

## Effect of ISO 9001 effectiveness on the performance of certified manufacturing firms in Laguna and Batangas

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### **Abstract**

As company owners and top executives are still confused about what ISO 9001 may offer, this research study aimed to investigate if ISO 9001 effectiveness measured via the QMS rationale such as customer satisfaction focus, prevention of non-conformance and continuous improvement has significant effect on firms' performance through the determinants product quality, operational performance and business performance. The study utilized descriptive research design and convenience sampling technique covering 96 respondents from certified manufacturing firms in Laguna and Batangas. Responses were tallied and analyzed through linear regression analysis using SPSS version 20. Findings showed significant effect of ISO 9001 effectiveness on product quality, operational performance and business performance. The most essential findings noted in this research is the significant effect of ISO 9001 effectiveness and product quality on business performance contradicting previous empirical studies. An integral addition to the body of knowledge that addressed the controversial economic effect of ISO 9001. Generally, this paper depicted the significant effect of ISO 9001 on firms' performance when used effectively and optimally. As a matter of logic, an organization who struggles to demonstrate minimum compliance to QMS may not attain business excellence because ISO 9001 certification is not a guaranteed means for organizational survival. It is the firms' implementation effectiveness through objectives achievement that makes quality their best business plan.

**Keywords:** quality management system, ISO 9001 effectiveness, product quality, operational performance, business performance

## **Effect of ISO 9001 effectiveness on the performance of certified manufacturing firms in Laguna and Batangas**

### **1. Introduction**

In today's competitive world, survival is the name of the game. If you don't drive your business, you'll be driven out of business (B.C. Forbes). Nonetheless, size does not matter in organizational survival. It is on how quick a firm can respond to the changing needs of the market that matters. While change is inevitable, organizations are striving for ways and means of attaining and sustaining a competitive advantage over their competitors (Njenga, 2016). Quality setback is among the burning and an endeavor issue that organizations make every effort in order to succeed and survive in a competitive environment (Mangula, 2013). They are constantly looking for ways to expand and improve their business in terms of quality (Mangula, 2013). When quality is mentioned, there is only one name associated with it. W. Edwards Deming, an American Quality Guru also known as the "Father of Quality" who introduced several Quality concepts ([www.toolshero.com](http://www.toolshero.com)). These concepts had been helpful in problem solving and decision making which were eventually adopted by ISO (International Organization for Standardization) in most of their developed standards.

ISO is not an abbreviation. A Greek term means "equal" that when an organization is certified, its system is considered at par with any other companies who are also certified to specific standard. It is an independent, non-governmental and international organization with 162 member countries world-wide and headquarters located in Geneva, Switzerland. They are responsible for bringing together experts and develop consensus-based, market relevant International Standards particularly supporting innovation and providing solutions to global challenges (<https://www.iso.org>). Since 1987, ISO has established various generic standards for products and services. One of these is the most popular and termed as the foundation of all ISO standards. The ISO 9001 which relates to Quality Management System (QMS). The ISO 9000 series (ISO 9000, ISO 9001, ISO 9004 and ISO 19011) helps organizations in addressing various aspects of quality management as it provides guidance and tools for companies who would want to ensure that their products and services consistently meet customers' requirements with effective and efficient processes attained through continual improvement, the standard's three rationale (<https://www.iso.org>). To date, ISO 9001 standard requirement has arguably made the most influential contribution to QMS (Heras, 2011). It has played great and perhaps the most vital role in the perception of quality and quality assurance and quality management in the last 30 years (Medic, 2016)

Getting certified to ISO 9001 brings many organizational effects (Prates & Caraschi, 2014). The association of ISO 9001 standard to QMS is triggered by its tangible effect and promising benefits in all aspects of the business upon certification. Through the years many literatures originated in different parts of the world attempted to determine these effects to companies who adopt this internationally recognized standard. In Tanzania, it was revealed that the quality of products as well as its quantity (volume) has been improved in those organizations who have been certified with ISO 9001 (Shadrack Mangula & Karugira-Tanzania, 2013). In Kenya, it was evident that QMS has a great positive effect on the performance of an organization through service delivery and quality production, thus giving an organization a competitive edge in the market (Matata & Wafula, 2015). On the other hand in Jordan, an empirical study showed the extent to which Quality Management Practices (QMPs) and organizational performance are correlated and how QMPs exhibited effect on organizational performance (Jaafreh & Al-abadallat, 2012).

QMS has proven to be a beneficial tool not only in different countries but in many industries as well. ISO 9001 certification is even a trend in Cement industry as it gives positive effect to company's performance via the marketing advantage (Yahia-Berrouiguet et al., 2015). The cardboard companies in Brazil proved that ISO 9001 brings many organizational effects and leads to overall company improvement through increased in customers and suppliers' number and improved company image (Prates & Caraschi, 2014). Studies in Bangladesh's

garments industries showed positive effect of ISO 9001 on firm's performance in terms of production quality, human resource and reputation (Tabassum, 2017). Malaysian manufacturing firms found that implementing QMS promotes customer satisfaction and enhance their bottom line results (Agus & Abdullah, 2000). In Kenya, the oil sector market viewed a positive operational performance of QMS (Abdulrahman, 2014) while the food processing industries showed positive correlation with organization's competitive performance by improving internal efficiencies considered as prerequisite in becoming competitive in global market place (Nyakio Kibe & Wanjau, 2014). Also in Kenya, the study on its effect to hospitals revealed positive result on customer service, corporate image and internal business (Njenga, 2016). Finally, the construction industry in Spain viewed QMS adoption to have internal benefit on process improvement and external benefit in terms of gaining better chances of competing in the market (Prado-Roman, Del Castillo-Peces, 2018).

