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PREPARED BY:

Vega Marchena, André Steffano

Advisor: Sandro Sánchez Paredes

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Dedications

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Abstract

Transgas is a Peruvian shipping company based out of Lima, Peru that has specialized in the transportation of hydrocarbons such as liquefied petroleum gasses, oil derivatives, and various chemicals. As a member of a very complex industry, environment, safety, and people have always been the primary focus of Transgas. In that regard, quality management becomes an essential part of the organization to ensure clients, staff and the community that the integrity of people and environment is a top priority of their day-to-day business. For this reason, the company is currently international certified in quality, environmental and safety management.

After the initial analysis of the company´s current situation, the key problem was that Transgas has not implemented appropriately its quality management system. This problem causes a multitude of problems in regular operations, especially evidenced in the breakdowns on leadership and communication. The investigation focus on the challenges for a shipping company to fully-develop its quality management system due to the nature of the business such as the separation between the vessel operation and the administrative office.

The proposed solutions addressed the problem in three aspects. First, the commitment of the people towards quality management has enhanced through training and rewards program. Second, the role of top management towards quality in the company was reinforce with clearer job description to define leader's role and responsibilities. Finally, the lack of control and self-assessment was addressed by proposing a new quality policy and internal audits. The proposals are expected to help the company build a strong quality culture, increase the overall quality of its services and enhance team work. An implementation plan, along with its key success factors, was proposed to facilitate application of these proposals in the organization.

Resumen Ejecutivo

Transgas es una compañía peruana de cabotaje con sede central en Lima, Perú que está especializado en el transporte de hidrocarburos incluyendo gas licuado de petróleo, derivados de petróleo, y químicos diversos. Como miembro de una industria compleja, el medio ambiente, la seguridad y las personas siempre han sido el centro de atención para la empresa. En ese sentido, la gestión de calidad se convierte en una parte esencial de la organización para asegurar a sus clientes que Transgas tiene como prioridad principal su bienestar y el cuidado del medio ambiente. Por este motivo, la compañía posee certificaciones internacionales de gestión de calidad, medio ambiente y seguridad.

Después del análisis inicial de la situación actual de la compañía, el problema principal fue definido como una implementación no adecuada de su sistema de gestión de calidad. Este problema genera una multitud de problemas en las operaciones regulares de la compañía, especialmente evidenciado en los quiebres de comunicación y falta de liderazgo. La investigación se centra en los retos para una compañía de cabotaje para implementar por completo un sistema de gestión de calidad debido a la naturaleza del negocio como la separación entre las operaciones en los buques y las oficinas administrativas.

Las soluciones propuestas se centran en tres aspectos. Primero, el compromiso hacia la gestión de calidad será mejorado a través de capacitaciones y programas de incentivo. Segundo, el rol de los líderes será reforzado con descripciones de trabajo más claras que definan las responsabilidades de cada uno. Finalmente, la falta de control y autoevaluación será resuelta a través de una nueva política de calidad y auditorías internas. Se espera que las propuestas contribuyan a la creación de una cultura de calidad, incremente la calidad de su trabajo y mejore el trabajo en equipo. Un plan de implementación es presentado para facilitar la aplicación de las mejoras.

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Chapter I. General Situation of the Organization

1.1. Organizational Context

As part of the newly updated ISO 9001:2015, management is advised to provide an in-depth analysis of its organizational context. Chapter 4 (Context of the Organization), specifies that "organizations shall determine external, and internal issues relevant to its purpose and its strategic direction and that affect its ability to achieve the intended results of its quality management system" and furthermore understand the needs and expectations of interested parties (ISO 9001:2015). In order to provide this understanding, an internal and external analysis of Transgas is provided which highlights opportunities and threats impacting the business as a whole and also its quality management system.

1.1.1. Company overview

Headquartered in Lima, Peru, Transgas has specialized in the transportation of hydrocarbons which include cargo capacity for liquefied petroleum gases, oil derivatives, and various chemicals. Transgas started operations in Lima on July 16, 1991 and is now comprised of a total of 14 gas tankers and 2 multipurpose vessels (Transgas, 2016). As part of their service Transgas provides chartered ships to conduct specific services of short-term hydrocarbon transportation. Within the last decade Transgas has been able to expand their operations and are now sailing also in neighboring countries, including Chile and Ecuador and are reaching out to markets in the Caribbean. Environment, safety, and people have always been the major focus of Transgas. The company is currently certified with The International Organization for Standardization (ISO), International Safety Management (ISM), International Safety Port Security (ISPS), and Tanker Management and Self-Assessment (TSMA). By holding these certifications Transgas illustrated its commitment towards assuring clients, staff, and the community that Transgas is making their lives and the environment a top priority of their business day-to-day operations.

Their commitment to quality may become furthermore transparent in their company mission, which is compromised out of two parts:

- Provide adequate dynamics in the ongoing modernization of vessels and expand our activities to gain new markets. Provide an efficient service aiming to achieve zero incidents and zero cases of contamination.
- Achieving developed and trained staff, committed to continuous improvement and form an interred and efficient in the management of our operations and the slices we provide to our customers.

Thereby, the key components of a well-functioning quality management system are covered. Focus is put upon providing continuous modernization and improvement, while engaging employees and management to establish a focus on customer satisfaction and ensuring that any incidents are kept at minimum levels. Commitment is therefore stated as a major goal of Transgas, yet the translation into everyday operations seems to challenge for them.

1.1.2. Macro-environmental analysis: PESTE

It is important to understand its environment in which the company operates. Through a PESTE analysis, it is possible to identify the environmental factors that affect the performance of the company. The analysis focus on 5 different categories: political, governmental and legal factors (P), Economic factors (E), Social factors (S), Technological factors (T), and Environmental factors (E). The main threats and weaknesses of the company are identified as a result of the analysis.

Political, governmental and legal factors (P). The Peruvian maritime shipping industry operates under the legal framework of the law N° 29475 enacted by the Peruvian National Congress on December 17th, 2009 (Ministerio de Transporte y Comunicaciones, 2015). The main purpose of the law was to promote and develop the industry in order to

facilitate the shipping services of companies in the future. The legal framework proposed by the law determines some fundamental conditions in order to compete in the industry:

i. Maritime shipping industry can only be operated by Peruvian companies.
ii. It requires a minimum of Peruvian ownership of the company and Peruvian crew members.
iii. Ships must use Peruvian flag, but in case the company does not own any ships, the operation could be done by ships with foreign flags for no longer than 6 months.
iv. 25% of the total cargo is reserved to be transported by a Peruvian War Marine, which cannot be conceded to any third party.

The legal framework for maritime shipping has been changing over the years due to political interest from government. As a country, Peru presents good opportunities to develop its logistics infrastructures for aerial, fluvial, ground, and maritime transportation (Ministerio de Transporte y Comunicaciones, 2011). Being the later the one with more development opportunities, government has given incentives and loosened regulation in order to promote maritime shipping as an option for international commerce.

Economic factors (E). On the macroeconomic level, Peru has been one of the fastest growing countries of its region with an average growth rate of 5.9% in a context of low inflation (Worldbank.org, 2016). Nonetheless, economic growth has not continued in the same rates due to a lower business confidence environment, recession of the main Peruvian trader partners and difficulties in the private sector. The World Bank (2016) has identified some key challenges for Peru in the future: (a) decline in commodity prices, (b) possible period of financial volatility, (c) delays in the implementation of public and private investment programs and (d) impact of El Niño. Although the fast economic growth has contributed to the improvement of Peru´s level of socioeconomic development, Peru is still a country characterized by its inequalities, especially in education and income (Bertelsmann

Stiftung, 2016). Nevertheless, considering all factors Peru is considered a good place for business and an emergent country with favorable growth expectations.

For the shipping industry, demand for maritime transport services and seaborne trade is highly tied to economic growth and the need to carry merchandise trade (UNCTAD, 2014). Estimations indicate that seaborne shipments have been expanding, representing around four fifths of total world merchandise trade. Shipping has become especially important for developing countries which are major importers and exporters and a driving force underpinning seaborne trade flows and demand for maritime transport services (UNCTAD, 2014).

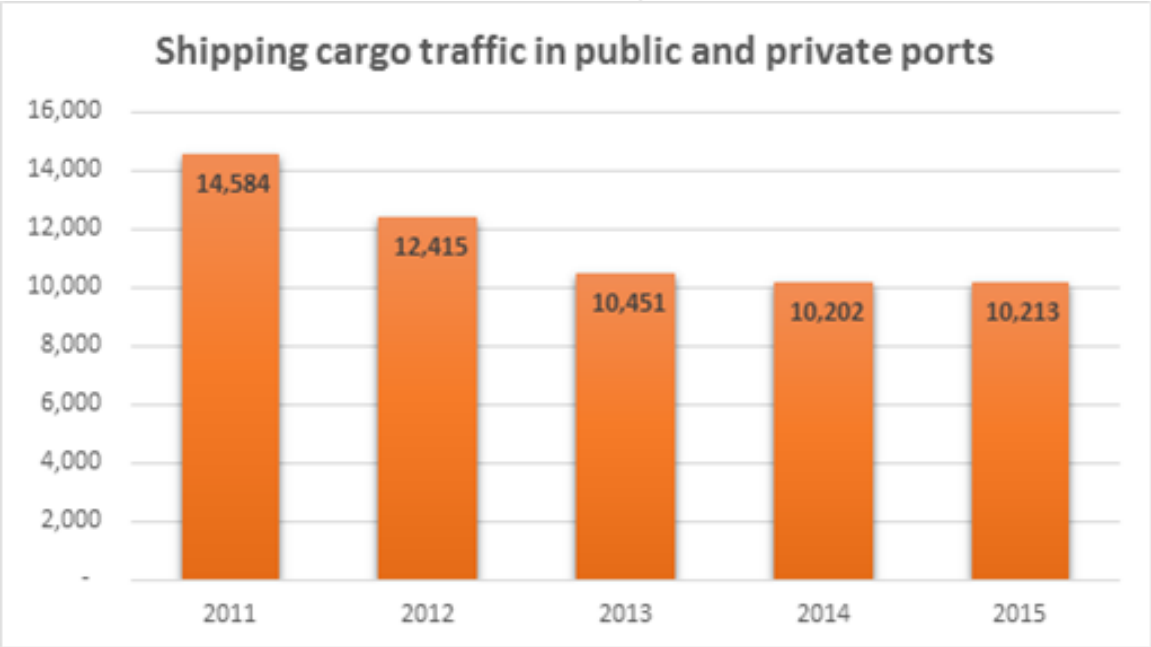

Figure 1. Shipping traffic in public and private ports (thousands of TM). Data are from "Estadísticas", Autoridad Portuaria Nacional (APN), 2016 (http://www.apn.gob.pe/estadisticas.php).

In Peru, volumes for a total load of shipping has been decreasing in the last years as a consequence of trades slowing down due to the economic environment. Figure 1 shows how the traffic level has been evolving to represent 10.213 thousand of TM in 2015 (Autoridad

Portuaria Nacional, 2016). Most of the traffic is for liquid bulk transportation, mainly hydrocarbon, representing 97% of the total, according to Autoridad Portuaria Nacional (2016). The hydrocarbon transportation seeks to satisfy internal demand through the main fuel providers Repsol, Petroperu and Pluspetrol. The rest is composed of chemicals requested by private companies for their operations. Therefore, the industry is dominated for few players and the demand depends on the economic performance of the country.

Social factors (S). There is a special interest for the Peruvian government on improving the general quality of life within the country. In that regards, one of the main aspects of the development of a country is having an appropriate infrastructure to support its productive activities. Peru's impressive economic growth has led to significant poverty reduction from 54.7% in 2001 to 23.9% in 2013 (Bertelsmann Stiftung, 2016). The same trends can be noticed with extreme poverty, however, this trend changes in rural zones where there are still high rates of poverty. The maritime shipping industry provides great opportunities for commerce and connection among all the regions in the country. The development of shipping collaborates with the development of clusters near the port regions that have direct impacts in the surrounding areas. Currently Peru possesses 62 ports, of which 45 are maritime and the most important are Paita, Callao and Matarani.

Technological factors (T). Technology development has influenced every industry and maritime shipping is no exception. Technological advances enable shipping companies to have real time control of their vessels, digital navigation systems, ship automatization, digital, and satellite communication systems among others. Due to technology, the crew of the ship is able to take better decisions, have better control of the cargo and improve the security on board. Therefore, shipping companies have now more competitive costs and more efficient operations.

The main asset use for maritime shipping are the tanker which is a ship designed to transport liquids in bulk. Tank ships are mostly oil tankers, chemical tankers and the liquefied natural gas carriers (Rowbotham and Rowbotham, 2008). These ships can carry a wide range of products that go from complex products such as hydrocarbon products or chemicals to the basic liquid product as fresh water or wine. In the industry, tankers used for liquid fuels are generally classified by their capacity (in Dead Weight Tons): (a) Seawaymax between 10 000 – 60 000 dwt, (b) Panamax: DWT 60 000 – 80 000, (b) Aframax between 80 000 – 120 000 dwt, (c) Suezmax, 120 000 – 200 000 dwt, (d) VLCC (very large crude carrier) between 200 000 – 315 000 date and (e) ULCC (ultra large crude carrier) between 315 000 – 520 000 dwt. The ships contain high technology, which allows companies to carry large travels around the world transporting the cargo. First, the ships contain digital navigation systems that include GPS, radar, satellite radios, and more. Then, they possess a monitoring system to keep track of the ship functioning, this includes both technical and safety machines and equipment. The ships also include the actual tank room design to pump and storage the liquid bulk. Finally, ships require advanced communication systems to operate in conjunction to their operations centers. The communication systems are usually satellite so it can work during the travels and not only in the ports.

Environmental factors (E). The shipping industry has a special focus on environmental issues. The international certification that allows a company to operate, such as the TMSA includes a detailed section in regard to environmental responsibilities. Ships heavily rely on oil for propulsion which in turn leads to environmental deterioration through the air and marine pollution and carbon emission. Just in 2012, CO2 emissions from international shipping were estimated at 2.2% of the total global emission (UNCTAD, 2014). In a society more concern about environment, decisions and policies are made to ensure the reduction of gases from international shipping.

Water management is the other great environmental topic in regard to maritime shipping. As the UNCTAD (2014) explained in its report "One of the major threats to biodiversity is the introduction of non-native species following the discharge of untreated ships' ballast water". In addition to that, there are always risks of fuel or chemicals spills that also threaten ocean's biodiversity. The marine environmental care in Peru is in charge of Direccion General de Capitanías y Guardacostas, which is part of the Peruvian Marine War. Its main objective is to look after the safety of human life, environmental protection and natural resource protection.

Opportunities and threats. Given the PESTE analysis of Transgas, it is possible to establish some initial conclusions about the possible threats and opportunities of the shipping industry environment in Peru, which are summarized in the Table 1. The political and social interest of the government in the industry represents a great opportunity for shipping companies. The regulations are becoming more open-market driven and the state is providing monetary and tax incentive in order to boost the development of ports and shipping as a competitive mean of transportation. The rapid technological growth will support the development of the industry with high end technology on board the ships that would lead to a more efficient operation.

On the other hand, the industry is also under several threats coming from external factors. The demand of the industry is highly dependent upon international commerce, and therefore, of the overall economic performance of the different countries. In that context, most of the largest economies are still recovering from recession years and there are several crises latent in the Eurozone. Finally, the shipping industry has been constantly under the scrutiny due to environmental factors. Because of this, the companies are held under strict certifications and regulations towards safety, and environmental control, such as the TMSA. Not fulfilling these standards would result in several financial and reputational losses.

Table 1

Opportunities and Threats

Opportunities	Threats
Political and social interest of the government in the industry	Demand of the industry is highly dependent upon international commerce
Regulations are becoming more open-market driven	Largest economies are still recovering from recession years
Monetary and tax incentive provided by the government	Several crises latent in the Eurozone
Rapid technology growth	Environmental factors heavily influence the public perception around the industry

1.1.3. Competitive analysis: Porter's five forces

According to Porter (2008), there are five forces that shape the structure of all industries and determine the profit potential of a given industry. By understanding the competitive forces and its root causes, it is possible to have a good sense of the level of competition in an industry. The Peruvian shipping industry may be analyzed under the 5 competitive forces that shape competition: (a) negotiation power of the suppliers, (b) negotiation power of the buyers, (c) threat of substitution, (d) threat of new entry and (e) competitive rivalry. The result of the analysis is summarized in the Figure 2.

Negotiation power of the suppliers. The Peruvian shipping industry is heavily influenced by the available infrastructure to perform its activities. Therefore, the main suppliers are the companies and institutions that provide the company with the necessary logistics. Among the main providers are Autoridad Portuaria Nacional (APN), la Empresa Nacional de Puertos (Enapu), el Organismo Superior de la Inversión de Transporte (Ositran),

Servicios Industriales de la Marina (SIMA), maritime commerce operators and terminal ports.

The influence of the Peruvian government is clearly noticeable in the industry. A significant part of principal suppliers to the industry are state-owned companies. APN´s role is to promote the development and competitiveness of the ports, facilitate multimodal transport, improve the ports and contribute to the general development of supply chain present in port terminals (Autoridad Portuaria Nacional, 2016). In the case of Enapu, the company is in charge of managing the activities and port services in the state-owned ports (Empresa Nacional de Puertos, 2016). Ositran, regulates the behavior of the market and supervises the activities when public transportation infrastructure is involved (Ositran, 2016). Finally, SIMA provides maintenance, construction and design services to the Peruvian Marine War, public companies and private companies (SIMA). The total of these companies has a high negotiation power based on the framework provided by laws and regulation that give them an advantageous position.

The other two key suppliers to the industry are the maritime commerce operators and the port terminals. The first ones are mostly logistics operators contracted by the company to reduce costs and improve time management. The offer of the service exceeds the demand, therefore, their negotiation power is low due to the high competition and the lack of restriction for shipping companies to select any company. The terminal ports are the most important infrastructure in the industry. Currently there are 68 terminal ports in the country, 51 are maritime, 11 are fluvial and 6 are lacustrine (Ministerio de Transporte y Comunicaciones, 2011). The port terminals have a high negotiation power as there is no other option for the ships to land in the country.

Negotiation power of the buyers. The main users of the Peruvian shipping system are the companies which generate cargo traffic in the form of liquid or dry bulk, and general

cargo. These companies currently use maritime and ground transportation in order to deliver the products from its production centers to their consumer centers. In the case of Peru, the principal products that are transported are the hydrocarbons and the minerals and most of the cargo are transported as liquid bulk. Therefore, the demand is dominated by Petroleum companies, such as Repsol, Petroperú, Pluspetrol; and by mining companies such as Southern Perú. The negotiation power of the buyers is high as the demand for shipping services is concentrated in very few companies of large size, however, regulations limit the market pressure they can apply.

Threat of substitution. The substitutes for shipping are the ground, which encapsulate road and freight, and aerial transportation. Ground transportation is the most important alternative transportation mode in the country. In 2014, it represented 69% of the total transportation in terms of value, followed by aerial transportation that represented 6.2% (Ministerio de Transporte y Comunicaciones, 2014). As maritime transportation represented less than 4% of the total, it is that substitution represents a big threat for the industry. Although maritime transportation can be seen competitive in term of cost, the ground transportation also offers more flexibility, high availability, more coverage and the service of door-to-door delivery.

Threat of new entry. The law Nº 29475 that regulates the industry promotes the reservation of shipping to ships that carry Peruvian flags (Ministerio de Transporte y Comunicaciones, 2015). Because of this, there are high barriers for new entrants coming from foreign countries. However, this law also promotes the entry of new competitors with fiscal benefits to private companies willing to invest in the shipping industry. Also, the law reserves a significant percentage of the total traffic to be handled by the Peruvian National Marine War, which limits the markets and discourages the entry of new competitors.

Competitive rivalry. Currently the shipping industry which is focused on the transportation of hydrocarbons and petroleum, only contains a very few important players. The offer is led by Naviera Transoceánica that has 56.7% of the total cargo, followed by Servicio Naviero de la Marina (10.94%), Bertling Transgás Tankers (8.21%), Blue Marine Inca (6.28%) and Transgás (3.99%) (Transgas, 2016). Aside from Naviera Transoceanica and Servicio de Naviera Nacional, the rest of the companies compete in similar condition for a small portion of the market. However, the level of competition is still low and there is an opportunity for companies to gain market share. This situation could change if a company would enter the container transportation sector, where they would have to compete with the ground transportation.

Given the Porter 5 forces analysis, it is possible to conclude that the shipping industry possesses a medium competitive level. Figure 2 shows the key points to each one of the five forces that shape the shipping industry. On the one hand, the suppliers, mostly composed by state companies, and buyers, which are very few and large, are in a more advantageous position against the shipping companies. Nonetheless, the regulations and incentives control up to which extend they can impose their strength to the market. Also, it is an industry with high entry barriers for non-Peruvian companies and the competition between the existing companies is still at an acceptable level. In that regard, the main competitive threat comes from the substitutes on other means of transportation, such as ground and aerial, which are often more preferred than shipping.

1.1.4. Key success factors in the industry

In any industry, it is critical to identify the areas where satisfactory results will ensure successful performance. Studies have classified these factors, according to which they are coming from. Grunert & Ellegaard (1992) presented 5 main sources for critical success factors: The industry, competitive strategy and industry position, environmental factors, and

managerial position. Following these classifications, it has been possible to identify the key success factors for a company in the shipping industry.

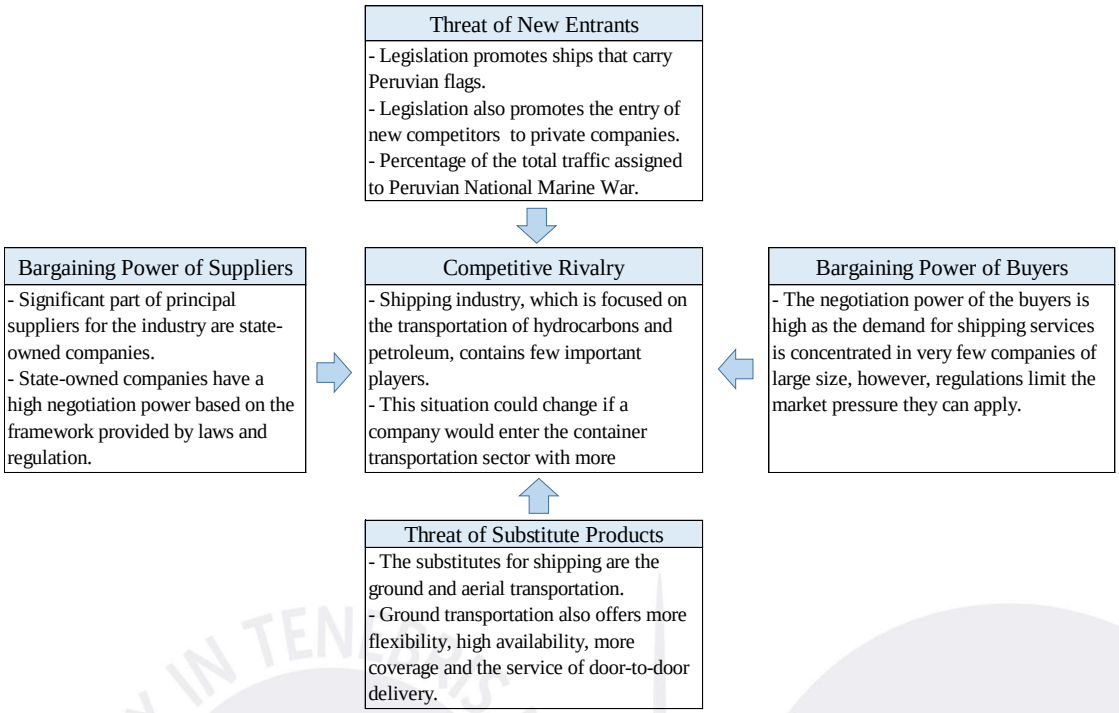

Figure 2. Porter´s five forces analysis.
Adapted from "The five competitive forces that shape strategy" M.E. Porter, 2008, *Harvard Business Review*, *86*(1), p. 78-93.

Firstly, the factors that come from the industry are mainly based on the support from related industries which are closely related to the competitiveness of shipping companies. The general Peruvian laws for the industry have gone from protectionism to economic incentive in order to make shipping an effective mean of transportation. The expected result is for companies in the sector to migrate into shipping transportation and, therefore, contribute to the development of ports. The success of Transgas is highly tied to the capabilities of every company in the industry to take advantage of these benefits and contribute to make shipping an attractive product.

Secondly, the success of a company can also come from its competitive strategy and industry position. The Peruvian shipping industry consisted of very few players, one of them is the National Peruvian Marine War. In this context, the success would be determined by

two main factors. First, the market shares in the export shipping service and second, the level of diversification of the company. Shipping includes the transportation of products with very specific specification. As a result, a company has very little flexibility to attend different markets and routes. The capability of a company to attend different types of clients according to demand, supply, price, etc., determines how competitive the company would be in the market.

The third source for key success factors is the environment. This factor has an inevitable effect on all the competitors of the industry and is nearly unavoidable. The success of the shipping industry worldwide is determined for three major factors: Economic Environment, Trade Environment, and Commercial Environment. The three factors respond to the nature of the demand for shipping industry, it is influenced by the level of worldwide trade. In regard to this, the Peruvian shipping industry is favored by the considerable number of Free Trade Agreements in place and the globalization trends that has significantly lowered trade barriers. As long as the favorable economic conditions sustain, international commerce would still be a central part of the world´s development.

Finally, the last factors come from the managerial position. For this aspect, the success of Transgas in the industry is determined by its quality and operation management. As stated before, quality management is highly critical for a shipping company as it is necessary to operate under strict international quality standards and fulfill the requirements for certifications as the TMSA. The level of accomplishment of the quality management system improves the trust of clients and, therefore, would contribute positively to the company´s sales. Also, it is critical that management is committed to quality service in an industry where very risk products are transported. In addition to that, the operational management has to put the company in a position to operate as efficiently as possible. In that

regard, the quality of maintenance and utilization of the vessels would impact directly in the success of the company.

1.1.5. Internal company analysis: AMOHFIT

Administration & Management. In the current year, the company went through a major administrative change as a new CEO step in the position. The designation of a new CEO responds to the new challenges of the industry and the expansion plans for Transgas. The first measures taken by the new administration consisted on changing the organizational structure. Transgas went from a vertical reporting structure with only three areas to a more horizontal one with 11 areas that report directly to the CEO (Appendix A).

This translation into everyday operations may be captured in part through their company structure and the roles and responsibilities of each individual department. Transgas works with a top down structure both in their office and aboard their vessels. On board their vessels Transgas operates a traditional structure with the Captain at the head overseeing the entirety of ship operations with the help of the First Mate, Chief Engineer, and the rest of the crew (Appendix A). Thereby, quality standards and requirements are tightly linked to everyday operations.

It is important to highlight that this organizational structure present two areas that work above the others playing strategic roles. The first one, it is the Designated Person Ashore (DPA) who is the main responsible of the safe operation in every ship. This include assuring the integrity of every member of the crew and the environmental safety. Additionally, the DPA works as the link between the company and the ships. This means, the DPA should assure that the adequate resources and support are put in place for the vessels operation. Nevertheless, it was noticed during the interviews that the DPA had difficulties communicating the requirements of the ships to the company, as well as maintaining a correct communication channel in terms of quality control (Appendix B). As a result, the company is

mainly unaware of the situation of the ships which makes it extremely difficult to monitor the processes. The second area playing a strategic role for Transgas is the Strategic Information Management, which is in charge of evaluating the more important financial, commercial and operative information in order to support the top management decision making.

