

Critical Success Factors of Renovation Projects

Ashish Juneja, Atul Dubey

Civil Engineering Department, Mahavir Swami Institute of Technology, Affiliated to GGSIPU, Jagdishpur,
Sonapat, Haryana, India

ABSTRACT

Today it is our duty to promote sustainable development in construction industry. This will help us to encourage the growth of Real estate sector, which includes residential, commercial, industrial, infrastructure amenities. There are many ways to promote sustainable development in construction like using waste material, maintenance, replacement and renovation of existing structures. Among all ways, we have chosen renovation for our research work. Renovation of existing infrastructure helps our society by reducing cost of construction, generating new employments and it also helps us to deal in recession period when the rate of new construction works are low. The future of real estate industry in developed or developing country is to provide reconstruction, renovation or retrofitting of old buildings which may have been damaged by atmospheric action, earthquake, tsunami, flood etc and due to overloading settlement occurs in structure. Nowadays in our country Govt declared smart city project in different different cities like amritsar, indore etc so renovation is the best way to make city smart at low cost which ultimately generate employment. In this research we will study the renovation projects and factors affecting renovation work. The word "CSF" used in this research is related to those factor which actually comes during renovation work and these factors are called critical success factors. Analysis of this research provides precise and concise finding on actual scenario happening in india on renovation work. The method adopted for this research is questionnaire survey and 45 respondent are selected for research. and for analysis of respondent responses we have used SPSS software.

Keywords : CSF, Questionnaire survey, Renovation work, SPSS Software

I. INTRODUCTION

1.1 Problem Statement

Worldwide there is an urge to promote development to improve quality of life (HIS Consulting 2012). This encourages the growth of the construction sector, which involving residential, commercial, industrial, infrastructural amenities and also other aspects of development (Harold 2009). The future of real estate industry in developed country as well as developing country is to provide reconstruction, renovation or retrofit old buildings, which may have been damaged by atmospheric action, earthquake, tsunami, flood etc. and overloading, settlement etc. or aging of structure. In any renovation or reconstruction work, an initial

condition study of the existing structure needs to be carried out. In general, re-construction and renovation projects are very complex in nature and require more time in planning and investigation stage and also require knowledge to study the nature of work needed for buildings. A Project is considered as a successful project when it completed on time, within budget & to performance specification. Project management play a vital role in project success. To determine the success or failure of a renovation project, there are many factors outside the control of project management. All these factors is referred as critical success/failure factors. There are only few studies are done in India with respect to renovation projects.

1.2 Aim and Objectives

The aim of this research is to study renovation projects in Indian contexts and identify the critical success factors in renovation projects.

The following objectives of the Research:

- i) To review the state-of-the-art of renovation projects
- ii) To study the process of renovation of RC buildings
- iii) To study exemplar successful renovation projects
- iv) To study the following through questionnaire survey
 - To identify factors which contribute to the success of renovation projects.
 - To study the role of various parties involved in project who are responsible for success of project.
- v) To recommend measures for success of renovation projects

1.3 Scope of Research

The research concentrates on private organisation which do renovation project in India and this research involves a combined questionnaire survey of professionals which are engaged in the renovation project those who have experience in handling renovation project.

II. METHODS AND MATERIAL

Research Methodology adopted for reasearch is as shown in flow chart fig 2.1

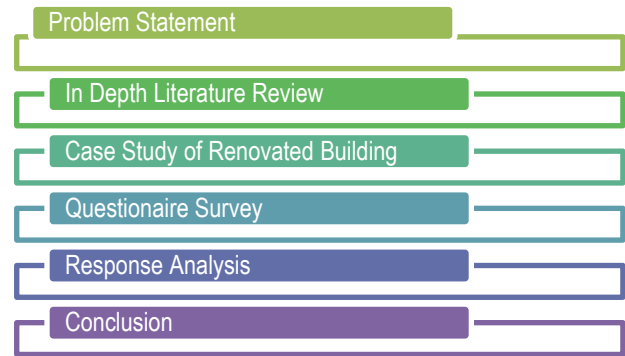


Figure 2.1 Research Methodology

2.1 Literature Review

2.1.1 Project Management

Project management has evolved over the past couple decades as researchers and practitioners have attempted to identify the causes of project failure and the various factors that lead to project success. Traditional project management skills were developed from the requirements of construction and defense industries to plan, control and manage large and complex projects (Morris, 1994; Bourne and Walker, 2004).

