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Analysis Of The Effect Of The Implementation Of ISO 9001:2015 Quality Management System On Company Performance And Its Impact On Chemical Industry Consumers

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Abstract

In maximizing some of the pillars / indicators that have become superior, Indonesia needs to implement a quality management standard system to ensure that some of the pillars / indicators that have become superior have been in accordance with the wishes and expectations to be able to compete with other countries. This research aims to find out the significant factors that affect the success of chemical manufacturing companies in implementing ISO 9001:2015 quality management systems and affect the success of chemical manufacturing companies in implementing ISO 9001:2015 quality management systems that impact customers which in this case is indicated by the company's performance. The population in this study was the company's employees in the Chemicals and Goods Industry of Chemicals which amounted to 15 companies with a total of 103 employees, with the number of samples based on proportionate stratified random sampling as many as 103 samples. The data analysis method uses the Structural Equation Model-Partial Least Square (SEM-PLS) and one of the Statistical Processing Control is a pareto diagram to be able to detect specific causes as early as possible. The results found that the implementation of the ISO 9001:2015 quality management system was found to have a positive and significant influence on customer impact and organizational performance. The results of variance accounted for (VAF) testing of the implementation of ISO 9001:2015 quality management system were found to have an indirect-only mediation effect on the relationship between external auditing, employee involvement, finance, infrastructure, motivation, team work, top management commitment, training and education, to impact to customer. The implementation of the ISO 9001:2015 quality management system mediates the relationship between external audits, team work positively and significantly on organizational performance. The implementation of ISO 9001:2015 quality management system was found to have an indirect-only mediation effect on the relationship between employee involvement, finance, infrastructure, motivation, top management commitment, and training and education to organizational performance.

Keywords: ISO 9001:2015, Finance, Top Management Commitment, Infrastructure, Employee Involvement, Team Work, Training And Education, Audit External, Motivation, Organizational Performance, Impact To Customer, Chemical Industry Consumers, SEM-PLS, VAF

1. Introduction

Indonesia's global competitiveness index ranking in the World Economic Forum (WEF) report fell from 45th out of 140 countries in 2018 to 50 out of 141 countries in 2019. Indonesia ranks 4th in ASEAN after Singapore (1), Malaysia (27) and Thailand (40), and when compared to Singapore which ranks first in global competitiveness, Indonesia still lags behind almost all components of competitiveness, except macroeconomic stability components and economic size (Nadya et al., 2020).

In the face of the Global Competitiveness Index in the following years Indonesia needs to maximize some pillars / indicators that have become superior, namely pillars with excellent and good scores, while improving the pillars that still score low to encourage Indonesia's position to excel among ASEAN peers and then excel in the global sphere. In maximizing some of the pillars / indicators that have become superior, Indonesia needs to implement a quality management standard system to ensure that some of the pillars / indicators that have become superior have been in accordance with the wishes and expectations to be able to compete with other countries. Therefore, the implementation of iso 9001:2015 quality management

system can be one solution to ensure the quality of different products competitiveness.

ISO 9001 is a comprehensive section published by the International Organization for Standardization (ISO). This ISO applies to facilities designing, developing, producing, installing & providing product services to customers who specify the product for which it must appear (Muschler et al., 2010). Despite changes in the content of ISO 9001 from the 2008 version to the 2015 version, the structural clause of ISO 9001:2015 still follows the Rules of Plan-Do-Check-Action (PDCA). The potential benefits of an organization implementing a quality management system based on the international standard ISO 9001:2015 according to (Kaur et al., 2021) 1) This organization has objective evidence that it attaches great importance to quality and gets everything audited regularly by internal and external auditors. This commitment increases the assurance in the organization. 2) The organization can achieve higher operating productivity. It is believed that any organization that considers a Management System as an essential part of their business operations generally achieves higher operating efficiency than those that do not. 3) A certified Management System improves the quality of manufacturing organizations and service providers and raises awareness among employees. 4) A certified Management System ensures that clear processes and communication structures, responsibilities throughout the organization. Therefore, it increases employee engagement, thereby improving the work atmosphere and reducing work pressure. According to a 2019 report published by ISO, 883,521 ISO 9001 certificates have been issued worldwide in 197 countries around the world and for Indonesia, 6,433 ISO 9001 certificates mean that 0.7% of organizations have iso 9001 certification.