In term of processes management, the company has not clear procedures and responsibilities assigned to their employees. This end up contributing to their low performance in relation to quality management, as the lack of procedures does not allow an effective control which in turn enables the capabilities of the company to improve their current standards.

Finally, it is important to notice how the nature of the business impact the administrative operations. Transgas is a service company which services takes places mainly in open sea. Because of this, the ships need to have the necessary consumable, tools, and equipment to support the operations during its travels. The dependence on such materials make the procurement process key for the company, as the breaks on inventory could represent significant operative losses for ships that cannot fulfilled their schedule.

Marketing. Quality certificates and high quality standards are increasingly important to the marketing purposes. Internationally recognized standards which are provided by third party audits provide validation and proof to high quality standards. These audits furthermore enable transparency towards clients and can therefore be used to increase the reputation of the company. Furthermore, one of the primary focuses of quality management is to meet customer requirements and to strive to exceed customer expectations.

The department therefore plays a crucial role working closely together with clients to ensure that customer focus is maintained and information about customer requirements are reported in order to provide constant improvements. The department Gestión de Operaciones Comerciales understands this importance and currently uses the certifications in their client

acquisitions though further information flow would be beneficial to further increase long-term customer satisfaction. Clients are interested in quality levels and are asking for certificated especially related to quality and the security of operating the vessels. Transparency exists about the achieved certificates though the marketing department who would benefit from deeper understanding of the overall quality management system. The department Gestión de Operaciones Comerciales has therefore a clear interested in having specific information about the current TMSA and the ISO's in order to provide commercial interested to Transgas.

Nevertheless, there is still some deficiencies in the customer focus outside of the commercial areas. As one of the main principles of the ISO certification for the quality management system, customer focus should be an integral part of every activity of Transgas. However, it was noticed during the interviews how most of the staff could not tell how their regular work affected customer satisfaction as most of the information collected from commercial areas were not directly used in actions plans that include different areas of the company.

Operations. Transgas has divided its operations in two major fronts. First, the operation of the vessels that is mainly composed by the transportation of hydrocarbons in ships that function as gas tankers. The operations take place in special environment which make the maritime transportation a complex activity that need to take different variables in order to ensure an adequate level of service. The second operation is the vessels maintenance, which include the minor, medium and major works in the vessels' engines, parts, machinery, among others that are mainly conducted by the crew members. Every ship has a designated superintended that is in charge of the maintenance management and keeps track of every work and work in progresses. In addition to that, special maintenance is subcontracted because of

the high level of expertise required to perform it. These two operative processes are supported by the Gestión the Control Interno in terms of quality and control.

Every crew member needs to adhere completely to quality standards on a daily basis. However, the captain is the final person who holds responsibility upon the ship and he reports any incidences to the DPA which functions as bridge between vessels and office. The DPA plays a central role in quality management, as he is responsible for all actions related to safety, health, and environment on the vessels and overlooks processes and audits related to the TMSA guidelines within the office. He thereby needs to ensure that the departments pass audits and incidence rates are kept at a minimal level to ensure the safety of all crew members. Focus is put upon quality standards on the vessels.

The department Gestión de Control Interno plays a central role in quality management, as the main responsibility lies within ensuring that quality standards within the office are met. Focus is thereby put on ISO guidelines related to workplace safety. Through passing the ISO 9001:2008 the department demonstrated its high commitment towards quality management. As this department is dedicated towards ensuring quality at Transgas its intentional is to establish a unity of purposes and direction to facilitate an environment in which people are engaged in achieving Transgas quality objectives. Part of the responsibility lies in having a clear contact person in each department.

Currently, the department Gestión de Control Interno is not well connected though reporting is made on an ad-hoc basis and no clear procedures are in place. Commitment and engagement are major weaknesses of the department though the current company structure which is lacking clear reporting procedures hinders a more transparent and holistic approach towards quality management. Furthermore, a clear separation between the quality management of the office and the vessel exists. Synergies can be achieved by promoting a holistic quality culture which translates into every aspect of Transgas organization. The Gestión de Control

Interno can facilitate the development but needs to be provided with top management support to have the resources and authority to implement changes.

Finance. The shipping industry is a capital-intensive business. Because of the nature of the business, with vessels needing to operate for long stretches without touching shore, Transgas need to ensure daily cash flows to sustain its operations. Especially in a volatile industry that depends mainly on external factors such as currency rates or oil prices, maintaining good financing policies becomes a key factor for success. Transgas manages its cash flows through its Treasury Department that looks for the best sources of financing. The general good financial performance of the company over the year had allowed Transgas to obtain favorable deals from suppliers and financial institutions.

The second main financial area of Transgas is its Accounting Department. As any company in Peru, Transgas needs to follow international accounting standards such as the International Financial Reporting Standards (IFRS). Nevertheless, accounting represents a significant challenge in an intensive-capital business such as the shipping. This was evident in the most importance assets of Transgas that are the ships. The vessels have several accounting implications such as their value, how the maintenance expense are treated, and the depreciation amounts among others. In that regard, the Accounting Department has the challenge to incorporate these special implications into Transgas' financial statements.

Finally, as a result of the new focus on data-based decisions, the administration and finance department needed to go under major changes. One of the main features of this new management was the commitment to closer cost monitoring. Transgas is thereby accumulating all annual expenditures and incomes working on providing the first annual report which captures the collective of all business operations of Transgas. By having further transparency about expenses and costs Transgas makes a major step in developing a deeper understanding of the company's activities and related financial and operational position.

Human Resources. In the management of human resources, Transgas main a clear distinction between its employees. Currently, the company separates the human resource management, including recruitment and staff management, between the employees within the office and the vessels. The Gestión de Control Interno Department focuses on the management of employees within the office, while the Gestión de Gente de Mar Department has a different administration and focuses solely on operations related to the fleet employees. Employment law and standards, administration of employee benefits and aspects of recruitment differ extensively as requirements are highly diverse between office and vessel employees.

The separation made in the Human Resource Management directly affects the separation created between the vessels 'operations and the administrative offices, influencing the company to work as two separate entities. The evidence during the interviews showed how the staff were unable to identify who were the people responsible for certain activities that involve their daily operations (Appendix B). In the same way, there were no proper communication channels between the on-shore and off-shore operations, which does not allow an efficient reporting and control of the core operations of the business.

Another problem identify were the lack of clear job descriptions that assigned the proper responsibilities to the members of the staff. This goes in line with the lack of procedures in the company, as during the interview when information in regard to KPI or controls were requested, there were no clear answers to who should be responsible to manage such kind of information (Appendix B).

Finally, the role of leadership is not currently supportive with the staff. Most of the crew do not have the right tools in order to perform its tasks and there is no engagement from the people in order to get operating excellence. The interviews show that the staff were not aware of its function, the software implementing by the company made their tasks more

difficult, there were no training plans in place, and commitment enhancing plans in place (Appendix B).

Information technology. Information Technology development has heavily influenced the maritime shipping industry. Technological advances that enable ships to have real time control are mainly based on IT software. Among the main technology used by the company is included the digital navigation systems, which use real time GPS localization information to trace the rout of the ships, and digital monitoring systems, that controls the integrity of the cargo during the trip. Due to technology, the crew of the ship is able to take better decisions, have better control of the cargo and improve the security on board.

The operations in the company are supported by the department Gestión de Soporte Operacional. The department provides the vessels with the necessary documentation in order to perform their activities without inconvenience, these include orders, certifications, and permits among others. The information is managed by an ERP platform that controls all the orders and personnel administrative processes. Nevertheless, the ERP is not well suited to create reports, therefore, most of the information processing is doing by hand in spreadsheet or by hand.

The maintenance of the vessels is managed through the operational software AMOS2 that allows the superintendent to program activities and control the state of the vessel. Thereby, shortcoming have become transparent, as in addition to the AMOS2 additional excel sheets are used to file additional maintenance information. As the AMOS2 is not easily usable and entirely in English forms are developed which are needed to document the entire maintenance procedures and activities.

Finally, the influence of IT in the company is limited by the lack of connectivity in the vessels and the access to computers by the staff in the ships. Currently, the internet connection only allows partial connectivity, this means that crew members can only

communicate and access the AMOS and ERP system in certain locations. On the other hand, only the Captain possesses a personal computer, which is shared with the officers and other members of the crew.

Internal strengths & weaknesses. Given the AMOHFIT analysis of Transgas some initial conclusions can be drawn about their internal strength and weaknesses, which are summarized Table 2. In order to be able to implement quality management systems the new ISO 9001:20115 revealed that top management support is needed. One the major strengths at Transgas is the willingness and interest in improving quality performance and openness towards change. Without any support of top management, transformations within the company would not be realizable. By having top management on board, a culture can be established which translates into every aspect of the company.

Table 2

Internal Strengths and Weaknesses

Strengths	Weaknesses
Willingness and interest in improving quality performance and openness towards change	Quality management vision it is currently not translated into every department
In-depth client knowledge and understanding	Lack of clear responsibilities and contact persons within each department who have an ownership on quality topics
High levels of operational expertise which enables them to offer valuable assistance to customers	Lack of clear documentation and transparency about quality requirements
Sustain growth and further increase of their services by expanding into international markets	Separation between vessels and offices

As part of their further internal strengths is the in-depth client knowledge and understanding. Throughout the last years Transgas was able to sustain growth and further increase their services and vessels by expanding further into international markets. Transgas understands the importance of an international presence in South American markets, Asia, and the Caribbean to strive for entrepreneurial attitude. Furthermore, Transgas has established high levels of operational expertise which enables them to offer valuable assistance to customers.

As part of the operations Transgas is facing though several weaknesses. Although a vision is in place about quality management it is currently not translated into every department. The company is lacking clear responsibilities and contact persons within each department who have an ownership on quality topics and are able to provide constant updates on specifics. This is furthermore transparent in the lack of clear documentation and transparency about quality requirements. Audits were handled on an ad-hoc basis though the benefits of a quality culture were not transferred into every-day operations. Another weakness which is currently affecting Transgas is the separation between vessels and offices. Thereby, information is not commonly organized or easily accessible and standardized processes are not in place which specify how to proceed in order to achieve high standards. This may be reflected in an overall lack of common policies which are applicable to the office and the vessels and a mission which states a common interest and goal to be achieved as a single company. Crew members should thereby perceive themselves as part of the office and interactions may be more frequent.

Given the better understanding of the internal processes focus needs to be taken upon establishing procedures and policies which act overarching upon Transgas. Thereby, the collaboration between the vessel and office needs to be stimulated, while clear responsibilities facilitate ownership and further engagement of employees.

1.2. Conclusion

Transgas presents a small and horizontal organization which a clear separation between the administrative and operational areas. In the shipping industry, quality certifications play an important role in order to attract and retain clients. The industry presents opportunities to develop thanks to the government incentives, but it is also under the threat of unfavorable economic trends that will affect international trades. Although the internal level of competition is low, buyers and suppliers are in advantageous positions against the shipping companies. In addition to that, the industry is still looking to present itself as a viable option for transportation against substitutes such as ground transportation. In this context, the development of quality management on the company becomes a necessity to satisfy client's needs.

Chapter II. Key Problem

2.1. Problem Definition

As stated in the previous chapter, quality is one of the most important topics for both the industry and Transgas. As part of its commercial efforts, the company has come to realize how important is to maintain a high-level quality standards to satisfy customer needs, become more efficient and have access to new markets. Because of this, the company has gone under the process to obtain international quality certifications such as the ISO 9001 that provide the general framework in order to establish a quality management system in the company. Quality management systems are becoming more important to clients that are eager to make business to qualified companies that can meet with their requirements and are able to provide customer satisfaction.

Nonetheless, one of the main concern from Alonso Burgos, the recent CEO of the company that have initiated a series of changes in the company, was his perception that the company was operating as if there were no quality management system in place. This will lead to the hypothesis that although Transgas has passed the certification process, the quality management system has not been implemented properly. In order to evaluate the level status of QMS in a company, it is necessary to assess how effective and successful the implementation of the QMS requirements, in the case of Transgas these are the ones which correspond to the ISO 9001, are taking place in the organization. As it is explained in the literature review, the requirements of the ISO are described in its clauses and based in its quality principles such as customer focus, people engagement, leadership and process approach.

The evidence found during the consulting report confirmed the initial thoughts from Alonso Burgos in regard to the inadequate implementation of the QMS. During the internal analysis that showed some clear weaknesses related to the QMS: (a) quality management

vision is not translated into every department, (b) there is a lack of clear management and responsibilities within quality topics, and (c) there is lack of clear documentation and transparency regarding quality requirements. Moreover, the results from the qualitative/quantitative and root-cause analysis also reinforce the idea of an inadequate implementation of the QMS in Transgas. The qualitative analysis showed the gap found in the audits in terms of leadership, planning and performance evaluation, which should be central part of any QMS. Additionally, the root-caused analysis showed how the inadequate organizational structure, the lack of definitions of leadership roles, unclear standards and policies, and ambiguous procedures contributed to the failure of the implementation of the QMS in the company.

2.1.1. Description of the problem

While the requirements of the ISO 9001 are being fulfilled, the mere existence of quality documentation does not ensure that the staff is including the basic quality principles on their every-day work. The main problem in Transgas is that its quality management system has not been implemented appropriately. This entails that Transgas is not effectively fulfilling the requirements established by the ISO 9001. This could be evidence through three major features of the company.

Firstly, there is no overarching culture that reinforces quality management. This results in a lack of engagement from employees, as they do understand the importance of the certification process but are not entirely aware of the benefits which can translate into their day-to-day operations. Furthermore, the values and beliefs are not well defined and there is no clear idea of the quality level of the operations. The policy establishes that organizations should understand the customer's current and futures need, meet customer requirements and exceed customer expectations. The concept of quality is focused on fulfilling the requirements for audits and not about the added value implementing these quality

management principles could have on operations. Since there is no quality culture in place there is no strive for continuous improvement. Improvement is essential for an organization to maintain current levels of performance to react to changes in their internal and external conditions and to create new opportunities.

Secondly, the purpose of management at all levels is to establish a unity of purpose and direction and are supposed to create the conditions in which people are engage on quality objectives. Transgas faces the problem that no clear responsibilities were defined. Furthermore, the quality management does not provide clear documentation which later translates into the lack of monitoring and measurement of the processes and progresses.

Thirdly, the final issue lies in the inadequate organizational structure, evidenced by the disconnection between the fleet operations and administrative office. The area in charge of monitoring quality in the company does not have a direct contact with any fleet member about the current procedures in place. As a result, there is no full transparency about the quality levels and guidelines, which prevents the company from creating a standard quality culture. The purpose of the organization is to build a common quality policy that can be applied to both the office and the vessels. Quality in the vessels are mostly focusing on operational level. The TMSA used by the vessels focuses on safety and environment, while the ISO, which is currently only utilized in the office, is intended to make the processes more efficient. It is evident that there is an opportunity here to make the crew on board more integrated into the quality culture by implementing these standards on board as well.

2.1.2. Dimensions of the problem

Location of the problem. The problem is widespread throughout the entire organization, including the vessels operations and the administrative offices. This is a consequence of the reach of the quality management system that entails all the processes in the organization. As the ISO provides the general guidelines for the quality management, the

consequences are seen in the regular activities at any level. The scope of the problem is centered in quality management, as the company has parallel systems to manage safety and environment in the company.

Ownership. Given the description of the problem it becomes transparent that ownership of the problem lies at top management. This implies that top management is the main owner, as leadership is the most important change for the new ISO. Along with the CEO, the heads of Control de Gestión Interna and DPA would play significant roles in the implementation of the quality management system in the company. Nonetheless, although there are specific positions defined who are the responsible for the QMS, they are currently lacking the resources to initiate change.

Magnitude and time. The problem affects the different areas of the organization at the same level. Although the vessel operations are under a stricter standard with the TMSA, the disconnection of the vessels in regard to the quality management system affects its overall performance in the audits. The problem is constantly present in the activities of the company and. Nevertheless, because quality represents such an important factor in international trade, the problem could jeopardize future market opportunities for the company.

2.2. Conclusion

The key problem for Transgas lies in the inadequate implementation of its quality management system which in turn affects its capabilities to meet client's requirements. This issue is constantly present throughout the organization and the consequence can be appreciated in regular activities necessary for the operation. Although the company has done a good job with the implementation and certification of the former ISO, the project presents an opportunity to take the quality management of the company to a deeper level.

Chapter III. Literature Review

3.1. Literature Mapping

The consulting project for Transgas is centered in the implementation of its quality management system, therefore, it is imperative to review the previous literature in topics related. The literature mapping in the topics is presented in Figure 3, which explores the topics of continuous process improvement, quality in the shipping industry, quality management system, and ISO 9000s series.

Literature in the topic of business problems analysis and solutions is mainly based in the concept of continuous process improvement (Chang & Niedzwiecki, 1993; Krajewski ,2007; Bonilla, Díaz, Kleeberg & Noriega, 2010). Previous work provides several models and methodologies to find and proposed solutions for a given problem such as the PDCA cycle (Mulhaney, Sheehan, & Hughes, 2004; Krajewski ,2007; Bonilla et al, 2010). Additionally, past studies present different tools, such as the Fishbone diagram, that facilitate the analysis of the information collected and the later analysis to find the root-cause analysis for the problem (Chang & Niedzwiecki, 1993; Heizer & Render, 2001; Bonilla et al, 2010)

As the following work analyze the implications for the implementation of a QMS in a shipping company, it was necessary to review the main concepts and research on the topic. Firstly, it was necessary to define the concept of quality (Stewart, 1999; Lizarzaburu Bolaños, 2016) and define the relevance of the industry (Grey, 2003; Lai, Lau, & Cheng, 2004; Madar, & Neacşu, 2016). As in any other industry, logistics and transportation companies, which include shipping firms, have also been subject to studies that showed the specifics considerations for quality management (Cheng & Choy, 2007; Stopka, Šimková, & Konečný, 2015; Madar et al, 2016). Among the special considerations for the shipping industry, it was noticed the need for companies to comply international codes and regulations

which in turn proposed challenges to their quality management (Celik, 2009; "ISM Code", 2016; Madar et al, 2016; "Tanker Management Self Assessment", 2016)

Previous work explored the concept regarding quality management systems (Hung, Lien, Fang, & McLean, 2010; International Organization for Standardization, 2015; Adab, Soloukdar, & Fahimi, 2016), the potential benefits for implementing them (Naveh and Marcus, 2007; Martínez-Costa, Martínez-Lorente, & Choi, 2008; Zack, McKeen, & Singh, 2009; Lee, To, Yu, 2009; Mak, 2011; David Han-Min & Quang Linh, 2014; Chatzoglou, Chatzoudes & Kipraios, 2015; García, Del Río Rama, & Simonetti, 2016), the challenges on integrating QMS with another management systems (Celik, 2009; Sitnikov et al, 2015; Adab et al, 2016; Łuczak & Wolniak, 2016; Madar et al, 2016; Paraschivescu, 2016).

With the widespread of QMS, the relevance for quality management standards has been constantly increasing and its influence in the form of the ISO 9000 series is evident (Taheri, 2001; Celik, 2009; Adab et al, 2016; ISO, 2016; Madar et al, 2016). The focus is made on the ISO 9001 series and its main principles (David Han-Min & Quang Linh, 2014; Chee Ming, Kathawala, and Sawalha, 2015; Ingason, 2015; Rogala & Wereda, 2015; Lizarzaburu Bolaños, 2016). The project presents the implementation of the new version of the ISO 9001 as a central point of the proposed solution. Literature covers different research that explained the new additions (Fonseca, 2015; Palmes, 2015; Perry Johnson Registrars, 2015; Sitnikov et al, 2015; Lizarzaburu Bolaños, 2016; Medić, Karlović, & Cindrić, 2016; West and Cianfrani, 2016).

3.2. Literature Review

3.2.1. Continuous process improvement

In order to conduct consulting project in the company, it is necessary to study theory for business problem analysis and solution. In that regard, the work on continuous process improvement provide us with the right methodology to conduct the consulting process in the

company. The theories and tools presented by several authors support us in the task of defining the problem, analyzing the situation to find the main causes and proposing the best alternative to solve it.

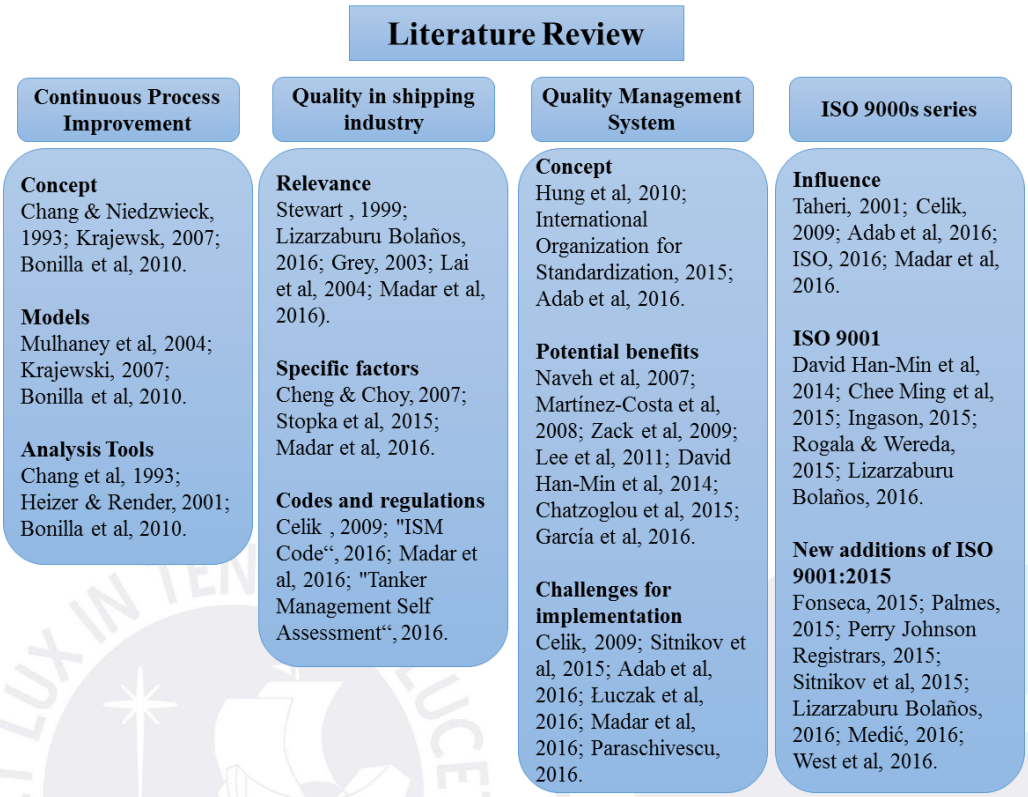

Figure 3. Literature mapping.

According to Krajewski (2007), continuous improvement comes from the Japanese term kaizen and it is a philosophy that consists on continuously looking for ways to improve the process within an organization. The objective is to identify best-practice models of this philosophy and promote to the personnel the notion that they are owner of their processes. This definition goes in line to the oe expressed by Bonilla, Díaz, Kleeberg & Noriega (2010) that defined continuous improvement as the development of systematic mechanisms to improve the performance of the different process of the organization. However, their work also highlighted continuous improvement as a management strategy whose objective is to enhance internal and external customer satisfaction through process improvement. Therefore, it is possible to appreciate that continuous improvement focuses in both the processes, as it

considers that there will always be a better way to perform the activities, and the people who is directly involved in the activities because they have the best opportunity to identify improvement opportunities (Chang & Niedzwiecki, 1993).

The most widespread methodology for process improvement is the PDCA cycle. As exposed by Krajewski (2007), the most firms train their personnel in the application of the Plan – Do – Check – Act for the solution of problems. Figure 4 shows a representation of the cycle that is one of the central theories for problem resolution in businesses.

As presented by Krajewski (2007), the cycle consists on the following steps:

- Plan: It is necessary to select the process that needs to be improved. Then, it is necessary to keep record of the main aspects related to the processes. The next step is to set qualitative improvement objectives and through the use of different tools and techniques, the possible alternatives to achieve the new goal are analyzed. As a result of the assessment of the different alternatives, an improvement plan is made which now must contain quantitative measures.
- Do: The proposed plan goes into action and a detailed track of the progress must be performed. It is necessary to continuously collect data during the process. If issues are found during the process, it is possible to made changes to the plan or conduct additional checks according to the impact of the problems found.
- Check: The data collected in the previous step needs to be analyzed. With the result of the analysis, it is necessary to verify the fulfillment. If the process is not fulfilling with the objectives, it is necessary to proposed action plans to change the course.
- Act: If the results in the previous turned out to be successful, and thus determining that the new process is an improvement from the prior standard, then the new process becomes the standard to follow in the future. This step is complement by

preparing the right documentation so the new process can be followed for every member of the organization.

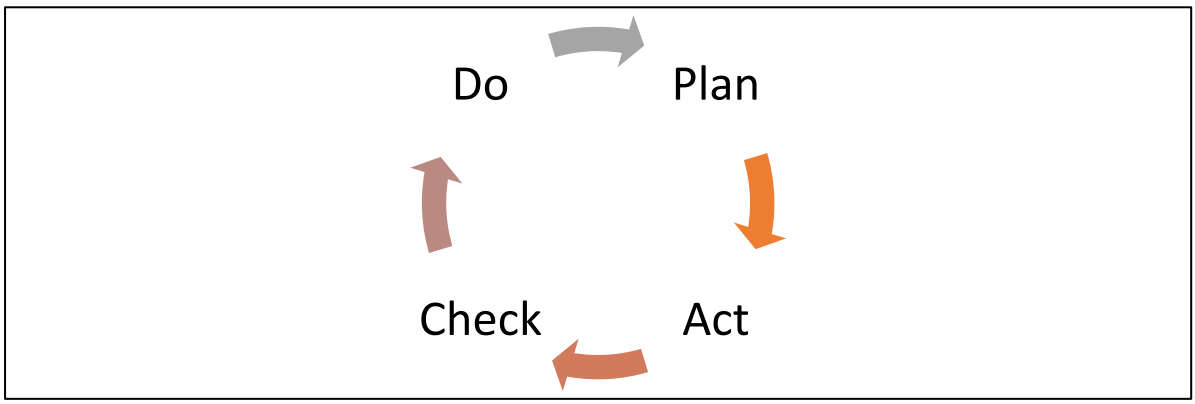

Figure 4. The PDCA cycle.
Adapted from "*Total quality management* (p.31) by P. Charantimah, 2011, New Delhi, India: Dorling Kindersley.

Finally, as the PDCA it is a continuous cycle, it is necessary to also keep track of this new process that could subject to improvement one more time in the future.

Some other authors have taken the PDCA cycle as a based point to proposed different methodologies for performance improvement on companies. A more detailed model was presented by Mulhaney, Sheehan, & Hughes (2004) in a case study for the TQM Magazine. The authors proposed a methodology based in the Deming cycle which is showed in Figure 5.

- Step 1: First, the data is collected in order to be analyzed in the next step. The information to be gathered depends of the nature of the process to analyze.
- Step 2: Data is analyzed by the team in order to find trends, patterns or unusual activity
- Step 3: As a result of the analysis conducted, the main problems associated to the process are identified. The problems identified in this stage ca be associated to bad performances, customer complaints or excessive processing time, among other.

- Step 4: After identifying the main issues, the next step consists on finding the best possible solutions to apply in each case.
- Step 5: Every alternative is assessed and an agreement is reached to determine the optimal solution.
- Step 6: As a consequence of the previous step, an action plan must be prepared in order to implement the new solutions found.
- Step 7: The action plan take place and the implementation is made according to the guidelines proposed in the plan. With the implementation the solution becomes the new standard for the organization.
- Step 8: The process needs to be revised in order to measure its success through indicators that track its performance.