Due to various effects that QMS could offer, ISO 9001 has revealed to be the pro-active strategy to improve organizational performance (Mangula, 2013). As QMS may be adopted on a voluntary basis to improve competitive power and/or for better quality products (Kafetzopoulos, Psomas, & Gotzamani, 2014), more and more companies are aiming for ISO 9001 certification. They even consider QMS as a magic cure for improving performance (Bikshapathi, 2011). As a matter of fact, more than a million certificates were issued in 170 countries including the Philippines (<https://www.iso.org>). While this certification has been popular in most industries, many companies are aiming for ISO 9001 certification believing that they can be at par with their competitors once certified. Some are doing it just because of the certificate to be used as marketing tool (Sharif, 2005). Even in government agencies, they implement ISO 9001 as a republic's mandate. For instance, here in the Philippines, former President Gloria Macapagal Arroyo signed Executive Order No. 605 series of 2007 specifically directing government agencies to adopt the ISO 9001:2000 standard as part of the implementation of government-wide quality management program. Moreover, other private firms are doing this because they are required by their customers and others are following their industry trend. Only few of them adopt QMS through ISO 9001 as they wanted customer satisfaction, effective and efficient processes, and continual improvement. These are the three rationales of QMS which most company owners and management are blinded with. They thought that ISO 9001 certification is purely documentation, additional workload, regulatory requirement, and customer demand. More so, they have this misconception that this is just an ordinary project that they can easily delegate to their middle management. Thus, top management's involvement and commitment seem to be lacking. What makes it even worse is that they are taking quality as a separate entity and not part of the organization's culture. As a result, the aim to ensure product quality compromises other areas of the business. Worse of all, many owners believed that when their business fail ISO is the reason for their firms' closure. Hence, despite the numerical success of ISO 9001 the certification is still much criticized as its full benefit is apparently not being felt by most company owners and spectators (Kaziliunas, 2010).

Several researches showed that failure in business is not about ISO certification but can be attributed to the motivations of companies in adopting QMS. Kumar and Balakrishnan concluded that the reasons behind the failure of ISO certified organizations are leadership, strategy and quality system related as well as society-oriented gaps. He added that eliminating such gaps would guarantee an effective business model with value added processes, methods, systems and efficient resources contributing for continual improvements and towards business excellence (Kumar & Balakrishnan, 2011). Failure is just around when the owners do not spend adequate time at the start of implementation to fully understand what a QMS entails (Lewis, 2007). Commitment on their part is one critical factor in the success of their business. In order to become certified and adhere to ISO standard, a company requires high investment of quality time, effort and resources (Kafetzopoulos et al., 2014). Owners and top management must realize that results expected from ISO 9001 implementation are strategy contingent (Rusjan, 2010). Certification can deliver business and financial effects, but the managers of organizations should carefully design the QMS implementation strategy (Kaziliunas, 2010).

When QMS is properly implemented and standards understood, organizations enjoy significant effect, either external or internal (Lourenço & Fonseca, 2012). Positive effect of ISO 9001 can be achieved depending on certain factors affecting the QMS implementation. There is an interesting relationship between the reasons of

ISO 9001 implementation and the corresponding performance outcomes, specifically emphasizing on the importance of correct maintenance of QMS during the post-certification period (Kaziliunas, 2010). Organizations with different QMS implementation patterns have significantly different performance outcome (Kaziliunas, 2010). For an organization that considers the real rationale behind the implementation of QMS, ISO 9001 certification offers tried and tested benefits and advantages at different areas of the organization. Strong internal motivation or willingness to improve a company's quality helps establish a QMS that leads to external and internal effect (Kaziliunas, 2010). ISO 9001 certification does not guarantee a problem-proof system. The key is to analyze the organization's current system and strategically design an effective QMS that would generate an effect on firm's performance upon full implementation.

Unfortunately, regardless of all these researches clarifying the reason why full benefit of ISO certification is not attained, effect of QMS on performance remains controversial with a number of empirical studies alluding to nullity of ISO certification on performance (Nyakio Kibe & Wanjau, 2014). Empirical studies showed that the effect of ISO 9001 standard or organization's performance is inconsistent and unclear (Neyestani, 2017). Although improving production process has consistently attained positive result, customers' results and financial performance were inconclusive and unclear because organizations with different quality management context have significantly different performance outcomes. An evidence showing that pre-requisites to enjoying the effect of ISO 9001 are not yet realized by some company owners. Moreover, in developing countries ISO 9001 certificate does not guarantee a statistically controlled internal processes which makes anomaly exist in the quality management viewpoint (Beshah, Kitaw, & Alemu, 2013). Taking a closer look at the inconsistencies on the empirical results of researches on the effect of ISO 9001 on firms' performance. It can be noted that as time goes by ISO 9001 is being taken seriously by most organization. Like for example in 2014, the research article of Prates & Caraschi attained positive results (Prates & Caraschi, 2014) while in 2008 the study of Capistrano showed improvements in some performance measures and showed declining performance on some firms. Thus, a speculation was derived that ISO 9000 certification is not yet fully understood, appreciated and implemented during that time (Capistrano, 2008).

The six years gap on both researches explains the difference between empirical results. More so, ISO 9001 standard is undergoing transition or upgrade to a better version once every six to seven years. Thus, the standard used in the 2008 research study is the ISO 9001:2000 version while the 2014 study used the ISO 9001:2008 version of the standard. As a new version of ISO 9001 is being released, upgraded standard can be observed. The newest version of ISO 9001 which is the 2015 standard ensures that certified organizations continuously adapt to the changing environments in which the organizations operate, basically focusing on risk-based thinking and leadership requirement (Medic, 2016). We can therefore say that, the positive effect of ISO 9001 certification can only be felt if organizations go beyond simply being accredited with the standard and instead to take advantage of ISO certification as a catalyst for change (Dalmau, Gimenez, & Castro, 2016). It is definitely, not about the number of years being certified but the level of maturity of an organization in terms of management commitment, culture and good practices (Fonseca, 2015). High level of QMS maturity is attainable and act as intermediary between quality management and financial performance when company thoroughly and consistently implements the ISO 9001 principles (Novokmet, 2017). Nevertheless, ISO 9001 does not solely depend on the standard itself but rather, on how this standard is effectively implemented by various organizations (Kafetzopoulos et al., 2014). In Kenya, food manufacturers are still struggling to embrace effective QMS as a strategy to gain a competitive edge (Nyakio Kibe & Wanjau, 2014). It is certain, that the success or failure of ISO 9001 to improve firm's performance may be attributed to its effective or ineffective implementation (Kafetzopoulos et al., 2014). Thus, ISO 9001 effectiveness plays an important role in converting QMS implementation into an improved firm's performance.

