hires. Such a generational gap causes strain in how tasks are conducted, where newer employees have been trained in more innovative practices, while older workers are more comfortable with labour intensive techniques. Therefore, while SIMA's employees exceed competency expectations, there are internal issues with how tasks are being executed. Furthermore, Table 34 outlines the present competencies of core metalworking personnel, which will be used to assess the present versus future labour requirements within SIMA. By conducting a gap analysis, the report will be able to show the

need for enhancing employee skillsets through a set of strategic initiatives that will help to bolster the competitiveness of the metalworking line.

In assessing the positions in Table 34, the report recognizes the high degree of specialized labour in jobs related to metalworking. There is, however, a noticeable lack of innovative capacity in the competencies listed below, as SIMA is presently utilizing outdated machinery and equipment to build heavy metal structures. Workers are therefore undertaking labour intensive tasks using outmoded practices, which hinders productivity and efficiency. With the strategic implementation of new technologies and software systems, however, SIMA will have to co-align the training of its staff to the implementation of modernized systems. The following section will attempt to forecast future HR requirements as they pertain to these technological updates.

In order to forecast the future HR requirements of SIMA, the report must consider the implementation of new technologies assessed in section 8.2.1. In this section, the report reviewed three different technological implementation strategies for SIMA to exercise within the next four years: to modernize crucial metalworking equipment, to create a new Modular Bridge division, and the creation of an engineering department in charge of new intellectual software. In considering these three strategies, the report recommends that proper staffing and training be made available to complement the upgrades and advancements being made within SIMA.

Therefore, in order to forecast future HR demands, the report analyzed what positions would need to be created, as well as what new tasks and duties would need to be trained for. First, the report must take into account the new positions that will need to be created for the implementation of new engineering software and development. It is therefore recommended that the company develop a small engineering department to handle new incoming projects, as well as to have negotiation skills with subcontractors from the technical side.

Table 34
Positions and Competencies at SIMA.

Structural Charge	Education	Competencies	Work Experience
Designer	Bachelor Degree: engineering, naval, mechanics or industrial	-Quality of Work -Knowledge of integrated management system	Two years of experience performing similar tasks
Logistics Manager	University degree or equivalent in specialty related to position	-Certification issues by OSCE -knowledge of office automation -Crisis Management	Four years of experience performing similar tasks
Sandblaster	Completion of Secondary School	-Surface Preparation and Coatings -Paint Plans and Coatings -Integrated Management System	Three years of experience performing similar tasks in industrial enterprises
Boilermaker	Completion of Secondary School	-basic welding -interpretation of planes -integrated management systems	Three years of Experience performing similar tasks in industrial enterprises
Builder	Completion of Secondary School	-smelting techniques -metallized -reading and interpretation of planes	Three years of experience performing similar tasks in industrial companies.
Dam Operator	Completion of Secondary School	-basic course in management of heavy machinery -integrated management systems	No experience required
Welder	Completion of Secondary School	-lay out and cutting of metal structures -reading drawings	One year of experience performing similar tasks in industrial companies
Welding Plant Operator	Completion of Secondary School	-Drafting technical reports knowledge of hazardous material and waste	Three years of experience performing similar tasks in industrial companies
Master Welder	University Degree	-electric arc welding -gas welding -cutting of metal tracings	Four years of experience performing similar tasks in industrial companies
Master Tinker	University Degree or equivalent in specialty related to position	-carry out assembly of metal structures -tracing of parts to be folded, cast, cut -pre-installation of metal structures	Four years of experience performing similar tasks in industrial companies
Quality Control Technician	University Degree or equivalent in specialty related to position	-prepare schemes for machine components -Measure thickness of structural profiles	Two years of experience performing similar tasks in industrial companies

The size of the department should be decided on by the company, but it is recommended that it should have at minimum of: (a) one senior manager responsible for the department, (b) two designer engineers, and (c) two technicians in charge of the drawings and minor calculations. This team will aid in specialized engineering services that pertain to the addition of new Tekla software, which will enable SIMA to develop its own 3-Dimensional blueprints.

The second consideration in forecasting future Human Resource demand is to assess the necessary training needed to operate modernized equipment and technology. In section

8.2.1, Table 32 outlined the different types of machinery that SIMA will purchase in the coming years, all of which require training to ensure their productive and efficient operation.

Take, for example, the implementation of CNC drilling, which will require workers to know how to write a drill cycle, spot facing cycle, and boring cycle statement (DUPONT, 2017). Moreover, by adding a new sector specific to the construction of modular bridges, employees will need to be trained on new equipment, such as the Ocean Liberator, which offers an intensive operator training program to instruct workers on how to work with automated CNC beam and profile coping (PEDDINGHAUS, N.D). There is therefore a skills gap that exists between current and future HR requirements that must be addressed through the implementation of strategic HR initiatives outlined in the following sections.

Recruitment strategies. The first HR strategy to consider is that of recruitment of employees in general, and to the new engineering division of SIMA in particular. Table 35 outlines the type of newly created positions, as well as the estimated cost of said recruitment. Above and beyond costs, however, it is also pertinent to make mention of the schedule for hiring new employees within SIMA. The following is thusly a detailed plan on how the company should implement a recruiting strategy for its new division. It is recommended that the plan be supplemented with the Gantt Chart in section 8.3, which specifies exact dates for which the company should execute a specific task.

Table 35
Estimated Investment for the Department of the Technological Modernization Plan

Actions	Necessary Resources		Estimated Budget US\$
	Quantity	Units	
Engineering department updating			65.143
Contract of the Professionals			
1 Chief of the Engineering design	1	Total cost per year	37.714
2 Metalwork Designers	2	Total cost per year	17.143
2 Draftsmen and technical professionals	2	Total cost per year	10.286
DIRECT COST			65.143

The first step in a recruitment strategy is for SIMA to assess the talent availability for the jobs listed above. An external market analysis will have to be conducted, as well as an internal talent review within SIMA itself. Parts of the external market analysis have been identified in the PESTE analysis in Chapter I, where the report made mention of the sizeable skills gap present within Latin America, in which 50% of firms do not find the workforce with the skills they need (OECD, 2016). Despite this negative statistic, there has been slight improvement within Peru in regards to its availability of scientists and engineers, where the World Bank has noted a positive rebound over the past two years (2016). Figure 33 highlights this upward trend, and thusly demonstrates the countries improved availability of engineers that SIMA could potentially employ.

In analyzing education within Peru, it was identified that there are a total of 25 universities dedicated to the professional training of industrial engineers, of which 14 are located in the Department of Lima. The country's capital thusly offers the most industrial engineering degrees, as 48% of universities house the specialty (Palma, Rios & Guerrero, 2012). Furthermore, in recent years, there has been an increase in admissions within the engineering sector, which creates a more saturated landscape from which employers like SIMA can find potential staff. In a 2012 report, researchers cited that 70% of industrial engineers work in jobs related to their field, 20% perform jobs that differ from their vocational training, and 10% are unemployed (Palma, Rios & Guerrero). These percentages show a high probability that a significant number of engineers within Peru (30%) would be willing to change to a more suitable engineering role, or to find a position altogether. There is thusly ample talent in which SIMA may be able to attract in their recruitment of a new engineering sector.

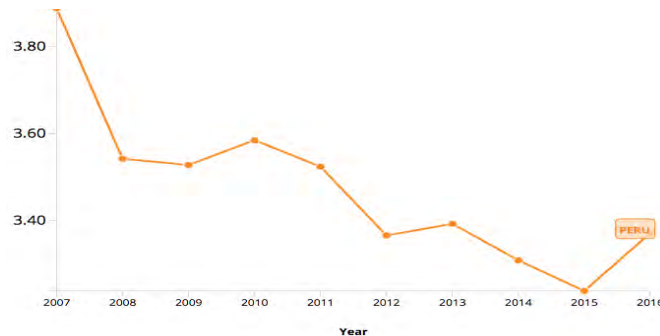


Figure 33. Availability of Scientists and Engineers, 1-7 (Best). World Bank Group (2016). Retrieved from: <http://tdata360.worldbank.org/indicators/avail>.

The second step in SIMA's recruitment strategy is to conduct an internal talent review process so as to understand the current competencies of its active employees. A preliminary analysis has already been conducted for SIMA in Table 34 in the text above. This table reviews the core competencies of workers related to the line of metalwork, as well as their educational background and years of experience. SIMA should utilize this chart in conjunction with monthly performance reviews, which will aid in highlighting those employees with superior performance, productivity and commitment to determine upward mobility or transferable skillsets.

The third point for SIMA to consider is that of their company's internal value proposition: they must identify what factors make SIMA an attractive place for people to work, how current employees feel about the company, and what their current turnover rate is. The former refers to SIMA's reputation as a quality builder of metal structures, as well as being an excellent training ground for employees to benefit from the immense transfer of knowledge. To further measure outside perceptions of SIMA, the company should develop a questionnaire that can be distributed on an online platform to better gauge what people think of the company. According to Abdel Karim Dumet Delfin (2017), SIMA's HR manager, SIMA's current employees view the company as inherently social in nature, in that it provides work that stimulates the economy and supports the Peruvian people. To have an up-to-date analysis on internal perceptions of the company, SIMA should develop an anonymous questionnaire given to each employee to better understand their motivation for working with

the company. The latter issue of turnover was estimated between 50-75%, due largely to the uncompetitive wage rates offered by SIMA in comparison to other domestic employers. Taking this information into consideration, the final statement should be able to thoroughly convince and entice professionals to want to work for SIMA over and above other companies. It is also important that SIMA's hiring managers have a clear idea of what areas to promote in order to adequately market the company to potential recruits.

The fourth step is to identify the most conducive sourcing channels for SIMA that will facilitate the highest degree of quality and quantity of applicants. Based on the large number of engineering specific universities in Peru in general, and in Lima in particular, it is recommended that SIMA look into scheduling campus recruitment visits to attract bright and innovative employees. By establishing a more visible public presence in areas ripe with attractive talent, SIMA will be able to attract a greater number of talented individuals to staff their new department. It is also recommended that SIMA utilize social networking platforms such as Facebook and LinkedIn to reach out to the younger generation currently searching for vacancies.

The fifth step is for SIMA to create a staffing plan based on its short and long term goals. In November of 2018, it is recommended that SIMA be finished its hiring of engineering staff within the engineering department, and must therefore look to start the recruitment process in March, by following the previous four steps outlined above. The start date should align with the start of the Fall university term so that adequate recruiting can be done on campus. Furthermore, the staffing plan should consider the five positions mentioned in Table 35, and look to staff these positions by outlining a list of suitable criteria for each role. SIMA should also enlist a hiring manager to be tasked with the above four steps, so that the person is given adequate time to prepare, search and interview potential candidates.

The final step is to execute the above strategy, culminating in the interview and hiring process by November 2018. The process should follow a schedule of: in-person interview, followed by a trial shift to test the skillset of the recruit. If the Hiring Manager approves a candidate, their employment should be finalized through the signing of a contract. After said time, SIMA will need to facilitate the training of the new recruits, as it is vital that they become acquainted with the newly acquired 3D programming software. Furthermore, it is recommended that SIMA reassess and refine its staffing needs every quarter to adjust for business changes.

Lastly, SIMA should utilize measurables to quantify the success of their recruitment strategies, the first being to measure the time it takes to fill a position. Moreover, it is important to quantify the quality of the new hire through conducting manager surveys, the retention of employees, and their productivity levels. It is also recommended that SIMA utilize a Recruitment Cost Ratio (RCR) to assess their staffing efficiencies, and the correlation between compensation and candidate supply and demand. The formula is as follows: $\text{total cost of recruitment} / \text{total compensation recruited} \times 100$, where the cost of recruitment must be broken down into four smaller components of internal and external recruitment, signing bonuses and travel and visa expenses. The first two can be further broken down into overhead, advertising and recruitment fees. As a final recommendation, the report suggests that SIMA calculate the Cost of Vacancy (COV) to determine the actual business impact of talent shortages that results from a gap between the time the talent is needed, and the time needed by the recruiting team to supply such talent. The formula is as follows: $\text{Total compensation recruited} \times \text{time to fill position} (14) / 365$. Such a formula will be useful to SIMA prior to it starting its recruitment so that they may know the impact that will occur from not meeting recommended deadlines for new hires.

Implementation budget. The following section is a detailed breakdown of the budget to be implemented by SIMA when considering its recruitment strategy, as can be appreciated in Table 36. This budget assesses the estimated costs for the implementation of a recruitment strategy for skilled and specialized laborers.

Table 36
Implementation Budget of the of Plan Enhancing the Recruitment Strategies

Actions	Necessary Resources		Estimated Budget US\$
	Quantity	Units	
Enhancing Recruitment Strategies			68.386
External Market Analysis			
PESTE analysis review	3	Manager-Hours	64
Analysis of Peruvian educational system	56	Office Man-Hours	120
Internal Talent Review Process			
Current core competencies	6	Manager-Hours	129
Monthly employee reviews	6	Manager-Hours	129
Assess Value Proposition			
External perception analysis	9	Manager-Hours	193
Internal employee perception analysis	9	Manager-Hours	193
Turnover measurement	9	Manager-Hours	193
Recruitment Sourcing Channels (2 employees)			
University campus recruiting	224	Office Man-Hours	480
Facebook recruiting	112	Office Man-Hours	240
Linkedin recruiting	112	Office Man-Hours	240
Staffing Plan			
Employ Hiring Manager	40	Manager-Hours	86
Create employment criteria	24	Manager-Hours	51
Interview and Hiring Process			
Stage one in-person interview	40	Manager-Hours	86
Trial shift suitability	80	Office Man-Hours	171
Signing of employee contract	32	Office Man-Hours	69
Contract of the Professionals			
1 Chief of the Engineering design	1	Total cost per year	37.714
2 Metalwork Designers	2	Total cost per year	17.143
2 Draftsmen and technical professionals	2	Total cost per year	10.286
Evaluation			
Quarterly Reassessment (four in one year)	200	Cost per season	800

Employee retention strategy. High employee turnover is a significant issue within SIMA, and must therefore be addressed through the implementation of an employee retention strategy. Organizational behavior is a highly-studied topic that has attempted to identify the determinants of employee withdrawal in regards to employee turnover. A study by John Meyer (2004) indicated that factors indicative of motivation and commitment are highly correlated to employee turnover, and are thusly pertinent to analyze in the context of worker retention. The two concepts are intrinsically related, as motivational tactics can be said to have an effect on commitment within the workplace. As motivation is quite philosophical in nature, it is important to define it in the context of how it relates to employee engagement, in that it is “a set of energetic forces that originates both within as well as beyond an individual's being, to initiate work-related behavior, and to determine its form, direction, intensity, and duration” (Pinder, 1998, p.11). This definition is useful in that it identifies what employees are motivated to accomplish, how they accomplish it, how hard they will work, and when they will stop. Therefore, in order to solve the issue of employee turnover within SIMA, this report will recommend a retention strategy that focuses on the motivation of human behavior through the implementation of Locke’s Motivation Plan, as depicted in Figure 34.

