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THE SCENARIO OF SOFTWARE INDUSTRIES IN INDIA

C.SenthilMurugan[1]
PhD Scholar
Dept of CSA, SCSVMV University, Kanchipuram
Dessenthil.c@gmail.com

Dr. S. Prakasam[2]
Head & Associate Professor
Dept of CSA, SCSVMV University, Kanchipuram
Dept of MCA, TCET, Vandavasi.
Prakasam_sp@yahoo.com

***Abstract*--- The software development is the task to solve large and complex programs and in a cost effective manner. The development and maintenance of software product have become important criteria. In the early years, engineers faced many problems without having a better knowledge in this field, such as late delivery of software, development team exceeding the budget, poor quality, user requirements are not completely supported by the software, difficult maintenance and unreliable software and lack of systematic approach. Now a day this problem is rectified and the advanced development process and standards are implemented. But still a lot of problems are faced by the software developers and the software industries. This paper focuses the current scenario of the software industries in India to improve the quality of the software.**

KEYWORDS: software development, software engineering, software quality**.**

1.INTRODUCTION

Quality is perceived differently by different people. Yet, everyone understands what is meant by "quality." In a manufactured product, the customer as a user recognizes the quality of fit, finish, appearance, function, and performance. The quality of service may be rated based on the degree of satisfaction by the customer receiving the service. The relevant dictionary meaning of quality id "the degree of excellence." However, this definition is relative in nature.

The customer's needs must be translated into measurable characteristics in a product or service. Once the specification is developed, ways to measure and monitor the characteristics need to be found. This provides the basis for continuous customer will be satisfied to pay for the product or service. This should result in a reasonable profit for the product or the service provider.

Concept of quality

- The ability of the product/service to fulfill its function
- Hard to define
- Impossible to measure
- Easy to recognize in its absence
- Transparent when present[6]

- *Quality is multidimensional*

It has many contributing factors. It is not easily summarized in a simple quantitative way.

- *Quality is subject to constraints*

Some resources will be more constrained than other and the availability of that resource will become critical to the overall quality.

- *Quality is about acceptable compromises*

If quality is constrained and compromises are required, some quality criteria may be sacrificed more acceptable than others.

- *Quality criteria*

Quality Criteria are not independent, but interact with each other causing conflict. [6]

Software Quality

Software quality refers to software quality as "fitness for the needs" and this definition recognizes two features of a piece of quality software:

- Conformance to its specification.
- Fitness for its intended purpose.

Software Quality Concepts

- Quality is conformance to product requirements and should be free.
- Quality is achieved through prevention of defects.

- Quality control is aimed at finding problems as early as possible and fixing them.
- Doing thing right the first time is the performance standard which results in zero defect and saves the expenses of doing things over.
- The expense of quality is non conforming to product requirements
- Quality is what distinguishes a good company from a great one.
- Quality is meeting or exceeding our customer's needs and requirements.
- Software quality is miserable.
- Quality is continuous improvement.
- The quality of a software product comes from the quality of the process used to create it.
- Quality is the entire company's business.
- Our quality network testing products help make our customers successful.[6]

Hierarchical Model of Quality

To compare quality in different situations, both qualitatively and quantitatively, it is necessary to establish a model of quality. Many modules suggested for quality, most are hierarchical in nature. Two principals of this type, one by Boehm (1978) and one by McCall IN 1977. A Hierarchical model of software quality is based upon a set of quality criteria, each of which has a set of measures or metrics associated with it.

The issues relating to the criteria of quality are:

- What criteria of quality should be employed?
- How do they interrelate?
- How may the associated metrics to be combined into a meaningful overall measure of quality?[6]

Software Engineering

Software Engineering is the establishment and use of sound engineering principles in order to obtain economically software that is reliable and works efficiently on real machines.

The software engineering is useful

- To acquire skills to develop large programs.
- Ability to solve complex programming problems
- Learn techniques of specification, design interface development, testing, and project management.
- To acquire skills to be a better programmer.

The primary goal of software engineering is o improve the quality of software products and to increase the productivity

and job satisfaction of software engineers. [25]

QUALITY CERTIFICATIONS SCENARIO IN INDIA

According to Bill Curtis, Former Director of the Process Program, SEI, Author of the **CMM** (Capability Maturity Model): "India is making progress on both the software CMM and people CMM faster than any other nation. The pinnacle will be reached when Americans are seeking visas so they can learn and work in India"

According to N.R. Narayana Murthy, the Former CEO, Infosys Technologies:

For quality experts to successfully inspire everybody from top to bottom in an organization there are three basic requirements:

- Quality has to be linked to business goals
- There has to be a sense of pride deeply installed in your organization
- The third requisite for quality is a shared vision and commitment of top management[4]

SW CMM MATURITY ORGANIZATIONS IN INDIA

The table page presents some vital information in this context. It shows that there are quite a few Indian SW organizations that are at SW CMM maturity. They are listed below in alphabetical order of their names. [4]

