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An Assessment Of The Critical Success factor For The Reduction Of Cost Of Poor Quality In Construction Projects In Swaziland.

Nokulunga Mashwama[a], Clinton Aigbavboa[b] &Didi Thwala[c]*

University of Johannesburg

"Department of Construction Management & Quantity Surveying, Faculty of Engineering &the Built Environment, University of Johannesburg, South Africa"[a,b &c]

Abstract

Cost of poor quality (COPQ) in the construction industry is a serious problem that the industry is faced with, due to failure in preventing wastage and defects during construction work. The cost of poor quality remains hidden and eats up to 40% revenues of the construction enterprise. Hence, the study investigated the critical success factors that reduce poor quality in construction projects according to the perceptive of construction professionals in the Swaziland construction industry. This research adopted quantitative research and 50 useable questionnaires were used as an instrument tool for the study. Random sampling method was used to select the respondents in various construction companies. Cost of poor quality impact the construction industry of Swaziland's and construction companies have to reserve funds for such occurrences, since poor quality cannot be tolerated and contractor have to rectify at own cost. Another challenge would be under-pricing the construction project and rectifying construction mistake it becomes a big problem for the contractor. Findings revealed that are a lot of success factors that can be used, it's just a matter of the implementation of the success factors in the project. The role of the managers in construction projects is still under looked and therefore, this can be a problem if it is not attained to. The study revealed that are a lot of success factors such as the use of quality management system and the critical success factors can actually help eliminate poor quality in most construction projects of Swaziland. The implementation of quality management systems at the beginning of the project and encouraging team work in the project could assist construction projects.

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* Corresponding author. Tel. +27 73167 9464.
E-mail address: nokulungam@uj.ac.za

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1. Introduction

According to [19], it is important to identify the cost of poor quality so that one can determine the expenses associated with producing quality products. Cost of Poor Quality (COPQ) in the construction industry is a serious problem that the industry is faced with; due to failure in preventing defects and wastages during construction work [19]. The cost of poor quality remains hidden and usually appears within the lantet and patent defect period, the contractor is obliged to fixed and eats up to 40% revenues of the enterprise including construction companies; which then can run a company which was once or trying to be successful to failure [14]. The cost of poor quality on construction projects impacts the economy of any nation with the reinvestment of funds to rework the poor quality projects [13]. Also, in case of government sponsored projects, the government has to invest in the same project again, thus leading to a waste of tax payer's money [6, 7&13]. Success or failure of construction work significantly affects the construction industry, which contributes significantly to socio-economic development and employment in any country [11, 13&15].

There are many success factors such as providing effective leadership, team development and deploying skilled workforce, cash flow, defining quality objectives, just to name a few and if addressed effectively that can reduce the COPQ from the construction projects [14]. Losses can be reduced by handling the Success Factors effectively. In the realm of project management, the schedule, cost and quality achievement is also referred to as the iron triangle [11&12]. Out of these three aspects, it is the achievement of schedule and cost compliances that the project management is attending to most of the time. This normally causes the achievement of quality to slack down at construction sites, in order to achieve the schedule and cost objectives.

[11&12] Stated that the project quality is sometimes overlooked at and this can be seen as one of the many causes of poor quality in construction projects. According to [17] the Cost of poor quality (COPQ) is the cost faced due to the production of poor quality products and services. The lack of quality in construction projects is caused by poor or non-sustainable workmanship, unsafe structures, delays, cost overruns and disputes in construction. Value and quality of construction is of concern to both public and private sector clients [17]. This study is focused on identifying the critical success factors for the reduction of Cost of Poor Quality (COPQ) from construction projects. A survey was conducted on companies of various categories, both working on private and public sector projects.

2. Construction industry

The construction industry is an important key player in the economy of every country [13,15&19]. Despite a number of challenges facing the interest-rate sensitive sectors within the building and construction environment. Although, it is deemed that the industry is improving, the construction industry still faces challenges such as rise of construction cost to 7% [4]. Therefore, the construction industry needs to grow above 7% to show some improvement, due to constant cost increases, the industry faces an uphill battles for growth and the cost of poor quality amongst other factors [6&7]. Swaziland has not escaped the problem of lack of quality focus in the construction industry [15]. The Swaziland construction industry is under pressure due to a combination of factors such as skills shortage, delays in payment, increased fee completion and variable quality [15].