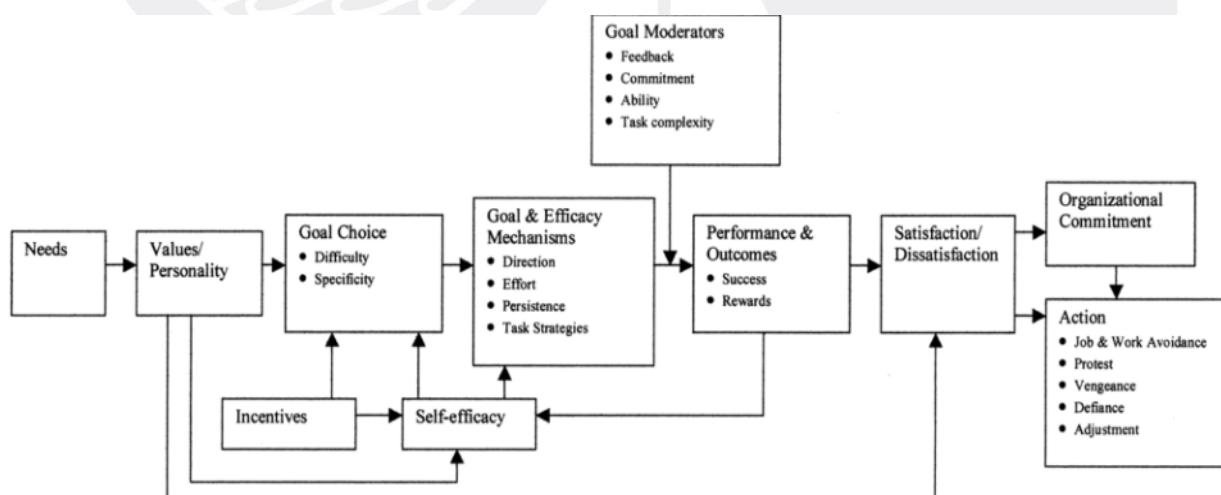


Figure 34. The Motivation Process. “The Motivation to do Work: What we Know” by E.A Locke (1997). In *Advances in Motivation and Achievement*, Vol. 10, M. L. Maehr & P. R. Pintrich (Eds.), p. 402.

The following is an employee retention plan that outlines the specific steps that SIMA should take to stimulate motivation within its workforce to reinforce organizational commitment and thusly minimize employee turnover. The plan is a modern adaptation of Locke's Motivation Process that was developed to gain an understanding of goal specific behavior and its consequences. The plan highlights several key indicators that help employees to feel incentivized and recognized for their work, which will consequently influence worker retention rates within SIMA.

The first step SIMA should take is to analyze the needs, values and attitudes of its employees as they relate to the company in order to gain a deeper understanding of their employee's engagement. By assessing what factors intrinsically and extrinsically motivate employee behavior, SIMA can start to develop a retention program that is specifically tailored to their staff's working needs, which can facilitate an environment of organizational commitment. It is therefore recommended that SIMA use a Human Resource Management (HRM) measurement to assess employee values and attitudes through the use of an additive and perceptual survey. According to an HRM study conducted by D.E Guest (2001), the most pertinent areas impacting employee values and behavior are good and safe working conditions, training and development, equal employment opportunities (EEO), and recruitment and selection processes. These factors will therefore be utilized in the survey to analyze the strength of HRM practices of the company. The additive portion of the survey asks employers to indicate, using a yes/no format, which practices from a comprehensive list of 60 practices (15 from each of the four functional areas) currently operate within SIMA. Furthermore, the perceptual survey will be comprised of 20 statements about SIMA's HRM practices that both employers and employees will have to rank on a Likert scale, with one being strongly disagree and five being strongly agree. Research exploring the perceptual and additive relationship show a strong correlation between high numbers of HRM practice and

positive employee attitudes (Fiorito, 2002; Guest & Conway, 2002). Therefore, the responses from this survey will help SIMA to identify its areas of strength as well as its weakness within HRM.

Step two in the employee retention strategy is for SIMA's management to clearly define the goals assigned to its workers in terms of difficulty and specificity. These goals should align with the company's vision within the metalworking sector, and therefore be tailored to improving the competitiveness of this particular sector. Furthermore, the goals should follow the SMART principle of being specific, measurable, attainable, relevant and time-bound. In terms of specificity, Locke and Latham (2002) argue that specific goals lead to better task performance than vague ones, and that clarity is therefore an instrumental factor in defining goals for employees. SIMA must therefore clearly define the goals it has for its employees by stating for example, that a steel bridge must be 55% constructed by October 15th, 2017 to stay on time and within budget of US\$1 million.

Furthermore, there is a need for SIMA to have key metrics in order to measure its performance and success. This is where Key Performance Indicators (KPIs) become instrumental, as Ernst and Young (2014) have asserted that having effective KPI selection and monitoring processes is crucial in today's competitive and integrated business environment. SIMA should look at its productivity labour KPI to show the efficiency of workers producing outputs per labour hour through the following calculation: *Productivity Labor: Number of outputs produced / Number of hours spent to produce these outputs*. A second KPI that should be measured is a Growth and Development KPI, which outlines such things as skills training or promotions. For SIMA to implement a KPI for skill development, they will need to design a training scorecard that measures the number of training hours passed, as well as the final score of the employee. Figure 35 depicts the step-by-step process that SIMA should take in implementing and measuring skill development KPIs. Here, it is

important to note, that SIMA must adequately prepare by hiring training staff, and calculating the cost of said training seminars.

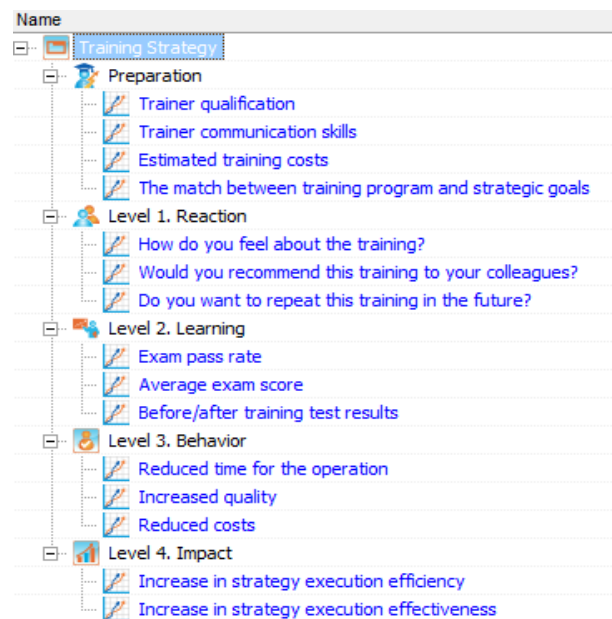


Figure 35. Training Scorecard Template. From “Training Scorecard: From Exam Scores to KPI Effectiveness” by Aleksey Savkin (2016). Retrieved from: <http://www.bsccdesigner.com/training-scorecard.htm>.

A third KPI for SIMA to implement is that of compensation, where it will be useful for SIMA to measure the benefit satisfaction that their employees hold for specific tangible incentives they may receive. A way in which SIMA can do this is to distribute a survey that asks employees a range of questions about what benefits they value to what the company may supply them with. All questions should be answered on a 5-point Likert scale, where 1 is strongly disagree and 5 is strongly agree. From this KPI, SIMA will be able to determine what incentives influence the motivation of their workers, as well as the level of satisfaction their employee’s currently feel towards this motivator. A fourth and final KPI to implement is that of budget variance, which measures if the expected budget matches the actual budget totals (Karlson, 2017). If the numbers do not match, SIMA will be able to recognize an issue in such things as labour productivity, shortsighted forecasting, or leadership issues.

Within the SMART framework of goal creation, it is also important that SIMA create objectives that are attainable. Locke and Latham (2002) stress the importance of creating a

goal that is challenging, as people are often driven by achievement, and will thusly judge a goal based on the significance of the anticipated accomplishment. SIMA must therefore create objectives for its employees that motivate them to seek the intrinsic accomplishment of completing a difficult task, as well as to implement rewards for achieving monumental targets. In that sense, the goals must also be relevant, in that they must be specific to bolstering the competitiveness of the metalworking unit through the creation of efficiencies within the building process. A final component of the SMART framework is to have a timeline that goals strictly adhere to. The following section will outline specific goals that SIMA should adopt, where the time consideration for each objective to be followed will be mapped out in the Gantt chart.

Step three of the employee retention strategy is to formulate specific HR goals that will aid in boosting employee motivation and organizational commitment, the first of which is to promote staff workshops and training seminars. Within SIMA, it is important to consistently attend to the changes in technological advancement, as the metalworking industry is constantly innovating and improving itself to be more effective and productive. By understanding its employee's values and attitudes taken from part one, as well as by taking measurements on previous productivity KPIs, SIMA can begin to develop a comprehensive training program that delivers on both worker and company needs. Step one allows SIMA to develop a workshop that focuses on what staff members have communicated as important for them to learn, while measuring past productivity will show the gap between expected and actual outcomes, providing a good indicator of future productivity targets. Training workshops should be held every six to eight months, dependent on the development within the specific specialization, and will require one instructor per specialization to train the teams. After each training session, SIMA's management team should complete the training KPI scorecard to measure the Return on Investment (ROI) taken from each session. It is

essential to note that the training of the new engineering department for SIMA should follow this regimen, where the exact dates are specified in the Gantt chart labelled “training seminar engineering department”. The data collection from steps one and two are, however, not necessary to this particular workshop, as the employees will be newly recruited.

A second goal that the report recommends that SIMA follow is to implement an incentive program to strengthen employee motivation and commitment to the organization. After analyzing the data from step one, and gathering information and compensation as a KPI from step two, SIMA’s management can begin to develop a rewards program that is tailored to the specific needs and desires of their staff. Rewards will be based on productivity and task completion, and can thusly be measured through the productivity KPI in step two, as well as the budget variance KPI. If the variance between actual and forecasted budget is close in size, than those workers who were notably productive within the project should be rewarded with benefits identified from steps one and two. Such incentives will help to boost internal motivation, which has positive impacts on productivity and organizational commitment.

The fourth step in the employee retention strategy is to measure the job satisfaction and dissatisfaction rates of employees after the completion of a project or goal. If the project is a success, then according to Locke’s Motivation Plan, employees should feel more committed to SIMA. There is a stipulation, in that SIMA must follow through on its training and staff incentive plans for organizational commitment to take hold. Measuring job satisfaction can be quantified through worker productivity as well as the percentage of employee retention per annum. Employee dissatisfaction can be measured through quantifying work avoidance by absenteeism, as well as employee turnover rates per annum. Through the strict adherence to the dates and metrics of the retention strategy outlined above, this report asserts that SIMA will experience a decrease in their turnover rate, while also benefiting from a more motivated and productive workforce.

Implementation budget. Table 37 shows the estimated budgets for the implementation of the employee retention plan, which will be pertinent to the development of this strategy. SIMA is advised to review and consider all tasks outlined above, as well as their cost structures below.

Table 37
Implementation Budget of the of Employees Retention Plan

Actions	Necessary Resources		Estimated Budget US\$
	Quantity	Units	
Employee Retention Plan			21.911
Assess Employee Needs and Values			
Create an additive and perceptual survey	1	Documentation	200
Distribute surveys	7	Office Man-Hours	15
Collect and quantify results	21	Office Man-Hours	45
Create Goal Specific Frameworks			
Develop KPIs			
productivity KPI	32	Manager-Hours	69
compensation KPI	32	Manager-Hours	69
growth and development KPI	32	Manager-Hours	69
budget variance KPI	32	Manager-Hours	69
Staff Workshops and Training Seminars (General)			
Hire training manager	40	Manager-Hours	86
Collect above data to design workshop	16	Manager-Hours	34
Complete training processes (for 500 employees twice a year)	7500	Cost per season in 1 year	15.000
Complete training KPI scorecard	16	Manager-Hours	34
Training Seminar Engineering Department			
Hire training manager	40	Manager-Hours	86
Complete training process (Technical 5 employees)	500	Cost per season	1.000
Complete training KPI scorecard	16	Manager-Hours	34
Implement Incentive and Rewards Program			
Analyze data from step one survey	16	Manager-Hours	34
Measure Compensation KPI step two	32	Manager-Hours	69
Implement specified rewards from previous data (500 employees)	10	Incentive cost per employee	5.000

8.3 Gantt Chart Implementation Scheme

8.3.1 Short-term Gantt Chart

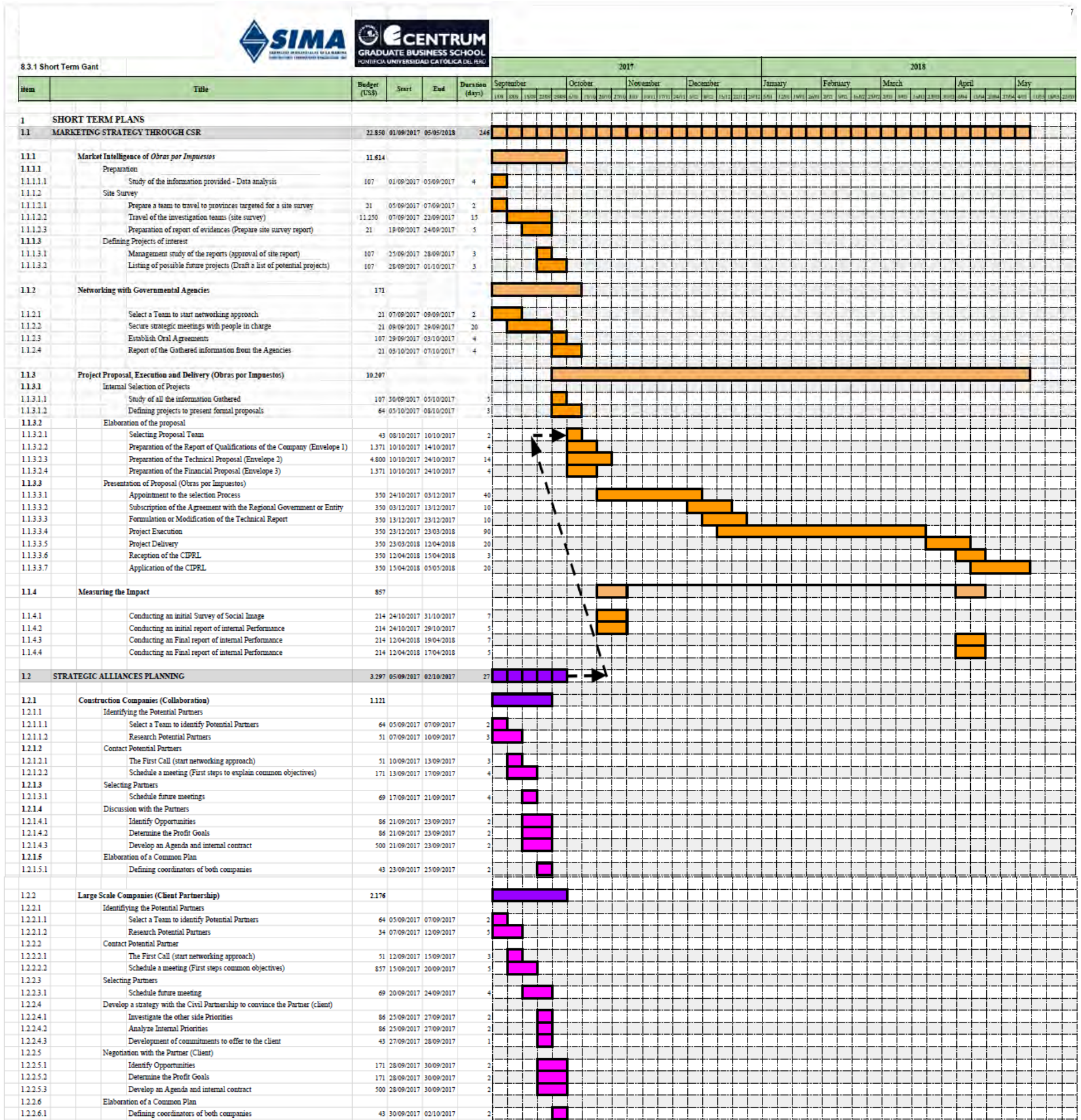


Figure 36. Short-Term Gantt Chart

8.4 Key Success Factors

It is essential for any company to recognize its key success factors and set the enablers required to achieve the desired objectives of the company. In fact, SIMA must identify these enablers as well as the risks associated with them in order to successfully carry out the four-prong implementation plan outlined above. The following is an analysis of the enablers and risks inherent in the Leadership Leader Plan as they pertain to specific implementation strategies.

