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FACULTY OF LAW  
SCHOOL OF INTERNATIONAL STUDIES**

**TOPIC:**

**" FEASIBILITY STUDY OF THE IMPLEMENTATION OF A VERIFYING INSPECTION  
AGENCY FOR EXPORTS OF MINERALS"**

Thesis project prior to obtaining a Bachelor's Degree in  
International Studies with a bilingual minor in Foreign  
Trade

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## **DEDICATION**

This thesis is dedicated to my family and Pedro Andrés, since they were, without a doubt, the greatest source of support throughout this journey and who always encouraged me to see the best of each situation.

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## **ABSTRACT**

The main objective of this project is to answer the question of whether it feasible or not to establish an inspection agency that verifies foreign trade and is specialized in exports of mineral concentrates. This analysis was made through the examination of the results of a market study carried out through structured surveys with the producers of mineral concentrates, whether they are natural or legal entities. The technical and financial analysis of the current situation of the market of production and commercialization of mineral concentrates were fundamental guidelines to be able to obtain conclusions. In order to carry out this paper, a bibliographic review was carried out to base important terms and concepts. It was determined that there is feasibility in the implementation of said project as it is profitable and can be achieved in the medium term.



## **INTRODUCTION**

The present project was conducted since there is an opportunity in the market for the insertion of a new inspection body that verifies exports of mineral concentrates. As time passes, techniques improve, so the production of mineral concentrates is constantly growing as well as the exports of this product to the world. To export such material, an inspection body is required to carry out quality control to provide security and confidence to both the buyer and the seller. Thanks to this process, buyers can be sure that the goods are the products agreed on and negotiated. In the same way, these inspections are carried out prior to the shipment of the containers, so they guarantee that the material is not altered and that it keeps its integrity until its arrival at customs. This is why the implementation of an inspection body implies a series of steps that guarantee the certainty and veracity of the reports issued. Thus, the company must have an accreditation by the regulatory body, which in this case is the Service of Ecuadorian Accreditation (SAE). In order to determine if the implementation of this organization is feasible or not, a market research, a technical analysis of compliance with the requirements and a financial analysis to determine its profitability were carried out. Primary information was researched and collected by the author and secondary information obtained from official sources.

## **CHAPTER 1**

### **SCOPE OF THE PROJECT**

The aim of this project was to determine the feasibility of the implementation of an inspection body type foreign trade verification specialized in exports of mineral concentrates. The inspection body is planned to be located in the province of El Oro due to its high mining production, which includes the minerals concentrates. The market study presented below was carried out in that area and it is the primary source of information for this project.

The performance of the inspection body is focused on the documentary visual inspection of said exports. It should be clarified that a visual documentary inspection is the non-intrusive verification of the products, in which it must be verified that these are the ones agreed upon in the negotiation, how they are loaded, towed and sent, as well as their weights and other characteristics. In the case of irregularities, these are notified to the person requesting the service. All these activities are documented by the inspectors with photos and recordings that serve as a record to provide security to traders in their negotiations.

In order for the agency to perform its functions, it must have a certification that guarantees that the work it carries out is impartial and reliable, which is why the Ecuadorian Accreditation Service (SAE) intends to obtain certification for the exercise of activities.

## MARKET RESEARCH

### 1.1 FUNDAMENTAL CONCEPTS

The objective of this chapter was to theoretically establish concepts and terms that are necessary for the development of this research. In this section topics such as process management systems, quality management, mining, mineral concentrates and others will be discussed. The definition of terms and concepts that must be clarified to facilitate their understanding and development which include the following:

Foreign trade: According to Ernesto Sbriglio (2001), there is a small differentiation between foreign trade and international trade, both of which can commonly be understood as synonyms. The first can be defined as *"the act of trade between residents of a country (Exporter) with those of another foreign State (Importer), covered by administrative, banking and tax collections and solemnities, which both laws require regarding the matter."* (p.15). International trade is understood as *"a set of commercial and financial movements, developed by States and individuals or States among themselves, worldwide"* (15). This demonstrates that foreign trade refers to an act that takes place unilaterally of the country that negotiates with the outside, while international trade embraces a more globalized vision, which is multilateral.

Exports: Within the dynamics of foreign trade, exports are understood as *"the exit of goods, capital and services destined abroad"* (Borisov, Zhamin, & Makarova, 2017, p.95).

Imports: Regarding the concept of imports in foreign trade, it can be defined as *"the introduction of goods, capital and foreign services in the domestic market of a country. The importation of one country corresponds to the export of another."* (Borisov, Zhamin, & Makarova, 2017, p.120).

Verifiers: Among the figures that operate in Ecuadorian foreign trade are verifiers, which are defined by the former Ecuador Customs Corporation (CAE) now the National Customs Service of Ecuador (SENAE) as *"private companies authorized by the Ecuadorian*

*Customs Corporation that perform the services of physical inspection of the goods, verifying its nature, quantity, classification, weight, value, among others" (2).*

Mineral Concentrates: As a result of the activities carried out by mining companies, materials of different physical forms and consistencies can be obtained, so that, after the processing of the raw ore taken from the mines, the final result are the mineral concentrates which are defined as *"The product obtained after the ore extracted from the mine goes through crushing, grinding and flotation processes. Each mineral concentrate has different elements that make it up"* (Huby, 2014, p.12). The mineral concentrates have different characteristics. Their components can vary between contents of gold, silver, copper, zinc. In some cases, they can be combinations of these minerals. Also, the physical characteristics of the mineral concentrates can vary in weight, consistency and viscosity. These are packaged inside "big bags" for proper storage.

Market research: This is a fundamental part of the development of this project because of the necessary information it provides to facilitate decision making about feasibility. There is wide variety of bibliography on the subject of market research, which is defined as *"the planning, collecting and analysis of relevant data for marketing decision-making and the communication of the results of this analysis to management"* (MCDaniel & Gates, 2016, p.4). Naresh Malhotra also defines market research as *"the identification, collection, analysis and dissemination of information in a systematic and objective manner, with the purpose of improving the decision-making related to the identification and solution of problems and opportunities of marketing"* (Malhotra, 2008, p.7).

Supply and Demand: In terms of economy, supply and demand are always closely linked, since one depends on the other. Therefore, according to Michael Parkin (2009), demand can be defined as *"the number of wishes or unlimited yearnings that people have for goods and services, while supply is the quantity of goods or services that can be profitably produced to be offered in the market"* (p.53). In this paper, the offer corresponds to the number of existing verifiers in the market willing to provide inspection services, while the demand would be the number of producers or marketers of mineral concentrates who are willing to use the service of a pre-shipment inspection body.

Processes: It is essential to clarify the concept of processes since it refers to the development of steps to follow to achieve a result. In this case, when dealing with the study of an inspection body, process controls must be emphasized. Therefore, a process can be considered as *"... a totality that fulfills a complete objective and that adds value for the client. This unit is a wealth creation system that initiates and ends transactions with customers in a certain period of time. Each activation of the process corresponds to the processing of a transaction, in an irreversible way, for that reason the concepts of temporality and "arrow of time" are used"* (Bravo, 2008).

Process management: After having clarified the definition of process, the process management must be taken into consideration. A concept that adequately describes the process management is that of Juan Bravo (2008), who states that a *"Process management is a systemic way to identify, understand and increase the added value of a company's processes to comply with its business strategy and raise the level of customer satisfaction. (p.21).*

*"Process management based on the systemic vision allows for the increase of productivity and management control to improve key variables"* (Bravo, 2008, p.23, 24). Also, according to Bravo (2008), process management influences the integration of concepts and techniques that allow for the improvement of the performance of processes, whether new or already existing within an organization. Process management helps achieve a correct administration and distribution of tasks to exercise controls and corrections effectively and efficiently, and to facilitate decision making in an appropriate manner.

Quality: The implementation of an inspection body, which in this case is a verifier, goes hand in hand with quality, since inspection is a guarantee that reduces the possibility of any type of error or non-conformity. As a result, it is necessary to determine what quality encompasses to offer services that meet the needs of consumers. According to the American Society for Quality (2018), quality can be defined as *"the set of functions and characteristics of a product, process or service that give it the necessary capacity to meet the needs of a specific user"* (15). Likewise, in accordance with the International Standard Organization (ISO), which is the world reference in terms of quality management and

standardization systems, it defines quality as *"the degree to which a set of inherent characteristics complies with the requirements"* (International Standard Organization, 2015). When taking into account several quality concepts, Joseph Jurán (1993) should also be mentioned since he believes that *"... quality has multiple concepts, of which the most representative is that quality are those characteristics that the customer wants to achieve their satisfaction; likewise, quality consists in freedom after overcoming deficiencies. Therefore, according to this author, quality is ultimately defined as the suitability for its use"*. Also, Edward Deming (1988) considers quality as *"... translate the future needs of users into measurable characteristics, only then can a product be designed and manufactured to satisfy a price that the client will pay; quality can be defined only in terms of the agent"* (p.2). As a result, it can be concluded that quality seeks to adapt to the needs of customers to meet their requirements and expectations in a sustainable manner while offering goods and services that meet parameters that are constantly improving. It also means the elimination of possible errors and managing controls over failures to avoid reoccurrence. Therefore, in the case of verifiers, the implementation of quality is combined with the veracity of the reports and inspections generated by their actions, which forces institutions to exercise rigorous controls over the level of quality and also the personnel in charge of the process.

Quality management: Quality management is highly important since it manages and controls processes and tasks. Thanks to quality management, possible problems or inconveniences can be corrected and the necessary modifications can be made to offer products and services that achieve customer satisfaction. Thus, the ISO (2015) defines quality management as *"the set of coordinated activities that direct and control an organization in relation to quality. It generally includes the establishment of quality policy and quality objectives, as well as planning, control, assurance and quality improvement."*

Feasibility study: According to Baca (2006), the feasibility study consists of *"... deepening research into primary and secondary sources in market research, detailing the technology that will be implemented, determining total costs and profitability, this being the basis on which investors are supported to make a decision"*(p. 38). In the same way for Nassir Sapag the feasibility study seeks: *"... to determine if it is possible physically or materially*

*to carry out a project, and in some cases, it is possible to evaluate the technical capacity of all the resources of the company"* (Sapag, 2007). In this study, it is essential to highlight that a feasibility study was applied, being this its main objective. The feasibility study was carried out to determine if the project can be carried out profitably and efficiently by analyzing the results obtained from the investigation.

## **1.2 BACKGROUND**

Since the early beginnings of the development of societies, humans have been closely linked with trade. This changed over the years, starting from the barter and the exchange of products, to the peak of its current expression that consists of conducting negotiations through electronic means in which physical presence nor being within the same time zone are required to conduct business in real time. Currently, negotiations and trade are carried out using the different tools that have been provided as a result of globalization, thus resulting in the multilateral relations that exist today that facilitate communication, transportation, collections and other activities of the current trade.

As part of the modification and adaptation of trade to respond to changing situations in the economy, international trade was developed to facilitate exchange of goods and services between countries. Currently, it is governed and controlled through different international organizations which are based on the will of the parties, in this case the States, who sign different agreements to achieve equity and stability within the international scope of trade to promote cooperation and development.

In the same way, mining in all of its forms has had a strong link to trade since its inception. According to the Royal Spanish Academy, mining is the art of working in mines for the extraction of minerals. Taking this into account, this economic activity is considered as one of the most profitable primary activities in the world. Ecuador is considered a country that produces raw materials, and mining can be considered one of these activities. Mining within the Ecuadorian context has varied over the years and has faced technical standards in comparison to past decades, which is why mining is not currently marketed only as extracted materials, but also as processed materials. Data from the Central Bank of Ecuador in its Mining Report of July 2018 shows the gross added value of the exploitation

of non-metallic minerals and other activities for mines and quarries. The data between 2007 to 2017 establishes that the GDP value has increased from 0.12% to 0.17%. (See Table 1).

**Table 1: GROSS ADDED VALUE BY MINING INDUSTRY / PERCENTAGE OF GDP**

Years	Mining of metallic minerals	Mining of non-metallic minerals and support activities for mines and quarries	Mining and quarrying
2007	0.17	0.12	0.29
2008	0.20	0.13	0.33
2009	0.18	0.13	0.31
2010	0.19	0.13	0.32
2011	0.18	0.14	0.32
2012	0.21	0.14	0.36
2013	0.22	0.15	0.38
2014	0.26	0.16	0.41
2015	0.26	0.17	0.42
2016 (sd)	0.28	0.18	0.45
2017 (p)	0.32	0.17	0.49

SOURCE: BCE, 2018

Similarly, data from the Central Bank of Ecuador demonstrates the evolution of mining exports, specifically gold and silver, from 2005 to 2018 (April). The data shows that mining exports are more representative as of 2011, reaching its highest point in 2014 with a value of \$25,724.40. Its decrease in the following years was due to the control exercised over illegal mining and small-scale mining. (See Table 2).





