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# The Relationships between Standards Implementation and Organizations Performance

## A Cross Case Analysis in Manufacturing Firms-Indonesia

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**Abstract** – This research analyzes the relationship between standards implementation, which is believed to be able to give contributions in value creation process, and organization performance. Mixed method approach was used to deeply investigate field fact through two ways. The first is the quantitative approach using appropriateness testing of EQA Model and organization performance measurement in three case unit analyses. The second is the qualitative approach to explore top management perception about standards implementation and organizations performance. Based on the findings, the conclusions are threefold. First, all of the case study objects believe that standards implementation can maintain and improve organization performance. Second, standards implementation will improve organizational performance through improvement in employee capability, effectiveness and efficiency in the resource use and production process, employee satisfaction, customer trust, good relationships with the community, and multiplayer effect. Finally, improvement of organization performance will indirectly change the mindset of top management with regard to standards.

**Keywords** – Standards, Implementation, Assessment, Performance, EQA.

### I. INTRODUCTION

The contribution of standards in many aspects of life has prompted awareness governments, and academia to explore and develop theories and to find facts related to contribution of standards in macro and micro levels of economy [1, 2, 3, 7, 8], in strengthening national quality of infrastructure through standards and in other related aspects. At macro level, the ISO tries to encourage greater efficiency and effectiveness through synchronization and harmonization of product and process standards. This study defines standards that are applied in industries as standards of product, process, compliance, international, national, industry, and company's own. Strategic roles of standards to business organization can be measured through contributions of standards to business performance. Meanwhile, reference [14] has identified the effects of standardization on business process performance in single case study. In 2010, contributions of standards implementation to business organizations are economically recognized by ISO [11]. The contributions of standards to EBIT are approximately 0.4-0.6% in three Indonesian

manufacturing firms [2]. These benefits or contributions will ultimately affect performance of organizations. Performance of business organization itself can be measured using various ways or models such as Deming Prize, Malcolm Baldrige National Quality Award and European Quality Award (EQA).

EQA model was developed in Western Europe as a self-evaluation tool to measure performance of organizations. The final result of performance measurement by the organization itself is expected as a self-evaluation for performance improvement. The EQA can also be a representation of the philosophy of Total Quality Management to organizations. The EQA will map out strengths and weaknesses of an organization based on high and low scores on each criterion. There are two groups of criteria in the EQA model, the first group comprises five enabler criteria and the second group consists of four result criteria. The criteria and their weights in the EQA can be seen in figure 1. Based on the weights of the criteria, three groups are recognized: low (6%), moderate (8-10%) and high (14-20%). Each group represents its weight of contribution to organizational performance in the EQA model.

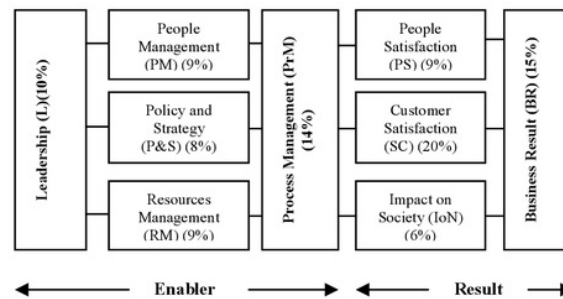


Figure 1. European Quality Award Model [9]

To use the EQA which was developed based on characteristics of business organizations in Europe, it is necessary to test the suitability of the model in Indonesia's business context. Business context is an important aspect that should be considered in implementing best practice performance measurement [6]. In this regard, reference [10] has developed a questionnaire to test the EQA and a tool to

measure organization performance in Indonesia's business context based on the EQA.

Five levels of quality management achievement based on the EQA have been developed under the initiative of the Dutch Ministry of Economic Affairs. The five levels are inspection-oriented, process-oriented, systems oriented, chain-oriented, and Total Quality Management [9]. Effects of implementation of standards on performance of business organizations can be seen in at least two categories such as quantitative and qualitative benefits. The first category is related to contributions that can be quantified (economic benefits), such as the reduction in the number of defects, increased productivity, increased market share and others. The second category is contributions that cannot be quantified or qualitative in nature such as cultural change and better communication. Based on the explanation above, it does make sense that standards implementation will affect organization performance.

There are several stakeholders integrated in the EQA, i.e. employees, customers, communities, and shareholders. On the other hand, main functions of business organization, including leadership, resource management, policy and strategy, people management and process management can be seen in the enabler dimension. Based on those criteria, open questions related to the implementation of standards and organizations performance can be developed to investigate more deeply. In summary, the two open questions for respondents from top management level in the studied companies are "What are companies doing to get the maximum benefit of implementation standards related to criteria in EQA model?", and "How implementations of standards affected or affect EQA criteria?".