8.4.1 Company commitment.

Company commitment will enable SIMA to meet its goals, particularly when it comes to a key stakeholder's involvement in change processes, such as the change in employee motivation techniques needed to be carried out by managers. Such an enabler can be ensured by emotionally connecting to why the project's overarching goal is important and responsibly using the authorities and assigned responsibilities. Moreover, it is important to create a united sector through the promotion of a common vision, where each employee visibly recognizes where they fit in the company and how their work contributes to its priorities and mission.

8.4.2 Adequate funds.

Having the adequate funds would ensure the success of the implementation's sustainability, as almost 70% of the recommended solutions provided to SIMA to improve its competitiveness requires funds. SIMA can ensure an influx of funds by getting the approval from FONAFE through the justification of a solid the Return on Investment (ROI). Furthermore, SIMA can enable access to funds through the successful alliance strategies with large-scale clients mentioned in section 8.1.2. These large-scale clients have very large taxes that, through the *Obras por Impuestos* framework, can allow SIMA to finance expensive projects through the work for taxes program.

8.4.3 Human capital.

Human capital is considered to be one of the initial enablers to attain key success factors, as all divisions come to rely on human capital. Therefore, by defining the scope of work and allocating the appropriate manpower, SIMA can ensure the attainability of such capital. In addition, retention and recruitment of satisfactorily skilled and trained staff will enable SIMA to have the competent manpower.

8.4.4 Technological capability.

SIMA needs to utilize this enabler to enhance its competitiveness in developing a modular bridge division, as well as the successful implementation of new technologies to increase efficiencies throughout the metalworking unit. The enabler to ensure this capability is to provide training that supports workers to be as productive as possible, while also ensuring that approval for technological modernization is met through FONAFE.

8.4.5 Risks.

SIMA may potentially face some risks associated with the enablers and therefore must put in place the right risk management mechanisms. First, SIMA has a risk of obsolete technology impeding on efficiency and productivity which would have a negative impact on enlarging SIMA'S capacity and competitiveness in metalworking. Therefore, the approval from FONAFE will eliminate the risk for SIMA, and enable the replacement of obsolete technology in order to ensure efficiency and productivity. Second, there is a risk of SIMA looking to implement the long-term preferences over the short-term, as the company's capacity for change is more geared towards preferring a longer time frame. The report has therefore supplied a straightforward and comprehensive implementation plan with feasibility and timeliness. The implementation plan acts as a structural building block, where SIMA must implement short term plans in order to reap the benefits of long term goals. There is, however, the possible risk of not receiving FONAFE'S approval in certain areas, such as to

fund the renewal of machinery. If FONAFE were to disregard the technological implementation plan, there would be negative consequences for SIMA's technological capabilities. Finally, there is the risk of SIMA not obtaining sufficient projects to sustain competitiveness in the domestic market which may affect the overall anticipated plan of enhancing SIMA's competitiveness. Hence, the preparation of an accurate forecast of the future market is an integral step to minimize the risks and manage them.

8.5 Conclusions

Cohesive and clear implementation strategies are critical to a company wishing to create meaningful and impactful change within their company. The four strategies that have been outlined above develop both short and long-term strategies that point towards building quick and meaningful relations with investment companies and civil trade organizations. The short-term initiatives will help SIMA to win more bids through the *Obras por Impuestos* framework that has been described above. These short-term plans will be developed up until the end of 2017, where it is very likely that the state will accelerate prevention projects due to the rainy season. Furthermore, such a market was selected because it is probable that the selected strategies will help to maintain SIMA's competitiveness amongst other companies, albeit with a gap in technological capabilities.

In the long-term, strategies point towards minimizing the gap of competitiveness based on technological investment and the correction of Human Resource issues. The time framework for the long-term implementation strategies correspond to the National Reconstruction Program between the years 2017-2020. The long-term strategies will help to develop SIMA's durable capabilities to enhance the competitiveness of the metalworking line. These strategies will bolster competitiveness not only within the *Obras por Impuestos* market niche, but also for any other contract modality in the future. These strategies should therefore be developed to help SIMA attain an increasingly competitive disposition.

Chapter IX: Expected Outcomes

9.1 Affordable Investment

SIMA's annual profits have been around US\$1 and US\$2 million. Moreover, SIMA is well positioned due to their large base of cash stemming from their assets that is valued at US\$100 Million. Therefore, as it can be appreciated in Table 38, the cash flow required for implementing the Industry Leadership Plan is enough to not require any additional loans as well as to not demand any external inflows of cash rather than yearly profits.

Table 38
Investment Flow of the Industry Leadership Plan

INDUSTRY LEADERSHIP PLAN	Direct Investment (Dollars)			
	2017	2018	2019	2020
Short Term Plan	26,147			
MARKETING STRATEGY THROUGH CSR	22,850			
STRATEGIC ALLIANCES PLANNING	3,297			
Long Term Plan		2,798,628	269,389	269,389
TECHNOLOGICAL MODERNIZATION		2,708,330	179,092	179,092
STRATEGIC HUMAN RESOURCES PLANNING PROCESS		90,297	90,297	90,297
TOTAL	26,147	2,798,628	269,389	269,389

9.2 Enhance SIMA's Ability to Capture the Market

Based on the present production capacity, SIMA is only able to capture around 6% of the market, which can be appreciated in Table 39. The Industry Leadership Plan will, however, be able to enhance SIMA's market capturing capability to the same level as that of their competitors. This is motivated by the investment in technology that will meet the similar standards of their competitors within the last months of 2018.

Moreover, since the Industry Leadership Plan is focused on the market niche of *Obras Por Impuestos*, SIMA should be able to outperform its competitors. This is motivated not

only through the technological modernization scheme but also through the enhanced brand awareness through CSR initiatives, as well as strategic alliances and Human Resource improvement. It is expected that until the implementation of the technology renewal in 2019, the other strategies should compensate for the market competence of SIMA within the market of *Obras por Impuestos*. After the modernization of technology, SIMA will be able to move into the position as industry leader in this market.

Table 39
Actual and Future Market Capture Capability of SIMA

SIMA's Market Capture possibility in the present	
Total Supply of the market	148,392 Tons/year
Total Metalwork Supply of Sima	9,192 Tons/year
Average Supply of competitors	28,800 Tons/year
Market Capture of SIMA	6%
Market Capture of Competitors	19%
SIMA's expected future Market Capture (Industry Leader Plan)	
Any Contract Modality	19%
Obras por Impuestos	25%

9.3 Short-Term Non-Tangible Expectations

The positive short-term outcomes of SIMA's metalworking division participating in non-profit projects of *Obras por Impuestos* can be expected in the following three areas: improvement of public image, brand awareness, and cash flow.

9.3.1 Public image.

Involvement in non-profit activities can help SIMA to build a reputation of being a responsible organization which in turn will lead to organizational competitive advantage. A good corporate image will reflect SIMA's credibility and integrity to establish confidence, loyalty, trust and stronger business relationships.

9.3.2 Brand awareness.

Being socially responsible can benefit SIMA to enhance reputation with the public, as well as within the business community. Furthermore, social responsibility can increase the

organization's ability to attract investment and alliance partners. Ultimately, involvement in social project will help SIMA to build metalwork brand awareness through its association with the non-profit business.

9.3.3 Cash flow.

Organizations addressing ethical, social, and environmental responsibilities have easier access to capital that might not otherwise be available. This is due to an increasing tendency to invest in socially responsible causes for the betterment of the organization and its external environment. SIMA's socially responsible nature is thusly a perfect fit for working with *Obras por Impuestos* projects, which can provide SIMA with enough projects to sustain itself in the short run.

9.4 New Market Opportunity for SIMA due to the Reconstruction Plan

According to the capabilities developed by the Industry Leadership Plan, SIMA will have access to around US\$57 Million (or 199 Million Soles) until 2020 in the *Obras Por Impuestos* market. This is due to the company developing the capacity to build modular bridges which will allow them to benefit greatly from the projects created for the National Reconstruction Plan. Table 40 highlights the availability of bridge construction projects from 2017 to 2020, which underscores the massive opportunity present for SIMA in the next few years.

Table 40
SIMA's Available Market of Projects Through Obras por Impuestos

	SIMAS market of Projects Through Obras Por Impuestos				
	2017	2018	2019	2020	TOTAL
SIMA's future possible Scope					
Modular Bridges*	0	0	32	6	38
Definitive Bridges	7	52	44	9	112
Existent Market	49	0	0	0	49
Total	56	52	76	15	199

Note. (*) In 2017 and 2018 even though there are offered Modular Bridges, SIMA does not have the capability to build them

9.5 Return on the Investment of the Industry Leadership Plan (2017-2020)

The investment required represents a positive Net Present Value for the company with a minimum considered rate of 10% of opportunity cost. As shown in Table 41, when comparing the investment with the market niche of *Obras por Impuestos*, there is an obtained Net Present Value of around US\$0.7 Million (2.54 Million Soles). As shown in Table 42, when comparing the investment with the market of metal bridges due to El Niño, there is an obtained Net Present Value of around US\$1 Million (3.68 Million Soles). The size of the return makes this strategy attractive since the NPV obtained for the investment over the years 2017 to 2020 is around one to two times the size of the usual annual income of the company. This is because the metalwork industry has quicker returns and higher margins comparative to the shipbuilding industry. Beyond the amount of the return, The Industry Leadership Plan will also tackle urgent issues occurring within SIMA, which will consequently enhance SIMA's positioning in the future.

Table 41

Cash flow of the Investment related to the Obras por Impuestos Market due to el Niño

	Cashflow (Million Soles)			
	2017	2018	2019	2020
MARKET OF METAL BRIDGES - <i>Obras por Impuestos</i> due to El Niño				
SIMAS future possible scope*	56	52	76	15
Market share capture	19%	19%	25%	25%
SIMAS Expected Market Share	11.0	10.05	18.93	3.78
SIMAS Margin	15%	15%	15%	15%
Profit	1.64	1.51	2.84	0.57
Industry Leader Plan Investment	-0.03	-2.80	-0.27	-0.27
Final Cashflow	1.62	-1.29	2.57	0.30
NPV	2.54			

Note. (*)In 2017 and 2018 even though there are offered modular bridges, SIMA does not have the capability to build them.

Table 42

Cash Flow of the Investment related to the Bridges Market in any other contract modality due to el Niño

	Cashflow (Million Soles)			
	2017	2018	2019	2020
MARKET OF METAL BRIDGES				
SIMAS possible scope	19	138	202	40
Increase of Demand due El Niño	6%	6%	19%	19%
SIMAS Expected Market Share	1.1	8.29	39.18	7.82
SIMAS Margin	15%	15%	15%	15%
Profit	0.17	1.24	5.88	1.17
Industry Leader Plan Investment	-0.03	-2.80	-0.27	-0.27
Final Cashflow	0.15	-1.56	5.61	0.90
NPV	3.68			

9.6 Long Term Profitability and Sustainability for Years Inclusive to 2030

The investment in the Industry Leadership Plan should enhance the market share capture capability of SIMA, and in the very long term, can represent a possibility to better compete in the big infrastructural gap existent in Peru. As shown in Table 43, with the new market capture that SIMA will develop, the company will double the Net Present Value of the profits of future projects.

Table 43

Comparison in the Long Term (2020-2030) of Investing and not into the Industry Leadership Plan

	Cashflow (Million Soles)											
	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	
MARKET OF METAL BRIDGES - INFRASTRUCTURE GAP IN PERU												
Infrastructure Gap in Peru of Metal Bridges (Estimated in US\$ 1.3		130	130	130	130	130	130	130	130	130	130	
Market share capture without Investment		6%										
Market share capture with Investment		19%										
SIMAS Margin		15%										
Cashflow without Investment		1.48	1.48	1.48	1.48	1.48	1.48	1.48	1.48	1.48	1.48	
Cashflow with The Plan Investment	-3.36	3.71	3.71	3.71	3.71	3.71	3.71	3.71	3.71	3.71	3.71	
		NPV	ROI									
Without Investment		9.1										
Investment of Industry Leadership P.		19.4	110%									

9.7 Long-Term Non-Tangible Expectations

The positive long-term outcomes of SIMA's metalworking division participation in non-profit projects of *Obras por Impuestos* can be expected in the following areas: improvement of loyalty, performance, and productivity.

9.7.1 Loyalty.

SIMA currently experiences around 50-70% employee turnover, which in turns leads to high expenditures on recruitment and training of new employees. By investing in human capital and by increasing both intrinsic and extrinsic motivators, SIMA will have an opportunity to increase employees' satisfaction levels and loyalty. Loyalty will reduce costly turnover rates by eliminating the time needed to search, interview and train new employees, as well as to negate the time needed to wait for employees to gain a desirable level skill and experience.

