
EFFECTS OF UNCERTAINTY FACTORS AND REFURBISHMENT PROJECTS PERFORMANCE IN RELATION TO LEADERSHIP QUALITY OF PROJECT MANAGERS

R. Yacob, I. Rahmat, M. Saruwono, Z. Ismail*

Faculty of Architecture, Planning and Surveying, Universiti Teknologi MARA, Shah Alam. MALAYSIA.

*Corresponding author: zulhabri@salam.uitm.edu.my

Abstract

Refurbishment projects vary in scope of work compared to the new projects. The key features are unique, inherent with uncertainty factors, difficult to achieve high performance and filled with existing leadership quality of project manager issues. This research aims to establish the relationship between refurbishment project uncertainty factors and refurbishment project performance in relation to the quality of leadership among project managers. The objective of this research is to measure the level of uncertainty factors of building refurbishment projects, to determine the performance of building refurbishment projects, to identify the leadership quality of refurbishment project managers and to analyse the relationship between refurbishment project uncertainty factors and project performance in relation to leadership quality of refurbishment project managers. The quantitative research method was adopted in this research and analysed using descriptive and correlation analysis via IBM SPSS version 22, 130 questionnaires were distributed to the target group of Project Managers involved in building refurbishment and registered with CIDB in the Klang Valley, Malaysia, with contract value starting from RM500,000. 35 responses were found to be suitable to form a database for analysis. The results conclude that there were significance relationships between the groups of variables in the conceptual framework, thus, contribute in managing uncertainties factors of building refurbishment projects through leadership qualities among project managers and for furthered research in this area.

Keywords: Leadership Quality, Project Managers, Project Performance, Refurbishment Project, Uncertainty factors.

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INTRODUCTION

Building refurbishment is an important sector, rapidly growing in the construction industry. According to Ali (2008) in the United Kingdom; 50 per cent of the construction output was contributed by the refurbishment sector which was further supported by Rahmat and Ali (2009) stated, building refurbishment was an important sector in many developed countries such as the United Kingdom and Germany, contributing to about half of the construction output. Furthermore, the growth pattern and expend over Malaysia's refurbishment sector among the construction industry, as reported by CIDB (2014), was estimated at about 7.1 per cent output, many of which was not reported and yet steadily increased yearly. Egbu (1997) stated that building refurbishment projects were initiated due to many reasons and some of which include obsolescence and physical deterioration due to functional, economic, technological, social, locational, legal, aesthetic and visual reasons.

On the other hand, Rahmat & Adnan (2012) claimed that building refurbishment projects were one of the most risky; inherently so due to complex and uncertain factors. Young et al. (1996) mentioned that managing refurbishment projects means managing an uncertain project since the situation could change dramatically; which was also cited by many construction management writers such as Egbu (2001) and McKim et al (2000) who further iterated that uncertainty and complexity of refurbishment projects were the main reasons for the poor performance. A research by Jens (2013) asserted that moving from an environment of stability to an environment of complexity and constant change required new leadership skills and qualities. Supported by Jaeger and Adair (2010) it is said that the successful management relied primarily on the engagement by the project managers to the construction projects; where the leaders, followers and organizational factors heavily influence the behaviour of people and the climate at work, in a way which could increase or decrease the performance of a project.

Phil Hodgson & Randall White (2003) claimed that the various uncertainties required specific leadership qualities of project managers. Dick (2015) also maintained that to improve the team members' spirits and also performances of the team it must began with the leadership shown by the heads or managers. Therefore, there was a need for project managers to exhibit the leadership

qualities in order to manage the uncertainty factors in refurbishment projects. Hence, the objective of the research was to design and address the issues which arising in refurbishment projects by establishing the relationships between all variables and analysing the effects.

UNCERTAINTY FACTORS IN BUILDING REFURBISHMENT PROJECTS

Uncertainty means the difference between the amounts of information available to perform a task. It is also defined by Ward and Chapman (2003) as something that associated with 'lack of certainty' and also 'ambiguity' related with lack of data, detail, structure to consider issue, working and framing assumptions and the sources of bias. McKim et al (2000) asserted, uncertainty factors of refurbishment projects include; lack of information, space limitation for reconstruction projects, maintaining safety and health which involves many players including building users.

