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Research paper

Evaluation of Quality Management System by Implementing Quality Matrix in Residential Projects Using SPSS

T.Subramani[1*], M.Arsath[2]

[1] Managing Director, Priyanka Associates (Civil Engineers and Valuers), Salem, TamilNadu, India.*
[2] Design Engineer, M/s.Four Dimension (Civil Engineers and Valuers), Bengaluru, Karnataka, India.
[*]Corresponding author E-mail:tsmcivil2007@gmail.com

Abstract

Currently number of projects is lagging due poor management in execution and implementation. To overcome these factors in our project we proposed to find out the best quality management system (QMS) in the Civil Engineering industry by practicing with seven existing and new execution to actualizing quality network in private projects by utilizing Planning and statistical analysis software. By collecting questionnaire based on QMS form the existing literature review and same has been utilized for analysing and investigation in project planning management software. From the analysis we conclude that quality management system will play vital role in customer satisfaction and time consuming have the positive and critical changes in the QMS for each and every project in the construction industry in the execution level.

Keywords: *Evaluation, Quality, Management, SPSS, Matrix.*

1. Introduction

Quality is essential part in construction industry in all sorts of works like planning, execution and implementation of the project. Once the qualities less it lead to the entire project get loss in the systematic approach. To maintain this we proposed to schedule and planning by using software Primavera will enhance it output in our project. Once system has adopt automatically quality has improve in the construction industry.

1.1. Background

Amid the most recent decades construction industry has been vigorously condemned for its execution and productivity in connection to different industries. With the turn of the new thousand years, it gives the idea that the construction industry is experiencing an extraordinary time of thoughtfulness, which is exacerbated by expanded mechanical and social change. These progressions are changing the tempo of the environment within which construction works. Moreover, such changes extensively affect the way business is carried.

1.2. Objective of Study

- To examine the quality measures in keep up their presences in development industry.
- To locate the most influencing component to quality management system.
- To distinguish the most critical factor which influence Quality Management System and Provide unwavering quality for the notoriety of firms.
- To produce network models to assess the achievement of QMS.
- To enhance quality and profitability by creating framework according to clients criticism.

1.3. Scope of Study

- In the QMS all the Quality improvement efforts will be quantified, measured and analysed
- Site interview and questionnaire survey through collect the data of quality measures.
- Statistical method will be used for generate the matrix models.
- Research work is based upon the quality policy of different company and questionnaire will be filled by the representative of the construction company.

2. Methodology

Fig.1 shows the methodology of this study.

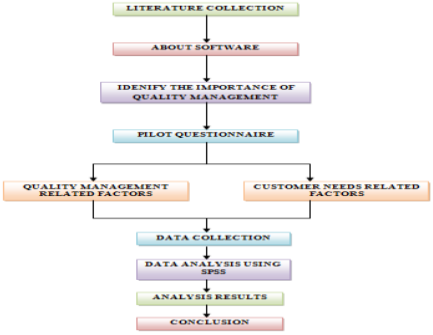

Fig.1: Methodology

3. Quality Management

The quality management system is one tool which enhancing the not only the construction but also features like health, safety and Environment. This will shows the business improvement practice and process to make decision in the company to meet current competition.

3.1. Quality Management Tools

By utilizing various tools like Autocad, SPSS and Primavera etc plays important criteria in improving the quality in the aspect of drawing, photos, planning, and scheduling.

3.1.1. Improvement Teams

Each and every task has been monitored by the team to overcome difficulties faced at the time of construction timingly.It will create and implement long term plan for construction management.

3.1.2. Process Maps

This document provides step by step process of the work in detailed and action plan of the business minimum of 2000 action plans. This will provide more help in improving the quality of the work.

3.1.3. Internal Quality Audits

Internal audit will provide day by day work flow in construction which causes defects, customer communication and other drawbacks for future.