9.7.2 Skills.

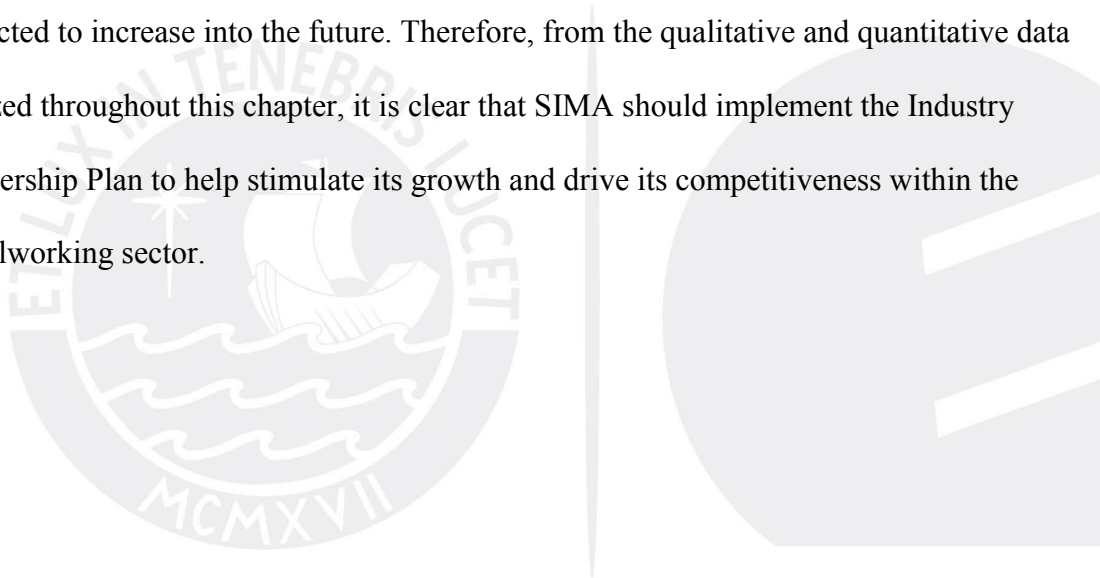
SIMA has a high percentage of experienced workers with an average age of 55 years. Considering high employee turnover and high average age, SIMA's investment into training will close the gap of required skills to operate new machinery and technology. Professionally skilled employees will help management to propose new ways to develop SIMA's operations at less cost or provide more competitive services. Technical skills will be especially important for SIMA to apply a new modular bridge technology, which would require technical skill to operate new machinery; otherwise, SIMA would fail to benefit from the upgraded technical capabilities.

9.7.3 Productivity.

The combination of aforementioned employee loyalty and new skills obtained through training working in symbioses with new technology will boost SIMA's overall productivity and performance. The same tasks could be completed much faster and less costly compared to the existing practice. Productivity can become a part of SIMA's organizational culture, and eventually integrate into SIMA's operations and processes. Thus, SIMA's metalworking division can become known for its productivity and high performance.

9.8 Conclusions

In this section, the report highlighted the financial feasibility of the implementation plan regarded in Chapter VII. It is important to note that budgets have been designed and estimated in conjunction with SIMA's annual profits to ensure the financial feasibility of the Industry Leadership Plan. Furthermore, the chapter made note of the positive outlook for SIMA, as the market for *Obras por Impuestos* is estimated to be at US\$58 million until 2020. SIMA will therefore ensure its future profitability by implementing the strategies involved within the Industry Leadership Plan, and can expect its Net Present Value to double in size by the year 2030. Beyond quantitative measures, SIMA can also expect positive outcomes in its qualitative measures, where the productivity, skills and loyalty of their workforce are expected to increase into the future. Therefore, from the qualitative and quantitative data utilized throughout this chapter, it is clear that SIMA should implement the Industry Leadership Plan to help stimulate its growth and drive its competitiveness within the metalworking sector.



Chapter X: Conclusions and Recommendations

10.1 Conclusions

The metalworking sector is a hyper-competitive industry that is constantly driven by innovative practices and technological modernization. The construction of heavy metal structures enables companies to attend to a multitude of different projects with varying costs that help to create sustainable infrastructure for a country's economy. This report has primarily focused on the construction of steel bridge structures within Peru, and has thusly identified key opportunities for SIMA to attend to within both the short and long term. These opportunities are heavily reliant on the restructuring and realignment of four key factors that were identified as being the key determinants affecting the competitive orientation of the company. Furthermore, the report has been written in alignment with the opportunities to reconstruct infrastructure after the devastating impacts of El Niño this past summer. The report will thusly go through these four criteria as they pertain to the upcoming Reconstruction Plan opportunities.

The marketing division of SIMA has struggled to create public visibility for the company, as they are hindered by regulations on channel distribution and a tight financial budget. Through the analysis of the company's key competitive advantages, however, it was established that SIMA's quality reputation and social disposition are perfectly aligned with marketing through CSR strategy known as *Obras por Impuestos*. This strategy grants SIMA the opportunity to partner with large scale clients, such as BNP, and construct bridges in exchange for their taxes. As large clients are more likely to win contracting bids, an alliance with these organizations would prove beneficial both in terms of financial feasibility, as well as being able to win more projects throughout Peru. This framework has an estimated US\$38 million in steel bridge projects available in 2017 alone, and is thusly an enticing framework for SIMA to utilize to not only build more bridges, but to also boost their public image within

the metalworking sector through the aid given to their country through reconstruction initiatives. Furthermore, the cash flow contrast between the investment required and the expected income from the market of *Obras por Impuestos* represents a positive Net Present Value that thusly indicates that projects are profitable within the timeframe suggested.

Within the short-term, it was also recommended that SIMA create and maintain alliances with civil trade companies throughout Peru. Such partnerships would help to complete SIMA's portfolio of capabilities when trying to win construction bids, as they would be able to not only showcase their strengths within the steel sector, but its partner's strengths within differing areas of civil trade. These strategic alliances are pertinent to bolstering the competitiveness of SIMA's metalworking line, as they will ultimately help the company to win more projects and aid in the transfer of knowledge of different trade capabilities. Furthermore, the infrastructural gap within Peru is estimated at US\$89 billion, which presents possible future markets for SIMA to compete within, and may therefore need to consider longer term strategic alliances for these projects.

As a technologically driven industry, the metalworking sector demands that companies stay up-to-date in their modernization of equipment and intellectual software. Despite the financial implications attached to the renewal of new technology, the return on investment is well worth the company's initial payment, as new equipment can help to improve productivity and efficiency within the workforce. SIMA must therefore capitalize on technological innovation by providing a framework that allows modernized technological developments to be assimilated efficiently into construction projects. This can be done through the facilitation of on-site training, as well as through the creation of new engineering divisions capable of handling the implementation of new equipment and software.

The development of human capital through human resource initiatives is vital to the successful operation of any company. Workers are indispensable stakeholders within an

organization that help to create, design, innovate and complete tasks that contribute to the greater good of the corporation. As globalization becomes an increasingly omnipresent force within the world, the facilitation of knowledge transfer will increasingly help to educate and motivate workers to be forward thinking innovators. As people grow, organizations must grow with them, and strive to understand their worker's values and motivators. By providing incentives or implementing training seminars, companies are showing workers that they are important and instrumental to the company, which aids in the commitment and motivation that employee places on their job. SIMA must thusly implement strategic HR initiatives to better understand its workers, as well as to successfully recruit young and ambitious talent.

The Industry Leadership Plan represents an affordable investment for SIMA that is estimated at US\$3 million in the years leading up to and inclusive of 2020. The plan will enhance SIMA's capability to capture the market of metal structures to a level similar to that of its rivals, and may even allow SIMA to surpass its competitors. Furthermore, in the market niche of *Obras por Impuestos*, the measures have suggested a sizeable enhancement in market share capture for SIMA of 25%, and SIMA may thusly become a leader within that specific market.

10.2 Recommendations

SIMA is a highly qualified and professional company with a highly-specialized skillset within the shipbuilding and metalworking sectors, and as such, has the opportunity to utilize this experience to seize monumental opportunities made available in the wake of the El Niño. The short-term implementation plan to be exercised from now until the end of 2017 is integral to SIMA being able to sustain itself within the metalworking sector, and it is therefore recommended that SIMA strictly adhere to the step-by-step guidelines provided to them in Chapter VII. By utilizing the *Obras por Impuestos* framework and creating strategic alliances, SIMA will be able to win more bids that will help to boost their public image and

ensure that the metalworking sector endures and becomes more profitable. In the long term, such initiatives as technological modernization and human resource management will help to make the sector more competitive through the creation of efficiencies and productivities. SIMA will therefore be able to compete with privatized rivals, and be able to offer minimized costs due to the productivity of their labour force and the efficiencies of their equipment. It is therefore recommended that SIMA vie for the approval from FONAFE for the implementation of new technology, as this will help to facilitate great competitive advantages for a firm that already has a firm grasp on quality.

A final recommendation for SIMA is one for the company to consider after the four-year implementation plan culminating in 2020. Within the fishbone analysis, it was determined that a key factor that hinders the competitiveness of the metalworking sector is the issue with state-ownership within SIMA. as an SOE, SIMA must adhere to strict policies regarding, budgets, hiring policies and marketing endeavors. The tight control over the company has stifled SIMA's ability to adequately development a plan that would allow their metalworking line to profit and flourish. Instead, SIMA must focus on its social image rather than financial motives. While this issue is very complex in nature, and therefore not covered due to time constraints, the report will recommend that SIMA attempt to privatize its metalworking sector so that it may be free to pursue competitive work and grow the business outside of government control. The transfer of power and control would be a long and arduous process involving such things as the sale of public assets to private owners, the cessation of government programs, contracting services from private firms formerly provided by the state, and the entry of private producers into markets that were formerly public monopolies (Goodman and Loveman, 1991). The report therefore recommends that SIMA implement a privatization plan over the next ten years, and only after significant research into the feasibility of such a strategy.

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Appendix A: SIMA's Income Statement 2015-2016

SERVICIOS INDUSTRIALES DE LA MARINA - SIMA PERU S.A.

ESTADO DE RESULTADO INTEGRAL
Por el periodo comprendido entre el
1º de Enero y el 31 de Diciembre de 2016 y 2015
(Expresado en soles)

	<u>2016</u>	<u>2015</u>
Ingresos		
Venta Neta de Bienes - Nota 25	217,339,307	318,393,204
Otros Servicios - Nota 25	136,471	553,535
Total ingresos brutos	<u>217,475,778</u>	<u>318,946,739</u>
Costos de ventas - Nota 26	-191,133,549	-310,240,249
Ganancia Bruta	<u>26,342,230</u>	<u>8,706,490</u>
Gastos de Ventas - Nota 27	(1,353,659)	(1,531,880)
Gastos de Administracion - Nota 28	(26,841,664)	(27,567,482)
Otros Ingresos Operativos - Nota 29	6,186,976	2,419,804
Otros Gastos Operativos - Nota 30	(289,803)	(51,527)
Ganancia y/o perdida operativa	<u>4,044,079</u>	<u>-18,024,595</u>
Ingresos Financieros - Nota 31	5,459,577	10,271,370
Gastos Financieros - Nota 32	-1,514,478	(1,932,091)
Ganancia por diferencia de cambio - Nota 33	54,695,743	43,050,688
Perdida por diferencia de cambio - Nota 33	(58,815,155)	(21,865,500)
Resultado antes del impuesto a las ganancias	<u>3,869,766</u>	<u>11,499,872</u>
Gasto por impuesto a las ganancias	(2,096,851)	(3,914,478)
Resultado integral total del ejercicio, Neto del Imp a la Renta	<u>1,772,915</u>	<u>7,585,393</u>

Las notas que se acompañan forman parte de los estados financieros.



Appendix B: SIMA's Balance Sheet 2015-2016

SERVICIOS INDUSTRIALES DE LA MARINA S.A. - SIMA PERU S.A.

ESTADO DE SITUACION FINANCIERA

Al 31 de diciembre del 2016 y 2015

(Expresado en nuevos soles)

ACTIVO	2016	2015
Activo Corriente		
Efectivo y Equivalente de Efectivo - Nota 5	325,979,256	253,254,269
Cuentas por Cobrar Comerciales - Nota 6	122,483,536	527,253,996
Otras Cuentas por Cobrar - Nota 7	2,356,406	2,425,789
Cuentas por Cobrar Relacionadas - Nota 8	1,053,629	733,848
Inventario, neto - Nota 9	88,321,382	132,643,837
Gastos Pagados por Anticipados - Nota 10	24,355,155	15,593,710
Total activo corriente	564,549,364	931,905,448
Activo no Corriente		
Cuentas por Cobrar Comerciales - Nota 6	4,315,567	4,577,312
Gtos. Por Anticipado- Trabajos en Curso - Nota 10	5,159,182	5,362,840
Inversiones Mobiliarias - Nota 11	20,852,388	21,848,381
Propiedades Planta y Equipo, Neto - Nota 12	103,215,459	102,815,402
Activos Intangibles, Neto - Nota 13	8,140,100	8,621,995
Total activo no corriente	141,682,696	143,225,930
Total activo	706,232,060	1,075,131,378
PASIVO y PATRIMONIO		
Pasivo corriente		
Ctas. por pagar Comerciales - Nota 14	24,202,578	115,530,097
Otras Cuentas por Pagar - Nota 15	22,242,807	12,730,712
Beneficios a los trabajadores - nota 16	4,607,479	5,532,029
Total pasivo corriente	51,052,864	133,792,838
Pasivo no corriente		
Cuentas por pagar a entidades relacionadas no corriente - Nota	24,703,296	27,829,811
Pasivo por Impuestos a las ganancias diferidas - Nota 18	1,041,374	1,041,374
Otras cuentas por pagar - Nota 15	1,267,625	
Ingresos y costos diferidos - Nota 19	491,302,739	775,272,152
Total pasivo no corriente	518,315,034	804,143,337
Total pasivo	569,367,898	937,936,175
Patrimonio Neto		
Capital - Nota 20	145,346,093	145,346,093
Reservas Legales - Nota 21	2,786,033	2,786,033
Resultados Acumulados - Nota 22	(20,199,345)	(19,868,304)
Otros Resultados - Nota 23	8,931,381	8,931,381
Total patrimonio neto	136,864,162	137,195,203
Total pasivo y patrimonio	706,232,060	1,075,131,378
Cuenta de orden activas y pasivas - Nota 24	526,176,786	695,699,144

Las notas que se acompañan forman parte de los estados financieros.