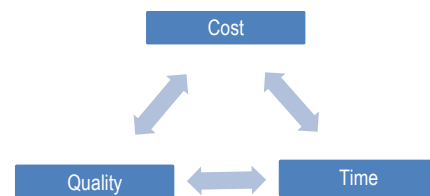


Figure 2.2. Component of Project Management

2.1.2 Renovation Project

Renovation includes both repair work and work undertaken for other reason. Vainio (2011) Renovation of existing building is a branch of construction industry the principle of renovation is analysing the defects and structural failure in building by using the advanced technology and marking the stage of work required for building. CPWD Handbook 2010

2.1.3 Project Success Factors

According to PMI (2004) a guide to the Project Management Body of Knowledge (PMBOK Guide), the definition of a project is: A temporary endeavour undertaken to create a unique product, service or result. Key Performance Indicators (KPIs) may be used to monitor performance and measure how successful certain projects are. The most important success factor established is the importance of keeping focus on organizational aspects. A systematic Risk Management approach is another success factor.



Figure 2.3 Cycle of Critical Success Factors, Source:Pakseresht and Asgari (2012)

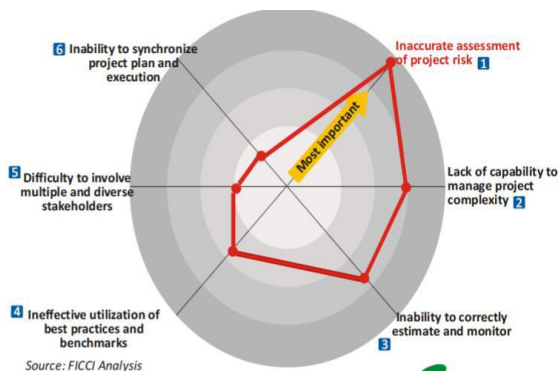


Figure 2.4 Critical success factors for project success(Source: FICCI Report 2009)

41 success factors are selected from research out of which 19 factors are shown in table 1.1 below;

Table 2.1 List of CSF selected from Literature Review

S.No	CSF	Refrence
1	Project management	Muhammad et al (2008);Zarina et al (2004)

	related	Mbugua et al (1999);Omran et al (2012)
2	Procurement	Peng (2017);Swapnil and Pimplikar (2016)
		Muhammad et al (2008);Zarina et al (2004)
		Tucker et al (2014);Swapnil and Pimplikar (2016)
3	Client satisfaction	Muhammad et al (2008)
		Mbugua et al (1999)
		Swapnil and Pimplikar (2016)
4	Design team Experience	Ogwueleka (2011); Mbugua et al (1999)
		Omran et al (2012); Peng (2017)
5	Business type	Muhammad et al (2008)
		Zarina et al (2004); Peng (2017)
6	Work environment	Muhammad et al (2008)
		Zarina et al (2004) ; Mbugua et al (1999)
		Omran et al (2012); Tucker et al (2014)
7	External issurs	Zarina et al (2004)
		Ghanaeea and Pourezzata(2013)
8	Objective Management	Ogwueleka (2011); Omran et al (2012)
		Peng (2017); APTA(2010)
9	Management Design	Ogwueleka (2011); Tucker et al (2014)
10	Technical Factors	Ogwueleka (2011); Mbugua et al (1999)
		Nguyen and Chileshe (
11	Top management support	Ogwueleka (2011); Peng (2017)
12	Risk Management	Ogwueleka (2011) ; Peng (2017)
		Ghanaeea and Pourezzata(2013)

13	Quality	Mbugua et al (1999); Omran et al (2012) Ghanaaea and Pourezzata(2013) Tucker et al (2014); Peng (2017)
14	Cost	Mbugua et al (1999) Ghanaaea and Pourezzata(2013) Tucker et al (2014); Peng (2017) Nguyen and Chileshe (2013)
15	Time	Mbugua et al (1999); Omran et al (2012)
16	Feedback Capacity	Mbugua et al (1999); Omran et al (2012)

2.2 Case Study

2.2.1 Case study of renovated buildings

Building selected for case study; (i) Empire State Building, New York, (ii) HUL Building, (iii). Express Tower, Mumbai, (iv) Neemrana Fort-Palace, (v) Rehabilitation of Cargo Disposal Unit Building at IGI Airport, (vi) VIP Conference Centre at Delhi.

2.3 Questionnaire Survey

The data collected through web based questionnaire survey. The online survey instrument was developed from the project management planning list that was used in previous research. The web based survey dramatically reduced the time needed for survey implementation. The question-building process was based on questions listed in literature and questions are modified according to requirement of research work, the final survey questionnaire was designed to obtain information about the impact of the project management practices on renovation project success. Questionnaire was distributed to 41 people for survey but 24 responses are obtained from this survey this was cause due to limitation of time of three weeks.