The countries with the highest number of ISO 9001 certified organizations are China, Italy, Germany and several other countries. Based on ISO data that for ISO 9001 certification consists of various types of industrial sectors where for the chemicals chemical product (fibres) sector, which is made from chemicals and rubber in 2017, as many as 29971 companies certified iso 9001 by certification bodies. From the graph above, there is a tendency to increase the number of ISO 9001 certificates validated from year to year in the manufacturing industry of chemicals and goods from chemicals. Quality Management Systems (SMM) emphasizes the application of quantitative approaches with experienced resources to improve processes within an organization and exceed customer expectations (Alka & Palmes Paul C, 2018).

Meanwhile, the number of ISO 9001 certificates in Indonesia, which are issued annually can be seen in graph 3 data. The number of ISO 9001 certificates in Indonesia validated from 1993 - 2019 is 103,224 ISO 9001 certificates validated in Indonesia. From data obtained from the Central Statistics Agency (BPS) in 2021, the number of companies as a whole in the industrial sector in 2017 amounted to 33,577 companies, in 2018 as many as 30,115 companies, and in 2019 as many as 30,072 companies. In terms of the number of companies, the number of companies in the chemical and chemicals industry sector did decrease, but in terms of growth according to BPS the growth of production of large and medium manufacturing industries in the fourth quarter of 2019 rose by 0.09 percent (q-to-q) in the third quarter of 2019. The industries that experienced the highest increases in production were the chemicals and goods from chemicals, up 13.07 percent (Bps.go.id, 2020).

Based on the Large and Medium Industry Survey conducted by the Central Statistics Agency, it aims to produce production index figures of medium and large-scale manufacturing industries used to calculate the growth rate of the manufacturing industry which will be used as the basis for calculating Gross Domestic Product, especially the manufacturing industry sector. Industries in the chemicals industry sector and goods from chemicals showed the production index in 2019 experienced fluctuations in the four quarters. Therefore, the Ministry of Finance continues to attract investment, increase production capacity, and build its ability to become a net exporter and producer of specialist chemicals (Kemenperin.co.id, 2018).

According to data from BSI group (British Standards Institution) on its website in 2021, companies certified iso 9001 benefited significantly in business after implementing ISO 9001 including 66% managed to improve the improvement of its products and services, 60% managed to reduce frequent errors, 65% managed to increase customer trust, 57% managed to attract new customers, 54% managed to improve the competitiveness of the company. According to (Lushi et al., 2016) ISO 9001 has an impact on the company's performance, namely financial performance, employee productivity and providing added value to customers. Then, Purwanto et al., (2020) suggested that there are benefits resulting from companies that have been ISO certified, namely the effect

on quality, reduction of defective products, decreased customer complaints and reduction of production / operational costs. According to Anoye, (2015) stated that companies certified iso 9001 is not positively correlated to the profitability of the company.

2. Review of Literature Study

2.1 Concepts and Definitions of Quality/ Quality

Ashby & James T Townsend, (1986) defines quality in two perspectives: quality in perception (how well a service/product meets customer requirements) and quality in reality (expertise) present in service or product development. The company must meet both types of quality in order to succeed.

2.2 Quality Management System

Martínez Fuentes et al., (2000) suggests three practical approaches used by organizations to implement quality management are the standard approach (e.g. the ISO 9001 standard), the awarding criteria (i.e. various national and regional business excellence or business quality such as the Malcolm National Quality Award Baldrige (MBNQA) and the Australian Business Excellence Awards (ABE), and an element approach consisting of many ideas promoted by consultants and experts in this field.Theories for quality management in organizations can be developed by looking at multiple sources; Quality perspectives, empirical research and official assessment models.