**Table 2: EVOLUTION OF MINING EXPORTS (2005-2018)**

<b>Year</b>	<b>Total Exports</b>	<b>Gold Exports</b>	<b>Silver Exports</b>	<b>Gold and Silver Total</b>	<b>Gold and Silver Export/ Total Exports</b>
	USD FOB MILLIONS	USD FOB MILLIONS	USD FOB MILLIONS	USD FOB MILLIONS	PERCENTAGE
2005	10,100.0	17.4	0.0	17.4	0.17
2006	12,728.1	34.5	0.1	34.6	0.27
2007	14,321.3	67.1	0.4	67.4	0.47
2008	18,818.3	16.4	0.0	16.4	0.09
2009	13,863.1	22.0	0.0	22.0	0.16
2010	17,489.9	33.9	-	33.9	0.19
2011	22,322.4	131.6	2.1	133.7	0.60
2012	23,764.8	392.3	2.1	394.4	1.66
2013	24,750.9	434.0	1.0	435.0	1.76
2014	25,724.4	1,002.1	1.5	1,003.6	3.90
2015	18,330.6	681.8	0.9	682.7	3.72
2016	16,797.7	261.9	0.3	262.2	1.56
2017	19,122.5	124.4	0.1	155.0	0.81
2018*	7,053.6	58.3	-	58.3	0.83

**SOURCE: BCE**

The Mining Regulation and Control Agency (ARCOM) also provides figures that show the production of mineral concentrates, specifically those of gold and copper in the El Oro and Azuay areas, where these products are processed. Despite the lack of a wide variety of the statistical data offered, the production of mineral concentrates is registered as of 2011, and has been increasing year after year. It can be seen in Table 3 that production decreased in 2017, which was the result of the implementation of controls on small mining producers and illegal mining.

**Table 3: REPORTED NATIONAL MINING PRODUCTION**

<b>REPORTED NATIONAL MINING PRODUCTION</b> <b>MINING CONTROL AND REGULATION AGENCY</b> <b>MINING MONITORING AND CONTROL MANAGEMENT</b>								
<small>AGENCIA DE REGULACION Y CONTROL MINERO</small>  								
MINERAL/YEARS	2011	2012	2013	2014	2015	2016	2017	TOTAL
ORO (grs.)	4923326	5138939	8676420	7322108	7722800	6761471	6176304	11099630,4
SILVER (grs.)	1589056	2934238	1198390	577052,2	2521406	934051	67726	1656782,33
COPPER (lb)	0		0			0	0	533400
GOLD CONCENTRATE (ton.)	5401,77	4100262	963374,8	873858,1	73887,35	70894,51	115774,5	6087678,99
COPPER CONCENTRATE (ton.)	953,54		945548,1	596630	7169,973	200926,6	40960,71	1751228,24
SOURCE: SYSTEM OF MINING RIGHTS ADMINISTRATION (SADMIN)								
* Provisional data								

**SOURCE: ARCOM**

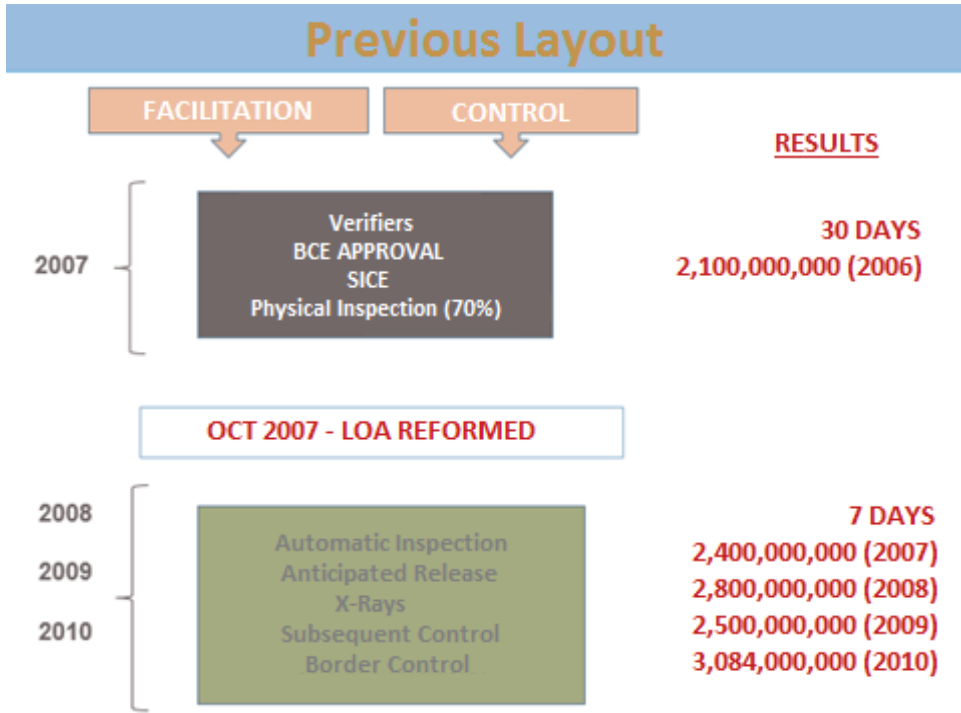
With the diversification of mining, mineral concentrates began to appear and increased the flow of mining production and the commercialization of them both nationally and internationally. In order for mineral concentrates to be sold at an international level, a process must be completed to make successful exports. In Ecuador, there are requirements to achieve the production of concentrates as established by the Mining Regulation and Control Agency (ARCOM), which is responsible for verifying the most optimal conditions at the time of extraction and production. This government entity works in agreement with other state entities such as the Ministry of Environment (MAE), Ministry of Public Health (MSP), and the Ministry of Labor to ensure that the activities carried out by mining companies do not affect the environment, nor the physical and moral integrity of workers.

Once the production requirements have been regularized, the next step is the negotiation process, which can be done directly between producers and a mineral trading company. The export process can be carried out by companies that will export and sell the concentrates internationally. In the same way, the export process can also be completed directly by the producers as long as they meet the necessary requirements, which include the possession of mining concession of their own or a lease contract on the area being worked on, ensuring that all workers are provided insurance in accordance with provisions

of the Ministry of Labor are complying with the environmental practices and permits provided by the Ministry of the Environment, among others.

A fundamental factor needed to be able to carry out the commercialization of mineral concentrates is the endorsement of a verifier, which fulfills the function of inspecting, checking and guaranteeing that the product being marketed is the correct one and complies with the characteristics that have been negotiated. This also guarantees the integrity of the product from the pre-shipment stage until its arrival at customs for the departure from the port of origin, and if necessary, until the arrival at the port of destination.

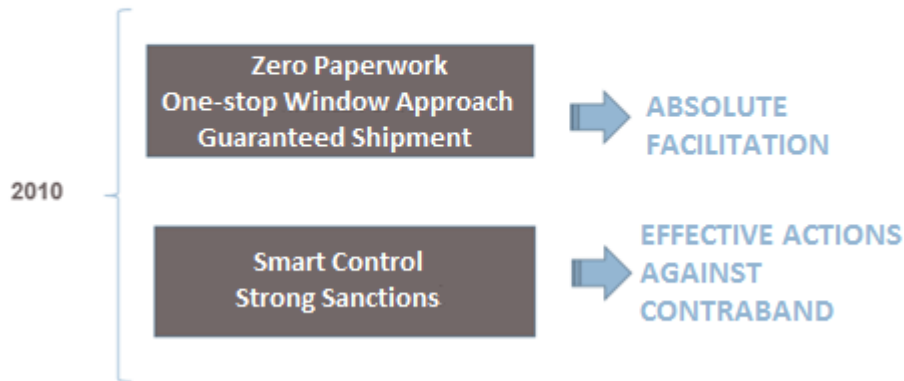
Until 2008, the endorsement of verifiers in Ecuador was a mandatory requirement to carry out imports and exports. Regulations were described in the Resolution of the Board of Directors of the Ecuadorian Customs Corporation (CAE) 14-2001-R2 of October 12th, 2001, which required the verifiers' authorization for imports over \$4,000 US dollars (SENAE, 2004). However, in 2009, with the change of government headed by Economist Rafael Correa Delgado, it was considered that the seal of approval of verifiers was unnecessary. In turn, the verifiers certification was eliminated, repealing said resolution and transferring the inspection activities carried out by the verifiers to the then CAE, now known as the National Customs Service of Ecuador. (SENAE). These activities were replaced and the four verifiers who maintained concession agreements with CAE at the time they were closed. The operating permits were revoked as a result of the reforms made to the Organic Law of Customs in October 2007, when the inspection activities in the port of origin that had previously been carried out by the verifiers were replaced and the customs entity were then in charge of these duties. The change of operation was in accordance with the layouts found in Figure 1 and 2 provided by SENAE.



**Figure 1: LAYOUT OF SENA E PRIOR TO REFORMS**

**SOURCE: SENA E**

## New Expected Layout



**Figure 2: NEW LAYOUT OF SENAE AS OF 2007**

**SOURCE: SENAE**

At the moment of this writing, verifiers still play a role in the foreign trade processes, nevertheless, these are not mandatory to import or export. Verifiers are used in a contractual manner between the buyer and the seller to guarantee integrity and generate confidence in the negotiation. In the same way, these services are used privately according to the nature of the products and by the contracting parties. Verifiers in Ecuador are currently accredited for operation by the Accreditation Service of Ecuador (SAE), which outlines the processes so that a legal entity meets the pre-established requirements to be recognized as an inspection body within the country. The requirements issued by the SAE must be complied with fully and compulsorily, since the foreign trade verifiers' functions are to carry out inspections that guarantee the quality of the product being marketed. Therefore, accuracy is fundamental, as well as compliance with quality control and proper management of processes internally to achieve reliable results and the objectives proposed by the organization.

## **1.3 MARKET RESEARCH**

The analysis of the feasibility of the implementation of an inspection body of a private nature, oriented towards exportable materials from mining activities such as mineral concentrates, is necessary because it is considered that the possible supply of entities that carry out this inspection activity are considerably low, which could be a reason why the costs of carrying out the verification are high. In the same way, it should be mentioned that the requirements that existed in the previous Organic Customs Law, which governed until 2007 with the change of the Ecuadorian Customs Corporation for the National Customs Service of Ecuador, were really high in costs and demands on the part of the State, since in these requirements the verifiers worked as the States' dealers. For these reasons, in 2009, there were only four companies authorized by the State that offered this service and because of the new reforms, they had to stop operating. The verifiers' role in relation to mineral concentrates exports consists of carrying out a pre-shipment inspection of the product before being placed inside the container, which ensures the integrity of the concentrates that are being negotiated, both in quantity, quality and status. This inspection is done under conditions agreed upon by the negotiating parts, which are the producer or seller and the buyer. In the inspection process, seals are placed that can only be removed by the customs authority and the verification company issues a report which describes the conformities and, if applicable, the non-conformities that may be found at the time of inspection. The possible irregularities must be notified and analyzed by any of the interested parties. It must be emphasized that, within this type of mineral exports, the verifiers still play an import role despite not being mandatory within the country, since the product being negotiated is delicate and susceptible to irregularities and changes.

### **1.3.1 INTERVIEW WITH AN EXPERT**

As part of the market research conducted to obtain more information on mining production, especially of mineral concentrates, and to be able to determine the current situation of mining in general, a survey was conducted with an expert on the subject. The person interviewed was Patricio Álvarez Rodríguez, a mining engineer who graduated from the Universidad del Azuay and has been working in the mining area in the El Oro

area for more than 20 years. He agreed to an interview that lasted approximately 50 minutes. In the interview, many of the questions that were previously prepared were answered, as well as others that arose during the interview that were necessary to clarify any doubts about this procedure. The interview consisted of the following questions:

- Do you consider that the production of mineral concentrates is on the rise?

Yes, because the process has changed from the normal extraction procedures to the production of mineral concentrates. This is because the gold values contained in the known deposits have been gradually decreasing over time, so the processes change as the gold laws<sup>1</sup> decrease. Thus, the flotation processes that are carried out are more affordable and eco-friendlier, reducing costs and emissions since cyanide is not used in this type of mining production. In addition, the recovery of minerals that have low grades is more efficient by means of the flotation process that is suitable for the production of concentrates.

-How do you consider the activities of the State within the mining field?

I think that mining controls are positive as long as a balance can be found to benefit all the parties involved. In this case, there is an abuse of the control on mining activities, and the demands by the government are too exhaustive in terms of the frequency and requirements of the controls. In addition, there are situations in which they do not know how to assess certain types of controls. The mining sector should be given more slack, especially the artisan sector, since the people who work in this sector generate work and income, unlike the large and medium-scale mining in which profits go to other sectors since the regulations written in the contracts to use local labor and to promote the social development of the areas where mining is carried out are not always fulfilled. Among government control entities are professionals with little training on specific issues, which distort the activities that the government intends to do, and in certain cases these officials are the ones that cause irregularities within the processes.

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<sup>1</sup> A Mineral Law or Laws refers to the contained and expressed amount of the mineral within a deposit.