III. RESULTS AND DISCUSSION

3.1 Comparative Analysis of Buildings

Table No.3.1 Comparative analysis of Buildings

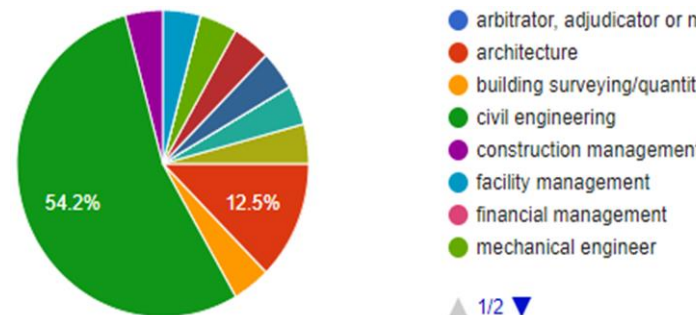
Buildi ng	Cost	Hei ght	Loca tion	Ye ar of co nst .	Buildin g type	Major Renov ation
Empir e State Buildi ng	USD 550 MN	381 m	New York City	19 30	Comme rcial	Upgra ding service system , sustain able retrofi t
HUL Buildi ng	INR 200 MN	NA	Mu mbai	19 26	Comme rcial	HVAC Upgra dation
Expre ss Tower	USD 20 mn	105 m	Mu mbai	19 32	Comme rcial	Upgra dation service system , sustain able retrofi t
Neem rana Fort-Palace	US\$1 5mn	35 m	Alw ar	14 67	Comme rcial	Restor ation and use as heritag e hotel
Cargo Dispos al Unit Buildi	INR 85 Lakh	NA	New Delh i	19 70	Infrastr uctural	Renov ation of structu re

ng at						
IGI						
Airpo						
rt						
VIP	INR9	NA	New	19	Comme	Class
Confe	0		Delh	57	rcial	3, class
rence	lakh		i			4
Centr						damag
e at						e
Delhi						renova
						tion
Buildi	Cost	Hei	Loca	Ye	Buildin	Major
ng		ght	tion	ar	g type	Renov
				of		ation
				co		
				nst		
				.		

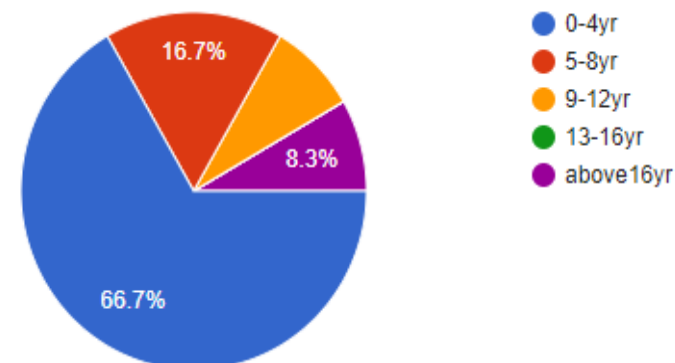
Source : Author

3.2 Analysis of Questionnaire Survey

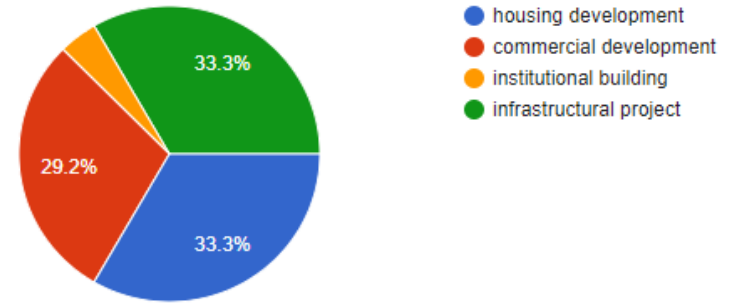
This section presents and interprets the results of the research work, and discusses the findings of the research.