Appendix C: Financial Indicators for 2013, 2014, 2015 and 2016

N°.	RATIOS		2015	IND.	2016	IND.	VARIAC
LIQUIDEZ							
01	LIQUIDEZ GENERAL	ACT. CTE- G.P. x Ant. = ----- PASIVO CORRIENTE	916,311,738 ----- 133,792,838	6.8	540,194,209 ----- 51,052,864	10.6	-3.73
02	PRUEBA ACIDA	A. CTE- EXT-+GAST.PAG X ANT. = ----- PASIVO CORRIENTE	783,667,901 ----- 133,792,838	5.9	451,872,827 ----- 51,052,864	8.9	-2.99
SOLVENCIA							
03	ENDEUDO PATRIMONIAL.	PASIVO TOTAL = ----- PATRIMONIO	937,936,175 ----- 137,195,203	6.8	569,367,898 ----- 136,864,162	4.2	2.68
04	ENDEUDAMIENTO ACT-FUJO A LARGO PLAZO	DEUDAS A LARGO PLAZO = ----- ACTIVO FUJO NETO	27,829,811 ----- 111,437,397	0.2	24,703,296 ----- 103,215,459	0.2	0.01
RENTABILIDAD							
05	RENTABILIDAD NETA DEL PATRIMONIO	UTILIDAD O PERDIDA NETA*100 VS. (PATRIMONIO-UTILIDAD O PERDIDA)	7,585,393 ----- 129,609,810	5.9	1,772,915 ----- 135,091,247	1.3	4.54
06	RENTABILIDAD DE VENTAS	UTILIDAD O PERDIDA DEL EJERCICIO/VENTAS NETAS	7,585,393 ----- 318,946,739	2.4	1,772,915 ----- 217,475,778	0.8	1.56
07	MARGEN OPERATIVO	UTILIDAD OPERATIVA = -----X100 VENTAS NETAS	-18,024,595 ----- 318,946,739	-5.7	4,044,079 ----- 217,475,778	1.9	-7.51
08	MARGEN NETO	UTILIDAD O PERDIDA DEL EJ. = -----X100 INGRESOS BRUTOS	7,585,393 ----- 318,946,739	2.4	1,772,915 ----- 217,475,778	0.8	1.56
09	RENDIMIENTO DE INVERSION	UTILIDAD OPERATIVA = -----X100 TOTAL DEL ACTIVO	-18,024,595 ----- 1,075,131,378	-1.7	4,044,079 ----- 706,232,060	0.6	-2.25
GESTION							
10	ROTACION DE CTAS. POR COB.	VENTAS NETAS = ----- CUENTAS POR COB.COMERC.	318,946,739 ----- 527,253,995	0.6	217,475,778 ----- 122,483,536	1.8	-1.17
11	ROTACION DE INVENTARIO	COSTO DE VENTAS = ----- EXISTENCIAS	310,240,249 ----- 132,643,837	2.3	191,133,549 ----- 88,321,382	2.2	0.17
12	GASTOS FINANCIEROS	GASTOS FINANCIEROS = ----- VENTAS NETAS	23,797,591 ----- 318,946,739	0.0746	60,329,633 ----- 217,475,778	0.2774	-0.2028

N°.	Ratios	2014	Ind.	2013	Ind.	Var
Liquidez						
01	Liquidez General: Activo corriente - Gastos Pagados por anticipado/Pasivo Corriente	679,536,165/ 50,677,797	6.8	916,311,736/ 133,792,838	13.4	-6.56
02	Prueba ácida: Activo corriente - Existencias - Gastos pagados por anticipado/Pasivo Corriente	629,856,150/ 50,677,797	5.9	783,667,901/ 133,792,838	12.4	-6.57
Solvencia						
03	Endeudamiento Patrimonial: Pasivo Total / Patrimonio	705,834,194/ 129,896,495	6.8	937,936,175/ 137,195,203	5.4	1.40
04	Endeudamiento del Activo Fijo a Largo Plazo: Deudas a largo plazo/Activo Fijo Neto	33,594,190/ 111,835,828	-0.2	27,829,811/ 111,437,397	0.3	-0.05
Rentabilidad						
05	Rentabilidad del Patrimonio: Utilidad o Pérdida del Ejercicio * 100/Patrimonio - Utilidad o Pérdida del Ejercicio	5,906,477/ 123,992,018	5.5	7,585,393/ 137,195,203	4.8	0.77
06	Rentabilidad de Ventas: Utilidad o Pérdida del Ejercicio/Ventas Netas * 100	5,906,477/ 250,913,520	2.4	7,585,393/ 318,946,739	2.4	0.02
07	Margen Operativo: Utilidad Operativa * 100/Ventas Netas	-6,039,308/ 250,913,520	-5.7	-18,024,595/ 318,946,739	-2.4	-3.24
08	Margen Neto: Utilidad o Pérdida del Ejercicio * 100/Ingresos Brutos	5,906,477/ 250,913,520	2.4	7,585,393/ 318,946,739	2.4	0.02
09	Rendimiento de Inversión: Utilidad Operativa * 100/Total del Activo	-6,039,308/ 835,732,689	-1.7	-18,024,595/ 1,075,131,378	-0.7	-0.95
Gestión						
10	Rotación de cuentas por Cobrar: Ventas Netas/Cuentas por Cobrar Comerciales.	250,913,520/ 354,457,535	0.6	318,946,739/ 527,253,995	0.7	-0.10
11	Rotación del Inventario: Costo de Ventas/Existencias	233,223,422/ 49,680,015	2.3	310,240,249/ 132,643,837	4.7	-2.36
12	Gastos Financieros: Gastos Financieros/Ventas Netas	6,289,241/ 250,913,520	0.0746	23,797,591/ 318,946,739	0.0251	0.0495

Appendix D: Analysis of the internal market of *Obras por Impuestos*

Ítem	Región	SIMP Code	Item	Obj. Descripciones	Kind of Project	Total project investment (Soles)	# Users	Investment in Metal buildings (Soles)	Times Impact events
1	ANCASH	26483	INSTALACION DEL PUENTE PEATONAL CAJAN EN LA LOCALIDAD DE TACTA, DISTRITO DE SAN PEDRO DE CHAMPA - HUARI - ANCASH PP INACTIVO	INSTALACION DEL PUENTE PEATONAL CAJAN EN LA LOCALIDAD DE TACTA, DISTRITO DE SAN PEDRO DE CHAMPA - HUARI - ANCASH	Metal Bridge	353,243.26		353,243	2
2	AREQUIPA	26053	CONSTRUCCION DEL PUENTE VEHICULAR Y PEATONAL EL TORO EN LA CARRETERA VECINAL AL CENTRO PUEBLO EL TORO, DISTRITO DE COACHACRA - ISLAY - AREQUIPA	CONSTRUCCION DE PUENTE TIPO VARRON CON MONTANTES DE 30.00 MTS. DE LUZ ENTRE EJES DE APOYO, CON UN ANCHO DE CALZADA DE 5.00 MTS. BERMAS DE 0.30 MTS. A CADA LADO. VEREDAS DE CONCRETO ARMADO DE 0.15 MTS.- ANCHO TOTAL DE LUZ 8.80 MTS.- LA SUPERESTRUCTURA ESTA COMPUESTA POR VIGAS TRANSVERSALES Y LOSA DE CONCRETO F'c=280 KG/CM2, ADECUOS DE ARMADO ESTABILIZADO DE 20 CM DE ESPESOR, 3AS MTS., A LA MARGEN IZQUIERDA Y 15 MTS. A LA MARGEN DERECHA, CON UN ANCHO DE CALZADA DE 5.00 MTS., BERMAS DE 0.30 MTS. Y UN ANCHO DE LA PLATAFORMA DE 6.00 MTS., SEÑALES PREVENTIVAS, INFORMATIVAS, REGULADORAS Y AMBIENTALES. MANTENIMIENTO FUTURO ANUAL Y FORTALECIMIENTO CAJAN TRES AÑOS.	Metal Bridge	25,611,966.00	103,377	25,061,566	12
3	LAMBAYEQUE	20670	CONSTRUCCION DEL PUENTE CARRIZABLE PALO BLANCO, DISTRITO DE CAÑARI - FERREÑIFE - LAMBAYEQUE	PUENTE CARRIZABLE CON VIGAS RETICULADAS Y TABLERO DE CONCRETO ARMADO.	Metal Bridge	541,211.93		541,212	2
4	AREQUIPA	17383	INSTALACION DEL PUENTE VEHICULAR DE INTERSECCION PERUVIBO - PP JUJICO SECCION GUERRA DE ARAHUAYOCAY ITALIA, DISTRITO DE CERRO COLORADO - AREQUIPA - AREQUIPA	Construye en la intersección de 01 puente tipo arco Metálico de 151.00 ml de luz total, con un ancho de plataforma de 32.40 ml, la cual está conformada por 02 calzadas paralelas de 02 carriles de ancho 3.20 cm, el cual tendrá una carpeta de rodadura de 2.5 de espesor, primer tratamiento del terreno mediante el sistema de suelo reforzado (tellos de concreto armado) luego de la construcción de los cimientos para su estabilidad y conformado para soportar la carga y sobrecarga de 0.15 m de espesor en toda su extensión cumpliendo con lo indicado en las especificaciones técnicas antes de la impresión y el perforado respectivo, para luego realizar el laminado y la carpeta asfáltica correspondiente, también se construye veredas de 2.40ml a ambos lados de la vía, bermas de 2.30ml, jardines de 2.30ml y 01 Ducto de ancho 4.00ml, también se contempla el sistema de drenaje de aguas y/o el puente con 02 bocanillos de Fc=200kg/cm2, construcción de 100.00ml de cimiento con concreto	Metal Bridge	13,394,613.00	7,600	161,653	1
5	AREQUIPA	93130	CONSTRUCCION DEL PUENTE PEATONAL PARA EL ACCESO DE LOS ASIENTOS HUMANOS MONTERICO, BRIGAS DE ISLAY Y MIRADOR, DISTRITO DE ISLAY - ISLAY - AREQUIPA	CONSTRUCCION DE UN PUENTE PEATONAL DOBLANTE Y ACCESOS.	Metal Bridge	4,069,625	1,530	3,201,061	3
6	AREQUIPA	15106	CREACION DEL PUENTE PEATONAL PARA EL ACCESO DE LOS ASIENTOS HUMANOS MONTERICO, BRIGAS DE ISLAY Y MIRADOR, DISTRITO DE ISLAY - ISLAY - AREQUIPA	CONSTRUCCION DE UN PUENTE PEATONAL DOBLANTE Y ACCESOS.	Metal Bridge	931,903.00		931,903	2

Estado	Región	EMP Code	Nombre	Obj. Descripción	Estado al Proyecto	Total project investment (Soles)	Estimated of Metal building (Soles)	Time lapse (months)
Viable	AREQUIPA	245813	CONSTRUCCION DE PUENTE VEHICULAR Y PEATONAL, TOMA DE LOS PADRES, QUEBRACA DE LOS MEDIANAS MUJACACHE, DISTRITO DE SOCABAYA - AREQUIPA - AREQUIPA	OBRAS PROFESIONALES: estudio de eficiencia de obra, cota de obra 1 mil, cerco perimetrico provisional de 120 m, cuota de guardiana, etc. - CONSERVACION DEL MEDIO AMBIENTE: program de protección, conformación de bordados, limpieza, limpieza de medio contiguo, etc. - PUENTE VEHICULAR/PUENTE CONCRETO Y ESTRUCTURAL: obras preliminares, demoliciones y desmontajes, movimiento de tierra, concreto simple, concreto armado, concreto, muros de contención, zapatas, parapetos, arcos, etc. - OBRAS DE REORGANIZACION: obras de reorganización y protección de entornos, muros de concreto ciclopeo, muros de retención, estacas, anclajes, de acero cromado, cadenas de muros existentes, etc. - CARRETERAS DE ACCESO: obras preliminares, movimiento de tierra, pavimento, obras y señalización.	Mix Bridge metal/concrete	2,808,461.00	1,128,966	1
REGISTRO EN FASE DE INVERSION	ICA	162525	CONSTRUCCION DE PUENTE CARRIZABLE EN EL SECTOR HUANCATINCO DEL COPP SAN FLOREAN - SAN JUAN DE LUYO Y OTROS - AHIENOS DEL DISTRITO DE CHAVIN - PROVINCIA DE CHINCHA - ICA	Construcción de puente carrizable, entre vega marítima y boca de 30.00 m. de concreto colado sobre cimientos de concreto armado con acceso de grúas tipo caja, 7% rebalzo perimetro tipo caja y limpieza para el mantenimiento del río.	Mix Bridge metal/concrete	2,411.35	430,383	2
REGISTRO EN FASE DE INVERSION	ICA	155652	CONSTRUCCION DEL PUENTE VEHICULAR Y PEATONAL SOBRE EL RIO TEPERAS BLANCAS, SECTOR SANTA FE Y UNION VICTORIA, CIUDAD DE NAZCA, PROVINCIA DE NAZCA - ICA	CONSTRUCCION DE UN PUENTE VEHICULAR Y PEATONAL DE SECCION COMPUESTA QUE UNE LOS SECTORES SANTA FE Y UNION VICTORIA MEDIANTE EL ENLACE DE LAS VIAS AV. LA ESTRELLA Y LA CALE A TIPO DE ESTRUCTURAL. Puentes Mixto. Sección Compuesta con los de concreto y muros de acero. LONGITUD DE PUENTE: 28.00 m. 02 Estribos de Cables, de Concreto Armado 1"x200 kg/m2, de 6.00 m. de altura. CONSTRUCCION DE RAMPA(S) DE ACCESO AL PUENTE VEHICULAR Y PEATONAL (02 Rampas de acceso al Puente, de 35.25 m y 35.70 m, de longitud cada una y con pendientes menores al 5.00%. Construcción de 02 Muros de Soportamiento que contendrán el material de relleno de las rampas de acceso al puente, de 14.00 m. y 67.00 m. de longitud, respectivamente). CONSTRUCCION Y MEJORAMIENTO DE PANTAS Y VEREDAS EN LAS VIAS DE ACCESO AL PUENTE VEHICULAR Y PEATONAL (Pavimentación de 833.50 m2 de aceras en la Calle A, Construcción de 65.30 m. de veredas en la Calle A, Mejoramiento de 76.20 m. de veredas en la Av. La Estrella). CONSTRUCCION DE MUROS DE ENCAUZAMIENTO Y DE PROTECCION DE LA ESTRUCTURA VIAL PROTECTADA (02 Muros de Protección de Riesgo de Acceso aguas arriba y abajo, de concreto ciclopeo de 69 m. y otro de 84 m. de longitud, respectivamente. 02 Muros de Encauzamiento compuestos por arcobridos, agua arriba y abajo, de 50 m. y otro de 25 m. de longitud respectivamente).	Mix Bridge metal/concrete	3,719,588.00	300,631	6
Viable	LA LIBERTAD	61430	MEJORAMIENTO DEL ESTADO MUNICIPAL SAN LUIS, PROVINCIA DE VIRU - LA LIBERTAD	Realización de campo de fútbol con graderías, iluminación de noche, alfombra para tribunas de visitas y estacion; construcción de pista deportiva con arcobridos, arquibancos para hombres y mujeres; Construcción de Canchales, estacion, arquibancos para deportistas, Topografía, Oficina administrativa, caserío de fútbol, biblioteca, biblioteca y departamento construcción de gradas; 02 rubros de arcobridos, rubro de cancha y construcción de cobertizo e iluminación; construcción de estacionamientos, arcobridos, canchales e implementación con áreas de fútbol profesional, banchones para tiro de saque, bancas; banco de concreto adyacente con muros y áreas verdes. - Construcción de los muros deportivos a la población a través de muros de construcción.	Metal ceiling	15,372,184.00	2,615,037	6

