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Project Management for Construction Services Engineering: An Indepth Study Based On Hong Kong

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Abstract
Experts in the profession say that a Quantity Surveyor's Day is mostly devoted to reviewing proposals from potential subcontractors. Nevertheless, a few of significant clients are still dissatisfied "A potential replacement for the current system of chosen subcontractors is domestic subcontracting, which the Hong Kong Jockey Club is looking at. Their hope is that this was make it easier for them to avoid lawsuits and conflicts with contractors. As time has progressed, the frequency with which "bills of quantities for business-related construction services" have expanded. There is little to no difference in the total cost of the offer between deals with and without BQ. Always remember to maintain a "keeping a with its help, the building services expert may create more methodical plans while keeping a careful eye on the project's finances. An old method of measuring building services projects in Hong Kong was developed by a number of the city's leading architect and quantity surveying firms in collaboration. Since the conventional method has been shown to be too complex, "assessment," QS firms are more likely to create their own system of measurement.

Keyword: *Methodical Designs, Measurement of Buildings*

1. Introduction

Initiatives that have a restricted time range are referred to as projects. According to the fifth edition of the American Project Management Association's body of knowledge, project management is defined as the process by which projects are discovered, managed, monitored, and finished in order to meet predefined objectives. By adhering to the phases of the sustainability process, it is possible to achieve a goal with the assistance of a framework that encourages sustainability. This is hardly what you would call a plan. On the other hand, it is connected to a determination to alter one's own financial habits, viewpoints, ways of thinking, and behaviours around money. It is necessary for there to be growth within generations as well as justice between them in order to have a future that can be maintained. At this point in time, academics regard sustainability and project management to be two separate fields of study. Nevertheless, in the realm of business, they are equally reliant on one another. In this new century, environmental concerns are being given a greater amount of weight in the construction projects that are being undertaken (Myers,2018).

Typical measures for determining whether or not a project was finished did not take these implications into consideration. When evaluating the effectiveness of a project, for instance, the project implementation profile (PIP) developed by Pinto, which is commonly used, does not take into consideration the concept of sustainability. This information is necessary for both the community of project managers and the efforts pertaining to sustainability. To be eligible for funding from European Public Finance Institutions (EPFIs), projects are required to adhere to certain procedures that evaluate pertinent sustainability risks. EPFIs are characterised as financial institutions that have principal criteria that have been developed for the purpose of recognising, assessing, and mitigating social and environmental risk in project finance. Those projects that adhere to these guidelines was have a greater chance of being responsible in terms of both the environment and communities. The regulations that regulate the manner in which projects are financed are intimately connected to each and every one of these needs. On the other hand, this demonstrates how essential it is to determine what the needs for sustainability are while projects are still in progress. BREEAM, which was released in 1990 by the Building Research Establishment (BRE) in the United Kingdom, is considered to be the measure of environmental sustainability that is considered to be the silver standard. However, BREEAM is responsible for establishing standards and criteria for projects that are comparable. The consequences that a project has on the environment are the primary emphasis of this section (Wong,2019).

2. Background of the Study

Acquisition of construction projects is often accomplished via the use of contractual agreements. All the way through the project's design and construction, this is correct. The selection of the relevant architects and builders is the first and most crucial part of the procurement process. When you hire designers and contractors, you may have to go through the hassle of bidding, selecting suppliers and subcontractors, and writing

contracts. Procurement strategies used during a project's feasibility study may have a major influence on the project's final cost, duration, and quality. A project's procurement procedure must be carefully crafted with several factors into mind. Included in this are a number of issues, such as the client's capacity for project management, cost management, the allocation of workers between the design and construction phases, and the possibility of overlapping tasks between the two. When it comes to construction, the techniques used in China are rather similar to their British counterpart. The construction industry saw the creation and broad adoption of new contractual arrangements as a consequence of the significant upheaval that occurred in the UK legal environment in the 1970s. Services such as design-and-build, management contracting, and project management were discussed here. Even if it is growing at a slower pace, China might nonetheless undergo growth patterns similar to those. Using unconventional methods including design-and-build, management contracts, and joint ventures, some new construction projects in China have undoubtedly been testing the waters. Reason being, the city's natural setting and intrinsic qualities have been considered (Yin,2018).

Project budgets, timelines, consultant-contractor interactions, client-contractor risk-sharing arrangements, design responsibilities, and construction responsibilities are all open to change. In order to stay up with the changes described earlier, it is essential important to examine the contracting procedures for construction services thoroughly. Reason being, building services work is starting to play a bigger and bigger role in the construction contract (Phillips,2018).

