
Quality in the supermarket sector in Peru

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Abstract: This research aims to analyse the supermarket companies in Peru that have implemented or not a quality management system (QMS), considering the total quality management (TQM) factors. The instrument includes four blocks (top management, supplier, process management and customer) and nine factors, as well as 35 variables based on a sample of 73 companies in the Peruvian supermarket sector. In this sector, companies with and without the quality management system did not have significant differences in the nine TQM factors. It is also analysed if ISO 9000:2015 principles are considered in the TQM factors and if the managers in the companies are doing what they are asked in the questionnaire. This study gives a new perception and new insights about the management of the supermarket sector in Peru in terms of quality and the important impact that this topic have in these companies. A more comprehensive exploration of supermarket's quality management in developing countries with a different perspective would be useful for enhancing the literature.

Keywords: supermarkets; quality; quality management system; QMS; total quality management; TQM; ISO 9001; HACCP; ISO 22001; management; Peru.

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1 Introduction

Quality, in general, has not been a crucial issue for business success in Peru. It was not until 1980s when quality culture began to gain relevance in the country. In the late 1990s, large companies pioneered in International Organization for Standardization (ISO) 9001 certification processes. Small and medium-sized enterprises followed this quality trend, and in mid-2002, small businesses aimed to obtain ISO certification. Small-sized enterprises benefited from the advantages of having a quality certification, such as cost reduction, improved work environment, an increase of productivity, reduction of losses, an increase of sales, among others (Benzaquen de las Casas, 2018). For this reason, consumer goods and services companies shall prioritise quality.

According to Uría (2016), the technical secretariat of the Commission for Standardization and Control of Non-tariff Trade Barriers at the National Institute for the Defence of Competition and Protection of Intellectual Property (INDECOPI) claimed that Peru and Bolivia are the two countries in Latin America that have fewer certified companies (nearly 1,000 companies). This occurs because in industries like that of mass-market products, formal businesses in Peru have a low market penetration (17% of the total sales, approximately). The rest of the sales correspond to open markets (neighbourhood markets-traditional channels) and small shops, such as convenience stores (Clasificadora de Riesgos Class & Asociados S.A., 2016). Despite this situation, in 2017, there were few companies with certified quality management system (QMS) in the country (Benzaquen de las Casas, 2018).

Sila and Ebrahimpour (2002) determined, through a work analysis from 1989 to 2000, that there are 25 success factors for total quality management (TQM). The study includes the analysis of 347 researches carried out around the world between 1989 and 2000. In 2003, a research was published on the principles and practices of the administration of the quality in China (Li et al., 2003), in which TQM instruments were considered by different authors (Ahire et al., 1996; Rughunathan et al., 1997; Sun, 2000; Zhang et al., 2000), for which they used an indicator based on 40 questions divided into eight factors that were included in a survey taken from a sample of Chinese companies. For the research, it was developed a quality measurement tool that combines the key elements identified by the aforementioned authors, with modifications to be replicated in Peru and in Latin American countries. Thus, a focus group was held with experts in the field of quality management, where key factors and variables were discussed and analysed in order to adapt them to the reality of Latin American companies. As a result of this analysis, a measurement of the implementation of quality management was established in an instrument that includes four blocks of quality (top management, supplier, process management and customer), and nine factors based in a questionnaire with 35 variables. The study included 276 supermarket companies in Peru, and considered as QMS

companies those that implemented ISO 9001, ISO 22001 or hazard analysis and critical control points (HACCP) system.

The lack of studies that link quality management practices and food quality practices in Peruvian supermarkets was one of the main motivations for doing this research. In this sense, one of the purposes of the study is to establish whether or not there are differences in the results of the TQM factors among the supermarket companies that implemented QMS and those without QMS. Also, it is important to know the level that managers in the Peruvian supermarkets are considering for the variables, factors and blocks of the instrument used. In addition, this research explores if there is a direct relation between TQM factors and principles of ISO 9000:2015 in Peruvian supermarkets. The methodology used to analyse these cases is based on the instrument developed by Benzaquen de las Casas (2015), which is an adaptation of TQM theory for Latin American companies.

2 Literature review

TQM is a concept related to the idea of quality as a factor for an organisational strategy in a firm or company. This method is based on the idea to produce high-quality products and services by a continuous improvement of inputs and process, teamwork, and customer-driven quality that enhance an organisation's overall performance [Lee and Hew, (2017), p.228]. It is characterised by being a comprehensive organisational effort related to the top management, suppliers, employees, and customers, focusing on the continuous improvement of quality in products, services and processes according to the requirements and expectations of customers (Jaca and Psomas, 2015).

The main authors or 'top quality gurus' on this field are Deming (1986), Juran and Gryna (1988) and Crosby (1979), who proposed a structured approach that integrates, facilitates and enriches the impact of using analysis and control tools (Huq and Stolen, 1998). Other important authors on this field are Feigenbaum, Ishikawa, Groocock and Taguchi [Lee and Hew, (2017), p.289]. Each 'guru' has contributed to the theory of quality with a definition and some recommendations. Deming (1986) considered that the needs of the clients define the quality, and developed 14-step guidelines as part of his philosophy, which can be apply to all kind of companies. According to Juran and Gryna (1988), quality is the client's capacity to demand some characteristics in a product or service; they identified five major dimensions of quality characteristics and recommended a ten-step process for quality improvement (Juran et al., 1974). Crosby (1979) considered quality as a medium to provide a set of standards so the company have 'zero defects', and introduced a 14-step program for quality improvement. Feigenbaum (1986) identified quality as an integral part of the day-to-day work, meanwhile, for Taguchi (1986), it was a matter of minimising the total loss imparted to society. Other contributions to quality practices are made by Ishikawa (1985) who introduced the 'quality circles' approach, and recommended seven basic tools of quality. Likewise, Groocock (1986) introduced the concept of 'chain performance' and the use of various techniques such as SPC, 'competitor quality evaluation', and 'system quality audits' [Lee and Hew, (2017), p.229].

According to Paul (1997), the TQM approach requires certain important key factors:

- a visible organisational values, principles and standards
- b an entrepreneurial orientation with a clear strategy, mission, quality policy, and objectives, with effective procedures and practices
- c clearly developed customer/supplier requirements (internal and external)
- d demonstration of all processes and their problems.

Ruiz-Canela (2004) stated that TQM refers to the strategic impact that makes a company offer a competitive advantage in order to meet and exceed customers' expectations and to make this competitive advantage profitable because of the design and implementation of efficient processes. According to Evans and Lindsay (2005, p.432), companies can face the following obstacles when implementing or maintaining TQM:

- a the absence of motivation
- b lack of time for quality initiatives
- c the absence of a formal strategic plan for changes.

Yu et al. (2017) stated that quantitative methods and human resources can help to enhance the business process and performance in order to exceed both current and future customers' needs. In addition, TQM tries to achieve long-term business success with employee feedback, to satisfy customer expectation, and to comply with governmental statutes and regulations (Peljhan and Marc, 2018).

A research of the Malaysian service sector determined that for the small service forms in Malaysia, the dimensions of TQM constructs are positively related to the learning organisation and customer orientation. The findings showed that process management and information analysis are the two essential TQM practices related to customer orientation; and for learning organisation, the most important constructs of TQM are customer focus, human resource focus and process management (Ang et al., 2011). Another research of the Malaysian commercial banking industry showed a positive relationship between TQM practices, as strategic planning, leadership, process management, customer focus, information analysis, and human resource; as well as service quality identified by the employees of the middle management (Sit et al., 2011). Darmawan et al. (2011) did a literature research on how TQM affects the supply chain collaboration level. Their research proposed a model in which TQM practices as leadership, strategic planning, customer focus, human resource focus, process management and information analysis are independent variables, while supply chain collaboration is the dependent variable. In their proposal, TQM factors and supply chain collaboration have a direct and positive relation, so if any TQM variable increases, so will increase the supply chain collaboration level.

