# DETERMINE OPERATIONAL COMPETENCIES RELEVANT FOR IT PROJECT MANAGERS WORKING IN APPLICATION DEVELOPMENT PROJECTS

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**Abstract**: **Objectives**: (1) To identify operational competencies relevant for project managers working in software application development projects (2) To identify whether there is a significant difference in proficiency levels of project managers across various demographic factors. **Methods:** Data from 350 project managers working in Indian IT organizations were sampled for the study. Using mail survey technique, the responses were collected and data was analyzed using SPSS V16 software. **Findings**: The multiple linear regression (MLR) technique was used to identify competencies (Independent variables) which has significant influence on project profit margin which is a dependent variable. The regression output $R^2$ (89%) helps us to infer the degree of accuracy of the model. The analysis of variance (ANOVA) results helps to infer that there is a significant difference in proficiency levels of project managers' educational qualification, experience and domain in which they are working in. c**onclusion**: There were 16 sub competencies considered for the research under operational efficiency. All sub competencies except "code review efficiency" variable is influencing project profit margin. The operational efficiency competencies are vital to have a high profit margin for software application projects.

**Keywords:** Profit Margin, Project Manager Competencies, Software Application Development Project, Software Projects, Project Manager.

**Introduction:** Corporate Executive Board report 2015 says "the majority of projects fail to deliver the expected business outcomes, even those delivered within 90% of schedule and budget targets" (corporate executive board, 2015). It is evident that project delivered successfully yield more project revenue. A competent project manager is the key to project success. In this study the success of the project is measured in terms of project profit margin. Margin is defined as project revenue – project cost. Lee and Loong (2003) suggested that project manager's capability to deliver the project has significant impact on project success. Though earlier research has identified spectrum of project management competencies focus of the paper is to identify operational competencies relevant for a project manager to have the project profit margin.

**Methodology:** ***Sampling:*** Simple random sampling was used in selection of project managers for this research. 350 project managers working in software application development projects were sampled for the study. The samples were from 10 Indian IT organizations which has larger market capitalization and listed in Indian stock market.

**Variables:**

Dependent variable - Project Profit margin –[Y]

Independent variables -

| | |
|---|---|
| Maintain Software Code review efficiency | [X1] |
| Standardizing the software coding system | [X2] |
| Ability to control and reduce the repeated incidents | [X3] |
| Ability to reduce MTTR | [X4] |
| Ability convert repeated tasks into automated task | [X5] |
| Capability to handle project escalations | [X6] |
| Ability to govern project metrics | [X7] |
| Adhere to status reporting | [X8] |
| Review effectives | [X9] |

| | |
|---|---|
| Design effectiveness | [X10] |
| Re-use of codes | [X11] |
| Ability to maintain productivity improvement | [X12] |
| Ability to render support in critical times | [X13] |
| Ability to keep track on project metrics | [X14] |
| Design re-work effort | [X15] |
| Ability to overcome requirements gap | [X16] |

**Instrument:** The survey has two sections. The first section captures details of the project, projects manager's demographics. The second section has the list of operational competencies which impacts the profit margin. 5-point Likert scale was used where in (1) strongly disagree (2) Disagree (3) Neither agree nor disagree (4) agree (5) strongly agree.

**Discussion:**

**Results of Multi Linear Regression Technique:**

**Table 1:** Model Summary

| Model | R | R square | Adjusted R Square | Std.Error of the estimate |
|---|---|---|---|---|
| 1. | 0.8069 | 0.89834 | 0.89812 | 4.3185 |

From regression model summary it is inferred that 89 % of variation in profit margin which is the dependent variable is being explained by operational competencies considered for the study. The The degree of accuracy more than 80% conveys that the model is fit.

