بسم الله الرحمن الرحيم

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تم رفع هذه الرسالة بواسطة / مني مغربي أحمد

بقسم التوثيق الإلكتروني بمركز الشبكات وتكنولوجيا المعلومات دون أدنى مسئولية عن محتوى هذه الرسالة.

ملاحظات: لا يوجد

Construction Phasing Evaluation Model for Real Estate Development Projects

By

Dina Mohamed Abdel Wahab Mohamed Hamdala

A Thesis Submitted to the
Faculty of Engineering at Cairo University
in Partial Fulfillment of the
Requirements for the Degree of
INTERDISCIPLINARY-MASTER OF SCIENCE
In
Integrated Engineering Design in Construction Projects

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Construction Phasing Evaluation Model for Real Estate Development Projects

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Construction Phasing; Real Estate Development; Customer Satisfaction; Profit Net Present Value

Summary:

The aggressive competition in real estate market is forcing the real estate developers to tackle the challenge of selecting the best project construction phasing alternative. The development of phasing plan is a complex process with many alternatives that require informed decision based on the impact on customer satisfaction and project profit. This research addresses the problem of selecting the best phasing alternative for a real estate development project considering two objectives: maximizing the customer satisfaction and project profit. The research proposes a model that generates all possible construction phasing alternatives for real estate project. The model performs multi-criteria decision making to rank all possible alternatives given the former objectives' relative weights. The proposed model consists of five modules which are Phasing Sequencing, Customer Satisfaction, Cash-In, Cost Estimation and Decision Making. Two case studies demonstrate the practicality of the model. This research assists real estate investors in determining the optimum construction phasing plan considering limited funds, imposed constrains on phase's duration, functional components of each phase, and contractual delivery dates.

Disclaimer

I hereby declare that this thesis is my own original work and that no part of it has been submitted for a degree qualification at any other university or institute.

I further declare that I have appropriately acknowledged all sources used and have cited them in the references section.

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Signature:

Dedication

I am dedicating this thesis to my parents who mean the world to me, and have always been constant source of support and encouragement during my whole life. I also dedicate this work to my many friends who have supported me throughout the process. I will always appreciate all they have done.

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Abstract

The aggressive competition in real estate market is forcing real estate developers to tackle the challenge of selecting the best project construction phasing alternative. Profit and customer satisfaction are important success criteria for evaluating real estate projects. These criteria are directly affected by the adopted construction phasing plan. Construction phasing is dividing the project scope into stages, where each stage is spaced out over a specific duration. Phasing allows investors to make changes, and take corrective actions based on initial phase performance in the market. Moreover, phasing allows optimizing the use of available funds by completing some stages in the project making it more attractive for lenders investments, or delivering part of the project in order to generate cash-in for funding latter phases. Therefore, a selection decision of the phasing alternative is expected to be dependent on a number of criteria to satisfy the imposed constrains. The development of the construction phasing plan is a complex process with many alternatives that require informed decision based on the impact of each on customer satisfaction and project profit. Accordingly, this research addresses the problem of selecting the best phasing alternative for real estate development projects considering two objectives. These objectives are maximizing the customer satisfaction and project profit.

This research proposes a model that generates all construction phasing alternatives, and performs multi-criteria decision making to rank all possible phasing alternatives. The proposed model consists of five modules which are: 1) Phasing Sequencing module, 2) Customer Satisfaction module, 3) Cash-In calculation module, 4) Cost Estimation module and 5) Decision Making module. Phasing Sequencing module receives the project license information such as buildings built up areas, number of floors, repetitions, number of units, building licensed function, and layout. In addition, information related to number of phases and clusters of buildings within each phase are fed to the module. It generates all possible phasing sequencing alternatives. The Customer Satisfaction module receives the generated phasing solutions to estimate the Customer Satisfaction Index (CSI) for each. The Cash-In module receives the project revenues in the form of prices per square meters, desired installment plan, and target revenues per month. It calculates the revenues and plots the cash-in profiles for each phasing alternative. The Cost Estimating module receives project construction cost, construction duration and total project cost to generate Cash-out profiles for the predetermined construction phasing alternatives. Finally, Decision-Making module ranks all construction phasing alternatives according to their corresponding profit Net Present Value and Customer satisfaction index. Two case studies are presented to demonstrate the practicality of the model. The proposed research assists real estate investors in determining the optimum construction phasing plan considering limited available funds, imposed constrains with respect to phases' duration, functional components of each phase, and contractual delivery dates.