A research by Harris (2006) stated uncertainty in building refurbishment works depended on the levels of complexities which interrelated among the building systems for retrofitting works. Holm (2000) further explained that approval from the appropriate authorities in design for construction projects needed to be completed before the projects could be executed. Manavazhi and Xunzhi (2001) pointed out that, additional requirements from different local authority influences the amount of changes in refurbishment design thus created the uncertainty factors in design requirements. Boyle (2003) mentioned that sufficient time frame was one of the most important factors contributing to successful design. Another point stressed by Rahmat & Adnan (2012) states that the inherent complexity and uncertainty of refurbishment projects were cited by many construction management writers to be the main reason for the poor performance of refurbishment projects.

Therefore, from the statements above; managing uncertainty factors were very important and thus more researches needed to be conducted. The relationships between the refurbishment project uncertainty factors and the refurbishment projects performance would be analyzed and the effects would be helpful and serve as a general guidance in managing the uncertainty factors of building refurbishment projects.

BUILDING REFURBISHMENT PROJECT PERFORMANCE

Regardless of the size or location and various sources of uncertainty, refurbishment projects were fraught with risks. Ron Ponce (2009) emphasized that, one of the things which contributed to the failure of any project was the lack of control, especially around the scope and budget. According to Babangida (2014) building refurbishment projects whether renovation or rehabilitation, there was the accumulation of risks that may affect the outcome of the project performance due to uncertainty factors which in turn may become the main factor in resulting in a poor project performance.

Based on a research by Ali et al., (2003) declared that the main problem with building refurbishment works was the limited amount of information available in the design process and the uncertainty in retrieving design information which depended on the condition of the existing building structure. Frequently, there were cases where structural information for buildings in archive documents such as reports, as-built drawings and manuals were not properly documented, incomplete or missing and thus required more time; affecting the overall performances.

Salter and Torbett (2003) stressed out that, the measurement of performance was important in indicating the level of success, as well as improving the quality and reducing the number of complaints. Therefore, there was a need to manage the uncertainty factors in building refurbishment projects in order to improve refurbishment projects performance related to time, cost and quality.

LEADERSHIP QUALITY OF REFURBISHMENT PROJECT MANAGERS

Leadership is a holistic spectrum that can arise from the highest levels of physical power, superior mental energies, motivational forces, communication and also determination. In addition, leadership also calls for the ability to see the overall picture (macro scale), and the ability to address specialised tasks (micro scale); especially in managing refurbishment projects which comprise of uncertain and complex situations. A research by Peters and Austin (1985) declared that leadership means vision, cheerleading, enthusiasm, love, trust, verve, passion, obsession, consistency, the use of symbols, and a numerous of other things. Therefore, leadership qualities were an important quality for refurbishment project managers and thus become a key ingredient to successful project performance.

According to Affendy (2005), there were main attributes that a refurbishment manager should possess in order to make the refurbishment project successful which included experience and decision-making. Jackson & Parry (2008) expressed that leadership has been linked to certain personality traits in leaders, factors such as conscientiousness, agreeableness, extraversion, and emotional stability. According to Lind Nilsson (2001) the environment around an organization laid a

constant pressure on a leader to further develop his or her skills in order to handle uncertain situations, self-awareness and maturity within oneself were required from the leader, skills that were very visible in success as well as in failure.

A research by Berg & Karlsen (2007) affirmed that project managers continued to face many challenges and problems concerning leadership, for example, leadership styles, stress, uncertainties, motivation, learning, and teamwork. In addition, Pinto et.al (2007) the project manager must be experienced in refurbishment work as well as in handling refurbishment projects, Furthermore, team and a working group's experience had been proven to be associated with the project performance. An organization would improve their performance when employing competent, experienced and knowledgeable staff. According to Duan (2000) empathy was the ability to actively share emotions with others, and passively experience the feelings of others. Lind Nilsson (2001) also added that empathy included not only verbal skills, but also the message transmitted by body language as well as movements of the eyes and the sound and the tone of the voice. Empathy could be learned to improve group performance and effectiveness, which leaders may needed to develop in order to demonstrate this ability.