As effectiveness can be viewed as the fulfillment of an objective, a better way to measure effectiveness of ISO 9001 is through its rationale which are enhancing customer satisfaction, prevention of non-conformance through efficient and effective processes and providing framework for continual improvement (<https://www.iso.org>). On the other hand, researchers from different parts of the globe used product quality,

operational performance and business performance as determinants of firm's performance. In manufacturing firms, product quality usually relates to product reliability, durability, and conformance to customer requirements and expectations (QMS Requirements, 2015). Operational performance is measured in terms of internal efficiency and effectiveness while business performance relates to profitability, financial results and market growth (Lazar, 2016). In the Philippines, (Talavera, 2005) specifically used quality, business and operational performance as measures of firm performance. Not only is ISO 9001 effectiveness having direct effect on product quality, operational and business performance, it is also believed that these three determinants of firms' performance eventually pose an effect on either improved business performance or enhanced product quality. In the study of (Bhatia, 2014), he proved that QMS mostly affects these measures and ultimately takes business performance into a higher level.

Performance improvement brought about by ISO 9001 effectiveness can only be felt by an organization year after certification. It is not an ordinary project that gives immediate effect right after certificate awarding. The study of (Kafetzopoulos et al., 2014) entitled "The Impact of Quality Management Systems on the Performance of Manufacturing Firms" involves respondents who belong to certified firms three years and beyond. Thus, the ISO 9001 series used in this research is ISO 9001:2008 version as ISO 9001:2015 version has just been released in November of 2015. This makes this study timely and significant for the research industry. Definitely, research must untangle how and when these standards affect organizations (Terlaak & King, n.d.). It is a replication of Kafetzopoulos, Psomas and Gotzamani's research considering their recommendations and bringing their instrument from Greece to the Philippines and using the newest version of ISO 9001 which is the ISO 9001:2015. In order to investigate the applicability of this study to other population in different counties, this research study was conducted on ISO 9001 Certified manufacturing firms here in the Philippines, specifically in Laguna and Batangas provinces. For a more diverse population, targeted respondents came from Industrial Parks within these two provinces through the link with their Park Administrators. These areas are Lima Technology Center and First Philippine Industrial Park in Batangas. While Carmelray Industrial Parks, Calamba Premier International Park, Light Industry and Science Park and Laguna Technopark in Laguna. Other manufacturing industries that qualified with the set sampling criteria were included in the population provided that they belong to Laguna and Batangas provinces.

Determining the Effect of ISO 9001 certification on firm's performance paved the way to open-up the minds of organizations' owners and top executives to commit and regard quality as their best business plan (John Lasseter, Pixar). Furthermore, these results will enable them to view ISO as a valuable tool to improve firm's performance. A tangible evidence to prove that there is more to ISO than its certificate.

1.1 Conceptual Framework

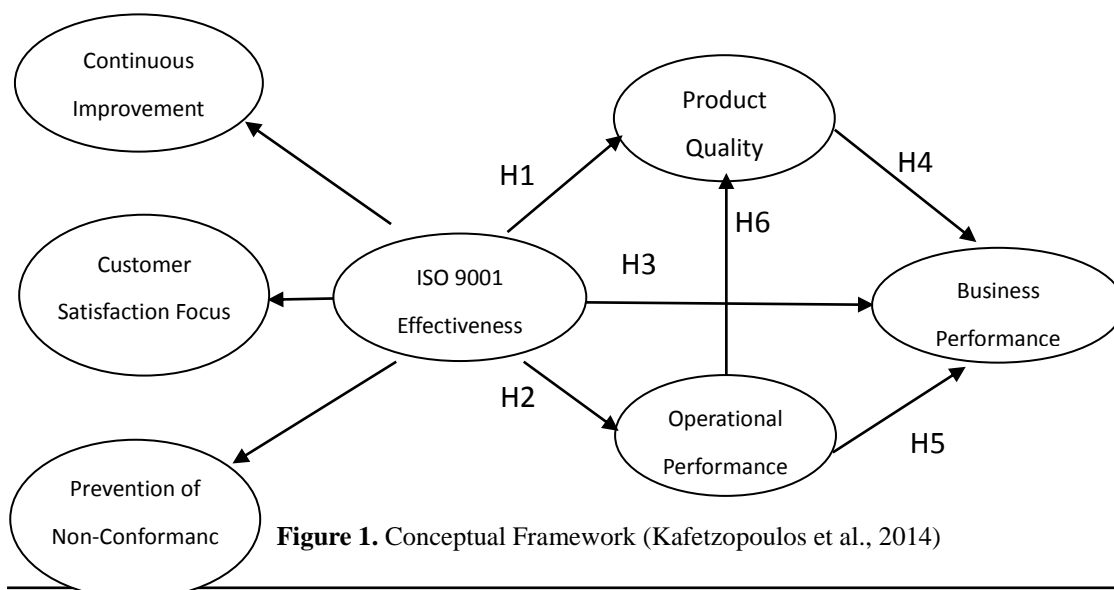


Figure 1. Conceptual Framework (Kafetzopoulos et al., 2014)

This conceptual framework is used in the study of Kafetzopoulos et.al, 2014. Their study aimed to provide additional evidence of the impact of ISO 9001 effectiveness on three dimensions of a firm’s performance, namely product quality, operational performance and business performance. To investigate the relations between the construct of their model, the analysis included an initial Exploratory Factor Analysis (EFA), followed by Confirmatory Factor Analysis (CFA) and Structural Equation Modeling (SEM). Respondents of the study are 287 ISO Certified manufacturing firms in Greece. Findings showed direct contribution of ISO 9001 effectiveness to product quality and operational performance. However, no direct impact was observed on firms’ business performance instead an indirect impact was noted on business performance as well as product quality through an improved operational performance. Additionally, no indirect impact was obtained on business performance through an improved product quality. The sample was limited to small and medium manufacturing companies in Greece. Internal business environment and endogenous business factors have not been assessed in the study. Although it offers clarity for managers that are focusing on the elements to increase ISO 9001 effectiveness and provides a better guide on choosing strategies, allocating resources and improving their firm’s performance. Their study has become another contribution to the literature gap that aims to examine the degree to which ISO 9001 effectiveness influences the performance of certified firms.