Ítem	Región	IMP Code	Sub	Via Descripcioe	Clas of Project	Total project investment [Sales]	\$ Units	Investment of Metal Building [Sales]	Time to putc [months]
11	PIURA	236844	CONSTRUCCION DE PUENTE VEHICULAR Y PEATONAL JAPAN PABLO II Y ACCESOS - PIURA.	EL PROYECTO CONTIENE LA CONSTRUCCION DE UN PUENTE TIPO ARCO METALICO ATRAVESADO DE TABLERO ANTERIOR DE LONGITUD TOTAL ENTRE EJES DE ESTRIBOS 62.00 ML, CON UN TABLERO DE ACCESO ESTRUCTURAL CON UNA LOSA DE CONCRETO ARMADO DE ESPESOR DE 0.206 M, DE DOS CALZADAS CON DOS CARRILES POR CALZADA, SIN BERMA, CENTRAL DE LONGITUD DE 16.20 ML Y CON VEREDAS LATERALES DE 2.40 M DE ANCHO. ESTA SUPERE ESTRUCTURA ESTARA APOYADA SOBRE ESTRIBOS Y ESTE SOBRE UNA CIMENTACION PROFUNDA MEDIANTE PILOTOS DE DIAMETRO DE 120 CM.	Metal Bridge / partial part of the project			12,206,381	18
12	TUMBECS	340888	REHABILITACION MEJORAMIENTO DE COMPUERTAS METALICAS EN MALECON BENAVIDES CON CANAL RECOLECTOR DE AGUAS PLUVIALES DE AV. MARISCAL CASTILLA, DISTRITO DE TUMBES, PROVINCIA DE TUMBES - TUMBES	REHABILITACION Y MEJORAMIENTO DE COMPUERTAS METALICAS EN INTERSECCION AV. MARISCAL CASTILLA Y CALLE MALECON BENAVIDES	Metal Bridge	43,730,051.00	426,838	1,030,371	1
13	HUANCAVELICA	194384	INSTALACION DE PUENTE PUCAPUMI SOBRE EL RIO CHU EN EL DISTRITO DE HUANCAVELICA, PROVINCIA DE HUANCAVELICA - HUANCAVELICA	Creación de un puente (puente tipo arco de sección constante) de una luz libre de 25.00 m, la superestructura completa por una luz de concreto armado de 0.20m de espesor y ancho de la plataforma de 8.00 m (doble vía), con veredas laterales de 1.85 m. La luz está apoyada sobre 04 muros en pilotes, principales de 1.50 m de altura y secundarios con vigas de concreto (tipo trascarrapes) anchuras de 1.00 m de altura. La sub-estructura de apoyo completa se 02 columnas de concreto armado de 0.45 m de altura total, cubiertas con espaldas de 4.00 m de ancho y 3.00 m de alto, completamente adosada de concreto como losa simple horizontal. El puente está provisto con sistemas de seguridad como barandales de protección, muretes de protección como los distribuidores y apoyos en los cimientos. Además de cumplir el acceso para la entrada del puente en ambos extremos del río. Por otro lado se construye un puente adyacente del río con estructura precomprimida de malla de cables de 2, con un volumen de 1950 m ³ de concreto y los pilotes en un banco del río. También se ha completado la adquisición del terreno adyacente al cual consisten de trabajos de excavación y nivelación del terreno de las áreas de cada extremo del puente de acuerdo a las especificaciones de los planos de cada extremo del puente.	Metal Bridge		396,577	3	
14	CAJAMARCA	21359	CREACION DEL PUENTE PEATONAL CHACAPUMA SOBRE EL RIO CHICAMA A LA ALTURA DEL SECTOR CHACAPUMA, DISTRITO DE COSAN - CAJAMARCA - CAJAMARCA	CONSTRUCCION DE UN PUENTE PEATONAL DE 100.00 ML.	Metal Bridge	3,657,357.00		739,059	2

Appendix E: Slides of the Reconstruction Plan Draft related to Bridges



PERÚ
Ministerio de Transportes y Comunicaciones
Proveías Nacional

PLAN DE RECONSTRUCCIÓN CON CAMBIOS

Ministerio de Transportes y Comunicaciones

“FENOMENO NIÑO COSTERO” 2017

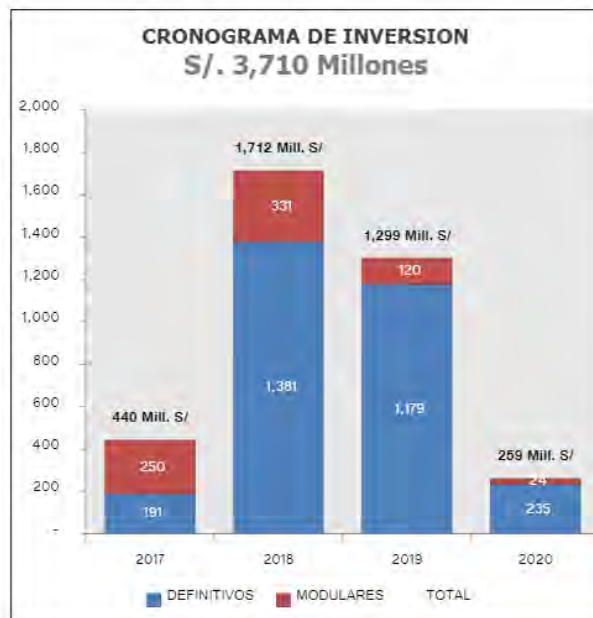
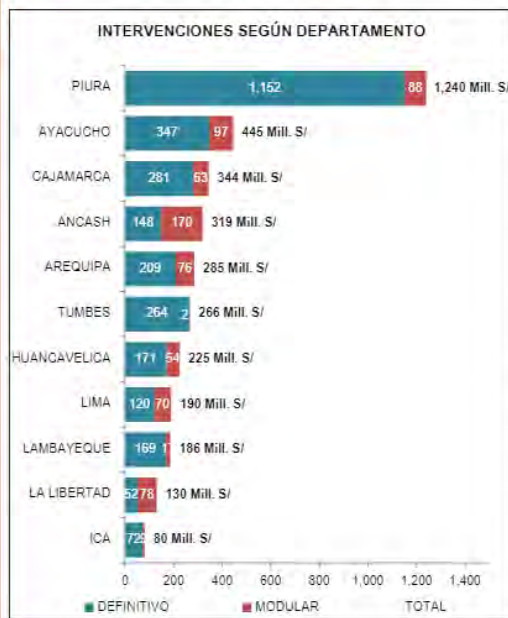




Lima, Mayo 2017

PLAN DE RECONSTRUCCION CON CAMBIOS (RCC)

PROGRAMACION MULTIANUAL DE INVERSIONES
Programa Puentes Nacionales y Sub nacionales



Cuadro Resumen - Programa de PUENTES

Departamentos en Emergencia en red vial nacional y sub nacional

DEPARTAMENTOS	CANTIDAD DE PUENTES			COSTO PUENTES (Mill. S/)		
	DEFINITIVO	MODULAR	TOTAL	DEFINITIVO	MODULAR	TOTAL
TUMBES	30	1	31	264	2	266
PIURA	55	50	105	1,152	88	1,240
CAJAMARCA	28	39	67	281	63	344
LA LIBERTAD	3	44	47	52	78	130
LAMBAYEQUE	15	8	23	169	17	186
ANCASH	12	110	122	148	170	319
LIMA	3	43	46	120	70	190
AYACUCHO	14	71	85	347	97	445
HUANCAVELICA	18	30	48	171	54	225
ICA	8	4	12	72	9	80
AREQUIPA	10	33	43	209	76	285
TOTALES	196	433	629	2,986	724	3,710

PRINCIPALES PUENTES MODULARES CONCLUIR 2017

ITEM	NOMBRE	RUETA	TRAMO	REGION	PROG.	LONG.
1	CHAPIRA	PE-2B	MIRAFLORES - SANTA ANA	PIURA	05+600	33.53
2	PORVENIR	PE-3N	Vado Grande - Huancabamba - Hualapampa	PIURA	1859+800	33.53
3	DESPLAYO	PE-3N	Vado Grande - Huancabamba - Hualapampa	PIURA	1872+000	33.53
4	POZO CLARO	PE-3N	Vado Grande - Huancabamba - Hualapampa	PIURA	1875+600	27.43
5	COIPA	PE-3N	Vado Grande - Huancabamba - Hualapampa	PIURA	1885+300	18.29
6	PARAMO	PE-3N	Vado Grande - Huancabamba - Hualapampa	PIURA	1899+100	30.48
7	HUAVO	PE-3N	Vado Grande - Huancabamba - Hualapampa	PIURA	1910+400	18.29
8	PUENTE 1	PE-1NT	Paimas -HUANCABAMBA	PIURA		30.48
9	PUENTE 2	PE-1NT	Paimas -HUANCABAMBA	PIURA		30.48
10	PUENTE 3	PE-1NT	Paimas -HUANCABAMBA	PIURA		30.48
11	CAJQUES	PE-3N	Sausacocho - Cajabamba	CAJAMARCA	1144+145	9.14
12	LILICHUCO	PE-3N	Sausacocho - Cajabamba	CAJAMARCA	1144+932	9.14
13	CASCASEN	PE-3N	Sausacocho - Cajabamba	CAJAMARCA	1207+690	36.58
14	ALLAUCA	PE-10C	PTE PALLAR- PTE MAMAHUAJE	LA LIBERTAD	200+000	30.48
15	SUYOPAMPA	PE-10C	PTE PALLAR- PTE MAMAHUAJE	LA LIBERTAD	230+000	24.38
16	NUEVO PROGRESO	PE-10C	PTE PALLAR- PTE MAMAHUAJE	LA LIBERTAD	250+000	24.38
17	PATIBAMBA	PE-10C	PTE PALLAR- PTE MAMAHUAJE	LA LIBERTAD		21.34
18	LA PACCHA	PE-10C	PTE PALLAR- PTE MAMAHUAJE	LA LIBERTAD		30.48
19	EL BOSQUE	PE-10C	PTE PALLAR- PTE MAMAHUAJE	LA LIBERTAD		33.53
20	SHACSHA	PE-14A	Emp. PE-3N (Huaraz) - Masin	ANCASH	732+500	30.48
21	SANDIEGO	PE-3N	CARAZ - CORONGO	ANCASH	663+744.5	30.48
22	CARRIZAL	PE-14D	DESVIO ANRA - PTE COPUMA - HUACAYBAMBA	ANCASH	02+000	18.29
23	BATAN	PE-14D	DESVIO ANRA - PTE COPUMA - HUACAYBAMBA	ANCASH	3+315	15.24
24	GUERRERORAGRA	PE-22A	MALA - CALANGO - SAN JUAN DE TANTARACHE	LIMA	58+850	18.29
25	CARHUAN	PE-22A	MALA - CALANGO - SAN JUAN DE TANTARACHE	LIMA	67+600	18.29
26	MAYOLI	PE-22A	MALA - CALANGO - SAN JUAN DE TANTARACHE	LIMA	67+600	25.00

PRINCIPALES PUENTES MODULARES CONCLUIR 2017

ITEM	NOMBRE	RUTA	TRAMO	REGION	PROG.	LONG.
27	Playa 1	PE-28H	PE-28B (Rosario) - Tribolina - Sivia - Llochegua - Mayapo - Canayre - TZOMAVENI	AYACUCHO	66+625	15.24
28	canayre	PE-28H	PE-28B (Rosario) - Tribolina - Sivia - Llochegua - Mayapo - Canayre - TZOMAVENI	AYACUCHO	80+338.39	140.21
29	SANTA ROSA	PE-26	IZCUCHACA - HUANCAVELICA - MAYOCC	HUANCAVELICA	72+050	18.29
30	PULLO	PE-15L	CARRETERA PE - 15L	AREQUIPA	121+075	33.53
31	huario	PE-15L	CARRETERA PE - 15L	AREQUIPA		30.48
32	huacclay	PE-15L	CARRETERA PE - 15L	AREQUIPA		30.48
33	Mencoriari	PE-28C	San Francisco - Quimbiri - Puerto Ene - San Martin de Pangoa - Mazamari	JUNIN	50+620	21.34
34	Ajos	PE-28C	San Francisco - Quimbiri - Puerto Ene - San Martin de Pangoa - Mazamari	JUNIN	53+000	21.34
35	Sonaro	PE-28C	San Francisco - Quimbiri - Puerto Ene - San Martin de Pangoa - Mazamari	JUNIN	58+600	21.34
36	Mahuanca	PE-28C	San Francisco - Quimbiri - Puerto Ene - San Martin de Pangoa - Mazamari	JUNIN	63+000	9.14
37	Valero 1	PE-28C	San Francisco - Quimbiri - Puerto Ene - San Martin de Pangoa - Mazamari	JUNIN	64+000	9.14
38	Valero 2	PE-28C	San Francisco - Quimbiri - Puerto Ene - San Martin de Pangoa - Mazamari	JUNIN	64+600	9.14
39	Libertad	PE-28C	San Francisco - Quimbiri - Puerto Ene - San Martin de Pangoa - Mazamari	JUNIN	66+700	12.19
40	Chiquitirca	PE-28I	Emp. PE-28B (L.D. Cusco en San Francisco) - Santa Rosa - San Miguel - Emp PE-28B (Tambo)	JUNIN	100+600	12.19
41	Tojate	PE-28I	Emp. PE-28B (L.D. Cusco en San Francisco) - Santa Rosa - San Miguel - Emp PE-28B (Tambo)	JUNIN	108+500	12.19
42	Warmamayo	PE-28I	Emp. PE-28B (L.D. Cusco en San Francisco) - Santa Rosa - San Miguel - Emp PE-28B (Tambo)	JUNIN	108+800	21.34
43	San Antonio	PE-28I	Emp. PE-28B (L.D. Cusco en San Francisco) - Santa Rosa - San Miguel - Emp PE-28B (Tambo)	JUNIN	142+300	21.34
44	Roki	PE-28C	San Francisco - Quimbiri - Puerto Ene - San Martin de Pangoa - Mazamari	JUNIN	62+308	12.19
45	Morapau	PE-28C	San Francisco - Quimbiri - Puerto Ene - San Martin de Pangoa - Mazamari	JUNIN	69+208	12.19
46	Pizaca	PE-28C	San Francisco - Quimbiri - Puerto Ene - San Martin de Pangoa - Mazamari	JUNIN	71+808	12.19
47	Cimahu	PE-28C	San Francisco - Quimbiri - Puerto Ene - San Martin de Pangoa - Mazamari	JUNIN	72+008	12.19