2.3 Quality Contribution

Garini & Alim, (2018) explained that quality is beneficial for the company in determining things such as Company Reputation, Product Liability, Global Implication. The three steps to quality are quality leadership, modern quality technology and organizational commitment. Ishikawa &Lu, 1985 stresses its importance. Employee training and education and the use of statistical techniques to collect and analyze factual data, and teamwork as a basis for applying overall quality.

2.4 Quality Control Tools

In 1960, Ishikawa introduced seven tools for quality control in Japan. Quoted from Sulaeman, (2014), the seven quality control tools introduced by Ishikawa include checksheets, checksheets, causal diagrams (fishbone diagrams), pareto diagrams, scatter diagrams, flow diagrams, control diagrams.

2.5 Overview of ISO 9001:2015

ISO 9001:2008 provides guidance for organizations to create their quality systems by focusing on procedures, controls and documentation (Sun et al., 2018). Therefore, the purpose of ISO 9001:2008 is to provide consistency in the product, meet customer needs and regulatory requirements and have a system that satisfies customer satisfaction, continuous improvement, prevention of non-compliance and the use of systems approaching TQM (Martínez Fuentes et al., 2000). ISO 9001:2008 is considered a management tool, a driver of innovation and plays a strategic role in organizations in focusing and ensuring the delivery of quality products/services (Wiele et al., 2005).

The process approach is developed based on the belief that the desired outcome is achieved more efficiently if related activities and resources are considered a process (Bhuiyan et al., 2005). In addition, the use of process approaches emphasizes the importance of understanding and meeting needs, the need to consider processes in terms of added value, process outcomes and continuous process improvement based on objective measures (Leong et al., 2012). ISO 9001:2015 uses a process approach that combines a Plan-Do-Check-Act (PDCA) cycle and a risk-based mindset. The process approach allows organizations to plan their processes and interactions. The PDCA cycle enables an organization to ensure that processes with resources are adequate and managed, and opportunities for improvement are determined and acted on.

(Feng et al., 2008) state that organizations that run voluntary and positive certification processes as well as widespread deployment of goals tend to report improved organizational performance rather than organizations driven by customer pressure. Compared to TQM, (Martínez-Costa & Martínez-Lorente, 2003) writes that ISO 9001 has a lower impact on business performance than TQM. In contrast, Corbett, Montes-Sancho, &Kirsch (2005) found that the use of ISO 9000 had a positive impact on business performance. Corbett et al., (2005) suggest that ISO 9001 certification brings significant improvements in financial performance.

Based on Lushi et al., (2016) the benefits of ISO 9001 certification companies have an impact on the company's performance, namely financial performance, employee productivity and providing added value to customers. The same thing was obtained from Jannah et al., (2020) that the implementation of ISO 9001 has a significant effect on financial performance.

The same results were obtained by (Rahman, 2001) in his research of West Australian companies on the impact of ISO 9001 on organizational performance between ISO 9001 registered companies and unregistered companies. Simmons &White, (1999), when they compared the performance of ISO 9001 companies that are certified and not certified. Simões et al., (2016) could not see any difference in the performance levels of the two groups.

2.6 Success Factors for ISO 9001 Implementation and Organizational Performance

According to Doto et al., (2018) the implementation of QMS ISO 9001 has a positive impact on organizational performance and organizational performance has a positive impact on customers. Top management commitments, employee engagement, training and education, communication and teamwork have a significant influence on the effectiveness of the implementation of ISO 9001 QMS as well as organizational performance (improving the quality of products or services, increasing productivity, reducing production costs, and reducing customer complaints). The company's performance has a significant impact on customers (customer satisfaction, attracting new customers and repeat orders).

