

# Enhancing Information Security Management by STOPE View with Six Sigma Approach

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**Abstract**—Customer satisfaction measurement is a complex task and for this a large number of ISMS (Information Security Management System) quality features are required to be analyzed. The main objective of this article is to improve the quality in delivery of Information Technology Service and to support processes with Six Sigma approaches by using STOPE view. This research proposes a new framework to facilitate a relationship and merging the two approaches of Six Sigma with STOPE view. The new proposed framework is the combination of DMAIC (Define, Measure, Analyze, Improve, Control) and DMADV (Define, Measure, Analyze, Design, Verify) which fully works under user satisfaction. Until unless the user requirements and needs are not fulfilled, the process does not move ahead. It, not only satisfies today’s needs but also satisfy the management in reasonable time, also it is satisfying the performance requirements. Once the secured correct data is passed through any stage, it says correct. For best results before shifting any data in the next stage, the data was checked for validity. To better understand the requirements and dissatisfaction aspects of ISOFM (Information Security One Flow Model) customers, the questionnaire developed helped ISOFM managers and developers in a good way.

**Index Terms**— DMAIC, DMADV, Information security, six sigma, STOPE view.

## I. INTRODUCTION

To protect information and information security from unauthorized access, use, disclosure, disruption, modification or any kind of destruction is actually the Information Security. Information security, computer security and information assurance are the fields that are interrelated to each other and share the common goals to acquire flawless information. Six Sigma is a business management strategy, originally developed by Motorola that today enjoys wide-spread application in many sectors of industry [4]. The basic purpose of my research was to develop an Information Security one Flow Model (ISOFM), that is only one flow and it is a combination of DMAIC and DMADV models. The process / project is Defined and if the process is either existing or not, is shifted towards the Measure stage where the old or new process criteria is measured and only after the user’s satisfaction it is moved towards the next step i.e. Analyze for the analysis purpose. In this way the process goes on step by step after achieving the user satisfaction. At any stage if user satisfaction is not achieved, it stays in that particular stage and satisfies the user first and then move towards the next stage. Information

security is required at every step of STOPE view for any kind of organization. To make the organization successful, information security must be at its Strategy stage as well as its Technology, Organization, People and Environment stages[5].

## II. MATERIAL AND METHODS

In Information Security One Flow Model (ISOFM), there was only one flow and it was a combination of DMAIC [1] and DMADV [3] models. The process / project was Defined and if the process was either existing or not, was shifted towards the Measure stage where the old or new process criteria was measured and only after the user’s satisfaction it was moved towards the next step At any stage if user satisfaction was not achieved, it remained at the stage and satisfied the user first and then moved towards the next stage. In the end, after satisfying the user from the Verify and Control stage, the work was done and secured information was achieved successfully. The ISOFM is shown as;

A framework – Information Security Management System (ISMS) – must be created to implement, manage, maintain, and enforce the information security process. It is important early in the ISMS creation process to identify and empower a Security Lead or Information System Security Officer to coordinate, oversee, and ultimately take ownership of the ISMS [2] . Information security is required at every step of STOPE view for any kind of organization. To make the organization successful, information security is must at its stages that are Strategy, Technology, Organization, People and Environment. Short phrases including the factor descriptive adjective instead of adjective alone are used to make the questionnaire more understandable and as unambiguous as possible. The criterion is related to the features given below.

Information availability: The data and information I use/need for my job are:

Available at convenient places	3 . 2 . 1 . 0 . 1 . 2 . 3
Unavailable	
Available every time	3 . 2 . 1 . 0 . 1 . 2 . 3
Unavailable	
Accessible (procurable) from	3 . 2 . 1 . 0 . 1 . 2 . 3
Inaccessible different IS (sources)	
Data retrieval is Easy	3 . 2 . 1 . 0 . 1 . 2 . 3
Complex	
The information availability is:	
Important to me	3 . 2 . 1 . 0 . 1 . 2 . 3
Unimportant	

Fig: Illustration of questionnaire form [6]