PRINCIPALES PUENTES MODULARES CONCLUIR 2017

ITEM	NOMBRE	RUTA	TRAMO	REGION	PROG.	LONG.
46	Pizaca	PE-28C	San Francisco - Quimbiri - Puerto Ene - San Martin de Pangoa - Mazamari	JUNIN	71+808	12.19
47	Cimahu	PE-28C	San Francisco - Quimbiri - Puerto Ene - San Martin de Pangoa - Mazamari	JUNIN	72+008	12.19
48	Fevalen	PE-28C	San Francisco - Quimbiri - Puerto Ene - San Martin de Pangoa - Mazamari	JUNIN	72+608	12.19
49	VITOC	PE-24B	San Ramon - Uchubamba - Quero - Molinos - Masma - Ataura	JUNIN		30.48
50	MALA ALMA	PE-24B	San Ramon - Uchubamba - Quero - Molinos - Masma - Ataura	JUNIN		30.48
51	TULUMAYO	PE-24B	San Ramon - Uchubamba - Quero - Molinos - Masma - Ataura	JUNIN		30.48
52	YANANGUITO	PE-24B	San Ramon - Uchubamba - Quero - Molinos - Masma - Ataura	JUNIN		30.48
53	TSORONTARY	PE-55B	EMP. PE-55(DV. BAJO KIMIKIRI) - CAPACHARI - DV. PUERTO OCOPA	JUNIN	54+034.7 1	33.53
54	INETO	PE-55B	EMP. PE-55(DV. BAJO KIMIKIRI) - CAPACHARI - DV. PUERTO OCOPA	JUNIN	62+173.5 3	33.53
55	KATARUHSARI	PE-55B	EMP. PE-55(DV. BAJO KIMIKIRI) - CAPACHARI - DV. PUERTO OCOPA	JUNIN	48+667	33.53

Red Vial Nacional – ANCASH: Programa de PUENTES

41 Puentes

12 Puentes
Definitivos

29 Puentes
Modulares



Red Vial Nacional – PIURA: Programa de PUENTES


70 Puentes

55 Puentes
Definitivos

15 Puentes
Modulares



Appendix F: Construction Budget of the Bridges YUNCULMAS, PUELLAS and CHIVIS

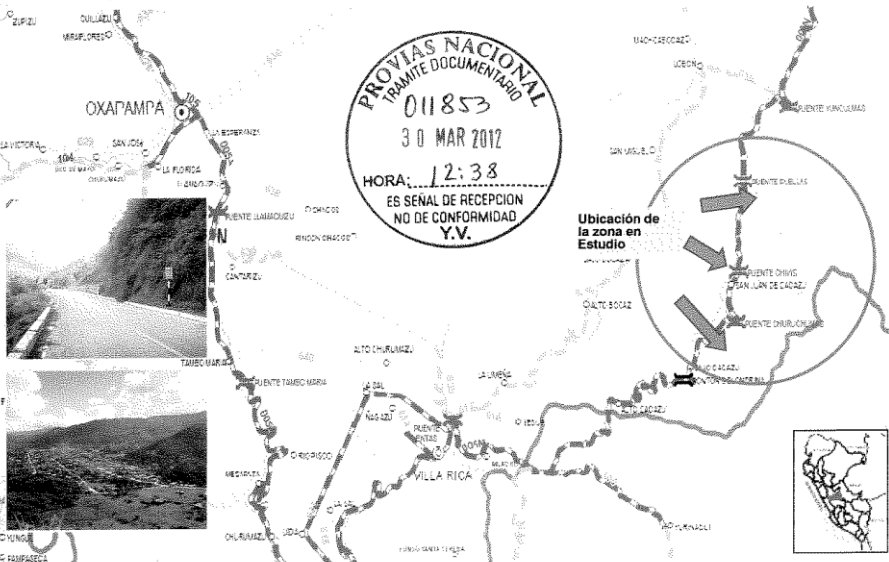


PERÚ Ministerio de Transportes y Comunicaciones

MINISTERIO DE TRANSPORTES Y COMUNICACIONES
PROYECTO ESPECIAL DE INFRAESTRUCTURA DE TRANSPORTE NACIONAL
PROVIAS NACIONAL
CONTRATO N° 123-2009-MTC/20

Servicio de Consultoría de Obras para la Elaboración del :
"ESTUDIO DEFINITIVO DE LOS PUENTES YUNCULMAS, PUELLAS Y CHIVIS Y ACCESOS"

DISTRITO DE VILLA RICA, PROVINCIA DE OXAPAMPA, DEPARTAMENTO DE PASCO





INFORME N° 04 : INFORME FINAL
"PUENTE PUELLAS"

VOLUMEN 07 : PRESUPUESTO DE OBRA, ANALISIS DE PRECIOS UNITARIOS

MARZO 2012

CONSULTOR:
CONSORCIO TRES PUENTES
(VERA & MORENO S.A. CONSULTORES DE INGENIERIA - ING. FLORIANO PALACIOS LEÓN)

 **VERA & MORENO S.A.** CONSULTORES DE INGENIERIA  **FLORIANO PALACIOS LEÓN - INGENIERO**

S10

Página 1

Presupuesto

Presupuesto
Subpresupuesto
Cliente
Lugar

0406002 "ESTUDIO DEFINITIVO DEL PUENTE PUELLAS Y ACCESOS".
001 "ESTUDIO DEFINITIVO DEL PUENTE PUELLAS Y ACCESOS".
S10 S.A.
PASCO - OXAPAMPA - VILLA RICA

Costo al 31/12/2011

015

Item	Descripción	Und.	Metrado	Precio \$/.	Parcial \$/.
	PUENTE				1,420,760.85
01.01	TRABAJOS PRELIMINARES				221,013.22
01.01.01	MOVILIZACION Y DESMOVILIZACION DE EQUIPOS	glb	1.00	146,332.47	146,332.47
01.01.02	TRAZO Y REPLANTEO	m2	7,019.08	2.24	15,722.74
01.01.03	DESBROCE Y LIMPIEZA	ha	0.29	3,187.06	924.25
01.01.04	DESVIO DE RIO	m3	600.00	3.34	2,004.00
01.01.05	ACCESO A CANTERAS, FUENTES DE AGUA Y DME.	km	0.52	6,506.52	3,383.39
01.01.06	MANTENIMIENTO DE TRANSITO Y SEGURIDAD VIAL	mes	6.00	5,416.42	32,498.52
01.01.07	DESVIO PROVISIONAL DE CARRETERA	glb	1.00	20,147.85	20,147.85
01.02	ESTRIBOS				468,425.22
01.02.01	EXCAVACION PARA ESTRUCTURAS EN SECO	m3	57.51	7.20	414.07
01.02.02	EXCAVACION PARA ESTRUCTURAS BAJO AGUA	m3	1,304.53	14.04	18,315.60
01.02.03	CONCRETO f'c= 100 kg/cm2 BAJO AGUA	m3	17.86	282.95	5,053.49
01.02.04	ACERO DE REFUERZO fy= 4200 Kg/cm2	kg	34,389.52	4.73	162,662.43
01.02.05	ENCOFRADO CARA NO VISTA BAJO AGUA	m2	469.21	101.66	47,699.89
01.02.06	ENCOFRADO CARA NO VISTA EN SECO	m2	299.10	57.43	17,177.31
01.02.07	ENCOFRADO CARA VISTA EN SECO	m2	160.14	80.10	12,827.21
01.02.08	CONCRETO f'c=210 kg/cm2 BAJO AGUA	m3	269.50	384.47	103,614.67
01.02.09	CONCRETO f'c=210 kg/cm2 EN SECO	m3	76.66	337.09	25,841.32
01.02.10	RELLENO PARA ESTRUCTURAS CON MATERIAL PROPIO	m3	1,225.84	31.42	38,515.69
01.02.11	RELLENO PARA ESTRUCTURA CON MATERIAL DE PRESTAMO	m3	663.73	52.49	34,839.19
01.02.12	TRANSPORTE Y ELIMINACIÓN DE MATERIAL EXCEDENTE	m3	136.20	10.75	1,464.15
01.03	VIGAS DE ACERO ESTRUCTURAL				554,466.24
01.03.01	FABRICACIÓN DE ESTRUCTURA METÁLICA	t	54.34	6,643.06	360,983.88
01.03.02	PINTURA ANTICORROSIVA Y ARENADO	m2	881.87	28.03	24,718.82
01.03.03	PINTURA ESMALTE EPOXICO	m2	881.87	19.61	17,293.47
01.03.04	PINTURA PARA ACABADO DE POLIURETANO	m2	881.87	21.94	19,348.23
01.03.05	TRANSPORTE DE ESTRUCTURA METALICA A OBRA	t	56.13	360.10	20,212.41
01.03.06	MONTAJE DE ELEMENTOS METALICOS	t	54.34	2,059.43	111,909.43
01.04	LOSA DE CONCRETO Y VEREDAS				111,456.82
01.04.01	ENCOFRADO CARA VISTA	m2	459.08	80.10	36,772.31
01.04.02	ACERO DE REFUERZO fy= 4200 Kg/cm2	kg	7,028.17	4.73	33,243.24
01.04.03	CONCRETO f'c=210 kg/cm2	m3	14.69	337.09	4,951.85
01.04.04	CONCRETO fc = 280 kg/cm2	m3	70.58	381.23	26,907.21
01.04.05	RIEGO DE LIGA	m2	371.98	1.65	613.77
01.04.06	CARPETA ASFALTICA EN FRIO	m2	371.98	24.11	8,968.44
01.05	LOSA DE APROXIMACION				14,497.02
01.05.01	EXCAVACION PARA ESTRUCTURAS EN SECO	m3	17.64	7.20	127.01
01.05.02	ENCOFRADO CARA NO VISTA EN SECO	m2	13.08	57.43	751.18
01.05.03	ACERO DE REFUERZO fy= 4200 Kg/cm2	kg	1,417.40	4.73	6,704.30
01.05.04	CONCRETO fc = 280 kg/cm2	m3	17.64	381.23	6,724.90
01.05.05	TRANSPORTE Y ELIMINACIÓN DE MATERIAL EXCEDENTE	m3	17.64	10.75	189.63
01.06	VARIOS				50,902.33
01.06.01	JUNTA DE DILATACIÓN	m	16.10	344.42	5,545.16
01.06.02	APOYOS DE NEOPRENO TOPE LATERAL Y LONGITUDINAL	u	10.00	139.82	1,398.20
01.06.03	APOYOS DE NEOPRENO REFORZADO	u	6.00	617.32	3,703.92
01.06.04	TUBOS DE DRENAJE	u	20.00	11.39	227.80
01.06.05	TUBERÍA PARA VEREDAS	m	163.20	19.20	3,133.44
01.06.06	ACABADO DE VEREDAS	m	81.60	11.93	973.49
01.06.07	BARANDAS METALICAS	m	81.60	235.04	19,179.26
01.06.08	BRUÑAS ROMPE AGUA EN LOSA	m	81.60	8.80	718.08
01.06.09	PARAPETOS DE CONCRETO	m	81.60	196.36	16,022.98
02	ACCESOS				1,108,184.83
02.01	MOVIMIENTO DE TIERRAS				323,811.67
02.01.01	EXCAVACION EN EXPLANACIONES EN MATERIAL COMUN	m3	2,499.35	4.15	10,372.30



ESTUDIO DEFINITIVO DE LOS PUENTES
Y UNICULMAS, PUELLAS Y CRIVIS Y ACCESOS

Ing. Francisco Arellano Gómez
Jefe de Estudio

LUIS ENRIQUE BENDEZU VELARDE
INGENIERO CIVIL
Reg. CIP N° 43296





PERÚ Ministerio
de Transportes
y Comunicaciones

MINISTERIO DE TRANSPORTES Y COMUNICACIONES
PROYECTO ESPECIAL DE INFRAESTRUCTURA DE TRANSPORTE NACIONAL

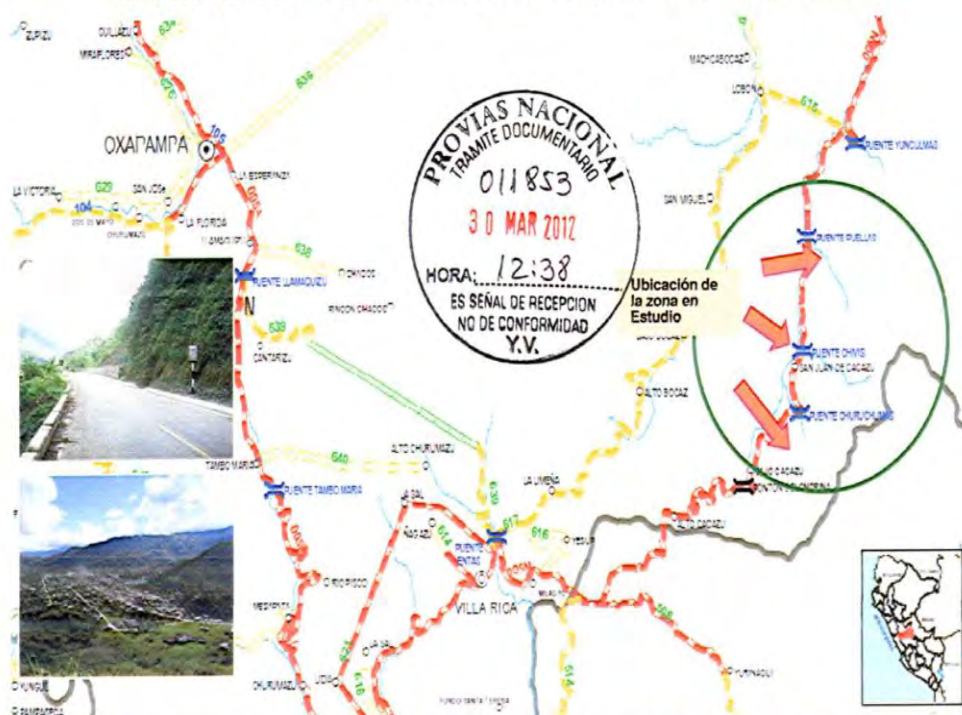
PROVIAS NACIONAL

CONTRATO N° 123-2009-MTC/20

Servicio de Consultoría de Obras para la Elaboración del :

"ESTUDIO DEFINITIVO DE LOS PUENTES YUNCULMAS, PUELLAS Y CHIVIS Y ACCESOS"

DISTRITO DE VILLA RICA, PROVINCIA DE OXAPAMPA, DEPARTAMENTO DE PASCO



INFORME N° 04 : INFORME FINAL "PUENTE CHIVIS"

VOLUMEN 07 : PRESUPUESTO DE OBRA, ANALISIS DE PRECIOS UNITARIOS

MARZO 2012

CONSULTOR:

CONSORCIO TRES PUENTES

(VERA & MORENO S.A. CONSULTORES DE INGENIERIA - ING. FLORIANO PALACIOS LEÓN)



VERA & MORENO S.A.
CONSULTORES DE INGENIERIA



FLORIANO PALACIOS LEÓN - INGENIERO

S10

Página

1

Presupuesto

Presupuesto 0406001 "ESTUDIO DEFINITIVO DEL PUENTE CHIVIS Y ACCESO".
 Subpresupuesto 001 "PUENTE CHIVIS Y ACCESOS"
 Cliente S10 S.A.
 Lugar PASCO - OXAPAMPA - VILLA RICA