Furthermore, Udhayakumar and Karthikeyan (2014) stressed out that, the qualities of leadership during project execution would somehow affect the project performance. Hoogh et al (2007) claimed, employees feel more committed and behaved more cooperatively when leaders are charismatic this in turn will boost profitability of organizations. Therefore, relationships between refurbishment projects uncertainty factors and building refurbishment projects performance in relation to leadership quality of project managers had been researched. The results showed significant reasons to manage building refurbishment projects through improved leadership qualities of building refurbishment project managers.

RESEARCH METHODOLOGY

Lowe et al., (2000) reviewed 10 years of research articles between 1990 and 1999. A total of 188 articles on "leadership quarterly" were analysed, it was found that, 64% of the research studied employed a questionnaire-based method of data collection. Furthermore, Toor et al., (2016) recognized that quantitative research methods are characterized by the assumption that human behavior can be explained by social facts. Thus, it was applied as an evidence for research methodology adopted in this research.

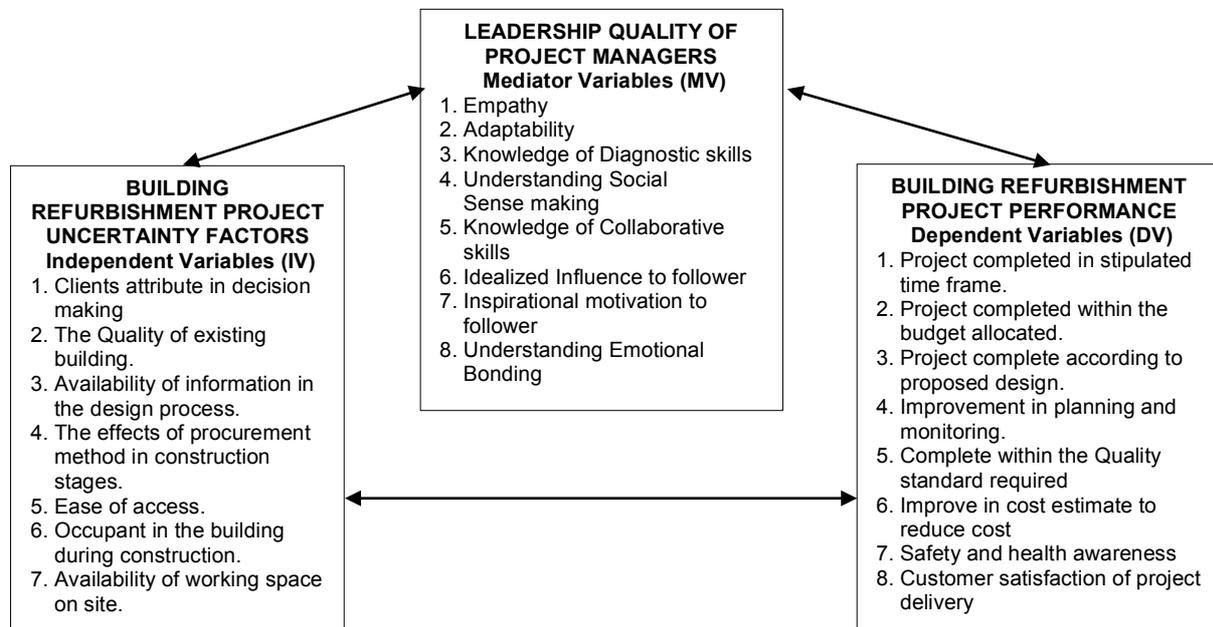


Figure 1: Conceptual framework of the effects of uncertainty factors on refurbishment projects performance in relation to leadership qualities of project managers. Adaptation from Statistic Mediation Model (Cooper 2015)

In addition, Statistical Mediation Model was adapted (Refer to Figure 1) to identified and explained the relationship between an independent variables (IV) and a dependent variable (DV) via the inclusion of a third hypothetical variable, known as a mediator variable (MV). According to Cooper (2015) emphasizes that, a mediator explains how or why an independent variable is related to a

dependent variable and mediation is exemplified by the question “how did it work?”, the focus on understands the causal chain of events, or the underlying process. Furthermore, provided with a critical discussion concerned to the quality, reliability and validity which in turned has become the blueprint for the data collection, measurement and data analysis. Therefore, quantitative research method was found to be suitable and was mainly used as regards to the research aim and objectives in this research.