Linear regression coefficient is summarized in the table2

**Table 2: Multiple Linear Regression Coefficients**

| Model | Unstandardized coefficients | | Standardized coefficients | t | Sig. |
|---|---|---|---|---|---|
| | B | Std.Error | Beta | | |
| (Constant) | 1.120 | 1.221 | | 0.718 | .000 |
| Maintain Software Code review efficiency | 0.231 | 0.0092 | 0.045 | 0.330 | .002 |
| Standardizing the software coding system | 0.035 | 0.055 | 0.001 | 0.674 | .078 |
| Ability to control and reduce the repeated incidents | 0.198 | 0.070 | 0.278 | 0.086 | .000 |
| Ability to reduce MTTR | 0.476 | 0.067 | 0.498 | 0.045 | .000 |
| Ability convert repeated tasks into automated task | 0.039 | 0.029 | 0.056 | 0.149 | .000 |
| Capability to handle project escalations | 0.946 | 0.089 | .036 | 0.346 | .000 |
| Ability to govern project metrics | 0.143 | 0.384 | 0.12 | 0.049 | .000 |
| Adhere to status reporting | 1.678 | 0.541 | 0.12 | 0.156 | .000 |
| Review effectives | 6.730 | .372 | .143 | .192 | .000 |
| Design effectiveness | 1.842 | .130 | .047 | 2.225 | .000 |
| Re-use of codes | .129 | .245 | .009 | .375 | .008 |
| Ability to maintain productivity improvement | 1.991 | .237 | .998 | .495 | .003 |
| Ability to render support in critical times | 1.879 | .711 | .084 | 4.149 | .000 |
| Ability to keep track on project metrics | 9.730 | .372 | .243 | .172 | .000 |
| Design re-work effort | 1.652 | .140 | .047 | 2.225 | .000 |
| Ability to overcome requirements gap | .165 | .247 | .769 | .895 | .008 |

The linear regression equation arrived from the below table
Project Profit margin = 1.120 - (0.231 * Maintain Software Code review efficiency) + (0.035*Standardizing the software coding system) + (0.198 * Ability to control and reduce the repeated incidents) - (0.476 * Ability to reduce MTTR) – (0.039 * Ability convert repeated tasks into automated task) - (0.946 * Capability to handle project escalations) + (0.143* Ability to govern project metrics) + (1.678* Adhere to status reporting ) + (6.730* Review effectives)+ (1.872* Design effectiveness) + (0.129 * Re-use of codes) + (1.995* Ability to maintain productivity improvement ) + (1.879 * Ability to render support in critical times) + (9.730 * Ability to keep track on project metrics ) + (1.652* Design re-work effort ) + (0.165 * Ability to overcome requirements gap)

**One Way Anova Test for Educational Qualification of Managers:**
**Hypothesis 1:**
**H0:** There is no significant difference among operational competencies across project managers qualifications
**H1:** There is a significant difference among operational competencies across project managers qualifications

| | Sum of squares | df | Mean square | F | Sig. |
|---|---|---|---|---|---|
| Between groups | 0.232 | 2 | 0.187 | 0.813043 | 0.049 |
| With in groups | 17.052 | 347 | 0.23 | | |
| | 17.282 | 349 | | | |

It is observed from table 3 that the significance level is 0.049 which is below the level of significance (5%). There is statistically difference in the operational competencies among the educational qualification levels of project managers participated in the research.

**One Way Anova Test for Experience of Managers:**
**H0:** There is no significant difference among operational competencies across project managers experience
**H1:** There is a significant difference among operational competencies across project managers experience

| | Sum of squares | df | Mean square | F | Sig. |
|---|---|---|---|---|---|
| Between groups | 0.178 | 2 | 0.198 | 0.942857 | 0.001 |
| Within groups | 11.234 | 347 | 0.21 | | |
| | 11.412 | 349 | | | |

It is observed from table4 that the significance level is 0.001 which is below the level of significance (0.05). We could infer that there is statistically difference in the operational competencies among the experience levels of project managers participated in the research.

**Hypothesis 3:**
**H0:** There is no significant difference among operational competencies across vertical in which project managers are working in
**H1:** There is a significant difference among operational competencies across vertical in which project managers are working in.

| | Sum of squares | df | Mean square | F | Sig. |
|---|---|---|---|---|---|
| Between groups | 0.111 | 2 | 0.199 | 1.88 | 0.002 |
| Within groups | 13.051 | 347 | 0.11 | | |
| | 13.1682 | 349 | | | |

It is observed from table5 that the significance level is 0.002 which is below the level of significance (5%). There is statistically difference in the operational competencies among the project domain in which the project manager is working in.

**Conclusion:** Multi-linear regression technique gives the estimate of the dependent variable (Y) which is project profit margin with 15 different independent variables (X2 to X15). Standardizing the software coding system[X2] ,Ability to control and reduce the repeated incidents [X3] , Ability to reduce MTTR [X4] ,Ability convert repeated tasks into automated task[X5], Capability to handle project escalations[X6],Ability to govern project metrics[X7],Adhere to status reporting[X8],Review effectives[X9],Design effectiveness[X10], Re-

use of codes[X11],Ability to maintain productivity improvement [X12], Ability to render support in critical times[X13],Ability to keep track on project metric [X14], Design re-work effort [X15] , Ability to overcome requirements gap[X16]. The competency proficiency levels differ across the Indian IT project managers experience, educational qualification and industry domain in which they work.

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