ABSTRACT

Management of software development process offers a great opportunity to develop successful software although software development remains a complex process with a number of inherent challenges. Software Project Management (SWPM) is an important activity that plays a major role in deciding about the outcome of any software development project. The real challenge is to deliver performing software within the estimated time and cost, with quality as the bedrock. There are various dimensions to SWPM starting from project planning to project closure. In each of these, among many umbrella activities, software metrics is an important umbrella activity that plays a vital role and is fundamental to any software project management. There are many subjective factors in the development of software that need to be made objective and quantified. And this is taken care by ‘Software Metrics Program’ in any software development organization.

Indian IT companies have evolved over the years while adopting many globally accepted software metrics management practices on their own and some because of the expectations of their clients to follow such standards for ensuring minimum expected delivery. This may not be true with the In-House Development Centres (IHDCs) in India. Non-IT companies in India, although software is used by them for conducting their businesses, such software may be developed by third party developers or by their own IHDCs. Such IHDCs perform production support and maintenance activities too, besides developing their own software. It is to be noted that the IHDCs have evolved from data processing to development centres over a period of time and it is more likely that there may be absence of professional approach as far
As software metrics management practices are concerned. Therefore, this research titled “An Empirical Study on the Software Metrics Management Practices Followed in In-House Development Centres” which is explorative in nature attempts to know the software metrics practices followed in the Indian IHDCs and to suggest ways and means to improve the quality of SW development happening in the IHDCs by following better software metrics practices.

After doing review of literature, discussing with experts in Industries and professional organizations, identification of the research issue, selection of the research problem, the selection of the research frame were done. Six sectors namely Education, Engineering, Finance, Health, Logistics and Tourism were considered for sampling. Objectives of the study were framed followed by formulation of relevant hypotheses. Survey explorative was the design methodology followed, with quota sampling and snow ball sampling as sampling processes. After determining the sample size, there were 253 responses against the planned responses of minimum 200 to maximum 300. A pilot study was done with 35 respondents, with the feedback received necessary improvements were made in the questionnaire and finally the data could be collected and tabulated for analysis and interpretation. Statistical techniques such as measures of central tendency, Kruskal Wallis ANOVA Test, Chi-Square Test and Spearman Rank Correlation Test were done to get the results for due analysis and interpretation. Tools such as SPSS and MS-Excel were used extensively for doing the analyses.

Interesting findings have been made about the Heads of IHDCs with respect to demographic factors. Majority of the Heads of IHDCs are Male members (93.7%), most of them belong to the Age group 31 to 40 years (48.6%), most of them are Graduates (69.6%), most of them have 16 to 20
years of Experience (39.9%), only a few of them have Professional Certification on Project Management (5.9%), most of them have level-2 Designation (33.6%).

Estimation & Scheduling is the major activity performed by the IHDCs (47.7%), Risk Management is the least practiced metrics (0.8%), Finance and Engineering sectors are the sectors following the maximum metrics practices of 25.2% and 25.0% respectively.

‘Customer Focus’ is the major organizational factor followed in all the sectors (26.9%), among the Human Resource Management needs, ‘Stability and Continuity of Team’ is the most preferred need by majority of the IHDC Heads (95.3%), among the Project Management needs, ‘Information Security’ is the most preferred need by majority of the IHDC Heads (100%) and among the needs for Support Skills and Environment, ‘Work-Life Balance’ is the most expressed need by majority of the IHDC Heads (96.0%).

When considering the association between the project categories namely Process Database (PDB), Process Capability Baseline (PCB), Process Planning (PP), Quality Planning (QP), Estimation & Scheduling (ESC), Project Monitoring & Control (PMC), Risk Management (RM), Project Closure (PC) and the demographic factors Gender, Age, Experience, Qualification, Designation, and Certification, it has been found out that there is no association between project categories PDB, PP, ESC, PMC, and the demographic factors, there is no association between PCB, QP and demographic factors excepting Age, there is no association between RM and demographic factors excepting Designation, there is no association between PC and demographic factors excepting Gender and Experience.
It has been also found out that between any two metrics categories from the eight categories mentioned before, there is a significant difference between any two software metrics categories except between ESC and RM. It has also been found out that there is an association between Sectors and Organizational Focus Areas.

It has been found out that there is a very high degree of correlation existing between PDB and PC, PCB and PP, PCB and ESC, PCB and PMC, PP and ESC, PP and PMC, PP and PC, QP and RM, ESC and PMC, PMC and PC, there is a strong correlation existing between PCB and PC, PP and QP, ESC and PC, the correlation between PDB and PCB, PDB and PP, PDB and ESC, PDB and PMC, PCB and QP, PCB and RM, PP and RM, QP and PMC is sufficient, there is a weak correlation existing between PDB and QP, PDB and RM, QP and ESC, QP and PC, ESC and RM, RM and PMC and RM and PC.

It has also been found out that there is a significant difference among the sectors in the software metrics categories PDB, PCB, PP, ESC, PMC and PC, and there is no significant difference among the Sectors in the software metrics areas QP and RM. Many recommendations to improve the metrics practices have been made. One of the recommendations is to consider offering a ‘Special Professional Programme’ to develop Human Resources in performing activities connected to In-House Development Centres (IHDCs). Another important recommendation was to change the view of the Top Management to see their IHDCs as ‘Profit Centres’ instead of ‘Cost Centres’. This research has opened up scope for exploring more through further research with respect to the Software Metrics Practices followed in the IHDCs in India.