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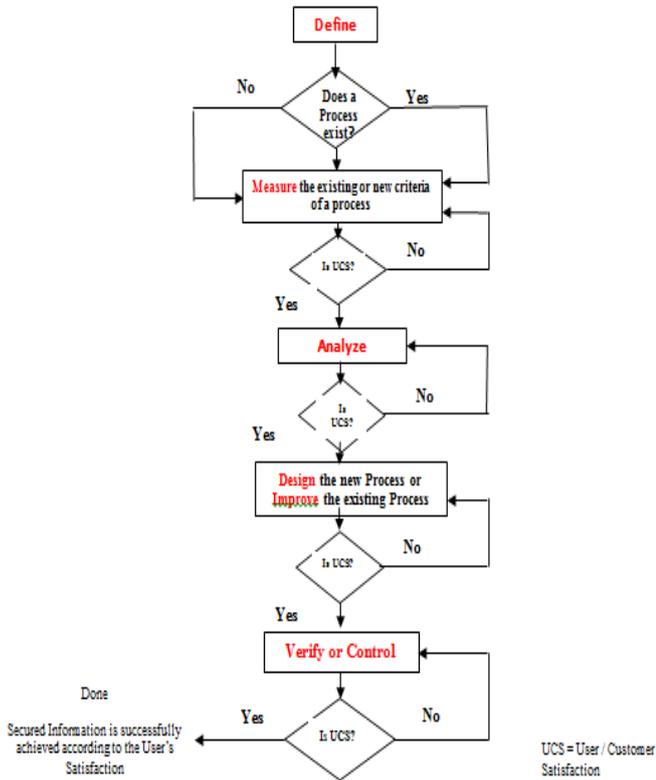


Fig. 1. Information security one flow model(ISOFM)

### III. RESULTS AND DISCUSSIONS

DMAIC and DMADV, two methodologies of Six Sigma are business oriented techniques in which customer satisfaction is not considered much and there are two different tracks to move on to. Whereas the new Information Security Flow Model (ISOFM) has many advantages over the pervious information system and full fills all the requirements of the end-user and the top management.

We classified ISOFM customers as internal or external. Internal customers are Project planners, analyzers, designers, developers, technologists and quality department within an Information system. End users, insurance providers, suppliers, services researchers, etc. are the external customers. The spot light of this research is on Internal Information Security users only. If these customers are not satisfied by the worth of a system, by the excellence of the service integrated in the system and by the quality of information delivered by the system, they will not use it, or will not use it correctly and efficiently.

The user or customer is satisfied at every step in this new process, which plays a vital role in the success of any organization. In the previous existing systems, DMAIC and DMADV were taken individually and only one methodology of Six Sigma could be used at one time. But the new information Security Flow is the system in which not only both the methodologies are used at the same time but also usually get the successful results. In the previous methodologies, the user is asked in the end, for his/ her satisfaction. In case of no satisfaction the whole process is repeated again, which is wastage of time, money, resources, management and the security of information as well but all this is not happened in new process. We want to obtain a

customer satisfaction distribution which is near to target points that is towards more and more positive point (Maximally Satisfied).

The customer satisfaction factor is scaled as;

- 3 Highly Positive (left)
- 2 Positive (left)
- 1 Normal (left)
- 0 Mid Point
- 1 Normal (right)
- 2 Negative (right)
- 3 Highly Negative (right)

Before implementing ISOFM, the results were observed on the existing system to compare them with the results after implementing ISOFM. The observations were made from the questionnaires that are divided into five sections having salient features. Previous and the new observations were made on the same set of questionnaires for the exact comparison.

**Results:** Black graphs show the previous results where as white graph shows the results of ISOFM.

#### Section A: User Profile (Define Phase)

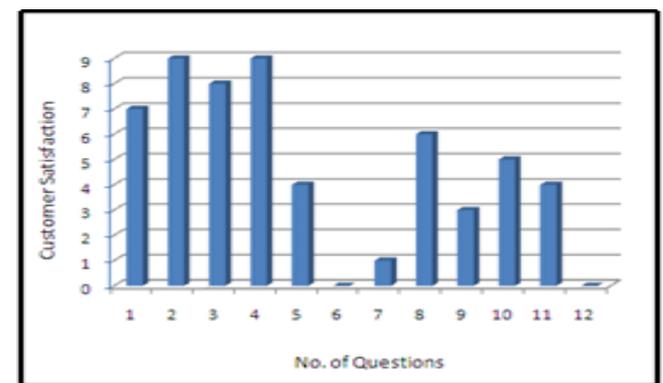
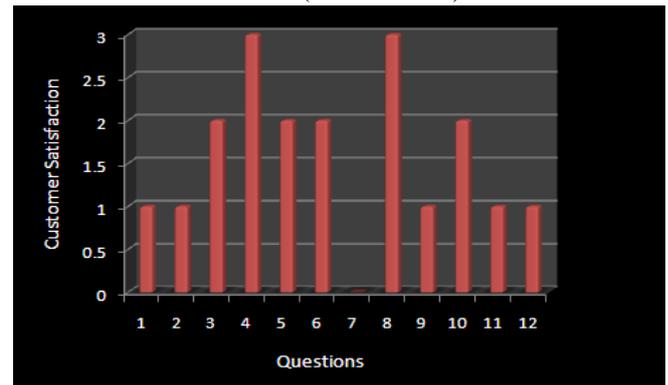


Fig. 2. User profile

ISOFM graph is showing positive result having maximum value of 9. Where as in the previous system we were having maximum value of 3 only which is quite low. ISOFM user profile shows all the high positive values which indicate a good level of customer satisfaction.