It is important to highlight that, despite all the literature on the TQM approach, there is still no consensus on one definition. However, there are institutions that made important quality definitions, like the ones made by the ISO and the American Society for Quality (ASQ).

2.1 ISO 9001

The ISO family of standards guarantees quality and provides guidelines to improve companies' management (Ramesh and Jain, 2013). In that sense, the ISO 9000 family is

the most implemented and specifies the requirements of QMS that can be used internally to obtain certifications or for contractual purposes (INDECOPI, 2010). The 2015 version of ISO 9000 standard is based on eight principles:

- a customer focus to understand the clients' needs
- b leadership to create and maintain a conducive environment to involve all the staff
- c engage the staff to participate
- d process approach
- e system approach to management
- f continuous improvement to achieve permanent objectives
- g factual approach to decision-making based on accurate information
- h mutually beneficial supplier relationships, a win-win situation (ISO 9000:2015) (ISO, 2015).

It is important to highlight that ISO 9000 is a standard that describes the QMS principles and defines its terminology, while ISO 9001 is responsible for specifying the requirements.

ISO 9001 standards are part of the ISO 9000 family, but present the requirements to establish a QMS necessary for customer service [Sfreddo et al., (2019), p.336]. As ISO 9000, the ISO 9001 is applicable to any organisation regardless the company size or type, and it is intended to increase customer satisfaction (ISO, 2015). According to the Société Générale de Surveillance (SGS) of Peru, ISO 9001 standard allows a continuous improvement of the QMS, the organisational processes, and the operations in order to meet the customers' needs and expectations.

On the other hand, Corbett, Kirsh and Montes-Sancho (cited in Gómez et al., 2013) mentioned that the implementation of ISO 9001 requires organisational discipline, i.e., the company must design procedures to ensure a consistent quality measurement to take appropriate corrective actions when needed. A study about Malaysian companies showed that, in general, the approach based on ISO 9001 promotes the adoption of TQM practices (Al-Khalili and Subari, 2014). Sitki and Aslan (2012) carried out a study in Turkish small and medium-sized companies, and discovered that those with the ISO 9001 certification had more TQM practices than those that did not have it. Benzaquen de las Casas and Pérez-Cepeda (2016) conducted a research in 163 Ecuadorian companies to analyse the impact of the nine TQM factors. The results confirmed that companies with the ISO 9001 certification obtained better scores in the nine TQM factors analysed in the study. However, Martínez-Costa et al. (2007) found different results in studies about the effect of the ISO 9001 performance. In view of the above, this research differs from the previous ones because it includes other quality certifications, applying it to a study in the Peruvian supermarkets sector.

2.2 HACCP

In the 1960s, Pillsbury Company developed a system with the National Aeronautics and Space Administration (NASA) and the U.S. Army Laboratories, in order to ensure the safety of food preparation, handling and storage for manned space missions, which

inspired the HACCP system [Gkionis et al., (2011), p.198]. The concern about food safety, based on media reports of foodborne outbreaks, has encouraged the application of this system as a measurement of food quality [Adegoke et al., (2008), p.60].

Thus, the HACCP is a preventive system related to physical, chemical, and biological hazards and it is an internationally recognised system that can help to identify and control those hazards throughout the food chain (Musaj et al., 2017; Novakovic and Savanovic, 2017). Nowadays, the U.S. Food and Drug Administration (FDA) manages this system. The National Agricultural Health Service (SENASA, n.d.) in Peru pointed out that the HACCP is a process that identifies specific hazards and control measures in order to ensure food safety, hazard evaluation, and the implementation of control systems focused on prevention. Based on scientific evidence on human health risks, the HACCP can be applied throughout the food chain.

It should be noted that the HACCP is compatible with the ISO 9001 QMS since – in a study conducted in 1994 by experts of the Food and Agriculture Organization (FAO) of the United Nations – it was argued that the basic planning of the ISO 9001 standards is very similar to the HACCP principles. Therefore, both standards can complement each other to prevent the inadequacy of the product (p.9). In Peru, the Ministry of Health (2006), through Ministerial Resolution No. 449-2006/MINSA, approved the health regulations for implementing the HACCP system in the foods and beverages production sector. This regulation is applicable to all individuals and legal entities involved in any stage of the production or industrialisation process of food and beverages. The certification must cover each production line and each food and beverage product (*Diario Oficial el Peruano*, 2006).

In the literature, there are examples about the importance of the HACCP system implementation in the food production and supply chain. For example, a study of a typical tropical market in Nigeria (the Bodija Market) about ready-to-eat foods (RTE, street) demonstrates that the application of the HACCP system can be a useful instrument to avoid illnesses transmitted by badly handled food. The food samples analysed contained bacterial contaminants, which could produce toxins if the food was not reheated. This happens because food handlers do not have the appropriate knowledge and expertise in the application of food hygiene and good handling practices; in fact, RTE foods were prepared by hand and without sanitary practices, so the recommendation was to apply the HACCP to educate and train food handlers in good sanitary practices (Adegoke et al., 2008).

Another study relates quality attributes of halal food with the implementation of the HACCP system to improve Malaysia and United Arab Emirate standards in terms of quality production of halal meat (Al Halaseh and Sundarakani, 2012). A research on smoke salmon production in a real Sicilian industry proposed a semi-quantitative procedure based on the HACCP and the technique for order of preference by similarity to ideal solution (TOPSIS) to prioritise production process stages on the basis of their actual process. The advantages of this approach are that it offers the possibility for judges to express their judgements through opinions, as well as through scores (Certa et al., 2018).

The FDA (n.d.) mentioned that food safety management in retail includes HACCP principles and controls the industry administration. Both the industry and regulators can work together to understand the different perspectives, identify food preparation methods, and provide the service in several facilities. For this matter, the FDA developed two manuals to guide the industry.

2.3 ISO 22001

The ISO 22000 is an international standard for food safety management, which covers all stages of food chain, and includes HACCP and ISO 9001 (Euformación Consultores, 2012). The SGS (n.d.) stated that ISO 22001 certification covers all the food chain processes that influence the safety of the final product. This is the only regulation on food safety that unifies the various national standards. All companies working in the food chain – the agricultural sector and livestock, food services, processing, transportation, storage, packaging and retail – must have this certification.

SGS (n.d.) specified that companies must comply with the following requirements to obtain this certification:

- a plan, implement, operate, maintain and update the food safety management system focused on providing safe products to consumers
- b demonstrate the compliance with the applicable by-laws and regulatory requirements of food safety
- c evaluate the customer's requirements and demonstrate the compliance with the mutually approved food safety requirements to improve consumer satisfaction
- d efficiently communicate the food safety problems and incidents to the suppliers, customers, and other actors in the food chain
- e make sure that companies comply with food safety policies
- f demonstrate such compliance to any interested party
- g contact an external consultant or internal auditor to get the QMS certification.

2.4 Supermarket companies in Peru

Sánchez (2005) emphasised that quality has ceased to be a competitive element. Instead, nowadays quality is considered a component that companies need if they want to survive in the market. The main companies in the supermarket sector in Peru have a QMS. These organisations focus on ensuring that their services meet all the quality requirements of ISO 9001, ISO 22001, or HACCP certifications.