3. Methodology

The methodology to be used in this research is descriptive research analysis, research conducted quantitatively. The data is collected through a pre-prepared questionnaire. In addition, to validate the results of the study used the Partial Least Square – Structural Equation Modeling (PLS-SEM) application system and one of the Statistical Processing Control is a pareto diagram to be able to detect specific causes as early as possible then use a Cause-and-Effect Diagram to further take remedial action on the problem. Operational variables in this study finance top management commitment consists of 5 indicators, infrastructure consists of 2 indicators, employee involvement consists of 3 indicators, teamwork consists of 3 indicators, training and education consists of 3 indicators, external audit consists of 3 indicators, motivation with 1 indicator. Organizational performance consists of 4 indicators and impact to customer consists of 3 indicators.

The population in this study was the company's employees in the Chemicals and Chemicals Industry which amounted to 15 companies with a total of 103 employees. According to Umar, (2000) To determine the required sample size of a population of 103 used the formula Slovin, the sample size needed in this study as many as 99 respondents. Sampling technique with Proportionate Stratified Random Sampling is done by collecting data on the number of employees from each section which is then determined the number of samples needed for each section. According to (Natsir, 2003) the formula for the number of samples of each section with the Proportionate Stratified Random Sampling technique Based on perhitunagn Proportionate Stratified Random Sampling the number of samples to be used in this study amounted to 103 samples.

4. Result

4.1 Research Data Analysis

The design model in the study uses a hierarchical component model (HCM) approach with a reflexive-formative measurement model consisting of lower-order and higher-order construct. Analysis of data in research using the Partial Least Square Structural Equation Modelling (PLS-SEM) method. The first stage is done by analyzing the factors carried out to test whether the repeated indicators used can confirm latent variables that have a second-order model while the second stage is done to analyze the structure of interconnected (correlation) between higher-order variables that will be carried out at the test stage of the research hypothesis.

Based on the test results it can be known that all measuring items have met the requirements of testing outer loading values which will then be analyzed the average variance extracted (AVE) value above 0.50 so that it can be said to be valid and can be used to measure each latent variable. From the results of the analysist it can be known that the entire measuring item / indicator that is a representation of each dimension is valid to be able to measure and confirm the variable construct of iso 9001:2015 quality management system implementation variables.

Variance Inflation Factor (VIF) test results show the VIF value of all predictor constructs is less than 7, therefore, colinearity is not an issue between construct dimensions (Hair et al., 2014). Confidence interval (CI) values of both 2.5% and 97.5% of each dimension against variables worth less than or equal to 1.00 can be seen in the table below, so it is concluded that each supporting indicator does not have discriminant validity problems. The results of composite reliability tests showed that all latent variable

values had a value of ≥ 0.70 and Cronbach's alpha and rho_A had a ≥ value of 0.60. Thus all constructs are acceptable reliability.

Table 1 Results of The Significance of the Relationship Between Dimensions and Variables

	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (|O/STDEV|)	P Values
Audit External [LOC] -> Implementation of ISO 9001:2015 Quality Management System [HOC]	0.134	0.131	0.015	9.102	**0.000**
Employee Invlolvement [LOC] -> Implementation of ISO 9001:2015 Quality Management System [HOC]	0.194	0.195	0.018	11.024	**0.000**
Finance [LOC] -> Implementation of ISO 9001:2015 Quality Management System [HOC]	0.072	0.073	0.005	13.125	**0.000**
Infrastructure [LOC] -> Implementation of ISO 9001:2015 Quality Management System [HOC]	0.136	0.137	0.013	10.773	**0.000**
Motivation [LOC] -> Implementation of ISO 9001:2015 Quality Management System [HOC]	0.069	0.069	0.004	16.528	**0.000**
Team Work [LOC] -> Implementation of ISO 9001:2015 Quality Management System [HOC]	0.181	0.182	0.015	12.035	**0.000**
Top Management Commitment [LOC] -> Implementation of ISO 9001:2015 Quality Management System [HOC]	0.268	0.267	0.018	14.630	**0.000**
Training and Education [LOC] -> Implementation of ISO 9001:2015 Quality Management System [HOC]	0.149	0.148	0.008	17.646	**0.000**

Source: SmartPLS Output Results 3.3.3 (2022)

Based on the results of the second order confirmation factor analysis test used to identify the dimensions of a structure and then determine how far each variable can be explained by each dimension, the entire lower-order construct forming a higher-order national culture construct is found to have a t-statistics value above 1.96 and a p-value below 0.05, it can be concluded that all lower order dimension constructs are components. higher order variable construct formation.