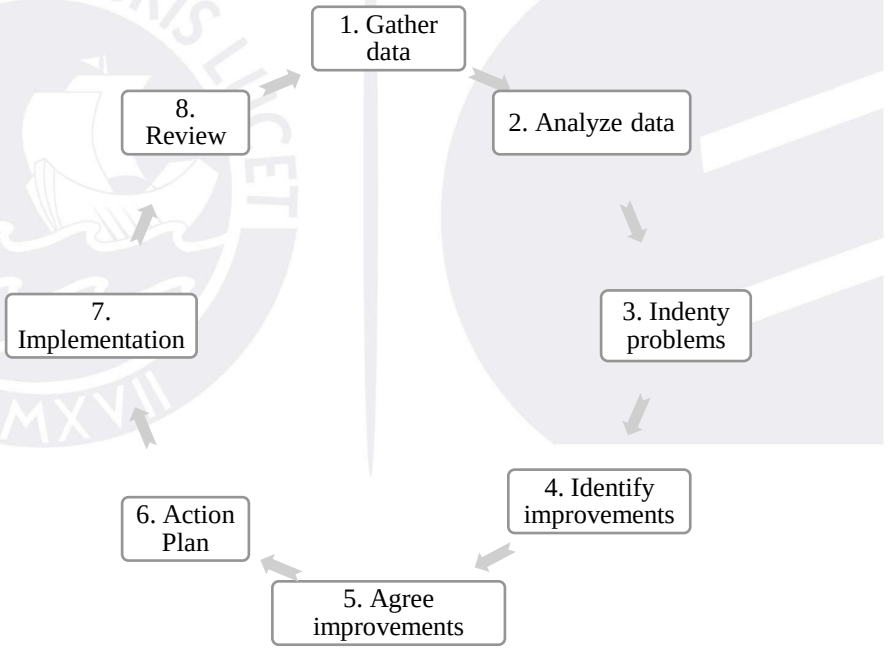

Figure 5. Process improvement model.
Adapted from "Using ISO9000 to drive continual improvement in a SME", A. Mulhaney, J. Sheehan, & J. Hughes, 2004, *The TQM Magazine*, *16*(5), p. 325-330.

The models presented share both similarities and difference, but in general terms showed similar paths in order to propose solutions to the problems found in organizations.

However, continuous improvement methodologies fell short in explaining with detailed how to define a problem. The present work tries to fill the gap by dedicating a whole chapter to understand all the relevant aspects of the problem to analyze.

In addition to the models for continuous improvement, studies also presented several tools whose objective is to facilitate the task of analyzing information and drawing conclusions. One of the most well-known tool is the Ishikawa diagram or Fishbone diagram, which is a description of the main causes for a previously stated problem (Bonilla, 2010). The diagram is commonly used in root-cause analysis to determine the main drivers behind an unwanted situation. Figure 6 showed an example of the Fishbone diagram where it can be appreciated how every bone of the fish represents a possible cause for the main problem that is represented as the end of the central bone.

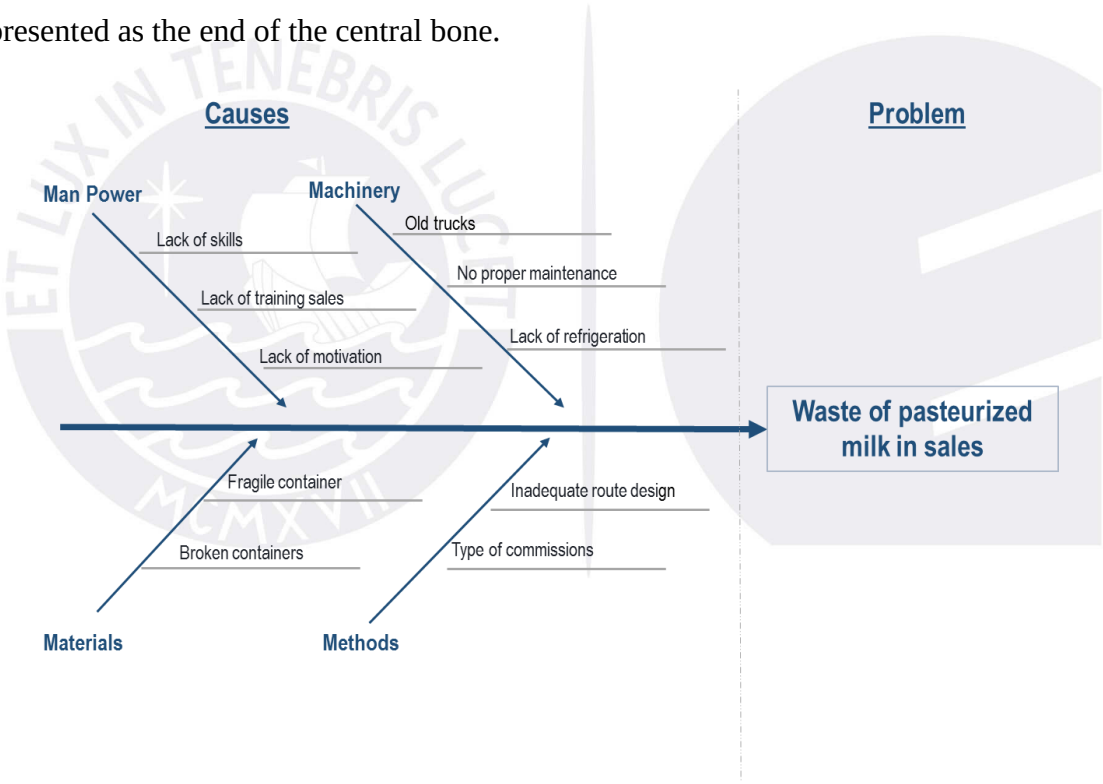

Figure 6. Fishbone diagram example.
Adapted from "Using fishbone analysis to improve the quality of proposals for science and technology programs", S. Li, & L. Lee, 2016, *Research Evaluation*, *20*(4), p. 275-282.

During the application of the Fishbone diagram, it is common to divide the main causes into categories for a better analysis. Studies recommended to elaborate the Ishikawa

diagrams based on four major categories: Material, Machinery, People and Method (Heizer & Render, 2001). These categories are going to be put as the first bones of the fish and then, sub-causes are going to be derived of each category. However, the categories can be adapted according to the nature of the problem. Before the elaboration of the diagram, usually a brainstorming to get possible causes for the problem. After brainstorming, the possible causes would be put in the diagram, however, these possible causes need to be validated in the information collected for the process analysis. As a final step, once you have identified the main root cause, you will need to address each cause appropriately. Therefore, it must be determine how best to change the processes and systems to eliminate the root cause and thus, eliminating the problem found. Then, as the continuous improvement cycle indicates, the success should be measure and control to determine if the problem was solve.

Another interesting tool is the checklist presented by Bonilla (2010) in its work. The objective of this tool is to provide an easy and practical way to collect information in an organized and detailed manner, so it can later be classified in homogeneous categories. The information can be gathered through interviews, surveys, event observations, inspections, records, audits, among others. The tool reduces data processing time and provides a better organization for the findings during the data collection stage of the process improvement projects. Table 3 shows an illustrative example about the verification of set of pieces that do not meet the required specification of length.

The concept of quality in relation to the ISO 9001 norms refers to how good is the product when fulfilling the client's need (Lizarzaburu Bolaños, 2016). In other words, the quality of a product is always defined by the consumer preferences. So, a product must not only pass all the quality control test of the production process, but also need to comply and even surpass client's expectation. As a result, companies are now moving towards quality systems to improve its quality management capabilities.

Quality system is the most essential element when building trust and relationships with customers and suppliers, since it helps others to evaluate your products (Stewart, 1999). In the other words, an outstanding quality system can provide the corporation more chances to build customer base and loyalty as well as a long-term relationship with suppliers while earning higher reputation through high quality standards. On the other hand, a sensible quality control management system can help with building a common goal and separating responsibilities clearly within an organization. Every employee in every department then understands the corporate goals and knows how to contribute to it through their own work.

Table 3

Checklist Example

Length	Machine A	Machine B	Machine C	Total
23:98 – 23:99	III	I	I	5
23:99 – 24:00	II	III	II	7
24:00 – 24:01	IIII	I	III	8
24:01 – 24:02	I	I	II	4
Total	10	6	8	24

In regard to the shipping industry, it still remains as one the most important mode of transportation in international trade as a substantial percentage of the world's trade is carried on merchant ships (Grey, 2003). The importance of the industry is not only determined by the volume of goods but also for the material value that are carried by merchant fleets. Shipping is also considered a complex activity due to the high investment in technology, which are mainly represented by the modern means of transportation and port infrastructure (Madar, & Neacşu, 2016). The literature for quality mainly focuses in good's, with not a substantial number of works referring to services such as logistics or transportation (Lai, Lau, & Cheng,

2004). Nevertheless, some authors focused in the role of quality in the operations for shipping companies.

The quality in transportation, which include shipping companies, is a significant determinant of the demand and an important tool for customer retention (Stopka, Šimková, & Konečný, 2015). As in any other industry, quality is one a main driver for good performance as the level of satisfaction of the client would substantially impact the demand for the products. For example, Stopka et al (2015) explained how the satisfaction of the customers of transportation were heavily influence by the waiting time for the next connection and the cleanliness. Although shipping works under different rules that regular transportation, it is still interesting to notice how aspects that are not directly related to the travel time, which is supposed to be the main source of satisfaction, can heavily influence the perception of the client towards service.

However, the nature of the industry imposed some challenges for quality management. Firstly, shipping companies heavily depend of the infrastructure available to fulfill its needs, being the port infrastructure the main operative constrain. Secondly, the main operation takes place far away from headquarters, which increase the risk and level of impact in case of eventualities. In specific, the complexity of the industry lies in the environmental conditions in which the ships have to operate when they are at open sea that requires special safety measures (Madar & Neacşu, 2016).

Therefore, institutions such as the International Maritime Organization (IMO) exists to control the safety and security of shipping and to manage the prevention of marine pollution by ships (Stopka et al, 2015). Madar et al also explained the need for the industry to address directions towards prevention of marine an environmental pollution, individual security for vessel operating personnel and response methods for emergency situation.

More studies have been conducting towards the specific topic of quality management in the shipping industry. Cheng & Choy (2007) conducted a study based on a large-scale survey of shipping industry executives and a rigorous research methodology to treat the survey data in order to determine the main factors influencing the success of quality management in the industry. The results showed that the main factors were top management commitment and participation, quality information and performance measurement, employee training and empowerment, and customer focus. This goes in line with the new additions of the ISO 9001:2015 in terms of leadership and knowledge management, that were the focused of the solutions proposed for the company.

It is important to notice that the shipping industry works with more specific quality standards, as each company adopts different quality strategies according to the nature of their activity. For instance, due to navigation accidents having a significant impact on shipping, it was necessary to design a ship safety management code (Madar, & Neacşu, 2016). In the case of shipping industry, quality standards mainly focus in the topics of safety and environmental management.

Most of the shipping companies work under the International Safety Management (ISM) code which provides and international standard for safety management and operation of ships and pollution prevention ("ISM Code", 2016). The code was adopted in 1993 in the SOLAS convention due to the significance of the code and among other things, it established that every ship requires a Safety Management System (Celik, 2009). The objective is to emphasize the role of management on improving the technical and operating processes on ships in order to obtain a minimum standard of quality for safety and pollution prevention. As a result, the adoption of this code have changed the way shipping companies normally operate. According to Celik (2009), the implementation of the ISM code has impacted

management styles in the industry due to the considerable changes companies have gone through in their organizations.

The spread of ISM code among most firms has made almost impossible to operate if a company is not under certain type of quality assurance. Madar & Neacşu (2016) explain how quality assurance has become a real tool to overcome challenge in the industry, although it requires heavy training and specialization in all the topics specified by the international regulations. It is also highlighted the fact that stipulations for quality and environmental policies for a shipping firm significantly differ from a land-based company, especially when designating responsibilities (Madar & Neacşu, 2016). These challenges were also present in the company, as the persons designated responsible by the company for safety and quality management were not connected with the officers in charge of the ships.

Although the ISM code is the main international standard for the shipping industry, certain companies have explored different quality standards to complement its quality management. That is the case of the company under study which presented an additional international certification for its operations: The Tanker Management and Self Assessment (TMSA). The TMSA is a program introduced by the Oil Companies International Marine Forum (OCIMF) to help vessel operator asses, measure and improve their safety management systems ("Tanker Management Self Assessment", 2016). In other words, while SOLAS and ISM standards provide the framework and direction to establish safety management system, the TMSA focus on what actions are necessary in order to maintain an effective SMS.

Literature on the impact of adopting such type of standards for quality management is scarce. Nevertheless, some authors explore the implications safety and quality management system in shipping operations. Celik (2009) proposed a systematic approach for exploring the compliance level of the ISM code with the ISO 9001:2000 so an integrated quality and safety management could be established for shipping operations. The challenge lies on being

efficient when managing different standards. This includes identifying similarities on its specification in order to propose a system that unifies procedures, documentation and responsibilities.

Challenges for quality management are also addressed in recent studies. One main issue addressed was concerning the top management role in quality assurance. Reports in most of the accidents in maritime transportation heavily criticized shore and ship management (Madar, & Neacşu, 2016). This entails management commitment to operate under quality standard levels that minimize safety and environment risk.

Another issue identified was the lack of effective communication between vessel operations and the shore (Celik, 2009; Madar, & Neacşu, 2016). Problems with the vessel-shore interface was considered one of the main weaknesses because they make the implementation of standards difficult as there is no constant follow up regarding the fulfillment of both systems requirement in a shipping company.

Finally, it is addressed the sustainability of such quality strategies. It has become common for shipping companies to get the international certifications and develop a QMS according to international standards, however, the gains for the companies and interested parties were still not clear. Madar and Neacşu (2016) explained how a large shipping company, considered a high quality provider, addressed these concerns through heavy investment in quality equipment, redesign of operating processes and expert training to its employees to minimize accidents.

3.2.2. Quality management systems

As stated before, quality is regarded as one of the most important factors for success in the shipping industry. Looking for ways to improve quality have been the subject of study of many works. As a result of the improvements and research on the topic, it became necessary to establish different units in the organization to manage the complexity of

maintaining and improving quality, which in turn resulted in the introduction of the concept of quality management system (Adab, Soloukdar, & Fahimi, 2016). The quality management system is defined as the management structure, procedures and practices focused on meeting customer requirement, lessening non-conformance to specifications and enhancing customer satisfaction in the most effective way (Hung, Lien, Fang, & McLean, 2010). The new version of the ISO 9001 also established that the QMS should be aligned with the company strategic direction (International Organization for Standardization, 2015).

Literature showed that a well-implemented quality management system will not only improve the quality of the final products or services, but also the quality of the internal processes. García, Del Río Rama, & Simonetti (2016) asserted that because quality management systems involve every area of the organization, the benefits therefore will be observed throughout the organization at a financial, business performance and customer level. It is also possible to find specific examples of the performance and financial benefits gained by companies in the industrial sector after the correct implementation of a QMS (Naveh and Marcus, 2007), however, there are very few studies in the topic for the shipping industry. In line with the main objective of the work, that is to assist the company in the implementation of the ISO 9001:2015, literature also shows that implementing the ISO 9001 contributes to the generation of positive and measurable results for the company (Lee, To, Yu, 2009; Mak, 2011; Chatzoglou, Chatzoudes & Kipraios, 2015). Additionally, research has also showed that the benefits from adopting international certification are highly related to the level of implementation on critical factors (García, Del Río Rama, & Simonetti, 2016).

Others authors have based their research in the moderating conditions on the relationship among the adoption of a quality management system and organizational performance (Zakuan, Yusof, Laosirihongthong, & Shaharoun, 2010; Lam, Lee, Ooi, & Lin, 2011). This line of study suggests that the adoption would improve internal processes and

thus, would lead to a better organizational performance. This theory was reassured with further studies that also include the implementation of knowledge management as a benefit on organizational performance (Zack, McKeen, & Singh, 2009; David Han-Min & Quang Linh, 2014) In summary, literature clearly shows two types of benefits for implementing a QMS: external, in relation to the perception of the client and can be reviewed in the company results, and internal, which are more related to organizational performance and internal processes.

Nevertheless, studies also debate about the actual benefits obtained by the certification on a quality management system. Although there are studies such as the ones cited before that argued in favor of QMS showing the positive financial gains and the improvement on internal processes after the adoption, there are also research that show inconclusive results about the benefits of implementing the system (Martínez-Costa, Martínez-Lorente, & Choi, 2008). The difference in result for studies in the same topic shows the limitations of such works and bring up the need of further research in the topic, probably exploring different type of companies and industry.

With the appearance of codes and international standards for ship management, firms face the challenge of integrate all the different regulations they must follow under one single concept. For that reason, studies aimed to expand the concept of quality management to include into its management structure elements of environment management and work safety management (Łuczak, & Wolniak, 2016). As explained before, this topic is especially critical for the shipping that is usually under several international rules and regulations.

Research on the topic explained the need on shipping companies to develop integrated management system for quality, environment and safety and to improve the training and knowledge of the personnel in relation to international rules and regulations (Madar, & Neacşu, 2016). Celik (2009) also explained the challenged of implementing the requirements

of the ISO 9001 while maintaining the ISM foundation. The work established the importance of quality planning and environmental management system objective for the shipping management and how this should take into account different operational variables and the degree of danger for the ship, personnel and cargo carried. The company under study deals with the same challenge as they have to maintain its QMS that is based in the ISO 9001 certification, the ISM code and the TMSA.

Following the need of integration between quality, safety and environment, international shipping regulations and code, such as the TMSA and ISM code, stands as complementary tools for the quality system. The ISM code provides a more assertive view in the safety and environmental topics of vessel operation, which both are critical due to the nature of the business where accidents can have large repercussions. On the other hand, the TMSA position itself as a tool that complements quality codes in the industry by promoting the self-regulation and continuous improvement for safety in the ships.

The work from Łuczak & Wolniak (2016) proposed a model in which the different management systems, which consisted on quality, environment and occupational safety and hygiene (OHS), are integrated under the QMS based on the ISO 9001 standard. In this model the QMS works as a basic management structure that includes the rest of the elements and defines: managerial staff responsibility, continuous improvement, documentation supervision and trainings. Two of the main takeaways from Łuczak & Wolniak (2016) is the integration on the responsibility level by concentrating the responsibility of the three management into one position and the introduction of a uniform manner of documenting in order to facilitate the application of uniform forms of procedure and instructions.

Another approach for the adoption of a QMS was the integration of this system with the latest studies of Balance Scorecard (BSC) under the title of New SBSC (Adab, Soloukdar, & Fahimi, 2016). In this case, the design and implementation of the QMS was made based on

seven perspectives that combined the principles established in the ISO 9001:2008 with the ones included in the new SBSC model: financial, customer, growth and learning, local processes, social, environmental and future forecasting.

Risk management has also been put as a topic that should be integrated with quality management to form an integrated management system. The reasoning behind this proposal is that risk analysis should be carried out in the early stages of the processes within the quality management system, which in turn would contribute to the identification, analysis and prevention of these risks (Paraschivescu, 2016). Due to the increasing importance of quality for companies, it makes sense to add risk management to the equation in order to manage the uncertainty surrounding processes. By putting both systems together, it is expected that the firm would able to concentrate all the efforts into one particular objective. Paraschivescu (2016) established four levels for the documentation that would constitute the fundamental elements of the system:

- Level 1 - Integrated Management Manual of reference
- Level 2 - Procedures Manual;
- Level 3 -Technical documentation. Rules and working instructions
- Level 4 - Recordings.

Finally, studies also have been conducted in regard to the challenges to be face when implementing QMS. Adopting a new management system or making changes to the one that is in place in the organization usually implies significant changes in the company culture to sustain the appropriate level of quality and avoid returning to old habits (Brandt, 2016). It is necessary for the change to be fully effective to closely monitor the execution of the system in practice. Finally, surveys among ISO users expressed the need to review some guidelines for the Quality management system for the future (Sitnikov & Bocean, 2015): Integrate the ISO 9001 with different management system, provide an integral approach for organizational

management and enhancing organizations´ ability to reach customers. Nevertheless, literature in the topic is still very few in number when discussing the negative implications of adopting a QMS and the success factors to ensure a correct implementation.

3.2.3. Quality management system standards, ISO 9001 series

Among the different QMS standards, the project focuses in the ISO 9001 series, specifically in its 2015 version recently approved. Literature in the topic mainly focuses in the role of international standards for QMS, the role the ISO 9001 series is having in the current industry and what are the changes in the 2015.

The creation of quality standards tried to established central concepts that need to be implemented in a structured way to ensure the quality of your processes to the interested parties (Adab et al, 2016). The first quality standards were developed in England and then in the form of ISO 9000 series standards it got rapidly widespread around the world. The final objective of a quality standard series is to help organizations succeed in the competitive market.

International standards are featured as new tools for promoting quality management on industrial production and achieving sustainable development (Taheri, 2001). The importance for quality management standards can be further noticed in recent trends in the industry. From the last ISO survey, the ISO 50001 for energy management demonstrates a 40 % growth rate, led by Germany which is responsible for 50 % of the 6778 certificates reported. Similarly, food management standard ISO 22000 continues to deliver reliable performances with a 14 % growth rate, while ISO 16949 for the automotive sector shows accelerated progression with a commendable 8 %, signaling that economic recovery in the auto industry is holding up (ISO, 2016).

All the data above are the examples reflecting the fact that international quality standards represent a significant trend on international management. As any other industry,

shipping has also been affected by the adoption of international quality standards. Celik (2009) explained how the adaptation of ISO quality standards provided invaluable benefits with regard to the technical management of merchant ships, service quality and customer satisfaction. Also, as shipping firms are immersed on international commerce, in addition to regular trade barriers, maritime transport companies are also required to take measure to get certified on international QMS standards (Madar, & Neacşu, 2016).

In specific, the ISO 9001 defines the necessary requirements in order to establish a quality management system within an organization (Rogala & Wereda, 2015). However, Rogala et al (2015) also pointed out how the standard is not intended to be a performance standard to measure the quality of the firms' products or services, but rather propose general guidelines to systematize a series of company processes into procedures with the proper documentation and implementation. Organizations in order to receive the ISO 9001 international certification need to satisfy all the requirements proposed by the standard and be evaluated by a certified third party (David Han-Min & Quang Linh, 2014).

The ISO 9001 norm is based on 8 basic principles for quality management that are defined as it follows (Lizarzaburu Bolaños, 2016):

- Customer focus: Organizations depends on their clients, so they must keep track of their current and future needs, satisfy their requirements and surpass their expectations.
- Leadership: Leaders establish the purpose and orientation within the organization. They must create and maintain an internal environment in which people can fully commit themselves to help the firms achieve their objectives.
- Engagement of people: Because personnel constitutes the most essential part in an organization, their total commitment assure that their skills are being used to the benefit of the company.

- Process approach: Desirable results are reached more efficiently when the activities and resources related are manage as a process.
- System approach to management: Identify, understand and manage the interrelated processes as a system contributes to the efficiency of an organization in the achievement of their goals.
- Continual improvement: Continual improvement of the global performance of the organization must be a permanent objective.
- Factual approach to decision making: Effective decisions are based in the analysis of data and information.
- Mutually beneficial supplier relationship: An organization and its suppliers are interdependent. A mutually beneficial relationship enhances both capabilities to create value for their organization.

According to Chee Ming, Kathawala, and Sawalha (2015), because the ISO 9001 sets the minimum requirements for establishing a documented QMS that will ensure customers that the firm can meet its requirements, it has become a commercial necessity. Using ISO 9001 as an example, Appendix B shows the world distribution of ISO 9001, which covers almost any country in the world. Appendix C more specifically shows the evolution of ISO 9001 in Peru, which is also experiencing an increasing trend. Companies are increasingly complying to ISO standards, which puts pressure on organizations to further comply.

By 2013, Peru only had 1200 companies certified with the ISO 9001, 200 hundred more than the previous year, which represent 0.017% of the total companies operating in the country (Lizarzaburu Bolaños, 2016). In comparison to European countries such as Germany, the much lower coverage shown in Peru demonstrates that the recognition still needs to be improve within Peruvian companies. Therefore, there are pressures in shipping companies to

comply international standards as the nature of its business made them work with global companies in different continents.

As the importance of ISO 9001 quality standard has been increasing, factors affecting its correct implementation have been subject of study in several works. Commitment and direct participation of the management is mention as one of the main factors for a successful implementation, as well as the direct participation of the employees (Ingason, 2015). Therefore, as the correct implementation of the norm requires direct involvement from top management and employees, it is necessary to take into account the internal cost related to the time expected to be invest in adopting these new rules. Ingason (2015) also stated that companies that plan ahead on this investment on time were likely to have shorter implementation time.

Chee et al (2015) on the other hand, explained how in addition to peer and management support, the understanding of the ISO 9000 requirements is also an important factor influencing QMS practitioners on their effort of implementing and maintaining ISO norms. The theory explained that a deep understanding of the requirements will enhance the efficiency of the implementation and contributes to the execution of the principles once the certification is obtained.

Rogala et al (2015) provided an alternative view in the topic as it relates the undesirable results of the introduction of a QMS to its ineffective implementation. The work cited ineffective internal audits as one of the main factors affecting the implementation. According to Rogala et al (2015), the problem is attached to the lack of involvement from auditors in other activities concerning quality management and the proper number of active auditors.

Nevertheless, the studies fall short in providing concrete examples of how to deal with the cultural changes this kind of implementation brings to the company and how to

actually motivate personnel to embrace the change. Studies provided a good initial step by showing examples of the benefits of adopting the QMS, however, potential benefits are sometimes not enough to get employees and top management commitment.

The ISO norm, as any other international standard, has a directive controlling the publication of the standards and the periodical review of these. For the ISO 9001, which needs to be reviewed every 5 years, the revision process to update the ISO 9001:2008 into its new version ISO 9001:2015 International Standards aims to reflect the changes of an increasingly demanding and dynamic environment (Fonseca, 2015). Because of its possible impact on business, several authors have analyzed the new changes the norms bring.

Sitnikov et al (2015) asserted that the main changes refer to the structure, content and essence of the ISO 9001:2015 including:

- Terminology changes which can be seen in Table 4.
- Increase main clauses from seven to ten.
- Paying special attention to risk management.
- Paying special attention to the organizational context.
- Paying special attention to leadership.

The last point is one of the central takes in consulting projects as the lack of attention from top management to quality management was one the main problems in organizations.

Additionally, the new version introduces flexibility in regard to quality control document management as the new version takes into account the integration of technology in the processes of the company (Sitnikov et al, 2015). The new structure of the ISO 9001:2015 that now includes 10 main clauses mainly aimed to facilitate the harmonization and integration of ISO 9001 with other standards (Perry Johnson Registrars, 2015). This change would allow companies to obtain multiple certifications without losing the essence of the QMS.

Another important change in the new ISO standard is the reduction of the quality management principles from eight to only seven, in order to provide more flexibility (Fonseca, 2015). The transition of the quality management principles into the new norm can be seen in Figure 7.

Table 4

Terminology Changes

ISO 9001:2008	ISO 9001:2015
Products	Products and services
Exclusions	Application Documented Information
Documents, Records	Environment for the operation of processes
Work Environment	Environment for the operation of processes
Purchased Product	Externally provided products and services
Supplier	External Provider

Note. Adapted from "The role of risk management in ISO 9001: 2015", C. Sitnikov, & C. Bocean, 2015, Paper presented at 9th International Management Conference: Management and Innovation for Competitive Advantage, Bucharest, Romania.