Table 1: Sampling Frame of Project Manager, adaptations from CIDB report 2015.

Item	Descriptions	Potential Populations		Sample Size suggested by Chua (2012)
		Malaysia	Klang Valley	
1	Number of Project Managers registered with CIDB.	53,332 (100%)	20,000 (37.5%)	377
2	Project Managers involve in refurbishment projects.	5,866 (11%)	2,200 (11%)	327

Contractors were the one had prevailing influencers over the project directions, on that basis the target group were selected as project managers and registered with CIDB in the Klang Valley. In addition, the sampling sizes subjects were chosen based on their involvement in building refurbishment projects start from RM500, 000.

As indicated in the table 1, Chua (2012) suggested that minimum sample size is 327. However, as recommended by Delice (2010) the acceptable sample sizes for survey based research are between 30 and 500. Waris et al (2014) emphasized that a response rate in the region of 20% to 30% were acceptable as the feedback from the construction industry.

Therefore, due to time limitation and accessibility to respondents; only 130 questionnaires were distributed with an aim of 35 responses and constitute about 27% were collected by the cut-off date for data analyses. Furthermore, the purpose of this research is to get a snapshot on the subject matter. More extensive research is expected for more valid findings.

Descriptive Analysis

Table 2: Likert Scale and Indicator

Scale	Indicators (N=35)
1	Very low
2	Low
3	Moderate
4	High
5	Very High

Descriptive statistics is a measure of central tendency and dispersion, the mean, median, mode, variance and standard deviation. In addition, descriptive statistics would also be used to summarize the data collection in the research methods. The questionnaires were designed with a rating scale (Refer to Table 2), to manage the data collection and evaluation in the analysis stages. Thus, the score helps in identifying the level of refurbishment uncertainty factors, refurbishment project performance and also leadership quality for project managers.

Table 3: Landell Classification Scale

Description	Classification Rating Scale (N=35)
Low	1.0 – 2.33
Moderate	2.34 – 3.68
High	3.69 – 5.00

Furthermore, total average score mean values were analyzed and arranged by frequency and ranking where the results were further analyzed using Landell's scale (1997). Therefore, to determine the classification scale of all the variables from the rankings such as refurbishment uncertainty, leadership quality and also refurbishment performances the classification of the rating scales designed were as follows (Refer to Table 3):-

Correlation Analysis

To understand the relationship and effects of all the variables, the research provided the three (3) correlation analysis frameworks as seen below:-

1. Correlation A: Refurbishment projects uncertainties factors correlates with leadership quality for refurbishment manager.
2. Correlation B: Leadership quality of project managers correlates with Refurbishment project performance.
3. Correlation C: Refurbishment projects uncertainty factors correlates with Refurbishment project performance.

Table 4: Strength of Relationship (McLeod 2008).

Scale	Strength of Relationship (N=35)
-1.0 to -0.5 or 1.0 to 0.5	Strong
-0.5 to -0.3 or 0.3 to 0.5	Moderate
-0.3 to -0.1 or 0.1 to 0.3	Weak
-0.1 to 0.1	None of very weak

The coefficient can range between ± 1.0 (plus or minus one). A coefficient of 1.0, a perfect positive correlation, means that changes in the independent item will result in an identical change in the dependent item. A coefficient of -1.0, a perfect negative correlation means that changes in the independent item will result in an identical change in the dependent item. But if the change is in the opposite direction; Coefficient of zero, means there is no relationship between the two items and that a change in the independent item will have no effect in the dependent item (Refer to Table 4).

DATA ANALYSIS AND FINDINGS

As a result, the data analysis illustrated the findings and has signified the critical issues pertaining to effects of uncertainty factors on refurbishment project performance in relation to leadership qualities of a project manager as follows:-

Building Refurbishment Project Uncertainty Factors

Data analysis and findings for building refurbishment project uncertainty factors show the results as follows:-

Table 5: Data Analysis and Findings for Building Refurbishment project Uncertainty factors.