3. Quality in construction industry

Errors in construction sites occur frequently and can be costly for the contractors and owners of constructed facilities. In fact, 6-15% of construction cost is found to be wastage due to rework of defective components detected during maintenance [19]. The nature of these errors is quit diverse 20-40% of all site defects have their roots in errors arising during the construction phase, 54% of the construction defects can be attributed to human factors like unskilled workers or insufficient supervision of construction works[15]. Furthermore, 12% of the construction defects are based on material and system failures [19]. These observations suggest that a thorough inspection of construction sites is needed and that current site inspection approaches need to be improved in identifying defects on construction sites effectively. Since the main causes of construction errors, e.g. human involvement in the construction process and

changing environmental conditions resulting in discrepancies in material behavior are uncontrollable, it is critical to improve the inspection and assessment of the quality of construction projects [19&14].

4. Quality

Quality may mean different things to different people [11].To others it may represent customer satisfaction and others interpret it as compliance with contractual requirements. Quality in terms of construction is even more difficult to define [11]. Therefore, quality is defined as "conformance with requirements", construction project quality is the fulfilment of the owners needs per defined scope of works within a budget and specified schedule to satisfy the owners/user requirements per defined scope of works [9,11,12 &18). In the case of the construction industry the requirements are the specifications and contract drawings [5]. These two documents are used by the contractor during the construction phase to assist with the achievement of quality on a project. Hence, it is important not to confuse quality with luxury [10].

5. Critical success factors

5.1 Quality measurement criteria in construction

[1] Highlighted the significant of measurement of quality in the construction sector in order to improve quality. Producing high quality that provide customer with the value they need is the key to longer term business success and major determinant in beating the competition [3].

5.2 Strategic planning as tool for quality improvement

Strategic planning during the early stages of a project is important in achieving the project objective successfully [2]. When strategy is strong and tactics are weak, there is a great potential for creating strong, well-intended projects that never get off the ground [5,6&2]. Cost and schedule overruns, along with general frustration, are often the side effects from projects which encounter such "errors of inaction." [11].

5.3 Management as a tool for quality improvement for success factor

A project manager is the key person at the site who, within a set of guidelines kept in place by the top management, allocates resources and makes policy decisions at site level [5]. Project manager's involvement on site activities can lift the morale of team members and they start working with full zeal and enthusiasm to achieve the desired quality level [7&12]. Positive attitude of project managers and project participants according to [2&10] has emerged to be the most important success attribute for quality compliances at project sites

5.4 Adequate monitoring and feedback as success factor

The successful running of any project is determined by a couple of attributes [7]. Numerous success factors such as the monitoring and feedback of the project as stated above refers to the project control processes by which at each stage of the project implementation, key personnel receive feedback on how the project is comparing to initial projections [7]. [11] States that asking allowance for adequate monitoring and feedback mechanisms gives the project manager ability to anticipate problem, to oversee and to corrective measures and to ensure that no deficiencies are overlooked. Committed participants would stick to the quality plan and they would follow the accepted technical practices to carry out the different project activities [11].

5.5 Owner involvement as success factor

The owners' involvement in the project is of outmost important in achieving the goals deliverables. The owners play an important role in achieving the desired quality level [15]. Not only are they responsible for the preparation of a clear and unambiguous specification, but they must also monitor the actual work at the site. It is well recognized that having the clients' inspectors work with the contractor to establish good quality control procedures before the work is done, is much more effective than walking around after [11,13,15&19). However, it is advantageous to understand how the different parts of the process fit together. Waste, excessive cost and delays can result from poor coordination and communication among specialists. It is particularly in the interest of owners to insure that such problems do not occur. According to [11] if the owners desire a quality job, they should stick to the specification since any relaxation in quality performance, even for few times, can set a bad precedence. Thus competence of the owner plays a prominent

role in defining the expected level of quality from the contractor organization hence the factor truly justifies its importance.