Chapter 1 : Introduction

1.1. General

Real estate industry in Egypt contributes to about 10% of the economic GDP according to the Monthly Statistical Bulletin 268 by the Central Bank of Egypt [1] represented in Figure 1.1. Currently, there exists 32 Real Estate Developer listed in the Egyptian Stock Exchange [2], and more than 130 real estate developer in Egypt [3]. The competition between the developers made it necessary to adopt new strategies to expand their business, increase their market share, and maximize profit.

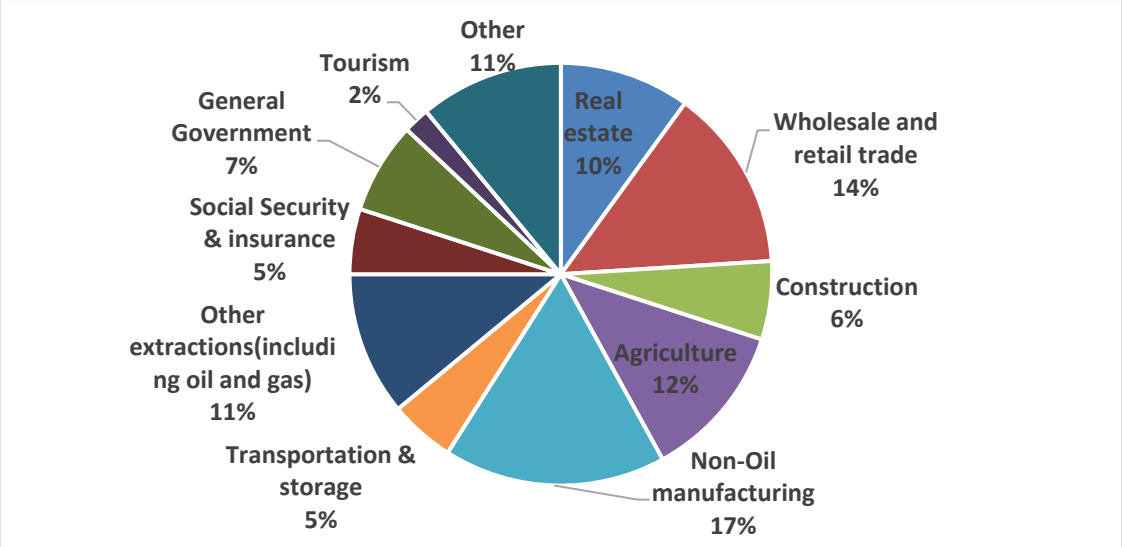

Figure 1.1: Real estate sector Contribution in Egyptian GDP [1]

The objective of profit maximization for a developer is bounded by the project incurred costs and achieved revenues. These two attributes are kept regularly and closely monitored while tactics are tackled to attain maximum revenues and costs savings. The phasing of the real estate projects is a key factor that directly affects these attributes and their underlying parameters. The construction phasing divides the project scope into phases executed during certain duration. Phasing determines the monetary amounts to be spent and sales to be achieved during each phase within the project. This allows optimizing the use of available funds by completing some stages in the project which can make it more attractive for lenders investments, or delivering part of the project in order to generate cash-in for funding latter phases. This technique implies cost savings through reducing project financing cost in addition to increasing the net present value of the project profit.

Besides the impact of phasing on profit, phasing significantly affects the level of customer satisfaction and hence, the developer market share. Phasing allows the investors and owners to make changes, and take corrective actions based on initial