# FUNCTIONALITY ASSESSMENT MODEL TO ESTIMATE QUALITY OF THE EFFECTIVE E-PROCUREMENT PROCESS IN ADOPTION

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*Abstract:* The paper presents results from an empirical study of software functionality of e-procurement that is developed at design stage of software development life cycle. Functionality is improved and enhanced in each phase of software development life cycle, while quality factors are mostly improved. A multiple linear regression approach is used for qualitative analysis which is further validated using 2t test on Functionality assessment model. This statistical analysis helps to experts in selection of software systems whose concern is more about the functionality of software.

*Index Terms* - **Quality criteria, Object oriented system, software development life cycle, Functionality, Assessment Model**
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## I INTRODUCTION

There are a number of principles for functionality, such as ISO15504 and CMMI, and McCall over the earlier period decades; numerous techniques were developed for functionality. To get a software product it ought to be clear to have a established periphery and it must get increasingly important as development continues or no product ever shows up[5]. Software correctness get through roughly 40% of the software use, since it is a non-inconsequential stage in software development lifecycle catching functionality connect amongst code and element in earliest shortage can be useful in numerous tasks. Program cognizance, correctness, design tracing, affect investigation and reuse of existing software [7]. Numerous numbers of functionality examples or techniques were acquainted with follow back elements from source code in outline out. Design patterns, classes, inheritance, data abstraction, design artifacts, objective focused are couple of cases of functionality strategies. The requirement to functionality has expanded essentially with the move toward web based UI. The functionality approaches and strategies are utilized for some reasons; for example, software development, involve study and, software design.

## II SOFTWARE FUNCTIONALITY

Software Functionality is how the result of any software system is produced when design input is provided to the software system, what is the process that is followed for initiate the result, in what period of time, effectiveness and excellence of effect is concerned [1]. Functionality is a significant software quality parameter defined in ISO 9126[2]. Object is produced by the arrangement of data and functionality. It has a assets of possess their data and methods due to which it can be taken for granted for their set functions that under any conditions they will perform their required function. Functionality and object oriented characteristics are associated in types of theme or gap [6], shown in figure 1.
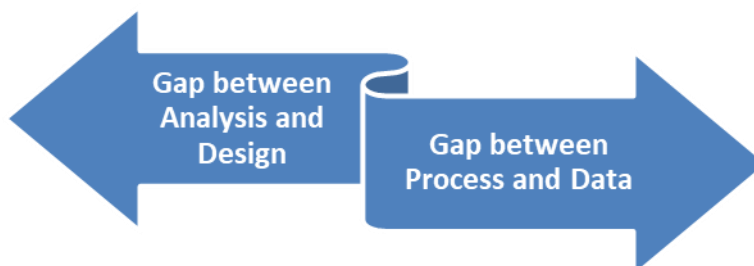


**Figure 1 Functionality Gap**

## III FUNCTIONALITY MODEL DEVELOPMENT

Using standard terminology as correlation are inaccuracies in the process committed while trying to understand between two or more variable. In order to developed the functionality assessment model using the design artifacts. The proposed model is calculated by different object oriented characteristics and their best suited metrics values. It is necessary to estimates the

functionality at design levels due to class association, abstraction levels, functions association generates the fault. Functionality measurement model have involved the low levels artifacts of design criteria and show the relationship in figure 1. For model development, using the SPSS tools and data have taken from [3, 4] in table 1. SPSS is a special tools for calculate the index value of variables, which is shown in table 2. Table 3 presented the model summary of functionality measurement model. Model summary table explain the all variables status in terms of mean, standard deviation, correlation between dependent and independent variables.

In the next steps we developed the model use with multiple linear equations as following.

$$Y = Y = \alpha_0 + \alpha_1 X_1 + \alpha_2 X_2 + \alpha_3 X_3 + \ldots \ldots \alpha_n X_n \qquad \text{Equation} \quad (1)$$

Where
• Y is dependent variable
• X1, X2, X3......... Xn are independent variables.
• α 1, α 2,… α n are the regression coefficient of the respective independent variable.
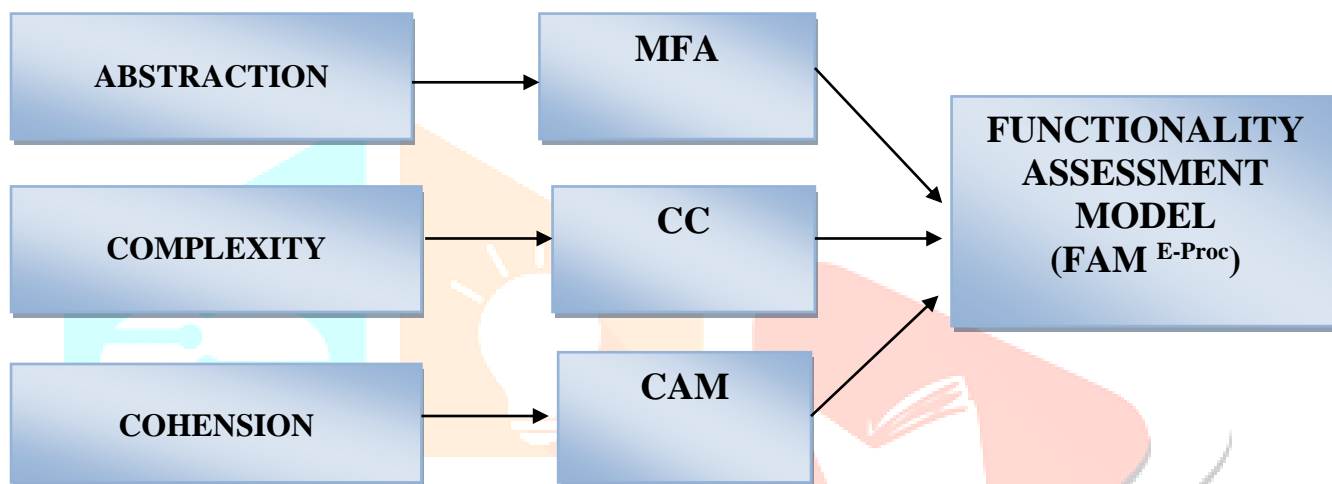• α 0 is the regression intercept.



