

UNIVERSITI TEKNOLOGI MARA

**INTEGRATIVE MECHANISMS IN
THE DESIGN PROCESS OF
BUILDING REFURBISHMENT PROJECTS**

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**Thesis submitted in fulfillment of the requirements
for the degree of
Doctor of Philosophy**

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Candidate's Declaration

I declare that the work in this thesis was carried out in accordance with the regulations of Universiti Teknologi MARA. It is original and is the result of my own work, unless otherwise indicated or acknowledge as referenced work. This topic has not been submitted to any other academic or non-academic institution for any other degree or qualification.

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Abstract

This thesis reports an empirical study on uncertainty aspects in the design process of refurbishment projects in Malaysia. The study focuses on the identification of the project variables that are associated with design performance. The investigation also introduced the functions of integrative mechanisms, which consist of coordination devices and the degree of involvement of key participants in decision-making, as a means to integrate management into the design process. This is paramount in order to increase information-processing capacity during the design process.

The study adopted a triangulation technique that combined both quantitative and qualitative methods of data collection. One-thousand-five-hundred-and-fifty-two (1552) questionnaires were sent out to registered professional architects in the preliminary questionnaire survey to partially validate the theoretical framework of the study and to obtain a general profile of refurbishment design activities in Malaysia and a 24 percent response rate was achieved. In addition, 21 semi-structured interviews were carried out with selected respondents. The third part of the triangulation involved a final questionnaire survey. Eighty-two (82) out of 234 questionnaires from the final questionnaire were found to be useful and formed a database for data analysis purposes. The Statistical Package for Social Science (SPSS) was used in the data analysis for both descriptive and inferential statistics.

The study identified fifteen (15) dominant project variables concerned with the design process of refurbishment projects and, of those, eight variables were found to be significantly correlated to design performance. The variables are: availability of design information, structural content, services content, statutory requirements, clients' attributes, clients' needs, design fees and project funding. The greater part of design process suffers from uncertainty nature of the projects. Almost half of refurbishment projects prepare design with less than 70 percent information available. It was also found that integrative mechanisms contribute toward the improvement of the design performance. All coordination devices were found to be significantly associated with at least one of the performance variables. In addition, a high degree of involvement by architect and M&E engineer during the construction stage improved refurbishment design performance. The design performance recorded more than three-quarters of refurbishment projects exceed the targeted design time and cost.

From the findings, it could be concluded that the major part of the design process of refurbishment projects suffered from the uncertain nature of the projects. The implementation of integrative mechanisms indicated the possibility of improving some of the design performance. However, the use of integrative mechanisms in the design process is based mainly on the degree of uncertainty that occurs in refurbishment projects.

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