Apart from the changes in the structure, the ISO 9001:2015 also introduced significant changes in the essence of the norm. One remarkable change in how the norm now signals that the efforts in the QMS should not only be aimed to satisfy customers need, but also should understand the needs and expectations of every interested party (Lizarzaburu Bolaños, 2016). By this, the ISO moves from its more traditional principles that stated satisfying customer needs as the main objective of the QMS. In addition to that, the new considerations highlight the importance of change management in three places of the standard, as the lack of change management has been seen as one main reasons for system failure (Fonseca, 2015).

Another topic included in the new norm is knowledge management. Lizarzaburu Bolaños (2016) explained how knowledge management has been traditionally attached to what is commonly known as explicit knowledge, which included process documentation, but with the new norm is now linked to the implicit knowledge. The objective is for the organization to consider knowledge management as an intangible asset just as important as quality or risk management in the company. In the same line of organizational management, the new standard also introduces the concept of context of the organization. This refers to the combination of internal and external factors that influence organization's approach to product and investment and how they have an effect on the implementation of the QMS.

Figure 7. Proposed changes in quality management principles.
Adapted from "From Quality Gurus and TQM to ISO 9001:2015: A Review of Several Quality Paths", L. Fonseca, 2015, *International Journal For Quality Research*, *9(*1), p. 167–180.

The last two concepts introduce in the ISO 9001:2015 is the risk-based thinking and the focus on leadership. The ISO incorporates the risk-based thinking in its requirements for establishment, implementation and continual improvement of the QMS in order to achieve a way of preventive management system (Medić, Karlović, & Cindrić, 2016). This goes in line

with previous work that suggested that risk should be an inherent part of any quality management system.

For leadership, the topic gained an important relevance in the updated version of the ISO norm as it contains several improvements regarding top management and its role in quality management. In specific, the subclause 5.1.1. defined as leadership and commitment for the QMS includes 11 requirements to ensure management commitment to the QMS (Palmes, 2015). These requirements expand the role of top management from giving directions to actively participating in the process of quality management. Palmes (2015) explained the main implications of such changes for managerial behavior. Firstly, top management is called to take accountability of the effectiveness of the QMS and ensuring that the quality policy is properly communicated to all organization and it's aligned with the firm's strategic direction. Secondly, top management is required to engage and support persons to contribute to the effectiveness of the QMS. Finally, the norm puts the responsibility on top management to ensure the integration of the QMS requirements into the organization business process.

Nevertheless, West and Cianfrani (2016) explored in their work the emphasis of the ISO 9001 to go beyond the minimum compliance of the requirements. West et al (2016) stated that although the new norm puts in the table new efforts to go beyond of simply meeting requirements for a certification, there are still limitations of the norm in several aspects of the business management. In the positive side, the ISO 9001:2015 put more emphasis in the role of quality management as an input for strategic-planning process, establish self-assessment as a necessary tool for the determination of conformity and includes risk assessment as an integral part of the processes. However, the ISO still does not address the topics of innovation processes and new structures to face the globalization challenges ahead for companies.

3.3. Conclusion

As stated before, the main problem for Transgas was defined as the inadequate implementation of its quality management system. In order to addresses the issue, the literature provided us with different methodologies and techniques that were the base to proposed the approach to solve the problem that are going to be presented in the following chapters: (a) quantitative/qualitative analysis of the problem, (b) root-cause analysis, (c) assessed solution alternatives, and (d) proposed solution. However, the literature did not provide enough inside in regard to implementation, which is a central aspect of the problem presented in the company. Because of this, it was additionally included the presentation of the implementation plan and a list of key success factors to ensure it.

Additionally, literature also provide us with vital information in regard to quality management system in the shipping industry which allow us to properly defined the problem The insight in relation to the challenges faced by shipping company to implement QMS showed the significant influence of the environmental factor surrounding the operation and international codes and regulations for the success of quality management.

Finally, previous work gives us the proper framework in order to propose solutions for Transgas. Literature was focused on how the implementation of the new ISO 9001:2015 was able to address some of the problems related to the quality management system. Firstly, the detailed work on the new changes of the ISO 9001 in its 2015 version address several of the problems that were found in the initial analysis of the company. And secondly, previous literature exposed the key factors to ensure a successful implementation that are later during the proposed implementation plan. However, very few work is made in the cultural and motivational aspect of adopting a QMS which is addressed in the solutions proposed ahead.

Chapter IV. Qualitative/Quantitative Analysis

4.1. Project Scope

As part of their business, Transgas is obliged to focus extensively on quality management within their company. Without being able to meet international standards and oblige to quality controls Transgas faces the risk of severe impacts on its employees and the environment. The company therefore holds certifications for national and international shipping purposes. The goals of these certifications are to improve the quality of the company in terms of customer satisfaction and management and to attain international requirements such as marine training safety and environmental standards. Currently, the company holds the following ISO certifications which include the ISO 9001:2008, ISO 14001:2004 and OHSAS 18001. As part of their shipping obligations Transgas commits to the TMSA maritime certification, which focuses more specifically on the industry requirements. The ISO 9001 is specifically important as it helps the organization to improve their quality standards at an overarching level since it not only covers issues specifically tied towards maritime shipping, but rather the management of a quality management culture which spans into all departments of the organization.

When having initial meetings with the client, various problems and areas of improvement were proposed, specifically linked to the TMSA, maintenance, and quality management. After several interviews with employees, observations of the company, and the analysis of the industry and certifications, it became clear that the company is currently facing improvement opportunities in various areas of the organization (Appendix B). Specifically, by focusing on the ISO 9001 it is possible to resolve the quality issues and help the company to improve the quality management in their organization. Transgas holds the ISO 9001:2008 certification, however, the ISO 9001 has been updated as of 2015. ISO 9001:2015, holds new and important modifications. This opens up the opportunity to work on

facilitating in the implementation of the updated ISO guidelines, while reviewing current quality operations and resolving internal issues. Implementing and assisting the company with the installation of the updated ISO 9001, which focuses on the requirements for a quality management system, will help Transgas to become more efficient in its quality management and improve customer satisfaction.

4.1.1. New elements of the ISO 9001:2015

In order to be able to provide a proper analysis of the scope of this assignment, a great understanding of the ISO 9001:2015 is required. First, it is important to understand the differences between ISO 9001:2008 and 2015 which entails the comprehension of the clauses that compose the certification.

The ISO 9001:2015 put greater emphasis on the roles of top management and their deployment as a key to success. Recognizing the importance of leadership as the core of its thinking is a key change in the new standard. Furthermore, it puts greater emphasis on the objectives, measurements and changes of the quality management system within organizations. ISO 9001:2015 is comprised of ten clauses, in comparison to the eight clauses used in ISO 9001:2008.

Leadership. As previously mentioned, the element of leadership is the main difference between ISO 9001:2008 and 2015 version. As the 2008 version did not provide any specifications about leadership it implies that the client has not received audit feedback regarding leadership, and therefore, does not have the knowledge available for its implementation. For this reason, the strategy for this project is to prove with evidence that Clause 5 (Leadership) that leadership is the most important clause to implement first, and that the implementation of this clause will hold important benefits for the long-term and short-term visions of Transgas.

The Clause 5 specifically highlights:

- "More emphasis placed on Leadership will naturally drive top management to get involved in an organization's quality management system. This helps to align and motivate company workforces towards the stated goals and strategic objectives."
- "Greater involvement in the management system by leadership teams helps to promote and motivate team buy-in to successfully achieve goals and business objectives, bringing quality and continuous improvement into the heart of your business." (ISO, 2015)

It is therefore important to thoroughly understand the components of the leadership clause in order to conduct further analysis. More specifically, the collection of data from the company about the current situation with regards to their leadership system. Employees are to be so used, guided and supported so that they can contribute to the effectiveness of the QMS while management clearly provides direction.

Additional elements. Facilitating the new definition of responsibilities at top management, another element which is newly introduced in the ISO 9001:2015 focuses on the systematic approach to knowledge management within organizations. This includes, the holding, maintaining and availability of information to all employees with the necessary knowledge to carry out the processes. How knowledge management is to be implemented is not specified by the ISO guidelines though the advantages of maintaining knowledge throughout the firm effectively are highlighted. It is therefore important to build a suitable knowledge base for the respective company. This part is also crucial to facilitate quality management at Transgas, as it will enable the company to establish a framework in which quality can be continuously improved and facilitated throughout the organization. In part a "risk – based approach" is a new element which promotes a culture in which identifying, managing, monitoring and reducing the risks become key to operations.

4.1.2. Relation to other certifications

The ISO 9001:2015 was developed to improve the alignment with other standard management systems. It is therefore possible to resolve additional issues related to quality management while implementing the new ISO and combining key aspects to other certifications. It thereby functions as an overarching framework which sets the basis for managing quality throughout the entire organization. In part this is essential to Transgas, as one of the other major certificates is the Tanker Management and Self-Assessment (TMSA). The TMSA was developed to help vessel operators assess, measure and improve their safety and environmental management systems. It complements industry quality codes and is intended to encourage self-regulation and promote continuous improvement among tanker operators. The TMSA is therefore focusing more specifically on the operations on the vessels, while the ISO 9001 provides a general guideline to manage quality in an organization.

The ISO 9001 and TMSA have chapters very specifically in common:

- Clause 5 Leadership of the ISO is equivalent to Element 1: Management, Leadership and Accountability of the TMSA.
- Clause 9 Performance Evaluation & Clause 10 Improvement ISO to Element 12: Measurement, analysis and improvement.

The remaining chapter cover the same content though the ISO 9001 provides a general approach towards handling a quality management system, while the TMSA requires more specific procedures and documentations specifically tailored to operations on ships. Thereby, Clause 6 Planning, Clause 7 Support & Clause 8 Operation of the ISO 9001 set the general quality management system requirements which are affecting Elements 2 through 8 of the TSMA. An overview is provided in Table 5.

In summary, working on facilitating the implementation of the updated ISO guidelines will provide the company with an overarching framework which will set the basis for managing quality throughout the organization. The focus is going to be on leadership as is the main difference between ISO 9001:2008 and 2015 and it is the most important clause to be implemented first. Due to the lack of feedback from previous audits, these clause represents a good opportunity for improvement.

Table 5

Comparison Between the ISO 9001 and the TMSA

ISO 9001:2015	TMSA
Clause 5 Leadership	Element 1: Management Leadership and Accountability
Clause 6 Planning	Element 2: Recruitment and Management of Shore-Based Personnel
Clause 7 Support	Element 3: Recruitment and Management of Vessel Personnel
Clause 8 Operation	Element 4: Reliability and maintenance standards
	Element 5: Navigational Safety
	Element 6: Cargo, Ballast and Mooring Operations
	Element 8: Incident investigation and analysis
Clause 9 Performance Evaluation	Element 12: Measurement, Analysis and Improvement
Clause 10 Improvement	Element 7: Management of Change
Not specifically covered in ISO	Element 9: Safety Management
	Element 10: Environmental management

4.2. Qualitative Analysis

In order to provide a deeper understanding of the problem at hand, the results of the ISO and TMSA audits are analyzed. By this it is possible to understand which areas need further attention and give opportunities for improvement.

4.2.1. Interviews

As part of the research process, there has been conducted several interviews with the personnel in regard to the overall performance of the company which enable to draw some conclusions from the answers and observation (Appendix B).

First, in general terms it was not clear for the personnel who were the people in charge of quality management in every area. As a result, there were difficulties in finding certain type of information regarding performances as it was not clear who was the person in charge of controlling one specific processes.

In second place, although all the documentation regarding processes, inspection, and audits were available at request, it would take longer than expected to process the request. This evidenced the lack of engagement of the personal towards having a quality culture in the company. It was apparent that they knew the importance of the certifications and the quality management system but they would not include the principles of the ISO norm on their everyday activity.

Finally, the different interviews showed how the administrative offices and the vessels operation were disconnected in terms of quality management. Both the offices and the operations follow two different standards, which both have different focuses and reach. Information transfer was difficult due to the lack of the correct communication channels and there was a lack of transparency in controlling the good performance of the QMS in the vessels.

4.2.2. ISO audit results

The results of the last audit for the ISO management system give an initial outlook of the state of the QMS in the company. Conducted by the certification company Bureau Veritas, the audit reports signals that there were none non-conformities founded in regard to the ISO 9001:2008 guidelines. The audit evaluated all the clauses for the ISO with the exception of the 7.3 Design and Development, as Transgas correctly argues that by the nature of the business the company would only work in providing existing services. Furthermore, the certification indicates that all management processes required by the ISO (documentary control and record, internal audits, non-conformities, preventive/corrective actions, top management revision) were integrally managed by all the areas and projects in the different activities of the company. These reflects the capabilities of the company to have the QMS in place and with the right documentation to support the activities.

Nevertheless, it is important to notice that the results of the internal audit conducted two months before the certification audit showed 16 non-conformities related to the QMS. On the one hand, this shows the commitment of the company to continuous improvement as the company is correcting the flaws that could affect the performance of management system. However, it could also represent that the results of the audit are reflecting just the result of the recent adjustment to the system and not the regular performance in the activities.

The comparison of the results of the ISO audits with the performance of the others part of the management system in the organization, such as the TMSA certification, and the interviews with the personnel provide a better insight about the state of quality management at Transgas.

4.2.3. TMSA audit results

In order to gain a more profound understanding of the quality management at Transgas, the TMSA audit of 2014 provides a good frame of reference. It is a recent

document which assess the current quality management approach at Transgas in great detail. For each element (which is equivalent to a chapter) of the TMSA a ranking from one to four exists which has specific criteria in place which need to be met. Four thereby represents the highest quality standard, while one is the most basic. The audit thereby assess the status of implementation of Transgas and gives specific feedback upon the criteria they are currently lacking.

In order to gain a general understanding about common trends in the data, an assessment of the audit is made. Firstly, each criteria of the Elements which is currently not met at Transgas is listed. Thereafter, three overarching trends used to categorize the criteria. These trends are in accordance to the ISO 9001 standard and represent key areas of quality management systems. Specifically, Leadership provides insights into weather the quality management system is promoted throughout the organization, commitment is derived from its management and employees and whether further training is needed. Planning includes clear documentation, procedures and responsibilities. While the final area Performance Evaluation is composed specific targets / objects / KPI's which are specified by Transgas and whether a continuous strive for improvement is missing. Each criteria is then categorized according to the areas which enables us to gain insights into the trends at Transgas. Check Appendix D for the detailed analysis.

Interestingly, a few trends become transparent when looking at the outcomes. More specifically, elements of the TMSA which relate to Management clearly indicate that a lack of commitment and promotion of the quality management system are major areas for improvement. Criteria encompass that "vessel and shore-based management teams do not promote safety and environmental excellence" or "Managers are clearly held accountable for achieving the objectives established for them". Thereby, the engagement of employees and clear communication of goals seems to be lacking. The lack of promotion of the quality

management system may result in the loss of commitment of employees and management. Leadership may need to make it a clear priority to actively promote safety and quality systems throughout the entire organization. As part of the area for improvement is also the commitment to performance evaluation. Management does not seem to set specific targets and objectives which need to be achieved. Therefore, a lack of continuous improvement is in place as areas such as "Benchmarking is used to identify further improvements to the safety management system" are not done by Transgas. Figure 7 shows the distribution of the criteria not met in Management classified by category.

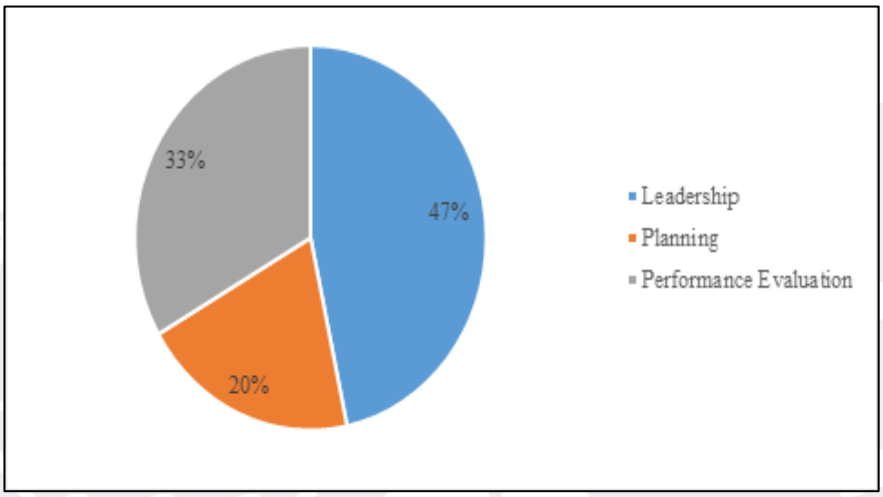

Figure 7. Criteria not met by category in management.
Data are from "Informe de Auditoría TMSA - Transgas", Isthmus Bureau of Shipping (IBS), 2014, p.6.

Within the specific areas of Vessel Operations, planning seems to be the criteria affecting the overall rating the most. Vessel operations encompasses the elements of the TMSA which are tied to the safety and quality requirements of operating ships. Specifically, the area of reliability and maintenance standards achieved an overall bad rating. This is specifically due to a lack of documentation and procedures. Out of the 11 criteria which are not fulfilled five were due to a lack of clear documentation and four due to undefined

procedures. This gap in organization matches to overall pattern within the other elements. In order to provide higher quality standards to the vessel it is therefore important to review the current procedures and improve that documentation in the areas of Navigational Safety, Cargo and Ballast Operations, Mooring Operations and Reliability and Maintenance Standards. Interestingly is that although the organization seems to be lacking responsibilities within the area of vessel operations are clearly defined. Training would benefit though specifically the area of Emergency Preparedness and Contingency Planning. Figure 8 shows the distribution of the criteria not met in Vessels Operation classified by category.

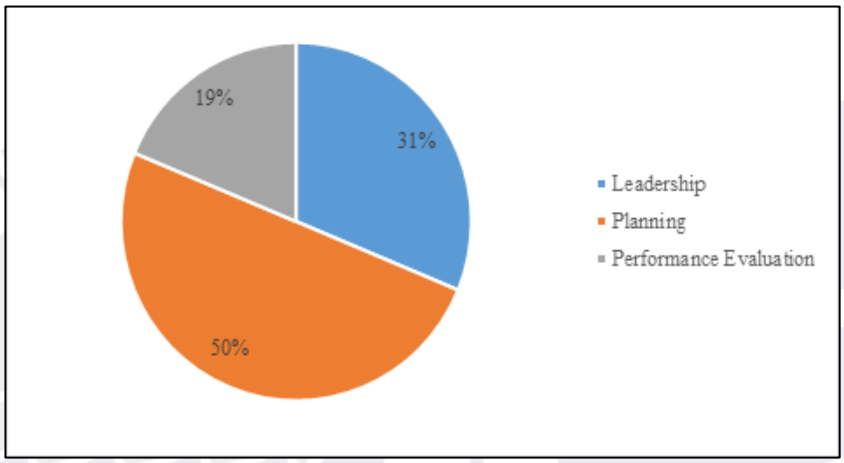

Figure 8. Criteria not met by category in vessel operation.
Data are from "Informe de Auditoría TMSA - Transgas", Isthmus Bureau of Shipping (IBS), 2014, p.5.

Finally, the topics of Safety Management, Environment and Measurement & Improvement represent areas which are affecting Transgas at a more general level. A clear guidance needs to be in place enforced by management which is then transferred into the operations of the ships and office. A lack of commitment and no clear policies which specify procedures are thereby the main causes for the ratings. Specifically, the area of environment would benefit of a commitment towards long-term goals which are specified within a business plan. By having enforceable objectives employees would be able to derive greater

ownership of the issues and strive for the implementation. Performance evaluation is therefore crucial. In part all topics require clear objectives and a better strive for continuous improvement. Figure 9 shows the distribution of the criteria not met in Safety, Environment & Improvement classified by category.

Overall all three areas have shown a high percentage for Performance Evaluation. By setting clearer objectives and targets Transgas would be able to improve the overall commitment and ownership towards issues, while gaining insights into which areas are currently not performing well. As part Transgas needs to work on retaining their knowledge management. Criteria such as "Audit reports from the fleet are analyzed and actions taken to improve procedures" or "Audit results drive continuous improvement of the management system" were not fulfilled which clearly indicates that insights are lost and Transgas is currently missing out on correcting, preventing and reducing undesired outcomes.

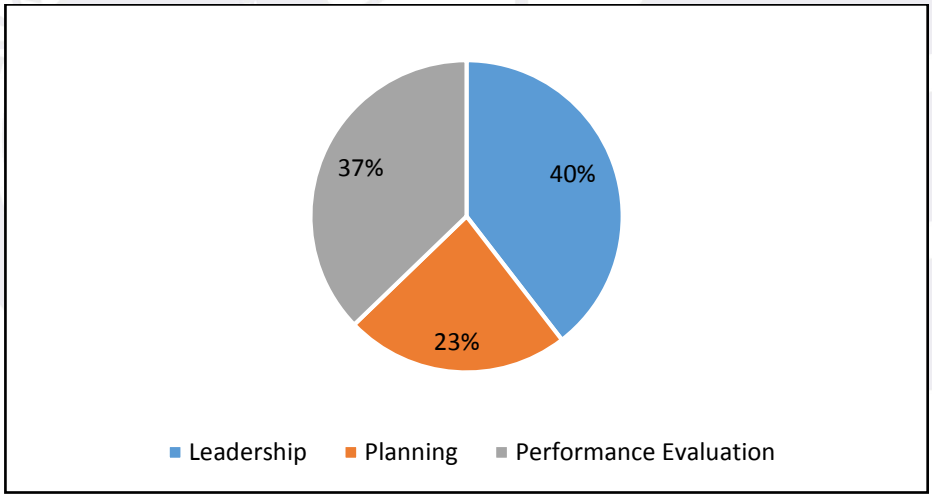

Figure 9. Criteria not met by category in safety, environment & improvement.
Data are from "Informe de Auditoría TMSA - Transgas", Isthmus Bureau of Shipping (IBS), 2014, p.6.

4.3. Quantitative Analysis

4.3.1. Quality management survey

As stated before, the main issue at Transgas is related to the inadequate implementation of its quality management system and leadership plays an important role

which needs to be addressed. In order to get a deeper analyses of the problem at Transgas, a survey was conducted between the top managers of the company. The main objective of the survey is to get a general view of the role of leadership in the quality management system and the perception of the leaders of the company towards the topic. Using a survey will be useful for the analysis since it allows the collection of data from the company and the employees, with regards to the different elements of the leadership clause. The survey also allows an analysis of the data and preparation for the action plan.

The survey was conducted among 11 members of the staff, which consisted in the managers of the most important areas of Transgas. The survey contains a list of questions based on the specifications of the ISO 9001:2015, but the questions were adapted and translated to suit the members of Transgas' staff (Appendix E). Some conclusions in regard to quality management can be drawn in some aspects of the Leadership clause of the ISO.

Leadership and commitment. The first section of the survey focuses on leadership and commitment. Based on the answers, it is apparent that leadership and commitment has a positive impact on quality as 70% of the areas valued them on high level. However, the rest of the areas have the impact of leadership and commitment in just medium levels. It is important to notice that the lowest score was made in the areas related to the vessels, which could be consequence of the separation between the administrative offices and fleet operations.

Policy. The second part of the survey is focused on policy and is divided in two different categories: developing quality and communicating quality. Based on the answers two trends can be clearly noticed. First, all areas of the organization are conscious about the quality policy in place in the company. 100% of the areas consider that the policy is clear and well documented, while also providing the necessary framework for the quality management in the organization. However, the answers also show that there is room for improvement in

regard to the communication of these policies. 35% of the areas indicated difficulties in the communication, and once again the lowest scores can be found in the areas related to the vessel operations. This also can be explained in the disconnections of the ships with the offices.

Organizational roles, responsibilities and authorities. The organizational roles, responsibilities and authorities sub-section of the leadership clause is crucial for the implementation of ISO 9001:2015. The answers in this section reflected that the responsibilities towards managing and controlling the performance of the QMS are well defined in the company. However, 40% of the areas stated that the responsibilities were not clearly assigned regarding the promotion of the customer focus throughout the organization. Being Customer Focus one of the principles for the implementation of the ISO standard

The analysis shows that while Transgas show a very good initial structure, it is not fully prepared to implement the new leadership clause of the new ISO 9001:2015. Opportunities for improvement in communication of the quality policy, the influence of leadership and the promotion of Customer Focus throughout the organization can still be found in the company.

4.3.2. Analysis by specification of the leadership clause

The analysis consists in performing an overall assessment of every specification in the Leadership clause of the new ISO 9001:2015. The analysis is based in the result of the surveys, the interviews conducted in the company, the analysis of the TMSA and ISO audits and the general observation of the processes in the company. The objective is to evaluate how well the processes in the company are adjusted to the model proposed by the leadership clause of the ISO and identified the strong and weak points. The first chapters will provide the background to interpret the specifications in the context of the company.

In order to make the assessment, a general criterion have been defined to score the level of fulfillment of each requirement. The criterion follows the line of the current internal audit processes used by the company. In total, 5 qualification criteria have been defined, which go from 0% to 100% according to level of implementation of every clause in the activities in the company. The overall criteria can be revised in Table 6. The process to evaluate each specification consists in three simple steps: (a) Detailed reading of each specification in the ISO norm, (b) Analysis of the current situation of the company, and (c) Assessment of the level of adjustment to the specification. Table 7 shows the overall assessment of the Leadership clause in the company. The table is divided into sections based on the sub-clauses presented on the ISO 9001:2015.

Table 6

Qualification Criteria for Quality Management Assessment

Qualification Criteria	Assessment
Not in place: There is no evidence of fulfillment of the clause	0
Partially in place: There is evidence of the fulfillment of the clause but does not meet all the requirements	25%
In place: The requirements of the clause are fulfilled but there is no evidence of an actual application	50%
Partially implemented: The requirements of the clause are fulfilled but there is little evidence of its application	75%
Fully implemented: The clause is fully in place and it effectively applicate	100%

Some conclusions can be drawn from the overall assessment of the company about the specifications of the ISO norm. First, the company has an acceptable level of

implementation at 58% without former audits or training in the new specifications. However, in order to obtain the certification for the ISO there is still a gap to close. Second, the best improvement opportunities are located in the 5.1 and 5.2 clauses. For these clauses, although all the requirements are in place and well documented, the general implementation has not been reached due to planning and communication issues. Finally, the overall good scores, over 50% in most cases, evidenced that the company has the resources and capabilities to have a better performance in its QMS.

Table 7

Level of Implementation for the ISO 9001:2015

5. Leadership	58%
5.1 Leadership and commitment	50%
5.1.1 Leadership and commitment for the quality management system	50%
5.1.2 Customer Focus	50%
5.2 Quality Policy	50%
5.2.1 Developing the quality policy	50%
5.2.2 Communicating the quality policy	50%
5.3 Organizational roles, responsibilities and authorities	75%

4.4. Conclusion

In summary, the analysis showed that although the currently QMS has passed the audits and it is fully documented and in place throughout the company, the company still needs assistance to fully implement its QMS. The analysis shows that the current QMS has managed to have all the processes following the requirements stablished by the ISO 9001:2008. This was confirmed by the last ISO audits and the survey conducted for quality

management. Nevertheless, as explained by West et al (2016) there are several limitations in the ISO norm that do not enhance firms to go beyond of simply meeting requirements for a certification. It is clear after the analysis that the ISO certifications is more cyclical process to renew the certification rather than an integral adoption of the quality principles stated in the norm.

However, it has also been noticed that in practice, there has been problem in the implementation of the quality management system. The deeper analysis in the TMSA audits show some deficiencies in regard to planning, documentation and communication that should have been covered by the QMS. This goes in line to the literature that evidenced top management commitment and participation, quality information and performance measurement, employee training and empowerment, and customer focus as the main factors for a successful QMS (Cheng et al, 2007). Also, the same factors are part of the problem that are addressed by the new changes in the ISO 9001:2015 in regard to leadership, knowledge management and controlling (Ingason, 2015).