- Is it feasible to carry out mining production nowadays, specifically mineral concentrates?

In recent years, mining has changed. Before it was 100% cyanidation and gravimetry, but nowadays, 90% of the mining material processing plants carry out flotation processes because they involve simpler operations. Additionally, the reagents that are used within this process pollute the environment less since they are bio-degradable. Also, the newer process is also much more profitable because its operating cost is cheaper than others, which in turn allows for profits to rise.

-Which mineral concentrates are the most popular in the negotiation market?

When it comes to negotiations, the type of marketer or company that purchases mineral concentrates should be taken into account since there are different types of requirements. For example, exports to China show a preference for arsenic gold concentrates because in this country, ecological and environmental restrictions are not as demanding and they allow imports with this "contamination". However, in Europe there is a preference for copper concentrates without arsenic, since arsenic is a penalized mineral because of its smelting process, which does not comply with the established environmental laws. As a result, if any mineral concentrate that contains arsenic enters Europe, a high fine would have to be paid because of pollution.

-What is your perspective about the export process of mineral concentrates?

It can be said that the market is distorted, since the regulations set by the previous government went against the trading companies and prevented them from negotiating concentrates and exporting abroad. These regulations caused the trading companies to export the concentrates through the producers, which is a process that creates a fictitious export in which the exporter became the producer. This is why I think that the regulation terms for this type of trade should be revised, since it will generate benefits to the producers themselves and to the marketers, since the exports can be carried out without the producers.



-What is your opinion about the current offer of foreign trade verifiers, at the time of pre-shipment inspection?

It seems to me that there is a monopoly in this sector since in our country there is only one verifier in charge of the inspections of this branch. This verifier does not have a national certification, yet it operates with its international accreditation because it is a multinational company. It is important to mention that no local company has been able to obtain a verifier certification.

- Why do you think that there is no greater offer in the market in terms of verifiers?

I believe that the conditions of the organisms that grant the permits and regulations for the creation or constitution of the verifiers are very strict or require extremely high guarantees that do not allow small companies to obtain an operating permit to become a verification body.

- How does the verification of the export product guarantee that it has the agreed upon characteristics?

When verifying a product, a sampling of the export product is carried out simultaneously and/or individually to each of the "big bag" containers within which the mineral concentrates are contained. This sampling is carried out by randomly puncturing the body of the big bag. Once the sampling is done, the verifier proceeds to place the security seals in each of the big bags to guarantee the integrity of its content. The samples obtained are sent to metallurgical laboratories to ensure the content of the existing minerals are the same. This action is carried out by the people or company in charge of taking samples.

- Do you consider there to be conformity between the activity carried out by the verifiers and the costs of carrying out the inspection?

No, there is not conformity since the costs are high for exporters. If there were more companies that worked in this field, the prices would be self-regulated. The price is also too high due to the extra transportation costs since the offices of these companies are

located in cities such as Guayaquil or Quito, which increases the value of verification even more.

- How common is the use of a verifier in the export of mineral concentrates?

Due to the high costs, the exporting and marketing companies have stopped using their services; however, it is a very important stage in the export process because it allows the interested parties to be sure that the concentrates are the ones that they purchased and that they are embarked in an integral way. However, there are companies or people who prefer to export without prior verification and submitting directly to physical capacity as the costs are not profitable at the time of export.

- Do you believe that it is necessary to use the services of a verifier when exporting mineral concentrates?

I think that the verification services are very important, especially to speed up the process when transferring the mineral from the export container to its final destination. This is due to the fact that inspection can last two or three days or even more since it is placed on a waiting list because an intrusive physical inspection must be applied, which lengthens the export process. As explained before, a verification gives security both to the producer and the buyer in that the products sent are the net concentrates in the amounts previously agreed upon in the negotiation, and there are no inconveniences or irregularities in these.

### **1.3.2 INVESTIGATION DESIGN**

#### **INFORMATION NEEDED**

The information needed for this market research is qualitative and quantitative, which was collected from the producers of mineral concentrates from the El Oro area. The information was collected in an impartial manner to guarantee the veracity of the investigation. The aim was to obtain information about the behavior of mineral concentrates producers when selecting the verifying services. Based on this information, an analysis of whether it is feasible or not to implement a verifying inspection body in this area was carried out.

## COLLECTION OF SECONDARY DATA

To collect secondary data, it was important to use official sources that guarantee their reliability. In this case, the data provided by the Central Bank of Ecuador was used to obtain information about mineral exports that have occurred in 2018 and the income that these have generated to the country. Additionally, data from the Ministry of Energy and Mines and the Mining Regulation and Control Agency was used to obtain information about the large-scale mining projects that have governmental support. The Mining Report was also used since it presents the results obtained by this economic activity in 2018. The news and press bulletins was also taken into account as a secondary source, as well as the National Customs Service of Ecuador to obtain the information that previously controlled the verification companies prior to their shut down. Likewise, information was provided by the Ecuadorian Accreditation Service to determine the requirements that will then be analyzed to decide its feasibility.

## COLLECTION OF PRIMARY DATA

As for the collection of the primary data, an interview was conducted with the mining engineer Patricio Álvarez Rodríguez, who has worked in the El Oro area for more than 20 years, and owns a mining laboratory in the zone. This expert has experience in the area of negotiations of mineral concentrates and in the activities carried out by the verifiers. The interview lasted approximately 50 minutes where it was possible to obtain information of great importance that helped to guide and resolve any doubts. Another primary source was the surveys applied to the producers and marketers of mineral concentrates, which was the universe to be analyzed, since they directly use the services provided by the verifiers when negotiating their products prior to the export process.

## SCALING TECHNIQUES

A nominal scaling technique was used in this project since the data in the questions of the surveys applied were a label to facilitate the tabulation and accounting of the answers obtained and to avoid confusion. Also, the questions had multiple choice boxes to select the available options.

## THE MAKING OF THE SURVEY AND THE PILOT-TEST

The survey applied was conducted to obtain the information needed to carry out this project. It included closed questions, which were distributed among dichotomous, multiple choice and selection questions. The survey aimed to reflect the preferences of the universe being studied when selecting a verification company. In the same way, the satisfaction obtained when using the verifying bodies was also analyzed, as well as the possibility and openness of the producers and marketers of concentrates to use the services of a new company in the market. The perception of the cost-benefit ratio in terms of the services provided by the current verifying companies was also considered. The pilot test was conducted on 20 individuals who were part of the universe. It was found that there were minimal errors that should be corrected prior to the application of the final survey, since they made it difficult to understand the questions and could distort the information obtained. In the same way, some words were replaced by other more common and simpler ones that facilitated the understanding of the questions. There was a total of 11 questions in the survey which included a multiple-choice question with several possible answers, five dichotomous questions and five selection questions. For the most part, only one answer was allowed to avoid confusion and to make the investigation simpler.

## SAMPLING TECHNIQUE

For the samples used in the investigation, the universe to be studied was constituted by the producing companies and the commercializing companies of the mineral concentrates. To obtain the sample size, the corresponding calculations were made using the following formula:

$$n = \frac{z^2(p \times q)}{e^2 + \frac{(z^2(p \times q))}{N}}$$

In which:

N = Population size

n = Sample size

$z$  = Confidence level

$p$  = Proportion of the population with the desired characteristic

$q$  = Proportion of the population without the desired characteristic

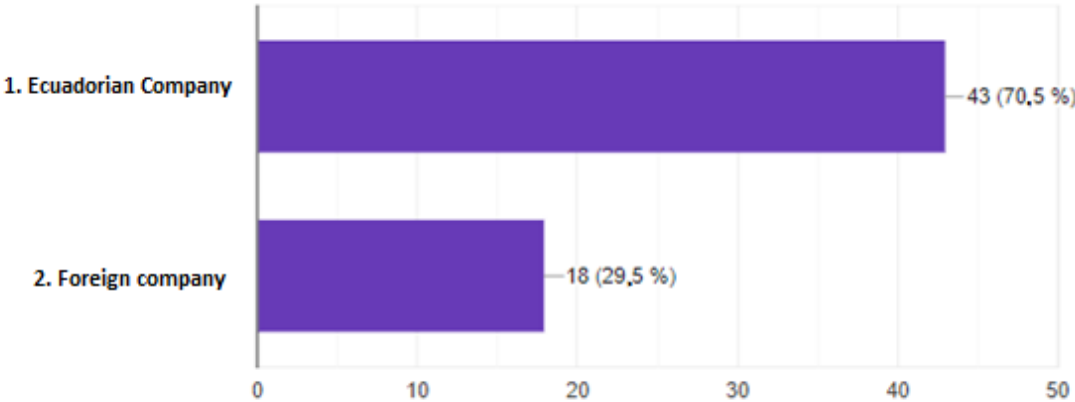
$e$  = Level of residual error

In order to obtain the size of the sample, a margin of error of 5% was considered, with a confidence level of 95% and with a universe or population size of 73. From this it was possible to obtain as a result a sample size of 51, which means the formula must be applied to 51 people or companies that are part of the universe that will be analyzed.

## FIELD WORK

The fieldwork began by making a phone call to all of the people who were a part of the sample in order to give a short introduction about the subject and request collaboration at the time of receiving the survey. The survey was as an electronic Google survey to facilitate the connection, since the people involved generally lived within the production sites which are difficult to access, since the mining plants are far from populated areas and permits are required to enter them. Once the call was made, the survey was sent, which lasted approximately 15 minutes.

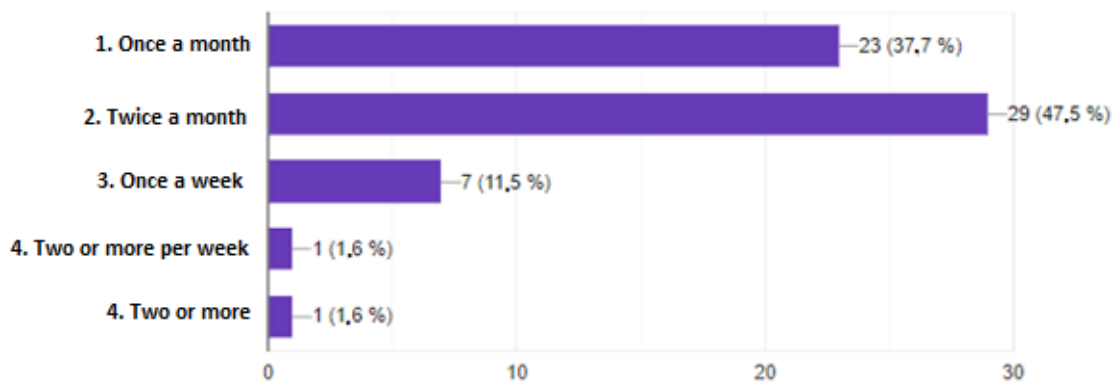
RESULTS:



**Figure 3: TYPE OF COMPANY**

**SOURCE: AUTHOR.**

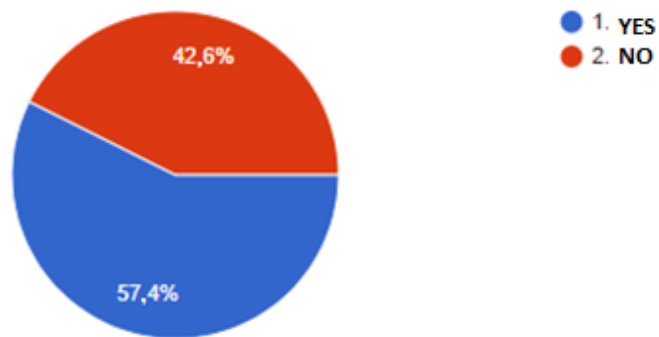
In the first question of the survey, 70.5% of respondents belong to companies that produce domestic mineral concentrates, that is, 43 respondents, while 18 respondents, representing 29.5%, belong to foreign companies.



**Figure 4: FREQUENCY OF COMMERCIALIZATION OF MINERAL CONCENTRATES**

SOURCE: AUTHOR.

Thirty-seven-point seven percent of the respondents, that is, 23 respondents, carry out the commercialization of mineral concentrates once a month; 29 respondents (47.5%), sell their product twice a month, this being the most common; 11.5% of respondents sell once a week, while 3.2% represented by 2 respondents market concentrates two or more times per week which is the least common of all the options presented.

