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A Comparison of Economic Performance Between ISO 9001 Certified and Non-ISO 9001 Certified Food Manufacturing Companies

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ABSTRACT

Only a small group of companies in Peru are certified to the ISO 9001 International Quality Standard, and it is uncertain whether this standard contributes to their financial performance. As a result, the objective of this study was to compare the financial performance of food manufacturing companies certified to ISO 9001 with those that are not. The non-parametric Mann-Whitney U test for median comparison was applied, since the data analyzed did not follow a normal distribution. It was found that there is no statistically significant difference between the financial results of the two groups; however, referring specifically to the asset turnover indicator, companies that have adopted the guidelines of the International Quality Standard, on average, convert their assets into cash more frequently.

Keywords: ISO 9001, financial performance, Lima Stock Exchange, international quality certification, financial results.

INTRODUCTION

In this globalized world, the success of companies depends, to a large extent, on their ability to adapt and remain competitive in a rapidly and constantly changing market. Today, there is a greater variety of management tools and methodologies that contribute to such goal. Chávez (2011) states that Peru has yet to develop strategies to address the demands of consumers, who now have a greater number of options available to them and carefully analyze their purchasing decisions. According to Encuesta De Opinión del Sector Público (Alvarez, 2018), 62% of Peruvian consumers are more demanding when purchasing now than they were a decade ago, reinforcing the need to find ways to respond to this new reality.

As stated by Guiltinan, Paul and Madden in their book *Marketing Management: Strategies and Programs* (as cited in Chávez, 2011), to face increasing competition, all processes within an organization should be managed as an integrated whole. Integrating all the activities of a company is not a simple task. Over the years, various strategies have been devised to achieve this integration, one of which being a quality management system certification, which aims to help companies implement simplified processes that improve operational efficiency, based on customer focus, leadership, staff commitment and continuous improvement. (Bureau Veritas, 2021).

Only a small group of companies in Peru are certified to the ISO 9001 International Quality Standard. As of September 2020, 883 521 companies around the world were certified to the latest version of this standard according to the International Organization for Standardization (ISO, 2020). Only 0.13% of this total

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are Peruvian, that is, approximately 1300 organizations out of more than 2 million registered, a figure that makes Peru the Latin American country with the least number of certified companies (Siesquén, 2019). Despite the fact that for more than a decade Peru has been combining efforts so that companies that operate in national territory involve processes that incorporate quality management, the number is still low compared to countries in the region that have similar levels of production (D. S. N.º 046-2014-PCM, 2014). The reason behind this might be that, being a voluntary, demanding and costly process which takes from 6 to 15 months (Escuela Europea de Excelencia, 2016a), companies are not motivated to become certified, regardless of its benefits, among which financial performance improvement deserves special mention (Escuela Europea de Excelencia, 2018).

As previously mentioned, consumers are increasingly more interested in the quality of products, especially in terms of the food they eat, so companies within this sector should take additional measures to ensure the approval of consumers (Kotsanopoulos & Arvanitoyannis, 2017).

Therefore, the purpose of this research is to compare the financial performance of Peruvian industrial companies in the food sector that are listed on the Lima Stock Exchange (LSE), and that are certified to the ISO 9001 International Quality Standard to those that are not.

A number of studies refer to the relationship between the implementation of ISO 9001 and the financial performance of companies. Fontalvo et al. (2012) analyze financial indicators such as gross margin, operating margin and return on assets (ROA), finding by means of a discriminant analysis using Box's M test that there is an improvement in financial performance. Similarly, Aba et al. (2015) in their study in which indicators, such as net income, were evaluated using the Mann-Whitney U test, found that, by implementing ISO 9001, the company in question is in a better position than its competitors. Indeed, they state that such companies are more competitive in the international market and that they have a strategic advantage over companies that do not have such recognition (Aba et al., 2015). Demuner and Mercado (2011) agree with the above, since, based on their study, 100% of the companies analyzed show an increase in their sales and profits after acquiring international quality certification. Some companies even report higher profitability and thus have managed to rapidly grow as an organization.