Chevarría (2007) stated that, in Peru, Supermercados Peruanos was the only supermarket chain that had the ISO 9001 certification. This creates a series of benefits for the company and customers; therefore, supermarkets have the opportunity to manage an efficient plan of continuous improvement for the QMS. The implementation of a HACCP system allows companies to ensure quality in their production lines. In this sense, the Ministry of Health (2006) mentioned that all individuals and legal entities involved in any process of manufacturing, processing or industrialisation of food and beverages to be consumed in the country or abroad are obliged to comply with the HACCP to ensure the sanitary quality and safety of such products for human consumption. For this reason, the government collaborated to increase the level of quality in companies, including supermarkets, which have several production lines of food and beverages.

Supermarkets should have food safety policies to make sure that the product will not affect the customers' health. Several organisations, such as SGS or the General Bureau of Environmental Health (DIGESA), provide the internationally renowned authorisations.

Perú Retail (2013) mentioned that the IFH Group supermarket chain includes the following brands: Plaza Vea, Súper Vea and Vivanda. SGS issued HACCP certification to these supermarkets, which are the only certified companies in the country. These supermarkets are one of the few in the world that achieved this certification in all their production processes: bakery, pastry, prepared meals, cold meats, dairy products, meat, fish, fruits and vegetables. In addition, Equilibrium Clasificadora de Riesgos S.A. (2013), a risk assessment company, stated that Supermercados Peruanos S.A. also obtained the ISO 9001 and ISO 22001 certifications.

The supermarket industry in Peru is divided in three major clusters:

- a Cencosud Peru: Wong and Metro supermarkets
- b Falabella Group: Tottus
- c IFH Group: Supermercados Peruanos with Plaza Vea, Vivanda, Mass and Economax.

This paper also includes supermarkets (retail stores) located in different regions of the country (see Appendix A). The Institute of Economics and Business Development (IEDEP, in Spanish) and the Lima Chamber of Commerce (cited in *América Economía*, 2016) informed that the market penetration rate for supermarkets in Peru is 15% (27% in Lima). This percentage is compared to that of other Latin American cities, such as Bogotá (70%) in Colombia, Santiago (80%) in Chile, and Rio de Janeiro (80%) in Brazil. The types of supermarkets in Peru are hypermarkets; supermarkets and shops. Appendix B includes the characteristics of these types of supermarkets.

Coloma (2011) stated that the strategy of Wong and Metro evolved from investing in mass media to a more specialised segmentation. The companies differentiated customers based on their socio-economic level and lifestyles. Wong uses direct or relationship marketing, i.e., the company treats the client individually and distributes customised catalogues. Metro uses mass marketing to position itself as a company with the lowest prices and good client experience. Perú Retail (2017) stated that Supermercados Peruanos is focused on training their staff, which leads to better customer service. In addition, the company is individually positioned in other cities, which helps it to lead the sector. According to the *Reporte de Sostenibilidad* (2016, p.63) of Tottus, it “tries to anticipate the needs of increasingly demanding and informed consumers in order to provide them with an appropriate service”, exceed their customer’s expectations, and ensure a pleasant purchase experience. According to Arellano Marketing (2015), Metro is the most remembered brand nationwide (90%), followed by Plaza Vea (88.7%) and Tottus (78.3%).

For the supermarket sector, the location is very important (Rajadell and Sánchez, 2010). A supermarket must be located where the consumer can buy what they need whenever they can. From a seller’s point of view, workers do not lose time transporting goods from door to door, and the buyer does not have to worry if more items are bought (Rajadell and Sánchez, 2010). According to an Equilibrium Clasificadora de Riesgos S.A.’s (2013) analysis, the infrastructure of supermarkets is mainly aimed to “show the available supply to the consumers, who resort to the self-service system and pay for the products at the cash registers located near the store’s exit.”

Barnett (2016) argued that the supermarket sector in Peru is growing. The sales volume in this sector increased 17% in 2012. Business Monitor International affirmed that, from 2012 to 2016, supermarkets achieved an annual growth rate of 15.1%.

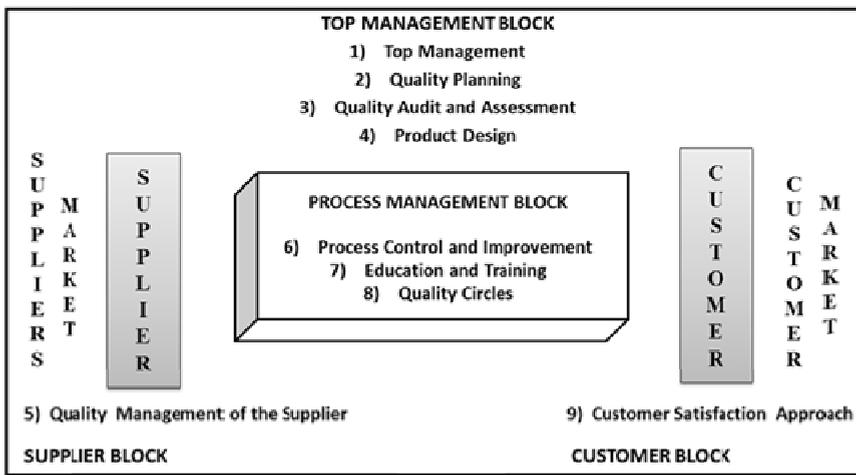
Cencosud Peru, Tottus, Supermercados Peruanos, Makro, and Mayorsa use e-commerce to increase their market share, reach more customers around the country, and increase their profitability. Laudon and Laudon (2012) stated that e-commerce entailed commercial transactions involve the exchange of money for a product or service to generate a greater flow and interaction between the company and the buyer. Most of the studied companies have implemented an ERP system, such as the SAP or EDI. These systems, according to Cuba (2006), help integrating information across the organisation, and automating their operations and main processes in order to improve decision-making and to reduce costs.

3 Research methodology

This quantitative research collected primary information to study how many elements of a population have a specific characteristic, the number of consumers, the strategies, etc. (Quijano, 2009). In this paper, we analyse them in four blocks (Figure 1) and the description of each factor is shown in Table 1.

As previously mentioned, the instrument used in this research was based on the concepts of Deming, Juran and Crosby, and the research of Li, Alistair and Harrison, and Ahire, Raghunathan, Zhang, Sila and Ebrahimpour about TQM success factors. The information of the key elements identified by the aforementioned authors about TQM, was combined to develop an instrument, with some modifications to be applied in Peru and other Latin American countries. Thus, a focus group was held with some experts in quality management, where the key factors and variables were discussed and analysed in order to adapt them to the context of the Latin American companies. The resultant instrument is the basis for implementing a continuous improvement and quality strategy for companies.

Figure 1 Nine-factor model of TQM in business



Source: Benzaquen de las Casas (2015)

Table 1 Nine TQM factors in business

<i>Block</i>	<i>Factor</i>	<i>Description</i>
Top management	Top management	Contributes to quality management and engages the institution in order to achieve the organisational goals
	Quality planning	Analyses if there are specific and detailed goals related to quality management
	Quality audit and assessment	Follows up on quality management goals
	Product design	Adopts innovation as a differentiating aspect in the environment
Supplier	Quality management of the supplier	Measures the level of the suppliers' quality management systems and the subsequent impact on the offered goods or services
Process management	Process control and improvement	Verifies if the operating process meets the clients' requirements and if the facilities and operating equipment are functioning properly
	Education and training	Measures the training, the quality management tools and the workers' commitment to the quality system
	Quality circles	Promotes organisational communication, teamwork and measures the frequency and impact on business performance
Customer	Customer satisfaction approach	Measures the level of customer satisfaction with respect to the offered goods or services and the manner in which these needs are met

Source: Retrieved from Benzaquen de las Casas (2015)

4 Questions and research hypothesis

Theories are a set of principles that help researchers describe and predict events. A scientific theory has the additional feature of allowing testable hypotheses to be generated from it. A scientific theory must have enough specificity and clarity for the theory to be testable. A research question (Q) lies between a theory, which is very broad, and a hypothesis (H), which is very precise [Vanderstoep and Johnson, (2008), p.4].