3.2. Recycling

Once the constructed structure is old or demolished, reuse the existing material like scrap wood, vinyl siding, cardboard and reinforcement etc., which improves quality and cost effectiveness in construction.

3.3. Green Features

After construction painting is one of the important factors considering. In the Exterior side of the construction color of the building is green which prevent that environment problems like heat radiation etc.

3.4. Quality Management Approaches

These are listed as follows, along with their definitions:

1. Quality by Qualifications
2. Quality by evaluated program
3. Quality by specified program
4. Quality by performance criteria
5. Quality by specification
6. Quality by warranty

4. About the software

Today latest tools utilized in the construction industry are not only for designing purpose but for analysing from planning to implementation. In this way SPSS software plays vital role in statistical analyse of the data.

5. Analysis Results

5.1. Factor Analysis

Factor examination is a factual strategy used to portray inconstancy among watched, connected factors as far as a potentially lower number of unobserved variables called factors. For instance, it is conceivable that varieties in six watched factors, for the most part, mirror the varieties in two in secret (fundamental) factors. Factor examination looks for such joint varieties in light of in secret idle factors. The watched factors are displayed as straight mixes of the potential variables, in addition to "mistake" terms. Factor examination intends to discover autonomous inactive factors. The hypothesis behind factor logical strategies is that the data increased about the interdependencies between watched factors can be utilized later to diminish the arrangement of factors in a dataset.

5.1.1. Total Variance Explained

Table 1 shows the factor analysis results.

Table 1: Factor analysis results

Total Variance Explained						
Component	Initial Eigen values			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	3.054	61.089	61.089	3.054	61.089	61.089
2	1.365	27.304	88.392	1.365	27.304	88.392
3	0.356	7.124	95.516			
4	0.187	3.749	99.265			
5	0.037	0.735	100.000			

Extraction Method: Principal Component Analysis.

5.1.2. Component Matrix

Table 2 shows the component matrix.

Table 2: Component Matrix Results

Component Matrix		
	Component	
	1	2
Quality manual	0.867	0.320
Records maintenance	-0.758	0.536
Effective management response	0.133	0.922
JIT delivery	-0.919	-0.256
Quality control	0.930	-0.246

Extraction Method: Principal Component Analysis.
a. 2 components extracted.

Table 3 shows the communalities table.

Table 3: Communalities Table

Communalities		
	Initial	Extraction
Quality manual	1.000	0.855
Records maintenance	1.000	0.862
Effective management response	1.000	0.868
JIT delivery	1.000	0.909
Quality control	1.000	0.926

Fig.2 shows the factor analysis inputs in SPSS.

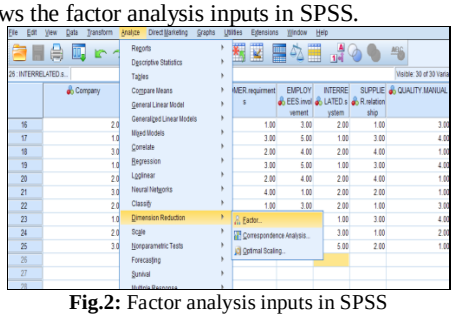

Fig.2: Factor analysis inputs in SPSS

Fig.3 shows the principal component analysis in SPSS.

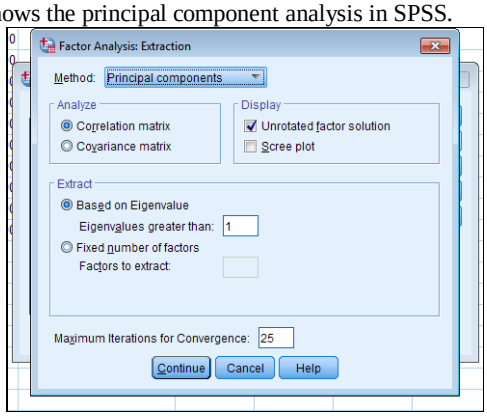

Fig.3: Principal Component Analysis in SPSS

5.2. Anova

The restricted analysis of change (ANOVA) is utilized to decide if there are any factually noteworthy contrasts between the methods for at least two independent (unrelated) gatherings (in spite of the fact that you keep an eye on just observe it utilized when there are at least three, as opposed to two groups).For illustration, you could utilize a restricted ANOVA to comprehend whether exam execution varied in light of test uneasiness levels amongst understudies, separating understudies into three free gatherings (e.g., low, medium and high-focused on understudies).