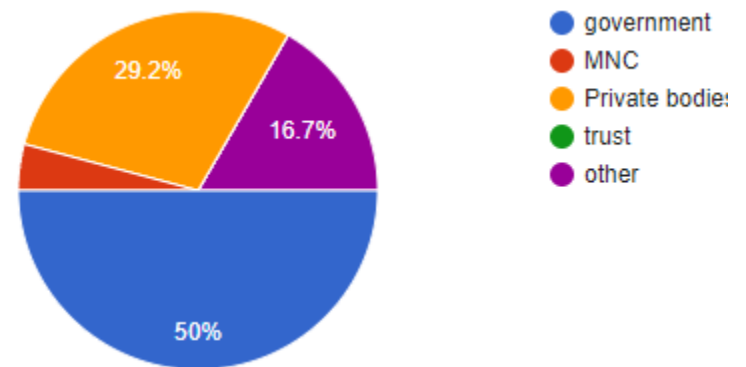
Q.1 Which of these job descriptions must closely first your principle role in the construction industry?



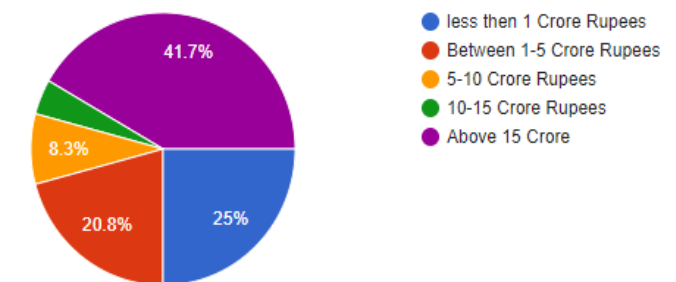
Q.2. Please indicate your experience?



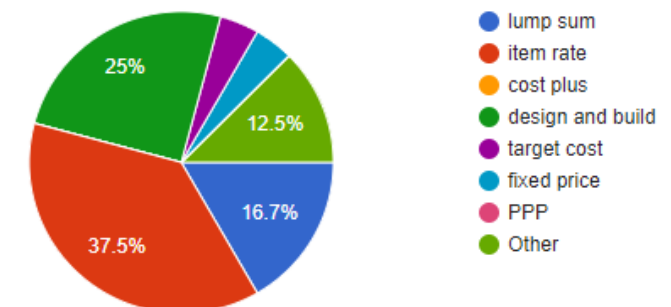
Q.3 Please indicate the business sector given below in which you have most experienced?



Q.4 Among the options given which is your most preferred client



Q.5. What size of project were you involved in as coordinating person?

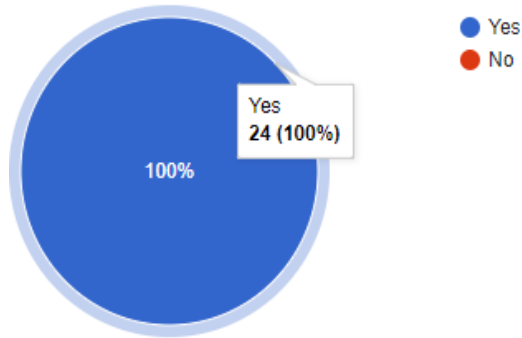


Q.6. What procurement method is used?

3.3 Project Success Criteria

There are total five project success criteria (PSC) to be assessed in second section of questionnaire. The ranking of project success criteria chosen by

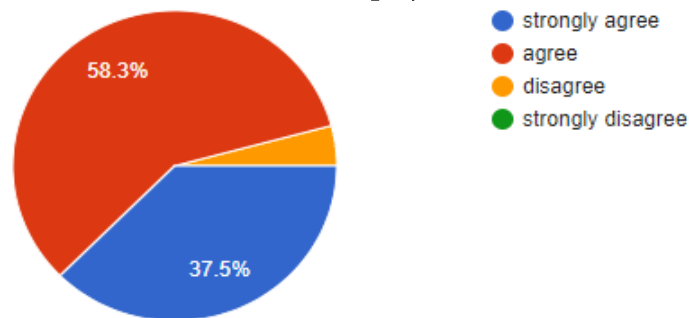
respondents is summarized as per Table 3.2 below. The criteria of Quality is topped at the rank, followed by Client / Customer satisfaction, Cost / Budget, Time / Schedule and Organization's strategic goals. The output of questions are shown in ven diagram in figures listed below;



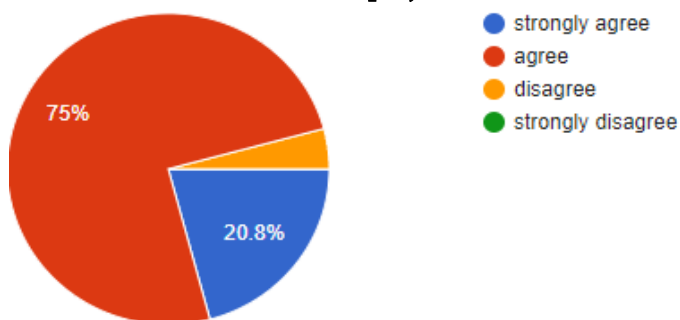
Q.7 Is it is necessary a Project Management Plan in place during the Renovation Project?