In addition to that, the interviews and process of data collection evidenced the difficulties in controlling the performance of the activities, having the documentation of processes in place and the disconnection between the administrative offices and the vessel operations. The result of the analysis confirms the hypothesis stated by Celik (2009) that considered the lack of effective communication between vessel operations and the shore as one of the main challenges for the quality management in the shipping industry.

Finally, the survey and interviews also allowed us to conduct an assessment on the role of leadership in quality management according to the new specifications of the ISO norm. Based on the 11 requirements to ensure management commitment to the QMS (Palmes, 2009), it was possible to identify that there were still deficiencies in the current role the leaders were displaying in the organization.

Chapter V. Root Cause Analysis

Given the outcomes of the company analysis at Transgas causes need to be analyzed in order to be able to resolve issues and provide a profound basis for the next steps. Figure 10 presents a list of the possible causes for the problem.

- Improper Planning
- Management Confusion
- Inadequate support to Manager
- Partial Implementation
- Impatience
- Implementation without Quality Culture
- Lack of Top Management Commitment and Involvement
- Employees Resistance to Change
- Lack of Teamwork
- No Term Goal or Focus on Short Term Goal
- Failure to Link Quality Management with Desired Goals
- Top Managers Are Idealists
- No Efficient Communication Platform
- No Specific Position to Coordinate
- Unclear Standards, Policies and Requirements
- No Supervisor
- Misunderstandings and Conflicts due to Inefficient Communication

Figure 10. List of possible causes.

When looking at these possible causes, it becomes clear that several causes are affecting the current performance at Transgas. In order to provide a clearer pictures five

specific categories can be defined: People (leadership), Communication, Environment (cohesion), Methods (procedures and implementations), and Measurement (standards, policies and requirements). Since each of them is suggested to be an essential element leading to the main problem, a fishbone diagram is beneficial to conduct a deeper and clearer analysis.

5.1. Fishbone Diagram Analysis

Figure 11 shows the many possible causes for the lacking quality management system at Transgas that were identified by the analysis. Each subcategory is analyzed individually to provide a more profound understanding of the possible causes.

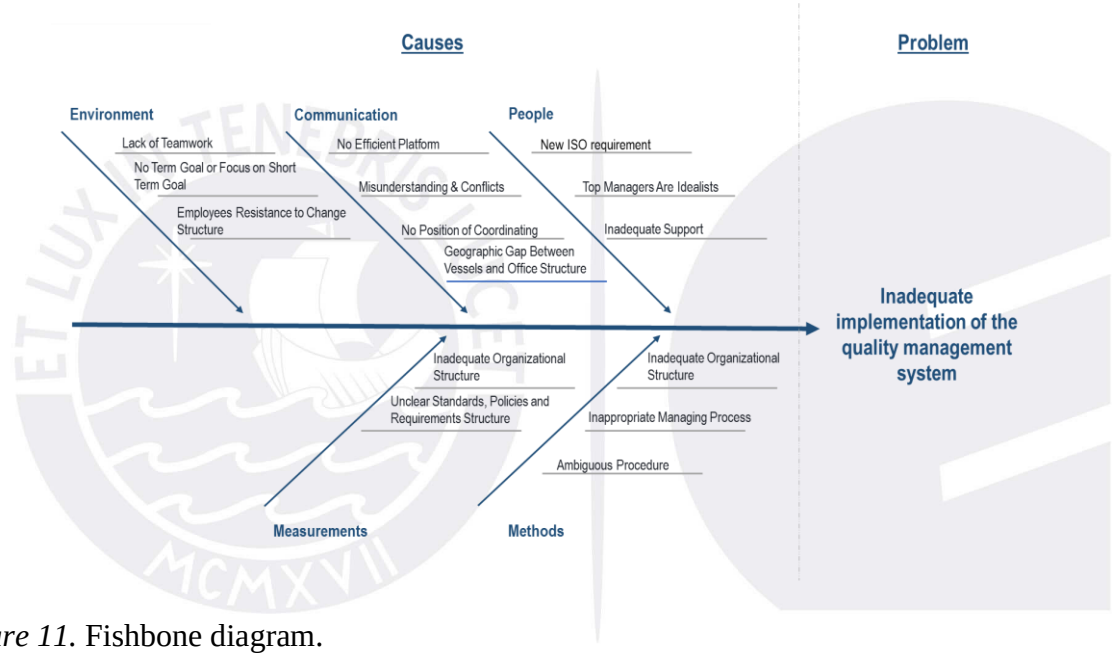

Figure 11. Fishbone diagram.

5.1.1. People

New ISO requirements. Due to the significant changes in leadership requirements derived by the ISO 9001:2015, it is necessary to recognize that the new leadership style should be highly concentrated and properly implemented for the next internal steps. To be more detailed, according to ISO 9001:2015, the three essential factors in leadership are leadership general, customer focus and policy (ISO, 2015). In this case, the top manager is required to take effort to make changes that will fit the new ISO standards well.

Compliance towards quality culture. Currently, Transgas has a clear mission statement which is dedicated towards providing high quality standards to ensure safety and health for its employees and the environment. The problem is though that this culture is not transferred into everyday operations. The common goals of the quality culture are not clear to the employees of the company, as it seems like worlds without deeper meaning to them. The usage and advantages are not clear to them. Without a clear education of the employees in each department, it is impossible to maintain a high-quality environment. According to interview with an employee, the quality culture was not clear to him. He has not heard about it and could not answer if there are specific quality standards in place. Moreover, since the vessels and office are considered to be separated, it might function as an indication towards signaling that no unified common goal and quality culture is in place.

Inadequate support of management. In order to be able to implement change, management must provide resources such as founding, time and training to its employees. Managers are responsible to understand the need for change and support its employees in taking the required steps. Currently, Transgas showed its commitment towards improving its quality management though a lack of resources might hinder successful implementations. Support of management therefore, does not only relate the willingness of change, but especially also to providing opportunities through providing time to employees and funding. Support therefore needs to be planned accordingly, as costs need to be considered and planned for a long term development. Without proper understanding of management of the current performance of Transgas no further commitment can be expected. Support is therefore also tied towards monitoring achievements and assessing the return on investments made upon the project. By having clear responsibilities in place in each department, will also help each department to understand the jobs and make the whole workflow more efficient

and smooth. In this case, manager should support with having such regulations of general meetings and determining responsibilities.

5.1.2. Communication

No efficient platform. As stated in the initial problem a clear separation between the vessels and office exists. This separation becomes furthermore transparent in the communication processes. Objectively, a geographic gap between office and vessels is one of the most important factors that weaken the communicating process. However, there are many other subjective reasons of this problem. There is no precise communication platform within in Transgas which is accessible to all departments. Most of the conversations are sent by email, which cause delays, conflicts, and misunderstandings. As mentioned above, the uncompleted regulations of general meetings will also create the current situation. Communication is also hindered though throughout the departments in the office. As processes are not clearly documented it is hard to find a common ground and source of information which can be communicated efficiently throughout Transgas. In turn, the lack of understanding of the company mission can be drawn towards a lack of clear communication.

No position for coordinating. Moreover, if there is a particular position in place which is dedicated to the coordinating between office and vessels, there will be a guarantee a more efficient communicating process. However, in Transgas, the loose connection is caused by no coordinator helping with the communication among each department to make sure their conversation going smooth with misunderstandings and conflicts.

Misunderstandings and conflicts. Furthermore, the communication problem also appears within the office among different departments and the also between employees and managers. Since employees do not comply with the company mission which is not communicated properly a barrier is formed which hinders the formation of a consistent idea of communication between employees. Without efficient communication it is hard to

establish a smooth workflow. Furthermore, when problems occur, the initial negotiation upon an implementation plan delays the resolution and has an adverse impact on the quality culture. The maintenance department is affected heavily by this issue, as no efficient communication is established between the DPA and the director of the maintenance department. This causes frustration and delays affect the performance of the department.

5.1.3. Environment

Lack of teamwork & no term goals. Given the lack of communication between the vessel and the office, both departments feel separated. This implies that the company is missing cohesion and common goals. By spanning the ISO 9001 requirements not only to the office but also incorporate the goals and requirements of the vessels into this common goals can be achieved and further teamwork enhanced. Currently, according to an employee's interview, most of the employees, including the top managers in each department, do not have a common idea of the corporate goal and just feel like doing their jobs separately without a unified idea. The lack of cohesion is also a primary cause of quality management system problem, since in an environment without cohesion, it is impossible to build a quality culture within the company as a whole. With a consistent quality management system, employees will work to meet with the requirements, which invisibly enhance the cohesion.

On the other hand, a corporation with high cohesion will find it easier to agree upon a common idea and be more consistent. In the case of quality management system, high cohesion will help the company to maintain a certain regulation and conduct implementation plans more productively.

Employee's resistance to change. At Transgas, management seems responsive to change though in general employees and management seem satisfied with the current situation of the company. Change is mostly initiated by consumer's pressure. Recently, consumers started asking for a documentation that can be covered by both the evaluations of

vessels and office. Employees pertain towards change though with resistance, as it affects their everyday work routine and procedures. Only by clearly communicating the advantages and encourage employees to actively participate in change changes can be implemented.

5.1.4. Methods

Inadequate organizational structure. An inappropriate organizational structure can lead to low efficiency in workflow and unclear of responsibilities. Transgas currently holds a structure which reinforces the separation between vessel and offices. The structure reinforces conflicts between office and vessels, when dealing with maintenance problem both the two managers from the vessels and the maintenance department should take responsibility. However, sometimes, both of the two managers might blame each other about the problems and cannot conduct a consistent plan to solve them. Without solving problems efficiently, the inadequate structure will be considered as a negative factor of damaging quality management system. Furthermore, departments need to start communicating more frequently with each other which can only be reinforced through meetings and a common company mission.

Inappropriate managing process. Managing process is another essential factor which is hindering efficient and effective quality management at Transgas. Since the inappropriate organizational structure, it is hard to run the managing process with productivity. Processes need to be defined more clearly, so that responsibilities are in place which can be made accountable for achievements and also lacks of commitments. Only through the setting of KPI's and clear objectives can performances be assessed and management processes improved. Managers need to create a sense of belongingness of problems by understanding the importance of supervision and coordination.

Coordination helps communicate common goals and ensure that the adequate steps are taken, while supervision takes the responsibility of observing and checking the achievements. In the case of Transgas without these two roles in the managing process, it

cannot be guaranteed that quality is managed appropriately. If no training and education is provided, knowledge of employees cannot be increased which potentially helps them understand their roles in the company and the quality system better.

Ambiguous procedures. As mentioned above, both inadequate organizational structure and inappropriate managing process can be the causes of ambiguous procedures. Especially, in Transgas, there is no specific definition and description of procedures. And most of the documentations, which are necessarily related to each step, are not well kept.

5.1.5. Measurement

Unclear standards, policies and requirements. Since the main problem is about quality management system, one of the most important factors is related to the measurement and evaluation of high quality standards. As the TMSA audit revealed, Transgas is currently lacking commitment to improve performances especially because no clear objectives, measurements and KPI's are in place. To become more competitive, Transgas needs to track more internal quality standards, policies and quality control requirements in order to have transparency and assess its performance. However, in the case of Transgas, there is no specific measurement about quality management system, which is hard to regulate employees and the quality of works.

5.2. Root-Cause Analysis Results

Given the analysis of each possible cause, an initial indication can be made that inadequate leadership and a lack of documentation and procedures are major causes affecting Transgas quality management system. As leadership has been highlighted as a central component of quality management in the ISO 9001:2015 version each factor can be related to leadership. For example, if top management can conduct a clear regulation of communication and quality measurement standards, both the problem categories of communication and measurement can be mitigated. To develop a clear common goal as well as mission and

vision can also help of enhancing cohesion. Furthermore, the inappropriate organizational structure and managing process is also the responsibility of top managers. If the lack of leadership can be resolve, the situation of quality management system will therefore further improve. In order to make the chosen of main cause to be more quantitative and qualitative, the assessment and evaluation of each category will be presented in the next session.

5.3. Determination Main Causes

As previously stated, it can be determined that the main causes for the lack of quality management in Transgas can be related back to five specific problem categories. They are People (Leadership), Communication, Environment (Cohesion), Methods (Procedures and implementations), and Measurement (standards, policies, and requirements).

In order to identify how they are contributing to the main problem, an assessment has been conducted. The categories are ranked from a zero to four scale, four representing a very high impact on the problem at hand and a zero representing a very long impact. Table 8 shows the criteria to assess the level of impact and Table 9 the final result of the procedure. Later, it is explained the reasons for the derived ranking.

Table 8

Qualification Criteria for Selecting Main Causes

Qualification Criteria	Assessment
Very Low Impact	0
Low Impact	1
Medium Impact	2
High Impact	3
Very High Impact	4

5.4. Rankings and Evidence:

People. People and leaderships received the average score of 9.6. Each of the elements in this category have great impact on Transgas, especially on the quality control management area, because each of them is a central the requirement of new ISO, which is necessary to be achieved in order to get the certified. It is suggested that the lack of leadership within Transgas is what is causing the lack of quality management across the board. For example, when employees were asked questions in regards to their quality management standards no specific responsibilities were assigned, nor was there specific knowledge about quality management in their department. Without strong leadership this problem will continue to fester and cause further problems for Transgas.

Communication. The lack of communications between the departments of Transgas is also adding to the magnitude of the problem that is why it is receiving an average score of 8. After a multitude of interviews with different departments, it is evident to see that Transgas does not communicate well with each other. There is not a lot of crossover between departments which leads to an overall breakdown of communications thought the entire company. Moreover, the misunderstandings and conflicts are playing important roles, because without efficient communication, it is extremely hard to implement an efficient quality management system.

Environment. Since there is a lack of communication in this organization there thus becomes a lack of a cohesive environment. That is why this factor receives an average score of 6.5. Speaking in a multitude of interviews it is clear to see that although the office and the vessels both operate as part of Transgas as a whole they act as though they are two separate entities. This causes a huge problem when it comes to quality management because in order to establish quality management throughout the company both the vessels and the office have to be on the same page.

Table 9

Results from the Impact Assessment

Causes	Assessed Impact on Results	Assessed Impact on Resources	Assessed Impact on Quality	Total Impact	Average Impact
1. People					9.7
1.1 New ISO Standards	4	2	4	10	
1.2 Top Managers are idealists	4	1	4	9	
1.3 Inadequate Support to Manager	4	2	4	10	
2. Communication					8.0
2.1 Geographic Gap & No Efficient Platform	2	2	3	7	
2.2 No Position of Coordinating	3	2	3	8	
2.3 Misunderstandings & Conflicts	3	3	3	9	
3. Environment					6.5
3.1 Lack of Teamwork & Goals	4	1	3	8	
3.2 Employees Resistance to Change	2	1	2	5	
4. Method					8.3
4.1 Inadequate Organizational Structure	3	2	3	8	
4.2 Inappropriate Managing Process	3	3	2	7	
4.3 Ambiguous Procedures	3	3	4	10	
5. Measurement					5.0
5.1 Unclear Standards, Policies & Regulations	2	1	2	5	

Methods. The methods in place have been given a ranking of 8.3 regarding its impact on the main problem. Especially ambiguous procedures contribute to the high score in this category. There is no doubt that most of the employees are not educated about the corporate procedures relating to quality management. Under this situation, it is impossible to build a

high quality culture. When it comes to implementing quality management standards, it is evident to see that there are no proper measures in place except for the ISO. This means that after an audit is completed, the standards fall by the wayside and are not picked up again till the next audit. This causes a problem because when it comes to quality management, there are no procedures put in place to make them sustainable.

Measurement. When it comes to the level of impact, measurement is only given an average score of 5. It is believed that if the other categories are looked at and implemented first that a way in which to measure the quality management standards and how they are being followed is the next logical step.

5.5. Conclusion

As the analysis revealed several causes are leading to the current problem at Transgas. The assessment revealed though that especially leadership, communication and a lack of procedures and implementations are currently affecting Transgas heavily. Without clear leadership, one cannot have and implement a clear quality management culture. Therefore, the next chapter address each of the main clauses with a proposed alternative solution.

Chapter VI. Assessed Solution Alternatives

6.1. Proposed Alternatives

In order to help solve the lack of quality management in the Transgas, there are a various number of possible solutions that can be proposed. For the purpose of this report, however, it is suggested that these possible solutions are based in four approaches: commitment, manager responsibility, quality policy and internal audit.

6.1.1. Increase commitment in the staff

The new ISO standards have a set number of criteria to help develop this commitment within the company. Most importantly they suggest that commitment to quality leadership needs to stem from top management down. Without top management being a commitment to maintaining quality management there is truly no going forward. According to the ISO 9001:2015 top management need to add the following elements and principles to the company in regards to commitment:

- Relating the objectives to the strategy of the organization
- Promoting awareness of the process approach
- Ensure the outputs of the quality management system
- Promoting the improvement in the organization
- Demand from other management parties to demonstrate their commitment to the quality management system – that means that officially the quality management system is not the problem of the top management alone.

By top management implementing this suggested elements of the new ISO it will help to solve the overarching problem of quality management within Transgas. In order to implement these elements there are three proposed solutions that can help them achieve this, they are as followed; Training, Rewards and incentives, and Customer Focus. Focusing on

these three areas will help to engage both employees and top management to be more commitment to quality management within their company.

Training. When it comes to fostering a commitment to quality management within Transgas, it is believed that employees need to have clear and direct training. When proper training on quality management is conducted company-wide, it allows for all departments to be on the same page and have both clear understandings and responsibilities. In order to complete this training, a training day should be held company-wide to make sure that all departments both in the office and on the vessels are aware of the new ISO standards and top management's position on a commitment to quality management. There are a number of factors that will play into this training day. Employees will be made aware of the new ISO standards; they are able to interact with different departments to not only talk about commitment but to develop cohesion among various roles. The cost to complete this training day will be relatively low because the new ISO gives set guidelines for how to implement commitment amongst a company. The time frame for this training day should be conducted as soon as possible, so everyone is on the same page for when the ISO 9001:2015 comes into effect. This training day will have a very positive effect company-wide if conducted properly and will help to solve the overall problem of a lack of quality management within Transgas.

Rewards and incentives' program. In order to make employees across all department enthusiastic about a commitment to quality management, it is also suggested that a rewards and incentives program be put in place. By having a rewards and incentives program, it gives employees a want to be committed to quality management and no just something they are told to do. These programs will consist of things like employees of the month. When an empress is showing exception effort on behalf of maintaining quality management standards, he or she will be nominated for employee of the month. At the end of each month, an employee will be chosen by top management and rewarded with a paid day off during the

coming month. By offering rewards to employees, it gives them an incentive to want to uphold the new quality management standards that will be put in place. The cost of these programs will be relatively low, only costing a day of pay for an employee a month, but will be highly effect to foster morale throughout the company.

6.1.2. Customer surveys

When it comes to a commitment to quality management customer focus is perhaps the most important. This is because without new and repeat clients the company will not grow. In order to implant a commitment to customer focus, it is suggested that clients be more involved in their overall portfolio. This means asking customers to fill out experience surveys about specific departments after their experiences. This ensures that departments become accountable for the experiences their clients have. It also ensures that any and all concerns the clients have will be sought to and taken care of. The implementation of these feedback surveys will happen at a significantly low cost and can be implemented immediately. By having such a strong commitment to the client's experiences, it will showcase to the customer how important their business is to Transgas and thus they are more apt to return.

6.1.3. Reinforce management responsibility

Framework for employee´s engagement. The management responsibility does not require a full implementation in the company as the company already has an official structure in place. However, it is important to promote the leadership within Transgas by creating and sustaining employee awareness and motivation by involving staff by different actions can represent a real benefit for the company. For this reason, a framework has been created specifically for Transgas, which is displayed in Figure 12. Different actions that the top management can do to involve employees in the company. Involving Transgas employees within the company will increase the management responsibility and the performance of Transgas.

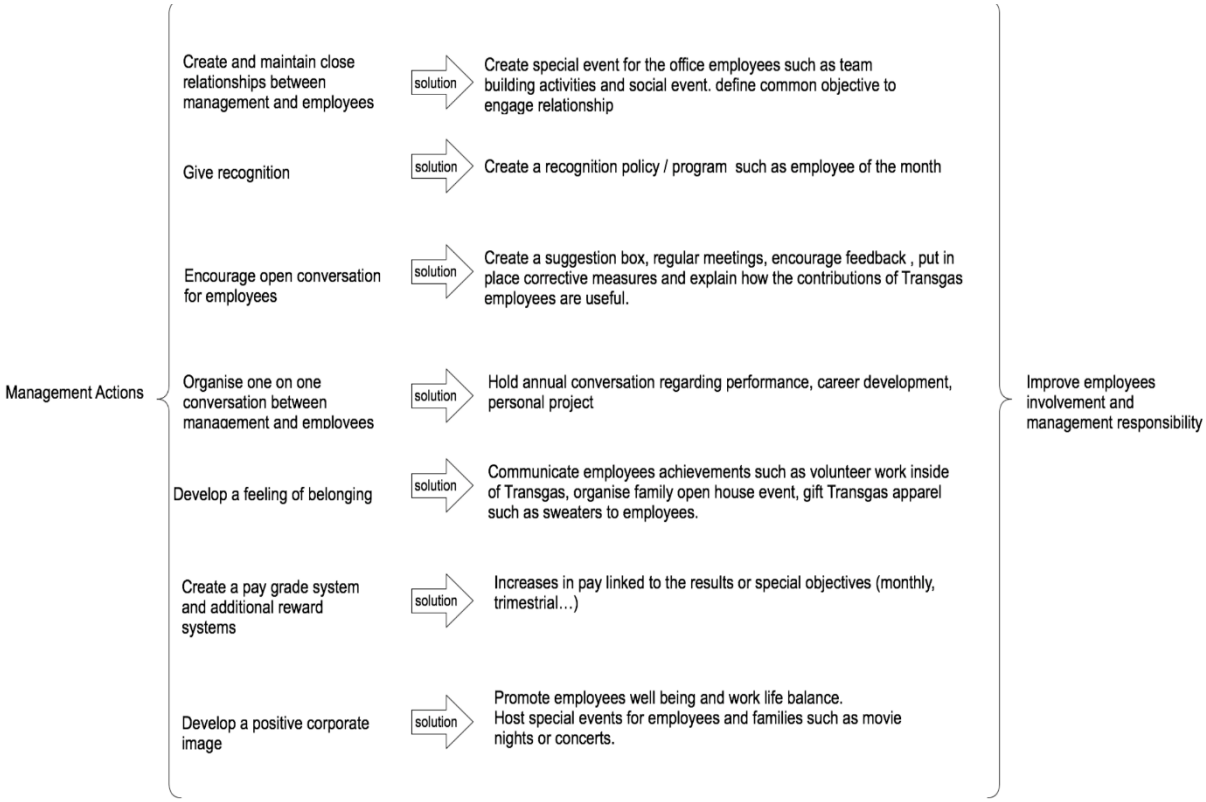

Figure 12. Framework for employee's engagement

The framework, present different actions that the company can put in place easily and without a huge financial cost. Each action had different objectives in term of involvement and management responsibilities.

- Create and maintain close relationship between management and employee. Employees who have good relationship with the manager will be more willing to work and be involved on the company objective. More receive feedback from employee is really important for a manager it will give him the opportunity to adjust his strategy more often in term of objectives but it will be also able to redefine responsibilities.
- Give recognition and create a pay grade system, to be involve employees need to feel that their work is valuable to the company. More put in place a reward system will improve the competition inside of the company to reach

objectives. The manager will have to be careful to have a positive competition to keep positive team cohesion.

- Encourage open discussion; as a result, the manager from Transgas will be aware of what happened inside of the company or of their own department such as logistic, maintenance or human resources. For example, use a suggestion box is easy and give employees opportunities to participate in decision making at work. As a result, they feel empowered and assume more ownership of their work.
- Organizing one on one discussion between management and employees, for Transgas this solution could be really efficient. In fact, it seems that the manager from the offices do not have a lot of communication with the vessel operation department. Organize annual or regular meeting between employee and manager will be useful to build a clear dialogue but also to redefine constantly objective and responsibility.
- Develop a feeling of belonging, if a manager show that is concerned about his employee he will have more result and efficiency Trangas can for example simply and without huge cost provide equipment and apparel to its employees. We also saw that maybe Transgas will need to improve his team cohesion by doing special event with family or just between employees Transgas will improve the cohesion of his workforce.
- Develop a positive image, actively promote organizational effectiveness, reputation, values and ethics – Employees want to feel good about their leaders, where they work, the products they sell and the reputation of their company.

The framework above offers 7 different solutions to Transgas to improve the involvement to its employees in the company. By doing this, Transgas will be able to redefine more often its objective and responsibility. The goal is that the solitons can be easily put in place to initiate the change in relation to leadership and management responsibility. All the solutions are put at disposition of the organization to choose the best order of implementation.

Provide a clear job description. Management responsibility is about defining clear role within the company for this reason Transgas can provide to their employees and future employees a clear job description.

The job description needs to be communicated clearly, to explain concisely what responsibilities and tasks the job entails and to indicate, as well, the key qualifications of the job – the basic requirements (specific credentials or skills) – and, if possible, the attributes that underlie superior performance.

The categories below make up a well-written job description:

- Title of the position
- Department
- Reports to (whom the person directly reports to)
- Overall responsibility
- Key areas of responsibility
- Consults with (those who the person works with on a regular basis)
- Term of employment

The job description needs to describe the skills and the competencies that the job requires, it will also clearly state the job within the company hierarchy. This will allow Transgas employees and management all to have a clear understanding. Transgas will need to have a deep job analysis, collect data, and information to be the more specific so to better

define the responsibility for the job. Moreover, employees will be able to refer to the description if responsibilities are ambiguous. The CEO will be able to use it for meeting and use as a reference for the responsibilities of each of his team members.

6.1.4. Develop a new quality policy

The quality policy is a central piece to the entire management process of quality management at Transgas. By clearly defining what quality means to the company and its respective employees, the organization is able to document a policy which reinforces a quality culture that matches the unique requirements of Transgas. In turn, a quality policy must be defined which is:

- Appropriate to the purpose and context of Transgas and supports its strategic direction
- Provides a framework for setting quality objectives
- Include a commitment to satisfy applicable requirements
- Include a commitment to continual improvement of the quality management system

By fostering such a Quality Policy Transgas is able to redefine their commitment towards quality. It is therefore also advisable to incorporate all levels of employees into this process. By assessing how each department views quality management, insights can be gained about common goals but also more specific alignments to operations. By incorporating all aspects of quality and defining a policy to which each employee can relate to will enable Transgas to further strive commitment and understanding.

Furthermore, Transgas needs to have a clear way to communicate the quality policies and the policies in a more general point of view with the staffs from the vessel and the head office. The risks of a poor communication about policies can be dramatic for Transgas as it can destroy the relations inside of the company, decrease the customer satisfaction, or fail on

different test such as the TMSA or the ISO. Different solution exists to communicate clearly the policies the solutions presented below are easy to implement and represent just little cost.

Because of this, there is clear need for Transgas to create the adequate communication channels for its quality policies. Therefore, it is recommended for the company to implement the following communication channels throughout the organization:

- Displayed on noticeboards
- Added to the company network or intranet
- Communicated in presentations
- Included in a staff handbook
- Emailed to staff

The solutions are easy to implement, the communication inside of the company is essential. Notice board implemented inside of Transgas offices is really useful. It will be a way to communicate to all the employees without chance of losing information such as it could be the case when a mailing system. In addition to this Transgas can implement an intranet communication by using special program such as Dropbox which is a tool useful to communicate document and information with the staffs especially when face-to-face can be difficult. Also provide each employee a handbook with the main quality policies will allow them to refer to it when they have a need too. It is also a way for the top management to be sure that each employee receives the necessary information.