3. The Purpose Of The Research

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4. Literature Review

Acquisition of construction projects is often accomplished via the use of binding contracts. All the way through the project's design and construction, this is correct. The selection of the relevant architects and builders is the first and most crucial part of the procurement process. When you hire designers and contractors, you may have to go through the hassle of bidding, selecting subcontractors and suppliers, and writing contracts. Procurement strategies used during a project's feasibility study may have a major influence on the project's final cost, duration, and quality. A project's procurement procedure must be carefully crafted with several factors into mind. Included in this are a number of issues, such as the client's capacity for project management, cost management, the allocation of workers between the design and construction phases, and the possibility of overlapping tasks between the two. When it comes to construction, the techniques used in Hong Kong are rather similar to their British counterpart. The construction industry saw the creation and broad adoption of new contractual arrangements as a consequence of the significant upheaval that occurred in the UK legal environment in the 1970s. Managerial, design-and-build, and building tasks were included in these. You may choose between contracts and project management. Even if it is growing at a slower pace, China might nonetheless undergo growth patterns similar to those. Using unconventional methods including design-and-build, management contracts, and joint ventures, some new construction projects in Hong Kong have undoubtedly been testing the waters. Why? Because they thought about the city's surroundings and its intrinsic qualities (Smith,2019).

Project budgets, timelines, consultant-contractor interactions, client-contractor risk-sharing

arrangements, design responsibilities, and construction responsibilities are all open to change. Thoroughly reviewing the legally enforceable agreements for construction services is vital for staying current with the advancements mentioned earlier. Reason being, building services work is growing in significance within the construction contract.

5. Research Questions

1.What are the qualities of the customer "and of the designer, in particular, the building services engineering designer" in this case?
2.When it comes to "to integrating projects, procurement procedures have a significant influence on the amount of" integration?

6. Research Methodology

The goals of the study was accomplished by doing a "literature analysis" prior to the collection of data via interviews with consumers, architects, structural engineers, and construction executives. They checked personal contacts, publications that have been peer-reviewed, and the employer alliance in order to collect names and addresses about potential candidates.

7. Research Design

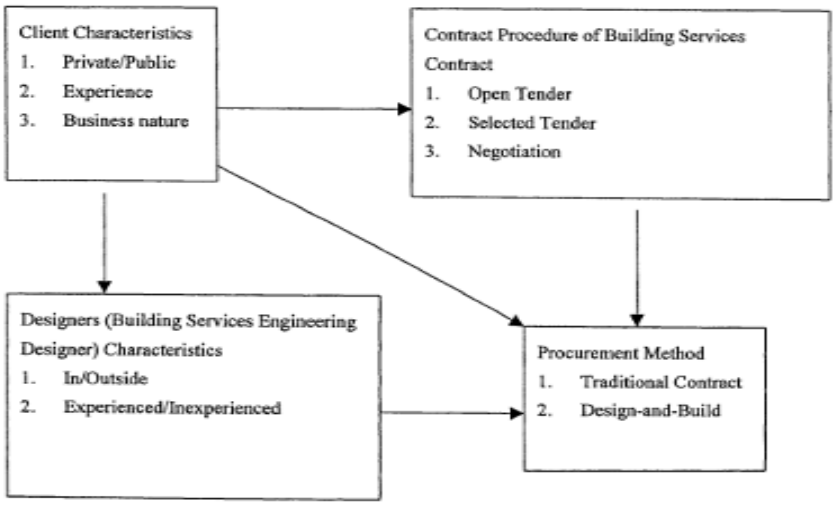
Building "Services Process Model factors are studied in six primary categories in the research model, which identifies and investigates their" interrelationships.

(a) Client characteristics
(b) Designers ("Architect and Building Services Engineer") characteristics
(c) Project characteristics
(d) Contract "procedure"
(e) "Procurement method"
(f) "Project performance"
The average cost "per square meter" and the cost range within which 60% of the project falls was computed after the projects have been grouped. Projects that cost more than 60% of the whole cost were considered costly, while those that cost less than 60% of the total cost were considered inexpensive. The Chi-square test and Pearson's Correlation Coefficient are two of the statistical tests to be "utilized.

8. Data Analysis

What follows is a breakdown of how the data for this study was analysed:
The findings of the survey questionnaire was put by hand into a "spreadsheet" with coded variables. "The analytical "tools was utilized to assess if the customer and building services engineering designer have an influence on how well building services engineering" operates, per clause (b).(c) "they was separate the Design-and-Build data from the usual" ones for "the objective of finding out if building services project performance changes based on the kind of customer and building services engineering designer."

