The quintessential Quality Management Systems CMM & ISO 9000-2001

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ABSTRACT
The main aim of this article is to gain an understanding on two different quality improvement models namely, ISO and CMMI, with a prime focus on TickIT. Through this report, we have discussed the how these process improvement models work by identifying their aims, characteristics and differences. Also, a discussion is presented on the benefits and shortcomings of these models.

Keywords – CMMI, ISO 9000, TICKIT, Differences, characteristics, quality improvement models, process improvement models.

I. INTRODUCTION

In a competitive world, organizations try to work on improving their process, in order to face the challenge among their competitors, stand out as an organization which can deliver to the needs of the customer, face market risks and testing times in the business with ease. To gain the satisfaction of the customer and to taste success in the competing markets, one might need a lot of resources which might be too costly. Customers can only be satisfied only if they are delivered a quality product. Quality product can be achieved when there is quality in the process of developing the product (at times this may not hold true). Quality management systems such as the ISO 9000 and CMMI are followed by organizations in order to gain an edge over their competitors and to improve the quality of the process, their organizations follow.

ISO 9000 is a family of standards which describe the essential quality management practices an organization needs to follow [1]. This standard consists of a group of requirements which are needed for a quality management system [1]. These requirements are independent of the work nature of the organization, type of the organization, how big the organization is etc [1].

CMMI is a capability maturity model integration, which suggests organizations, the essential requirements for a quality process [2]. This process improvement approach helps organizations in knowing their strengths and weaknesses and also areas where improvements are required [2].

II. QUALITY MANAGEMENT SYSTEMS

Let us now have a look into the two prime quality management systems available, which are being used by organizations round the world for process improvement.

TickIT

TickIT, which is well known as ISO 9000:2001 standard is a quality management certification programme which is supported by Industries across US and Europe [3]. It helps in knowing how quality becomes crucial in the process of developing a software and how can one improve their quality standards [3].

Why TickIT?

The main motto of TickIT is to increase the quality and performance of the process. Also, it ensures the output of the process by identifying the requirement of quality management systems in order to meet the customer expectations.

How TickIT works?

TickIT works by identifying and defining how the existing processes in the organization interact with each other. It provides requirements which help in continuously improving the quality management systems in an organization. Also, continuous monitoring of the quality management system is done.

Features of TickIT

TickIT is a standard for quality management in software development organizations. The main characteristics of TickIT are as follows:

Process oriented framework:

It is a process oriented framework, which describes what the organizations which implement Quality management systems need to follow. It spots the different processes followed by the organization and develops a relation between these processes. The problem of isolated process is solved by introducing process communication.

Focus on continuous QMS improvement:

Ways of optimizing the present processes followed by the organizations are identified. TickIT mainly focuses on areas such as the Quality

management system, resource management, management responsibility, and product realization. Business processes are mainly realized in TickIT. ISO 9000 focuses on the product realization part only.

- **Management responsibilities:**
  It describes how the managements of the organization should deal with the customer. It also helps in identifying the responsibilities of management which is an important aspect of ISO 9000, as the definition of what quality in their product means always comes from top clan of the management.

- **Documenting the requirements:**
  The documentation of the requirements help in understanding how well the organization is adjusted to the process and what the people in the organization are working on.

iii. CMMI
CMMI is a process improvement model which describes the characteristics of effective software processes by providing them with implementation guidelines to improve the overall structuring processes of the organization.

a. Why CMMI?
CMMI is developed as a cost effective solution to organizations, as a standard which can work well with other technologies and standards, as a continuous process improvement standard. It was also developed to set a benchmark in standardizing the process improvement paradigms.

b. How CMMI works?
The CMMI model has a set of 22 process areas which help in process improvement. Each process area consists of specific goals and specific practices.
The process areas are distinguished into two types, specific goals and generic goals. Specific goals explain what needs to be implemented in the organization where as generic goals helps in institutionalize process improvement across the organization.
CMMI has two organizing ways for working on process areas, staged and continuous. In the staged model there is a proper structure for process improvement in a stepwise fashion, continuous the process improvement is done by considering process area or process areas making them one group [5].

c. Features of CMMI
The characteristics of the capability maturity model are as follows:

- **Evaluation of the current process:**
  Improvement of the process can be done only evaluating the current process, how effectively is the process being followed, how well did the people in organization adjust to the process etc. Points of reference are provided in order to evaluate the current process [4].