Q Do Peruvian supermarket companies that implemented QMS have significant differences in TQM factors compared with companies that did not implement it?

In order to answer the research question, it was used a methodology to compare two groups of companies. One group was integrated by Peruvian supermarkets that implemented QMS, considering any company which has implemented ISO 9000, ISO 22001 or HACCP system, and the other group was composed by supermarkets without a QMS system, i.e., without a quality certification. Thus, the first step was to measure the distribution of the data based on the Kolmogorov-Smirnov test to determine if there is a normal distribution or not. According to the results obtained, a statistical test was applied to determine if there is a significant difference between both groups (U de Mann-Whitney or Kruskal-Wallis test). According to Vanderstoep and Johnson

(2008, p.5), hypotheses are specific predictions about what will happen according to the theory. The main resultant hypotheses were:

H Peruvian supermarket companies that implemented QMS obtain significant differences in TQM factors compared with companies that did not implement the QMS.

U de Mann-Whitney significance < 0.05 .

H₀ Peruvian supermarket companies that implemented QMS do not obtain significant differences in TQM factors compared with companies that did not implement the QMS.

U de Mann-Whitney significance > 0.05 .

The following hypotheses were formulated according to Benzaquen de las Casas' (2015) nine-factor instrument developed to measure TQM in a company:

Q1 Do Peruvian supermarket companies that implemented QMS have significant differences in the top management factor compared with companies without QMS?

This question aims to establish if Peruvian supermarket companies which implemented QMS have significant differences in the performance and practices of top management related to their involvement to accomplish a better quality management. Five variables were evaluated in order to measure company's Top management performance:

- 1 actively involvement in company's quality management
- 2 encouragement to employees' involvement in quality management
- 3 organisation of regular meetings basis to discuss issues related to quality management
- 4 providing of appropriate resources to increase quality level of the company
- 5 projecting long-term objectives of success for the company.

The results on these five variables constitute the top management factor evaluated in Peruvian supermarket companies. It resultant scores will be examined with U de Mann-Whitney test to compare the group that implemented QMS with the group that did not, and establish if there are significant differences. The research hypotheses in this question are below:

H1 Peruvian supermarket companies that implemented QMS have significant differences in the top management factor compared with companies without QMS.

U de Mann-Whitney significance < 0.05 .

H₁₀ Peruvian supermarket companies that implemented QMS do not have significant differences in the top management factor compared with companies without QMS.

U de Mann-Whitney significance > 0.05 .

Q2 Do Peruvian supermarket companies that implemented QMS have significant differences in the quality planning factor compared with companies without QMS?

This question aims to establish if Peruvian supermarket companies which implemented QMS have significant differences in the performance of quality planning factor, related to the develop of policies and strategies to accomplish a better quality management. Three variables were evaluated in order to measure company's quality planning performance:

- 1 developing specific and detailed quality goals
- 2 inspection on success and compliance with quality policies and plans
- 3 employees involvement on development of quality policies and plans.

The results on these three variables constitute the quality planning factor evaluated in Peruvian supermarket companies. The resultant scores will be examined with U de Mann-Whitney test to compare the group that implemented QMS with the group that did not, and establish if there are significant differences. The research hypotheses in this question are below:

H2 Peruvian supermarket companies that implemented QMS have significant differences in the quality planning factor compared with companies without QMS.

U de Mann-Whitney significance < 0.05 .

H2₀ Peruvian supermarket companies that implemented QMS do not have significant differences in the quality planning factor compared with companies without QMS.

U de Mann-Whitney significance > 0.05 .

Q3 Do Peruvian supermarket companies that implemented QMS have significant differences in the quality audit and assessment factor compared with companies without QMS?

This question aims to establish if Peruvian supermarket companies which implemented QMS have significant differences in the performance of quality audit and assessment factor, related to the regulation of company's policies and quality plans. Three variables were evaluated in order to measure company's quality audit and assessment performance:

- 1 regular evaluation in company's quality policies and plans
- 2 using of benchmarking
- 3 obtaining objective data for decision-making.

The results on these three variables constitute the quality audit and assessment factor evaluated in Peruvian supermarket companies. Its resultant scores will be examined with U de Mann-Whitney test to compare the group that implemented QMS with the group that did not, and establish if there are significant differences. The research hypotheses in this question are below:

H3 Peruvian supermarket companies that implemented QMS have significant differences in the quality audit and assessment factor compared with companies without QMS.

U de Mann-Whitney significance < 0.05 .

H3₀ Peruvian supermarket companies that implemented QMS do not have significant differences in the quality audit and assessment factor compared with companies without QMS.

U de Mann-Whitney significance > 0.05.

Q4 Do Peruvian supermarket companies that implemented QMS have significant differences in the product design factor compared with companies without QMS?

This question aims to establish if Peruvian supermarket companies which implemented QMS have significant differences in the performance of product design factor, related to taking into account the client requirements or necessities to develop a quality product. Three variables were evaluated in order to measure company's product design factor performance:

- 1 investment in design
- 2 consideration of customer's requirements
- 3 having a methodology to developing a designing in the product.

The results on these three variables constitute the product design factor evaluated in Peruvian supermarket companies. Its resultant scores will be examined with U de Mann-Whitney test to compare the group that implemented QMS with the group that did not, and establish if there are significant differences between each group. The research hypotheses in this question are below:

H4 Peruvian supermarket companies that implemented QMS have significant differences in the product design factor compared with companies without QMS.

U de Mann-Whitney significance < 0.05

H4₀ Peruvian supermarket companies that implemented QMS do not have significant differences in the product design factor compared with companies without QMS.

U de Mann-Whitney significance > 0.05.

Q5 Do Peruvian supermarket companies that implemented QMS have significant differences in the quality management of the supplier factor compared with companies without QMS?

This question aims to establish if Peruvian supermarket companies which implemented QMS have significant differences in the performance of quality management of the supplier factor, related to the relationship between the company and their suppliers. Four variables were evaluated in order to measure company's quality management of the supplier factor performance:

- 1 long-term cooperative relationship with suppliers
- 2 suppliers with quality products
- 3 detailed information of suppliers' performance in quality terms
- 4 evaluation or audits suppliers.

The results on these four variables constitute the quality management of the supplier factor evaluated in Peruvian supermarket companies. Its results will be examined with

U de Mann-Whitney test to compare the group that implemented QMS with the group that did not, and establish if there are significant differences between each group. The research hypotheses in this question are below:

H5 Peruvian supermarket companies that implemented QMS have significant differences in the quality management of the supplier factor compared with companies without QMS.

U de Mann-Whitney significance < 0.05 .

H5₀ Peruvian supermarket companies that implemented QMS do not have significant differences in the quality management of the supplier factor with companies without QMS.

U de Mann-Whitney significance > 0.05 .

Q6 Do Peruvian supermarket companies that implemented QMS have significant differences in the process control and improvement factor compared with companies without QMS?