6.1.5. Internal audit

Another possible solution is an internal audit which is tied towards continuous internal improvement driven by the employees of Transgas. An internal audit shall help with the implementation of key standards and definition of objectives which are frequently reviewed and tracked. An internal audit is an independent, objective assurance and consulting activity designed to add value and improve Transgas operations by bringing a systematic,

disciplined approach to evaluate and improve the effectiveness of its current quality system. Thereby, Transgas is able to more clearly see the developments within the quality management area while keeping close objectives to further enhance its achievements. Internal audits shall be conducted at planned intervals to determine whether the quality management system (1) conforms to the planned arrangements and requirements of the ISO standards and (2) is effectively implemented and maintained. Internal audits shall furthermore guarantee that more transparency is achieved through the documentation of key findings and involvement of employees.

An internal audit program contains three major steps (1) the initial planning (2) the actual internal audit (3) the post-audit, and is managed by a lead auditor who is selected from the firm. In the initial planning phase, the lead auditor and its audit team must make themselves familiar with the individual requirements of each department regarding the quality requirements of the management system. The auditor shall prepare an internal audit checklist which is to be defined with the help of each department. Thereby, each department and area needs to clearly define its objectives, the scope, location, responsibilities, and processes which are affecting the quality management system and are required by the ISO 9001 standards.

Based upon the checklist the actual internal audit takes place. The lead auditor communicates the audit timetable in which the schedule is explained. The frequency of audits is thereby determined by the status and importance of activities, data collected in past audits. As a minimum, an internal audit shall be conducted biennially. The auditor then reviews the state of the quality management system through the pre-determined checklist and prepares an internal audit report containing information on the current state of the quality management in the department, objective evidence, action items which define what needs to be done in order to improve performance, and any other conditions considered detrimental to normal practices.

The auditor then reviews the audit report together with the department and they establish:

- The corrective actions to be performed
- The time frame for implementation of the actions
- The date for a follow-up audit (if necessary)

It is essential that the auditor engages the employees of the departments to ensure that the audit process is a two-way view of the situation. Use auditing as a communication and educational tool enables Transgas staff can gain experience across the organization while being actively engaged in shaping the quality culture in their organization. The final phase is then reached in which the follow-up audits take place and it is ensured that the documentation of the audit is complete and accessible to every employee. Only through transparency and clear communication can questions be resolved and an optimal outcome achieved. A final management review meeting is then conducted in which the findings shall be presented to top management. Thereby, the documentation shall provide a clear overview of the current status of the firm and also highlight the achievements and shortcomings which need further attention. As resources are often required to resolve issues the meetings can be used to invite employees to raise their concerns and start direct communication with top management.

6.2. Assessment of Alternatives

In order to conduct a strategic evaluation, it is necessary to evaluate the suitability, acceptability and feasibility (Tribe, 2010). Because of this, the assessment of the alternatives has been conducted in two step, which are displayed in following tables. While looking at Table 10, in this case, the first thing to be considered is the priority to the major problem. Then comparing the cost and time complementation of each alternative with the proposed benefits it can bring to Transgas. Table 11 presents the relevant level of each alternative with measurement, method, communication and commitment to quality culture.

6.2.1. Assessment on increasing commitment in the staff

Training. It is considered that training has a high priority to the major problem, although the costs of training, such as tuition fee and employees' absence as well as a long-term time cost, are really high. Since training is the most efficient way to increase the awareness of employees about the quality management system which directly solve the major problem of Transgas. Moreover, the training program also provide a platform for the communication between employees and managers, which can reduce the conflicts and misunderstandings. In the training program, it is also suggested to educate employees with the company common goals in order to consist the organization as a whole.

Rewards & incentives. Rewards and Incentives are much easier to be implemented in short term with effective result to motivate employees and also increase the overall work quality. One of the major costs for this alternative is the extra compensation expenditure, which needs to be considered carefully about the amounts and frequencies of the rewards and incentives based on Transgas current financial condition. However, sometimes it is hard to make everyone feels fair with rewards and incentives, it is necessary to keep all the elect process open in order to guarantee the fairness.

6.2.2. Assessment on customer surveys

Customer Focus is also an important part in commitment, since the final aim of each corporation is to make customers satisfied. In the case of Transgas, customers have the requirement of products with high quality standards, which lead this alternative to the high priority. As mentioned, to implement it, it is essential to do customers and marketing researches, such as survey and questionnaires, which will bring a large amount of monetary and time cost. However, after taking effort into this step, it will bring benefits of building customer loyalty and customer base, earn positive brand image and reputation, as well as increase sales and profits.

Table 10

First Assessment of Alternatives

Alternatives	Priority	Cost Implementation	Time Implementation	Proposed Benefit
1. Increase commitment in the staff				
Training	High	Tuition fee Employees' absence	Long	Increase awareness of employees about the quality management system Set company-wide standards communicated throughout the organizations Build clear common goals and cohesion among employees
Rewards and incentives' program	Medium	Extra compensation cost Conflicts of unfairness	Short	Motivate employees Increase the overall work quality
2. Customer surveys	High	Customer and marketing research (Survey)	Medium	Build customer loyalty & customer base Earn positive brand image and reputation Increase sales and profits
3. Reinforce management responsibility				
3.1 Framework for employee´s engagement				
Relationship between Management / Employees	High	The developing fee of certain platform for communication	Long	Build Cohesion Enhance teamwork productivity and efficiency without conflicts and misunderstanding
Feeling of Belongingness	High	Managers' effort in listening and communicating with employees	Long	Eliminate complaints Have a better communication with understandings
Pay Grade System	Medium	Fee of setting up pay grade system Hire new position to do the evaluation	Short	Motivate employees Increase the overall work quality
Open Discussion	High	N/A	Short	Provide a chance to let employees get involved into brainstorming and decision making Enhance the feeling of belongingness
3.2 Job Description	High	Training cost	Medium	Help employees have a better understanding of their jobs Clearly distribute responsibilities and reduce conflicts Make the operating and managing process run flexibly and smoothly
4. Develop a new quality policy	High	Effort of building certain audit standards Capital expenditure New hiring of audit person	Long	Provide a general idea of quality management system and build quality culture Increase the quality of products regulated by specific standards Build a brand image and reputation of high quality
5. Internal Audit	High	Effort of building certain audit standards Capital expenditure	Long	Enable internal and external coordination Improve overall quality process

Table 11

Second Assessment of Opportunities

	Alternatives	Measurement	Methods	Communication	Commitment to Quality Culture
1. Increase commitment in the staff					
	Training	High	High	High	High
	Rewards & Incentives	Medium	Medium	Medium	Medium
2. Customer surveys		High	High	High	High
3. Reinforce management responsibility					
3.1. Framework for employee´s engagement					
	Relationship between Management / Employees	Medium	Medium	High	High
	Pay Grade System	Medium	Medium	Medium	Medium
	Open Discussion	Medium	High	High	High
	Feeling of Belongingness	Low	Low	High	Medium
	Positive Image	Low	Low	Medium	High
3.2. Job Description		High	High	High	High
4. Develop a new quality policy		High	High	High	High
5. Internal Audit		High	High	High	High

6.2.3. Assessment on reinforce management responsibility

Framework for employee´s engagement. There are five components under this sections. When doing the assessment, they are divided into two groups, soft skills and hard skills. Because the first three, Relationship between management and employees, Feeling of Belongingness and Positive Image, are all about soft skills, such as emotional changing and relationship building, it is suggested to combine them all together to have a one clear assessment. And then since Pay Grade System and Open Discussion are two implementations with hard skills, it is considered to be explained separately.

Soft skills. All the soft skills alternatives above are considered to have high priority but need long time to implement, since all of them are soft and invisible, but hard to achieve.

The only visible cost here is the developing fee of a certain platform for enhancing communication among employees and managers. Moreover, to achieve the goal of building cohesion, managers must take effort in listening and letting employees contributing as much as possible. Other benefits are considered to enhance teamwork productivity and efficiency without conflicts and misunderstanding, eliminate complaints.

Hard skills. Pay Grade System is similar with rewards and incentives, with a medium relevant priority and can be implement in short term. However, it is not easy to conduct a brand new system within an organization. First, the fee of setting up this pay grade system would be a huge cost of the company, since in order to make the system rational, the opinions and knowledge of expertise need to be considered. It also needs to hire a new position to take responsibility of the evaluation. As the benefits mentioned in Rewards and Incentives, it considered to be useful to have this pay grade system in Transgas.

Open Discussion can be seen as an alternative which helps with building positive relationships between management and employees as well as enhance the feeling of belongingness, since it provides a chance to let employees get involved into brainstorming and decision making. And it is easy to implement because there are particular costs to do so. Since there is no certain cost with a high priority, it is considered to be implemented immediately, which will be truly helpful to Transgas in short-term run.

Job Description. Job Description is necessary to be implemented, because it will help employees have a better understanding of their jobs and clearly distribute responsibilities so that to reduce conflicts. Moreover, it helps with achieving common goals and making the operating and managing process run flexibly and smoothly with the only cost of education each employees of their job. Having a clear and detailed job description will also contribute to develop the quality management system, because each description will also have

requirements to regulated the quality level. In this case, job description is the one that considered as having high priority to the major problem.

6.2.4. Assessment on developing a new quality policy

The internal quality policy is important, because the pass of ISO or TMSA is not enough to represent competitive advantage in high quality. With a certain quality policy, the general idea of quality management system and quality culture will be clearly defined, so that to increase the quality of products and build a brand image as well as reputation of high quality. Having a well-implemented quality system will push quality policy to be one with high priority. With a clear quality policy, the regulations and standards will also resolve the ambiguous procedures and make the whole organizational management run smoothly.

It will cost a lot to develop a brand new quality policy, which needs to ask advice from expertise, to do the competition analysis as well as to hire a new position of auditing the whole process. But comparing with the effective benefits it can bring, these costs are considered to be necessary to take and quality policy is worth to be implemented.

6.2.5. Assessment on internal audit

Only setting up a quality policy is not enough to guarantee a high standard of quality. To make sure of the quality policy is working effective and helping improve overall quality process in the organization, there is also necessary to have a step of internal audit. In this regular internal audit, all the operating processes will be checked carefully to see if they meet the requirements and expectations. Then there will be feedback meetings to discuss about how to improve and develop for the next step. The benefits of internal audit are not only about to help Transgas earn competitive advantages as well as enable internal and external conditions. But also, it is helping to build cohesion among employees and letting employees get involved.

To achieve this, it needs a long time to conduct a certain audit standards and systems with a huge capital expenditure and a new hiring of audit person. But as a possible solution, it can help with solving both hard skills and soft skills for Transgas, which should be considered as worthy doing.

6.3. Conclusion

After evaluating each alternative, it is clear how they will impact the functioning of the quality management system of the company. Although some of them have cost a lot to implement, the trade-off between costs and benefits is still considered to be positive and worth to do. Therefore, in the proposed solution, it is suggested to combine all these alternatives together into one and implement them step by step, which will be explained in details in next chapter.

Chapter VII. Proposed Solution

As the analysis in the previous chapter revealed, in the case at hand it is of utmost importance to incorporate all alternatives into a single solution. According to the International Organization for Standardization (2015), a successful implementation of a QMS requires effective planning, review and continuous improvement at all levels in the organization. The alternative solutions aim to address different aspects of the problem, but if one aspect is not taken into consideration it would not be possible to generate the deep-rooted practice that are necessary for a QMS.

Figure 13 shows the PDCA framework cycle proposed by the International Organization for Standardization (2015) that illustrates that it is necessary to work simultaneously in different areas, but having leadership as the central point. Because of this, only addressing one aspect would not solve the problems in the company.

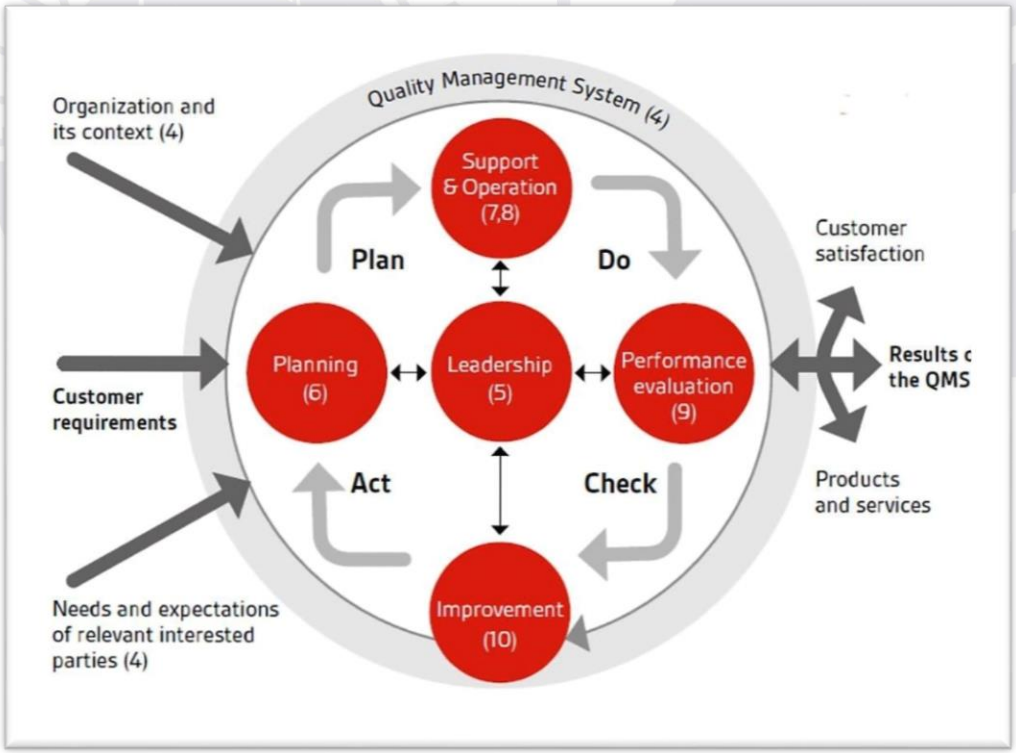

Figure 13. Quality management system framework.
Adapted from "Final Draft ISO 9001:2015", International Organization for Standardization, 2015, *Quality management Systems-Requirements*, Geneva.

Therefore, only by addressing several issues through a combined approach will it be possible to solve the multifaceted problem. Quality management systems thereby require the attention of management, commitment of employees, the development of processes and documentation, while fostering a culture that reinforces safety and continuous improvement at Transgas. The sequence with which the solutions are going to be implemented plays a crucial role though.

The first phase is mostly characterized by the initial planning and organization of the quality management system. Thereby, the formal endorsement of top management is the first step. The commitment from top management is crucial for the implementations of a QMS. In this top management formally documents its support of an implementation strategy, which lays down the design, the timeline and estimated budget for the project. This step assures the commitment of top management and secures the appropriate level of resources required for implementation.

Following top managements support is the development of commitment throughout the entire organization. Employees must understand the need for the advancement of the quality management system and its implications for their jobs. Only then can be guaranteed that newly defined guidelines will be implemented and followed in their daily operations. By defining a quality policy and clearly allocating responsibilities ownership of quality issues can be enhanced.

Furthermore, the initial planning and documentation of the quality policy ensures that it can be clearly communicated throughout the entire organization while being the foundation for further improvements. Only transparency and the joint development of objectives may insure that processes are understood and continuously improved. The development of responsibility furthermore creates ownership and a sense of personal commitment towards a common goal.

After conducting the first internal audit within Transgas the second phase is initiated. The first internal audit reveals the divergence of the newly defined objectives and process and the actual state at which Transgas currently is. Therefore, phase II focuses on identifying and developing processes which are currently not in place. This step feeds directly into the preparation for the second internal audit, in which each department clearly states its objectives and quality management processes. After the internal audit took place the final phase focuses on resolving any open issues and provides time for adjustments. The proposed solutions therefore feed slowly into the final external audit, while providing guidance and direction not only for management but also employees. The proposed solution is summarized in Figure 14, which details the phases and sequence of implementation.

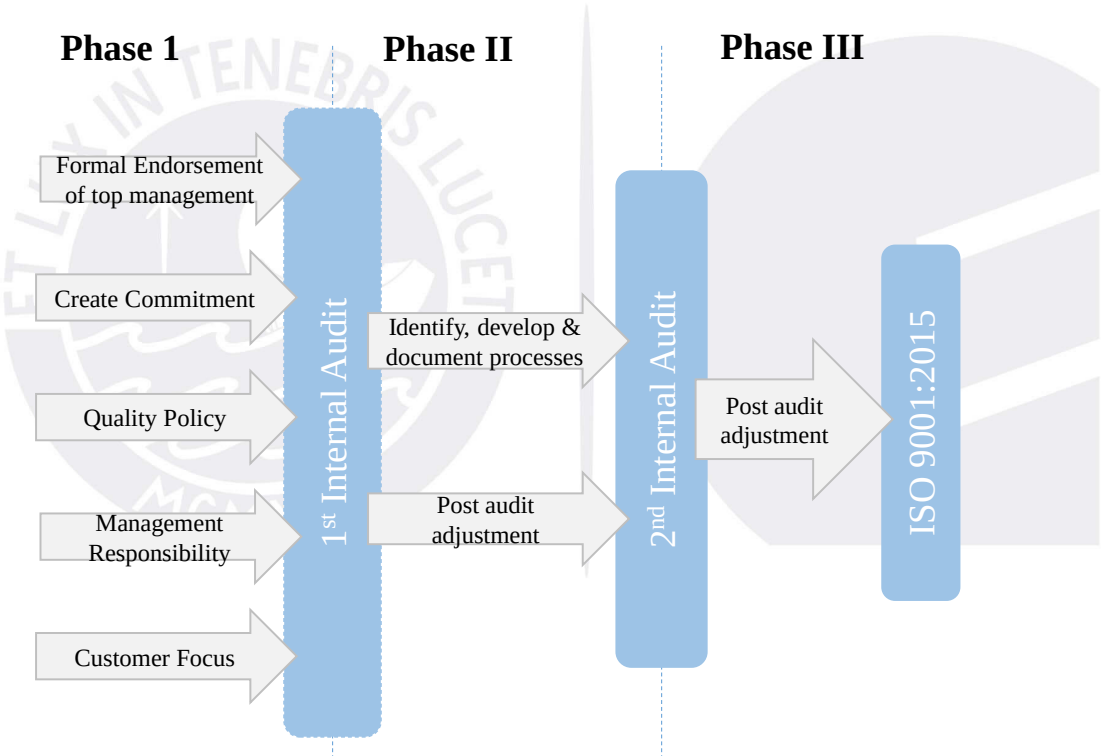

Figure 14. Scheme for proposed solution.

Chapter VIII. Implementation Plan and Key Success Factors

8.1. Implementation Plan

As the report shows previously, the company will implement a series of solutions that are going to help the company in their preparation into fully implementing the ISO 9001:2015. In order to achieve this objective, a solution has been proposed in chapter six, which is based on the assessed solution alternatives presented in Chapter 5 of the report. All these solutions have the same goal, which implements the leadership composed of different elements, which are commitment, customer focus, quality policy, and management responsibility. In order to facilitate the implementation of the proposed solution, an action is presented that will be focused on the different clauses of the Leadership clause of the new ISO 9001 2015. However, the company will still need to take into consideration all the other clause of the ISO 9001 2008 and based their action plan based on the previous audit. The detailed steps and schedule are showed in Figure 15.

Before to start all the process of the implementation of the leadership and the new ISO 9001 2015, Transgas need to be sure that the top management is fully aware of this transition and that it will be efficient. Moreover, elect a quality manager who will have the role of the coordinator during the implementation is essential in order to have a constant verification of the implementation during the established period.

Following the current structure in the company, the role should rely on the head of the Control de Gestion Interno department and a second responsible designated by the Quality Manager. These two individuals are responsible for quality management and ISO within the organization. That being said, since the new ISO is related to top-down management, the involvement of the CEO needs to be included in the initial steps for implementation.

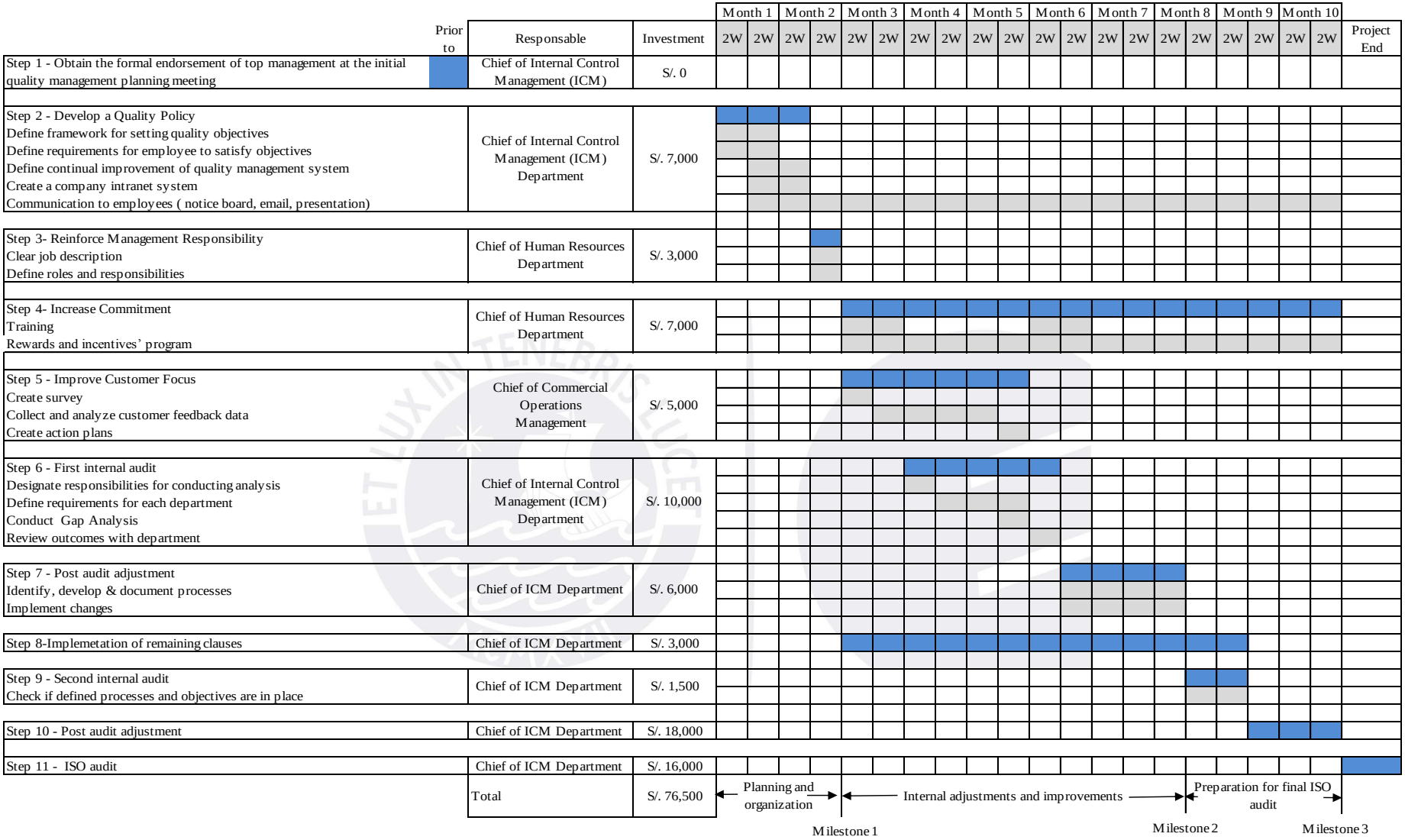

Figure 15. Implementation plan.

Step 2 is focused in the Quality Policy, the activities necessary to define it and be able to communicate it effectively at all levels of the organization. The activities presented in the plan are aimed to be performed in a workshop with representative from both the office and the vessels. The objective is to create the environment that allows the brainstorming for ideas regarding quality and communication throughout the organization. The step begins with the definition of the quality policy and ends with the correct communication of this policy through the channels developed.

The next step focuses in the management responsibility in quality. For this part it is necessary to create clear job descriptions that necessarily include the role of every position in regard to quality in the company. An example for a job description is provided in Appendix F. In addition to that, it is necessary to define the roles and responsibilities in the quality management system. In relation to this, the head of every department should be the main responsible of assuring the fulfillment of the quality policy, with a second person designated to provide support in this task. In this context, the role of DPA connecting the office and the vessels become critical for the success of the quality management system. Concerning the job descriptions, the Human Resources Department and/or the Manager of each department will need to complete

The next step defines Commitment as an ongoing process during all the implementation plan. In fact, Transgas will choose which of the seven tools presented on the framework "Transgas framework for employee's engagement and management responsibility" have to be implemented first. Additionally, the company needs to provide training to the employees and create a reward policy. It is estimated that 1 month will be necessary to do it cause of the large number of employees which are represented in 11 different departments (Appendix C). A second training of the same length is scheduled to reinforce the knowledge in the personnel.

Then, the company will need to implement the customer focus. To fulfill this objective, the company need to create a customer survey, collect and analyze the results, and finally create action plans. An example of the survey can be found in Appendix G. The managing of the survey is going to be in charge of the customer service department (Gestión de Operaciones Comerciales). The surveys need to be verified by the area in charge of quality (Control de Gestión Interno) and all areas with direct relation to customers.

The next steps involve conducting internal audits and making the right adjustments. It is projected to have two internal audits that should prepare the organization to face the external process for the new ISO. Appendix H provides some examples to elaborate the internal quality audit. Additionally, the organization will continue with the implementations of the remaining clauses as a continuous process. The company already receive during the Audit of the ISO 9001 2008 a feedback concerning the other clauses. For this reason, Transgas need to keep going the improvement during the whole process. Finally, as a final step the company needs to receive the external to certificate for the new ISO.

8.2. Implementation Cost

The implementation costs for the proposed solution is mainly composed by the staff cost associated with the implementation project during the timeframe and the certification expenses. The manager of Control de Gestión Interno would serve as the project leader and will dedicate 30% of his time. One of the analyst of the same area would provide support to the project leader using 40% of his time. The time spend by the organization's leaders and staff in training and implementation will be assume as part of their regular duties, therefore, would not be consider as a relevant cost.

For the certification expenses, the general fee charged by the certification companies lies around S/. 16,000. Additionally, the costs should include internal audit training, quality management training, and general expenses.

Table 12

Implementation Cost

Concept	Cost (Soles)
Certification	16,000
Personal staff cost (Project Leader)	18,900
Personal staff cost (Support)	14,400
Internal Audit Training	3,000
Quality Management Training	5,000
General expenses	3,000
Total	60,300

One of the limitations for the present investigation was the lack of financial or commercial information by the company. As a result, it is difficult to quantify the return for the investment. Nevertheless, the literature review shows us that the benefits as a result of the implementation of the quality management system can be measure in the following ways:

- Increase in the customer satisfaction
- Cost reduction for the internal processes
- Increase in the organizational performance that should be reflected in a better working environment
- Financial gains from the increase in sales and cost reductions in processes

8.3. Key Success Factors for Implementation

Proper implementation of the project would influence the level of impact the proposal can have in the organization. In order to secure the success of the project, it is important to understand the key elements that would allow the solution to be fully implemented. Before

starting with the implementation, it is crucial to have an understanding of the factors that can enhance or diminish the capabilities of the organization to successfully workout plans.

Firstly, it is important to identify the enablers that are the factors whose presence determines the success of the project. Therefore, it is important to strengthen them as they function as drivers for success. Table 13 presents the main enablers identify for the project and the key actions to ensure it.