This research investigates how standards implementation affects performance of organization and vice versa. Purposes of this study are to test appropriateness of EQA model and to measure organizational performance, to analyze how implementation of standards affects or is affected by the performance of business organization.

## II. METHODOLOGY

This study has used a mixed method approach. According to reference [5], there are six methods in research design, and one of them is an explanatory sequential design. This research has been carried out using a procedure in which the first stage is quantitative data collection and followed by analysis and then with qualitative data collection and analysis. The final step has been to make interpretations of quantitative and qualitative data. To explore and understand the real phenomenon, case study method has been used [16]. Three companies were used as a multiple case study.

The study was conducted in several stages. The data collection was done using questionnaire, in-depth interviews to make assessment, observations as first round data collection. Then, it was continued with data processing, analyzing of appropriateness of EQA model and assessing of performance using the model. Finally, in-depth interviews were conducted with top management of the companies in

order to validate the results of performance assessment and to explore the relationships between standards implementation and the organization performance as second round data collection. The case study objects are three manufacturing firms in Central Java province-Indonesia, called "Diesel", "Steel" and "Textile" for the anonymity purposes.

## III. RESULTS

### Company Highlights

"Steel" is a company that processes steel materials to become steel pipes for construction materials and water pipes and others. The main stakeholder is a leading company from Japan. Main standards used are related to products and processes using Japanese standards (JIS), British (BS) and American ones (ASTM). "Diesel" is a company that assembles diesel and gasoline engines, and their application in domestic and overseas markets. The company is owned by Indonesian and Japanese investors. Standards of products and processes that are used are dominated by Japanese standards. "Textile" is a company that processes the cotton into yam and then into fabric or denim. The company's market is mainly overseas with some share in domestic market. Textile is a national company that has implemented ISO 9001 and 14001.

### EQA Model Appropriateness Testing

This testing was done only to address the appropriateness of EQA model for the case study objects. Based on the model, there are nine criteria in EQA or Dutch model. Following that, the questionnaire has been used similar to that of [10]. There are two types of testing, i.e. validity and construct. Validity testing includes two types of indicators. The first type is related to the calculation of r count value compared with r critical value. The second type is reliability testing. This has been done by testing the value of Cronbach Alpha. The next one is the construct testing. There are five indicators that can be used in this test such as normality, linearity, multicollinearity, heteroskedasticity testing and values of canonical correlation coefficient of the hypotheses. Value of the two Main indicators (Cronbach-Alpha coefficients and Canonical Correlation values) can be seen in the Table 1 below.

Table 1 shows that the values of Cronbach alpha coefficient are above 0.6 and the values of canonical correlation coefficient are above 0.5. These values show that the Model is reliable and the correlations between variables are high. Put it simply, the EQA model is appropriate and can be used to measure organizational performance of the case study objects.

### Assessment of the Organization Performance

The processes of performance measurement were done using structured interviews with assessment performance form of the EQA to the top management officers. Tool of assessment can be seen in [10]. The results of the interview were cross checked, as a form of data triangulation, through field observations, analysis of records, and carried out benchmarking to other studies, such as [10]. To sum up, the performance of the case study objects can be seen in Table 2.

TABLE 1. THE MAINS INDICATORS OF EQA APPROPRIATENESS

EC	Cronbach-Alpha ≥ 0.6			Canonical Correlation ≥ 0.5			Relation-ship
	S	D	T	T	D	S	
L	0.782	0.713	0.803	0.764	0.578	0.518	L-P&S
PM	0.774	0.867	0.783	0.756	0.586	0.538	L- PM
P&S	0.860	0.827	0.684	0.695	0.510	0.516	L- RM
RM	0.802	0.936	0.749	0.700	0.791	0.651	P&S-Pr.M
Pr.M	0.852	0.945	0.735	0.801	0.597	0.706	RM-Pr.M
PS	0.849	0.882	0.813	0.696	0.677	0.709	PM-Pr.M
CS	0.852	0.911	0.823	0.702	0.630	0.525	Pr.M-CS
IoS	0.910	0.761	0.805	0.838	0.580	0.542	Pr.M- PS
BR	0.954	0.962	0.854	0.820	0.668	0.706	PM- IoS
Steel = S; n = 52;				0.669	0.764	0.936	CS-BR
Diesel= D; n = 33;				0.769	0.750	0.865	PS-BR
Textile= T; n = 44;				0.718	0.906	0.890	IoS-BR