Authors such as Mahmood et al. (2014), on the other hand, determined that there is no representative variability in financial ratios after implementing ISO 9001. They chose profitability, cash flow and company size as variables for this analysis. No significant association with certification was found. Similarly, Ochieng et al. (2015) found that those companies with ISO 9001 certification do not have a significant advantage over those that do not, regarding a company's asset turnover and net income. Student's t-test for independent samples was used in this study.

In the articles reviewed, the type of financial ratios used is referred to as a limitation; in order to contribute to further knowledge on this subject, this paper proposes financial indicators that measure different aspects of a company's activity: liquidity, debt and profitability. Also, a different context to those previously evaluated is considered for the study, as no research has been found on the subject involving companies operating in Peru. The purpose of this research is to provide information that will allow Peruvian companies, particularly those in the food sector, to learn about the impact of ISO 9001 certification and to serve as a reference for future research on the subject.

Theoretical Framework

Understanding this research study requires a more detailed description of some important concepts, starting with ISO 9001, the international quality standard, which specifies a series of requirements for a quality management system, so that the organizations that implements it delivers products and services with consistent characteristics to customers while satisfying applicable legal and regulatory requirements (Natarajan, 2017). This concept cannot be addressed without also mentioning the concept of quality, which is a complex term as it largely depends on the perception of the person performing the assessment. Over time, various definitions have emerged; however, for the purposes of this research, the most accurate is the one proposed by ISO 9001-2015 (Escuela Europea de Excelencia, 2016b), which defines this term as the set of characteristics inherent to the product or service offered, and that meets the requirements of consumers.

METHODOLOGY

This is a theoretical, non-experimental, descriptive and qualitative research study. The study technique applied was documentary review, through which financial information from industrial food companies listed in the Lima Stock Exchange, and that registered activity during 2017, 2018 and 2019, was collected and analyzed. The necessary data were obtained from the *income statements* and *balance sheets* found in the audited reports and annual reports of each of the chosen companies. Also, two research variables were determined: ISO 9001 certification and financial performance. The first being the independent variable, and the second the dependent variable.

The research variables and the indicators used to measure them are shown in Table 1.

Population and Sample

The study population consisted of 12 companies that met the established aforementioned guidelines, and the main selection criterion was the degree of accessibility to the financial and corporate information of each company during the study period. Given the small size of the population and the fact that all the companies complied with the established requirements, the population was considered in its entirety, without any type of sampling.

Consistent with the research objective, the companies included were divided into two groups for comparison: companies certified to ISO 9001, accounting for 58% of the total, and companies that are not certified to ISO 9001, accounting for the remaining 42%. For this division, we considered the information provided by various reports found in the database of the LSE. Table 2 shows the list of companies included in the study and whether their processes follow the guidelines of the International Quality Standard.

Data Analysis

The study consists of a descriptive statistical analysis based on the type of variable collected. For this case, a nominal variable is considered, which corresponds to the results of the assessment of the financial performance of the companies during the study period. There are a total of 180 values in the available database. The research begins with a preliminary review to determine the behavior of the data by comparing five main concepts: minimum value, maximum value, mean, standard deviation, and median.

Table 1. *Study Variables and Indicators.*

Variable	Indicator
ISO 9001 certification	The company is certified to ISO 9001
	The company is not certified to ISO 9001
Financial performance	Cash ratio
	Debt ratio
	Gross margin
	Asset turnover
	ROA

Source: Prepared by the authors.

Table 2. *Distribution of Companies in Terms of ISO Certification.*

Company	Not Certified	Certified
Agroindustrias AIB S.A.		X
Cervecería San Juan S.A.		X
Corporación Lindley S.A.		X
Leche Gloria S.A.	X	
Laive S.A.		X
Camposur Inc. S.A.C.	X	
Eco-Acuícola S.A.C.	X	
Unión de cervecería Backus y Johnston S.A.A.	X	
Pesquera Exalmar S.A.A.		X
Quimpac S.A.	X	
Alicorp S.A.A.		X
Austral Group S.A.A.		X

Source: Prepared by the authors.