Table 4: Anova Results

				Sum of Squares	df
Quality control	Between Groups	(Combined)		14.000	3
		Linear Term	Unweighted	1.429	1
			Weighted	0.083	1
			Deviation	13.917	2
	Within Groups			30.000	21
	Total			44.000	24
Quality tool	Between Groups	(Combined)		39.023	3
		Linear Term	Unweighted	2.450	1
			Weighted	3.000	1
			Deviation	36.023	2
	Within Groups			25.138	21
	Total			64.160	24

				Mean Square	F	Sig.
Quality control	Between Groups	(Combined)		4.667	3.267	0.042
		Linear Term	Unweighted	1.429	1.000	0.329
			Weighted	.083	.058	0.811
			Deviation	6.958	4.871	0.018
	Within Groups			1.429		
	Total					
Quality tool	Between Groups	(Combined)		13.008	10.867	0.000
		Linear Term	Unweighted	2.450	2.047	0.167
			Weighted	3.000	2.506	0.128
			Deviation	18.011	15.047	0.000
	Within Groups			1.197		
	Total					

5.3. Pareto Analysis

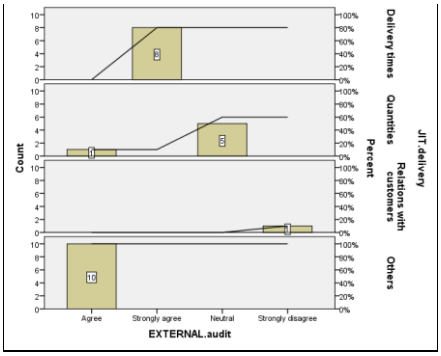

Fig.4: Pareto analysis for External audit vs. JIT delivery

Fig.5 shows the pareto analysis window in SPSS

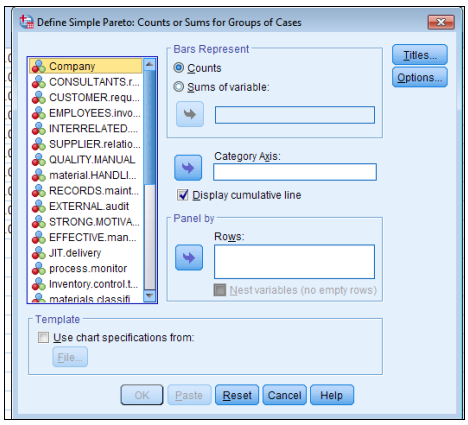

Fig 5: Pareto analysis window in SPSS

5.4. Control Charts

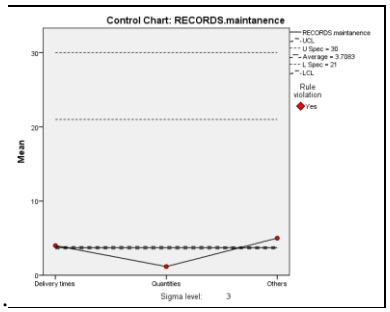

Fig.6: Control chart for records maintenance

Fig.7 shows the quality control chart for supplier relationship

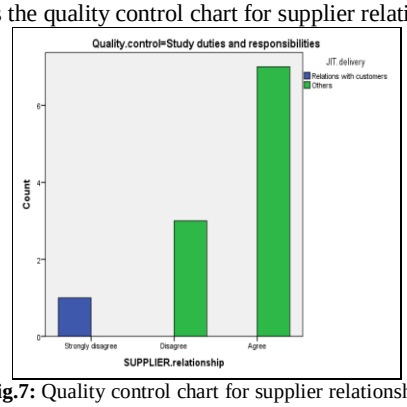

Fig.7: Quality control chart for supplier relationship

Fig.8 shows the control chart window in SPSS.

