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ANALYSIS OF KEY PERFORMANCE FACTORS AFFECTING RESIDENTIAL CONSTRUCTION PROJECTS IN PAKISTAN

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Abstract

Construction is one of the major sectors of Pakistan economy, ranked second to agriculture and manufacture due to direct and indirect contribution in GDP and employment. The problem of delays in construction industry have significant impact on project performance whereas well organized projects lead to timely completion. The aim of this research is to develop a framework 1) to identify factors affecting performance of residential projects, 2) ranking the factors using Relative Importance Index(RII) and 3) examining/analyzing the significance of factors by factor analysis and regression modeling. The developed framework is the tool for analyzing and identify the impact of factors and assist construction managers to take necessary measure in reducing the delay impact. These findings will be expected to significantly contribute in improving project performance in Pakistan residential construction projects.

Key Words: Key Performance, Construction Project, Cost, Quality, Satisfaction, Innovation

Introduction

The construction industry plays an important role in the growth and development of a country. Throughout the world, the business environment of construction organizations are operating continues to bring a rapid change.

The major problem construction industry is facing, are the delays and the level of impact these delays effect the projects to be delivered in a specified time, within allocated budget and expected quality. It is very rare to see that a construction project is completed on time. Also when stakeholder specification and satisfaction leads to project completion within time, cost and quality, the project is successful.

Development and economic growth are key indicators for the construction projects and infrastructure development of Pakistan (Haseeb 2011). The economy of Pakistan grew on average at 2.9 % per annum during the last five years. In 2012 3.2% growth increased to 5.2% growth this year on Construction Sector (Pakistan Economy Survey 2012-13). Construction projects are not always completed in time (Assaf 1995).

In Pakistan corruption, non availability of funds, Price increase in material, improper planning are some causes that affect the project's delivery time, budget and quality. Some recent examples of projects delayed in Pakistan are; New Islamabad International Airport delayed due to unavailable funding , delays in Lahore Ring Road project were caused due to changes in government caused delays and due to increased land acquisition, improvement the standard of existing roads being used in the project, shifting of utility installations, crossing over commercial and residential areas and improvements to junctions caused changes in the project and increase in total cost estimates and also Kalabagh Dam project has been delayed due to political grounds .

Research Objectives

The main objectives of the study include the following:

- To identify factors that contributes to the project performance of residential project using fishbone diagram
- To quantify and rank factors by using RII(relative importance index).
- To examine and analyze the significance of factors by factor analysis.
- To develop a predictive model in construction context using regression modeling.
- To identify improvement on performance of construction project.

Research Question

- What are the important factors affecting the performance of Private Residential Projects in Pakistan?

Significance of study

In Pakistan Projects are also facing cost overrun, time delays, critical issue of project management (Haseeb 2011). Weaknesses and faults of the owner and contractor are the main cause of variation in project delays (Al-Moumani 2000, Asaaf 2006).

The literature shows that the few projects are completed in time and also cost is overrun . In order to fill the literature gap and to focus on the construction industry problem in Pakistan, this study will measure the factors related to the construction industry in groups, analyze the impact of factors affecting performance of Private Residential projects and will also put up some estimates regarding the impact of factors on the project through a prediction model.

Furthermore, the study will make available important information about the topic to various types of construction firms. Project managers will get the benefit of this study as they will gain significant understanding to formulate policies to control the issues arising during project performance and causing delays in completion.

Literature Review

Delay means non completion of the project within the specified duration agreed on in the contract. In other words Delay is the loss of income according to and for the owner or client. A number of studies have been conducted to examine factors impacting on project performance in developing countries. In case of contractor, delay refers to the higher costs due to longer work time, labor cost increase and higher fabrication costs. Efficiency is an indicator of the projects completing in time. The construction industry is complex in its nature because it comprises large numbers of parties as owners (clients), contractors, consultants, stakeholders, and regulators.

Project performance can be measured and evaluated using a large number of performance indicators that could be related to various dimensions (groups) such as time, cost, quality, client satisfaction, client changes, business performance, health and safety. Time, cost and quality are 3 main performance evaluation dimensions. Iyer and Jha (2005) identified number of factors

influencing project cost performance, Coordination among project participants, however, was identified as the most significant of all the factors, having maximum influence on cost performance.

Pheng and Chuan (2006) evaluated project performance through 2 common sets of indicators. The first set is related to macro viewpoint of project performance (owner, users, stakeholders, and the general public). The second set related to micro viewpoint (developer and the contractor). Cavalieri et al. (2007) provided a comprehensive view of benchmarking and performance measurement service for the evaluation and comparison of scheduling techniques.

Generally, performance dimensions could be influence by various project characteristics. Enshassi et al. (2009) identified climate conditions at site as the most important factor affecting the performance of construction projects by owner, consultants and contractors because it effects the productivity and time performance of project.

Love et al. (2005) examined project time-cost performance relationship, and their results indicate that cost is a poor predictor of time performance.

Elyamany et al. (2007) introduced a performance evaluation model for construction companies in order to provide a proper tool for the company's owners, shareholders and funding agencies to evaluate the performance of construction companies in Egypt.

Ugwu and Haupt (2007) developed and validated key performance indicators (KPI) for sustainability appraisal using South Africa as a case study. It uses four main levels in a questionnaire to identify the relative importance of KPI. The main indicators were economy, environment, society, resource utilization, health and safety and project management and administration.

