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### Managing by Metrics

by

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**White Paper Submitted for SPM-ICON 2009**

## **Managing by Metrics**

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## Abstract:

### Introduction:

Customer surveys can yield need-to-know intelligence, but all too often they produce only nice-to-know facts. Gauging the customer satisfaction surveys and setting right action plan to address the areas of dissatisfaction will become the key driver for strategic growth. To deliver a differentiated customer experience, organizations must incorporate best practices and actions into their operations strategy, and their capability development and execution. Such an approach will enable them to understand their customers more deeply, delivering a differentiated customer experience to overcome competitive threats will ultimately generating sustainable business results.

### Audience:

- Project Managers
- Client relationship managers
- Account managers
- IT Directors

### Area of Application:

- Project Management

### Benefits:

- High customer satisfaction
- Customer retention
- Account penetration
- Positive company image

### Issues and Challenges: (Listed are the challenges that one might face in implementing the concept addressed in this paper)

- Frequent changes to client manager
  - Attrition of team members in the service provider organization
  - Availability of accurate metrics
-

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## 1.0 Introduction:

Are you seriously listening to your customer's feedback? How satisfied are your customers? Are they more or less pleased with your company and services than they were last year? Have you put some serious thought to the last customer satisfaction index received and set action plan to improve?

### Why to Measure Customer Satisfaction?

In today's tough economic climate, IT companies need to focus more than ever on what their customers have to say, so they can keep valued clients coming back for more.

One of the hardest things organizations have to do in (re)building customer focus is simply to learn to listen better to customers. They also need to acknowledge the difference between satisfaction and loyalty: satisfaction is an attitude (how a customer feels about your company, product or service), while loyalty is a behavior (they buy from you more than once).

It is well proven that winning new customers can be up to ten times more costly than building on existing relationships. Technology suppliers recognize that customers are their lifeblood and key to their future success and have consequently adopted customer surveys as a way of measuring customer satisfaction.

*"If you cannot measure it, you cannot improve it." - Lord William Thomson Kelvin (1824-1907)*

What better time than to review the role of customer satisfaction surveys, to build on the existing groundwork and consider how taking your customers' issues seriously can help drive business success?

### Pitfalls in Customer Satisfaction Review Process

These are the major reasons why customer satisfaction survey programs don't provide strategic value.

**1. Customer surveys are viewed as merely a performance appraisal tool.** In response to poor customer ratings, managers typically use Band-Aids rather than perform major surgery. Instead of focusing primarily on training and motivating employees to provide better service, management should focus on more fundamental issues such as whether the organization's services, processes, and culture need to change in order to improve customer satisfaction.

**2. The wrong people are involved.** Customer satisfaction is critically important to all organizations, yet the job of gathering and interpreting customer satisfaction data is often relegated to lower levels of the organization. These people are not in a position to evaluate the results from a strategic perspective, nor are they able to implement the major organization-wide changes that may be needed.

**3. Management engages in analysis paralysis.** Far too often, customer satisfaction survey data is over-analyzed, scrutinized, and beaten to death. Management responds MAKE MORE STRATEGIC USE OF CUSTOMER SATISFACTION SURVEYS with denial and finger-pointing instead of constructive actions or strategic decisions.

## 2.0 Content

Customer satisfaction index is a true test to the quality of deliverables. This white paper 'Manage by Metrics' explains how metrics were put to effective use on one of the engagement to manage and monitor the deliverables so as to improve upon the customer satisfaction index.

### Context

About the engagement: This is an engagement that is being executed in onsite-offshore model, providing production support and maintenance services for a Life & Health policy administration system. The system under scope of this engagement is fairly complex and has functionality that caters to entire policy life cycle. This is a long running engagement and our organization has been providing services since 5 years. Every six months the team receives feedback from the client, where the client has been rating the team on a scale of '0' to '5' (0 being the lowest) in the categories like delivery, quality, process, expertise, communication, and teamwork.