Building Refurbishment Project Uncertainty Factors (Variables).	Frequency of Respondents					Total (N)	Mean value	Classification	Rank
	1	2	3	4	5				
1. The availability of working space of the refurbishment project was limited.	1	1	11	13	9	35	3.80	High	1
2. The access of the refurbishment project was limited.	1	3	8	16	7	35	3.71	High	2
3. The client of the refurbishment project was knowledgeable.	1	6	10	13	5	35	3.43	Moderate	3
4. The occupant of the building of the refurbishment project was disruptive.	4	3	10	13	5	35	3.34	Moderate	4
5. The procurement of the refurbishment project was appropriate.	0	6	16	11	2	35	3.26	Moderate	5
6. The availability design information of the refurbishment project was sufficient.	1	9	11	11	3	35	3.17	Moderate	6
7. The quality of existing building condition of the refurbishment project was good.	4	9	12	9	1	35	2.83	Moderate	7

With reference to Table 5, *the availability of working space of the refurbishment project was limited and the access of the refurbishment project was limited*, which generated the high scoring and the overall high extent for building refurbishment project uncertainty factors.

On the other hand, the variables of the item: *the access of the refurbishment project was limited, the client of the refurbishment project was knowledgeable, the occupant of the building of the refurbishment project was disruptive, the procurement of the refurbishment project was appropriate, the availability of the design information of the refurbishment project was sufficient and also the quality of existing building condition of the refurbishment project was good*; resulting in Moderate extent. Therefore, the results is consistent with other researchers, who agreed that refurbishment

projects were different in many situation such as Quah (1992)., Egbu, (1997., 2001) and Rahmat (1997) and also the main characteristics of refurbishment work which were unique, high risk, full of uncertainties making it difficult to manage.

Building Refurbishment Project Performance

Data analysis and findings for building refurbishment project performances showed the results as follows:-

Table 6: Data Analysis and Findings for Building Refurbishment Project Performance

Building Refurbishment Project Performance (Variables).	Frequency of Respondents					Total (N)	Mean value	Classification	Rank
	1	2	3	4	5				
1. The project manager was able to achieve customer satisfaction for the project	0	1	11	15	8	35	3.86	High	1
2. The project manager was able to complete the project according to the proposed design.	0	1	12	16	6	35	3.77	High	2
3. The project manager was able to instill the safety culture for the project	0	1	16	9	9	35	3.74	High	3
4. The project manager was able to complete the project within the quality standard required.	0	1	11	19	4	35	3.74	High	4
5. The project manager was able to plan and monitor the project process efficiently.	0	3	14	12	6	35	3.60	Moderate	5
6. The project manager was able to complete the project within the stipulated time	0	4	16	11	4	35	3.43	Moderate	6
7. The project manager was able to deliver the project within the budget allocated	1	4	17	10	3	35	3.29	Moderate	7
8. The project manager was able to produce accurate cost estimates for the project.	0	5	20	10	0	35	3.14	Moderate	8

Based on the questions; *the project manager was able to achieve customer satisfaction for the project, the project manager was able to complete the project according to the proposed design, the project manager was able to instil the safety culture for the project, the project manager was able to complete the project within the quality standard required*; scored a high result.

On the other hand, the variable for the item, *project manager was able to plan and monitor the project process efficiently, the project manager was able to complete the project within the stipulated time, the project managers was able to deliver the project within the budget allocated and, the project manager was able to produce accurate cost estimate for the project* generated a moderate scoring. Findings from the data analysis showed that, respondents agreed that the building refurbishment projects performances would improve if project managers were equipped with specific leadership qualities.

Leadership Quality of Refurbishment Manager

Data Analysis and Findings for leadership qualities of refurbishment managers showed the following result:-

Table 7: Data Analysis and Findings for Leadership Quality of Refurbishment Manager

Leadership Quality for Refurbishment Manager (Variables).	Frequency of Respondents					Total (N)	Mean value	Classification	Rank
	1	2	3	4	5				
1. The project manager was trusted by his/her subordinates.	0	1	6	23	5	35	3.91	High	1
2. The project manager was able to lead his/her subordinates to achieve group norms.	0	1	5	26	3	35	3.89	High	2
3. The project manager was respected by his/her subordinates.	0	1	9	19	6	35	3.86	High	3
4. The project manager was able to be a role model to his/her subordinates	0	2	11	14	8	35	3.80	High	4
5. The project manager was able to influence his/her subordinates	0	3	6	21	5	35	3.80	High	5