Cheung et al. (2004) identified seven main key indicators for performance as time, cost, quality, client satisfaction, client changes, business performance, and safety and health. Chan and Chan (2004) observed that accurate construction planning is a key determinant in ensuring the delivery of a project on schedule and within budget. They noted that there is an increasing global concern about benchmarking best practice measures of construction time performance (CTP) for use by clients, consultants and contractors in the construction industry.

Assaf and Hejji (2006) conducted a survey on time performance to determine the causes of delay and their importance The most common cause of delay identified is ‘‘change order’’ Koushki et al. (2005) in the case of Kuwait with survey of 450 randomly selected private residential project owners and developers in 27 representative districts in metropolitan identified the major causes of delay and cost increase in construction projects of Kuwait. Al-Momani(2000) investigated causes of delay .The main causes of delay were related to design, user changes, weather, site conditions, and late deliveries, economic conditions and increase in quantity.

Ogunlana *et al*.(1996) studied the delays in building projects in Thailand, as an example of developing economies. They concluded that the problems of the construction industry in developing economies could be nested in three layers: (1) problem of shortages or inadequacies in industry infrastructure, mainly supply of resources; (2) problems caused by clients and consultants; and (3) problems caused by incompetence of contractors.

El-Razek et al. (2008) identified main causes of delays in construction projects of Egyptian and identified that the success of a project lies in team effort. Haseeb et al. (2011) mentioned the thirty-seven (37) factors that cause delay and their effects on the success and completion of project and grouped into seven (7) groups. The most common factor of delay is natural disaster in Pakistan like flood and earthquake and some others like financial and payment problems, improper planning, poor site management, insufficient experience, shortage of materials, and equipment. They covered

the delay factors and causes of delay and some suggestion for reducing these delays in large construction projects in Pakistan.

From these studies, it has been reported that most of delay problems have a strong link with the contractors, consultants, and owners; however the delay investigation method of each researcher is very similar and the factors which affected the delays were different from country to country.
In this research, Ishikawa diagram as in figure 3.1, is used to identify and present factors effecting the project performance in the construction industry

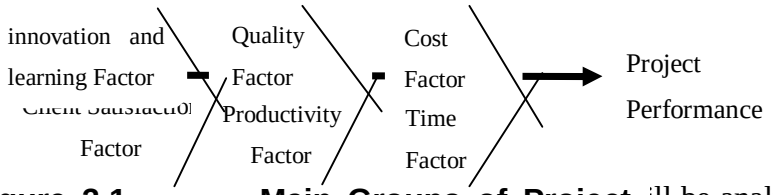

Figure 3.1: Main Groups of Project

No study is y ill be analyze for project performance through Relative Importance Index and Importance Index based on responses of questionnaire. Cronbach alpha (α) will be used for data reliability, to check data validity factor analysis will be conducted and a predictive model using regression will be developed to find relation between performance factors and Project performance

Gaps pertaining to the topic under study

From the above literature review, there are large number of factors with the potential to affect different dimensions of project performance. Therefore, it is important to identify the relationship between various dimensions of project performance and to develop a model for predicting the factors affecting project performance to make project successful. Work is yet to be done in identifying the relationship between performance dimensions and also prediction of success factors in construction of residential projects.

Research Framework and Proposed research model

The variables that are being considered are described in the theoretical framework (Figure 3.1)Cost, Time, quality, clients satisfaction, Productivity, innovation and learning, and environmental factors are independent variables of this study These factors will be examined to identify the relationship with Project Performance ,dependent variable and to develop a model to predict success factors in construction of residential projects.

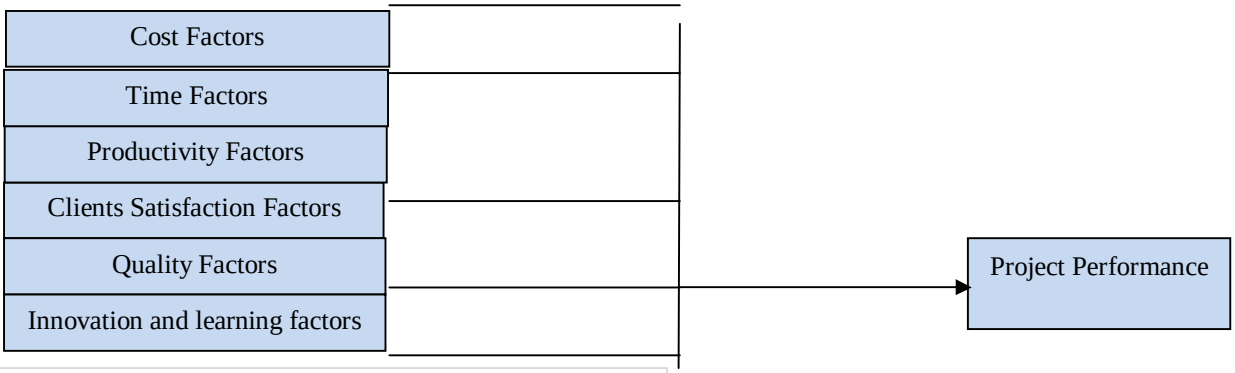

Figure 3.1: Theoretical Framework

Hypothesis

Hypothesis 1:*Cost factors have significant effect on Project Performance.*
Hypothesis 2:*Time factors have significant effect on Project Performance.*
Hypothesis 3:*Quality factors have significant effect on Project Performance.*
Hypothesis 4:*Productivity factors have significant effect on Project Performance.*
Hypothesis 5:*Client Satisfaction factors have significant effect on Project Performance.*
Hypothesis 6:*Innovation and learning factors have significant effect on Project Performance.*

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