In order to determine the most appropriate test for the research, it is necessary to know whether the data follow a normal distribution. Thus, the non-parametric Kolomogorov-Smirnov test is performed. This is a goodness-of-fit test to measure the similarity between the distribution of a set of more than 30 data with a theoretical distribution—which may be normal, exponential, Poisson, or uniform—by determining whether the data provided corresponds to the given distribution. For this purpose, two hypotheses are stated, and the result is compared to the p-value of 0.05.

> H_0: Data do not follow a normal distribution ($p < 0.05$).

> H_1: Data follow a normal distribution ($p > 0.05$.)

If the data follow a normal distribution, the parametric Student's *t*-test will be used for the comparison of means. Otherwise, the non-parametric Mann-Whitney *U* test will be used for the comparison of medians. The reason for choosing these tests is that the independent variable to be analyzed is divided into two groups: "companies certified to ISO 9001" and "companies not certified to ISO 9001". As in the previous case, the following hypotheses are stated:

> H_0: There are no differences in financial performance between companies that either are or not certified to the ISO 9001 International Quality Standard ($p > 0.05$).

> H_1: There are differences in financial performance between companies that either are or not certified to the ISO 9001 International Quality Standard ($p < 0.05$).

For data processing, a specialized statistical software, the Statistical Package for the Social Sciences (SPSS), a tool that offers advanced statistical analysis using algorithms, text analysis and Big Data, will be used.

RESULTS

Preliminary analysis results showed that companies certified to ISO 9001 quality standards have, on average, better economic performance, with the greatest difference between the two groups of companies observed in the asset turnover indicator (Table 3). An assessment of this indicator shows that, on average, companies certified to ISO 9001 convert their assets into cash about 0.23 times more than those that are not certified. A reason for this may be that certification provides the consumer with a guarantee about the quality of the product, which increases consumer satisfaction and retention (Normas ISO, 2017). Nevertheless, this result is not enough to draw a general conclusion, consequently, we continue with the analysis of the results obtained in the normality test.

From the results of the Kolmogorov-Smirnov test shown in Table 4, it is clear that the 180 data evaluated do not follow a normal distribution, as the significance value obtained is less that the expected

Table 3. *Data Preliminary Recognition.*

Ratio	ISO	Maximum	Minimum	Mean	Std. Deviation	Median
Cash ratio	NO	0.485	0.004	0.112	0.127	0.082
	YES	0.434	0.000	0.173	0.138	0.160
Debt ratio	NO	0.663	0.521	0.596	0.045	0.598
	YES	0.764	0.243	0.565	0.127	0.592
Gross margin	NO	1.013	0.184	0.415	0.314	0.253
	YES	0.720	0.147	0.326	0.182	0.247
Asset turnover	NO	1.149	0.172	0.596	0.399	0.431
	YES	1.527	0.378	0.814	0.348	0.813
ROA	NO	0.346	−0.032	0.078	0.128	0.034
	YES	0.407	−0.029	0.073	0.115	0.044

Source: Prepared by the authors.

Table 4. *Kolmogorov-Smirnov Test Results.*

	Statistic	Significance
Value	0.119	0.000

Source: Prepared by the authors.

p-value of 0.05; therefore, the null hypothesis (H_0) is accepted. The histogram (Figure 1) shows in a graphic manner how the values studied do not resemble the Gaussian bell, but rather have a leftward trend.

As the data do not follow a normal distribution, a non-parametric Mann-Whitney U test was performed for the comparison of medians. The results obtained when comparing the financial performance variable with the ISO 9001 certification variable are shown in Table 5. No representative differences were found in the analysis, since the significance level was greater that a *p*-value of 0.05 (sig. > 0.05), thus, financial performance does not vary depending on whether or not the company has processes conforming to the ISO 9001 International Quality Standard.

Considering that the ratios analyzed measure different financial aspects such as debt, liquidity, and profitability, the same test was performed, although measuring the impact of ISO 9001 on each of the indicators separately. The results obtained are shown in Table 6, again showing that no significant differences were found ($p > 0.05$). Nevertheless, the significance of asset turnover is close to the expected values and, based on the financial definition of this indicator, it can be said that there is a difference in favor of the companies that are certified to the International Quality Standard.