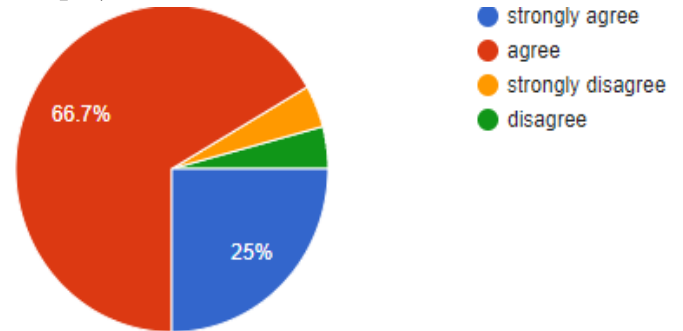
Q.8. Is the Project Management Plan contribute to the success of the renovation project?



Q.9. Is the Budget the most significant factor for an overall success of renovation project?



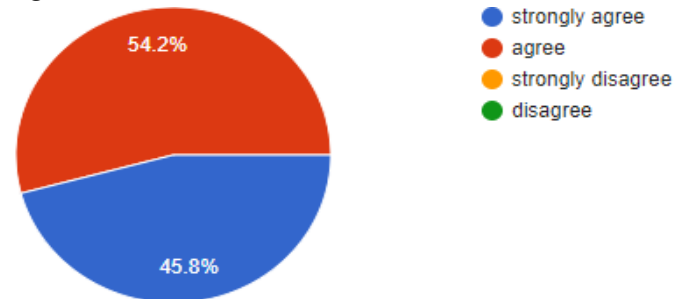
Q.10. The most significant factor that lead to an overall successful renovation project are the Project Management Planning practices utilized to establish the project "Time".



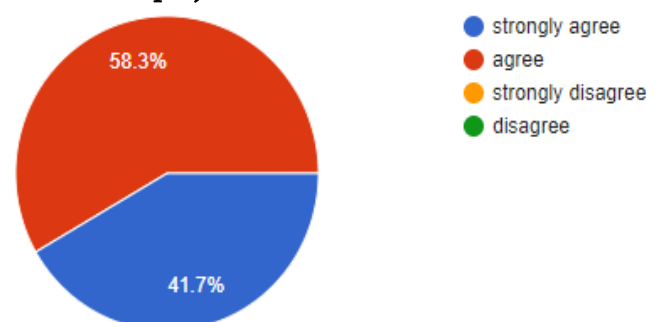
Q.11. The most significant factor that lead to an overall successful renovation project are the Project Management Planning practices utilized to establish the project "Performance".

3.4 Bidding/Pre-Construction/Construction

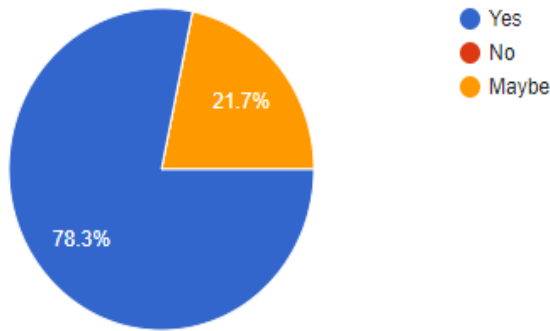
Third section of questionnaire is related to Bidding/Pre-Construction/Construction effect on renovation project success the answer analysed by google questionnaire survey are show in ven diagram figures listed below;



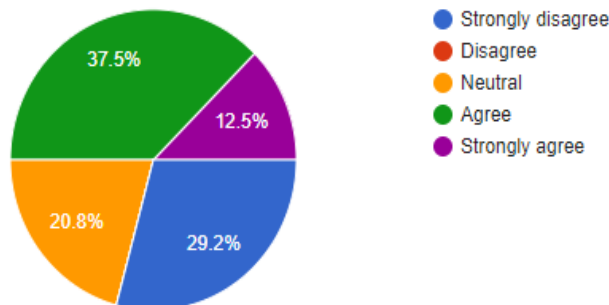
Q.12. Assessment of the building and its significance is done during the pre-planning phase of the renovation project?