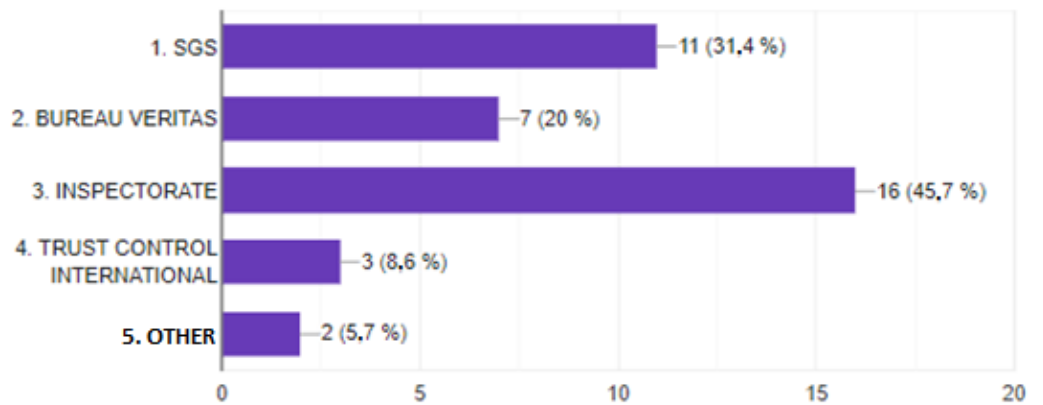


**Figure 5: COMMERCIALIZED / EXPORTED MINERAL CONCENTRATES USING THE SERVICES OF A VERIFIER**

SOURCE: AUTHOR.

Of the total people surveyed, 42.6% or 26 respondents do not use a verifier's service when marketing their products. On the other hand, 35 respondents representing 57.4% do use the verification service to market mineral concentrates.

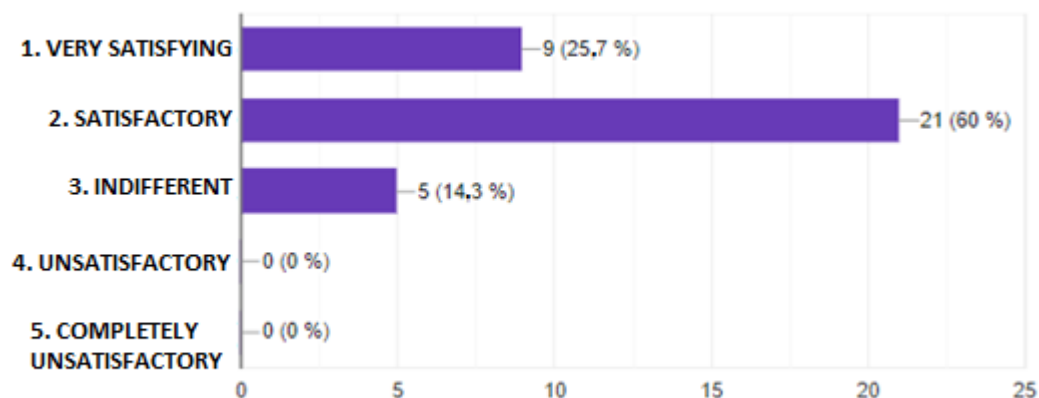




**Figure 6: VERIFYING COMPANY USED**

SOURCE: AUTHOR.

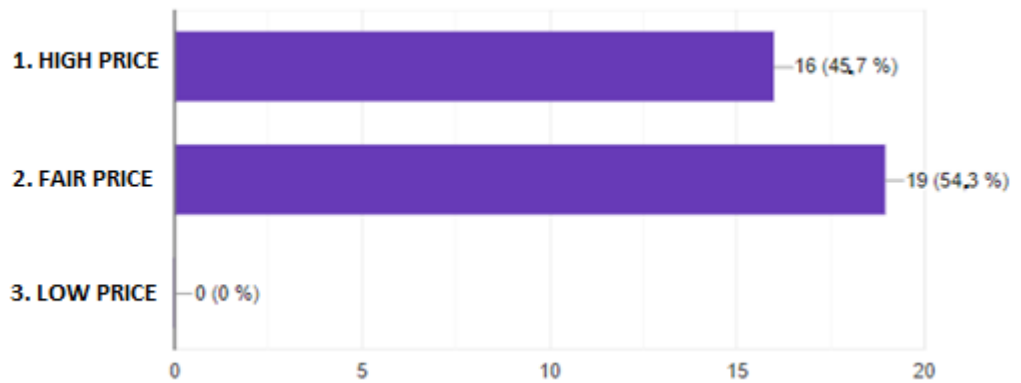
Of the companies with greater recognition according to this survey, 11 respondents, (31.4%) have carried out their verification with S.G.S, 20% or 7 respondents have done the verification with Bureau Veritas, 45.7% represented by 16 respondents prefer Inspectorate services being this the most used company; Trust Control International represents 8.6% of respondents, while others that have not been specified represent 5.7% corresponding to 2 respondents. It should be noted that respondents had the option of choosing more than one option, which is why 4 respondents chose two options.



**Figure 7: LEVEL OF SATISFACTION WITH VERIFYING SERVICES**

SOURCE: AUTHOR.

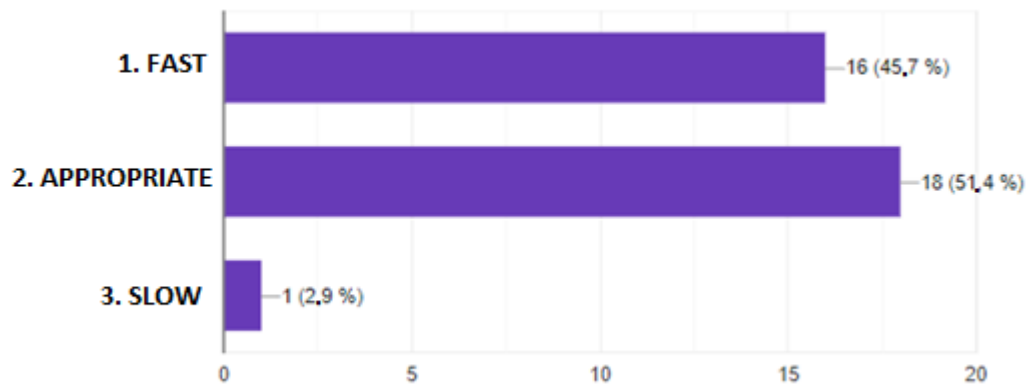
Twenty-five-point seven percent of the respondents who have used the verifier's service feel very satisfied with it. 60% corresponding to 21 respondents are satisfied with the service obtained, while 14.3% which corresponds to 5 respondents found the service rendered in an indifferent manner.



**Figure 8: PERCEPTION OF COST-BENEFIT RATIO**

SOURCE: AUTHOR.

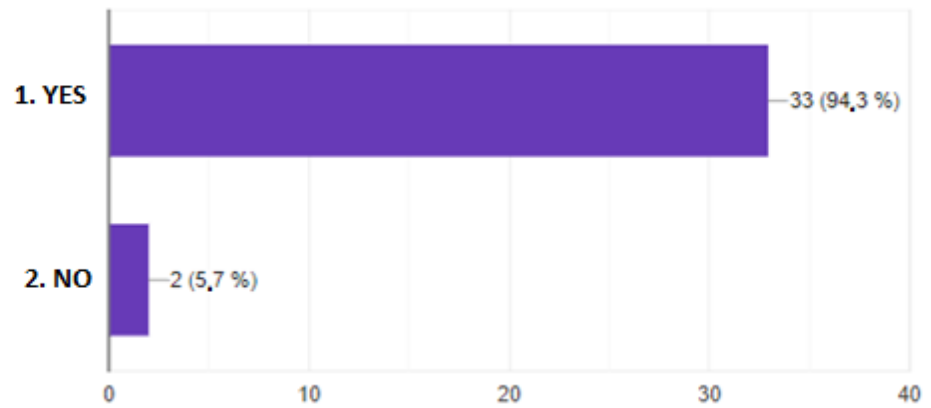
Regarding the cost-benefit ratio perceived by users, 45.7% of respondents consider that the price is high, while 54.3% of respondents consider that the price for the service is fair.



**Figure 9: VERIFIER'S RESPONSE TIME**

SOURCE: AUTHOR.

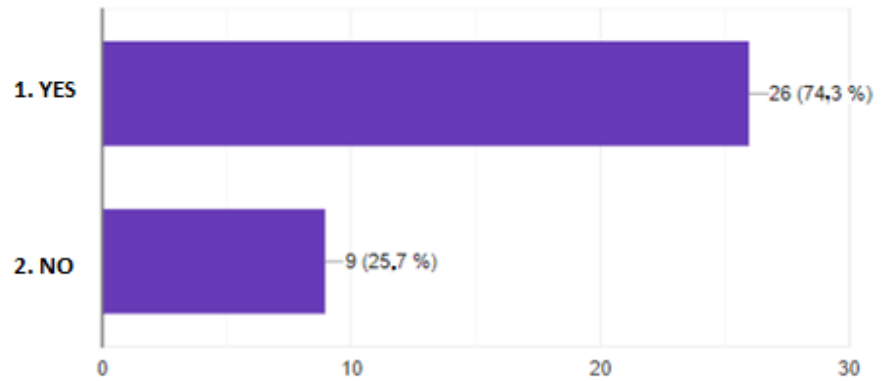
Forty-five-point seven percent of the respondents consider that the response time of the verifiers they have used is fast, while 51.4% consider that it is the appropriate time, and 2.9% consider that it is slow to respond.



***Figure 10: PERCEPTION OF SECURITY***

**SOURCE: AUTHOR.**

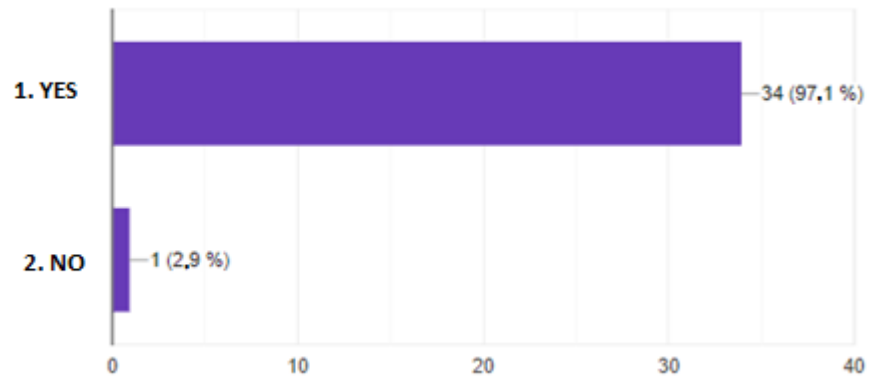
Ninety-four-point three percent of the respondents who use the services of verifiers agree that it provides security, while 5.7% do not consider it a security measure.



***Figure 11: WILLINGNESS TO USE SERVICES OF PREVIOUSLY CONTRACTED VERIFIERS***

**SOURCE: AUTHOR.**

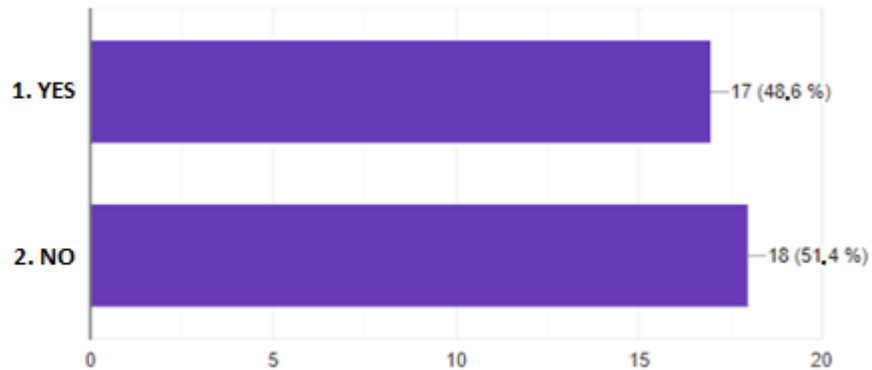
Seventy-four-point three percent of the respondents are willing to hire the service of the previously contracted verifier, while 25.7% would not be willing to hire the service again.



**Figure 12: WILLINGNESS TO USE SERVICES OF NEW VERIFIERS**

**SOURCE: AUTHOR.**

Ninety-seven-point one percent of respondents are willing to hire and test the service of a new verifier in the market that presents differentiated prices from existing ones, while 2.9% would not be willing to do so.



**Figure 13: PERCEPTION OF THE CURRENT MARKET OFFER OF VERIFIERS IN REFERNCE TO DEMAND SATISFACTION PERCENTAGE**

SOURCE: AUTHOR.

Forty-eight-point six percent of the respondents represented by 17 people surveyed consider that the verifiers that are currently on the market are sufficient to meet the demand, while 18 respondents representing 51.4% believe that the offer of existing verifiers on the market is not enough.

### 1.3.3 ANALYSIS OF THE MARKET RESEARCH

According to the answers obtained from the survey, it can be concluded that most of the universe that makes up this study does use the inspection services of a verifier when marketing their products. The producers and marketers of mineral concentrates are mostly satisfied with the services previously contracted for the inspections of their products, in terms of response time. Regarding costs, about half of respondents consider that prices are high. Most are willing to try new options that are offered in the market based on prices. The use of the services of a verifier is mostly used because of the security it gives to the sellers. It is considered that the existing supply in the market is sufficient, however there are possibilities for the entry of new competition within this medium, since the market is divided.