Furthermore, differences over time were also verified, thus, the test was conducted considering the three-year period of the study. The asymptotic significance values are shown in Table 7, and in no case is this value less than a *p*-value of 0.05. Nevertheless, it is observed that in some ratios the significance level is closer than in others, ratifying that there are variations in relation to time.

Considering the objective of the research study and the foregoing, it cannot be asserted that being certified to the ISO 9001 International Quality Standard is a determining factor for better financial results, as there is no statistically significant difference between the results of the two groups of companies studied.

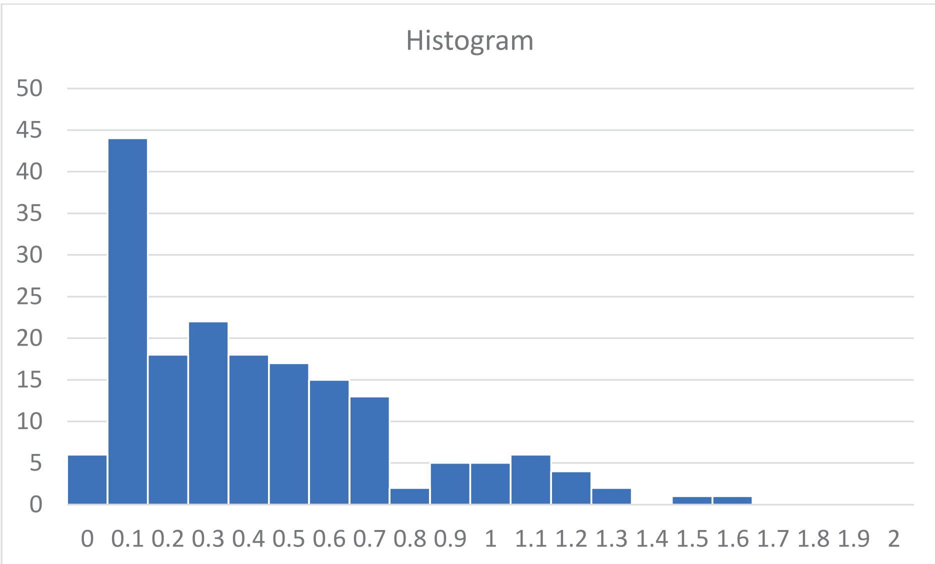

Figure 1. *Data Distribution and Comparison Using the Gaussian Bell*.

Source: Prepared by the authors.

Table 5. *Kolmogorov-Smirnov Test Results.*

Concepts	Value
Mann-Whitney U	3 671
Wilcoxon W	6 521
Z	−0.773
Asymp. Sig. (2-tailed)	0.439

Source: Prepared by the authors.

Table 6. *Results of the Comparison Test by Financial Ratio.*

Ratio		Value
Cash ratio	Mann-Whitney U	115
	Z	−1.363714361
	Asymp. Sig. (2-tailed)	0.172657482
Debt ratio	Mann-Whitney U	144
	Z	−0.433179856
	Asymp. Sig. (2-tailed)	0.664884112
Gross margin	Mann-Whitney U	134
	Z	−0.754053823
	Asymp. Sig. (2-tailed)	0.450816903
Asset turnover	Mann-Whitney U	99
	Z	−1.877112709
	Asymp. Sig. (2-tailed)	0.060502648
ROA	Mann-Whitney U	129
	Z	−0.914490807
	Asymp. Sig. (2-tailed)	0.360459006

Source: Prepared by the authors.

Table 7. *Results of the Comparison Test by Financial Ratio and Year.*

Year	Ratio	Asymp. Significance Value
2017	Cash ratio	0.465
	Debt ratio	0.685
	Gross margin	0.465
	Asset turnover	0.167
	ROA	0.685
2018	Cash ratio	0.223
	Debt ratio	0.935
	Gross margin	0.935
	Asset turnover	0.291
	ROA	0.291
2019	Cash ratio	0.808
	Debt ratio	0.935
	Gross margin	0.570
	Asset turnover	0.372
	ROA	0.685

Source: Prepared by the authors.