### Engagement Challenges:

- Frequent changes in the client's IT managers and business users
- System hosted on Legacy systems which is a rare skill in the market
- Complex system with several key functionalities

### Receiving Customer Satisfaction Index

In the first half of year 2008 the Life & Health policy administration system supported by this team has undergone several changes to the key functional areas. The changes to the system were implemented in production without any serious delays to the schedule laid out by the business. The customer satisfaction for the first half of the year 2008 was received in the second week of July 2008. An overall CSI rating of 3.5 was received and a CSI rating below 4 is considered to be a sign of unsatisfied customer. The client has rated the team low on the following parameters which resulted in dip of overall rating to 3.5:

1. Delivery
  - Project delivered on time
  - Scope was managed proactively.
  - Issues addressed in a timely manner.
2. Quality
  - Compliance to the agreed Project Metrics (Residual Defect density, compliance to agreed standards)
  - Consistently delivered components with low defect rates.
3. Processes
  - Effort estimation accurate and scientific (historical data).

Given below is a feedback that was received from the client.

Customer Satisfaction Survey			
Date	14-Jul-2008		
Project Name			
Feedback From	Client project manager		
Period	Jan-08 to Jun-08		
Category	Question	Rank	
Delivery	Project delivered on time	3	
	Delivery made within forecasted budget (Only applicable for Fixed Price Projects)		
	Co-ordination with offshore members was conducted efficiently		
	Functional requirements adhered to.		
	Scope was managed proactively.	3	
	Issues addressed in a timely manner.	3	
	Deliverables met agreed performance requirements.		
Quality	Compliance to the agreed Project Metrics (Residual Defect density, compliance to agreed standards)	3	
	Consistently delivered components with low defect rates.	3	
Processes	Effort estimation accurate and scientific (historical data).	3	
	Used change management, scope control and alerting processes.		
	Employed software configuration management (Source code control and defect tracking). Adherence to be measured to Marsh defined procedures.		
	Conducted code inspection, reviews and early defect detection exercises.		
Expertise	Team demonstrated subject matter expertise in required technical area.		
	Team brought prior experience to the table and shared knowledge from past experiences.		
	Team has proven ability to solve or participate in solving complex problems.		
Communication	Team demonstrated high quality of written and verbal communication.		
	Status, issues and responses to requests communicated in a pro-active, candid and timely manner.		
Team work	Shared knowledge and expertise within the team.		
	Operated as a cohesive part of the team.		
	Overall rating (1 to 5, 1 to <2 - Poor, 2 to <3-Average, 3 to <4-Good, 4 to < 4.5 -Very Good, >4.5 to 5-Exceptional)	3.5	
The respondents expressed their satisfaction about LTI's services against each question on a scale of 1 to 5. The table below explains the ranking system followed:			
Rank	Description	Rank	Description
5	Strongly Agree	2	Somewhat Disagree
4	Agree	1	Strongly Disagree
3	Somewhat agree	0	Don't Know/Decline to Answer

## Analysis of Customer Satisfaction Parameters

Customer feedback is an important factor to measure the project performance in the eyes of the customer. As a service provider, it is important to take serious note of the feedback to know how we have performed in the eyes of the customer and take necessary action to improve the performance going forward.

As mentioned earlier there are several challenges in supporting and maintaining this system, overcoming the challenges and winning customer satisfaction on such an engagement is difficult. To some extent I can quote that the deliveries were affected because of the changes that took place on the client's business users during this period. But it is not time for finger-pointing or denial so we have decided to get to the root cause and set up an action plan that will address the parameters with low CSI.

A meeting was called for to share the feedback with all the team members and every member of the team is made aware of the expectations from the customer. The discussion started with trying to relate individual tasks/incidents that lead to customer's dissatisfaction on the mentioned parameters. The discussion gave us some answers but did not really address the real root cause and did not either give us a permanent solution. I understood that, more we tried to relate parameters with low CSI ratings to individuals and the tasks they performed the farther away we got from finding a permanent solution.

## Solution

Analysis revealed that customer concerns are primarily in the areas of timelines and defects. Our discussions also highlighted the effort variance is due to several reasons like low requirement stability, resource expert level on some functionalities and efforts spent on rework due to defect leakage into later phases of development cycle. In process of analyzing and finding answers of low CSI ratings we have started to look back at the metrics that we have been gathering on this engagement. This gave us an idea to identify the group of metrics that can be tied to each of the parameter in CSI and when analyzed can give us the root cause.