## **1.4 COMPETITION**

Regarding the existing competition within the verifier market, after carrying out research on an accredited body for this activity, four agencies were found, which are as follows:

- SGS International, which operates with an international license.
- Inspectorate, agency that also has an international license
- Bureau Veritas that has an international license
- Trust Control International which is new to the market and has an international license.

From these organisms it can be concluded that the most used is Inspectorate, since it facilitates verification services alongside with Bureau Veritas that performs the sampling process. This body is located within the country and operates with international licenses, since the SAE does not specify the visual document inspection for minerals. This body is positioned in the country, and according to the survey conducted to producers and marketers of mineral concentrates, Inspectorate is the most requested.

## **1.5 DEMAND**

According to the previously obtained and analyzed data, it can be summarized that there are the following types of markets:

- Potential Market: It corresponds to 71 people or companies that are producers or marketers of mineral concentrates that are currently active.
- Available Market: According to the surveys carried out, it can be defined that 35 people or companies in the universe studied use the services of a verifier, who are satisfied with the services obtained and are willing to use the services of the verifiers again that have already tested.
- Effective Market: Of the 35 respondents who use the inspection services in their negotiation processes, there are 34 respondents who represent the effective market and who would be willing to use the services of a new verifier based on prices.

Within these are the 16 respondents who consider that the price of the service to be high.

- Target Market: It is concluded that the target market corresponds to 18 of the respondents, since these are the ones who consider that the options that currently exist are insufficient. These respondents represent 50% of the available market, and are those that are not completely satisfied with the services, costs or times of the other verifiers, so they are open to use services of new companies.

## **1.6 CONCLUSIONS**

In accordance with the above data, it can be concluded that the company has an opportunity to be accepted in the market. The producers of mineral concentrates are satisfied; however, they are open to new options. It should be taken into account that inspections are considered on the basis that there are 18 possible customers who, according to data obtained from the survey, carry out 2 exports of concentrates per month, that is, a total of 36 exports per month.

## CHAPTER 2

### TECHNICAL STUDY

This chapter will explain the technical requirements necessary to achieve the creation of the inspection body. According to Jorge Prieto Herrera (2009), it is considered that the technical study aims to: *"... verify how possible it is to manufacture a product or provide a service, analyzing the optimal size, most favorable location, equipment to be used, necessary facilities and the organization required for its execution."* This chapter describes the creation of the company, as well as the requirements necessary for its accreditation as an inspection body according to the regulations of the Ecuadorian Accreditation Service (SAE). In the same way, the necessary personnel are described, as well as the instruments to be used to carry out the inspection process.

#### 2.1 CREATION OF THE COMPANY

For the creation of a company in Ecuador, it is necessary to consult with competent body, which in this case is the Superintendence of Companies (Supercias), and the Ministry of Labor, which detail the steps that must be followed:

1. Decide what type of company will be constituted.
2. Choose and reserve the name of your company in the Superintendence of Companies.
3. Open a capital integration account in the banking institution of your choice.
4. Prepare the bylaws of the company, and raise the constitution of the company to public deed, which must be done in a notary.
5. Submit the ballot of the capital integration account to the Superintendence of Companies.
6. Withdrawal of the approval or trade with the necessary corrections in the Superintendence of Companies.

7. Publish the data indicated by the Superintendence of Companies in a widely circulated newspaper.
8. Appoint a legal representative and a company administrator, and register this information in the Mercantile Registry.
9. Submit to the Superintendence of Companies the needed documents: Deed registered in the civil registry, a copy of the newspaper where the creation of the company was published, a copy of the appointments of the legal representative and administrator, a copy of their Identity Card, possessing a form of RUC (Unique Taxpayers Registry) completed and signed by the representative.
10. Wait for the Superintendence, once the documents have been reviewed, the RUC form is handed in, and there must be compliance with the obligations and legal existence, general data, payroll of shareholders and an official letter to the bank.
11. Deliver in the Internal Revenue Service (SRI), all documentation previously received from the Superintendence of Companies, to obtain the RUC (Ministry of Labor, Migration and Social Security, 2018).

## **2.2 ESTABLISHMENT AND PERSONNEL**

This project is planned to take place in the province of El Oro, and so the office in which it will be established is in the Canton Piñas, due to its proximity to the places where the inspections will be carried out. The address of the office will be located on Avenida Angel Salvador Ochoa, since this is the main road of the canton. The office that has been selected has approximately 30 square meters of space, and will include the following:

- The office must include two HP All In One desktop computers, one that will be used by the person in charge of the administrative tasks, while the other will be used by the technical personnel who will carry out the inspections and subsequent reports.
- A DELL I5 7200 laptop will be needed for office and inspector use.
- An EPSON I 575 printer and scanner is also necessary.
- Three desks, six chairs, and a filing cabinet.

- Although it is not necessary at the beginning, the possible purchase of a specialized software program that guarantees the security of the data must be taken into account.
- A camera and a video camera for each inspector at the time of the inspections, since everything must be documented.
- A seal supplier, which is located in the city of Guayaquil and has been chosen for having affordable prices and quality products.

The personnel within the organization must include the following profiles:

- A general manager to assume the legal responsibility of the company,
- A person in charge of administration, accounting and reception.
- For field work, it is necessary to have two technicians to carry out the inspections and the necessary reports, who will work as inspectors.

In the same way, it is essential to provide the inspectors with protective clothing to guarantee safety. The clothing consists of a vest, steel toe shoes and helmets to avoid any accidents.

The implementation of the necessary signs must be found within the facilities of the offices.

A fundamental part in the development of this study are the operating requirements needed to be able to operate in the country under an accreditation. This is granted by the competent entity and in this case, it is the SAE. In order to obtain such accreditation, the company must have prior implementation of an internal quality management system.

In order to implement an internal quality management system within the organization prior to applying for certification, external advisory services must be hired, which will serve as a guide to implement the control and management of the processes of the company, since it is unnecessary for the internal quality management system to have a certification. In addition, it is intended to implement the requirements of the SAE within the company in order to obtain acceptance of the accreditation application.

The procedures to be carried out for the implementation of the quality management system include the following:

- Clearly defined policies, mission and vision of the company
- Creation of organization charts
- Execution and definition of the profiles and tasks for each position within the organization
- Production of internal process manuals
- Verification of the correct development of inspections
- Application of staff training in their corresponding area
- Implementation of internal audits to evaluate the functioning of the organization
- Correction and removal of any non-compliance found within internal audits
- Collection of all the necessary information to present the accreditation request
- Provide support during the accreditation process from its inception until it is obtained.

It is necessary to take into account that the process of accreditation or designation as an inspection body within the SAE, is governed by the Standard NTE INEN ISO / IEC 17020: 2013 "Evaluation of Conformity - Requirements for Operation of Different Types of Organizations that They perform inspection."

### **2.3 NORMA NTE INEN ISO/IEC 17020:2013**

The corresponding procedures must be performed to obtain the accreditation, which are regulated by the SAE. For new companies, accreditation must be considered as a requirement to be able to enter the market competently in the face of the existing demand.

The previously mentioned standard was taken from the Ecuadorian National Standardization Institute. It can be said that this standard was adopted and approved by the SAE for the procedures that organizations carry out to obtain a certification, inspection and laboratories. This standard will serve as a guide for this accreditation procedure, which is why it is an important part of the study that must be defined and clarified. The

implementation of this standard is intended to ensure impartiality and consistency in inspection activities (INSTITUTO ECUADORIANO DE NORMALIZACIÓN, 2013).

### **2.3.1 STRUCTURE OF THE STANDARD NTE INEN ISO / IEC 17020: 2013**

The inspection bodies that are willing to be accredited must benefit from one of the three figures included in the standard. Depending on the figure to which they have focused on, different requirements must be met. The standard describes the following figures:

#### **TYPE A AGENCIES**

It refers to an organization that conducts third party inspections, which must meet the following requirements:

- Must be independent of the parties involved
- The agency and its personnel must not intervene in any activity incompatible with their independence of judgment and integrity as far as their inspection activities are concerned. They must not intervene in the design, manufacture, supply, installation, purchase, possession, use or maintenance of the items inspected.
- The agency must not be part of a legal entity that deals with the design, manufacture, supply, installation, purchase, possession, use or maintenance of the items inspected.
- The inspection body should not be linked to a separate legal entity involved in the design, manufacture, supply, installation, purchase, possession, use or maintenance of the items inspected. (INSTITUTO ECUADORIANO DE NORMALIZACIÓN, 2013)

#### **TYPE B AGENCY**

It refers to an inspection body that performs first-party inspections, secondary inspections, or both. It must meet the following requirements:

- The agency must only provide inspection services to the organization it belongs to.
- The responsibilities of inspection personnel should be clearly separated from those of personnel employed in other functions.
- The inspection body and its personnel must not intervene in any activity incompatible with their independence of judgment and integrity as regards their inspection activities. They must not intervene in the design, manufacture, supply, installation, purchase, possession, use or maintenance of the items inspected. (INSTITUTO ECUADORIANO DE NORMALIZACIÓN, 2013)

#### TYPE C AGENCY

It refers to an inspection body that performs first-party inspections, secondary inspections, or both. The requirements are as follows:

- The inspection body must establish safeguards within its organization to ensure an adequate segregation of duties and responsibilities between the inspection and other activities.
- The design, manufacture, supply, installation, service, and maintenance and inspection of the same item performed by a type C inspection body must not be carried out by the same person. An exception to this is when a regulated requirement explicitly allows a particular person of a type C agency to perform both the design, manufacture, provision, installation, maintenance, and the inspection of the same item, provided that this exception does not compromise the results of the inspection. (INSTITUTO ECUADORIANO DE NORMALIZACIÓN, 2013)

The standard NTE INEN ISO / IEC 17020: 2013 has generalities in which it refers to the requirements that the company must have, and if not, they must be implemented in order to access the accreditation process. These generalities are as follows:



- **IMPARTIALITY:** The inspection body must carry out its activities with impartiality, and must be responsible for such impartiality. It must not allow commercial, financial or any other type of pressure to intervene in its functions. If there is a risk for impartiality, the body must have mechanisms to eliminate or minimize it.
- **INDEPENDENCE:** The agency must be independent to the extent required by the conditions on which its services are provided.
- **CONFIDENTIALITY:** Regarding confidentiality, the inspection body is responsible for safeguarding the information obtained as a result of the inspections. If the information is requested by law, the client must be notified.
- **ADMINISTRATIVE REQUIREMENTS:** The inspection body must be a legal entity or a defined part of a legal entity so that it can be considered legally responsible for its inspection activities. It must have documentation describing the activities for which it is competent, it must have civil liability insurance, funds to cover its activities and contractual documentation that describes the conditions on which the service is provided.
- **ORGANIZATION AND MANAGEMENT:** The inspection body must be structured and managed in a way that its impartiality is ensured and allows it to comply with its activities. The structure of the organization must be defined and documented, as well as the responsibilities assigned to each job position.
- **PERSONNEL:** The agency must define and document the competence requirements for personnel participating in inspection activities. Within these requirements are training, education, technical knowledge, skills and experience. The number of people within the organization must be sufficient to fulfill the activities, as well as to replace any if necessary. The procedures that belong to each position must be documented and the start and end period of the activities must be included. A record of the supervision, education, knowledge and skills of each member must be kept. The salary of personnel should not be used to influence the result of inspections. Personnel participating in the activities of the inspection body must maintain confidentiality and impartiality.

- **FACILITIES AND EQUIPMENT:** The inspection body must have the necessary facilities and equipment to carry out the inspection activities correctly and it must provide the personnel with the necessary material. The facilities must have the required signage. All equipment must have an identification, and the operating manuals must be available. Equipment calibration must be designed and implemented in such a way that the measurements of the inspection body are traceable to national and international standards. If necessary, the instruments must undergo internal checks. The agency must have documented procedures for the selection and qualification of suppliers, verification of goods and services that are received and adequate storage facilities must be assured. In the case that the inspection body uses computerized or automated equipment in connection with the inspections, it must be guaranteed that the software is suitable for use, including the maintenance and calibration dates.
- **SUBCONTRACTING:** The inspection body should normally carry out inspection activities on its own; however, if subcontracting is necessary at any point of the inspection, it must be demonstrated that the subcontractor is competent to carry out the assigned activities. The client must be informed that subcontracting will be carried out.
- **METHODS AND INSPECTION PROCEDURES:** The inspection agency must use methods and procedures defined in the requirements of the inspection that will be carried out. The agency must have and use appropriate and documented instructions regarding the planning of inspections. If the agency uses methods or procedures that are not standardized, these methods must be appropriate and fully documented. The agency must have a contract control system or work orders that ensure that the work is within their technical expertise and that the agency has the resources to meet the requirements. Any abnormality or nonconformity that occurs within the inspection must be notified to the client.
- **TREATMENT OF THE INSPECTION AND SAMPLING ITEMS:** The inspection body must ensure the integrity of the samples or items received at the time of inspection. The inspection body must ensure that the items and samples

have a unique identification number to avoid confusion. The inspector must determine if the item has been prepared for inspection.