DISCUSSION

Based on the results section, the ISO 9001 International Quality Standard does not guarantee better financial results for certified companies. It is found that there is no statistically significant difference between the two variables studied. Such result is consistent with that obtained by Mahmood et al. (2014), who conclude that there is no statistically significant relationship between financial ratios such as ROE, ROI, and cash flow and the ISO 9001 International Quality Standard. A conclusion that is also shared by Astrini (2018), who, after a systematic review of the literature, shows that 77% of the longitudinal studies analyzed in relation to the topic discussed do not show a considerable relationship between both variables. Similarly, Cândido et al. (2016), in their research conducted on a sample of 143 Portuguese companies certified and not certified to ISO 9001, conclude that there is no statistically significant difference in the financial performance of ISO-certified companies. This result is also supported by the study of Mahnaz (2014), who was unable to prove a positive relationship between the accreditation of the International Quality Standard and the improvement in the financial performance of companies in Pakistan.

In contrast, the results obtained are inconsistent with other research, such as that conducted by Fontalvo et al. (2011), where a significant improvement in the financial performance of Colombian companies after being certified to ISO 9001 is evidenced. A similar conclusion is drawn by Hall and Gutierres (2013), who demonstrate that there is an improvement in the financial performance of the companies in the sample analyzed after implementing the international quality management system. A similar result is obtained by Demuner and Mercado (2011), who mention that 100% of the companies analyzed in their study reported an increase in sales and profits after adjusting their processes to the ISO 9001 standard.

There are several hypotheses that explain this result. One of them is the size of the companies chosen, regarded as large companies in terms of their number of workers. Studies report that most of the organizations that pursue certification under an international standard are small and medium-sized companies, as they understand this certification as a means to improve the performance of their business, reach their target segment, and compete with larger and better positioned companies in the market (Zaramdini, 2007). Other studies also mention that, based on the good performance of large companies, they are less likely to see international certifications as an added value for their business (Mahmood et al., 2014). The latter is supported by the analysis of financial ratios conducted in this study, where it is observed that there are no significant fluctuations in the financial results during the research period (2017-2019). Although during the years in question Peru suffered great political instability that led to an economic crisis that affected investments in the Peruvian market (BBC News Mundo, 2020), the performance of companies was not greatly affected by these external factors. It was found that the reason for the companies considered in this study to become certified, beyond and improvement in their financial performance, stems from the request of third parties, especially their clients, who demand that all parts of the supply chain be certified.

CONCLUSIONS

The purpose of this study is to compare the financial results obtained by Peruvian industrial companies in the food sector certified to ISO 9001 International Quality Standard with the results obtained by companies that are not certified. Following the application of specific statistical tests, the results show that there is no relationship between financial performance and the implementation of the ISO 9001 International Quality Standard. Exceptionally, for the asset turnover indicator, a significance level close to acceptable was obtained and, according to the preliminary analysis performed, certified companies were found to have a better management of their asset sales. Non-certified companies, however, obtained similar results to certified companies in all other cases.

There were several limitations to the research. First, the information collected is affected by various events that occurred during the study period. Second, there is no list that includes all the organizations certified to ISO 9001 in Peru; therefore, the review process was conducted manually, verifying one by one the reports found in the LSE database, limiting the determination of companies for the population of this research. Third, other variables such as the size of the company, years of experience in the sector, other financial indicators, and the continuity with which the companies hold the ISO 9001 International Quality Standard could have been considered.

Despite the limitations described above, this research provides a basis for future studies. Although it does not result in a statistically significant improvement in financial performance, this research study contributes to the business sector by raising awareness of the fact that this certification provides added value to the products offered, which gives the consumer a guarantee and security, a determining factor today, when it has been proven that customers are more demanding when purchasing. We therefore recommend that companies in all sectors become certified to ISO 9001, regardless of their financial performance, as it represents a change in organizational culture that improves overall company results in the long term.

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