Based on the preliminary analysis we have decided to apply the Goal Question Metric (GQM) approach which is based upon the assumption that for an engagement to measure in a purposeful way it must first specify the goals for its CSI, then it must trace those goals to the data that are intended to define those goals operationally, and finally provide a framework for interpreting the data with respect to the stated goals.

Our approach started by setting up goals to increase the CSI rating of the parameters under categories of delivery and quality to greater than 4. With goals being set, sessions were conducted to brainstorm and identify the metrics that will help us conclude on the root cause for the low CSI ratings on certain parameters. In the brainstorming sessions the goals were refined into several questions and the questions were further refined into metrics. Metrics like effort variance, requirement stability index, defect removal efficiency, and defect trend were identified and the data for 1<sup>st</sup> half of 2008 was gathered for analysis.

Interpretation of metrics helped us greatly in finding the root cause and the reasons that could have lead to receiving low CSI on certain parameters. Findings from our analysis of metrics were recorded and action items to address the weak areas were laid out. Buy in from the team members was obtained, action plan was implemented immediately and we have continued to track the progress of our action plan with the help of same metrics that were used for finding the root cause of the problem.

At this point the senior manager and the project manager had a session with the client to communicate that we understand the areas of their concern and we are in the process of addressing them.

## The GQM approach

The section below describes the goals that were set, the questions that were answered in the process of analyzing why certain customer satisfaction parameters received low ratings, then metrics that were used.

### Goal 1 :

Improve on aspects of delivery that will lead to increase of CSI ratings of the following parameters:

- Project delivered on time
- Scope was managed proactively
- Issues addressed in a timely manner

### Questions :

- What is the schedule & effort variance on the deliverables?
- Are the variances within the limit of Organization goals?
- Are the organization goals for this project not in line with the customer expectation?
- Are the variances due to poor estimation?
- Are the efforts spent on each PDLC cycle captured?
- Do we need to revise the estimation guidelines?
- Is it because of Team member's poor knowledge on application?
- How many change requests were raised?
- What is the reason behind the change request?

### Metrics:

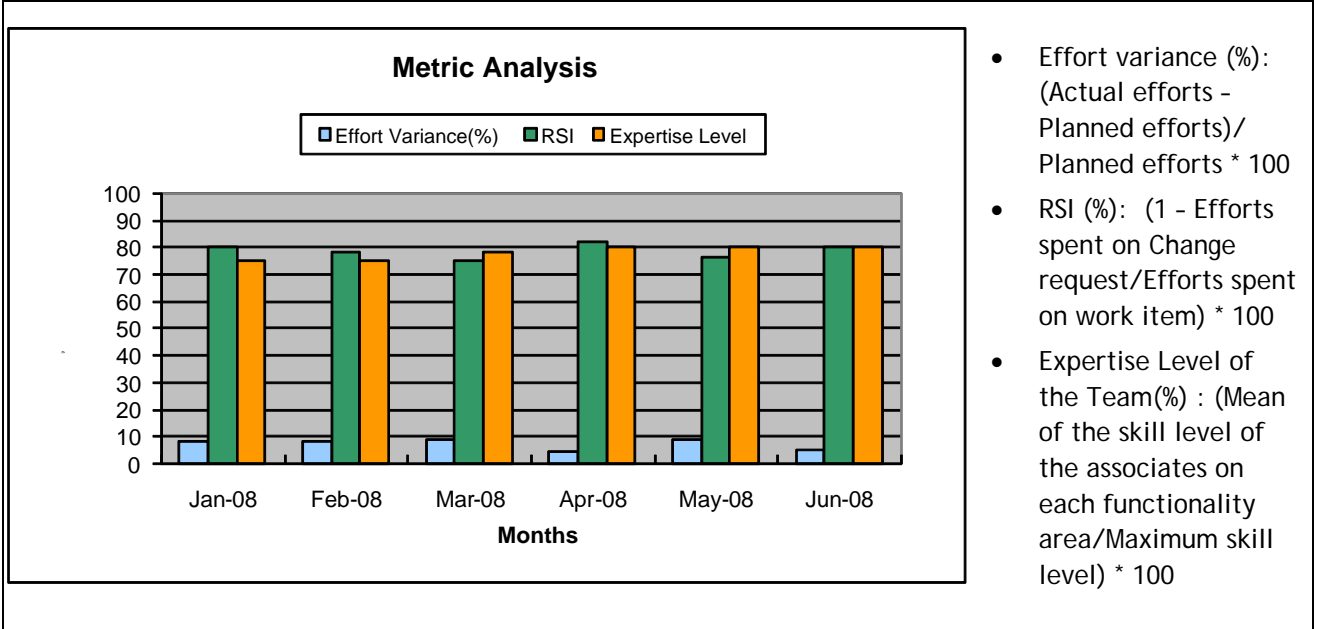
The following metrics were identified to be analyzed to answer the above questions