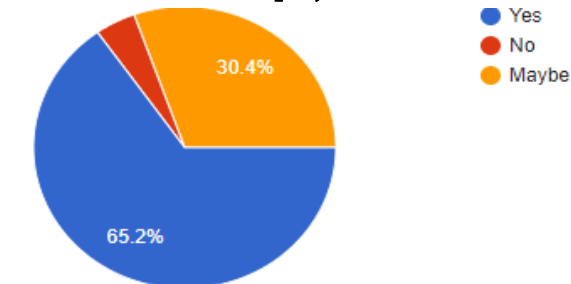
Q.13 Is a comprehensive analysis of the site done prior to the construction phase?



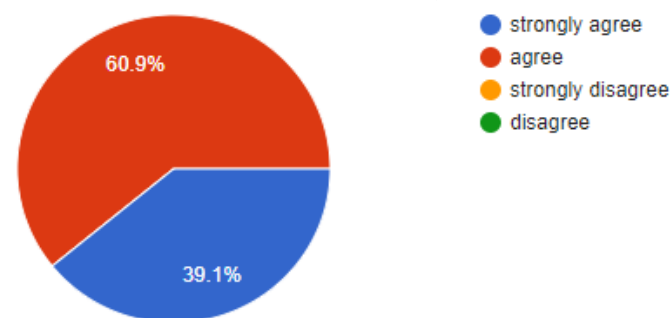
Q.14. Is implementing a Staging or Site layout plan necessary during the renovation?



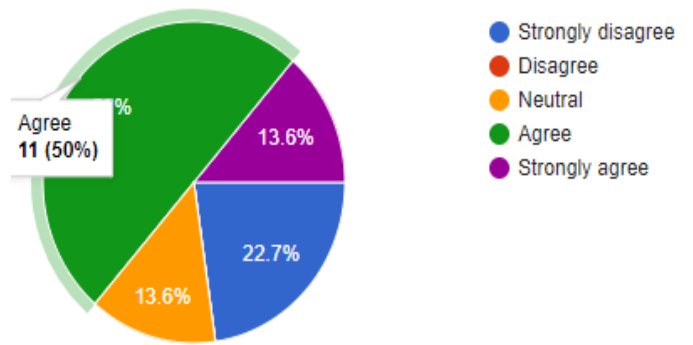
Q.15. Is Value Engineering is necessary for the success of renovation project?



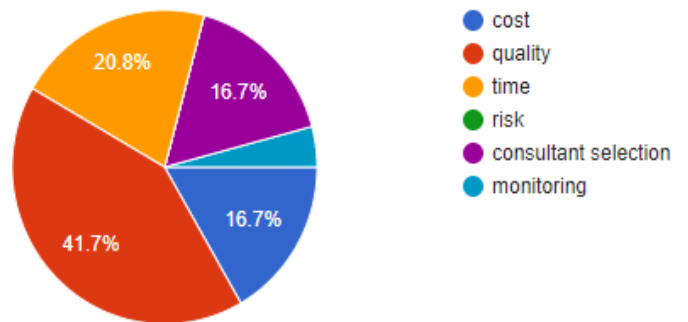
Q.16. Is the Schedule development for the renovation project the construction task clearly define?



Q.17.Is the Communication and Feedback with the project team (Owner,Designer,Contractor) consistently available during the renovation project?



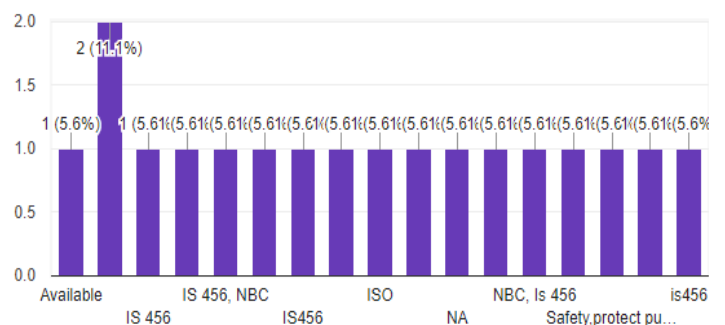
Q.18.Is A develop comprehensive Quality Assurance Plan is necessary for the success of renovation project?



Q.19.On the basis of your experience please mark the resources which ensure success of project?