This question aims to establish if Peruvian supermarket companies which implemented QMS have significant differences in the performance of process control and improvement factor, related to the operating process management in the companies. Five variables were evaluated in order to measure company's process control and improvement factor performance:

- 1 meeting customer's requirements in regard to delivery time
- 2 properly operational team work thank to the facilities and physical layout gave by the company
- 3 maintaining the operating equipment properly
- 4 using the seven tools of quality control on the process to control and improve it
- 5 implementing effectively quality control.

The results on these five variables constitute the process control and improvement factor evaluated in Peruvian supermarket companies. Its results will be examined with U de Mann-Whitney test to compare the group that implemented QMS with the group that did not, and establish if there are significant differences between each group. The research hypotheses in this question are below:

H6 Peruvian supermarket companies that implemented QMS have significant differences in the process control and improvement factor compared with companies without QMS.

U de Mann-Whitney significance < 0.05 .

H6₀ Peruvian supermarket companies that implemented QMS do not have significant differences in the process control and improvement factor compared with companies without QMS.

U de Mann-Whitney significance > 0.05 .

Q7 Do Peruvian supermarket companies that implemented QMS have significant differences in the education and training factor compared with companies without QMS?

This question aims to establish if Peruvian supermarket companies which implemented QMS have significant differences in the performance of education and training factor, related to the company's ability to provide training and development to its staff. Four variables were evaluated in order to measure company's education and training factor performance:

- 1 giving quality education and training to the majority of employees
- 2 employees' capacity to using tools for the quality management
- 3 employees' awareness in quality
- 4 involving employees actively in quality-related activities.

The results on these four variables constitute the education and training factor evaluated in Peruvian supermarket companies. Its results will be examined with U de Mann-Whitney test to compare the group that implemented QMS with the group that did not, and establish if there are significant differences in the score obtained by each group. The research hypotheses in this question are below:

H7 Peruvian supermarket companies that implemented QMS have significant differences in the education and training factor compared with companies without QMS.

U de Mann-Whitney significance < 0.05 .

H₇₀ Peruvian supermarket companies that implemented QMS do not have significant differences in education and training factor compared with companies without QMS.

U de Mann-Whitney significance > 0.05 .

Q8 Do Peruvian supermarket companies that implemented QMS have significant differences in the quality circles factor compared with companies without QMS?

This question aims to establish if Peruvian supermarket companies which implemented QMS have significant differences in the performance of quality circles factor, related to the company's ability to use this tool which helps to identify problems and opportunities to improve, and to recommend solutions for implementing in future. Four variables were evaluated in order to measure company's education and training factor performance:

- 1 company's ability to perform quality circles
- 2 using quality circles to reduction of costs
- 3 using proper tools to perform quality circles
- 4 employees' capacity to perform quality circles activities.

The results on these four variables constitute the quality circles factor evaluated in Peruvian supermarket companies. Its results will be examined with U de Mann-Whitney test to compare the group that implemented QMS with the group that did not, and

establish if there are significant differences in the score obtained by each group. The research hypotheses in this question are below:

H8 Peruvian supermarket companies that implemented QMS have significant differences in the quality circles factor compared with companies without QMS.

U de Mann-Whitney significance < 0.05 .

H8₀ Peruvian supermarket companies that implemented QMS do not have significant differences in the quality circles factor compared with companies without QMS.

U de Mann-Whitney significance > 0.05 .

Q9 Do Peruvian supermarket companies that implemented QMS have significant differences in the customer satisfaction approach factor compared with companies without QMS?

This question aims to establish if Peruvian supermarket companies which implemented QMS have significant differences in the performance of customer satisfaction approach factor, related to the company's give importance to satisfy the requirement and necessities of their clients. Four variables were evaluated in order to measure company's customer satisfaction approach factor performance:

- 1 having means to obtain information about the customers
- 2 paying attention to information of the customer complaints
- 3 conducting an annual customer satisfaction survey
- 4 carrying out a general assessment of customer requirements.

The results on these four variables constitute the customer satisfaction approach factor evaluated in Peruvian supermarket companies. Its results will be examined with U de Mann-Whitney test to compare the group that implemented QMS with the group that did not, and establish if there are significant differences in the score obtained by each group. The research hypotheses in this question are below:

H9 Peruvian supermarket companies that implemented QMS have significant differences in the customer satisfaction approach factor compared with companies without QMS.

U de Mann-Whitney significance < 0.05 .

H9₀ Peruvian supermarket companies that implemented QMS do not have significant differences in the customer satisfaction approach factor compared with companies without QMS.

U de Mann-Whitney significance > 0.05 .

5 Population and sample selection

The study population included 276 companies from the supermarket sector in Peru (see Appendix A). The sample consisted of 73 companies. The probability sampling method in this study has a 10% margin of error and a 95% confidence level.

Hernández et al. (2010) stated that the reliability of a questionnaire varies according to the number of items included in the measuring instrument. We used Cronbach's alpha coefficient to measure reliability and the Statistical Package of the Social Sciences (SPSS). Malhotra (2008, p.285) said that this coefficient "varies from 0 to 1. A value equal to 0.7 is acceptable, and less than 0.6 usually indicates unsatisfactory reliability of internal consistency." Table 2 shows the results of Cronbach's alpha coefficient.

Table 2 Results of Cronbach's alpha

<i>Factor</i>	<i>Cronbach's alpha</i>	<i>No. questions</i>
Top management (X ₁)	0.773	5
Quality planning (X ₂)	0.771	3
Quality audit and assessment (X ₃)	0.760	3
Product design (X ₄)	0.882	3
Quality management of the supplier (X ₅)	0.791	4
Process control and improvement (X ₆)	0.794	5
Education and training (X ₇)	0.823	4
Quality circles (X ₈)	0.849	4
Customer satisfaction approach (X ₉)	0.700	4

6 Result analysis

In this study, we considered that companies implemented a QMS if the organisations obtained ISO 9001 and/or ISO 22001 and/or HACCP certification, 58 (79.5%) companies implemented a QMS.

The survey results showed the following characteristics:

- All the companies (100%) were private.
- 80.8% of the participants are located in Lima and Callao, while 19.2% are in other regions.
- 83.6% of the surveyed companies have more than 200 employees.
- The answer is from area manager, head of department or store manager (61.6%) and others (38.4%) answered the survey.
- 87.6% of companies have more than 11 years of operation.

The Universidad de Valencia de España (2010) mentioned that the Kolmogorov-Smirnov test measures the consistency between the distribution of a dataset and a normal distribution. In this sense, SPSS was used to determine if the sample has a normal distribution. Kolmogorov-Smirnov test results showed that the significance level was less than 0.05; therefore, the sample does not have a normal distribution. For this reason, we conducted the U Mann-Whitney test. If the significance level is less than 0.05, then there is a significant difference. The test results showed that there were no significant differences in the nine TQM factors (see Appendix C). The differences were only marginal. Since there were no significant differences, the companies with and without a QMS will be considered in one group.

With the results obtained from the sample, it would be important to verify if the principles of ISO 9000 are considered in the TQM factors in the Peruvian supermarket sector. It is also important to know the level of implementation of the blocks, factors and variables of the instrument. The answers of the variables (questions) that are in Appendix D were classified based on a five-point scale (1 = totally disagree, 2 = disagree, 3 = neutral, 4 = agree and 5 = totally agree). To classify the implementation, the values from 4 to 5 mean that managers are doing what they are asked to do; the values equal or higher than 3.5 mean that the manager tends to do it; values lower than 3.5 mean that managers tend not to do it, and the values 1 and 2 mean that managers are not doing it.