α < 5%; EC = EQA Criteria

TABLE 2. THE ACHIEVEMENT OF ORGANIZATIONS PERFORMANCE

EC	S	D	T
L	3.12	3.14	3.3
PM	2.7	2.73	3
P&S	2.74	2.6	3.1
RM	2.7	2.88	2.9
PrM	3	2.95	3
PS	3	3	3
CS	3	3	3
IoS	2	2	3
BR	3	3	3

Top Management Perception

In this section, data collection was carried out by interviewing several top management officers. Table 1 is the guidance to conduct the interviews. The respondents in Textile are 3 persons (Senior Manager Public Relation and Legal, Management Representative ISO 9001 and Production General Manager), while in Steel are 4 persons (Manager of Quality Assurance, Manager of Production, Manager of Public Relations and Human Resource Development and Director) and in Diesel are 5 persons (Manager of Human Resource and Development, Vice Manager of Procurement, Manager of Financial, Manager of Production, and Director). The interviews were recorded. Based on [19], data coding and interpretations of the interviews findings can be seen in Table 3.

TABLE 3. THE FINDINGS OF INTERVIEWS WITH TOP MANAGEMENT

EC	Standards Implementation		
	What	How	
L	S	Monitoring and motivated	Task of leader is easier
	D	Monitoring, evaluation, coordination.	Employee is as partner of leader
	T	Monitoring and controlling	Standards can reduce intervention from leader. Leader is as motivator
PM	S	Upgrade minimum education for employee recruitment	Standards implementation need suitable background education

D	D	Training, Coaching.	Productivity can be achieved by employee with obey standards
	T	To give punishment for violation of standards	Employee must obey standards and they can propose improvement
P & S	S	Standards is a tool to get customers	Proactive approach is used to responds new standards
	D	To deploy policy and strategy in technical level by standards	Standards are as improvement focus
R M	T	Company must obey all standards from stakeholders	Standards from market encourage adjustment to company P & S
	S	To provide equipment and material required by standards	Standards are as minimum quality and requirement
R M	D	Investment of resources is directed to fulfill standards	Standards are as minimum quality and requirement
	T	To provide equipment and material required by standards	Standards are as minimum quality and requirement
P r M	S	Focus on raw material and machine flexibility	Standards are as business activities
	D	Quality and productivity are as achievement indicators	Standards are as business activities
P S	T	Standards are exist in any work instruction and production process	Standards can control main variables of production process and product quality.
	S	Standards are a part of work contract	Standards give guidance and to make everything easier
P S	D	"write what you do and do what you write"	Standards give guidance and to make everything easier
	T	To speed up the learning process for new standards	Standards give guidance and to make everything easier
C S	S	To increase standards implementation effectiveness	Standards is a language to communicate with customers
	D	To keep product quality through standards	Standards implementation can increase customers trust
I o S	T	Company must obey all standards from customers	Standards implementation can increase customers trust
	S	To obey environment standards and local regulation	Standards give a guidance to manage relationships with society
I o S	D	To obey environment standards and local regulation	ISO 14001 and local regulations are as guidance and reference
	T	To obey environment standards and local regulation	Standards implementation ensure good relationships with society
B R	S	To increase effectiveness standards implementation as a part of business process	Standards can increase productivity and reduce product defect
	D	Standards update is a continuous improvement process	The effectiveness of standards implementation can improve performance
B R	T	Standards implementation is a part of investment process	Standards implementation give multiplayer effect to performance

IV. DISCUSSIONS

Based on the EQA appropriateness [1]st results, which includes testing of validity and reliability, it can be concluded that the model is valid and reliable. Meanwhile, based on the results of testing of construct on the organizations in the five indicators that have been used, it can also be seen that the construct is appropriate with the organizational characteristics. The two main indicators that have been analyzed further are Cronbach-Alpha coefficient and Canonical Correlation coefficient. Table 2 shows that the values of Cronbach-Alpha in the case objects are above 0.6. This means that the questionnaire is reliable to measure the variables. Slightly

different results are shown in Canonical Correlation values, although they are still above 0.5 but there is several correlation values close enough to 0.5. Textile has a relative correlation value better than those of Diesel and Steel. Meanwhile, the results on automotive companies which are affiliated with Japanese companies showed that the values of coefficients correlation are relatively high [10]. This could indicate that there are other things that affect the value of canonical correlation. The following analysis discusses the performance of organizations.