**Fig 1Mapping between Two Variables**

Functionality Assessment Model (FAM $^{\text{E-Proc}}$) = - 22.7 + 48.4 *CAM + 21.9* CC - 5.8 *MFA      **Equation (2)**

**Table 1 Data Calculation Table**

| PROJECT | STANDARD VALUES | CAM | CC | MFA |
|---|---|---|---|---|
| P$_1$ | 11.225 | 0.500 | 0.667 | 0.818 |
| P$_2$ | 9.092 | 0.500 | 0.600 | 0.700 |
| P$_3$ | 14.391 | 0.550 | 0.660 | 0.750 |
| P$_4$ | 7.747 | 0.583 | 0.333 | 0.923 |
| P$_5$ | 10.461 | 0.409 | 0.727 | 0.529 |

**Table 2 Index Table**

| Project | CAM | CC | MFA | Cal Functionality | Std Functionality |
|---|---|---|---|---|---|
| P$_1$ | .5000 | .6000 | .7000 | 10.5800 | 9.4980 |
| P$_2$ | .5556 | .6667 | .7500 | 14.4400 | 10.3988 |
| P$_3$ | .5833 | .3333 | .9231 | 7.4790 | 5.8037 |

| $P_4$ | .4091 | .7273 | .5294 | 9.9570 | 11.2699 |
|---|---|---|---|---|---|
| $P_5$ | .4375 | .7500 | .9211 | 9.5580 | 11.1965 |
| $P_6$ | .4333 | .6467 | .7333 | 8.6210 | 10.2767 |
| $P_7$ | .4667 | .8000 | .9024 | 12.1730 | 11.9160 |
| $P_8$ | .4444 | .7143 | .8810 | 9.3450 | 10.7702 |
| $P_9$ | .5000 | .5000 | .9286 | 7.0640 | 7.9260 |
| $P_{10}$ | .4375 | .8000 | .5714 | 12.6810 | 12.2280 |
| $P_{11}$ | .4815 | .8889 | .8644 | 15.0570 | 13.1582 |
| $P_{12}$ | .5000 | .7500 | .7500 | 13.5750 | 11.4463 |
| $P_{13}$ | .5333 | .6667 | .9024 | 12.4800 | 10.2144 |
| $P_{14}$ | .5000 | .7500 | .6250 | 14.3000 | 11.5766 |
| $P_{15}$ | .5000 | .7500 | .7500 | 13.5750 | 11.4463 |
| $P_{16}$ | .4762 | .8571 | .9381 | 13.6770 | 12.6511 |
| $P_{17}$ | .5000 | .7500 | .9250 | 12.5600 | 11.2637 |
| $P_{18}$ | .4815 | .7778 | .8000 | 12.9980 | 11.7437 |
| $P_{19}$ | .4167 | .8333 | .8810 | 10.6060 | 12.3255 |
| $P_{20}$ | .5000 | .7500 | .9444 | 12.4470 | 11.2434 |

## Table 3 Model Summary

| Model Summary | | | | |
|---|---|---|---|---|
| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate |
| 1 | .999[a] | .999 | .998 | .0968274 |
| a. Predictors: (Constant), MFA, CC, CAM | | | | |

## IV VALIDATION OF MODEL

It is important that proposed model is validated or not. So experts explain the model theme and compare to previous model index values. Observation is presented in table 4. Apply 2t test to check the validity of model. 2t test also known as Hypothesis test. Basically we used the two type hypothesis.