- **INSPECTION RECORD:** The agency must have a record of the inspections with start and end dates to demonstrate effective compliance with the inspection procedures, as well as establishing the inspector in charge of performing the inspection.
- **INSPECTION CERTIFICATES:** The inspection agencies work must be supported in an inspection report that must include the identification of the issuing agency, unique identification and date of issue, inspection dates, identification of the items, approval signature provided by the authorized personnel, declaration of conformity, the results of the inspection.
- **COMPLAINTS AND APPEALS:** The inspection body must have a documented system to receive, evaluate and make decisions about complaints and appeals. There must be a procedure for the treatment of complaints; the relationship of the complaints with the inspection activity must be analyzed. The inspection body should be responsible for decisions at all levels of the complaint process. Decisions regarding appeals should not lead to discriminatory actions. (INSTITUTO ECUADORIANO DE NORMALIZACIÓN, 2013)

## **2.4 ACCREDITATION PROCESS**

The accreditation process for inspection bodies is available on the SAE website, which is harmonized with the processes of the International Laboratory Accreditation Cooperation (ILAC), of which the SAE is a part. The accreditation process according to the SAE is as follows:

1. As an initial point of the accreditation process, the requirements and documentation that will be needed within the accreditation process must be clear. Once these requirements have been reviewed, a quality management system can be implemented within the body that wishes to carry out the accreditation, since this includes a fundamental part of the process. The quality management system should try to be harmonized according to the requirements of the SAE.

2. Once the quality management system in the company is established, it is important to search for the necessary information to start the accreditation application process. The next step is to apply for accreditation for inspection bodies: one form is F PA03-01-R06, which must be completed, attached are instructions on how to complete the application that serves as a guide for further understanding; the other for is F PA06-02-I-01, that likewise must be filled out in its entirety and sent together with the application. Both forms are public domain and are available on the SAE website [www.acreditacion.gob.ec](http://www.acreditacion.gob.ec). The application must be enclosed with a series of company documents, referring to the quality management system. The application must be signed by the legal representative of the company
3. Once the application is submitted, it will be accepted if it is filled out correctly and, in its entirety, and if it includes all the requested documents.
4. After the acceptance of the accreditation application, the payment must be made immediately, which grants the official start of the accreditation process.
5. The SAE proceeds to assign a group of technical evaluators specialized in the area to be accredited to perform the evaluations to the agency. Evaluations may vary depending on the needs of the agency.
6. The SAE informs the agency about the costs of the accreditation process.
7. The evaluation team then carries out a documentary review about the information granted by the inspected agency to verify the quality management system. In this part of the process, the evaluators must issue a Documentary Evaluation Report
8. The evaluation team must carry out an "in situ" evaluation, in other words, it carries out an inspection of the organization in its establishment. Along with the inspection, a testification is also done in which an assessment is applied to the agency when it is performing their inspection activities. The evaluators must be present as observers without interrupting the activities carried out by the inspectors. The tests that the evaluators consider necessary must be carried out. In the same way, the evaluators must issue an Evaluation Report.
9. Once the reports are issued, the conformities are presented and, if applicable, the non-conformities, on which the inspection body must take actions to correct these errors. The inspection body has 180 days to carry out the survey of non-conformities.

10. The SAE receives the removal of non-conformities and, if necessary, a second "in situ" inspection can be carried out to corroborate the corrections applied.
11. The SAE proceeds to analyze the reports submitted by the evaluation team as well as the corrective actions taken by the inspection agency, and determines whether or not it will grant accreditation.
12. Accreditation has a duration of 5 years and the SAE carries out surveillance evaluations during that period. (ECUADORIAN ACCREDITATION SERVICE, 2018)

## **2.5 INSPECTION AGENCY: GENERAL ASPECTS**

The inspection body corresponds to a legally constituted and new entity; that is, it does not have any relationship with an existing company in the market. This new company aims to qualify to offer inspection services under the NTE INEN ISO / IEC 17020: 2013 standard.

To comply with the requirements imposed by this standard, it must be emphasized that the personnel must be trained to carry out the inspection activities. The profile of the person or persons in charge of the quality management system, as well as that of the inspectors, must necessarily have completed the course of the standard NTE INEN ISO / IEC 17020: 2013, which is offered by the SAE in order to train its users.

To comply with the requirements of the standard, the inspection body should be classified as an A-type body, as it is totally independent of any design, manufacturing, supply, installation process, purchase, possession, use or maintenance of the items inspected. It is also important that officials not be involved with interested parties and must keep the confidentiality statutes clear.

The goal of the inspection bodies is to obtain an accreditation in visual and documentary inspection for the field of mineral concentrates in pre-shipment, within the mining area. If it is the case that there is no Accreditation Evaluation Body accredited in the field needed, the inspection body is open to benefit from Law No. 2007-76 of the Ecuadorian Quality

System that grants the figure of "designation." This figure allows acting as a kind of accreditation for two years, while the inspection body follows the process to achieve official accreditation.

According to the standard, the operating procedure of the inspection agency of preference must be standardized nationally and internationally. However, in some cases it admits that the inspection body carries out its own inspection procedure based on the requirements of the clients and the capabilities that the inspection body has to carry out the activities. Therefore, the inspection entity must follow the inspection procedure detailed below:

- The entity must receive the documentation and respective information of the cargo to be inspected in the offices. This information includes identification of items, weight of the items, identification of the container, name of the buyer and seller, and place where the items will be loaded.
- The inspection body must make a contract that clearly establishes the parameters to be inspected between the client and the inspection body, the costs of the inspection must be specified.
- It must schedule the exact time and date of the inspection and the place where the inspection will take place.
- The entity must request the total or partial payment prior to the inspection.
- It must assign the inspector (s) that will carry out the inspection.
- Inspectors must arrive at the site of the inspection at least 10 minutes before the agreed time.
- The client is in charge of the transfer or mobilization of the inspectors to the place where the inspection will take place.
- Before starting the inspection, the inspectors must have the necessary documentation as well as their identification.
- Prior to loading the container, it must be inspected by lightly tapping the bottom with a hammer to verify that it does not have a double bottom. It must be checked and verified that the container does not have abnormal characteristics.

- Before loading the container, the inspectors should inspect item by item, so that their description is the same as what was presented in the documentation.
- The inspectors must verify that the cargo placed inside the container is the same as the products sampled by the designated entity according to the agreement between the buyer and the seller.
- The inspectors must be present during the entire process of placing the cargo in the container.
- It must be verified that the product has been loaded correctly and that it does not compromise the integrity of the product.
- The inspectors must verify that the weight of the cargo matches the weight previously determined in the documentation.
- Once the loading process is finished, before placing the seals the inspectors check them to make sure they have a unique identification number designated by the inspection body.
- The inspectors proceed to close the container and place the seals, which should not be removed unless requested by law or the customs entity for the performance of their duties.
- The entire process carried out by the inspectors must be documented with photos and videos.
- In case there is any inconsistency regarding the items, weights, load or any abnormality, the inspector must immediately contact the client to report them, and request authorization to stop or continue the inspection.
- Inspectors will leave the site once the container is completely sealed and shipped to its destination.
- The inspection report must be made within a maximum of 24 hours.

Likewise, a report regarding the inspection carried out must be submitted. This report must be prepared with accuracy, taking into account the procedures established within the quality management system, especially with impartiality and confidentiality. The report must contain the following information:

- The specific place, time and date of the start and end of the inspection.
- Information of the client who contracts the inspection.
- Information of who exports the cargo.
- The detail of identification and weights of the items.
- Quantity and form of packaging of the loaded product.
- Information about the container and the means of transportation, including names and other information of the driver.
- Information about the fork lift, if requested
- Identification number of the seals placed.
- Information of the means of transport (license plate).
- Any inconsistency regarding the items, weights, load or any abnormality, must be described within the report.
- All the photos that were documented during the inspection process
- Information of the port of shipment.
- The inspection method applied.
- The amount of product that has been sampled
- Use of a letterhead of the inspection body and use its own seals.
- The signature of the inspector who carried out the inspection.

## **2.6 CONCLUSIONS**

It can be concluded that for the agency to function correctly, this entity must comply with the different requirements regulated by the SAE. In the same way, the implementation of an internal quality management system in the company is fundamental to achieve its accreditation, which is one of the main objectives of the organization. The implementation of the technical standard must be fully implemented to ensure that the body can exercise its functions, since without accreditation the activities it carries out will not have any guarantee and impartiality. Also, the procedure must be performed correctly as described and approved by the regulatory entity, in order not to compromise the integrity of the cargo or any irregularities that impede impartiality during inspections.



## CHAPTER 3

### FINANCIAL ANALYSIS

The purpose of this chapter is to show the financial analysis of the project based on the analysis of the financial statements. Understanding this analysis as: "*... a set of techniques used to diagnose the situation and perspectives of the company in order to make appropriate decisions*" (Amat, 2008). This section will help to determine whether the implementation project of an inspection body focused on exports of mineral concentrates is profitable or not. Important aspects are analyzed, such as: fixed assets, project operation costs, expenses, among others that provide information necessary for the development of this project. The values presented in this chapter are annual data.

#### 3.1 ASSETS

Among the assets are the assets of the company, which help and serve as support for the provision of the service. Below are the different types of assets that are necessary within the project.

##### 3.1.1 TANGIBLE ASSETS

Tangible fixed assets are the items that are necessary for the operation of the company and are not recoverable in the short term. There is a total of \$4,907.57 in fixed assets divided into: \$ 1,577.32 in furniture and appliances, \$ 3,250.25 in computer equipment, and \$80 dollars of office supplies. Table 4 details the fixed assets needed in the project.

**Table 4: TANGIBLE ASSETS**

<b>TANGIBLE ASSETS</b>			
<b>FURNITURE AND FIXTURES</b>	<b>UNITS</b>	<b>UNIT PRICE</b>	<b>TOTAL</b>
Desk	3	\$ 174.20	\$ 522.60
Basic chair	3	\$ 136.64	\$ 409.92
Chair for customers	6	\$ 67.20	\$ 403.20
Hammer	2	\$ 7.00	\$ 28.00
File cabinet	1	\$ 213.60	\$ 213.60
<b>TOTAL FURNITURE AND FIXTURES</b>			<b>\$ 1,577.32</b>
<b>COMPUTER EQUIPMENT</b>			
Desktop PC ALL IN ONE HP 22	2	\$ 589.12	\$ 1,178.24
DELL I5 7200 Laptop Computer	1	\$ 745.00	\$ 745.00
Nikon Coolpix Camera	2	\$ 300.00	\$ 600.00
Sony Cameraman	2	\$ 160.00	\$ 320.00
EPSON I575 Printer / Scanner	1	\$ 407.01	\$ 407.01
<b>TOTAL COMPUTER EQUIPMENT</b>			<b>\$ 3,250.25</b>
<b>OFFICE SUPPLIES</b>			
Office phone	1	\$ 80.00	\$ 80.00
<b>TOTAL OFFICE SUPPLIES</b>			<b>\$ 80.00</b>
<b>TOTAL FIXED ASSETS</b>			<b>\$ 4,907.57</b>

**SOURCE: AUTHOR**

### **3.1.2 INTANGIBLE ASSETS**

Intangible assets are also those that are not recoverable in the short term and that are not palpable. There is a total value of \$ 8,520.02 dollars of intangible assets, of which the item of greatest value is the external consultancy for the implementation of the quality management system, which represents a fundamental part to achieve the desired accreditation. The intangible assets of the project are presented in Table 5

**Table 5: INTANGIBLE ASSETS**

<b>INTANGIBLE ASSETS</b>		
	<b>UNIT PRICE</b>	<b>TOTAL</b>
Constitution of the Company	\$ 363.94	\$ 363.94
External Consulting in Quality Management	\$ 6,000.00	\$ 6,000.00
Municipal Patent	\$ 8.00	\$ 8.00
SAE Accreditation Costs	\$ 2,148.08	\$ 2,148.08
<b>TOTAL INTANGIBLE ASSETS</b>		<b>\$ 8,520.02</b>

SOURCE: AUTHOR

### **3.1.3 COSTS AND EXPENSES**

As for costs, it is necessary to mention the expenditures that must be made in order to produce the service that is intended to be offered. The direct operating costs involved in the production of the service are taken into account, which is a total of \$12,523.60, of which the items necessary to carry out the inspection activity are described. As for administrative expenses, the value is \$15,724, which includes the lease, basic services and others that allow the organization and administration of the business; while the sales expenses corresponding to advertising, which will be scheduled twice a year, are a total of \$600 dollars. In total, the cost of the project is \$28,847.60 dollars. Table 6 shows the costs of the first year of the project are demonstrated

**Table 6: COSTS AND EXPENSES**

<b>COSTS AND EXPENSES</b>			
<b>DIRECT OPERATING EXPENSES</b>	<b>UNITS</b>	<b>UNIT PRICE</b>	<b>TOTAL ANNUAL</b>
Inspector Salary	2	\$ 500.00	\$ 12,000.00
Protective Clothing for Personnel	3	\$ 70.00	\$ 210.00
Seals	1000	\$ 0.31	\$ 313.60
<b>ADMINISTRATIVE EXPENSES</b>			<b>\$ 12,523.60</b>
30 m office rental	1	\$ 250.00	\$ 3,000.00
Basic services	1	\$ 90.00	\$ 1,080.00
Office supplies for reports	1	\$ 30.00	\$ 360.00
Manager Salary	1	\$ 500.00	\$ 6,000.00
Office supplies	1	\$ 400.00	\$ 400.00
Salary Secretary / Accountant	1	\$ 400.00	\$ 4,800.00
Uniforms	12	\$ 7.00	\$ 84.00
<b>TOTAL ADMINISTRATIVE EXPENSES</b>			<b>\$ 15,724.00</b>
<b>SALES EXPENSES</b>			
Advertising	2	\$ 300.00	\$ 600.00
<b>TOTAL SALES EXPENSES</b>			<b>\$ 600.00</b>
<b>TOTAL COSTS AND EXPENSES</b>			<b>\$ 28,847.60</b>

SOURCE: AUTHOR

### **3.2 DEPRECIATION**

Depreciation refers to the wear and tear that weighs on assets as time passes. It has been determined based on the assets of the company. To generate this table, the official depreciation values of the Ministry of Finance of Ecuador have been taken into account. The depreciation of 10% of its value was applied to the furniture, in the same way 10% depreciation was applied to the office material, that is, they have 10 years of useful life, in this case the projection is made to 5 years so the remaining value belongs to the following 5 years. For computer equipment, 3% depreciation was applied in accordance with the law, which means that they will be used until the third year of the project. Table 7 shows the depreciation.