3.5 Information Management

Fourth section of questionnaire is related to analyse the information about structural audit of building, application and condition assessment of equipment use for strength testing, codes and standards required for design figures is related to information management for work;



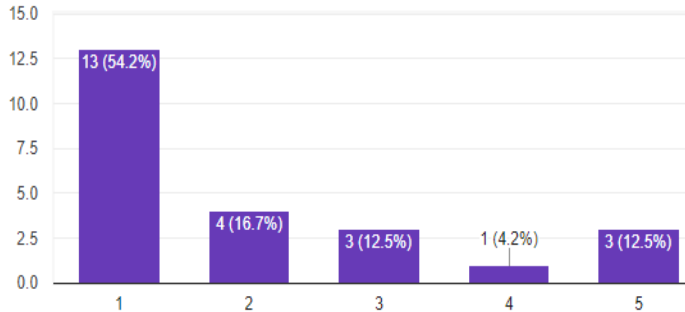
Q.22. The codes/standards to which the building was designed/built?

3.6 Time Management and Renovation Project Justification-

Section five and six are related to time management and justification of renovation work. Time is an

IV. CONCLUSION

important aspect for the success of any construction project because cost and schedule both are related to time. Figures showing bar diagram for answer related to time management and technique required for managing renovation project.



Q 25. Which is most suitable for construction of old building, renovation or rebuild give justification? (Mark 1 for renovation, 2 repair, 3 rehabilitation, 5 for rebuild)

Table No. 3.2 List of Critical Success Factors From research

Ranking	Ranking CSFs	CSF
1	Project Management Plan Assessment of the building Quality	CSF01
3	Time comprehensive analysis of the site Communication and Feedback	CSF02
6	consultant selection Budget Site layout plan	CSF03
11	Site layout plan	CSF04
12	Monitoring Value Engineering	CSF05
13	Risk Shedule	CSF06

This study provides precise and concise findings on actual development scenario happening in Indian renovation industry and this we achieved via learning, brainstorming session, case study and via a Questionnaire with Industry practitioners, particularly project managers and professionals involved in renovation projects and Industry practitioners, particularly project managers and professionals involved in renovation projects are expected to gain significant advantage from this study. We found there different factors which can impact the project so after going through questionnaire we got below results

Procurement Method Used for Project Majority of professional's has voted for Item rate with 37.5 %

Project Success Criteria Project Management Plan The criteria of Quality is topped at the rank, followed by Client / Customer satisfaction, Cost / Budget, Time / Schedule and Organization's strategic goals.

Critical Success Factors and their Factor Groups. Project leader's / manager's performance, and quality is ranked the top, followed by Planning, time and communication feedback in second. Project team's competency and Available budget is shared the third place with the same score.

Information Management Nondestructive test has been up voted by majority of professionals with 21.4 % followed by rebound hammer test with 14.28%

The study also suggests that there is significant relationship between risk management, monitoring and feedback factor towards time & schedule criteria. To making a project successful top management support & planning & controlling factors respectively. Based on above analysis we can recommend for studying more about renovation projects as it is a need for future as sustainability will be achieved with renovation instead of new construction where no need for new construction And we also found that cost, time , quality or monitoring are most important factors for renovation project.