Organization	Maturity Level	Date of Appraisal
BFL Software Limited, Bangalore	4	June 1999
CG Smith Software, Bangalore	5	Sept 1999
DCM Technologies, DCM ASIC Technology Limited, New Delhi	5	April 2000
HCL Perot Systems, Noida and Bangalore	5	Feb 2000
IBM Global Services India, Bangalore	5	Nov 1999
International Computers India Ltd(ICIL), Pune	5	Feb 1999
Motorola India Electronics Ltd. (MIEL), Bangalore	5	Nov 1993
Network Systems and Technologies (P) Ltd, Trivandrum	5	May 2000
Satyam Computer Services Ltd, India	5	March 1999
Tata Consultancy Services, HP Centre, Chennai, India	5	July 1999
Tata Consultancy Services, SEEPZ, Mumbai, India	5	Aug 1999
Tata Consultancy Services, Shollinganallur, Chennai, India.	5	Nov 1999
Tata Consultancy Services, US West, Chennai, India	5	April 1999
Wipro GE Medical Systems, Bangalore, India	5	Jan 1999
Wipro Technologies, Enter price Solutions Division, Bangalore, India.	5	Dec 1998
Wipro Technologies, Global R&D (formerly Technology Solutions), Bangalore, India	5	June 1999

THE P-CMM SCENARIO IN INDIA

People CMM is a process targeted at managing and developing an organization's workforce and adopts the maturity framework of the Capability Maturity Model for software (CMM). The aim of PCMM is to radically improve the ability of software organizations to attract, develop, motivate, organize, and retain talent needed to continuously improve software development capability. PCMM consists of five maturity levels that lay successive foundations for continuously

improving talent, developing effective teams, and successfully managing the people assets of the organization.

For a country like India, with its large assets in the form of skilled human resources, the relevance of people CMM needs no emphasis. A large number of Indian IT software and services companies have been quick to realize this and have either implemented or initiated programs.

THE INDIAN SOFTWARE SCENARIO IN GENERAL

Global Scenario for Software Market is characterized by the following:

- The total value of software is estimated to be around $600 billion+
- About half is for general-purpose or shrink-wrapped software products
- Other half is the software service market

Given this scenario, services segment is well suited for offshore work (low risk, low capital, manpower intensive…) in which low dependence on physical infrastructure is considered ok. This makes the scheme of things well suited for country like India as the software industry is mostly in the service sector.

Opening of the economy has given a spurt to the Indian Software Industry, which is young. [4]

Cost and Quality Advantage: Indian Software Industry

Indian players have created a strong value proposition in the IT software and services arena. India enjoys advantages of people sophistication in terms of a very large pool of English speaking scientific personnel, varied and extensive skill sets in terms of technology, and offering services at globally competitive costs.

The other heartening feature has been the growing acceptance and adoption of the newly emerging people-capability Maturity Model (people-CMM) by the Indian software industry.

A large number of Indian IT software and services companies have been quick to realize this and have either implemented or initiated programs.

The Indian Software Industry: Problem & Challenges

Indian software exports are steadily growing. The largest number of quality certified software organizations are in India. However, although all this may appear to present a rosy picture, it is not that the Indian software industry is without any problems and challenges.

The major problems and challenges seem to be:The uneven profile of the Indian software industry

- People management problems
- Infrastructure related problem
- Growing competition from other countries[4]

The Uneven Profile of the Indian Software Industry

The Indian software industry has been characterized by an uneven profit along several dimensions. These skews have important implications for both the growth and earnings potential of Indian software as listed

- Uneven output
- Uneven export destination
- Uneven divisions of labor
- Uneven location division
- Uneven skill division
- Uneven market share
- Uneven site distribution

People Management Problems in the Indian Software Industry

There is widespread dissatisfaction among senior managers in the software industry with the performance of software projects. This takes the form of inordinate delays, time and cost overruns, user dissatisfaction and maintenance problems. “High Burn Out” is a common problem in most Indian software companies.

In order to overcome these problems, software companies are investing heavily to make improvements in their software processes and practices. Many of them have realized that lasting improvements require significant changes in the way they manage, develop and use people. In many software companies the work of managing people is seen as a responsibility of the Human Resources Department. The practices relating to the management of people are done in an ad-hoc manner with little realization of their impact on the motivation and morale of staff. The reluctance of project leaders/managers to undertake such responsibilities is because they have not been trained to perform functions relating to the management of people and also the fact that they are constantly under the pressure of delivery deadlines.

Infrastructure related problems

The infrastructure consists of transport, electricity, and connectivity; land availability, quality of life, government facilities etc.

Good communication infrastructure is considered vital for the continued growth of the software industry. Overall, the data communication infrastructure in India is expensive and in limited supply. [4]

Growing Competition from Other Countries

The global reach of software products and services from India is constantly under threat from global competition from other countries that can offer educated manpower at competitive rates.

As per the NASSCOM review the top most software companies in India are listed [7]

S.No	Company Name
1	Tata Consultancy Services Ltd
2	Infosys Ltd
3	Wipro Ltd
4	HCL Technologies Ltd
5	Tech Mahindra Ltd
6	iGate
7	Mphasis Ltd
8	L&T Infotech Ltd
9	Syntel Ltd
10	CSC, India

CONCLUSION

The character and concepts of quality is discussed and the current Scenario of the software industries is discussed. This shows the problems that are faced by the software industries and show to find the ways to solve the problems in the current scenario.

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