**Table 7: DEPRECIATION**

DEPRECIATION								
CONCEPT	VALUE	USEFUL LIFE	% BY LAW	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5
TOTAL FURNITURE	\$ 1,549.32	10	10%	\$ 154.93	\$ 154.93	\$ 154.93	\$ 154.93	\$ 154.93
TOTAL COMPUTER EQUIPMENT	\$ 2,330.25	3	33%	\$ 776.75	\$ 776.75	\$ 776.75	\$ 0.00	\$ 0.00
TOTAL OFFICE MATERIAL	\$ 80.00	10	10%	\$ 8.00	\$ 8.00	\$ 8.00	\$ 8.00	\$ 8.00
TOTAL CONCEPTS	\$ 3,959.57			\$ 939.68	\$ 939.68	\$ 939.68	\$ 162.93	\$ 162.93

SOURCE: AUTHOR

### 3.2.1 AMORTIZATION

Amortization refers to the distribution of expenses that have been made during a certain period of time. In the same way as depreciation, referential values were taken into account to carry out the amortization. The amortization was calculated based on the intangible assets of the project. The amortization values were calculated for 5 years and the values that were used to achieve the constitution of the company, the quality management system and other paperwork for the creation of the inspection body have been distributed. Table 8 shows the amortization table.

**Table 8: AMORTIZATION**

AMORTIZATION								
CONCEPT	VALUE	USEFUL LIFE	% BY LAW	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5
TOTAL INTANGIBLE ASSETS	\$ 8,520.02	5	20%	\$ 1,704.00	\$ 1,704.00	\$ 1,704.00	\$ 1,704.00	\$ 1,704.00

SOURCE: AUTHOR

### 3.3 5-YEAR PROJECTION

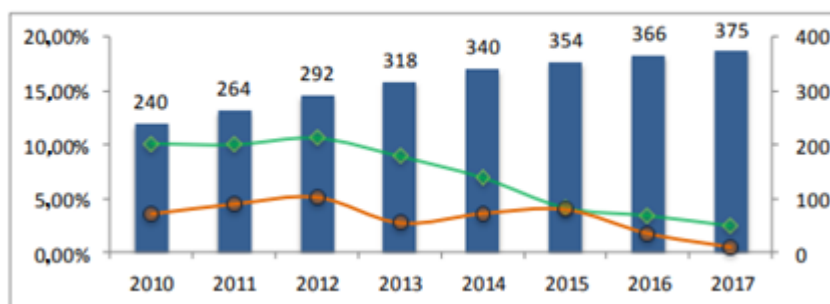
The 5-year projection of this project has been made based on the evolution of the unified basic salary from 2013 to 2018 and the evolution of the basic food basket from January 2013 to January 2018. A linear projection was used to elaborate future calculations.

#### 3.3.1 SALARY PROJECTION

The salary projection considers the following staff members: the manager, the secretary / accountant and the two technicians. The total value per employee is presented including salary, vacations, bonuses and contributions to the Ecuadorian Social Security Institute

made by the employer. In table 10 the evolution of the previously mentioned items is presented. To carry out the projection, the evolution of the unified basic salary 2013-2018 was considered. The 5-year salary projection has been carried out in Figure 14 and Table 9.

**Evolution of the unified basic salary (SBU) and inflation from 2010 to 2016**



**Figure 14: EVOLUTION OF THE UNIFIED BASIC SALARY (SBU) AND INFLATION FROM 2010 TO 2016**

Source: Inec, Ministerio del Trabajo  
 Created by: Dirección de Análisis Salarial. MDT.

**Table 9: EVOLUTION OF THE UNIFIED BASIC SALARY 2010-2017**

Year	2010	2011	2012	2013	2014	2015	2016	2017
Salary	240	264	292	318	340	354	366	375
Increase SBU	10.09%	10.00%	10.61%	8.90%	6.92%	4.12%	3.39%	2.45%
Annual Inflation	3.33%	5.41%	4.16%	2.70%	3.67%	3.38%	2.32%	0.47%

Source: Inec, Ministerio del Trabajo  
 Created by: Dirección de Análisis Salarial. MDT.

**Table 10: 5-YEAR SALARY PROJECTION**

SECRETARY / ACCOUNTANT	MONTHLY YEAR 0	ANNUAL YEAR 0	MONTHLY YEAR 1	ANNUAL YEAR 1	MONTHLY YEAR 2	ANNUAL YEAR 1	MONTHLY YEAR 2	ANNUAL YEAR 2	MONTHLY YEAR 3	ANNUAL YEAR 3	MONTHLY YEAR 4	ANNUAL YEAR 4
Salary	\$ 400.00	\$ 4,800.00	\$ 422.35	\$ 5,068.20	\$ 437.97	\$ 5,255.64	\$ 453.59	\$ 5,443.08	\$ 469.20	\$ 5,630.40	\$ 484.82	\$ 5,817.84
Holidays	\$ 200.00	\$ 200.00	\$ 211.18	\$ 210.78	\$ 218.99	\$ 218.32	\$ 226.80	\$ 225.86	\$ 234.60	\$ 233.39	\$ 242.41	\$ 240.93
Thirteenth remuneration	\$ 400.00	\$ 400.00	\$ 422.35	\$ 421.57	\$ 437.97	\$ 436.64	\$ 453.59	\$ 451.71	\$ 469.20	\$ 466.78	\$ 484.82	\$ 481.85
Fourteenth remuneration	\$ 386.00	\$ 386.00	\$ 407.57	\$ 407.57	\$ 422.64	\$ 422.64	\$ 437.71	\$ 437.71	\$ 452.78	\$ 452.78	\$ 467.85	\$ 467.85
IESS contribution	\$ 44.60	\$ 535.20	\$ 47.09	\$ 565.08	\$ 48.83	\$ 585.96	\$ 50.58	\$ 606.96	\$ 52.32	\$ 627.84	\$ 54.06	\$ 648.72
<b>TOTAL</b>		<b>\$ 6,321.20</b>		<b>\$ 6,673.20</b>		<b>\$ 6,919.20</b>		<b>\$ 7,165.32</b>		<b>\$ 7,411.19</b>		<b>\$ 7,657.19</b>
<b>MANAGER</b>												
Salary	\$ 500.00	\$ 6,000.00	\$ 527.94	\$ 6,335.28	\$ 547.46	\$ 6,569.52	\$ 566.98	\$ 6,803.76	\$ 586.50	\$ 7,038.00	\$ 606.03	\$ 7,272.36
Holidays	\$ 250.00	\$ 250.00	\$ 263.97	\$ 260.78	\$ 273.73	\$ 268.32	\$ 283.49	\$ 275.85	\$ 293.25	\$ 283.39	\$ 303.02	\$ 290.92
Thirteenth remuneration	\$ 500.00	\$ 500.00	\$ 527.94	\$ 521.56	\$ 547.46	\$ 536.63	\$ 566.98	\$ 551.70	\$ 586.50	\$ 566.77	\$ 606.03	\$ 581.84
Fourteenth remuneration	\$ 386.00	\$ 386.00	\$ 407.57	\$ 407.57	\$ 422.64	\$ 422.64	\$ 437.71	\$ 437.71	\$ 452.78	\$ 452.78	\$ 467.85	\$ 467.85
IESS contribution	\$ 55.75	\$ 669.00	\$ 58.87	\$ 706.44	\$ 61.04	\$ 732.48	\$ 63.22	\$ 758.64	\$ 65.39	\$ 784.68	\$ 67.57	\$ 810.84
<b>TOTAL</b>		<b>\$ 7,805.00</b>		<b>\$ 8,231.63</b>		<b>\$ 8,529.59</b>		<b>\$ 8,827.66</b>		<b>\$ 9,125.62</b>		<b>\$ 9,423.82</b>
<b>TECHNICIAN 1</b>												
Salary	\$ 500.00	\$ 6,000.00	\$ 527.94	\$ 6,335.28	\$ 547.46	\$ 6,569.52	\$ 566.98	\$ 6,803.76	\$ 586.50	\$ 7,038.00	\$ 606.03	\$ 7,272.36
Holidays	\$ 250.00	\$ 250.00	\$ 263.97	\$ 260.78	\$ 273.73	\$ 268.32	\$ 283.49	\$ 275.85	\$ 293.25	\$ 283.39	\$ 303.02	\$ 290.92
Thirteenth remuneration	\$ 500.00	\$ 500.00	\$ 527.94	\$ 521.56	\$ 547.46	\$ 536.63	\$ 566.98	\$ 551.70	\$ 586.50	\$ 566.77	\$ 606.03	\$ 581.84
Fourteenth remuneration	\$ 386.00	\$ 386.00	\$ 407.57	\$ 407.57	\$ 422.64	\$ 422.64	\$ 437.71	\$ 437.71	\$ 452.78	\$ 452.78	\$ 467.85	\$ 467.85
IESS contribution	\$ 55.75	\$ 669.00	\$ 58.87	\$ 706.44	\$ 61.04	\$ 732.48	\$ 63.22	\$ 758.64	\$ 65.39	\$ 784.68	\$ 67.57	\$ 810.84
<b>TOTAL</b>		<b>\$ 7,805.00</b>		<b>\$ 8,231.63</b>		<b>\$ 8,529.59</b>		<b>\$ 8,827.66</b>		<b>\$ 9,125.62</b>		<b>\$ 9,423.82</b>
<b>TECHNICIAN 2</b>												
Salary	\$ 500.00	\$ 6,000.00	\$ 527.94	\$ 6,335.28	\$ 547.46	\$ 6,569.52	\$ 566.98	\$ 6,803.76	\$ 586.50	\$ 7,038.00	\$ 606.03	\$ 7,272.36
Holidays	\$ 250.00	\$ 250.00	\$ 263.97	\$ 260.78	\$ 273.73	\$ 268.32	\$ 283.49	\$ 275.85	\$ 293.25	\$ 283.39	\$ 303.02	\$ 290.92
Thirteenth remuneration	\$ 500.00	\$ 500.00	\$ 527.94	\$ 521.56	\$ 547.46	\$ 536.63	\$ 566.98	\$ 551.70	\$ 586.50	\$ 566.77	\$ 606.03	\$ 581.84
Fourteenth remuneration	\$ 386.00	\$ 386.00	\$ 407.57	\$ 407.57	\$ 422.64	\$ 422.64	\$ 437.71	\$ 437.71	\$ 452.78	\$ 452.78	\$ 467.85	\$ 467.85
IESS contribution	\$ 55.75	\$ 669.00	\$ 58.87	\$ 706.44	\$ 61.04	\$ 732.48	\$ 63.22	\$ 758.64	\$ 65.39	\$ 784.68	\$ 67.57	\$ 810.84
<b>TOTAL</b>		<b>\$ 7,805.00</b>		<b>\$ 8,231.63</b>		<b>\$ 8,529.59</b>		<b>\$ 8,827.66</b>		<b>\$ 9,125.62</b>		<b>\$ 9,423.82</b>
<b>TOTAL ANNUAL SALARIES</b>		<b>\$ 29,736.20</b>		<b>\$ 31,368.08</b>		<b>\$ 32,507.95</b>		<b>\$ 33,648.30</b>		<b>\$ 34,788.05</b>		<b>\$ 35,928.64</b>

