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Establishing and Developing a Computer Application (Software) For Repetitive Detailed Cost Estimation Of Construction Projects

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AUTHORIZATION FORM

I, Nabil Mustafa Al-Fayyoumi, authorize Isra University to provide copies of my Thesis to libraries, establishments and individuals upon request, according to Isra University regulations.

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Date: 13 Aug. 2017

COMMITTEE DECISION

This Thesis (Establishing and Developing a Computer application "Software" For Repetitive Detailed Cost Estimation of Construction Projects) was successfully defended and approved on August 6th, 2017.

Discussion Committee	**signature**
Prof. Dr. Rami A. Maher	……..……
Prof. Dr. Mohammad Hiyassat	……...
Dr. Karim Al Jeboury	…….

DEDICATION

TO THE SOUL OF MY PARENTS
TO MY WONDERFUL WIFE
TO MY GREAT FAMILY
WITH LOVE

Developing and Establishing Computer Application (Software) for Repetitive Detailed Cost Estimation to Construction Projects

By
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ABSTRACT

Many main contractors and subcontractors face a lot of problems due to a very limited time given by the owners or the consultants of the construction projects at the bidding competition stage, which usually ranges between 30 – 45 days,. They make several deviations and mistakes related to this limited time to submit their best technical and financial proposals for the construction execution. For many reasons, several cases are recorded for a huge difference between the first bid value and last bid value in most of construction projects which in some cases ranges between (-15%) to (+50%) of the accepted bid value. Therefore, there is a big need to establish a computerized management tool for repetitive process of cost estimation method to the Contracting Sector and to be as a guide and judgment for the Consulting Sector who is directly involved in the analysis and decision making for the awarding process.

In this thesis, the contribution will be based on the creation of templates, forms and tables for the integrated cost estimation methodology and to be as a solid basis for any contracting organization to highlight and build up its own strategy, principles, components, tactics, involved teams, tools, scenarios and calculations to reach and apply an accepted bid value. This study will also be joined by establishing and developing a computer application (software) made specifically for this process for ease reference and use by all contracting companies to ease and facilitate their works in the estimation process which can be used also at a later stage during execution process for progress of works, reporting and forecasting.

The computer software application will mainly contain three major categories; the first part will be especially for the Estimation Process, the second will be for Wok Progress and finally the third will be for Project Forecasting.

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LIST OF SYMBOLS

Symbol	Definition
BOQ	Bill of Quantity
RDC	Repetitive Detailed Cost
JCA	Jordanian Contractors Association
MPWH	Ministry of Public Works and Housing
PPP	Private Public Partnership
BOT	Built Operate Transfer
SQL	Structured Query Language
C#	C-Sharp Language
V	Total project value (Selling Price)
Q	Quantity of item a
UR_a	Unit rate of item a
a	Activity or work item
D	Total Direct Cost of project activities
I	Total Indirect Cost of project
O	Total Over-Head Cost
P	Total Profit Amount for nominated project
S	Total sub-contractors supply & apply cost
M	Total material cost of project activities
L	Total labor cost of project activities
E	Total equipment cost of project activities
S	Total sub-contractors supply & apply cost
i_a	Category cost of indirect cost
d_a	Direct cost of activity (a)
I_a	Indirect cost of activity (a)
O_a	Overhead Cost of activity (a)
d_a	Direct cost of activity (a)
P_a	Profit amount of activity (a)
S_a	Subcontractor S/A cost of activity (a)
M_a	Material cost of activity (a)
L_a	Labor cost of activity (a)
E_a	Equipment cost of activity (a)
EV_a	Earned value for executed work item or activity (a)

$\% C$	Percentage completed
EV_e	Value of executed extra works of work item or activity (e)
EV_i	Periodical earned value (usually monthly)
EVc	Earned vale at completion = Budgeted Cost of Work Performed BCWP
CV	Cost variance
$\% CV$	Percentage of cost variance
AC	Actual cost = Actual Cost of Work Performed ACWP
CPI	Cost performance index
SC	Schedule cost = Budgeted Cost of Work Scheduled BCWS
t	Percentage of cumulative time
SV	Schedule variance
$\% SV$	Percentage of schedule variance
SPI	Schedule performance index
PC	The percentage of project completion
EAC	Estimated at completion
VAC	Variance at completion
TAC	Time at completion
T	Original project time
SCI	Schedule cost index
$TCPI$	To complete performance index
$C\alpha$	Cronbach alpha value
K	Number of items in each domain
r	The average correlation
$\bar{X}$	The item or domain mean
i	The scale points
f	The frequency of observed scale
x	Item scale point
n	Sample size
S	Standard deviation
Zc	Calculated critical value
μ	Population mean
α	Significant level

LIST OF APPENDICES