Table 13

Key Enablers for Implementation

	Enabler	Key actions to ensure it
1	Communication	Creation of communication plan Establish a unique communication platform Create the channels that allow access to all relevant information anytime Establish frequent and continuous communication & feedback Set a clear reporting structure
2	Team Cohesion	Set clear responsibilities & tasks State a common goal which is aligned mission Manage expectation Creation of trust
3	Effective Meetings	Agenda established at the beginning of the meeting Set time to complete deliverables in a meeting Thorough preparation before meetings Debriefing after each meeting
4	Analytical Thinking	State-of-the-art analytical tools Implementation of frameworks Critical review of current processes
5	Organizational Knowledge	Reference academic cases to solidify arguments Ask experts of the field for more detailed inputs Use data from several sources to validate recommendations

Secondly, it is vital to have an understanding of the risks surrounding the project. Risk assessment is vital for implementation, as a plan has greater chances to be successful if the potential threats and risks are identified before the implementation process start. By identifying risks, the organization is able to elaborate strategies to face it. Table 14 states the

critical risks that could prevent the success in the implementation process and the key actions to face it.

Managing the key success factors for the implementation of the proposal will increase the possibility of success, and therefore, the potential benefits the project could have in the organization. Understanding the strengths and weaknesses of the organization contributes to building the right capabilities before entering the implementation stage. In that regard, take into account the enablers and risk, and the consequent actions to manage will provide the organization the right tools to take the plan into action.

Table 14

Critical Risk for Implementation

	Risk	Key actions to manage risk
1	Miscommunication	Get to know individual communication styles and adapt working towards those Conduct regular meetings Ensure the feedback and de-briefing in sessions to ensure that members understand
2	Lack of Industry Knowledge	Review recent articles, cases, reports which are available in databases Create the right environment that facilitate ask questions and share knowledge
3	Distribution of Duties	Ensure that the distribution is shared equally Ensure that individual capabilities are reinforced and efficiently used among the team
4	Ineffective Use of Meeting	Come prepared to meetings Set schedule for meetings Ensure the personal is actively involved in the meetings
5	Misunderstanding of the Task	Prepare continuous progress reports Create a layout out schedule Conduct interviews with the individual members of the team about their understanding to ensure that no mismatch is in place Work with visuals to clarify processes and ideas

Chapter IX. Expected Outcomes

After the implementation plan, it is expected some changes in the quality management system that would contribute to its further implementation. For that reason, it is important to estimate what would be the expected outcomes and set indicators in order to control the effectiveness of the implementation. The goals and KPI were set along with the company according to the past results and the expected improvement as a result of the implementation plan. The expected results of every alternative proposed is presented in Table 15 and further explain in this chapter.

Commitment. The aim of commitment is to help of building a positive working atmosphere with high quality of work be done. Therefore, the expect outcomes in workplace are helping increase awareness of employees about the quality management system, set company-wide standards communicated throughout the organizations, build clear common goals, cohesion and motivate employees. In this case, there will be formed a great working environment with an increasing of the overall work quality. Commitment will also bring the expect outcomes for the whole brand, such as building customer loyalty and customers base with a positive brand image and reputation, so that to increase the sales and profits as a result.

Management responsibility. The major aim of implementing management responsibility is to build cohesion for Transgas. In the short-term, the alternatives, such as pay grade system and open discussion will have the outcomes to motivate employees and let them feel involved. In the long-term point of view, the soft skill building will help enhance teamwork productivity and efficiency without conflicts and misunderstanding, eliminate complaints and have a better communication. Furthermore, the most direct outcomes, to resolve the quality management problem, are brought by job description, which are helping employees have a better understanding of their jobs, clearly distributing responsibilities,

achieving common goals and making the whole operating and managing process run flexibly and smoothly.

Table 15

Expected Outcomes After Implementation

Alternatives	Expected Outcomes	Indicator	Goal	Timeframe
Increase commitment in the staff	Build a positive working atmosphere	Workplace survey	Over 75% in score for more than 90% of the staff	1 year
	Increase awareness of employees about quality management system Set company-wide standards communicated throughout the organizations Build clear common goals, cohesion and motivate employees Increase overall work quality	% of people in training	Over 75% of the staff taken quality management training	1 year
Customer surveys	Build customer loyalty and customer base with a positive brand image and reputation	Customer satisfaction	Over 75% in score for more than 90% of the customer	1 year
	Increase sales and profits	% of sales	5% increase in sales	1 year
Reinforce management responsibility	Build cohesion and motivate employees Enhance team work productivity and efficiency without conflicts Eliminate misunderstandings and complaints Better communication among management and employees Have clearly defined jobs and distributed responsibilities Operating and managing process run flexibly and smoothly	Internal Audit	Over 100% in score for leadership clause	1 year
Develop a new quality policy	Provide a general idea of quality management system Build quality culture with awareness	% of people in training	Over 75% of the staff taken quality management training	1 year
	Increase overall quality of products Earn brand image and reputation of high quality standards	Customer satisfaction	Over 75% in score for more than 90% of the customer	1 year
Internal Audit	Get employees involved into discussion Have feedback before going next step Guarantee the whole operating process meet requirements and expectations Earn competitive advantages Enable external and internal conditions	Internal Audit	100% compliance of Internal Audit Schedule	1 year

Quality policy. The quality policy is the alternative with a closest relationship with the major problem, which can be seen as a fundamental solution for it. Therefore, the expect outcome here is providing a general idea of quality management system and build quality

culture for the whole organization, so that the increase the quality of products. With the certain standards and policies, it will also provide a guarantee of quality to customers in order to build a brand image and reputation of high quality standards. Quality policy can also be considered as a brand vision and mission in Trangas, which will also help of building the cohesion and common goals among employees.

Internal audit. Internal Audit is the possible solution that helps regulate and develop the whole quality culture. Since with a regular internal audit, Transgas can have a better control of its quality management system, the feedback of current conditions and the discussion of next step. It will provide a guarantee that the whole operating process in current condition meets the requirements and expectations, in order to remain the brand reputation of high quality and meet customers' satisfaction. The benefits of internal audit are not only about helping to earn competitive advantages as well as enable internal and external conditions. But also, it is helping to build cohesion among employees and letting employees get involved.

After displaying all the expected outcomes for each alternative, there is no doubt that all of them can bring the benefits which are directly related to help resolve the major problem. Apparently, each alternative can provide the solutions for more than one cause, but touch upon almost all aspects of the major problem. Therefore, it is suggested that to implement all these alternatives in appropriate steps will provide the most effective results to Transgas in current condition.

Chapter X. Conclusions and Recommendations

10.1. Conclusions

The present report reflects the results of the consulting process conducted in Transgas, which include an extensive analysis of the organization, analysis of the current situation, solution proposal and establishment of an implementation plan. As result of this process, some conclusions can be drawn from the overall experience:

1. In order to get a full understanding on the company, it is important not only to conduct a preliminary, but also to involve the personnel from the company in the process. The interviews with different members of the organization provided the team with useful information to get a fully understanding of how the company operates and all the certifications that are needed in order to conduct their business. As a result, it was possible to conduct the internal analysis that showed how that Transgas presented a small and horizontal organization with a clear separation between administrative and operational areas. It was also noticed as a part of the analysis how quality certifications played an important role in attracting and retaining clients.
2. The shipping industry presents opportunities to develop thanks to the government incentives. There few competitors for Transgas, but buyers and suppliers are in advantageous positions against them due to their size and negotiation power. In addition to that, the industry is still looking position itself as a viable option for transportation against substitutes. In this context, the correct implementation of quality management on the company becomes a necessity to satisfy client's needs.
3. Detailed analysis of Transgas showed that although the company had its certifications in place, the company did not reflect how a quality-focused company should work. The key problem lied in the not proper implementation of

the quality management system in Transgas. Thus, the company was not able to meet and surpass customer's expectation.

4. As the final proposal of the project involve the modification of the current quality management system, it becomes necessary to gain over the course of this project a great deal of knowledge on the certifications Transgas required. Because of the focus of the project, the investigation and research were mainly based on the TMSA certification and the ISO 9001 certification, specifically in the difference between its 2008 and 2015 version.
5. The evidence presented in the qualitative/quantitative analysis shows the importance of having a well-placed quality management in the company. The findings showed that where there was a lack of quality management, there was a breakdown in the overall success of the company. Also, it became apparent that the support of top management would be necessary to promote the change inside the company.
6. From the root-cause analysis, there were found several causes that are leading to the current problem at Transgas. The assessment revealed though that especially leadership, communication and a lack of procedures and implementations were the ones affecting Transgas heavily. Those three elements are key to implement a clear quality management culture.
7. The implementation of the new version of the ISO 9001 will facilitate the creation of a quality culture within the company. As the new version of this standard puts more emphasis on Leadership, this will naturally drive top management to get more involved in the organization´s QMS. As a result, this will increase the engagement of employee towards quality in the company.

8. The document proposed five alternative solutions: Increase commitment in the staff, create customer surveys, reinforce management responsibility, develop a new quality policy and establish well-grounded internal audits. Each alternatives was evaluated to determine its impact in the company and their trade-off between cost and benefits.
9. As the QMS is an integral part of the organization that needs leadership, planning, support operations, improvement and people engagement, it was decided to combine all these alternatives together into one and implement them step by step. The solution is schemed in three phases and presents communication and teamwork as the key enablers for a successful implementation.
10. The expected outcomes of the proposed solutions are mainly centered in building a quality culture in the organization, set company-wide standards and ensure that the operative processes are meeting requirements and expectations from the clients. As a result, this would help the company earn brand image and reputation as a high quality company.
11. Communication and commitment from the employees plays a key role when implementing quality management in the organization. It is no sufficient to hold the certifications or have the documentation in place. If the quality objective is not communicated through all the organization and quality does not become part of the decision making of the personnel, the benefits of a QMS are limited.

10.2. Recommendations

The report present several solutions focused on leadership that can be applied by different organizations to improve its current QMS. Firstly, the Framework for Employees Engagement and Management Responsibility provides some interesting tools to increase the engagement from employees and puts the top management as the main responsible to develop

a quality culture. Additionally, guidelines to stablish and communicate the quality policy are stated. And especial emphasis has been made in the means to communicate quality policy and objectives throughout the whole organization. Finally, the report presents a general outline of the process to prepare the company to update its ISO 9001 from the version 2008 to the 2015.

Juan Carlos Jimenez, head of Sea Crew Management Department; Gustavo Medina, DPA; and Elmer Acuña, head of Fleet Technical Management Department, should put more emphasis on measurement, controlling and improvement of its processes. The lack of information limited the level of depth in the analysis and thus, the accuracy of the conclusions made. It is suggested that the company review the documentation of all processes so it can establish principal control points. After this, the company should be able to establish its main KPI. Additionally, it is necessary to conduct weekly meetings to control the performance of those KPI and proposed detailed action plans to face any variation in the indicators.

Elmer Acuña, head of Fleet Technical Management Department, must evaluate the functioning of the software that supports its maintenance, which is called AMOS. During the interviews and through observation in the consulting process, it became apparent that the software was not fulfilling its objective of facilitating the maintenance management. Instead, it was reported that it was causing problems both in the office and the vessels. For this reason, the company should conduct a customer satisfaction and identify all the problems that users face when using the software. Then, it is necessary that the company weights the cost between addressing the problems identify and select a different software from the market.

Currently, the reach of the ISO 9001 certification only includes the administrative process of Transgas. As a result, there is certain disconnection in regard to quality topic between the operational and administrative areas. Alonso Burgos, CEO of Transgas, should evaluate the possibility to fully implement the ISO 9001 to all the processes in the

organization. Although the final certification recommended for the 2015 version is still for the administrative areas, it is necessary that the steps proposed in the final solution reach all the processes of the company. The certification process maybe longer for the operation processes but they still should follow the principles recommended by the ISO.

Along with the QMS, Corina Figueroa, head of Internal Control Management Department, needs to incorporate document management policies, which need to be supported by IT Software. The mishandling of documentation in the company limits the good performance of its processes and the creations of organizational knowledge. Cloud-based services are available to update the documentation in.

Finally, Gustavo Medina, who works as the DPA, should aligned the procedures and documentation related to safety and environment to fit the overarching structure of the ISO 9001:2015. The objective is that although quality and safety work under two different certifications, they should work under the same QMS that would allow Transgas to get a better control and continuous improvement.

References

Adab, H., Soloukdar, A., & Fahimi, M. R. (2016). Evaluation of the Results of the Establishment of Quality Management System by Using the new SBSC in Water and Wastewater Company, District 4, Tehran City. *Proceedings Of The European Conference On Management, Leadership & Governance*, 483-491.

Autoridad Portuaria Nacional. (2016). Estadísticas. Retrieve from http://www.apn.gob.pe/estadisticas.php

Autoridad Portuaria Nacional. (2016). *¿Quiénes somos?.* Retrieve from http://www.apn.gob.pe/quienes-somos.php

Bertelsmann Stiftung. (2016). BTI 2016 Peru Country Report. Retrieve from https://www.bti-project.org/fileadmin/files/BTI/Downloads/Reports/2016/pdf/BTI_2016_Peru.pdf

Bonilla, E., Díaz, B., Kleeberg, F., & Noriega, M. (2010). *Mejora continua de los procesos*. Lima, Peru: Universidad de Lima.

Brandt, C. (2016). System Sustainability. *Quality Progress, 49*(6), 22-27.

Celik, M. (2009). Designing of integrated quality and safety management system (IQSMS) for shipping operations. *Safety Science*,*47*5,69-577.

Chatzoglou, P., Chatzoudes, D., & Kipraios, N. (2015). The impact of ISO 9000 certification on firms' financial performance. *International Journal of Operations & Production Management, 35*(1), 145-174.

Chang, R. & Niedzwiecki, M. (1993). *Continuous improvement tools*. California, United States: Richard Chang Associates, Publications Division.

Chee Ming, O., Kathawala, Y., & Sawalha, N. (2015). A Model for ISO 9000 Quality Management System Maintenance. *Quality Management Journal, 22*(2), 11-32.

David Han-Min, W., & Quang Linh, H. (2014). The Relationships among Quality Management System, Knowledge Management and Organizational Performance: An Application of the Heckman Two-step Method. *Journal Of Applied Economics & Business Research*, *4*(4), 235-245.

Cheng, T. & Choy, P. (2007). Measuring Success Factors of Quality Management in the Shipping Industry. *Marit Econ Logist*, *9*(3), 234-253. Retrieve from http://dx.doi.org/10.1057/palgrave.mel.9100179

Empresa Nacional de Puertos. (2016). *La Empresa*. Retrieve from http://www.enapu.com.pe/web/contenido.php?id=1461771932

Fonseca, L. (2015). From Quality Gurus and TQM to ISO 9001:2015: A Review of Several Quality Paths. *International Journal For Quality Research*, *9*(1), 167–180.

García, J. Á., Del Río Rama, M. C., & Simonetti, B. (2016). Implementation of a quality management system in rural accommodations: perceived benefits. *International Journal Of Business & Society*, *17*(1), 63-80.

Grey, M. (2003). Home truths on the importance of shipping. *Bimco Review 2003 (under World Trade Section)*, 54-57.

Grunert, K. G., & Ellegaard, C. (1992). *The Concept of Key Success Factors: Theory and Method*. London, England: MAPP.

Guide to the Implementation of a Quality Management System for National Meteorological and Hydrological Services. (n.d.). Retrieved from http://www.wmo.int/

Heizer, J. & Render, B. (2001). *Operations management*. New Jersey, United States: Prentice Hall.

Hung, R., Lien, B., Fang, S., & McLean, G. (2010). Knowledge as a facilitator for enhancing innovation performance through total quality management. *Total Quality Management & Business Excellence*, *21*(4), 425-438.

International Organization for Standardization (2015). *"Final Draft ISO 9001:2015" Quality management systems-Requirements*. Geneva, Switzerland: ISO/IEC

ISM Code. (2016). *Imo.org*. Retrieved 14 from http://www.imo.org/en/OurWork/humanelement/safetymanagement/pages/ismcode.aspx

ISO. (2016). *The ISO Survey*. Retrieved from http://www.iso.org/iso/iso-survey

Krajewski, L., Ritzman, L., & Malhotra, M. (2007). *Operations management*. New Jersey, United States: Pearson Prentice Hall.

Lai, H., Lau, G. & Cheng, T.C.E. (2004). Quality management in logistics industry: an examination and a ten-step approach for quality implementation. *Total Quality Management, 12*(2), 147-159.

Lam, S., Lee, V., Ooi, K., & Lin, B. (2011). The relationship between TQM, learning orientation and market performance in service organisations: an empirical analysis. *Total Quality Management & Business Excellence*, *22*(12), 1277-1297.

Lee, P. K. C., To, W. M., & Yu, B. T. W. (2009). The implementation and performance outcomes of ISO 9000 in service organizations: an empirical taxonomy. *International Journal of Quality & Reliability Management, 26*(7), 646-662.

Lizarzaburu Bolaños, E. R. (2016). La gestión de la calidad en Perú: un estudio de la norma ISO 9001, sus beneficios y los principales cambios en la versión 2015. *Universidad & Empresa, 18*(30), 33-54.

Łuczak, J., & Wolniak, R. (2016). Integration of quality, environment and safety management systems in a foundry. *Metalurgija, 55*(4), 843-845.

Madar, A., & Neacşu, N. A. (2016). Quality management in shipping. Case study: Maersk Line Denmark. *Bulletin Of The Transilvania University Of Brasov, Series I: Engineering Sciences, 9*(1), 139-148.

Mak, B. L. M. (2011). ISO certification in the tour operator sector. *International Journal of Contemporary Hospitality Management, 23*(1), 115-130.

Martínez-Costa, M., Martínez-Lorente, A. R., & Choi, T. Y. (2008). Simultaneous consideration of TQM and ISO 9000 on performance and motivation: an empirical study of Spanish companies. *International Journal of Production Economics*, *113*(1), 23-39.

Medić, S., Karlović, B., & Cindrić, Z. (2016). New standard ISO 9001:2015 and its effect on organisations. *Interdisciplinary Description Of Complex Systems*, *14*(2), 188-193. doi:10.7906/indecs.14.2.8

Ministerio de Transporte y Comunicaciones. (2014). Anuario Estadístico. Retrieve from http://www.mtc.gob.pe/estadisticas/publicaciones/anuarios/ANUARIO_ESTADISTICO_2014.pdf

Ministerio de Transporte y Comunicaciones. (2015). LEY Nº 29475. Retrieve from http://transparencia.mtc.gob.pe/idm_docs/normas_legales/1_0_2870.pdf

Ministerio de Transporte y Comunicaciones. (2011). Plan de Desarrollo de los Servicios de Logística de Transporte. Retrieve from https://www.mtc.gob.pe/estadisticas/files/estudios/Diagn%C3%B3stico%20Final%20-%20Anexos.pdf

Mulhaney, A., Sheehan, J., & Hughes, J. (2004). Using ISO9000 to drive continual improvement in a SME. *The TQM Magazine, 16*(5), 325-330.

Naveh, E., & Marcus, A. (2007). Financial performance, ISO 9000 standard and safe driving practices effects on accident rate in the US motor carrier industry. *Accident Analysis & Prevention*, *39*(4), 731-742

Ositran. (2016). *¿Quiénes Somos*? Retrieve from https://www.ositran.gob.pe/nosotros/quienes-somos.html

Paraschivescu, A. O. (2016). Risk Management and Quality Management an Integrate Approach. *Economy Transdisciplinarity Cognition*, *19*(1), 55-61.

Perry Johnson Registrars, Inc (2015). *Preparing for the Change – Transition to ISO 9001:2015.* Retrieved from http://www.pjr.com/downloads/ISO%209001%20Transition%20FAQ.pdf

Porter, M. E. (2008). The five competitive forces that shape strategy. *Harvard Business Review*, *86*(1), 78-93.

Rogala, P., & Wereda, W. (2015). Factors affecting the effectiveness of internal audits of quality management system. *Hyperion International Journal Of Econophysics & New Economy*, *8*(2), 401-408.

Rowbotham, J. and Rowbotham, J. (2008). Introduction to marine cargo management. London: Informa.

SIMA. (2016). *La empresa.* Retrieve from http://www.sima.com.pe/ace_empresa.asp

Sitnikov, C. & Bocean, C. (2015). *The role of risk management in ISO 9001: 2015*. Paper presented at 9th International Management Conference: Management and Innovation for Competitive Advantage, Bucharest, Romania.

Stewart, R. (1999). Measuring service quality: current thinking and future requirements. *Marketing Intelligence & Planning*, 17(1), 21-32.

Stopka, O., Šimková, I., & Konečný, V. (2015). The Quality of Service in the Public Transport and Shipping Industry. *Nase More*, *62*126-130. doi:10.17818/NM/2015/SI7

Taheri, S. (2001) TQM & Series of ISO 9000 & ISO 14000. Teheran: New Science

Tanker Management Self-Assessment. (2016). *Oil Companies International Marine Forum*. Retrieved from https://www.ocimf.org/media/8874/TMSA.pdf

Tribe, J. (2010). Strategy for tourism. Oxford, England: Goodfellow Pub.

Transgas. (2016). Retrieved from http://www.transgas.com.pe/

UNCTAD. (2014). Development in International Seaborne Trade. Retrieve from http://unctad.org/en/PublicationChapters/rmt2015ch1_en.pdf

West, J., & Cianfrani, C. A. (2016). ISO 9001:2015-What's Vital. *Quality Progress*, *49*(9), 53-54.

Worldbank.org. (2016). Peru Overview. Retrieve from http://www.worldbank.org/en/country/peru/overview#1

Zack, M., McKeen, J., & Singh, S. (2009). Knowledge management and organizational performance: an exploratory analysis. *J Of Knowledge Management*, *13*(6), 392-409.

Zakuan, N., Yusof, S., Laosirihongthong, T., & Shaharoun, A. (2010). Proposed relationship of TQM and organisational performance using structured equation modelling. *Total Quality Management & Business Excellence*, *21*(2), 185-203.

Appendices

Appendix A: Organizational Structure of Transgas

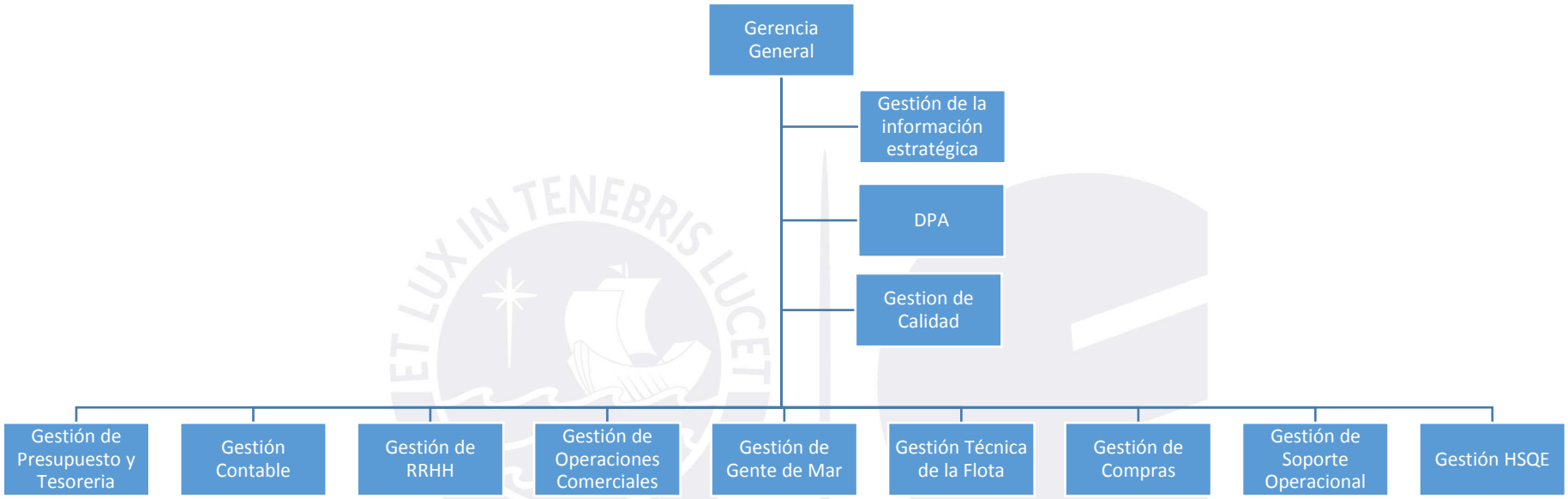

Figure A1. Organizational structure of Transgas.
Data are from "Lineamientos y Políticas de la Gestión 2016", Transgas Shipping Lines S.A.C., 2016, Lima, Peru: Author.

Appendix B: Staff's Interview

Staff Interview			Interview Summary
Name	**Position**	**Area**	- In general terms it was not clear for the personnel who were the people In charge of quality management In every area. - Although all the documentation was supposed to be available at request, it would take longer than expected to process the request or the documentation was never delivered. - Both the offices and the operations follow two different standards, which both have different focuses and reach. - There were difficulties in finding certain type of information regarding performances as it was not clear who was the person in charge of controlling one specific processes. - Information transfer was difficult due to the lack of the correct communication channels and there was a lack of transparency in controlling the good performance of the QMS in the vessels. - It was apparent that they knew the importance of the certifications and the quality management system but they would not include the principles of the ISO norm on their everyday activity.
Alonso Burgos	CEO	Gerencia General	
Corina Figueroa	Manager	Gestión de Control Interno	
Adriana Novoa	Analyst	Gestión de Control Interno	
Percy Salcedo	Analyst	Gestión de Control Interno	
Gustavo Medina	Manager	DPA	
Juan Carlos Jimenez	Manager	Gestión Gente de Mar	
Elmer Acuña	Manager	Gestión Técnica de Flota	
Richard Nomberto	Superintendent	Gestión Técnica de Flota	
Ivan Rivera	Analyst	Gestión Contable	
Mario Muñoz	Analyst	Gestión de Compras	

Figure B1. Staff's interview summary.