#### Section B: Quality of ISOFM Deliver Services / Organization Process (Measure Phase)

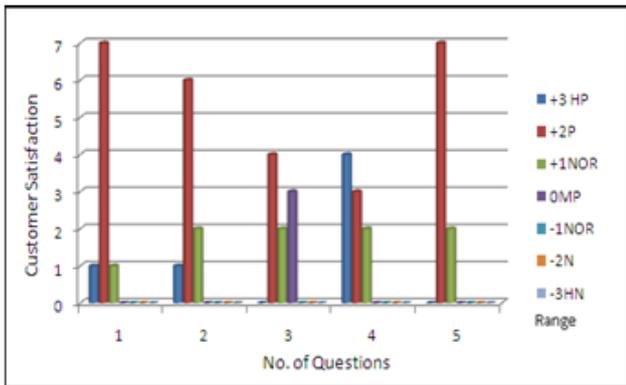
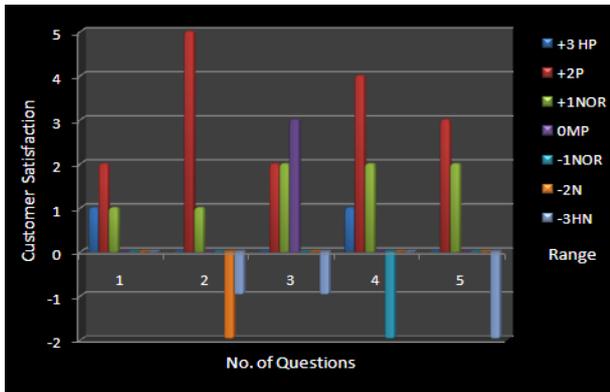


Fig. 3. Quality of ISOFM deliver services / organization process (measure phase)

Section B is showing all the positive values with the highest value of 7 where as in the previous system there are five high negative values and having positive value of 5 only. There is a quite big difference before implementing ISOFM and after implementing ISOFM. Thus represents a good customer satisfaction level and approaching the target value.

**Section C: Quality of the System (Analyze Phase)**

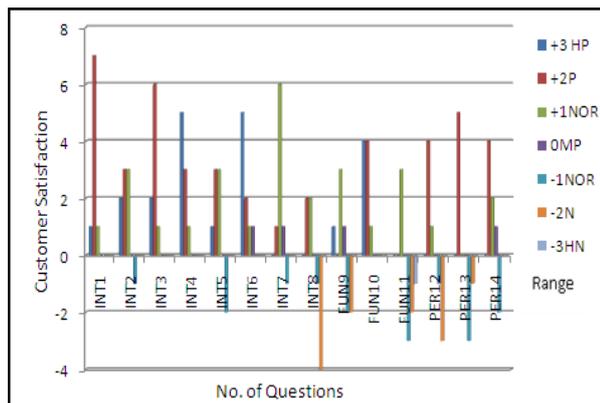
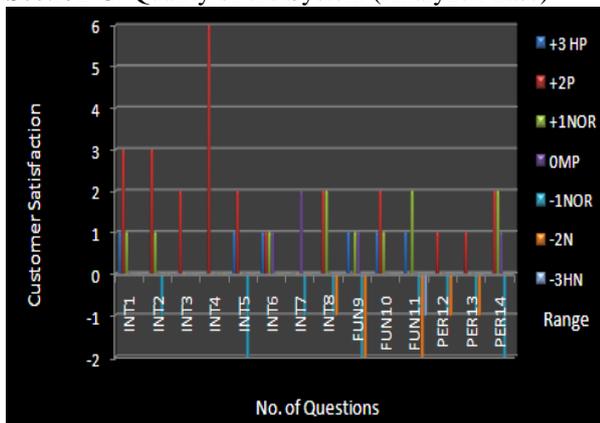


Fig. 4. Quality of the system (analyze phase)

Quality of the ISOFM is also divided into three major portions as was divided for the previous system i.e. interfaces, function and performance. The previous result is displaying the lower satisfaction level and there are many negative values but ISOFM results for its quality shows the highly positive results in all of its features. Therefore, we get high positive results which are close to the satisfaction level.