5.6 Team Organization

According to [16] explains that bringing people together does not necessarily ensure they will function effectively as a team or make appropriate decisions. Teams are composed of people who have a variety of emotional and social needs which the team can either frustrate or help to meet. Teamwork indifference – failing to take action to promote good teamwork – is a strategy likely to result in mediocre performance [10]. Quality improvement teams do not appear on the organization chart. Each floats—it has no personal boss. Instead, the team is supervised impersonally by its mission statement and by the quality improvement roadmap [16]. The team does have its own internal organizational structure. This structure invariably includes a team leader (chairperson and so on) and a team secretary [2].

5.7 The need for training as a success factor

According [2,3,11,15&19)], many researchers agreed that appropriate training and enlarging experience is necessary in transferring the quality project. [3] Added that labour productivity is become significant in construction because of its impact in the process of completing projects. [7 &15] further supported that the construction quality can be enhanced by increasing the capability of site labours.

5.8 Continuous improvement on quality

Improving quality reduces the cost of poor quality; every time a mistake is identified, or things are not done right the first time, it costs time and money to repair and rectify. According to [16] which is A paper Quantifying quality costs and the COPQ in translation[8,9&16] Cutting costs by budget reductions, percentage points or targets usually reduces quality and thus increases the cost of poor quality, if no analysis is made of which factors contribute to good quality and which are hindrances. Cost of Poor Quality in Translation [8,9&16] states that: It is usually more expensive to correct errors than to get it right the first time, but the latter requires an investment in quality, which, if done properly, is offset by cost savings because fewer errors occur further down the line. It is a matter of finding the right balance between investing in quality control and working in a cost-effective way.

6. Methodology

The study focused on the critical success factors for the reduction of cost of poor quality in construction projects. The study investigated possible techniques, measures and methods to improve the cost of poor quality in construction projects. The data was collected from secondary data which is (journal, articles, books & electronic databases) and primary data which is the questionnaire. This research adopted quantitative research and 50 useable questionnaires were used as an instrument tool for the study. Random sampling method was used to select the respondents in various construction companies.

Questionnaires were used to collect data for the study and closed questions were asked in order to manage the data. The likert scale of 1 to 5, where 1 -“Strongly disagree”, 2-“Disagree”, 3-“neutral or unsure”, 4-“Agree” and 5-“Strongly agree” was used. The likert scale is a popular format of questionnaire that is used in education research. [15] The likert scale is chosen in this study because it allows the respondents to express how much they are agree or disagree with certain statements. The Mean Item Score (MIS) is ranked in descending order (from the highest to the lowest).The statement with the highest ranking is the one that was considered to be dominant. The Mean Item Score (MIS) was derived from the following formula [15].

$$MIS = \frac{1n1 + 2n2 + 3n3 + 4n4 + 5n5}{\sum N}$$

Where;

n_1 = number of respondents for strongly disagree
n_2 = number of respondents for disagree
n_3 = number of respondents for neutral
n_4 = number of respondents for agree
n_5 = number of respondents for strongly agree
N = Total number of respondents

7. Findings and discussion

7.1 Quality

This doughnut chart (figure 7.1) represent that 80% of the respondents have an understanding of the quality control processes and 12% are unsure, where the least of the respondents showed that they do not have knowledge on quality control processes at 8%.

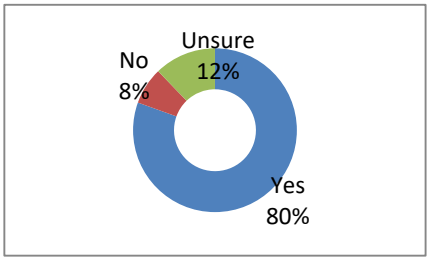

Figure 7.1 Respondent knowledge on quality control processes

7.1 Success factors for the reduction of cost of poor quality

Respondents under the planning stage they ranked Defining quality objectives (standards and specifications) highest with (MIS=4.39; R=1); Providing effective leadership was ranked second (MIS=4.20,R=2); respondents ranked team development third with (MIS=4.13,R=3); Clearly defining the project objectives was ranked fourth with (MIS=4.12, R=4) cash flow planning was ranked second last with(MIS=3.85, R=7) and Defining measurement and testing procedures was ranked last with (MIS=3.34; R= 8).