The results of the measurement of organizational performance using the EQA model in Steel and Diesel show that the organizations are in a process-oriented phase that will be transformed into a system. Both of average performances are almost same relatively. In fact, the two companies also have similar characteristics in several aspects. That the process-oriented phase is being transformed into system-oriented one shows that the companies (Steel and Diesel) are still focusing on production process and its control; an attempt to successfully integrate all sections of the companies so that the companies will transform into system oriented. The implementation of standards is very strict and in overall sections of the organizations, which has helped shifting the focus of attention into a more system-oriented. Different result is shown by Textile; this company is on system-oriented phase. It is very reasonable, considering it a big company managing several business units with more than 6000 employees. This requires that the organization be more system-oriented, in which the use of information technology (SAP) has helped improving the efficiency of resource use and focusing on external customers. The values of the company's performance in all criteria of the EQA are almost the same. It also shows that the company gives a balance attention on all the criteria. The next analysis discusses the relationships of organization performance and management perception towards the implementation of standards.

The cross case analysis about the relationships of the implementation of standards and organization performance<sup>21</sup> based on Table 2 and Table 3 in the case study objects is divided into two parts, i.e. the criteria of enabler and results dimensions. The qualitative and quantitative findings have been interpreted into organization orientation phase. Then, it has been linked with qualitative findings about the implementation of standards.

Criteria of enabler dimension are discussed in this section. The weight of Leadership criterion is relatively modest, while the performance measurement results show that the organizations are in system-oriented phase (performance value is 3). The achievement means that the role of the leaders in the standards implementation is more on monitoring, controlling and evaluating. This has led the manager's role to becoming easier and more as a motivator without the need of intervention. The second criterion is the People Management. A survey results on manufacturing firms in Portuguese have concluded that employee is one of important aspect in the organization performance [4]. The performances of this criterion in Diesel and Steel are relatively the same (around 2.7), confirming that the two companies are still in process-oriented phase. Meanwhile, the performance of this criterion

in Textile is 3, showing that the company has begun on system-oriented phase. The role of standards implementation in this criterion at Steel is based on the experience that educational qualifications of the employees will determine the employee's ability to implement standards so that the Human Resources and Development department gradually increases the minimum educational qualification of employees from elementary school to senior high school. Meanwhile, Diesel is more emphasizing on training, coaching and implementing of strict standards to encourage the employees to be more disciplined and obey the standards. In Textile, the top management gives heavy sanctions for any breach of standards while provides opportunities for the employees to propose improvement in standards implementation. In general, standards contribute to work culture in the organizations and the organizations make standards as a guidance to work.

The third criterion of enabler dimension is the Policy and Strategy. Organizations performance on this criterion is 2.7 for Steel and 2.6 for Diesel, while Textile is 3.1. This shows that Diesel and Steel are in process-oriented phase, while Textile is in system-oriented one. Top management in the three organizations basically has the same perception about standards, i.e. as a tool to compete. The issue of strategic standards is used to redefine their business strategy and then to deploy the business process activity through the standards although Diesel and Steel have taken reactive responds to a new standard [12]. The role of knowledge management in organizations is important in the documentation process for standards at the technical level [13]. The fourth criterion of enabler dimension is the Resources Management. This issue is related to how organization manages resources owned on planning, procurement, production process and controlling. Based on performance assessment on the organizations, this criterion is in process-oriented phase that would soon change to system-oriented one (scored 2.7 - 2.9). Top management officers in the case study objects have the opinion that standards are as minimum quality and requirement. It has made the resource management section directed to meet the minimum requirement of standards. Facts on the companies show that the top management is working to improve effectiveness and efficiency of resource management through information technology implementation. The level of sophistication of information technology varies according to the complexity of problems that exists in each organization. The last criterion of enabler dimension is the Process Management. The case study objects have relatively the same performance (2.95 - 3) on this criterion. Contribution of this criterion is relatively high to the organization reflected through how top management perceives on the standards as business process activities; it is in line with the relatively high weight of the criterion in the EQA (14%). The implementation of standards is also considered capable to control major variables related to product quality. Quality management standard (ISO 9001) is a tool or system to organize overall standards and processes in the case study objects. The philosophy of "Do what you write and write what you do" and "continuous improvement" in ISO 9001 is understood by middle and top management to change organizations. It is in line with the findings of reference [15].

The results dimension of the EQA has four criteria. The first criterion is the People Satisfaction, based on the assessment of performance on this criterion; the organizations' performance is the same, which is already in system-oriented phase. On the other hand, data records also showed that the organizations turnover level is relatively low. It indicates that employees or people are relatively satisfied with the organizations. Related to the standards implementation, top management considers that standards have facilitated employees to work. However, at the beginning of the standards implementation, employees assume that implementing the standards would need extra time to learn, so the task of top management is to shorten the learning process time. The role of employees in standards implementation is also strengthened through several clauses in collective work agreement (PKB-Perjanjian Kerja Bersama) between the management and the employees.