6. The project manager was able to drive his/her subordinates to create an atmosphere of a shared vision.	0	3	10	14	8	35	3.77	High	6
7. The project manager was able to identify his/her subordinate's behavior to improve teamwork	0	2	7	24	2	35	3.74	High	7
8. The project manager was able to accept differences of ideas of his/her subordinates.	0	3	12	15	5	35	3.63	Moderate	8
9. The project manager possesses high analytical skills.	1	2	8	22	2	35	3.63	Moderate	9
10. The project manager was able to share with his/her subordinate's feelings.	0	3	12	16	4	35	3.60	Moderate	10
11. The project manager was able to develop his/her subordinate's emotions with others.	0	3	12	16	4	35	3.60	Moderate	11
12. The project was able to change his/her subordinate's behavior.	0	7	7	20	1	35	3.43	Moderate	12

For the questions; *the project manager was trusted by his/her subordinates, the project manager was able to lead his/her subordinates to achieve group norms, the project manager was respected by his/her subordinates, the project manager was able to be a role model to his/her subordinates, the project manager was able to influence his/her subordinates, the project manager was able to drive his/her subordinates to create an atmosphere of a shared vision, the project manager was able to identify his/her subordinate's behaviour to improve teamwork*, the scoring resulted in High extent.

On the other hand, for the items; *the project manager was able to accept differences of ideas of his/her subordinates, the project manager possesses high analytical skills, the project manager was able to share with his/her subordinate's feelings, the project manager was able to develop his/her subordinate's emotions with others, the project was able to change his/her subordinate's behaviours*, the result showed Moderate extent. Therefore, based on the respondents' feedbacks, leadership quality is in fact, very important for building refurbishment project managers and thus becomes a key ingredient for successful management of uncertainty factors.

Correlation A: Refurbishment projects uncertainties factors correlates with leadership quality of refurbishment manager.

Table 8: Correlation A

Leadership Quality of Refurbishment project managers	Refurbishment project uncertainties factors					
	1.The client of the refurbishment project was Knowledgeable.	2. The availability design information of the refurbishment project was sufficient	3. The procurement of the refurbishment project was appropriate.	4. The occupant of the building of the refurbishment project was disruptive.	5. The availability of working space of the refurbishment project was limited.	6. The access of the refurbishment project was limited.
1. The project manager was able to share with his/her subordinate's feelings.	.436**	.398*	.156	.198	-.046	.170
2. The project was able to change his/her subordinate's behavior.	.344*	.302	.262	.227	.130	.256
3. The project manager possesses high analytical skills.	-.003	.225	-.030	.381*	.351*	.340*
4. The project manager was respected by his/her subordinates	.050	-.035	-.014	.127	.462**	.328
5. The project manager was trusted by his/her subordinates	.009	.039	.338*	.137	.072	.041
6. The project manager was able to drive his/her subordinates to create an atmosphere of a shared vision.	.014	-.037	.117	.124	.261	.428*

** Correlation is significant at the 0.01 level (2-tailed). * Correlation is significant at the 0.05 level (2-tailed).

Findings from correlation A indicated that, there were nine significant correlations (Refer to Table 8) and the averages strength of relationships between refurbishment project uncertainties correlated with the leadership quality of project managers are as followings:

$$i. \text{ Significant value } \bar{x} = \frac{\sum a}{n} \quad (\text{Equation 1.0})$$

$$\bar{x} = \frac{.436+.344+.398+.338+.381+.351+.462+.340+.428}{9} = 0.386^*$$

$$ii. \% \text{ of overall correlation } x = \frac{\sum n_{\text{correlated}}}{\sum n_{\text{element}}} \times 100 = \frac{9}{36} \times 100 = 25\% \quad (\text{Equation 2.0})$$

The significant values were about 0.386* (Refer to Table 4) highlighted the positive and moderate impact of changes. On the other hand, percentages of overall correlation elements were only 25% equal to weak relationship in the variable of correlation A, between refurbishment projects uncertainties factors and leadership quality of refurbishment manager. Therefore, further research need to be carried out in order to explore others variables related to human aspects and bridge that gaps.

