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Quality Control Circle And Performance On Construction Industry

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Abstract

Quality is a key element that can not be ignored in the competition and is one of the critical issues for the success of the company, including in the construction industry. On the other hand, if the quality management policy is not implemented or limited participation will both negatively affect the management of the project and competitiveness of the firms. This will also decrease the survival potential of construction firms within the industry. Achievement of performance can be better if the implementation of integrated quality management is supported by the company. Quality Control Circles (QCC) have been found to be a simple and productive technique of Total Quality Management (TQM) and proposed implementable in construction industry. This paper aims to influence of quality control circle implementation on company performance in construction industry. Regression is used to analyze the collaborative effect of the quality control circle on firm performance. Based on the analysis of the data obtained from the survey it was concluded that the quality control circle is an important and effective tool used to solve problems in the organization and can improve company's performance.

Keywords
Quality Control Circle, Construction Industry, Performance, Regression Analysis

1. Introduction

The development of industry in quality management during the 1980s further led to the principles of business internationally through integrated quality management (Robin et all, 1993). Improved quality in product, service and management aspects can bring the organization to survive in the global business environment (Tjiptono et all, 2001). Basic principle behind quality control circle are to contribute for improvement & development of organization, to exercise human capability fully & explore hidden capabilities and to respect humanity & build a worth while to live in happy positive environment (Rajesh & Lalit, 2012). The impact of quality control circle on employees and organizations has become very important to improve the company's capability to achieve conformity and maintain competitiveness (Chitra, 2013). Quality control circle is also way of retaining the workforce & enhances their motivation, morale & desire to work for the organization but also increases the satisfaction level of the employee by which employer can gain trust & commitment from the employees (Poonam, 2014). One of the successes of industrialization in Japan is the effective application of quality control circle. Because of this, a number of developed and emerging industrial countries including Indonesia are implementing quality control circle in industrial companies to improve quality, productivity and competitiveness (Directorate General of Small

and Medium Industry, 2007). Establishment of quality control circle in the company should be based on awareness and commitment to quality improvement and productivity (Holil, 2011)

Quality can be seen as a set of coordinated activities to direct and control the construction organization in order to improve the effectiveness and efficiency of its performance. Perception of the quality control circle members on job satisfaction and commitment to organizational goals and values that they are able to identify themselves with it which the company believes, can increase performance too (Marluna, 2016). Although the concepts of performance measurement are developed to improve the performance of a business, it can sometimes mislead management. If it is not appropriately designed and implemented for any business, it can be of no use and sometimes become a threat for the business (Robert and David, 1992). A positive relationship between three measures of workplace performance are about financial performance, labor productivity and service quality (Eason et all, 1955). Construction company will have a well-plan and organize management system that improve its quality of construction products and their organization processes for continual improvement and consistently meet the client's requirements (Nurul et all, 2015). Constructing Excellence Organization in UK which aims to improve construction performance in order to produce a better built environment, developed a set of performance indicators and classified them into three main groups, namely; economic, social and environmental perspectives (Hany et all, 2013).

Construction industry provide various conditions which are favorable to the implementation of Quality control circles as a program to improve the quality of construction projects (Dominic, Nagesh and Laxman, 2015). Quality control circle is a tool which gives a number of benefits like organizational performance improvement, product quality improvement and improvement in the relationship within the organization which motivate workers and improve team work among them (eason et all, 1955). Though quality control circle studies are a few decades old and have been regularly undertaken in many countries and industries, quality control circles are not only limited to manufacturing firms but for variety of organizations where there is a scope for group based solution of work related problems (Sourabh and Rajesh, 2016). In order to bridge this gap, the present study has been undertaken. It is expected that this study will widen the existing knowledge base of the quality control circle as well as construction literature.

2. Literature Review

Every organization is concerned with the quality of its product. While it is important that quantity requirements be satisfied and production schedules met, it is equally important that the finished product meet established specifications. Because, customer's satisfaction is derived from quality products and services. Stiff competition at national and international level and consumer's awareness require production of quality goods and services for survival and growth of the company. Quality and productivity are more likely to bring prosperity into the country and improve quality of work life.

2.1 Quality Control Circle

Quality control circle as one of the tools used under the total quality management concept for the development of human resources assumed its importance after the World War II. Quality circles were first established in Japan in 1962; Kaoru Ishikawa has been credited with their creation (Kaoru, 1985).. The movement in Japan was coordinated by The Japanese Union of Scientist & Engineers. The first company in Japan to introduce quality control circles was the Nippon Wireless & telegraph company in 1962 (Nida, 2014).. By the end of that year there were 36 companies registered with JUSE by 1978 the movement had grown to an estimated 1 million circles involving some 10 million Japanese workers (Poonam, 1998). Even though the concept of quality circle was originated in Japan, it was adopted and followed by a number of countries for the development of their human resources. As a human resource development tool, it was found to be effective for improving the level of performance of employees in various sectors. A number of studies have been conducted on various aspects of total quality management, quality circles and employee performance by individual research scholars, research organizations and other agencies.