1.2 Operational Framework

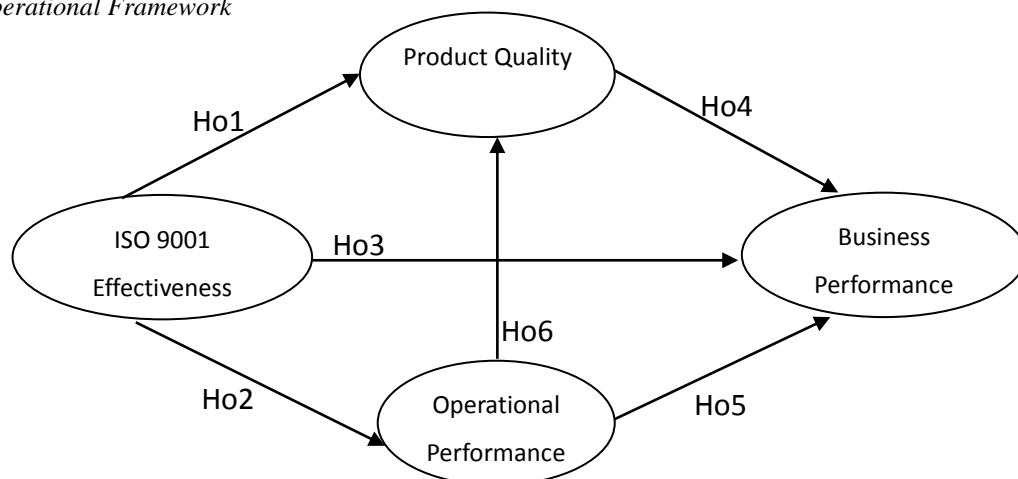


Figure 2. Operational Framework

This operational framework is anchored on the conceptual framework of Kafetzopoulos et al. (2014) in their study entitled “The Impact of Quality Management Systems on the Performance of Manufacturing Firms”.

The recommendation of Kafetzopoulos et al. (2014) to explore if the results obtained through their study are applicable to a population of companies from other countries led the way to test it here in the Philippines, particularly in Laguna and Batangas provinces. Although no significant effect of ISO 9001 effectiveness and product quality was observed on firms’ business performance, still the same questionnaire was used and hypotheses were tested to determine if the same result will be obtained in this study.

In this research, the independent variable which is ISO 9001 Effectiveness was defined using the three ISO 9001 rationale namely continuous improvement, customer satisfaction focus and prevention of non-conformance. Since it was tested as feasible by Kafetzopoulos et al. (2014) it was but fitting to define ISO 9001 effectiveness using these three objectives upon checking the reliability of questionnaire in the chosen locale of the study. On the other hand, dependent variables such as product quality, operational performance and business performance were measured using the perception of respondents from ISO certified manufacturing firms within Laguna and Batangas.

This research study aimed to investigate if the perceived ISO 9001 effectiveness has significant effect on product quality (Ho1), operational performance (Ho2) and business performance (Ho3). In addition, this study

further explored if the perceived product quality has significant effect on business performance (Ho4) and if the perceived operational performance has significant effect on business performance (Ho5) and product quality (Ho6).

### *1.3 Objectives of the Study:*

The general objective of this study is to investigate the effect of ISO 9001 effectiveness on the performance of certified manufacturing firms in Laguna and Batangas. As for the specific objectives these are:

- To investigate if the perceived effectiveness of ISO 9001 has significant effect on product quality.
- To investigate if the perceived effectiveness of ISO 9001 has significant effect on operational performance.
- To investigate if the perceived effectiveness of ISO 9001 has significant effect on business performance.
- To investigate if perceived product quality has significant effect on business performance.
- To investigate if perceived operational performance has significant effect on business performance.
- To investigate if perceived operational performance has significant effect on product quality.

In the study of Kafetzopoulos et al. (2014), the impact of ISO 9001 effectiveness was measured using the assumptions on relationship of ISO 9001 effectiveness to product quality, operational performance and business performance. Upon clarifying with the Dr. Kafetzopoulos himself, he confirmed that the terms impact or effect, relationship and influence are treated the same (Appendix D). Since here in the Philippines relationship and effect are separately being measured, it was deemed necessary to examine the effect of ISO 9001 effectiveness on the performance of manufacturing firms in terms of product quality, operational performance and business performance instead of mere measuring the relationship of the variables. Hence, the formulation of hypotheses below:

Ho1: The perceived effectiveness of ISO 9001 has no significant effect on product quality.

Ho2: The perceived effectiveness of ISO 9001 has no significant effect on operational performance.

Ho3: The perceived effectiveness of ISO 9001 has no significant effect on business performance.

ISO 9001 effectiveness may have no direct effect on firm's performance. However, the determinants of firm's performance such as product quality, operational and business performance may exhibit significant effect among themselves thereby affecting the level of performance as ISO 9001 effectiveness changes. For and in consideration of the previous study, the following hypotheses were formulated:

Ho4: Perceived product quality has no significant effect on business performance.

Ho5: Perceived operational performance has no significant effect on business performance.

Ho6: Perceived operational performance has no significant effect on product quality.