Then, we will analyse each block and the factors. The best five average factors were the following:

- a top management
- b quality management of the supplier
- c quality planning factor
- d quality audit and assessment factor
- e customer satisfaction approach factor.

Since approximately 80% of the sample had a QMS, the relationship of TQM factors and the principle of ISO 9000:2015 will be discussed in each factor. It should be noted that all factors are above 4.00 (according to the Likert scale values). This means that the responses showed that companies strive to maintain the internationally accepted levels of quality. Appendix D shows the nine TQM factors and their variables (questions) results.

6.1 Top management block

- Top management: The U de Mann-Whitney test demonstrates with a significance of 0.764, the null hypothesis (H_0) is accepted. This means that there are no significant differences between companies that implemented a QMS with companies without QMS in the top management factor. However, this factor obtained a high value throughout the sample with an average of 4.44, which means that top management plays an important role in achieving organisational objectives. Supermarkets promote long-term success, and without the top management's support, any initiative could fail. ISO 9000:2015 mentioned top management as a fundamental QMS. It helps to generate an appropriate environment with employees, who are involved in the company and its quality and ensures QMS's effectiveness. The top management allocates the necessary resources involving all the organisation levels, promoting the quality policy and objectives (ISO, 2015). Top management also aims to comply with good practices to be more competitive. Top managers know the importance of allocating the necessary resources to increase quality. The leadership principle means that leaders define the organisation's objectives and direction (ISO, 2015).
- Quality planning: The U de Mann-Whitney test demonstrates with a significance of 0.706, the null hypothesis (H_0) is accepted. This means that there are not significant differences between companies that implemented a QMS with companies without QMS in the quality planning factor. In average, including all the supermarket

companies, this factor obtained a high value of 4.53. This might be the result of the plans, policies and a clearly defined process that QMS requires. Since the majority of surveyed companies are asset-heavy and large-sized enterprises, they prioritise the planning processes. This TQM factor is related to the QMS principle that identifies and manages the business processes. The results showed that it is important to involve the employees in the development of quality policies and plans.

- **Quality audit and assessment:** The U de Mann-Whitney test demonstrates with a significance of 0.620, the null hypothesis (H_0) is accepted. This means that there are not significant differences between companies who implemented a QMS with companies without QMS in the quality audit and assessment factor. This factor obtained also a high average value of 4.31. The result is similar to the quality planning factor because audits measure the implementation of quality planning. In ISO 9000:2015, a fundamental of QMSs related to this factor is audited. It is used to know to what extent the requirements of the QMS are fulfilled. The results of the audit are used to evaluate the QMS' effectiveness and to identify opportunities for enhancement (ISO, 2015). The companies constantly follow-up their plans, policies, and processes. This TQM factor can relate to two quality principles: the continuous improvement and factual approach for decision-making. The results showed that it would be important to use more benchmarking in the supermarket sector.
- **Product design:** The U de Mann-Whitney test demonstrates with a significance of 0.133, the null hypothesis is accepted. This means that there are not significant differences between companies who implemented a QMS with companies with companies without QMS in the quality audit and assessment factor. This factor obtained the lowest value of all factors with a score of 4.04, but the result means that managers are still doing what they are asked to do. This might be due to the fact that the customers' needs must be transformed into the logistics-commercial service which must be properly designed. In addition, companies aim to differentiate from the competition through innovation. They must invest in benchmarking and then put the international standards into practice in Peru. Finally, supermarkets must invest and strengthen the planning and design of the product considering the customers' demands. The companies are related to the principle of customer focus since it is important to meet the requirements.

In this block, that considers the top management, quality planning, quality audit and assessment and product design factors, the average score of all this factors is 4.51. This means that managers are doing what they are asked to do in the top management block.

6.2 *The suppliers block*

- **Quality management of the supplier:** The U de Mann-Whitney test demonstrates with a significance of 0.899, the null hypothesis is accepted. This means that there are not significant differences between companies who implemented a QMS with companies without QMS in the quality management of the supplier factor. The highly similar values determine that having a QMS is not important in supermarket Peruvian companies to ensure a good management of the supplier. This factor obtained an average score of 4.35, which might be a result of the importance given by supermarkets to purchase management processes and suppliers' compliance with

trade agreements. If the same suppliers supply the main supermarket chains, then the quality conditions are similar. The ISO (2015) mentioned a mutually beneficial supplier relationships' principle that is related to this factor: an organisation and its suppliers have a mutually beneficial relationship that improves the capability of both, and therefore, create value.

The results showed that supermarkets focus on the quality of the materials provided by suppliers, which is in compliance with the QMS standard related to the procurement process. The standard states that suppliers must be evaluated and selected based on their ability to supply products in compliance with the company's requirements. In this block, it means that managers are doing also what they are asked to do.

6.3 The process management block

- **Process control and improvement:** The U de Mann-Whitney test demonstrates with a significance of 0.439, the null hypothesis is accepted. This means that there are not significant differences between companies who implemented a QMS with companies without QMS in the process control and improvement factor. This factor obtained an average score of 4.20 points, including Peruvian supermarkets with and without a QMS. It is related to the continuous improvement in all the areas or process of the organisation, from planning to process execution and control. The surveyed companies obtained a high value, which means that they are doing it, in the variable related to the delivery time set by the client. This might mean that it is essential to meet the deadlines set by the clients.

In addition, this factor is related to two ISO 9000:2015 quality management principles, specifically, to the process approach and continual improvement. On one hand, in order to work effectively, companies have to recognise and be able to handle numerous interrelated and interacting processes. On the other hand, continual improvement principle includes analysing, evaluating the actual situation in order to recognise areas for improvement and search for a solution. However, the main objective of this principle is to satisfy customer needs based on continuous improvement (ISO, 2005).

- **Education and training:** The U de Mann-Whitney test demonstrates with a significance of 0.717 the alternative hypothesis (H_1) is rejected. This means that the null hypothesis is true, and there are not significant differences between companies who implemented a QMS with companies with companies without QMS in the process control and improvement factor. This factor obtained one of the lowest values with an average of 4.10 points, including Peruvian supermarkets which implemented or not a QMS. Supermarket companies shall have trained and motivated their staff in order to comply with the guidelines and parameters required by the quality standards. This is considered one of the most important factors for maintaining optimal QMS. It also promotes a greater commitment to and involvement in quality practices. The variable: 'The majority of the company employees are able to use the tools for the quality management' obtained the lowest value in this factor. This result might mean that supermarkets do not prioritise the training and education of the employees in using the right quality tools.

- Quality circles: The U de Mann-Whitney test demonstrates with a significance of 0.336, the null hypothesis (H_0) is accepted. This means that there are not significant differences between companies who implemented a QMS with companies who did not in the quality audit and assessment factor. However, despite the insignificant differences, the data results demonstrates that implementing a QMS helps to get a higher score in the present factor compared with not implementing a QMS.

It is important to note that this factor obtained one of the lowest average values in the nine TQM factors, with a 4.08 score which includes Peruvian supermarket companies with and without a QMS. Supermarket companies shall maintain constant communication to translate the concept of quality into the organisational culture. In fact, the internal variable of employees' participation is the lowest, which implies that quality circles are not being fully implemented. It is important to consider it because employees' participation enhances communication and teamwork, and it is useful to identify problems and recommend solutions. The highest variable of this factor was 'The company is trained to perform quality circles'. Hence, even though companies are trained to perform quality circles, they do not use this tool very often.