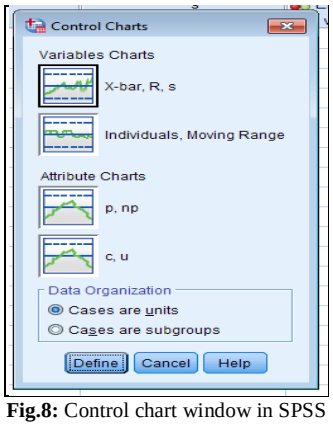

Fig.8: Control chart window in SPSS

5.5. Frequency Analysis

Table 5 shows the frequency table for most used technology

Table 5: Frequency table for most used technology

Inventory control Technology					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Bar codes	1	4.0	4.0	4.0
	EDI	3	12.0	12.0	16.0
	RFID	16	64.0	64.0	80.0
	Others	5	20.0	20.0	100.0
	Total	25	100.0	100.0	

Fig.9 shows the histogram for most used technology.

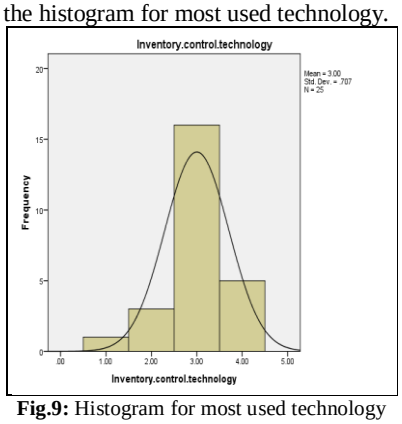

Fig.9: Histogram for most used technology

Table 6 shows the frequency table for records maintenance.

Table 6: Frequency table for records maintenance

Records maintenance					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	5	20.0	20.0	20.0
	Disagree	1	4.0	4.0	24.0
	Neutral	1	4.0	4.0	28.0
	Agree	8	32.0	32.0	60.0
	Strongly agree	10	40.0	40.0	100.0
	Total	25	100.0	100.0	

Fig.10 shows the histogram for records maintenance.

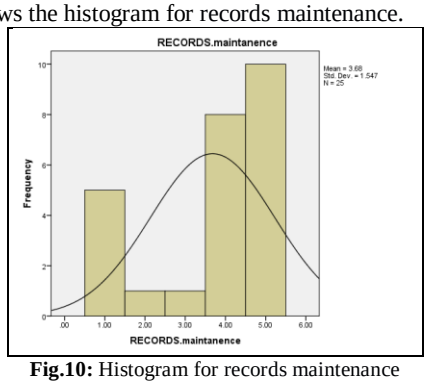

Fig.10: Histogram for records maintenance

Fig.11 shows the pie chart shows records maintenance response

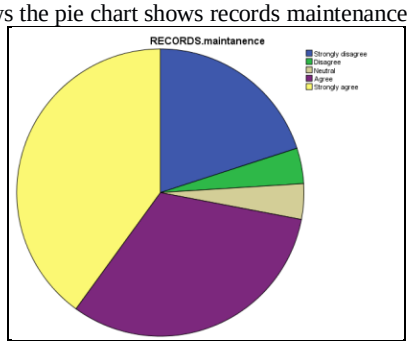

Fig.11: Pie chart shows records maintenance response

Table 7 shows the frequency table for quality manual.

Table 7: Frequency table for quality manual

Quality manual					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	11	44.0	44.0	44.0
	Disagree	3	12.0	12.0	56.0
	Neutral	5	20.0	20.0	76.0
	Agree	6	24.0	24.0	100.0
	Total	25	100.0	100.0	

Fig.12 shows the histogram for quality manual.