## **2. Methodology**

The study utilized a descriptive research design to investigate the effect of ISO 9001 effectiveness on the performance of certified manufacturing firms using convenience sampling technique. It was participated by multiple respondents belonging to middle management and up from Industrial Parks within Laguna and Batangas provinces through the link with their Park Administrators. These areas are Carmelray Industrial Parks, Calamba Premier International Park, Light Industry and Science Park and Laguna Technopark in Laguna. While Lima Technology Center and First Philippine Industrial Park in Batangas. Other manufacturing industries that qualified with the sampling criteria were included in the population provided that their firms belong to Laguna

and Batangas provinces. One of the recommendations of the previous researchers is to determine its applicability to other countries with multiple respondents per organization (Kafetzopoulos et al, 2014). Wherefore, a maximum of 5 respondents satisfying the above positions were considered per organization. The sample size was determined using G power with an anticipated effect size of 0.15, a desired statistical power level of 0.95, and a probability level of 5%. Using such method, a minimum sample size of 89 was calculated.

In order to test the efficacy of the survey questionnaire used in manufacturing firms in Greece here in the Philippines, pilot test was conducted. 30 samples were generated from respondents outside the locale of the study and those who are not within the industrial parks mentioned above. Results were subjected to reliability test using Cronbach's alpha via SPSS 20. The overall Cronbach's Alpha was computed as 0.979991. This value indicates an excellent reliability of the survey questionnaire when used in the Philippines.

During the conduct of this study, the researcher connected with the primary author of the research Dr. Dimitrios P. Kafetzopoulos of the University of Patras, Greece via e-mail, Linked-In and Facebook (Appendix D). This was done to secure permission to replicate their study which he positively responded upon and invitation accepted at once. Primary data was generated using survey questionnaire. Copy of questionnaire in Google Forms were sent to respondents via e-mail with the help of the Industrial Parks' Administration Personnel. In compliance with RA 10173 also known as the Philippines Data Privacy Act of 2012, e-mail addresses of the respondents were not collected. Parks' Administrators forwarded such to their respective locators (term used for companies inside an industrial park).

From a total of 528 questionnaires sent to target respondents, 131 were received. Further, the identified in-eligible respondents were 89 while unreachable were 98 (Computation in Appendix E). Respondents who were coming from service industry, positions other than middle management and above and less than three years of ISO 9001 certification were discarded from the population leaving a total of 96 valid responses. Since not all targeted respondents participated in the survey, pilot test responses were included in the population to complete the required minimum respondents. Based on these data, the computed Total Response Rate is 32.43% while the Active Response Rate is 42.81%. The gathered responses may be deemed adequate in accordance with the suggested reasonable response rate of (Saunders, Lewis, & Thornhill, 2016) at 30% to 40%.

The questionnaire was adopted from the study of Kafetzopoulos et al. (2014). Further, confidentiality of the received data was assured on the respondents as stipulated on the message request prior to actual questionnaire. All survey used a 7-point Likert Scale with responses as 1=very low to 7=very high. These represents the three dimensions of ISO effectiveness and three determinants of firms' performance. The Survey questionnaire consisted of 8 sections with the first and second sections as Title and Respondent's Profile Respectively Section 3 was a five-item questionnaire on customer satisfaction focus. A four-item questionnaire on prevention of non-conformance and a six-item questionnaire on continuous improvement were on Sections 4 and 5 respectively. The last three sections were composed of five, six and ten items on product quality, operational performance and business performance respectively. Acceptable responses were tallied and analyzed through linear regression analysis using SPSS version 20. The  $r$  values were interpreted as; exactly  $-1$  = A perfect negative linear relationship;  $-0.70$  = A strong negative linear relationship;  $-0.50$  = A moderate negative relationship;  $-0.30$  = A weak downhill negative linear relationship;  $0$  = No linear relationship;  $+0.30$  = A weak positive linear relationship;  $+0.50$  = A moderate positive relationship;  $+0.70$  = A strong positive linear relationship; Exactly  $+1$  = A perfect positive linear relationship. On the other hand, the  $r^2$  values were interpreted as the proportion of the variance in product quality, operational performance and business performance that is predictable from the ISO 9001 effectiveness in terms of customer satisfaction focus, prevention of non-conformance and continuous improvement. For the effect of the three determinants amongst each other,  $r^2$  values were interpreted as the proportion of the variance in product quality and business performance that is predictable from the perceived product quality and operational performance in terms of ISO 9001 effectiveness. The effect of ISO 9001 effectiveness on product quality, operational performance and business performance was considered significant if the  $p$  value is less than 0.05. Furthermore, the effect of product quality on business



performance and operational performance on business performance and product quality were considered significant if the p value is less than 0.05

### 3. Results and Discussion

This research study aimed to investigate the effect of ISO 9001 effectiveness on the performance of certified manufacturing firms in Laguna and Batangas. Out of 131 received responses 96 were valid at a response rate of 32.43%. 57 responses came from members of manufacturing firms in Laguna while 39 from Batangas with an average of 2 respondents per company from a total of 49 participating companies. Respondents were almost equally distributed among the three qualified positions as 31, 28 and 37 for CEO/COO/managerial, middle management and supervisory respectively. Nearly half of the respondents were outside the industrial parks at 47% with 45 participants. On the other hand, LiMA, CIP and LISP had 3 of the greatest number of respondents with 18, 11 and 8 respectively. To complete the respondents' list, FPIP had 6 while LTI and CPIP both had 4 contributors All the variables got an average response rating of 6 or nearly very high except for Business Performance where the mean response rate is 5.