The second criterion is the Customer Satisfaction. On this criterion, the results of organizations performance assessment show the organizations have begun their system-oriented phase. The weight of this criterion the highest compared to the other criteria. It shows that the criterion is the main variable to create and determine sustainability of the company's profits. It has also been found by reference [4]. Related to the implementation of standards, achievement of the organizations performance is obtained through a total focus on the implementation of standards. It is confirmed through the long experience of the organizations that standards bring better communications, improve trust and ultimately ensure customer satisfaction to their products.

The third criterion of the result dimension is the Impact on Society. Diesel and Steel are at the beginning of process-oriented phase, while Textile is at the level of early system-oriented. Facts in organizations show that several top managers in Diesel and Steel consider this criterion a cost that does not directly give benefit to the companies, while in Textile, it is a part of efforts to build image or reputation of the organization to the stakeholders as an environmentally friendly company. Contribution of this criterion is also relatively low (6%), it shows a view that this criterion does not give a great contribution to organization but it is still important to ensure the organization's relationship with the surrounding community and the sustainability of the organization itself. Related to the implementation of standards, the organizations agree that compliance with environmental standards and government regulations is a basis to build good relationships with the community, although the three are at different phases of performance-

The last criterion is the Business Result. The weight of this criterion is relatively high (15%). On the other hand, the performance of each organization is the same (3), which shows that the organizations already start their system-oriented phase. Through the implementation of standards that is becoming more effective and efficient, and always updating the standards used, the organizations believe that they will have multiplayer positive effects to improve the organizational performance. In summary, the phase of orientation in the EQA criteria and the relationships between standards implementation and organizational performance can

be seen in Table 4.

TABLE 4. SUMMARY OF DISCUSSIONS RESULTS

EC	Organization Orientation	The Relationship between Standards Implementation and Organization Performance
L	System (D, S & T)	Role of leaders is more to monitor, control, evaluate and motivate on the standards implementation
PM	Process-System (D&S), System (T)	Standards implementation can change employees' behavior to be more productive.
P&S	Process-System (D&S), System (T)	Standards are a tool of competitiveness to deploy business activity.
RM	Process-System (D, S & T)	Standards are as minimum quality and requirement to organize all resources.
PrM	System (D, S & T)	Standards are as business process activity that can control main variables related with product quality.
PS	System (D, S & T)	Standards can make employees easier to work and are considered a part of work contract
CS	System (D, S & T)	Standards are a tool to communicate, to increase trust and to ensure customer satisfaction.
IoS	Process (D&S), System (T)	ISO 14001 and environment regulations are mandatory to be obeyed & considered as guidance to make good relationships with society.
BR	System (D, S & T)	Standards can give multiplayer effect to improve performance.

Based on the explanations above, the implementation of standards through Enabler dimension will contribute to the capacity building of the employees and the effectiveness and efficiency of using the resources and bettering the production processes. Meanwhile, the results dimension will be able to increase employee satisfaction, customer trust, and good relationships with the community and give better multiplayer effects for overall organizational performance improvement. Conversely, organizational performance gives indirect effect to standards implementation management awareness in organization about the way it views the standards and the implementation. The relationships between standards implementations and organizational performance are explained in Figure 2.

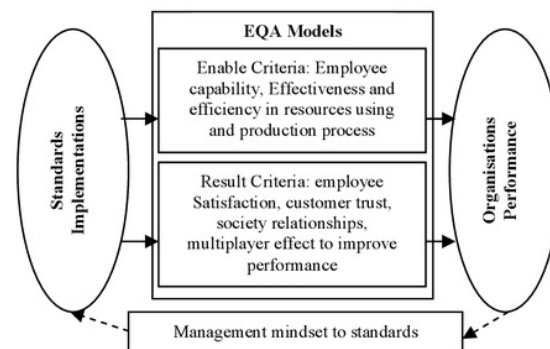


Figure 2. The Relationships between Standards Implementation and Organisations Performance

## V. CONCLUSIONS

The EQA model can be used to measure organization performance of the case study objects. The case study objects believe that implementation of standards contributes to the phase of performance achievement for each criteria in the EQA model. In general, the relationships between implementation of standards and organizational performance have shown that the enabler dimension criteria contributes in improving the capability of employees, the effectiveness and efficiency of resource use and the production process through the implementation of standards. On the other hand, the result dimension criteria can improve employee satisfaction, customer trust, good relationships with community and other stakeholders, and finally give multiplayer effects for overall organization performance improvement. Organization performance that is improved by standards implementation will indirectly affect the management awareness in the organization to change the mindset on the standards implementation.

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