A Quality control circle is volunteer group composed of members who meet to talk about workplace and service improvements and make presentations to their management with their ideas (Prasad, 1998). A Small group of people who volunteer to organize quality control circle in working life (Kaoru, 1985). The concept of Quality Circle is primarily based upon recognition of value of the worker as a human being, as someone who willingly put efforts to improve the job, his wisdom, intelligence, experience, attitude and feelings (Walker, 2002).

Quality control circle is a formal, institutionalized mechanism for productive and participative problem solving interaction among the employees of an organization (Charles, 2012). The objectives of the Quality Circle are as follows (Vishal et all, 2006).

a. To Motivate the employees

b. Encourage for team work
c. To enhance the quality and productivity
d. To improve the communication in the organization
e. To improve the quality product and service
f. To build a happy and meaningful environment
g. To develop a positive attitude and a sense of involvement in the decision making processes
h. To contribute towards the improvement and development of the organization
i. To satisfy the human needs

The success of the impact of Quality Circle towards employees & organization depends on (Rajesh and lalit, 2012) :
a. The members of the Quality Circle work & integrated together.
b. The circle philosophy has been evolved to fit into the company's style in an organization.

Quality Circle usually under the leadership of a team leader, who are trained to identify, analyze the work-related problems, to find the solutions of the problems and suggest the solutions to management in order to improve the performance of the organization, and motivate the workers (Rajnish and Raj, 2014)

2.2 Performance

A performance measurement framework is a complete set of performance measures and indicators derived in a consistent manner according to a forward set of rules or guidelines (Brown and Devlin, 2006). With the development of performance measurement, the frameworks have become more and more comprehensive and practicable.

Based on the review of performance measurement studies in construction from 1998 to 2009, it can be concluded that research in this area has focused on three levels, including:
a. Project level;
b. Organizational level; and
c. Stakeholder level.

The primary performance measurement frameworks applied in the construction industry are as follows (Huan et all, 2010).
a. EFQM excellence model;
b. BSC model; and
c. KPIs model.

While there are other frameworks for performance measurement implemented within the construction industry, these model are the most frequently used models for performance measurement in construction (Robinson et all, 2002). The main purpose of performance measurement is to measure and improve the efficiency and the quality of the performance, and identify opportunities for progressive improvements in performance (Tutu, 2000)

Performance measurement (and its management) must be fully attuned not only to economic but also to ethical objectives. There are two categories for analysis (Fitgerald, 1991):
a. Effectiveness of a chosen strategy such as extent of targeted market capture, financial performance, and real unit cost.
b. Determinants of competitive success such as embracing quality, flexibility, productivity, innovation, and social contribution.

The science of measurement in construction industry must be understood: it is the first stage of a continuous performance improvement cycle. Measurement must be proceeded by evaluation of results, comparison, planning for improvement, and then implementation of strategy within a specialist who are responsible for commitment and actions. The review of journals on project success reveals that cost, time and quality are the three basic and most important performance indicators in construction projects (Albert and ada, 2017).

In a quality driven construction organization, the following are principal reasons why measurement is needed and why it plays a key role in quality and productivity improvement. Measurement helps (Peter and Gary, 2000) :
a. Ensure that customer requirements have been met (and if not, why not);

b. Enable establishment of achievable business objectives and monitors compliance thereto;
c. Provide standards for business comparisons;
d. Provide transparency and a scoreboard for individuals to monitor their own performance;
e. Identify quality problems and those requiring priority attention;

2.3 Construction Industry

The construction industry is one of the pillars of the domestic economy for most countries. Although it has features in common with other sectors, such as manufacturing and services, it is unique in various aspects. This uniqueness is attributed to four kinds of uncertainty (Shantanu et all, 2013) :

a. Natural uncertainty,
b. Task uncertainty,
c. Organizational uncertainty,
d. Contractual uncertainty

The construction sector ranks third as a driver of economic growth in Indonesia throughout 2016, contributing 0.51 percent after the manufacturing and trading sectors. Based on data from the Central Bureau of Statistics (BPS), Indonesia's economy in 2016 has grown by 5.02 percent, higher than in 2015 which reached 4.88 percent. The contribution of the construction sector to the formation of gross domestic product (GDP) was quite significant, 10.38 percent. This number makes it at number 4 (four) after the industrial, agricultural, and trade sectors. The construction industry has growth significant 30% over the past three years. The growth shows that confidence in the construction industry is increasing (PUPR).

3. Methodology

This data is used as an effective tool to qualify for validity and reliability. The method used for data collection is using questionnaires. The list of questions in the questionnaire should describe the state of the actual variable. Questionnaire or questionnaire is a list of questions, which have been prepared in the form of a question sentence in accordance with the rules measurement. In filling questionnaires, the questions sent researchers to respondents through the media, so indirectly face to face. The target population are 100 people from various hierarchical levels of the Indonesia's construction industry who are involved with the quality control circle. The research tools for performance measurement using KPI's model based on organization level classified into three indicators (CBPP KPI, 2002) :

a. Safety;
b. Profitability; and
c. Productivity.