SOURCE: AUTHOR

### 3.3.2 PROJECTION OF COSTS

In the projection of costs, the percentage variation of the basic food basket was taken into account from January 2013 to January 2018. It must be emphasized that for this projection, the basic basket data was used since the inflation index is in deflation, which would result in data that is not compatible with reality. The projection is presented in Table 11 and 12:

**Table 11: FAMILY BASIC BASKET 2013-2018**

BASIC BASKET	
YEAR	VALUE
2013	601.61
2014	628.27
2015	653.21
2016	675.93
2017	701.93
2018	712.03

SOURCE: INEC  
CREATED BY: AUTHOR

**Table 12: 5-YEAR COST PROJECTION**

	RENT	BASIC SERVICES	MATERIAL FOR REPORTS	OFFICE SUPPLIES	UNIFORMS	PROTECTION CLOTHING	HAMMER	PRECINCT	ADVERTISING
YEAR 1	\$ 3,000.00	\$ 1,080.00	\$ 360.00	\$ 400.00	\$ 84.00	\$ 210.00	\$ 28.00	\$ 313.60	\$ 600.00
YEAR 2	\$ 3,125.17	\$ 1,125.06	\$ 375.02	\$ 416.89	\$ 87.50	\$ 218.76	\$ 29.17	\$ 326.68	\$ 625.03
YEAR 3	\$ 3,220.97	\$ 1,159.55	\$ 386.52	\$ 429.46	\$ 90.19	\$ 225.47	\$ 30.06	\$ 336.70	\$ 644.19
YEAR 4	\$ 3,316.77	\$ 1,194.04	\$ 398.01	\$ 442.24	\$ 92.87	\$ 232.17	\$ 30.96	\$ 346.71	\$ 663.35
YEAR 5	\$ 3,412.57	\$ 1,228.52	\$ 409.51	\$ 455.01	\$ 95.55	\$ 238.88	\$ 31.85	\$ 356.73	\$ 682.51

SOURCE: AUTHOR



### 3.3.3 EXPENSES

The expenditures are presented based on the previous tables of projections. Table 13 shows expenditures corresponding to the first 5 years of the project.

**Table 13: 5-YEAR EXPENSE PROJECTION**

EXPENSES														
YEARS	SECRETARY/ ACCOUNTANT	MANAGER	TECHNICIAN 1	TECHNICIAN 2	RENT	BASIC SERVICES	REPORT SUPPLIES	OFFICE SUPPLIES	UNIFORMS	PROTECTION CLOTHING	HAMMER	PRECINCT	ADVERTISING	TOTAL EXPENSES
YEAR1	\$ 6,673.20	\$ 8,231.63	\$ 8,231.63	\$ 8,231.63	\$ 3,000.00	\$ 1,080.00	\$ 360.00	\$ 400.00	\$ 84.00	\$ 210.00	\$ 28.00	\$ 313.60	\$ 600.00	\$ 37,443.68
YEAR2	\$ 6,919.20	\$ 8,529.59	\$ 8,529.59	\$ 8,529.59	\$ 3,125.17	\$ 1,125.06	\$ 375.02	\$ 416.69	\$ 87.50	\$ 218.76	\$ 29.17	\$ 326.68	\$ 625.03	\$ 38,837.05
YEAR3	\$ 7,165.32	\$ 8,827.66	\$ 8,827.66	\$ 8,827.66	\$ 3,220.97	\$ 1,159.55	\$ 386.52	\$ 429.46	\$ 90.19	\$ 225.47	\$ 30.06	\$ 336.70	\$ 644.19	\$ 40,171.41
YEAR4	\$ 7,411.19	\$ 9,125.62	\$ 9,125.62	\$ 9,125.62	\$ 3,316.77	\$ 1,194.04	\$ 398.01	\$ 442.24	\$ 92.87	\$ 232.17	\$ 30.96	\$ 346.71	\$ 663.35	\$ 41,505.17
YEAR5	\$ 7,657.19	\$ 9,423.82	\$ 9,423.82	\$ 9,423.82	\$ 3,412.57	\$ 1,228.52	\$ 409.51	\$ 455.01	\$ 95.55	\$ 238.88	\$ 31.85	\$ 356.73	\$ 682.51	\$ 42,839.77

SOURCE: AUTHOR

### 3.4 SALE PRICE

The project aims to carry out 20 inspections per month. This amount was decided based on the capabilities of the company and the results of market research. The value of the unit cost could be defined by calculating the total assets and the total number of inspections carried out in one year. As for the sale price, it is intended to obtain \$ 300 as a profit per inspection, so that adding the unit cost plus the profit generates a total annual sale of \$11, 4275.19. Table 14 presents the value of the unit cost of an inspection service, followed by the sale price.

**Table 14: SALE PRICE**

<b>PRICES</b>	
<b>UNIT COST</b>	\$ 176.15
<b>SALE PRICE</b>	\$ 476.15
<b>TOTAL ANNUAL SALES</b>	\$ 114,275.19

SOURCE: AUTHOR

### 3.5 CASH FLOWS

Cash flows demonstrate the way in which cash and its equivalents vary in a given period, the difference between sales and payments shows this variation. Table 15 shows the cash flows projected for the project, as well as the initial investment that will be made in year 0.

**Table 15: CASH FLOWS**

<b>YEAR</b>	<b>0</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
Income		\$ 117,275.19	\$ 122,168.42	\$ 125,913.33	\$ 129,658.24	\$ 133,403.14
Employees		\$ 31,368.08	\$ 32,507.95	\$ 33,648.30	\$ 34,788.05	\$ 35,928.64
Rent		\$ 3,000.00	\$ 3,125.17	\$ 3,220.97	\$ 3,316.77	\$ 3,412.57
Basic services		\$ 1,080.00	\$ 1,125.06	\$ 1,159.55	\$ 1,194.04	\$ 1,228.52
Report material		\$ 360.00	\$ 375.02	\$ 386.52	\$ 398.01	\$ 409.51
Office supplies		\$ 400.00	\$ 416.69	\$ 429.46	\$ 442.24	\$ 455.01
Uniforms		\$ 294.00	\$ 306.27	\$ 315.66	\$ 325.04	\$ 334.43
Instruments		\$ 341.60	\$ 355.85	\$ 366.76	\$ 377.67	\$ 388.58
Advertising		\$ 600.00	\$ 625.03	\$ 644.19	\$ 663.35	\$ 682.51
Gross profit		\$ 79,831.51	\$ 83,956.40	\$ 86,386.11	\$ 88,816.42	\$ 91,245.88
Depreciation		\$ 9,843.67	\$ 7,207.75	\$ 4,571.83	\$ 2,681.60	\$ 814.66
EBT		\$ 69,987.83	\$ 76,748.65	\$ 81,814.27	\$ 86,134.82	\$ 90,431.22
Taxes (22.7%)		\$ 15,887.24	\$ 17,421.94	\$ 18,571.84	\$ 19,552.60	\$ 20,527.89
Net Profit		\$ 54,100.60	\$ 59,326.71	\$ 63,242.43	\$ 66,582.22	\$ 69,903.33
Investment	-\$ 13,399.59					
Cash Flow	-\$ 13,399.59	\$ 54,100.60	\$ 59,326.71	\$ 63,242.43	\$ 66,582.22	\$ 69,903.33

SOURCE: AUTHOR

### 3.6 NET PRESENT VALUE

The Net Present Value is a financial indicator used to determine if a project is viable or not, for this it is necessary to measure the future cash flows and subtract the initial investment. In order to obtain the NPV of this project, the 20% interest rate established by the potential investors of the project was taken into account. The result of the NPV is \$169,684.03. Since this value is greater than zero, the project is profitable. (See table 16).

**Table 16: NET PRESENT VALUE**

<b>NPV</b>	<b>\$ 169,684.03</b>
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SOURCE: AUTHOR

### 3.7 CONCLUSIONS

This chapter presents the different financial statements, as well as the 5-year projections of expenses and costs. The analysis of this information, collected from secondary sources and generated by the author, allows us to conclude that the project is economically profitable and therefore the investment can be recovered with the work from the first year of the inspection agency.

## CONCLUSIONS AND RECOMMENDATIONS

As a final part of this project, it can be concluded that the feasibility analysis of the implementation of a verifying foreign trade inspection body is profitable and viable. The creation of a mineral concentrate verifier has become a necessary requirement since the current entities that provide this service in the market are foreign multinational companies; therefore, the existence of a national company that dedicates itself to these activities would be convenient in order to balance out the competition.

In order to obtain the information of the market research, potential customers were questioned through an e-survey, which questioned customers about the level of satisfaction, the frequency with which they use the services of a verifier and the perception they have about the cost-benefit relationship.

It was determined that the customers were satisfied with the previously hired services. However, they are willing to try new options. Despite the difficulty encountered in obtaining information and completing the survey, this was one of the bases to determine the feasibility of the project.

This project reveals details about the creation of the company, as well as the planning of its operation. The implementation of the quality management system is one of the most important aspects of the work, which is intended to be implemented from the beginning within the company in order to avoid possible errors and be able to perform controls on them. The implementation of the quality management system, more than being a prerequisite for the certification, is a fundamental part in order to guarantee that the service provided is aimed at the satisfaction of the client in its entirety. Thanks to this, the company can ensure that the necessary resources will be used as well as the help of external advice, which will be a guide to obtain improvement within the company.

The company's accreditation against the SAE is essential for its operation, which is why the organization is predisposed to accept the necessary procedures to obtain it. The

implementation of the standard within the organization, together with the accreditation process takes time and effort, factors into whether the company is willing to invest in order to move the project forward.

In the same way, reference is made to the Technical Standard ISO / IEC 17020: 2013 which sets the guidelines that must be followed to obtain the official certification granted by the SAE, which allows the company to operate as an inspection body.

With regards to the implementation costs, it has been determined that the project will be financed with its own resources. The income and expenses are projected to 5 years, which include: salaries, rent, basic services, insurance, tenths, among others. In order to obtain the Net Present Value, the income and expenses previously calculated are taken as references. A favorable NPV was obtained, since it is greater than zero, which means that the execution of the project is viable and profitable.

For all these reasons, it can be concluded that the implementation of a foreign trade inspection body focused on exports of mineral concentrates is fully feasible and viable and can be carried out in a medium time-frame.

Similarly, the implementation of the standard within the company is a process that must be developed between management and employees to achieve their objectives. This also takes into account the times of processes and procedures for obtaining accreditation.

## APPENDICES

### Appendix A

# SURVEY OF THE VERIFIERS IN THE EXPORTS OF MINERAL CONCENTRATES

This survey is aimed at producers and marketers of mineral concentrates, the information in this survey is for academic purposes as part of thesis project.

**\*Answer Required**

**1. 1. Select the type of company** \* *Select all that apply.*

- 1. Ecuadorian company
- 2. Foreign company

**2. 2. Select the frequency of commercialization of mineral concentrates** \* *Select all that apply.*

- 1. Once a month
- 2. Twice a month
- 3. Once a week
- 4. Twice or more per week

**3. 3. ¿ Have you carried out the commercialization / export of mineral concentrates using the services of a verifier?** \* *Mark only one answer.*

- 1. YES *Skip to question 4.*
- 2. No. you can continue to *"THE SURVEY HAS FINISHED, THANK YOU FOR YOUR TIME."*

IF YOUR RESPONSE IS POSITIVE CONTINUE TO QUESTION 4

**4. 4. Select the verification company that you have hired for their services.** \* *Select all that apply.*

- 1. SGS
  - 2. BUREAU VERITAS
  - 3. INSPECTORATE
  - 4. TRUST CONTROL INTERNATIONAL
  - 5. OTHER
- 

5. **5. Select the level of satisfaction obtained when hiring the services of the verifiers** \* *Select all that apply.*

- 1. VERY SATISFIED
- 2. SATISFACTORY
- 3. INDIFERENTE
- 4. UNSATISFACTORY
- 5. COMPLETELY UNSATISFIED

6. **6. Do you consider that the cost-benefit ratio is correct? Select one of the following options.** \**Select all that apply.*

- 1. HIGH PRICE
- 2. FAIR PRICE
- 3. LOW PRICE

7. **7. How do you consider the response time of the verifiers at the time of an inspection?** \* *Select all that apply.*

- 1. FAST
- 2. APPROPRIATE
- 3. SLOW

8. **8. Do you consider that using the services of a verifier gives more security?**

\* *Select all that apply.*

- 1. YES
- 2. NO

9. **9. Would you be willing to use the services of the previously contracted verifier again?** \* *Select all that apply.*

- 1. YES
- 2. NO

**10. Would you be willing to use the services of a new verifier in the market, based on the cost of the service? \* Select all that apply.**

- 1. YES
- 2. NO

**11. Do you consider that the current market offer in terms of verifiers is sufficient to satisfy the demand? \* Select all that apply.**

- 1. YES
- 2. NO

THE SURVEY HAS FINISHED, THANK YOU FOR YOUR TIME.

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With the technology of





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