In this block, that considers the process control and improvement, education and training and quality circles factors, the average of 4.13 means that managers are doing what they are asked to do.

6.4 *Customers' block*

- Customer satisfaction approach: The U de Mann-Whitney test demonstrates with a significance of 0.765, the null hypothesis (H_0) is accepted. This means that there are not significant differences between companies which implemented a QMS with companies which did not in the quality audit and assessment factor. This factor obtained one of the highest values with an average score of 4.30. The principal reason of this high result is because customer satisfaction is the *raison-d'être* of supermarkets. This factor is related to one of the quality management principles of ISO 9000:2015: customer focus. Organisations should understand the current and future customer needs, know customer requirements, and do the best to satisfy customers' expectations.

Finally, it should be emphasised that the clients' opinions are extremely important because, based on their needs; the company can improve the internal processes. Since 80% of the companies have a QMS, the obtained value increased due to the fact that certification includes the 'customer satisfaction' requirement. The staff should pay attention to the customers' complaints to improve the service in supermarkets. In this block, the average means that managers are doing also what they are asked to do.

7 **Conclusions**

The study population consisted of 276 supermarket companies, from which 73 valid questionnaires were obtained. This is a representative sample of the population: 58 companies implemented a QMS (79.5%). In this study, we considered that companies implemented a QMS if the supermarkets had ISO 9001 and/or ISO 22001, and/or

HACCP certification. In regards to the questionnaire, Cronbach's alpha results showed that the instrument used in this research is reliable.

Regarding the nine questions (Q: Do Peruvian supermarket companies that implemented QMS have significant differences in TQM factors compared with companies that did not implement it?) and the hypothesis (H: Peruvian supermarket companies that implemented QMS obtain significant differences in TQM factors compared with companies that did not implement the QMS). In this case, the U Mann-Whitney test demonstrates that companies with a QMS and those that did not implement a quality system had no significant differences in the nine TQM factors, so null hypothesis is accepted (H_0).

It can also be considered that ISO 9000:2015 principles must be implemented to help the supermarket accomplish the nine factors of TQM. Since a value above 4.00 was obtained in all the factors, this means that companies are doing what they are asked to do. The results obtained in the four blocks mean that not only managers tend to improve and apply quality strategies but they are doing it. Quality management of the supplier obtained the highest value, followed by the customer focus, top management and process management blocks.

Most of the supermarket companies in Peru have a QMS that promotes, facilitates, and enables the consistency and improvement of products and processes. It is necessary to have relevant and constant training courses for the employees, so that they can be aligned with the quality issues principles for business success. Also, it is extremely important for the top management to prioritise the good quality in business activities, such as maintaining and selecting the most qualified suppliers in the long-term. In addition, top executives have to know that a QMS ensures properly-defined products and processes and fully developed corrective action plans. Therefore, they should strive to have better monitoring of daily operations.

Another key aspects of success are education, training and communication. The achievement of the quality objectives will depend on how capable, competent, committed and informed is the employee. Customers are the reason for the organisation. For this reason, supermarkets conduct satisfaction surveys regularly, which help to see if the employees resolve customer complaints or use the feedback to take immediate corrective action. It is very important for the employees to know their specific duties in order to maintain an aligned team. Supermarkets must focus on training the personnel, using quality tools, and promoting quality circles. The implications for quality in the supermarket sector in this research are important for companies with a QMS, since it contributes to the improvement of the quality of the service and of the entire organisation.

Finally, we can say that the organisational culture supports the success of supermarkets in Peru. To this end, the top management must educate the employees in regard to the importance of quality for business success. This can be achieved by complying with the corporate vision, mission, and values, which must be aligned with the business objectives. We encourage the replication of the instrument used in this research in other Latin American developing countries.

7.1 Implications for supermarket management practice

7.1.1 Top management block

This block is considering a critical factor in TQM due to the fact that it enhances all service quality in the company. Top management should establish and diffuse quality goals to their employees because they need to focus on it (Polese et al., 2019). Therefore, conducting research related to examples of companies that were influenced by this topic in Latin American can be helpful to quality in the supermarket sector.

Using benchmarking is important because it helps to discover innovative approaches by finding problem areas for improvement, providing a motivation to change and formulating plans for action (Singh et al., 2017). However, Min (2010) recognised that the use of competitive benchmarking in the service sector is challenging because of its nature, but there are good results on hotels and restaurants. Nevertheless, there is no research on benchmarking focusing only on supermarkets, so we need a study in this sector. Finally, product quality, as Matsa (2011) mentioned, is an essential element of competition in the supermarket industry due to the competitive market that exists in this sector. Studying product design is important to know its relevance through the years, and the reason why there is no an investment in this in Peru.

7.1.2 Suppliers block

An effective supply chain management could be achieved through a system that can evaluate and monitor all the processes, and also through the development of a long-term relationship with suppliers (Santos et al., 2019). As Centenaro and Guedes Laimer (2017) confirmed, cooperative relationships with suppliers influence the company significantly, specifically in the supermarket sector, and it may have a competitive advantage over those that do not have a good relationship with suppliers. Therefore, it is relevant to examine the reason why the supermarket sector in Peru needs to have a strong relationship with suppliers, as mentioned before in the results of the quality management supplier factor.

7.1.3 Process block

Vella et al. (2009) mentioned that it is important that employees improve their predictive power by specifying in a precise way which internal elements of the service process influence positively/negatively the nature of service quality. In order to achieve that, it is important to use the quality control tools, but, in Peru, there is a low average related to it in the supermarket sector. Therefore, future research could be related to why Peruvian companies do not use these tools. Studies can also examine the implementation of quality tools and the subsequent improvement of the business performance.

7.1.4 Customer block

Tseng and Wu (2014) mentioned that customer knowledge is a critical advantage that can be valuable for organisations. Furthermore, customers are gradually focusing on product and service's quality, rather than on the price. For this reason, companies should observe carefully and interact with the customer to obtain knowledge and maintain a long-term relationship. The importance of this factor lays in the fact that customer demands and

needs evolve each day because of multiple factors. As a result, it is essential to search for the evolution of customers' needs and how companies can make the most of creative strategies.

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Appendix A

Supermarkets in Peru

<i>Supermarkets – modern channel</i>	<i>Name</i>	<i>No. of stores in Lima and other regions</i>
Falabella Group	Tottus	42
Cencosud Peru	Metro	69
	Wong	17
Supermercados Peruanos	Plaza Vea	84
	Vivanda	8
	Mass	4
	Economax	2
Makro Supermayoristas	Makro	10
Mayorsa Supermercado Mayoristas	Mayorsa	11
Ebony	Ebony	1
Candy Supermercado	Candy	2
Supermercado Don Vitto	Don Vitto	1
Supermercado Cossto	Cossto	1
Tola Minimercado	Tola	1
Supermercados el Centro	El Centro	1
Supermercados el Super	El Super	1
Supermercados Ska	SKA	1
Makroplaza Supermercados E.I.R.L.	Makroplaza	1
Supermercados la Inmaculada S.A.C.	La Inmaculada	1
Supermercados Alsuper	Alsuper	1
Fidelac S.R.L	Fidelac	1

Supermarkets in Peru (continued)