After the results of the questionnaire received, we calculated by using SPSS 22 and regression to analyze the collaborative effect of the quality control circle on firm performance.

4. Results and Discussion

The importance of identifying an organization's performance is evident throughout the global markets. Based on the literature review in this research area, it was found that research studies have focused on establishing the performance measurement frameworks construction companies based on KPI's model.

4.1 Research Instrument

Research variable is the attribute or the nature or value of the person, object or activity that has certain variations set by the researcher to be studied and then drawn its conclusions. There is a relationship between one variable with other variables then the various variables in the research can distinguished as follows:

a. Independent Variable (X)
   Variables that affect or cause change or the incidence of a dependent variable (bound). In this study that is to be an independent variable is a Quality control circle (X)

Table 1. Independent Variables Quality Control Circle (X)

Quality Control Circle (X)	
X1	Reduction Cost
X2	Motivate
X3	Team work
X4	Quality
X5	Communication
X6	Improve the quality & service
X7	Build a happy and meaningful
X8	Attitude
X9	Contribute for develop
X10	Satisfy

b. Dependent Variable (Y)
Variables that are affected or that result, because they are independent variable. In this study the dependent variable is company performance (Y) with a key performance index (KPI) approach from construction companies.

Table 2. Dependent Variables Performance in Construction Industry (Y)

Performance in Construction Industry (Y)	
Y1	Safety
Y2	Profit
Y3	Productivity

4.2 Data Analysis

From the results of the f test on SPSS software found that all variables of the quality control circle can simultaneously affect the performance of the construction industry. The results of the F test can be seen in the explanation below. The criterion of the influence of the quality control circle is explained by the conclusion that the influence of the quality control circle on safety gets a good criterion with the acquisition of 64% while for the influence of the quality control circle on profit and productivity the criterion is less good because the final value is less than 39%. It can be concluded that the quality control circle factors have more influence on the safety of construction performance than profit and productivity.

Table 3. Analysis Data of Quality Control Circle on Performance

Quality Control Circle on Performance in Construction Industry (Safety, Profit, Productivity)			
(X)	**(Y)**	**R Square**	**Criteria**
X1, X2, X3, X4,X5,X6,X7,X8 dan X9	Y1	64%	Good
	Y2	28%	Less
	Y3	39%	Less

4.2.1 Safety

Based on the calculation result on Table 4 below, the value of Sig. For all variable of quality control (x) to variable safety(Y1) equal to 0.000. So its value <0,05 and F value counts

15.897> from F table 1.967. The overall variable of the quality control (X) cluster simultaneously / simultaneously has an effect on the achievement of safety.

Table 4. Quality Control Circle on Safety Performance Data

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	7.746	10	.775	15.897	.000[b]
	Residual	4.336	89	.049		
	Total	12.082	99			

4.2.2 Profit

Based on the calculation result on Table 5 below, the value of Sig. For all variable of quality control (x) to variable profit (Y) equal to 0.000. So its value <0,05 and F value counts 3.620> from F table 1.967. The overall variable of the quality control (X) cluster simultaneously / simultaneously has an effect on the achievement of profit.

Table 5. Quality Control Circle on Profit Performance Data

Model		Sum of Squares	Df	Mean Square	F	Sig.
2	Regression	2.950	10	.295	3.620	.000[b]
	Residual	7.252	89	.081		
	Total	10.201	99			

4.2.3 Productivity

Based on the calculation result on Table 6 below, the value of Sig. For all variable of quality control (x) to variable productivity (Y3) equal to 0.000. So its value <0,05 and F value counts 5.869> from F table 1.967. The overall variable of the quality control (X) cluster simultaneously / simultaneously has an effect on the achievement of productivity.

Table 6. Quality Control Circle on Productivity Performance Data

Model		Sum of Squares	Df	Mean Square	F	Sig.
3	Regression	4.398	10	.440	5.869	.000[b]
	Residual	6.669	89	.075		
	Total	11.066	99			

5. Conclusion and Recommendations

Quality implementation is very important in the construction industry, management must be commited and quality culture must be created to nurture a positive attitude. Moreover, quality implementation reflects the business performance and image of the organizations and contributes to the impact of final construction output.

The criterion of the influence of the quality control circle is explained by the conclusion that the influence of the quality control circle on safety gets a good criterion with the acquisition of 64% while for the influence of the quality control circle on profit and productivity the criterion is less good because the final value is less than 39%. It can be concluded that the quality control circle factors have more influence on the safety of construction performance than profit and productivity.

Quality control circle is an important and effective tool used to solve problems in the organization and can improve performance company. However, there still are some potential improvement, such as :

a. Conduct further research to determine the application of control clusters quality of safety in the construction industry.
b. Doing an effective way to apply a quality control circle to solve the problem
c. The existence of company policy / business to support systemintegrated quality control, so the quality of the project results are done by the construction industry can be better
d. There is a commitment from each employee to apply a quality control circle in their environment by looking for an alternative effective way.

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