Correlation B: Leadership quality of project managers correlates with Refurbishment project performance.

Table 9: Correlation B

Leadership Quality of Refurbishment project managers	Refurbishment Project Performance						
	1. The project manager was able to complete the project with stipulated time.	2. The project manager was able to complete the project according to the proposed design.	3. The project manager was able to complete the project within the quality standard required.	4. The project manager was able to plan and monitor the project process with efficiently.	5. The project manager was able to produce accurate cost estimate for the project.	6. The project manager was able to instil the safety culture for the project.	7. The project manager was able to achieve customer satisfaction for the project.
1. The project manager was able to share with his/her subordinate's feelings.	.263	.269	.129	.429*	.392*	.290	.367*
2. The project was able to change his/her subordinate's behaviours.	.256	.158	.391*	.513**	.402*	.278	.442**
3. The project manager possesses high analytical skills.	.125	.067	.215	.391*	.004	.389*	.458**
4. The project manager was able to identify his/her subordinate's behaviours to improve teamwork	.262	.268	.364*	.197	.253	.371*	.344*
5. The project manager was able to lead his/her subordinates to achieve group norms.	.257	.310	.474**	.584**	.149	.471**	.482**
6. The project manager was able to influence his/her subordinates.	.169	.293	.269	.299	.393*	.426*	.440**
7. The project manager was trusted by his/her subordinates	.309	.321	.605**	.483**	.258	.427*	.471**
8. The project manager was able to be a role model to his/her subordinates.	.199	.343*	.390*	.427*	.161	.320	.485**
9. The project manager was able to drive his/her subordinates to create an atmosphere of a shared vision.	.449**	.494**	.570**	.596**	.281	.617**	.626**
10. The project manager was able to develop his/her subordinate's emotions with others.	.304	.360*	.311	.333	.503**	.439**	.425*

** Correlation is significant at the 0.01 level (2-tailed). * Correlation is significant at the 0.05 level (2-tailed).

Findings from correlation B indicated that, there were 38 significant correlations (Refer to Table 9) and the averages strength of relationships between the variables of Leadership qualities of project managers correlated with the variables of refurbishment project performance are as follows:-

$$i. \text{ Significant value } \bar{x} = \frac{\sum a}{n} \quad (\text{Equation 1.0})$$

$$\bar{x} = \frac{17.233}{38} = 0.454^*$$

$$ii. \% \text{ of overall correlation } x = \frac{\sum n_{\text{correlated}}}{\sum n_{\text{element}}} \times 100 = \frac{38}{70} \times 100 = 54\% \quad (\text{Equation 2.0})$$

The significant values were about 0.454* (Refer to Table 4) revealed the positive and moderate impact of changes. On the other hand, percentages of overall correlation elements were 54% equal to moderate relationship in the variable of correlation B, between leadership quality of refurbishment manager and refurbishment project performance. Therefore, contribute to the establishment of general guide of leadership qualities needed among project.

Correlation C: Refurbishment projects uncertainties factors correlates with Refurbishment project performance.

Table 10: Correlation C

Refurbishment project uncertainties factors	Refurbishment Project Performance						
	1. The project manager was able to complete the project with stipulated time	2. The project Manager was able to deliver the project within the budget allocated	3. The project manager was able to complete the project according to the proposed design.	4. The project manager was able to complete the project within the quality standard required.	5. The project manager was able to produce accurate cost estimate for the project.	6. The project manager was able to instil the safety culture for the project.	The project manager was able to achieve customer satisfaction for the project.
1. The client of the refurbishment project was knowledge.	.058	.400*	.109	-.067	.378*	-.073	.122
2. The availability design information of the refurbishment project was insufficient.	-.057	.182	-.033	-.117	.355*	-.201	.074
3. The availability of working space of the refurbishment project was limited.	.232	-.076	.093	.305	-.162	.402*	.329
4. The access of the refurbishment project was limited.	.493**	.150	.357*	.392*	-.115	.569**	.473**