- **Sound description of process definition criterion:**
  A clear description of requirements which help the process of implementing the process in an organization is given. This requirement description would result in providing a proper process definition criterion, which might help in understanding what needs to be done.

Process guidelines for implementing:
As all the process guidelines are described and documented very clearly and concisely, providing even the minute details, this would eradicate the problem of inventing new process guidelines.

Leads to business benefits:
There are a plethora of business benefits which can be obtained such as the cost performance, prediction of the accuracy, satisfaction of the customer, evaluation of the performance etc [4].

III. WHERE DO ISO & CMMI DIFFER?
Process independence
In CMMI, process is not dependant on the persons working in the organization or those who optimized the process. Even if a person or a group is out of the organization, it doesn't show effect on the process [6]. This is called Institutionalization which is more or the less absent in the ISO 9000 or the ISO 9001:2001 (TickIT).

Management Responsibility
Quality always flows from the top levels of an organization, and decision regarding the process has to be taken by the main management. This aspect which acts as an important requirement in ISO 9000 and TickIT goes totally missing in CMMI [7].

Defect-cause analysis and mitigation
Identifying a defect and to know the root cause of the defect is an important process area in CMMI. This also discusses the mitigation strategy of the identified defect [8]. Whereas, this is unclear and not properly discussed in ISO, though it discusses about the feedback from the client it does not talk about this issue.

Area of focus
The prime area of focus in CMMI is the continuous process improvement and evaluation of the current process whereas ISO focuses on the quality control aspects [9].

Product and project
ISO works on the improvement and assurance of quality of a system or a product,

whereas CMMI works on improving the process of the organization as a whole [10].

Certification and standard

ISO follows a set of strict rules, constraints, procedures, if these are not met by organizations, certification is not provided, whereas with CMMI, once if an organization is registered with it, it helps in continuous process improvement of that organization.

IV. BENEFITS & SHORTCOMINGS

There are several advantages and disadvantages of ISO and CMMI models. They are as follows:

ISO (TickIT):
Pros:
Internal benefits:

There are a quite a lot of internal benefits to the organization such as the improvement in the operational efficiency, betterment in the procedures of work, well motivated staff etc [11].

External benefits:

There are quite a lot of external benefits such as appraisal from the customer and his satisfaction, increase in the sales, edge over the competitors etc [11].

Cons:
Strict rules and regulations:

ISO has very rigid rules and procedures and the organization is bound to follow those. Due to this there are heavy limitations and restriction on the employees or the staff working in these organizations. This certainly would show result on the recreational aspects of the employee [9].

Recognition:

It is not recognized globally, only in some parts of Europe, this is recognized as a model for process improvement. American organizations out rightly rejects this TickIT as it doesn't specifically aim on a particular domain or it doesn't have a common framework.

CMMI
Pros:
A better work environment:

CMMI is very much flexible to employees through whom they can improve their abilities and knowledge. As the model is not rigid and no rules are enforced on the employees, it provides a better work environment which shows its effect of the increased levels of productivity.

Goes well with other technologies too:

CMMI is compatible with many existing models, practices and technologies in the domain of software engineering such as the Scrum, six sigma, ITIL etc [2].

Cons:
Time taking and expensive:

CMMI to get ROI (return on investments) requires a lot of time and patience. Requires lot of budget and huge investments have to made. Organizations which are in a rush to compete with their competitors will be unwilling to take up this model.

Scope of ambiguity:

There are areas of uncertainty and unclear topics on the issues such as the architecture, design etc.

V. ANALYSIS & DISCUSSION

When we have short span of time and limited resources like budget we can choose ISO for our organization and if we have huge resources, huge budgets and belief in improvement at a steady pace, we can try this long term process improvement, the CMMI. Though we have stated our views based on the available literature, when it comes to deciding to choose between these two models, the management of the organization has to make a choice of what best suits their organization.

VI. CONCLUSION

Through this paper we have tried to discuss two widely used process improvement models, the ISO and the CMMI model. We have tried to make a discussion on the characteristics, the need of developing these models, differences between these models, and the advantages and disadvantages of these models. Success doesn't come only by adopting these models but comes when these models are put into practice.

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