- Effort Variance
  - Actual efforts and planned efforts for each phase were gathered on all work items
- Skill matrix of the Team member
  - Assessed the team member's expertise level on key functional areas
- Requirement Stability Index
  - Number of change requests for each work item and their efforts spent

Mapping metrics to CSI parameters

- Effort variance - Project delivered on time
- Skill matrix of the Team member - Issues addressed in a timely manner
- Requirement Stability Index - Scope was managed proactively

Plotted in the graph below were the month wise effort variance, RSI & teams' skill level for the period of 6 months where the CSI rating was low.

**Findings:**

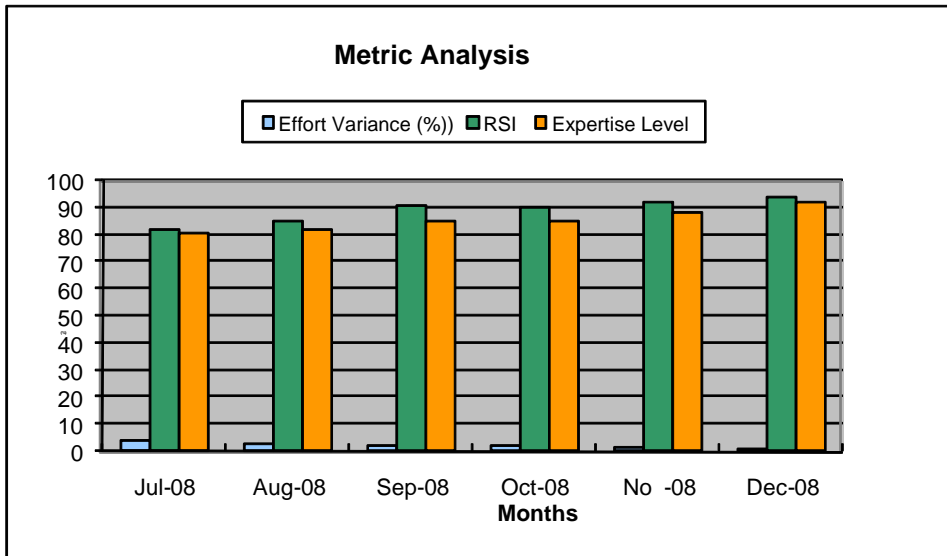
The reasons that resulted in causing effort variance on delivery of tasks

- Efforts spent on supporting the customer during user acceptance testing was not considered while estimating the work item
- The expertise level of the team member is not enough to estimate with more accuracy
- User test plan did not capture all the test scenario leading to delay of user acceptance testing
- Poor understanding and clarity of the requirements lead to high number of change requests
- Not having multiple subject matter experts on the team covering each functional area

**Action items:**

- Estimation guidelines to be modified to account for UAT testing time.
- Walk-thru of requirements with the business users
- User Test plan needs to be communicated and approval obtained from the business users or client analyst well in advance (before the coding phase).
- Cross training need to happen among the team members to improve the expertise level of the team and individual. A minimum of 2 team members to be made experts in each of the functional area of the application.

After implementing the action plan the effort variance, RSI & teams' skill level were managed and monitored on a monthly basis. The same has been plotted in the below graph.



- Effort variance (%):  

$$\frac{\text{Actual efforts} - \text{Planned efforts}}{\text{Planned efforts}} * 100$$
- RSI (%):  $(1 - \text{Efforts spent on Change request} / \text{Efforts spent on work item}) * 100$
- Expertise Level of the Team(%):  $(\text{Mean of the skill level of the associates on each functionality area} / \text{Maximum skill level}) * 100$

The action plan that was put in place proved to be successful and resulted in reducing the effort variance, brought more stability in requirements & increased expertise level of the team members.