ISO 9001 effectiveness was defined using the three QMS rationale namely customer satisfaction focus, prevention of non-conformance and continuous improvement. The perception of the above-mentioned respondents on ISO 9001 effectiveness were solicited using the three determinants of firms' performance as product quality, operational performance, and business performance. Results showed synonymous findings as that of Kafetzopoulos, et al, 2014 on the effect of ISO 9001 effectiveness on product quality and operational performance. The same is true with the effect of operational performance on business performance and product quality. However, contradicting results were obtained on investigating the effect of ISO 9001 effectiveness on business performance and product quality on business performance. Details of such findings are stipulated below. The results of statistical analysis are referenced in Appendix H while the summary results of this investigation are as follows:

To investigate if the perceived effectiveness of ISO 9001 has significant effect on product quality, table 2 below showed that at a regression value of 0.853 ISO 9001 effectiveness has strong positive linear relationship with product quality. Results further showed that ISO 9001 effectiveness (ISOE) has significant effect on product quality given the p-value of 0.000 which is less than the 0.05 standard. It means that ISOE is a significant predictor of product quality contributing 0.866 to every unit of change in product quality. Overall, the results of the multiple regression indicated that ISO 9001 effectiveness in terms of customer satisfaction focus, prevention of non-conformance and continuous improvement explained 72.70% of the variance of product quality ( $R=.853$ ,  $R^2=.727$ ,  $F=250.612$ ,  $p>.05$ ).

**Table 2**

*Effect ISO 9001 Effectiveness on Product Quality.*

Ho1: The perceived effectiveness of ISO 9001 has no significant effect on product quality.

Coefficients <sup>a</sup>						Interpretation
Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	
	B	Std. Error	Beta			
(Constant)	.932	.332		2.808	.006	
ISOE	.866	.055	.853	15.831	.000	Significant
a. Dependent Variable: Product Quality						
$R = .853$		$R^2 = .727$		$F = 250.612$	$p\text{-value} = .000$	

The result above proved that an organization who adopts an effective ISO 9001 produces high quality products which showed synonymous result with the studies of Agus (2000), Laurencio (2012), Mangula (2013), Bhatia et al (2014) and (Matata & Wafula, 2015). The quality of a product is the degree to which a set of inherent characteristics fulfill requirements of the customer (Kumar, 2008). A firm who implements effective ISO 9001 ensures customer satisfaction through conformance to requirements that are either specified by the customer or inherent to the product. When firms strive hard to listen to the voice of their customers by ensuring that non-conformances are prevented by further enhancing product characteristics such as durability and reliability this will lead to attaining higher level of firms' performance in terms of product quality. This confirmed the significance of product quality, product features and delivery in promoting customer satisfaction which is one of the ISO 9001 rationale.

Table 3 below, presents the effect of ISO 9001 effectiveness on operational performance (Objective number 2). It was noted that at a regression value of 0.823 ISO 9001 effectiveness has strong positive linear relationship with operational performance. Further, results showed that ISOE has significant effect on operational performance given the p-value of 0.000 which is less than the 0.05 standard. It means that ISOE is a significant predictor of operational performance contributing 0.877 to every unit of change in operational performance. Overall, the results of the linear regression indicated that ISO 9001 effectiveness in terms of customer satisfaction focus, prevention of non-conformance and continuous improvement explained 67.70% of the variance of operational performance ( $R=.823$ ,  $R^2=.677$ ,  $F=197.424$ ,  $p>.05$ ).

**Table 3**

*Effect ISO 9001 Effectiveness on Operational Performance.*

Ho2: The perceived effectiveness of ISO 9001 has no significant effect on operational performance.

Coefficients <sup>a</sup>						
Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Interpretation
	B	Std. Error	Beta			
(Constant)	.503	.379		1.328	.187	
ISOE	.877	.062	.823	14.051	.000	Significant
a. Dependent Variable: Operational Performance						
R = .823		R <sup>2</sup> = .677		F = 197.424		p-value = .000

This finding proved that an effective implementation of ISO 9001 leads to an improved operational performance. This is in congruent with several research studies of Mangula (2013), Prates & Carashi (2014), Abdulrahman (2014), Njenga (2016), Matata et al (2015), Prado-Roman et al (2016), and Tabassum (2017) which confirms that ISO 9001 effectiveness guarantees internal efficiency of processes thereby attaining improved operational performance. A firm who continuously find ways to ensure effectiveness and efficiency of their process to meet their customers' demand have nowhere to go but to attain a higher level of operational performance.

The third objective on investigating if the effectiveness of ISO 9001 has significant effect on business performance is an important finding in this study. Table 4 below, presents the effect of ISO 9001 effectiveness on business performance (Objective number 3). At a regression value of 0.692, ISO 9001 effectiveness has strong positive linear relationship with business performance. Findings also showed that ISOE has significant effect on business performance given the p-value of 0.000 which is less than the 0.05 standard. It means that ISOE is a significant predictor of business performance contributing 0.896 to every unit of change in business performance. Overall, the results of the linear regression indicated that ISO 9001 effectiveness in terms of customer satisfaction focus, prevention of non-conformance and continuous improvement explained 47.9% of the variance

of business performance ( $R=.692$ ,  $R^2=.479$ ,  $F =86.528$ ,  $p>.05$ ).

**Table 4**

*Effect ISO 9001 Effectiveness on Business Performance.*

Ho3: The perceived effectiveness of ISO 9001 has no significant effect on business performance.

Coefficients <sup>a</sup>						
Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Interpretation
	B	Std. Error	Beta			
(Constant)	-.033	.584		-.057	.955	
ISOE	.896	.096	.692	9.302	.000	Significant
a. Dependent Variable: Business Performance						
R = .692		R <sup>2</sup> = .479		F = 86.528	p-value = .000	