4.2 Measurement Model Analysis

All measuring items meet the outer loadings value testing requirements because there are no question items below 0.6. the entire measuring item / indicator that is a representation of each valid latent variable to be able to measure and confirm the construct of the intended latent variable. Confidence interval (CI) values of both 2.5% and 97.5% of each dimension against variables worth less than or equal to 1.00 can be seen in the table below, so it is concluded that each supporting indicator does not have discriminant validity problems. Each latent variable has a good discriminant validity where some latent variables still have a meter that is highly correlated with other constructs. By looking at cross-loadings, all indicators must contain the highest values on related constructions. The results of cross loadings show that the value of outer loadings on each intended construct is greater than the value of outer loadings with other constructs. The results of composite reliability tests showed that all latent variable values had a value of ≥ 0.70 and Cronbach's alpha and rho_A had a ≥ value of 0.60. Thus, all constructs are acceptable reliability. Cronbach's alpha is the lower limit and composite reliability is the upper limit of internal reliability consistency (Hair et al., 2017).

4.3 Structural Model Analysis

After the model is estimated to meet the criteria of the measuring model (outer model), the next test of the structural model (inner model). According to Ghozali (2015), the evaluation of structural models (inner models) aims to predict relationships between latent variables. Hair et al. (2017) in Ramayah et al. (2017) suggest looking at the value of the coefficient of determination (R2), the value of effect size (f2), the fit model and predictive relevance (Q2) to assess the structural (inner model). From the results of the above test can be seen that the value of R-Square (R2) adjusted or coefficient of determination of the impact to customer construct of 0.518. The results showed that the endogenous variable impact to customer with R-Square values of 0.518 and 0.608. The result of the effect size (f2) calculation in the research model where the entire path has a value range of 0.000 to 1,578. It was found that there was one relationship that had a large influence (strong) and two other relationships had a moderate effect. The results of predictive relevance (Q2) calculations, all values show values above 0.000, it can be concluded that the model has relevant predictive value. Based on tests of the fit model, the results showed that the model in this study had a good fit because it had a standard value of root mean square residual (SRMR) equal to 0.1. However, other goodness of fit criteria are not raised by SmartPLS 3.0 software. This is because the model in this study uses repeated-indicators models so that some of the criteria of goodness of fit are undefined.