V. REFERENCES

- [1]. Aneesha,k. and Haridharan,M. K., (2017), Ranking the Project Management Success Factors for Construction Project in South India , IOP Conference Series Earth and Environmental Science 80 pp 1-12.
- [2]. Abdussalam ,S.,and., Kumar,A.,(2015),Avoiding Cost Overruns in Construction Projects in India , Journal of Management Studies, Vol. 3, No. 7-8, pp.192-202.
- [3]. Alias,Z., Zawawi, E.M.A, Yusof, K. and Aris,(2014) Determining Critical Success Factors of Project Management Practice: A conceptual framework, Proceeding of AMER International Conference on Quality of Life, 4-5, January,2014
- [4]. Barbara M. Deja ,(2008), Renovation of building and modernization of buildup area, Article in Technical Sciences, vol 11(1), pp. 117-130,
- [5]. Didenko, I. and Konovets,I.,(2008), Success Factors in Construction Projects: A Study of Housing Projects in Ukraine., Master's Thesis Umea University, Ukraine.
- [6]. Escamilla, E.,(2011), Investigation of Project Management planning practices for renovation of historical buildings in urban contexts located in Texas, PhD Dissertation, A & M University, Texas.
- [7]. Erande, S.S, and, Pimplikar, S.S., (2016), Total Quality Management in Indian construction industry, International Research Journal of Engineering and Technology(IRJET), 3(6), pp 685-691
- [8]. Elizabeth, M., (2008), Infrastructure in India a Vast land of Construction Opportunity, PriceWaterHousecoopers, ISO 14001.
- [9]. Ghanaeea, M.,and Pourezzata, A.A., (2013), Identifying the critical success factors for urban renovation projects; lessons learned from Tehran residential renovation projects., International Journal of Urban Sciences, 17(3), pp. 414-443.
- [10]. Hamilton,A.,and, Young, T.L., (2004), revised 2nd Edition, Handbook of Project Management Procedures
- [11]. Jagarajan,R., Abdullah,M.N., Yim Mei,J.L. Misnan,M.S., Abdul, H.M., Jaafar,M.N. (2015), A Review on Critical Success Factors of Sustainable Retrofitting Implementation, Jurnal Teknologi, 74(2) pp. 109-116.
- [12]. Kumar, K. (2002) CPWD Handbook Repair and Rehabilitation of RCC Structure
- [13]. Mbugua, L.M., Harris, P, Holt, G.D..and Olomolaiye, P.O., (1999) A Framework for Determining Critical Success Factors influencing Construction Business Performance, Association of Researchers in Construction Management, Vol. 1, 255-264
- [14]. Matthew, T., Martin, T., and Sam, H., (2014) Critical success factors of an effective repairs and maintenance service for social housing in the UK, Published by Emerald Group Houshing Limited, 35(5/6), pp. 226-240.
- [15]. Nguyen, T.P., and Chileshe N ,(2013), Revisiting the critical factors causing failure of construction projects in Vietnam ARCOM Conference, Association of Researchers in Construction Management, 2-4 September 2013,pp. 929-938.
- [16]. Ogwueleka,A., (2011), The critical success factors influencing project performance in Nigeria International Journal of Management Science and Engineering Management, 6(5) pp.343-349
- [17]. Omran,A., Abdulbagei, M A., and Gebril, A.O.,(2012), An Evaluation of the Critical Success Factors for Construction Projects in Libya, Journal of Economic Behaviour, vol 2 ,pp. 17-25.
- [18]. Oberlender,G.D.and Peurifoy,R.L.(2000),2nd Ed.Project Management For Engineering and Construction

- [19]. Pakseresht, A., and Asgari, G., (2012), Determining the Critical Success Factors in Construction Projects: AHP Approach, *Interdisciplinary Journal of Contemporary Research in Business*, 4(8), pp. 383-393.
- [20]. Peng, F.S., (2017), The critical success factors for renovation projects, M.Tech Dissertation, Lee Kong Chian Faculty of Engineering and Science Universiti Tunku Abdul Rahman, Malaysia.
- [21]. Project Management Institute (PMI), 2000, A Guide to the Project Management Body of Knowledge. Project Management Institute Inc.
- [22]. Rauzana, A., (2016), Cost Overruns and Failure in Construction Projects *IOSR-JBM* vol 18(10), pp 80-83.
- [23]. Research for a smart and competitive railway system (2015) www.transport-research.info doi: 10.2832/915127
- [24]. Roy S., (5, January, 2017), New Look for Old Delhi Railway Station *The Hindu*
- [25]. Royal Charter and Bye-laws, 9, October, 2013.
- [26]. Saqib, M., Farooqui, R.U., and Lodi, S.H., (2008), Assessment of Critical Success Factors for Construction Projects in Pakistan, 1ST International Conference of Construction in Developing Countries, 4-5, August, 2008, pp. 392-404
- [27]. Shobana, K. S, Ambika, D., (2016), Evaluation of Factors Affecting Quality in Construction Projects, *International Journal of Innovation Research in Science, Engineering and Technology*, 5(3), pp. 3527-3529.
- [28]. Srivastava A. Makeover to turn Old Delhi Station Into Gold *Tribal News Network*, 16, Oct, 2016
- [29]. Szentes, H., (2010), Success Factors in Large Construction Projects, Book Article 18th CIB World Building Congress, pp. 423-432
- [30]. (8, June 2010), State Rail Planning Critical Success Factors APTA
- [31]. Trabucco, D., (2013), Confronting the Question of Demolition or Renovation, *CTBUH Journal Paper*, i. 4, pp. 38-43.
- [32]. Vainio, T.H. Building Renovation-A new Industry? Conference Management and Innovation for a Sustainable Built Environment, 20-23 June 2011
- [33]. A Case Study in Urban Revitalization, <https://cdn.mra.wa.gov.au/subi-centro-a-case-study-in-urban-revitalisation>.
- [34]. Zhenjum, M.A., Paul, C., Daly, D. and Led, L., (2012), Existing Building Retrofit-A methodological Approach, *Journal of Energy and Building* vol 55, pp. 889-902.