The obtained result is in contrast with the previous study of Kafetzopoulos et al (2014) supported by Prado-Roman (2016) who answered the doubts on the economic value of ISO 9001 and the criticisms that QMS implementation is costly and time-consuming through the negative results that they got (Nyakio Kibe & Wanjau, 2014). They explained that effective implementation of QMS entails flexible work practices and additional manpower for quality assurance which requires extra costs thereby affecting profitability. However, they pointed out that this effect may only be felt in the next few years upon certification. On the other hand, the same result as this current study was obtained in the research of Kazilunas (2010), Yahia-Berrouguet (2015), Njenga (2016) and Novokmet (2017) which proves that companies at a higher maturity level in QMS implementation have better long-term financial outcomes (Novokmet, 2017). An effective QMS may be translated to an improved corporate image thereby attaining a competitive advantage that may lead to higher market share and net profit (Njenga, 2016). It also demonstrates that ISO 9001 effectiveness through customer satisfaction focus and continuous improvement can deliver business and financial benefits if firms' managers will be able to carefully design the QMS implementation strategy that guarantees competitive edge among firms' competitors (Kazilunas, 2010). While preventive action used by Kafetzopoulos et.al, 2014 focuses on the installation of control measures to prevent the occurrence of process deviation, rejects and reworks. Such action requires additional resources to safeguard non-conformances incurring lesser revenue for the company. Novokmet, 2017 used the new framework for QMS maturity metrics that is based on ISO 9001 standard and its principles is herein proposed as an intermediary between quality management and financial performance. According to him, high level of QMS maturity is attainable when company thoroughly and consistently implements all the ISO 9001 principles (Novokmet, 2017).

The elucidation stipulated on the result of objective number 3 holds through with objective number 4 which also achieved an essential finding. The aim on investigating if the perceived product quality has significant effect on business performance confirms that at a regression value of 0.692, product quality has a strong positive linear relationship with business performance. It further proved that product quality has significant effect on business performance given the p-value of 0.000 which is less than the 0.05 standard. This means that product quality is a significant predictor of business performance contributing 0.882 to every unit of change in business performance. Overall, the results of the linear regression indicated product quality in terms of ISO 9001 effectiveness explained 47.90% of the variance of business performance ( $R=.692$ ,  $R^2=.479$ ,  $F =86.563$ ,  $p>.05$ ).

**Table 5***Effect of Product Quality on Business Performance.*

Ho4: Perceived product quality has no significant effect on business performance.

Coefficients <sup>a</sup>						
Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Interpretation
	B	Std. Error	Beta			
(Constant)	-.061	.587		-.104	.917	
Product Quality	.882	.095	.692	9.304	.000	Significant
a. Dependent Variable: Business Performance						
R = .692		R <sup>2</sup> = .479		F = 86.563	p-value = .000	

The above data showed that perceived product quality due to ISO 9001 effectiveness eventually leads to a better business performance which is inconsistent with the results obtained by Kafetzopoulos et al (2014) and Prado-Roman (2016). However, the researcher found consistency of such result with the studies of Tabassum (2017) and Popova (2018) who supported the idea of internal integration of quality management system and other improvement tools to attain improvement not only in quality but in the overall performance of a firm. The time element on the previous and current study is also one logical interpretation of this result contradiction. The released ISO 9001:2015 version in September of 2015 has introduced a more significant changes than with that of the 2008 version which specifically introduced the concept of risk-based thinking. In this approach, the organization is not only concerned with achieving an excellent quality but looking at the optimum value of a product considering all aspects of the business. It is more of achieving an organizational direction through balanced scorecard (Kaplan, 1998). Such considerable perspectives of balanced scorecard are financial, customer, internal business process and learning & growth. The aim is to consistently produce high quality products at an optimum resource allocation by creating balance among these four perspectives thereby achieving business sustainability. Although both used the ISO 9001:2008 version in their research, Tabassum, 2017 used the concept of continual improvement while Popova, 2018 introduced the integration of QMS via the concept of balanced scorecard.

**Table 6***Effect of Operational Performance on Business Performance.*

Ho5: Perceived operational performance has no significant effect on business performance.

Coefficients <sup>a</sup>						
Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Interpretation
	B	Std. Error	Beta			
(Constant)	.532	.531		1.002	.319	
Operational Performance	.835	.091	.688	9.181	.000	Significant
a. Dependent Variable: Business Performance						
R = .688		R <sup>2</sup> = .473		F = 84.293	p-value = .000	

The objective on investigating if the perceived operational performance has significant effect on business

performance achieved a strong positive linear relationship at a regression value of 0.788. Given the p-value of 0.000 which is less than the 0.05 standard, this proved that operational performance has significant effect on business performance. It means that operational performance is a significant predictor of business performance contributing 0.835 to every unit of change in business performance. Overall, the results of the multiple regression indicated that operational performance in terms of ISO 9001 effectiveness explained 47.30% of the variance of business performance ( $R=.688$ ,  $R^2=.473$ ,  $F=86.293$ ,  $p>.05$ ).

The above result showed that operational performance contributes to the business performance of a firm exhibiting agreement with the results drawn from the researches of Mangula (2013), Kibe (2014), Matata et al (2015), Yahia-Berrouiguet (2015), Tabassum (2017), Prado-Roman and Del Castillo-Peces, (2018). This confirms that an increase in operational efficiency entails optimization of production cost that warrants flexible pricing to the firm thereby winning cost advantage among its competitors. This competitive advantage eventually allows expansion of the organization's market share that definitely achieves a higher net revenue. The result also proves that effective implementation of QMS enables organization to improve internal efficiencies which is considered as one pre-requisite to becoming competitive in global marketplace (Nyakio Kibe & Wanjau, 2014).

The perceived operational performance has significant effect on perceived product quality (objective number 6) is far more obvious than the rest of the objectives but is still worth the confirmation. Results showed that at a regression value of 0.788 operational performance has a strong positive linear relationship with product quality. Findings also proved that operational performance has significant effect on product quality given the p-value of 0.000 which is less than the 0.05 standard. It means that operational performance is a significant predictor of product quality contributing 0.751 to every unit of change in product quality. Overall, the results of the linear regression indicated operational performance in terms of ISO 9001 effectiveness explained 62.10% of the variance of product quality ( $R=.788$ ,  $R^2=.621$ ,  $F=154.340$ ,  $p>.05$ ).

**Table 7**

*Effect of Operational Performance on Product Quality.*

Ho6: Perceived operational performance has no significant effect on product quality.