Costo al 31/12/2011

015

Item	Descripción	Und.	Metrado	Precio \$/.	Parcial \$/.
	PUENTE				1,379,948.99
01.01	TRABAJOS PRELIMINARES				224,244.27
01.01.01	MOVILIZACION Y DESMOVILIZACION DE EQUIPOS	glb	1.00	144,394.64	144,394.64
01.01.02	TRAZO Y REPLANTEO	m2	7,596.11	2.23	16,939.33
01.01.03	DESBROCE Y LIMPIEZA	ha	0.27	3,187.06	860.51
01.01.04	DESVIO DE RIO	m3	720.00	3.34	2,404.80
01.01.05	ACCESO A CANTERAS, FUENTES DE AGUA Y DME.	km	0.32	6,415.52	2,062.97
01.01.06	MANTENIMIENTO DE TRANSITO Y SEGURIDAD VIAL	mes	6.00	5,416.42	32,498.52
01.01.07	DESVIO PROVISIONAL DE CARRETERA	glb	1.00	25,093.50	25,093.50
01.02	ESTRIBOS				432,035.19
01.02.01	EXCAVACION PARA ESTRUCTURAS EN SECO	m3	298.78	7.20	2,151.22
01.02.02	EXCAVACION PARA ESTRUCTURAS BAJO AGUA	m3	850.75	14.04	11,944.53
01.02.03	CONCRETO f'c= 100 kg/cm2 BAJO AGUA	m3	78.28	276.68	21,668.51
01.02.04	ACERO DE REFUERZO fy= 4200 Kg/cm2	kg	26,735.39	4.73	126,458.39
01.02.05	ENCOFRADO CARA NO VISTA BAJO AGUA	m2	320.08	101.66	32,539.33
01.02.06	ENCOFRADO CARA NO VISTA EN SECO	m2	316.57	57.43	18,180.62
01.02.07	ENCOFRADO CARA VISTA EN SECO	m2	194.54	80.10	15,582.65
01.02.08	CONCRETO f'c=210 kg/cm2 BAJO AGUA	m3	202.34	378.31	76,547.25
01.02.09	CONCRETO f'c=210 kg/cm2 EN SECO	m3	119.26	330.82	39,453.59
01.02.10	RELLENO PARA ESTRUCTURAS CON MATERIAL PROPIO	m3	1,030.98	31.42	32,393.39
01.02.11	RELLENO PARA ESTRUCTURA CON MATERIAL DE PRESTAMO	m3	1,173.92	46.30	54,352.50
01.02.12	TRANSPORTE Y ELIMINACIÓN DE MATERIAL EXCEDENTE	m3	114.55	6.75	773.21
01.03	VIGAS DE ACERO ESTRUCTURAL				554,236.95
01.03.01	FABRICACIÓN DE ESTRUCTURA METÁLICA	t	54.34	6,643.06	360,983.88
01.03.02	PINTURA ANTICORROSIVA Y ARENADO	m2	881.87	27.77	24,489.53
01.03.03	PINTURA ESMALTE EPOXICO	m2	881.87	19.61	17,293.47
01.03.04	PINTURA PARA ACABADO DE POLIURETANO	m2	881.87	21.94	19,348.23
01.03.05	TRANSPORTE DE ESTRUCTURA METALICA A OBRA	t	56.13	360.10	20,212.41
01.03.06	MONTAJE DE ELEMENTOS METALICOS	t	54.34	2,059.43	111,909.43
01.04	LOSA DE CONCRETO Y VEREDAS				106,148.89
01.04.01	ENCOFRADO CARA VISTA	m2	420.73	80.10	33,700.47
01.04.02	ACERO DE REFUERZO fy= 4200 Kg/cm2	kg	6,736.05	4.73	31,861.52
01.04.03	CONCRETO f'c=210 kg/cm2	m3	14.69	330.82	4,859.75
01.04.04	CONCRETO f'c = 280 kg/cm2	m3	70.58	374.85	26,456.91
01.04.05	RIEGO DE LIGA	m2	364.11	1.65	600.78
01.04.06	CARPETA ASFALTICA EN FRIJO	m2	364.11	23.81	8,669.46
01.05	LOSA DE APROXIMACION				12,883.85
01.05.01	EXCAVACION PARA ESTRUCTURAS EN SECO	m3	16.15	7.20	116.28
01.05.02	ENCOFRADO CARA NO VISTA EN SECO	m2	12.20	57.43	700.65
01.05.03	ACERO DE REFUERZO fy= 4200 Kg/cm2	kg	1,248.22	4.73	5,904.08
01.05.04	CONCRETO f'c = 280 kg/cm2	m3	16.15	374.85	6,053.83
01.05.05	TRANSPORTE Y ELIMINACIÓN DE MATERIAL EXCEDENTE	m3	16.15	6.75	109.01
01.06	VARIOS				50,399.84
01.06.01	JUNTA DE DILATACIÓN	m	16.20	344.42	5,579.60
01.06.02	APOYOS DE NEOPRENO TOPE LATERAL Y LONGITUDINAL	u	10.00	139.82	1,398.20
01.06.03	APOYOS DE NEOPRENO REFORZADO	u	6.00	617.32	3,703.92
01.06.04	TUBOS DE DRENAJE	u	20.00	11.39	227.80
01.06.05	TUBERÍA PARA VEREDAS	m	163.20	19.20	3,133.44
01.06.06	ACABADO DE VEREDAS	m	81.60	11.86	967.78
01.06.07	BARANDAS METALICAS	m	81.60	229.35	18,714.96
01.06.08	BRUÑAS ROMPE AGUA EN LOSA	m	81.60	8.80	718.08
01.06.09	PARAPETOS DE CONCRETO	m	81.60	195.54	15,956.06
02	ACCESOS				716,819.13
02.01	MOVIMIENTO DE TIERRAS				94,238.71
02.01.01	EXCAVACION EN EXPLANACIONES EN MATERIAL COMUN				2,743.15



LUIS ENRIQUE BENDEZU VELARDE
 INGENIERO CIVIL
 Reg. CIP N° 43296

Ing. Francisco Arellano Gómez
 Jefe de Estudio
 CIP 14296



**Appendix G: Previous Bridges projects selection schedule processes under the Modality
of Obras por Impuestos**



GOBIERNO REGIONAL PIURA

**COMITÉ ESPECIAL
Ley N° 29230**

**BASES DEL PROCESO DE SELECCIÓN DE LA EMPRESA
PRIVADA
QUE FINANCIARÁ Y SE ENCARGARÁ DE LA EJECUCIÓN DE
PROYECTOS DE INVERSIÓN PÚBLICA**

**PROCESO DE SELECCIÓN
RES N° 001-2016/LEY 29230/GRP
(PRIMERA CONVOCATORIA)**

CODIGO SNIP N° 236644

**FINANCIAMIENTO Y EJECUCIÓN DEL PROYECTO:
"CONSTRUCCION DE PUENTE VEHICULAR Y PEATONAL
JUAN PABLO II Y ACCESOS - PIURA"**

ANEXO N° 1

**CRONOGRAMA DEL PROCESO DE SELECCIÓN
GOBIERNO REGIONAL PIURA
COMITÉ ESPECIAL LEY N° 29230**

Actividades	De	Hasta
1. Convocatoria y publicación de Bases, incluyendo el formato de Convenio	05 de febrero de 2016	05 de febrero de 2016
2. Recepción de expresiones de interés de empresas (*)	08 de febrero de 2016	19 de febrero de 2016
3. Presentación de consultas y observaciones a las Bases (**)	08 de febrero de 2016	19 de febrero de 2016
4. Absolución simultanea de consultas y observaciones a las Bases	22 de febrero de 2016	02 de marzo de 2016
5. Integración de Bases y su publicación en el Portal Institucional	03 de marzo de 2016	03 de marzo de 2016
6. Presentación de Propuestas, a través de los Sobre N°1, 2 y 3 (Acto Público)	11 de marzo de 2016 Lugar: Salón Vip 2 del Gobierno Regional Piura Hora: 10:00 hrs.	
7. Evaluación y Calificación de Propuestas Técnica y Económica	14 de marzo de 2016	17 de marzo de 2016
8. Resultados de la Evaluación y Calificación de las propuestas en el Portal Institucional y Otorgamiento de la Buena Pro	18 de marzo 2016	
9. Suscripción del Convenio entre el Gobierno Regional y la Empresa Privada (en cuanto se haya completado la documentación respectiva)	21 de marzo 2016	01 de abril de 2016

* En la Oficina de Trámite Documentario del Gobierno Regional de Piura ubicada en Av. Ramón S/N Urb. San Eduardo, El Chipe Piura, en el siguiente horario: 8:00 am a 1:00pm y 14:30 pm a 16:00 pm

**Por escrito en Oficina de Trámite Documentario del Gobierno Regional Piura ubicada en Av. Ramón S/N Urb. San Eduardo, El Chipe Piura, en el siguiente horario: 8:00 am a 1:00pm y 14:30 pm a 16:00 pm

CEPRI
UNIDAD ESPECIALIZADA
PROMOCIÓN DE LA
INVERSIÓN PRIVADA

MUNICIPALIDAD DISTRITAL DE ECHARATI
REGIMEN ESPECIAL, N° 005-2017-LEY 29230-CE-MDE/LC-1

**BASES DEL PROCESO DE SELECCIÓN DE LA EMPRESA
PRIVADA PARA EL FINANCIAMIENTO Y EJECUCIÓN DEL
PROYECTO DE INVERSIÓN PÚBLICA EN EL MARCO DE LA LEY
N° 29230**

BASES INTEGRADAS

**REGIMEN ESPECIAL N° 005-2017-LEY 29230-CE-
MDE/LC-1**

**CONTRATACIÓN DE LA EJECUCIÓN Y FINANCIAMIENTO DEL
PROYECTO DE INVERSIÓN PÚBLICA:**

CONSTRUCCIÓN **PUENTE CAROZABLE ECHARATI, DISTRITO DE
ECHARATE - LA CONVENCION - CUSCO (SNIP 226107)**

ECHARATI, JUNIO 2017

MIEMBRO TITULAR

PRESENTE

MIEMBRO TITULAR



ANEXO N° 2

CALENDARIO DEL PROCESO DE SELECCIÓN

ETAPA	FECHA
Convocatoria y publicación de Bases	05/06/2017
Presentación de Expresiones de interés (*)	Del 06/06/2017 Hasta 13/06/2017 (10 días hábiles contados a partir del día siguiente de la publicación en el diario de circulación nacional)
Presentación de consultas y observaciones a las Bases (**)	Del 06/06/2017 Hasta 13/06/2017 (Dentro del mismo plazo establecido para Expresión de Interés)
Absolución de consultas y observaciones a las Bases	Del 14/06/2017 Hasta 16/06/2017 (plazo máximo de tres (3) días hábiles contados desde el vencimiento del plazo para la presentación de consultas y observaciones)
Integración de Bases y su publicación en el Portal Institucional	19/06/2017 (Al día hábil siguiente de absueltas las consultas o vencido plazo para presentarlas)
Presentación de Propuestas, a través de los Sobres N° 1, N° 2 y N° 3, y Evaluación de Propuesta Económica	27/06/2017 (Al tercer día hábil de integradas las Bases) a horas 11.00 am en el Auditorium de la Municipalidad de Echarati la presentación será en acto público
Evaluación de Propuesta Técnica	27/06/2017 (el mismo día de presentada) acto privado
Resultados de la Evaluación de las Propuestas y Otorgamiento de Buena Pro, Suscripción del Convenio de Inversión entre la Entidad Pública y la Empresa Privada (**)	27/06/2017 (el mismo día de presentada) acto público 19/07/2017 (Dentro de los 15 días hábiles de consentida la Buena Pro)



*En mesa de partes de la Municipalidad sito en la plaza de armas del poblado de Echarati en el siguiente horario: de 08:30 a 13:00 y de 14:00 a 17:00

El Comité Especial puede prorrogar los plazos previstos en el Calendario del proceso de selección, y, asimismo, sin expresión de causa puede suspender el proceso de selección, si así lo estimare conveniente, sin incurrir en responsabilidad alguna como consecuencia de ello. Asimismo, a solicitud de la Entidad Pública puede cancelar el proceso, aún luego de adjudicada la Buena Pro y hasta antes de la fecha prevista para el cierre.

MUNICIPALIDAD PROVINCIAL DE SATIPO
COMITÉ ESPECIAL LEY N° 29230

**BASES ESTÁNDAR DEL PROCESO DE SELECCIÓN DE LA EMPRESA
PRIVADA PARA EL FINANCIAMIENTO Y EJECUCIÓN
DE PROYECTO DE INVERSIÓN PÚBLICA**

PROCESO DE SELECCIÓN N° 001-2015-CE/MPS - LEY 29230

**ELABORACIÓN DEL EXPEDIENTE TÉCNICO Y LA EJECUCIÓN DEL PROYECTO
"REHABILITACIÓN DEL **PUENTE** COLGANTE CARROZABLE SOBRE EL
RIO SATIPO BOCA HUANTASHIRI, DISTRITO DE SATIPO, PROVINCIA DE
SATIPO – JUNIN"**

*Aprobadas mediante Resolución de la Dirección de Inversiones
Descentralizadas N° 002-2014-PROINVERSIÓN-DID*

Formuladas en noviembre de 2015

ANEXO N° 1
CRONOGRAMA DEL PROCESO DE SELECCIÓN
MUNICIPALIDAD PROVINCIAL DE SATIPO
COMITÉ ESPECIAL LEY N° 29230

PROCESO DE SELECCIÓN DE EMPRESAS PRIVADAS PARA EJECUTAR PROYECTOS EN
EL MARCO DE LA LEY N° 29230

CRONOGRAMA DEL PROCESO

Actividades	De	Hasta
1. Convocatoria y publicación de Bases, incluyendo el formato de Convenio	15/11/2015	
2. Recepción de expresiones de interés de empresas (*)	17/11/2015	30/11/2015
3. Presentación de consultas y observaciones a las Bases (**)	17/11/2015	30/11/2015
4. Absolución de consultas y observaciones a las Bases	01/12/2015	
5. Integración de Bases y su publicación en el Portal Institucional	02/12/2015	
6. Presentación de Propuestas, a través de los Sobre N° 1, 2 y 3.	03/12/2015	
7. Evaluación y Calificación de Propuestas Técnica y Económica	04/12/2015	
8. Resultados de la Evaluación y Calificación de las propuestas en el Portal Institucional	04/12/2015	
9. Otorgamiento de la Buena Pro	04/12/2015	
10. Suscripción del Convenio entre la Entidad Pública y la Empresa Privada (en cuanto se haya completado la documentación respectiva)	Se comunicará mediante circular	