9. Conceptual Framework



10.Result

Quantitative Data Collection
During the month of April in 2016, the ethical review committee gave their approval to the data gathering method. For the purpose of this research, the project manager serves as the primary analytical unit. In an effort to get information, the researcher sent a request to the Hong Kong Chapter of the Project Management Institute. There is a strong presence of the Hong Kong Chapter across the city, as it has 1,300 members on its roster. However, there was a number of individuals in the cast that were excessively out of place. In the wake of extensive deliberation, the Hong Kong Chapter has made the decision to endorse the research endeavor and was be actively encouraging its local

members to finish the survey (Appendix B). A number of LinkedIn connections were used in the study. These connections included individuals who were members of the Project Management Institute (PMI) and the China Institute of Construction Managers. It was provided by a few kind individuals to take part in the survey. Some individuals have hypothesized that the limited time span of the research, as well as the logistical difficulties that were experienced in the process of data collection (which included a "not very active response from potential participants"), might be the reason why only 55 out of 100 responses were legitimate. For instance, out of the total of 55 respondents, 28 of them have the Project Management Professional (PMP) credential. The remaining 35 respondents hold a range of extra qualifications, such as PRINCE2 and Chartered Surveyor. Every facet of the data gathering process was given the go-ahead by the LSE Ethical Review Committee, who granted their permission. Appendix A contains a letter of invitation that was issued to the Hong Kong Chapter of the Project Management Institute, and Appendix D has a letter of invitation to additional possible respondents. Appendices C and E include the survey instrument, and Appendix E contains the information sheet. The Hong Kong Chapter of the Project Management Institute has given permission for all three of these documents to be used in this survey. A total of three months was required to complete the application procedure. In July of 2016, the Project Management Institute (Hong Kong Chapter) gave its approval to the implementation of the survey. Using the contact information that was obtained from the China Institute of Construction Managers, the researcher has reached out to individual members of the institute using the professional networking platform LinkedIn. According to the description of their introduction, the researcher is now working towards earning a doctoral degree in business administration from London South Bank University. The researcher was doing a survey on the topic of sustainable project management in China, and The researcher was wondering if you would be interested in taking part in it. There is no issue, Gilman. Those who are responding have the option of either accepting or declining the request to connect on LinkedIn. Following the acceptance of the offer to connect by the potential respondent, a letter of invitation (Appendix D) and an information sheet (Appendix E) with the following message are given to them: The researcher would like to express our gratitude for your participation in the online survey. Please go to the online survey that can be found at the following link in order to verify that you have read the letter of invitation and information page that has been provided with the survey. At the URL that has been supplied, you was be able to view a survey that was generated by SurveyMonkey. Every survey that respondents have completed is included in the data that is maintained in the database that SurveyMonkey maintains. There is a screenshot of the SurveyMonkey form that may be seen in Appendix C. Obtaining an Excel file allowed us to analyze the information obtained from the 55 questionnaires that were filled out by the participants.

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation	Variance
Project on Schedule	55	1	7	4.75	1.734	3.008
Project within Budget	55	1	7	4.93	1.698	2.884
Project Developed Work	55	1	7	5.73	1.079	1.165
Client Use	55	2	7	5.89	.994	.988
Benefit Efficiency and Effectiveness	55	3	7	5.58	.975	.952
Project to Solve Problem	55	2	7	5.40	1.132	1.281
Important Client to Use Project Result	55	4	7	5.71	.762	.580
Project Process	55	2	7	5.20	1.129	1.274
Minimal Start-up Problem	55	1	7	4.80	1.458	2.126
Better Decision Making or Performance	55	2	7	4.91	1.110	1.232
Positive Impact on Client	55	3	7	5.73	.932	.869
Improve Managerial Performance	55	2	6	5.04	.962	.925
Project Implementation Success	55	2	7	5.64	.910	.828
Valid N (listwise)	55					