Table 7.1: Success factor at planning stage

	Success factors that influence the reduction of COPQ	MIS	RANK
Planning stage	Defining quality objectives (standards and specifications)	4.39	1.00
	Providing effective leadership	4.20	2.00
	Team development and deploying skilled work force	4.13	3.00
	Clearly defining the project objectives (scope, time and cost)	4.12	4.00
	Identification of processes and skills for activities	4.08	5.00
	Identifying technology requirement for processes	4.03	6.00
	Cash flow planning	3.85	7.00
	Defining measurement and testing procedures	3.34	8.00

Under the organising stage the respondent ranked defining quality control mechanism the highest with (MIS=4.12,R=1); Team development second with (MIS=4.1,R=2); Providing effective project management process was ranked third with (MIS=4.02,R=3), Defining the decision making process and empowerment was rank fourth with (MIS=3.76, R=4); Use of integrated procurement systems was ranked second last with (MIS=3.71,R=6) and Training, development and quality awareness of HR with (MIS=3.68, R=7)

Table 7.2: Success factor at organizing stage

	Success factors that influence the reduction of COPQ	MIS	RANK
Organizing stage	Defining quality control mechanism	4.12	1.00
	Team development and deploying skilled work force	4.10	2.00
	Providing effective project management process	4.02	3.00
	Defining the decision making process and empowerment	3.76	4.00
	Induction of appropriate technology	3.88	4.00
	Defining organizational structure	3.78	5.00

	Use of intergrated procurement systems	3.71	6.00
	Training, development and quality awareness of HR	3.68	7.00

The respondent ranked team work the highest under the executing stage with (MIS=4.32,R=1); Providing effective leadership was rank second with (MIS=4.20,R=2), Optimum uses of resources was ranked third with (MIS=4.05, R=3); Fulfilling contractual obligations was ranked fourth with an (MIS=3.93, R=4); Exercising transparency in procurement process and transactions was ranked second last with (MIS=3.63, R=8); and protecting stakeholder rights with (MIS=3.51,R=9)

Table 7.3: Executing Stage

	Success factors that influence the reduction of COPQ	MIS	RANK
Executing stage	Team work	4.32	1.00
	Providing effective leadership	4.20	2.00
	Optimum use of resources	4.05	3.00
	Fulfilling contractual obligations	3.93	4.00
	Fulfilling health and safety requirements	3.87	5.00
	Employee involvement	3.71	6.00
	Fulfilling environmental protection requirements	3.66	7.00
	Exercising transparency in procurement process and transactions	3.63	8.00
	Protecting stakeholder rights	3.51	9.00

Under monitoring stage the respondent ranked fulfilling health and safety requirement the highest with (MIS=4.10, R=1); measuring performance of activities on critical path was ranked second with (MIS=3.93, R=2); Measurement of executed works was ranked third with (MIS=3.85, R=3); Measurement of productivity of resources was ranked second last with an (MIS=3.68, R=6); and Measure variation in planned and actual resource utilization was ranked last with (MIS=3.61,7).

Table 7.4: Monitoring stage

	Success factors that influence the reduction of COPQ	MIS	RANK
Monitoring stage	Fulfilling health and safety requirements	4.10	1.00
	Measuring performance of activities on critical path	3.93	2.00
	Measurement of executed works	3.85	3.00
	Measurement of wastage and reworks(COPQ)	3.80	4.00
	Audit of expenditure and procurement process	3.70	5.00
	Fulfilling environmental protection requirements	3.68	6.00
	Testing of executed works	3.68	6.00
	Measurement of productivity of resources	3.68	6.00
	Measure Variation in planned and actual resource utilization	3.61	7.00

8. Conclusion and Recommendations

8.1 Conclusion

The findings of this study presented success factors that can be used to reduce COPQ only if addressed appropriately and effectively. The finding revealed that the construction professionals do not agree with that measurement s and testing procedure could reduce the COPQ, but rather defining the quality objectives during the planning stages is what is thought could help reduce the COPQ .Once the project participant know what is expected of them from the beginning in order to achieve quality then COPQ will be reduced. The finding represents that it is more like knowing what to do, when to do it and at a certain cost is what could sum up to a meaningful successful

running of a project, without poor quality having an impact on it.

8.2 Recommendation

The study has revealed research gap which might be fruitfully pursued, such quality to be taught in the higher learning instituted as a subject so that when the graduate access the industry they can simply apply and share the information with their colleagues in the industry.

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