#### Goal 2:

Improve on quality aspects of delivery that will lead to increase of CSI ratings of the following parameters:

- Compliance to the agreed Project Metrics (Residual Defect density, compliance to agreed standards)
- Consistently delivered components with low defect rates.

#### Questions :

- Are reviews conducted in each phase of PDLC?
- Are the defects identified in the earlier phases of PDLC than later?
- Are the defects captured and traced to closure before moving to next phase?
- What is the monthly trend of defect removal effectiveness?
- Are the defects caused due to missing test cases?

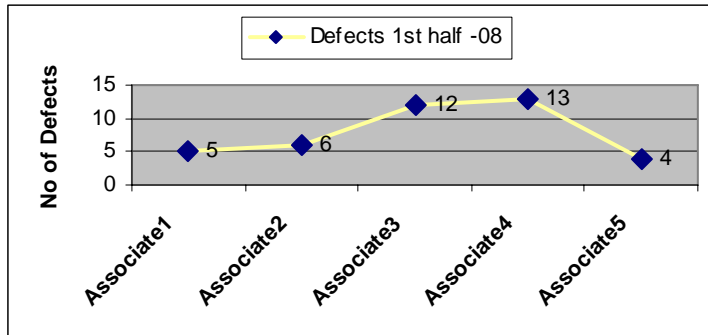
#### Metrics :

The following metrics were identified to be analyzed to answer the above questions

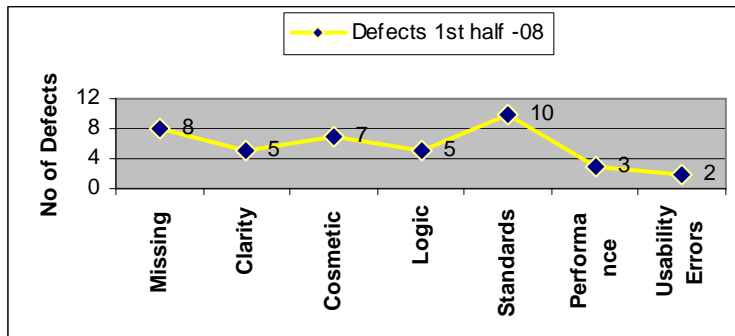
- Defect trends
  - Number of defects by category and also associated the defects with each team member

- Defect removal effectiveness
  - Number of defects captured in each phase of PDLC

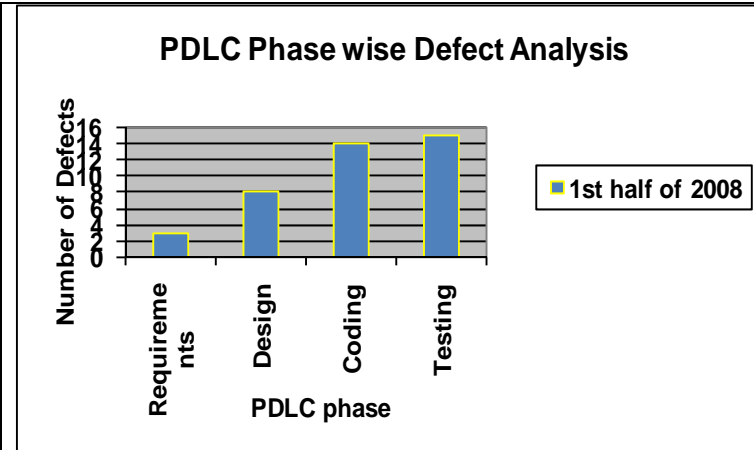
Plotted in the graph below is total number of defects introduced by each associate during the 1st half of 2008



Plotted in the graph below is total number of category wise defects introduced in the first half of 2008



Plotted in the graph below is total number defects in each phase of PDLC in the first half of 2008