**Null hypothesis ($H_0$):** There is no significant difference between Standard Functionality and Calculate Functionality.
$H_0$: $\mu 1 - \mu 2 = 0$
**Alternate hypothesis ($H_1$):** There is significant difference between Standard Functionality and Calculate Functionality.
$H_1$: $\mu 1 - \mu 2 \neq 0$

## Table 3 Paired Samples Statistics

| Paired Samples Statistics | | | | | |
|---|---|---|---|---|---|
| | | Mean | N | Standard Deviation | Standard Error Mean |
| Pair 1 | Cal_ Functionality | 11.658650 | 20 | 2.3578825 | .5272386 |
| | Std_ Functionality | 10.917650 | 20 | 1.6723459 | .3739479 |

Mean value and Standard Deviation value have been calculated for specified two samples and represented in table 5. The hypothesis is tested with zero level of significance and 95% confidence level. The p value is 0.06. The correlation outcomes are 0.703. Therefore alternate hypothesis directly discards and the null hypothesis is accepted. The developed equation used for functionality assessment model is accepted.

## V COMPARISION ANALYSIS

The simplest and most straightforward way to compare various dataset is often the classic based graph. The universally-recognized graph features a series of bars of varying lengths. The Graph presents the significance level between two dataset. This paper functionality evaluation process has calculated the functionality index values, which comparison to standard values and show in figure2.
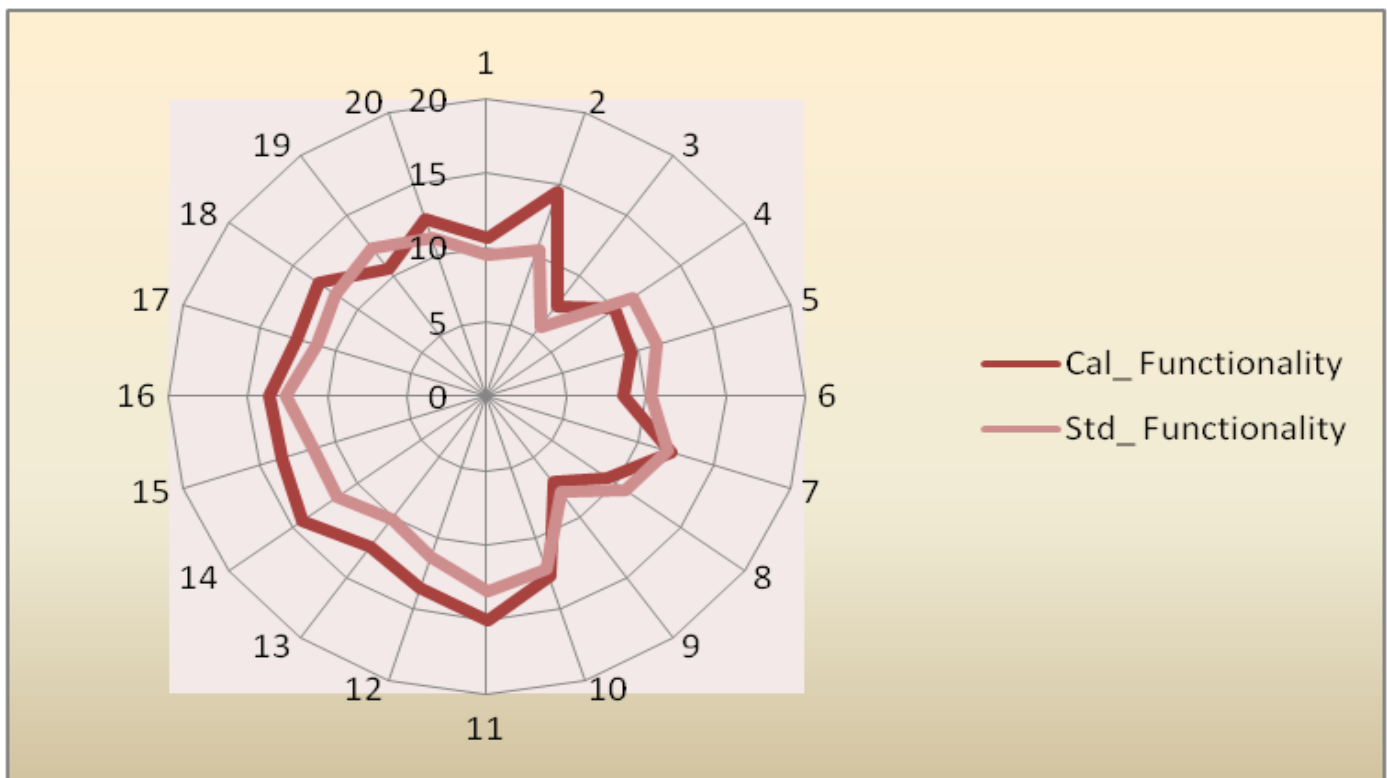
**Figure 2.  Graphical Comparison Between Two Indexes Of Functionality**

## VI CONCLUSION AND FUTURE SCOPE

Software Functionality in a e-procurement software is a important factors to estimate the correctness of quality attributes and their significance on correctness estimation at design phase has been tested and justified. The developed Functionality Assessment Model to assess quality of object oriented software is extremely reliable and correlated with object oriented design artefacts. Functionality Estimation Model has been validated theoretically as well as empirically using statistical test. After quantifying the Security Assessment Model for e-procurement [8] Completeness Assessment Model [9], Traceability Assessment Model [10] , Functionality Assessment Model .  In later research paper the  Reliability Assessment Model. will introduce for quantify the correctness of the quality of e-procurement

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