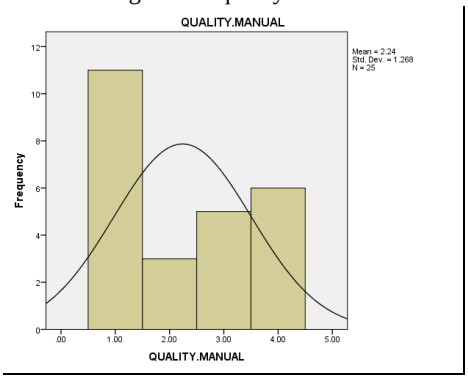

Fig.12: Histogram for Quality manual

Fig.13 shows the pie chart shows quality manual response.

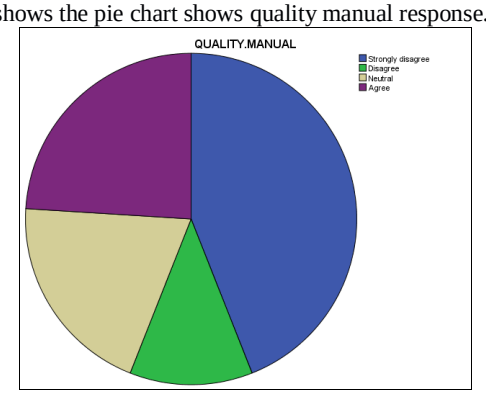

Fig.13: Pie chart shows Quality manual response

Fig.14 shows the pie chart shows supplier relationship response.

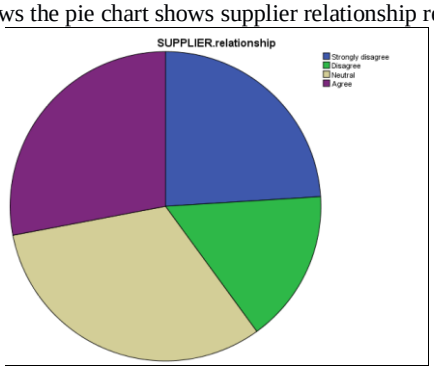

Fig.14: Pie chart shows supplier relationship response

Fig.15 shows the pie chart shows effective management response.

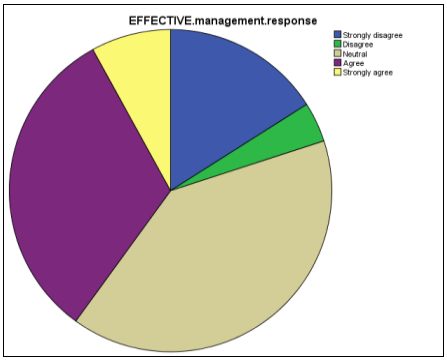

Fig.15: Pie chart shows Effective management response

5.6. Cross Tabulation

Table 8 shows the cross tabs for factors.

Table 8: Cross Tabs for Factors

Statistics						
		Employees involvement	Interrelated system	Supplier relationship	Quality manual	Material handling
N	Valid	25	25	25	25	25
	Missing	0	0	0	0	0
Mean		3.6400	2.1600	2.6400	2.2400	2.4400
Median		4.0000	2.0000	3.0000	2.0000	2.0000
Mode		4.00	2.00	3.00	1.00	1.00
Std. Deviation		1.22066	1.17898	1.15036	1.26754	1.26095
Variance		1.490	1.390	1.323	1.607	1.590
Minimum		1.00	1.00	1.00	1.00	1.00
Sum		91.00	54.00	66.00	56.00	61.00

6. Conclusion

From the analytical data which is collected from the existing literature and questionnaire form the field concluded that tool which is utilized will provide good results in analysing and suggestion for contractors in future. Through our project we predict that application of quality management software SPSS and ANOVA etc.. resulted best output.

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