**Findings :**

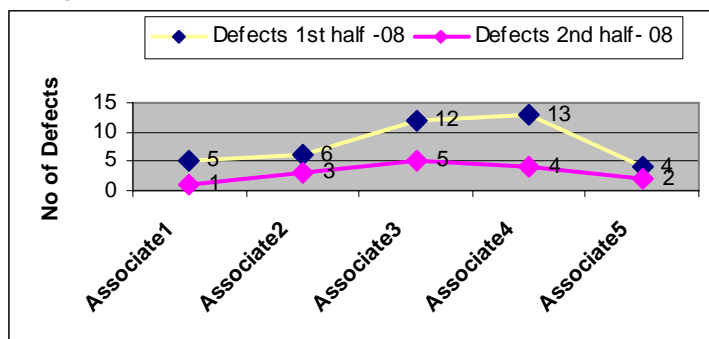
- On analyzing the defect distribution among the team members, each associate are having defect concentration for a specific defect categories
- It is found that more number of defects have been leaked into later phases of PDLC leading to high rework effort

**Action items:**

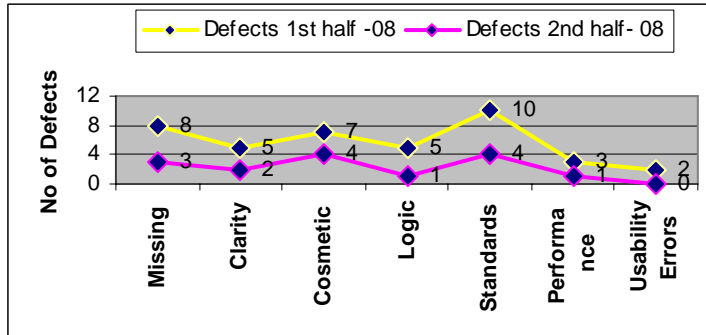
- Based on the trend analysis, objectives were set to each associate to reduce number of defects that have been introduced in a specific category
- Phase wise checklists were prepared to arrest the defect leakage

After implementing the action plan the defects introduced by each associate, defect trends by category and phase wise defects have been tracked every month. For the ease of representation cumulative defect trends for 6 months are shown below.

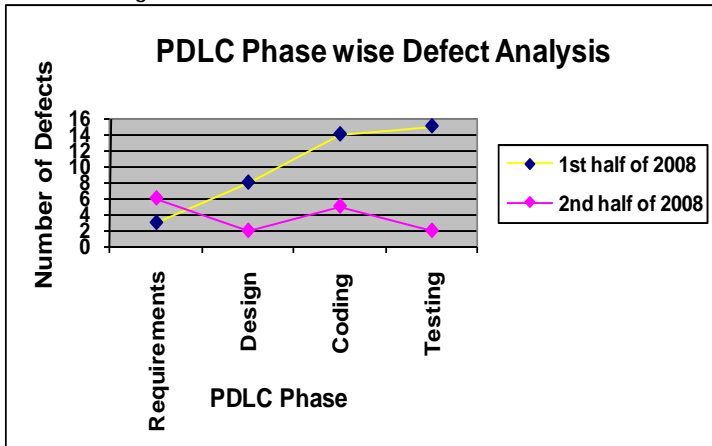
The below graph shows a comparison between the total number of defects introduced by each associate during the 1<sup>st</sup> half Vs 2<sup>nd</sup> half of 2008



The below graph shows a comparison between the total number of category wise defects introduced during the 1<sup>st</sup> half Vs 2<sup>nd</sup> half of 2008



The below graph shows a comparison between the total number of defects introduced in each phase of PDLC during the 1<sup>st</sup> half Vs 2<sup>nd</sup> half of 2008



The action plan that was put in place improved the quality aspects of deliverables by increasing the defect removal effectiveness and reducing the defect leakage into later phases of PDLC and thereby reducing the rework.

As the months passed by we could see our action plan working and the metrics showed us that there is consistent improvement. Six months passed by and it was time for next customer feedback. The customer feedback was received on Jan 8<sup>th</sup> 2009 with an overall CSI rating of 4. We were successful in achieving our goal on all the parameters that were managed and monitored using metrics.