Appendix C: World Distribution of ISO 9001 Certificates in 2014

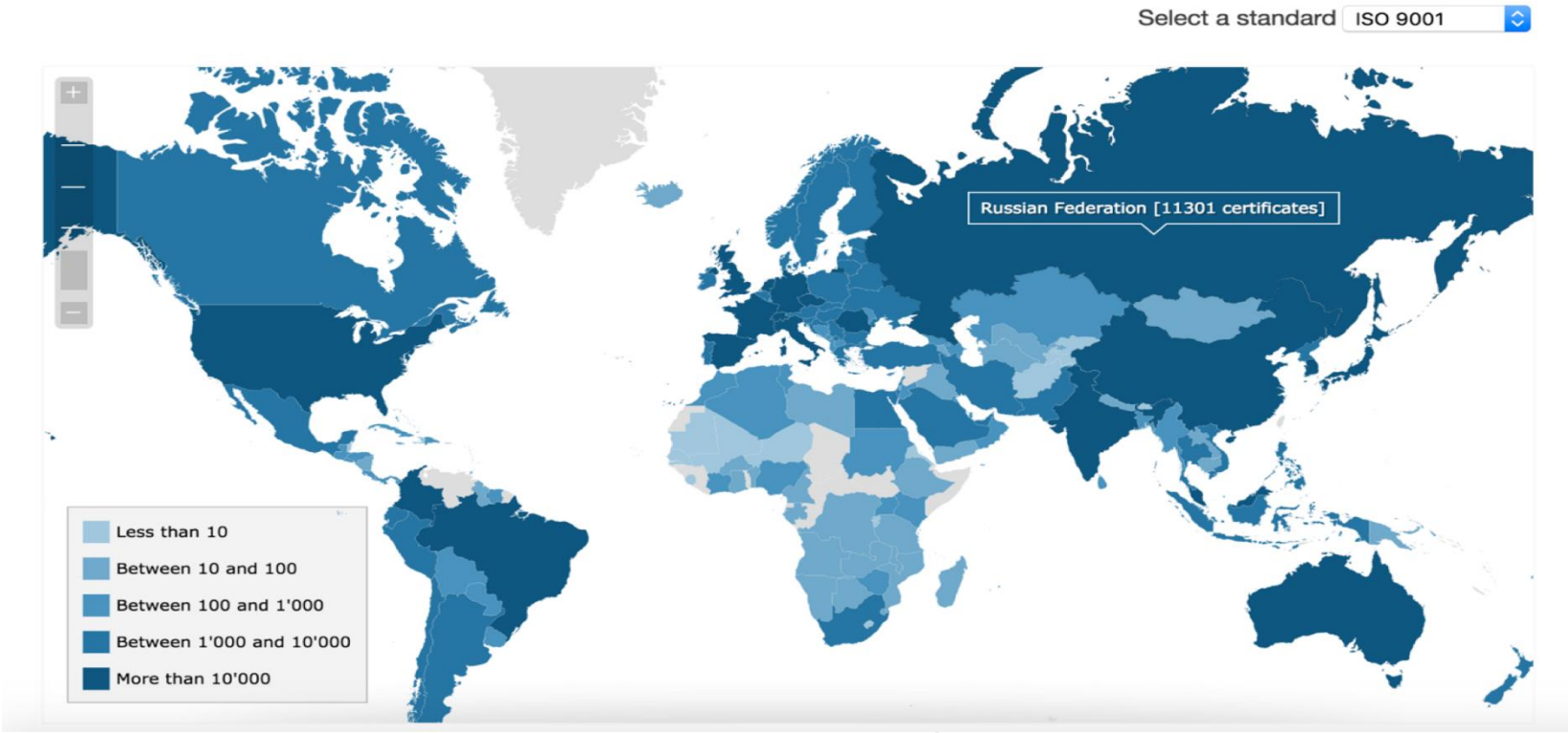

Figure C1. World distribution of ISO 9001 certificates in 2014.
Reproduce from "The ISO Survey", ISO, 2016, (http://www.iso.org/iso/iso-survey)

Appendix D: Evolution of ISO 9001 in Peru

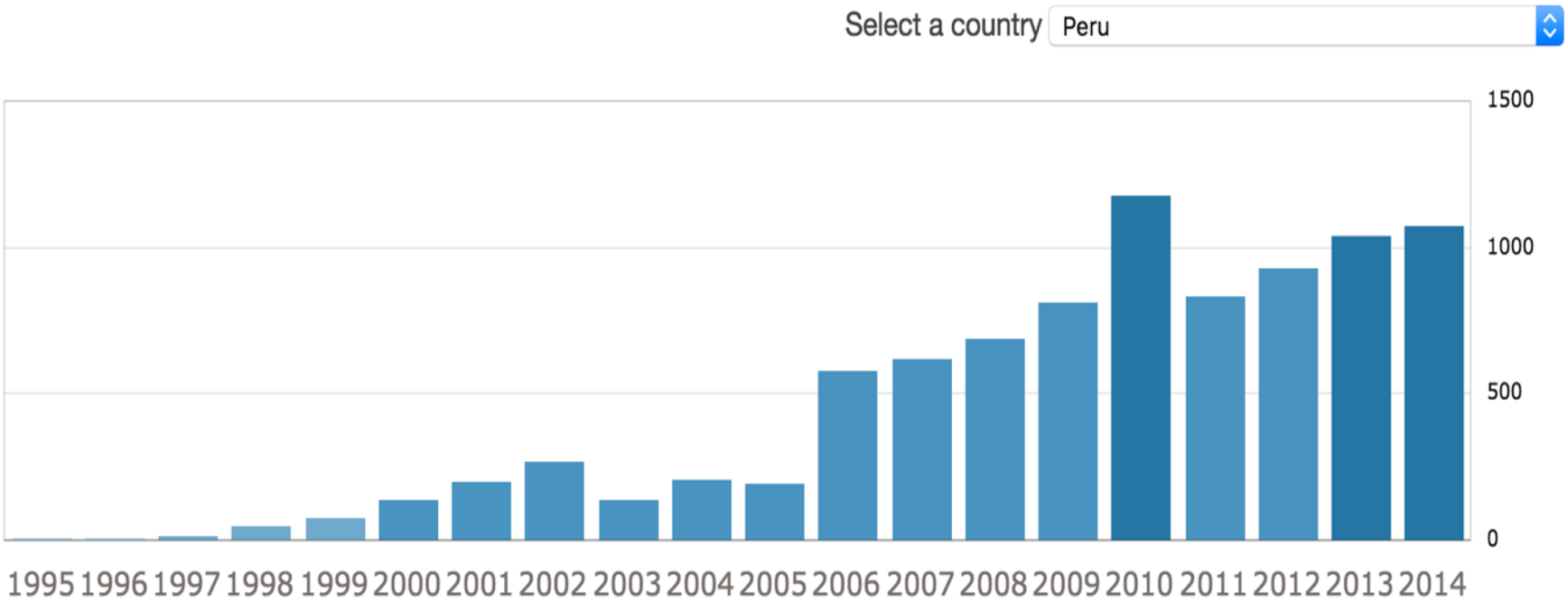

Figure D1. Number of companies with ISO 9001 certification in Peru.
Reproduce from "The ISO Survey", ISO, 2016, (http://www.iso.org/iso/iso-survey)

Appendix E: Detailed Analysis of TMSA Audits

		Leadership			Planning			Performance Evaluation	
		No Promotion Quality Mgmt. System	Lack of Commitment	Training	No Documentation	No Procedures	No Responsibilities	No Targets / Objectives / KPI's	Continuous Improvement
1	**Management, Leadership and Accountability**								
Level 3	*Vessel and shore-based management teams promote safety and environmental*	1	1						
	Safety and environmental targets and objectives are discussed at least quarterly, at management meetings on board and ashore							1	
Level 4	*Safety and environmental performance targets are monitored against KPIs*							1	
	All vessel and shore personnel demonstrate their commitment to safety and		1						
1A	**Management, Leadership and Accountability**								
Level 3	*Instructions and procedure covering shore and vessel operations are developed in consultation with those who will have to implement them*		1				1		
	Managers are clearly held accountable for achieving the objectives established for them		1				1		
Level 4	*Benchmarking is used to identify further improvements to the safety management*							1	
	Measurements are carried out regularly according to a comprehensive verification plan							1	
	Senior managers have a mechanism in place to verify the effectiveness of key areas of the safety management system					1			
2	**Recruitment and Management of Shore-Based Personnel**								
Level 4	*The company promotes appropriate interpersonal skills training*			1					

Figure E1. Checklist of the criteria not met by Transgas for TMSA´s clauses 1,1A, and 2. Number one indicates where the clause is classified in term of its impact.
Data are from "Informe de Auditoría TMSA - Transgas", Isthmus Bureau of Shipping (IBS), 2014, p.6.

		Leadership			Planning			Performance Evaluation	
		No Promotion Quality Mgmt. System	Lack of Commitment	Training	No Documentation	No Procedures	No Responsibilities	No Targets / Objectives / KPI's	Continuous Improvement
3A	**Recruitment and Management of Vessel Personnel**								
Level 3	*Training for seafares exceeds the minimum requirements of the STCW or of the relevant authority for vessel trade*								1
Level 4	*Company policy provides career opportunities for officers by providing shore-based*								
	All officers attend company.run seminars at elast once every two years			1					
4	**Reliability and Maintenance Standards**								
Level 3	*A common, computer-based maintenance system on board each vessel records all planned maintenance*				1	1			
	There is a formal shipyard repair list maintained on board and/or ashore		1		1				
	The company policy is to maintain an optimum spare parts inventory or system redundancy for all vessels				1				
Level 4	*Maintenance and defect reporting system also monitors the vessel's spares inventory and highlights any shortages*								
	The vessels maintenance and defect reporting system tracks all outstanding repair items, including dry-dock work lists				1				
	There is a company system that tracks all fleet-wide outstanding maintenance and				1				
	The maintenance plan includes proactive measures							1	1

Figure E2. Checklist of the criteria not met by Transgas for TMSA´s clauses 3A and 4. Number one indicates where the clause is classified in terms of its impact.
Data are from “Informe de Auditoría TMSA - Transgas”, Isthmus Bureau of Shipping (IBS), 2014, p.6.

		Leadership			Planning			Performance Evaluation	
		No Promotion Quality Mgmt. System	Lack of Commitment	Training	No Documentation	No Procedures	No Responsibilities	No Targets / Objectives / KPI's	Continuous Improvement
4A	**Reliability and Maintenance Standards (Critical Equipment)**								
Level 3	*Maintenance on critical equipment should follow defined procedures that include a risk assessment which requires approvals at the appropriate levels of management before*	1				1			
	If agreed shutdown period for critical equipment or systems is to be exceeded, any extensions or alternative actions will require review by shore management								
	The vessel operator identifies and documents competency standards with regard to critical equipment and systems					1			
Level 4	*No incidents or out-of service times are attributable to a failure in managing the maintenance of critical equipment or systems and associated alarms*								
	Critical equipment and systems should be treated as priority items in the fleet's planned maintenance systems								
4B	**Reliability and Maintenance Standards (Close-Out Performance)**								
	Year to date outstanding tasks are less than 6%								
5	**Navigational Safety**								
Level 3	*Vessel operator provide bridge resource management training courses for all deck officers. These courses follow a set format.*			1					
Level 4	*Electronic charts are in use aboard company vessels*				1				
	Audit reports from the fleet are analysed and actions taken to improve procedures							1	1
	Vessel operator arranges independent, random navigational reviews across the fleet to check general naviational competence					1			
	Deck officers undertake periodic bridge resource management simultor training at a recognised shore establishment			1					

Figure E3. Checklist of the criteria not met by Transgas for TMSA´s clauses 4A, 4B, and 5. Number one indicates where the clause is classified in terms of its impact.
Data are from "Informe de Auditoría TMSA - Transgas", Isthmus Bureau of Shipping (IBS), 2014, p.6.

		Leadership			Planning			Performance Evaluation	
		No Promotion Quality Mgmt. System	Lack of Commitment	Training	No Documentation	No Procedures	No Responsibilities	No Targets / Objectives / KPI's	Continuous Improvement
6	**Cargo and Ballast Operations**								
Level 3	*There is a documented system in place to ensure that junior officers/relevant vessel staff are actively involved in planning, cargo-line setting, and execution of the cargo*				1				
Level 4	*The company is actively involved with equipment manufacturers in the development of innovative technology*								
	Officers attend shore-based courses that provide interactive computer modules to ensure familiarity with operational and emergency procedures.			1					
6A	**Mooring Operations**								
Level 3	*There is a record of routine risk assessment to ensure that mooring arrangements and equipment are operated to ensure the safety of vessel personnel*				1				
Level 4	*The company has a documented process to ensure that power supplies for mooring equipment, inculding etc. are sufficient and adequately protected*				1	1			
7	**Management of Change**								
Level 3	*The system ensures that drawings, procedures and other technical documents are updated following any change or modification*								
	Procedures include provisions for the familiarisation of superintendents and crew with newly acquired vessels entering into the fleet ownership			1		1			
Level 4	*There is a documented annual review of impact of all changes to ensure objectives have*							1	
	For major changes to the shore organisation, the management of change procedures should require a detailed review of the impact on the organisation and on the		1						
7A	**Management of Change**								
Level 3	*The system ensures that the potential consequences of a change are identified, together with any required risk-reduction measures*		1						
Level 4	*The management of change system also ensures that temporary changes do not exceed the initial authorisation for scope or time without reviewing and re-approval by the appropriate level of management*						1		
	The system ensures that changed not carried out within the proposed time scale are reviewed and revalidated							1	
8	**Incident Investigation and Analysis**								
Level 4	*The vessel operator has procedures to share lessons with industry groups, where*					1			
	The vessel operator has procedures to share lessons with oil-major vetting departments, where appropriate					1			
8A	**Incident Investigation and Analysis - Training**								
Level 3	*When senior staff are recruited, they receive appropriate incident investigation training*			1					
Level4	*Procedures require that incident investigation refresher traninig takes place after an appropriate period*			1					

Figure E4. Checklist of the criteria not met by Transgas for TMSA´s clauses 6, 6A, 7, 7A, 8, and 8A. Number one indicates where the clause is classified in terms of its impact.
Data are from "Informe de Auditoría TMSA - Transgas", Isthmus Bureau of Shipping (IBS), 2014, p.6.

		Leadership			Planning			Performance Evaluation	
		No Promotion Quality Mgmt. System	Lack of Commitment	Training	No Documentation	No Procedures	No Responsibilities	No Targets / Objectives / KPI's	Continuous Improvement
9	**Safety Management – Shore Based Monitoring**								
Level 2	*Preventive measures and alternative methods of work to ensure safe completion of work are identified and documented in the risk-assessment process*	1							
	Achievable targets are set for close out of the preventive measures identified in the risk							1	
Level 3	*Shore-based management regularly reviews the validity of risk assessments and ensures that any common risk assessments are applied cross the fleet*		1			1			
	The risk-assessment processes should include response elements to limit the impact of any unplanned occurrences		1						
	Senior management established and support proactive safety campaigns		1						
	Appropriate company representatives make extended visits to all vessels within the fleet co confirm safety standards and ensure that safety training programmes are effectively						1		
Level 4	*Company management reviews and collates on-board risk assessments to check that standards are consistent*							1	
	The company issues periodic safety-related bulleting's/publications		1						
9	**Safety management – Fleet Monitoring**								
Level 3	*The vessels management team promotes a strong proactive safety culture on board, and all new crew members are encouraged to be involved in proactive safety*	1	1						
	Company safety policy ensures that senior officers and managers always lead by example in safety-related issues	1					1		
	The company sends officers and crew on safety training courses in excess of saturator			1					
	Safety best practice identified on individual vessels is transferred across the fleet								1
Level 4	*There is a system in place for vessels staff to communicate ideas for improving safety to share management*	1	1			1			1
	The company actively seeks modern safety-training material and courses that can be used for on-board and shore-based training.			1					

Figure E5. Checklist of the criteria not met by Transgas for TMSA´s clause 9. Number one indicates where the clause is classified in terms of its impact.
Data are from "Informe de Auditoría TMSA - Transgas", Isthmus Bureau of Shipping (IBS), 2014, p.6.

		Leadership			Planning			Performance Evaluation	
		No Promotion Quality Mgmt. System	Lack of Commitment	Training	No Documentation	No Procedures	No Responsibilities	No Targets / Objectives / KPI's	Continuous Improvement
10	**Environmental Management**								
Level 2	*Plans to minimise or further reduce marine and atmospheric pollution attributable to company activities are under development with defined priorities and a timescale for*								1
	The company has a clearly assigned management responsibility for each environmental						1		
Level 3	*The vessel operator has a system for auditing and reporting progress on effluent*							1	
	Pollutant reduction targets are set in the company business plan	1						1	
Level 4	*The company has environmental action plan*				1	1			
	The company has developed and maintains a long-term environmental operations and	1							
	Environmental performance is benchmarked across the fleet and against the oil/Marine industry as a whole							1	
10A	**Environmental Management**								
Level 3	*The company can demonstrate that it is taking measures the comply with known future regulations and legislation*							1	
	Waste reduction management is undertaken throughout the fleet and on all voyages								1
Level 4	*Improvements that enhance environmental performance are included into new-build design and vessel operating practices*	1							1
	The company employs/adheres to environmentally sound ship recycling practices		1						
11	**Emergency Preparedness and Contingency Planning**								
Level 4	*The company has in place necessary arrangements to use external resources in an*								
	External or additional resources are used to provide more realistic drills and exercises								
11A	**Emergency Preparedness and Contingency Planning**								
Level 3	*Exercises provide a comprehensive test of all communication and mobilisation system*			1					
	Exercises allow the participation of a significant number of individuals			1					
Level 4	*Drills and exercises test the effectivness of arrangements to call on external consultants and resources*								
12	**Measurement, Analysis and Improvement**								
Level 2	*The standard format measures the level of compliance with company and regulatory*	1				1			
Level 3	*The company analysis its inspection results and compares them with data from third-party inspections*							1	
	The company has a system that clearly demonstrates the status of recorded deficiencies through to close out				1	1			
Level 4	*Information from the analyses of these inspections is fed into a continous-improvement*								1
	The results of vessel inspections are analysed to identify trends and common problems							1	
12A	**Measurement, Analysis and Improvement**								
Level 4	*Audit results drive continuous improvement of the management system*								1
	The company identified trends by performing a formal analysis of audit results at least								1

Figure E6. Checklist of the criteria not met by Transgas for TMSA´s clauses 10, 10A, 11, 11A, 12, and 12A. Number one indicates where the clause is classified in terms of its impact.
Data are from "Informe de Auditoría TMSA - Transgas", Isthmus Bureau of Shipping (IBS), 2014, p.6.

Appendix F: Quality Management Survey

1. Liderazgo y compromiso		
1.1 General		
1	¿Existe alguien en la organización que se haga responsable por al efectividad del sistema de gestión de calidad?	Si ☐ No ☐
2	¿Ha recibido comunicación forma sobre la política de calidad y los objetivos de calidad de Transgas?	Si ☐ No ☐
3	¿En qué medida se han establecido los objetivos de gestión de calidad a nivel de departamento y individuo a lo largo de la organización?	Nula ☐ Baja ☐ Media ☐ Alta ☐ Muy Alta ☐
4	¿En qué medida Transgas ha promovido el uso de "Enfoque en Procesos" y "Pensamiento basado en riesgo"?	Nula ☐ Baja ☐ Media ☐ Alta ☐ Muy Alta ☐
5	¿Los recursos necesarios para el sistema de gestión de calidad han sido puestos a su disposición?	Si ☐ No ☐
6	¿Con qué frecuencia son comunicados los estándares de gestión de calidad a lo largo de la empresa?	Nula ☐ Baja ☐ Media ☐ Alta ☐ Muy Alta ☐
7	¿Qué tan buena es la supervisión de la gestión si se han conseguido los resultados esperados del sistema de gestión de calidad?	Nula ☐ Mala ☐ Regular ☐ Buena ☐ Muy buena ☐
8	¿Existe un responsable para asegurar la integridad de los requerimientos del sistema de gestión de calidad dentro de la organización?	Si ☐ No ☐
9	¿Qué tan bueno ha sido el papel de la administración promoviendo mejoras?	Nula ☐ Mala ☐ Regular ☐ Buena ☐ Muy buena ☐
10	¿Existe apoyo entre los roles gerencias hacia los temas de gestión de calidad?	Si ☐ No ☐
1.2 Enfoque a cliente		
1	¿Con qué frecuencia Transgas mide la satisfacción al cliente?	Nula ☐ Baja ☐ Media ☐ Alta ☐ Muy Alta ☐
2	¿Cómo se determina y dirige la capacidad de mejorar la satisfacción al cliente?	
3	¿Cómo se mantiene la satisfacción del cliente?	

Figure F1. Quality management survey for the leadership and commitment.

2. Políticas		
2.1 Desarrollo de Política de Calidad		
1	¿Se tiene una clara política de calidad?	Si ☐ No ☐
2	¿Usted cree que la política de calidad es apropiada para el propósito y contexto de la organización?	Si ☐ No ☐
3	¿La política de calidad proporciona un claro marco de referencia para establecer los objetivos de calidad?	Si ☐ No ☐
4	¿En qué medida son incluidos los requerimientos de aplicación del ISO en la política de calidad?	Nula ☐ Baja ☐ Media ☐ Alta ☐ Muy Alta ☐
5	¿En qué medida es incluido el mejoramiento continuo en la política de calidad?	Nula ☐ Baja ☐ Media ☐ Alta ☐ Muy Alta ☐
2.2 Comunicación de la Política de Calidad		
1	¿La política de calidad está claramente documentada?	Si ☐ No ☐
2	¿En qué medida la política de calidad se ha comunicado a nivel de toda la organización?	Nula ☐ Baja ☐ Media ☐ Alta ☐ Muy Alta ☐
3	¿En qué medida la política de calidad ha sido entendida y aplicada a nivel de toda la organización?	Nula ☐ Baja ☐ Media ☐ Alta ☐ Muy Alta ☐
3. Roles, responsabilidades y autoridad en la organización		
¿Hay responsabilidades y autoridades claramente definidas para:		
1	manejar activamente el sistema de gestión de calidad ISO en cada área?	Si ☐ No ☐
2	reportar el rendimiento del sistema de gestión de calidad?	Si ☐ No ☐
3	promover el enfoque al cliente a lo largo de la organización?	Si ☐ No ☐
4	asegurar que la integridad del sistema de gestión de calidad se mantenga?	Si ☐ No ☐

Figure F2. Quality management survey for policies and responsibilities.

Appendix H: Example of Job Description for Transgas

Position

- Vessel's operation Manager

Department

- Operations and management

Reports to

- CEO of Transgas

Overall Responsibility

Supervise the shipping department with all level of management regarding the staffs, the security, and the maintenance and supply delivery.

Key Areas of Responsibility

- Maintain established shipping procedures and regulation
- Maintain the level of security on the boat
- Keep a good rate of maintenance
- Managing the crews
- Be sure that the report from the captains and the crew are well done

Consults with

- CEO
- Head office staffs
- Vessels staffs
- All levels of management

Qualifications

- Strong sense of management
- Knowledge in the shipping industry

Figure H1. Example of job description for Transgas.

Appendix G: Example of Customer Survey for Transgas

Customer id.

Please indicate your industry sector:

- Commerce
- Agriculture
- Fishing
- And so on

How would you rate the professionalism of Transgas personnel?

- Highly professional
- Professional
- Unprofessional

How would you rate the responsiveness of Transgas personnel?

- Always responsive
- Mostly responsive
- Unresponsive

How would you rate the overall accuracy of the products and services?

- Always accurate
- Usually accurate
- Inaccurate

How would you rate the overall timeliness of Transgas services?

- Always on time
- Mostly on time
- Never on time

How would you rate the ease of use of Transgas services?

- Very easy to use

- Mostly easy to use
- Not easy to use

How would you rate the accessibility of Transgas services?

- Easy to access
- Mostly easy to access
- Not easy to access

Do the services provided by Transgas contribute to enhancing the economic viability of your operations?

- Always
- Mostly
- Rarely

Do the services provided by Transgas contribute to enhancing the safety of your operations?

- Always
- Mostly
- Rarely

Do the services provided meet the needs of your organization?

- Always
- Mostly
- Rarely

What impact do you believe Transgas services are having on your operations?

- Always positive
- Mostly positive
- Negligible

What is your level of overall satisfaction with Transgas services?

- Very satisfied

- Fairly satisfied
- Dissatisfied

Can you suggest ways in which we could improve Transgas services?

Appendix I: Example Questions for Internal Audit

4	QUALITY MANAGEMENT SYSTEM		
Standard clause (see ISO 9001:2008)			
4.1	GENERAL REQUIREMENTS		
1.	Have you identified all the processes and resources required to carry out the NMHS management activities, measure performance, realize its suite of products and make improvements?		
2.	Have you established methods, criteria and specific key performance indicators to ensure that each process is effective?		
3.	Where appropriate, have you documented the interactions between your NMHS processes and how they are managed and controlled?		
4.	Do you believe your processes have the appropriate level of resources?		
5.	Do you provide the appropriate level of information and instructions that the NMHS requires for its operations and monitoring?		
6.	Do you control, monitor, measure and analyse process performance?		
4.2	DOCUMENTATION REQUIREMENTS		
4.2.1	GENERAL		
7.	Do you have a list of all the documentation that the NMHS utilizes? Please provide this list.		
8.	Have you developed and documented a quality policy?		
9.	Have you identified and established the documentation and records such as e-mail policy and filing/archiving of folios that your NMHS requires?		
10.	Do the documents of your NMHS accurately reflect what you do and how you do it?		
11.	Have you considered and established the interaction and hierarchy of QMS documentation?		
4.2.2	QUALITY MANUAL		
12.	Has a quality manual been prepared for your QMS?		
13.	Does it accurately define the scope (boundary) of your QMS?		
14.	Does it justify all exclusions?		
15.	Are your NMHS procedures well documented and/or referenced in the quality manual?		
16.	Does the quality manual describe or provide a diagram depicting how the processes of your NMHS interact with one another?		
4.2.3	CONTROL OF DOCUMENTS		
17.	Do you use the quality management document control procedures for the documents of your NMHS?		
18.	Are documents approved prior to distribution or reviewed and re-approved whenever they are updated or revised? If so who approves them?		
19.	Is there a schedule for the revision of documentation and is the status specified?		
20.	Do you identify and manage documents from external sources which are required for the activities of your NMHS?		
21.	Do you ensure the provision of the correct version of QMS documents at points of use?		
22.	Do you prevent the accidental use of obsolete QMS documents?		
23.	Do you identify obsolete documents that are retained and, if so, how?		
4.2.4	CONTROL OF RECORDS		
24.	Are the records of your NMHS useable?		
25.	Are they legible?		
26.	Are they identifiable?		
27.	Are they retrievable?		
28.	Can the records of your NMHS be used as a reliable source of evidence?		
29.	Can they prove that requirements have been met?		

Figure I1. Example question for internal audit in quality management system. Reproduce from "Guide to the Implementation of a Quality Management System for National Meteorological and Hydrological Services" (http://www.wmo.int/)

5.	MANAGEMENT RESPONSIBILITY		
Standard clause (see ISO 9001:2008)			
5.1	MANAGEMENT COMMITMENT		
1.	Do you believe the top management of the NMHS fully supports the development and implementation of a QMS?		
2.	Do you believe it supports the development of a quality policy?		
3.	Do you believe it supports the development of quality objectives?		
4.	Do you believe it demonstrates its support by ensuring that resources are available for the QMS?		
5.	Do you believe it communicates how important it is to meet requirements?		
6.	Do you believe it explains why it is important to meet customer requirements?		
7.	Do you believe it explains why it is important to meet statutory and regulatory requirements?		
8.	Do you believe it supports efforts to continually improve the effectiveness of your NMHS activities?		
9.	Does it support continual improvement by conducting an adequate number of quality management reviews?		
5.2	CUSTOMERS FOCUS		
10.	Has your NMHS identified its key stakeholders and in particular its customers?		
11.	Does your NMHS enhance customer satisfaction by ensuring that customer requirements are identified and met?		
12.	Does your NMHS periodically review its customer requirements?		
13.	Does your NMHS conduct periodic customer satisfaction surveys to ensure that requirements are being met?		
5.3	QUALITY POLICY		
14.	Does your quality policy serve your NMHS overall purpose?		
15.	Does your quality policy make a commitment to continually improve the effectiveness of the QMS by meeting its objectives?		
16.	Is your quality policy communicated, discussed and understood throughout the NMHS?		
17.	Do you periodically review your quality policy to make sure that it is still suitable?		
5.4	PLANNING		
5.4.1	QUALITY OBJECTIVES		
18.	Do top managers support the establishment of quality objectives for your NMHS?		
19.	Do top managers support the establishment of quality objectives for your products?		
20.	If your NMHS has established specific organizational objectives, were they developed in collaboration with the staff?		
21.	Are the objectives of your NMHS effective and, if so, how was this established?		
22.	Are the objectives of your NMHS measurable?		
23.	Do the objectives of the NMHS support your quality policy?		
24.	Do your objectives support the objectives/targets of the NMHS strategic and operational plan?		

Figure I2. Example question for internal audit in quality management system.
Reproduce from "Guide to the Implementation of a Quality Management System for National Meteorological and Hydrological Services" (from http://www.wmo.int/)