4.4 Hypothesis Testing Analysis

Table 4.11 Bootstrapping Test Results

Path	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (|O/STDEV|)	P Values	Result	Conclusion
Implementation of ISO 9001:2015 Quality Management System [HOC] -> Impact To Customer [HOC]	0.347	0.336	0.161	2.150	**0.032**	Positive and Significant	Accepted
Implementation of ISO 9001:2015 Quality Management System [HOC] -> Organizational Performance [HOC]	0.782	0.778	0.059	13.245	**0.000**	Positive and Significant	Accepted
Audit External [LOC] -> Implementation of ISO 9001:2015 Quality Management System [HOC] -> Impact To Customer [HOC]	0.048	0.045	0.021	2.291	**0.022**	Positive and Significant	Accepted
Employee Invlolvement [LOC] -> Implementation of ISO 9001:2015 Quality Management System [HOC] -> Impact To Customer [HOC]	0.064	0.063	0.030	2.113	**0.035**	Positive and Significant	Accepted
Finance [LOC] -> Implementation of ISO 9001:2015 Quality Management System [HOC] -> Impact To Customer [HOC]	0.023	0.022	0.011	2.123	**0.034**	Positive and Significant	Accepted
Infrastructure [LOC] -> Implementation of ISO 9001:2015 Quality Management System [HOC] -> Impact To Customer [HOC]	0.045	0.043	0.021	2.132	**0.034**	Positive and Significant	Accepted
Motivation [LOC] -> Implementation of ISO 9001:2015 Quality Management System [HOC] -> Impact To Customer [HOC]	0.029	0.028	0.012	2.338	**0.020**	Positive and Significant	Accepted
Team Work [LOC] -> Implementation of ISO 9001:2015 Quality Management System [HOC] -> Impact To Customer [HOC]	0.067	0.066	0.032	2.127	**0.034**	Positive and Significant	Accepted
Top Management Commitment [LOC] -> Implementation of ISO 9001:2015 Quality Management System [HOC] -> Impact To Customer [HOC]	0.087	0.082	0.039	2.259	**0.024**	Positive and Significant	Accepted
Training and Education [LOC] -> Implementation of ISO 9001:2015 Quality Management System [HOC] -> Impact To Customer [HOC]	0.055	0.053	0.025	2.197	**0.028**	Positive and Significant	Accepted
Audit External [LOC] -> Implementation of ISO 9001:2015 Quality Management System [HOC] -> Organizational Performance [HOC]	0.108	0.106	0.017	6.389	**0.000**	Positive and Significant	Accepted
Employee Invlolvement [LOC] -> Implementation of ISO 9001:2015 Quality Management System [HOC] -> Organizational Performance [HOC]	0.145	0.144	0.010	14.477	**0.000**	Positive and Significant	Accepted
Finance [LOC] -> Implementation of ISO 9001:2015 Quality Management System [HOC] -> Organizational Performance [HOC]	0.052	0.052	0.006	8.736	**0.000**	Positive and Significant	Accepted

Path	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (|O/STDEV|)	P Values	Result	Conclusion
Infrastructure [LOC] -> Implementation of ISO 9001:2015 Quality Management System [HOC] -> Organizational Performance [HOC]	0.101	0.100	0.007	14.047	**0.000**	Positive and Significant	Accepted
Motivation [LOC] -> Implementation of ISO 9001:2015 Quality Management System [HOC] -> Organizational Performance [HOC]	0.065	0.066	0.005	13.590	**0.000**	Positive and Significant	Accepted
Team Work [LOC] -> Implementation of ISO 9001:2015 Quality Management System [HOC] -> Organizational Performance [HOC]	0.151	0.153	0.013	11.726	**0.000**	Positive and Significant	Accepted
Top Management Commitment [LOC] -> Implementation of ISO 9001:2015 Quality Management System [HOC] -> Organizational Performance [HOC]	0.197	0.193	0.020	9.825	**0.000**	Positive and Significant	Accepted
Training and Education [LOC] -> Implementation of ISO 9001:2015 Quality Management System [HOC] -> Organizational Performance [HOC]	0.124	0.123	0.009	14.039	**0.000**	Positive and Significant	Accepted

Source: SmartPLS Output Results 3.3.3 (2022)