** Correlation is significant at the 0.01 level (2-tailed). * Correlation is significant at the 0.05 level (2-tailed).

Finally, correlation C indicated that, there were 9 significant correlations (Refer to Table 10) and the averages strength of relationships between the variables of refurbishment project uncertainty factors correlated with the variables of refurbishment project performance are as follows:-

$$i. \text{ Significant value } \bar{x} = \frac{\sum a}{n} \quad (\text{Equation 1.0})$$

$$\bar{x} = \frac{.493+.400+.357+.392+.378+.355+.402+.569+.473}{9} = 0.424^*$$

$$ii. \% \text{ of overall correlation } x = \frac{\sum n_{\text{correlated}}}{\sum n_{\text{element}}} \times 100 = \frac{9}{28} \times 100 = 32\% \quad (\text{Equation 2.0})$$

The significant values were about 0.424* (Refer to Table 4) highlights the positive and moderate impact of changes. On the other hand, percentages of overall correlation elements were 32% equal to weak relationship in the variable of correlation C, between refurbishment project uncertainty factors and refurbishment project performance. Therefore, further research need to be carried out in order to explore others variables and bridge that gaps.

CONCLUSIONS

The strength of relationship (Refer to Table 4) between refurbishment project uncertainties factors and refurbishment project performance in relation to leadership quality of project managers (Refer to Figure 2) are as follow:-

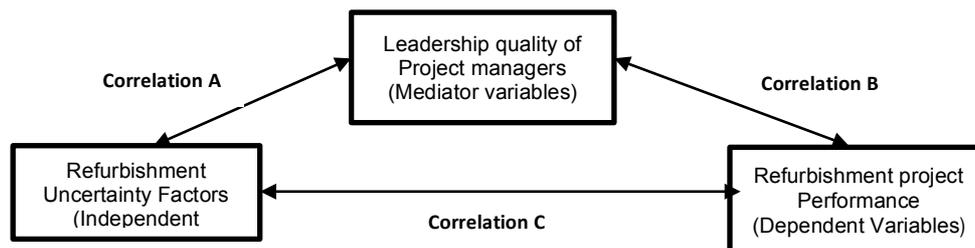


Figure 2: Relationship and effects between variables

1. Correlation A; the significant values of each variable were about 0.386* and highlighted the moderate positive correlations. On the other hand, the overall percentages of correlated variables were calculated to 25% and equal from low to moderate impacts, the measures of central tendency and dispersion (Refer to Table 2). Therefore, it was found that, there were significant relationships between refurbishment project uncertainty factors on leadership quality of project managers. However, further research need to be carried out in order to explore others variables of uncertainty factors related to human aspects and leadership qualities of project managers to bridge that gaps.

2. Correlation B; the significant values of each variable were about 0.454* revealed the moderate positive correlations. Furthermore, the overall percentages of correlated variables were calculated to 54% and equal to high impacts, the measures of central tendency and dispersion (Refer to Table 2).

Therefore, as mediator variable, it was shown that, there were significant relationships between leadership qualities of project managers on refurbishment project performance. Hence, contributes to the establishment of general guide of leadership qualities needed among refurbishment project managers in order to improve refurbishment projects performance.

3. Correlation C; the significant values of each variable were about 0.424* highlighted the moderate positive correlations. On the other hand, the overall percentages of correlated variables were calculated to 32% and equal from moderate to high impacts, the measures of central tendency and dispersion (Refer to Table 2). Therefore, it was found that there were significant relationships between refurbishment project uncertainty factors and refurbishment project performance. However, further research need to be carried out in order to explore others variables that related to human attribute and behaviors aspects that contributes to uncertainty in refurbishment projects and refurbishment project performance to bridge that gaps.

This research has successfully achieved its aim and objectives, to measure the levels of uncertainties factors for building refurbishment projects (Refer to Table 5), to identify the leadership qualities for project managers (Refer to Table 7) and also to determine the levels of building refurbishment project performances (Refer to Table 6) finally to analyses the relationships between all groups of variables in the conceptual framework (Refer to Figure 2). In a nut shell, at the end of this research paper, the relation between building refurbishment projects uncertainties factors and refurbishment project performance in relation to leadership qualities of project managers were established. It is also hoped that this research has contributed knowledge in managing uncertainties factors through leadership qualities among project managers and making way for further research.

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