<i>Supermarkets – modern channel</i>	<i>Name</i>	<i>No. of stores in Lima and other regions</i>
Panaderia Pasteleria La Gran Familia	La Gran Familia	1
Supermercados Giga Store S.A.C.	Giga Store	1
Clan Franco	Franco Supermercados	1
	Kosto	1
	Franco Xpress	1
	La Canasta	1
Supermercado La Canasta	La Canasta	1
Casa Market E.I.R.L.	Casa Market	1
Ecomarket	Ecomarket	1
Caesar's Market E.I.R.L.	Caesar's Market	1
Mega Supermercados	Mega	1
Orion Supermercados	Orion	1
Inversiones Yihiro	Yihiro	1
La Genovesa Express – store 1	La Genovesa	1
La Genovesa Express – store 2	La Genovesa	1
Ica Market	Ica Market	1
Market La Merced	Market La Merced	1
<i>Total population</i>		<i>276</i>

Appendix B

Types of supermarkets in Peru

Type	Characteristics	Names	Company	No. of shops	Target SES
Hypermarkets	Great variety of items. Sale of perishable and non-perishable goods and services (food court, banks, laundry service, among others). The main strategy is to offer low prices.	Metro – average area: 7,000 m ²	Cencosud	13	B and C
		Wong – average area: 4,900 m ²	Cencosud	1	A, B, C and D
		Plaza Vea – average area: 3,680 m ²	Supermercados Peruanos	49	A, B, C and D
		Tottus – average area: 4,900 m ²	Falabella Group	24	A, B, C and D
Supermarkets	There are two subtypes: 1 friendly atmosphere, excellent service and high prices 2 a variety of products with lower prices.	Metro – average area: 2,100 m ²	Cencosud	55	B and C
		Wong – average area: 3,000 m ²	Cencosud	18	A and B
		Vivanda – average area: 1,110 m ²	Supermercados Peruanos	8	A and B
		Plaza Vea Super – average area: 1,160 m ²	Supermercados Peruanos	23	B and C
		Tottus – average area: 1,470 m ²	Falabella Group	11	C and D
Discount stores	Limited variety of products. Target: lower income segments.	Makro – average area: 10,000 m ²	Makro Supermayorista S.A.	10	C and D
		Mass and Economax – average area: 890 m ²	Supermercados Peruanos	8	C and D

Source: Retrieved from Equilibrium Clasificadora de Riesgos S.A. (2013)

Appendix C*Results of the U Mann-Whitney test*

	<i>U Mann-Whitney significance</i>
Top management factor (X ₁)	.764
Quality planning factor (X ₂)	.706
Quality audit and assessment factor (X ₃)	.620
Product design factor (X ₄)	.133
Quality management of the supplier (X ₅)	.899
Process control and improvement (X ₆)	.439
Education and training factor (X ₇)	.717
Quality circles factor (X ₈)	.336
Customer satisfaction approach factor (X ₉)	.765

Appendix D*Quality factors, variable (questions) and average values*

<i>Factor</i>	<i>Variable</i>	<i>Questions</i>	<i>Average</i>
Top management	X ₁₁	The top management is actively involved in the quality management of the company	4.507
	X ₁₂	The top management strongly encourages the employees' involvement in the quality management	4.589
	X ₁₃	The top management meets on a regular basis to discuss issues related to the quality management	4.233
	X ₁₄	The top management provides the appropriate resources to increase the level of quality	4.288
	X ₁₅	The top management looks for the long-term success of the company	4.603
<i>X₁</i>			<i>(4.44)</i>
Quality planning	X ₂₁	The company has specific and detailed goals in regard to quality	4.589
	X ₂₂	The company pays attention to the compliance and success of the quality policies and plans	4.70
	X ₂₃	The company involves its employees in the development of quality policies and plans	4.000
<i>X₂</i>			<i>(4.53)</i>

Notes: Likert scale: the values from 1 to 5 mean: 1 – totally disagree, 2 – disagree, 3 – neutral, 4 – agree and 5 – totally agree.

Values from 4 to 5 mean that managers are doing what they are asked to do.

From 1 to 2, managers are not doing what is stated in the variable (questions). The values equal to or higher than 3.5 mean that the manager tends to do it, and values lower than 3.5 mean that managers tend not to do it.

Quality factors, variable (questions) and average values (continued)

<i>Factor</i>	<i>Variable</i>	<i>Questions</i>	<i>Average</i>
Quality audit and assessment	X ₃₁	The company regularly evaluates its quality policies and plans	4.370
	X ₃₂	Benchmarking is widely used in the company	4.123
	X ₃₃	The company obtains objective data for decision-making	4.370
<i>X₃</i>			<i>(4.31)</i>
Product design	X ₄₁	The company invests in the product design	4.068
	X ₄₂	The customers' requirements are fully considered in the product design	4.082
	X ₄₃	The company has a method to develop product design	3.973
<i>X₄</i>			<i>(4.04)</i>
Quality management of the supplier	X ₅₁	The company has long-term cooperative relationships with its suppliers	4.260
	X ₅₂	The quality of the suppliers' products is adequate	4.342
	X ₅₃	The company has detailed information about the performance of the suppliers in terms of quality	4.342
	X ₅₄	The company audits or evaluates their suppliers	4.466
<i>X₅</i>			<i>(4.35)</i>
Process control and improvement	X ₆₁	The operating process in the company meets the customers' requirements in regard to the delivery time	4.247
	X ₆₂	The facilities and physical layout of the operational team in the company work properly	4.082
	X ₆₃	The operating equipment of the company receive a proper maintenance	4.233
	X ₆₄	The company uses the seven tools of quality control for the control and improvement of the process (flow diagram, Ishikawa or cause-and-effect diagram, checklist, Pareto diagram, histogram, control charts, relationship diagram)	3.945
	X ₆₅	The company effectively implements quality control	4.493
<i>X₆</i>			<i>(4.20)</i>
Education and training	X ₇₁	The majority of the company employees receive education and training related to quality	4.301
	X ₇₂	The majority of the company employees are able to use the tools for the quality management	3.808
	X ₇₃	The quality awareness of the company employees is strong	4.137
	X ₇₄	The company employees are actively involved in quality-related activities	4.151
<i>X₇</i>			<i>(4.10)</i>

Notes: Likert scale: the values from 1 to 5 mean: 1 – totally disagree, 2 – disagree, 3 – neutral, 4 – agree and 5 – totally agree.

Values from 4 to 5 mean that managers are doing what they are asked to do.

From 1 to 2, managers are not doing what is stated in the variable (questions). The values equal to or higher than 3.5 mean that the manager tends to do it, and values lower than 3.5 mean that managers tend not to do it.

Quality factors, variable (questions) and average values (continued)

<i>Factor</i>	<i>Variable</i>	<i>Questions</i>	<i>Average</i>
Quality circles	X ₈₁	The company is trained to perform quality circles	4.356
	X ₈₂	The quality circles reduced costs in the company	4.000
	X ₈₃	The proper tools are used to perform the quality circles in the company	4.110
	X ₈₄	The majority of the company employees perform quality circles activities	3.836
<i>X₈</i>			<i>(4.08)</i>
Customer satisfaction approach	X ₉₁	The company has the means to obtain information about the customers	4.384
	X ₉₂	All the staff pays attention to the customer complaints information	4.288
	X ₉₃	The company conducts an annual customer satisfaction survey	4.452
	X ₉₄	The company carries out a general assessment of the customers' requirements	4.170
<i>X₉</i>			<i>(4.30)</i>

Notes: Likert scale: the values from 1 to 5 mean: 1 – totally disagree, 2 – disagree, 3 – neutral, 4 – agree and 5 – totally agree.

Values from 4 to 5 mean that managers are doing what they are asked to do.

From 1 to 2, managers are not doing what is stated in the variable (questions). The values equal to or higher than 3.5 mean that the manager tends to do it, and values lower than 3.5 mean that managers tend not to do it.