**Section D: Information Quality (Design Phase)**

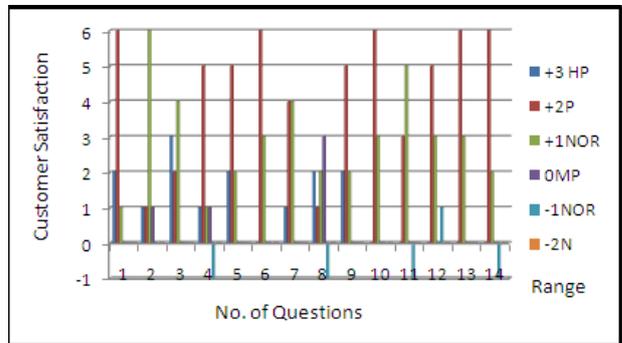
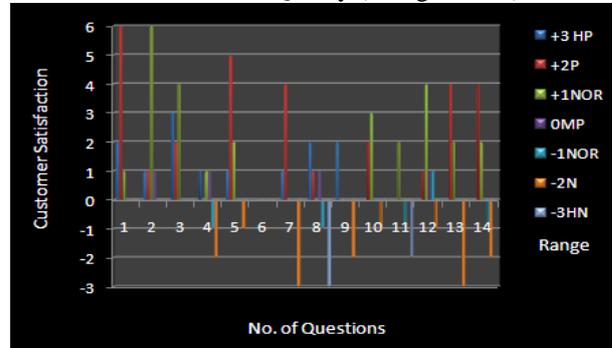


Fig. 5. Information quality (design phase)

Design phase is also simply displaying all the positive results which are very close to the target value of customer satisfaction. All the questions of this section have high positive values as compared to the previous system result.

**Section E: Global Sense of Satisfaction (Validate or Control Phase)**

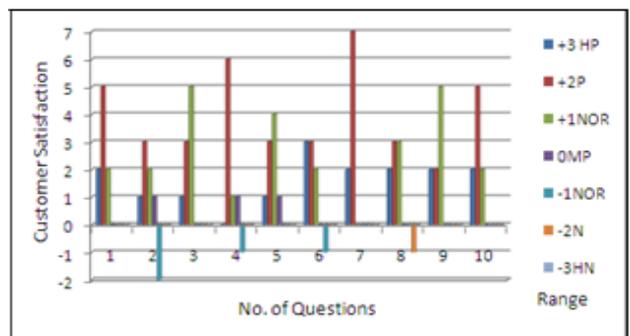
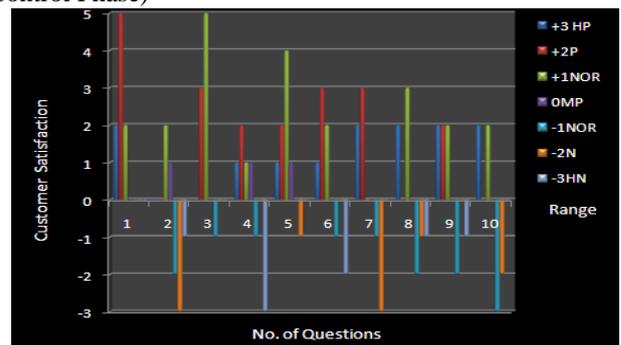


Fig. 6. Global sense of satisfaction (validate or control phase)

Global sense of satisfaction represents the validate or control phase of ISOFM which is exhibiting the positive results too. Questions in this section represent the improvement of the quality of work after implementing ISOFM which is positive. This graph shows that ISOFM not only make the work more efficient but also assists them in enhancing their performance. Cost, money, time and risks are reduced. All these important features show the customer satisfaction.

#### REFERENCES

- [1] Aazadnia and Fasanghari, "Improving the information technology service management with six sigma," *IJCSNS International Journal of Computer Science and Network Security*, vol. 8 no. 3, March 2008.
- [2] Carlson, "Information security management: understanding ISO 17799," *CISSP lucent technologies worldwide services*, 2001.
- [3] DMADV: An Approach for Developing New Initiatives Innovation Insights #20. The Pennsylvania State University, 2008.
- [4] Pinnacle Strategies. (2009). [Online]. Available: <http://www.pinnacle-strategies.com/Six%20Sigma.htm>.
- [5] Saad *et al.* "E-Business Diffusion Requirements: A STOPE View for Easing the Use of ISO 17799 Information Security Management Standard," 2006.
- [6] Vincent *et al.* "Hospital Information Systems Quality: A Customer Satisfaction Assessment Tool," presented at 32nd Hawaii International Conference on System Sciences, 1999.