Customer Satisfaction Survey		
Date	8-Jan-2009	
Project Name		
Feedback From	Client project manager	
Period	Jul-08 to Dec-08	
<b>Category</b>	<b>Question</b>	<b>Rank</b>
Delivery	Project delivered on time	4
	Delivery made within forecasted budget (Only applicable for Fixed Price Projects)	

	Co-ordination with offshore members was conducted efficiently		
	Functional requirements adhered to.		
	Scope was managed proactively.		4
	Issues addressed in a timely manner.		5
	Deliverables met agreed performance requirements.		
Quality	Compliance to the agreed Project Metrics (Residual Defect density, compliance to agreed standards)		4
	Consistently delivered components with low defect rates.		4
Processes	Effort estimation accurate and scientific (historical data).		4
	Used change management, scope control and alerting processes.		
	Employed software configuration management (Source code control and defect tracking). Adherence to be measured to Marsh defined procedures.		
	Conducted code inspection, reviews and early defect detection exercises.		
Expertise	Team demonstrated subject matter expertise in required technical area.		
	Team brought prior experience to the table and shared knowledge from past experiences.		
	Team has proven ability to solve or participate in solving complex problems.		
Communication	Team demonstrated high quality of written and verbal communication.		
	Status, issues and responses to requests communicated in a pro-active, candid and timely manner.		
Team work	Shared knowledge and expertise within the team.		
	Operated as a cohesive part of the team.		
	Overall rating (1 to 5, 1 to <2 - Poor, 2 to <3-Average, 3 to <4-Good, 4 to < 4.5 -Very Good, >4.5 to 5-Exceptional)		4
The respondents expressed their satisfaction about LTI's services against each question on a scale of 1 to 5. The table below explains the ranking system followed:			
<b>Rank</b>	<b>Description</b>	<b>Rank</b>	<b>Description</b>
5	Strongly Agree	2	Somewhat Disagree
4	Agree	1	Strongly Disagree
3	Somewhat agree	0	Don't Know/Decline to Answer

### 3.0 Conclusion

By following the road map, or recommendations of the proposed metrics driven approach, IT service organizations can:

- Help in delivering measurable results
- Directly contribute to improve the customers' satisfaction in the areas that are important to those customers
- Indirectly contribute to the satisfaction of their companies' external customers, revenue stream of their company and to stakeholder satisfaction

## 4.0 Definitions, Abbreviation and Acronyms

Acronym	Description
CSI	Customer Satisfaction Index
PDLC	Project Development Life Cycle
UAT	User Acceptance Testing

## 5.0 References

Item	Description
<a href="http://www.discoverysurveys.com/pdf/CUSTOMERSURVEYS.pdf">http://www.discoverysurveys.com/pdf/CUSTOMERSURVEYS.pdf</a>	Customer Satisfaction Surveys
<a href="ftp://ftp.cs.umd.edu/pub/sel/papers/gqm.pdf">ftp://ftp.cs.umd.edu/pub/sel/papers/gqm.pdf</a>	Information on GQM approach

## 6.0 Acknowledgements

Name	Description
Vetrivel Kandasamy	L&T Infotech Chennai Insurance BU Delivery Head reviewed the paper provided constructive feedback.
Deepashanthi M	L&T Infotech Chennai Insurance BU Senior project manager shared her inputs, reviewed the paper and provided constructive feedback.
Kavitha Arumugam	L&T Infotech Chennai Insurance BU Senior project manager from testing practice shared her inputs, reviewed the paper and provided constructive feedback.

## Biography of the authors

### Author 1:

Mehar Chigurupati is a Delivery Manager responsible for handling the delivery for a major Insurance brokerage firm operating globally. Has more than 11 years of IT experience which encompasses various domain related sectors such as Insurance, Credit card processing & Banking. He has software development, maintenance and Production Support experience of which 5+ years of proven experience on planning & execution of Project transitions and project management. He has managed various projects with responsibilities including project planning, resource management, risk management, configuration management, software quality assurance, and change control management. He has work experience in the US and has good exposure to Project Management and coordination with multi-ethnic clients and teams.

### Author 2:

Jaikanesh D is the project lead and has 5+ years of experience in entire SDLC process as part of maintenance projects for a leading US broker. He is certified by LOMA on Principles of Insurance covering Life, Health, & Annuities. He has been playing the role of Project Lead effectively and maintaining excellent rapport with the clients to ensure smooth project flow as well as maintaining and enlarging L&T's reputation as a strategic partner. He has implemented process improvements ensuring effective and better deliveries.

### Author 3:

Narasimha M is the project lead and has 5+ years of experience in coordinate with the business users and offshore team for designing & development of business applications. An accomplished IT professional specialized in software development and maintenance with specialization in applications development on legacy platforms and commercial application involving all phase of software development life cycle.