Coefficients <sup>a</sup>						
Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Interpretation
	B	Std. Error	Beta			
(Constant)	1.801	.353		5.102	1.801	
Operational Performance	.751	.060	.788	12.423	.751	Significant
a. Dependent Variable: Product Quality						
R = .788		R <sup>2</sup> = .621		F = 154.340		p-value = .000

This data proved that an efficient and effective operational performance that continuously improves, produces an even enhanced quality product. Although Kafetzopoulos et al (2014) did not find literature to support their claim when they did their research, Popova (2018) was able to affirm such in his study. His results revealed that firms' readiness for continuous improvement on operational efficiency via the adoption of lean concept leads to achievement of higher objectives (Popova, 2018). Manufacturing a product is not all about producing and delivering customers' requirements but to consistently convert resources into quality products by optimally using the firm's available resources at the shortest time possible.

#### 4. Conclusion and Recommendation

The findings in this research study has substantially provided theoretical evidence on proving that ISO 9001 effectiveness has significant effect on firms' performance specifically pertaining to product quality, operational performance and business performance. Therefore, the null hypotheses Ho1, Ho2 and Ho3 are hereby rejected. Another conclusion can also be derived about the significant effect among these three performance determinants such as product quality, operational performance and business performance. It can be concluded that product quality and operational performance has significant effect on business performance and operational performance has significant effect on product quality. Based on these results, the null hypotheses Ho4, Ho5 and Ho6 are thereby rejected.

This paper also proved that ISO 9001 is not all about being certified but going beyond certification through striving for QMS effectiveness. However, effectiveness is subjective depending on the organization's motivation on adopting their QMS. The misconception that ISO 9001 is effective if they were able to maintain certification by passing their periodic surveillance and re-certification audits can be clarified in this study. Unfortunately, companies may continuously gain recommendation for continued certification from their certifying body but the effect of ISO 9001 is not being translated to firms' performance outcome. It is but logical to define effectiveness through the ISO 9001 rationale namely customer satisfaction, continuous improvement and prevention of non-conformities by which this research study was able to prove.

Moreover, it is apparent in this research that the time element on the conduct of research is vital. This is an integral addition to the body of knowledge that addresses the controversial effect of ISO 9001 certification on firms' performance, specifically on business performance. This confirms that researchers who obtained contradicting results may not only base their findings on the manner or motivation that ISO 9001 was adopted or implemented. It is also worthy to consider the current standards being used by the organizations when the research studies were conducted. To further clarify on the essence of time element, ISO 9001:1987 version is all about procedures and documentation. In ISO 9001:1994, the standard included the concept of preventive action. For ISO 9001:2000, the standard was totally changed and introduced the concept of process approach and PDCA cycle. The ISO 9001:2008 is a clarification on terminologies of the 2000 version but still using process approach and PDCA cycle (basically an enhanced version of the ISO 9001:2000). ISO 9001:2015, the newest standard is a total make-over. It introduces the concept of risk management, internal and external issues (strategic planning) and interested parties. This development is significant in determining the effect of having an effective QMS in certified organization. It can be concluded that companies who can maintain the effective use of ISO 9001:2015 standard can enjoy its full benefit not instantly but gradually over a long period of time.

Generally, this paper depicted the significant effect of ISO 9001 effectiveness on firms' performance such as product quality, operational performance and business performance when used effectively and optimally by company owners and top-level management. The effective use of ISO 9001:2015 standard, integrated with other concepts such as continuous improvement and balanced scorecard brings out the significant effect of ISO effectiveness on firms' performance. As a matter of logic, an organization who struggles to demonstrate minimum compliance to QMS may not attain their much expected business excellence. The reason being is that ISO certification is not a guaranteed means for organizational survival. It is the firms' implementation effectiveness through objectives achievement that makes quality their best business plan.

The conclusion derived from this research study on the significant effect of ISO 9001 effectiveness on product quality, operational performance and business performance serves are an eye-opener to manufacturing firms to effectively commit to quality. It is but high time for the company owners and top-level management to view ISO 9001 as a catalyst for change rather than an instant cure for survival, compliance to government and customer requirement or marketing tool. Managers are highly recommended to gain high level of understanding on the standard requirements and design an implementation plan that best suit their organization and even the industry that they are operating with in order to capitalize on the effect of ISO 9001 into their firms' performance.

Not only is this research study valuable for private firms. The heads of government agencies are as well encouraged to realize that adopting QMS through ISO 9001 certification is not all about compliance to executive order but an opportunity to improve and better serve the nation in the most effective way. Policy makers are enjoined to device a mechanism such as developing Implementing Rules and Regulations pertaining to the released Executive Order 605 Series of 2007 to determine the effectiveness of the established QMS within ISO 9001 certified government firms in the Philippines. Lastly, the time element pertaining to the used standard during research conduct that has become an essential finding in this paper should be considered by researchers who opt to pursue this study. It is highly recommended to consider the ISO 9001 version of previous literatures using time elements during results investigation. In this way, contradiction on empirical results may be further explained and a more objective results may be obtained.

#### 4.1 Limitations of Research

This research study may have clarified confusions on previous empirical studies but still some limitations are associated with it. These may serve as basis for further conduct of future studies that would warrant numerous evidences to support the objectives of ISO 9001. Considering that this study solely gathered perception of the respondents, accurate data may not be obtained specifically on business performance particularly, financial. In this regard, the study suggests that future researchers use a combination of primary and secondary data gathering technique for business performance. Primary data may be improved by employing a more rigid qualification on the target respondents. This can be done through limiting respondents from Managerial position and above instead of including Supervisory position holders to ensure reliability of perception especially on the business performance. Those who have direct access to the needed information may be deemed as appropriate respondents. Qualifications may also be related to tenure or those who were present in the firm before and years after certification. Moreover, since the research was conducted in any manufacturing firms within the locale of the study without taking into account other factors that may affect respondents' perception, it is suggested to investigate its applicability to specific manufacturing or service industries basically adopting the same construct and modifying instrument applicable to that specific industry.

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