Appendix F displays the findings obtained from a stepwise regression model developed in SPSS. Several assumptions have been confirmed in the regression. After doing a standardized residual analysis, they found that there were no outliers in the data (Std. Residual Min = -1.918, Std. Residual Max = 2.354). In addition, the data showed that there were non-zero variances for the following: project completion time, budget, developed work, client use, benefit efficiency and effectiveness, project to solve problem, key client to use project result, project process, and key client to use project results. The launch was a smashing success, with a variance of only.828. The researcher have checked that the Variance Inflation Factor (VIF) is not collinear. According to the results, the data met the requirement of collinearity, and multicollinearity did not affect any of the predictors. Myers suggests that researchers should be concerned about multicollinearity with a VIF value of 10 or above. Research achieved a maximum VIF of 1.990 (Project Completed on Time). The traditional P-P plot of standard errors showed that the data points were almost normally distributed, even if they weren't quite on the line. It seems the assumptions are right, and the study can provide a model that the Hong Kong construction industry may use. The researcher found that four variables significantly impact the cost of successfully implementing a project when they used the sequential method. The four independent variables were all statistically significant: (1) Client Use (=.324, p.05), (2) Enhance Managerial Performance (=.355, p.05), (3) Positive Impact on Client (=.280, p.05), and (4) Project within Budget (=.324). A regression model incorporates the variables with the following values: r=.207, p.05. An F-test with a significance threshold of p.05 (F (4, 50) = 31.405, p.05, R2 =.715, R2Adjusted 95=.693) shows that there is a relationship between the dependent and independent variables. There is a significant correlation between the dependent variable and the four independent variables when they are combined linearly (p =.846). The change in Client Use explains 45.1% of the variance in the dependent variable (Project Implementation Success), as shown by the coefficient of determination (R2) value of.451. By incorporating client utilization with enhance managerial performance, the dependant variable gains 14.4 percentage points (59.5 minus 45.1). An additional 8.2 percentage points (67.7% - 59.5% rise) is added to the contribution when the Positive Impact on Client to Client Use and Improve is included.Findings from The Executive Suite. Total explanatory power for Project Implementation Success in the model is 71.5%, with 3.8% coming from Project within Budget (71.5% - 67.7%). The remaining eight considerations are not part of our study.Results from a multiple regression analysis showed that the following factors significantly predicted a successful project implementation: client usage, management performance improvement, client satisfaction, client impact, and project completion within budget. However, it was determined that the following factors had little impact on the success of a project's implementation: project schedule, project developed work, benefit efficiency and effectiveness, project to solve problem, project process, minimal startup problem, and better decision making or performance. The following multiple regression equation was used to predict project success in this quantitative analysis: project success =.324 (client usage) +.355 (better managerial performance) +.280 (positive effect on client) +.207 (project within budget).The Importance of Long-Term Viability for Successful Projects.The economic, environmental, and social aspects of sustainability all have an impact on how well a project is carried out. There are a variety of sustainability-related success criteria for each of the components that can be discovered in the literature. Figures 4.1, 4.2, and 4.3 show the three frameworks' definitions of the fourteen success criteria, which are independent variables, for the impact of sustainability.A sustainable economy is built on two pillars: reduced expenditures and enhanced operational efficiency.The third aspect is the need for quantitative and qualitative sustainability criteria.Build with Sustainability in Mind.

11.Discussion

Recognizing the conflict between rule-seeking and the impression of disputed meaning, the researchers began by conducting a quantitative survey of local construction project managers. Collecting quantitative data on effectiveness, attitude, observation, etc., requires the use of instrument-based questions and designed inquiries. Quantitative methods allow for the rapid and precise identification of problems, the recognition of valid constructions, and the testing of hypotheses.

On the other side, qualitative research allows for more in-depth conversations on abstract concepts. In practice, there is a good fit between quantitative and qualitative approaches. Since the quantitative data did not meet any criteria for social sustainability impacts, a qualitative e-Delphi research was developed to determine the relative relevance of the economic, social, and environmental sustainability effects. After much debate, the e-Delphi community has settled on a solution to the problems with quantitative research. You should think about these six results. The Level of Future-Readiness of the Project.It would seem that there is no clear trend towards environmentally friendly practices among China building projects. Environmentally friendly initiatives are still highly valued by many businesses. According to Silvius et al., about 25.9% of projects considered sustainability. Despite being the most advanced stage, they found that initiatives seldom considered Product/Services. They skipped over studying all building projects and instead focused on those in

Europe. First, the researcher wanted to know how seriously Hong Kong building projects took sustainability. When making choices, the sponsoring organization may think about how long the project was last. Five of the organizations supporting the projects aren't considering sustainability, according to the study's results. Of the fifty projects that were evaluated, 91% had a plan that incorporated sustainability. However, not all project management firms prioritize sustainability. Nonetheless, it is encouraging to see that some Hong Kong building projects have been honored with sustainability awards. This shows a dedication to creating a future that is less harmful to the environment. Given the increasing focus on sustainability in the business sector, the findings are not surprising (UNCED,2019).

12.Conclusion

The study's overarching goal is to fill gaps in our understanding of the factors (including client background, design traits of building services engineering, and procurement tactics) that influence these projects' final outcomes. In order to accomplish this goal, the research is being carried out. To evaluate the impact of the building services on the project's success as a whole, ten performance metrics were used. According to the Building Services Process Model, several measures were developed. It is possible to find out how effective a facility's service improvement initiative was in two ways. Time spent before, during, and after construction, weekly work area, cost per square meter ($/m2), and percentage of overruns are all examples of numbers that may be used as metrics in statistical analysis. The second evaluation was more subjective and asked participants to rate how well the project lived up to their expectations in terms of time, money, and quality.When it comes to managing the building's infrastructure, these two structures are poles apart. Another important factor that affects the design of building services is the number of quality requirements that customers create during the design stage. With this in mind, it seems that the ROI of a project would not be best measured by the unit cost of incorporating building services (Freeman,2019).

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