4.5 Statistical Process Control (SPC)

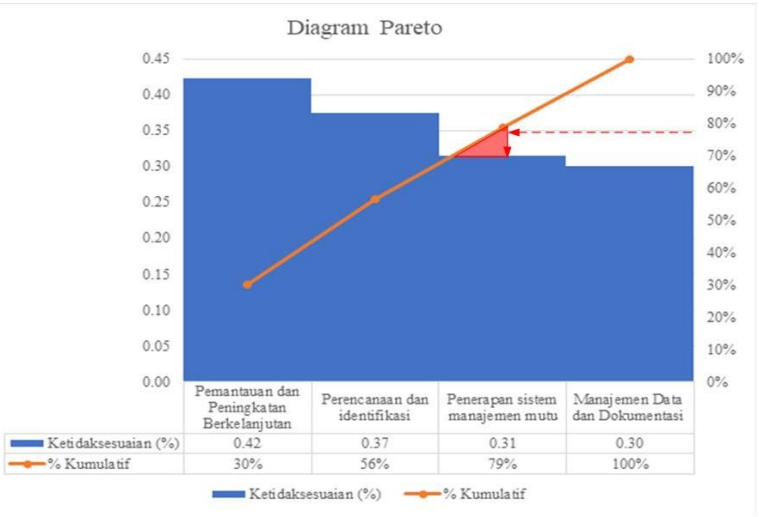

Figure 1. Pareto Chart

The study used Pareto's 80/20 chart analysis which was used to detect 20% of the causes of nonconformities and address them to correct 80% of nonconformities. The bar diagram that comes into contact with the shade area is the 20% cause of nonconformity so that it must be overcome to correct 80% of the discrepancies that occur in the quality management system, namely requirement 2 which is the Implementation of The Quality Management System.

The implementation of the quality management system causes the greatest defect which is then analyzed with fishbone to find the root-case of each item, so that remedial measures can be taken to overcome the existing problem.

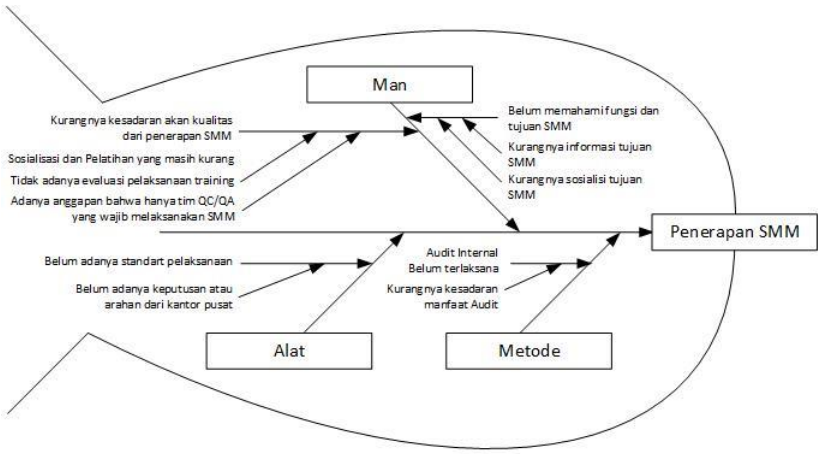

Figure 2. Fishbone Chart

5. Conclusions

The results found that the implementation of the ISO 9001:2015 quality management system was found to have a positive and significant influence on customer impact and organizational performance. The results of variance accounted for (VAF) testing of the implementation of ISO 9001:2015 quality management system were found to have an indirect-only mediation effect on the relationship between external auditing, employee involvement, finance, infrastructure, motivation, team work, top management commitment, training and education, to impact to customer. The implementation of the ISO 9001:2015 quality management system mediates the relationship between external audits, team work positively and significantly on organizational performance. The implementation of ISO 9001:2015 quality management system was found to have an indirect-only mediation effect on the relationship between employee involvement, finance, infrastructure, motivation, top management commitment, and training and education to organizational performance.

Researchers advise the Chemicals and Chemicals Industry companies to review in terms of providing resources so that operational activities can run effectively

in line with the implementation of ISO 9001 standardization in companies, often checking and maintaining infrastructure in accordance with ISO 9001 standardization in companies, embracing employees in order to achieve company targets with the implementation of ISO 9001 standards in companies where they work, Bringing together employees to work as a team with ISO 9001 standards, establish special conditions for the promotion of positions with skills competence and knowledge in accordance with ISO 9001 standards, find other solutions in finding sources of discrepancies in the implementation of ISO 9001 standards other than external audits that have been done, review whether the implementation of ISO 9001 standards is appropriate because it is still not able to reduce operational costs, and management must review whether the implementation of ISO 9001 standards is appropriate for consumers who are I've ever used a company's products to get them reordered.

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