“IMPROVING THE EFFICIENCY OF IT HELP-DESK SERVICE BY SIX SIGMA MANAGEMENT METHODOLOGY (DMAIC) – A CASE STUDY OF C COMPANY”
This research is conducted based on the application of Six Sigma concept, DMAIC quality improvement method.

It deals with project-related issues to improve the efficiency of information technology (IT) help-desk service through an eHelp-desk system.
Research Methodology

Past Research

Existing procedure

Simulation

New procedure

Estimation Poor Diagnostic 😞

Analyse & calculate Anticipated benefit
Research Methodology contd...

Current Research

- Repaired Request procedure
- Six Sigma quality method
- Improved procedure
- Manpower Processing time
- Substantial financial benefit
Six Sigma DMAIC Methodology

**Define**
- To define the scope, procedure and Financial goal of the project

**Measure**
- Measure the quality of the present procedure, find out the variable

**Analyse**
- Find out the key variable by analysis the present procedure

**Improve**
- To discover the key variable in order to propose the solution or best condition

**Control**
- Establishing the control system to make sure the procedure quality for long
Case Study

Compal

- One of the top five original design manufacturers (ODM) manufacturing firms.
- Established: 1984
- Products: Networking products, digital media product, computing devices, mobile devices, cloud platform & service
- Total Capital: NTD 38.8 billion (etd. 2008)
- Total Employee: 3500 (etd. 2008)
- C Company is the one which implements the Six Sigma technique to improve its quality.
- Corporate Headquarters: Neihu District of Taipei
C Company’s corporate headquarters include its administrative and management divisions, sales and sourcing centres, as well as its R&D groups.

Each project is completed in a step-by-step fashion, and executed by seasoned teams.

These projects are also supported by fast and efficient in-house communications and investment in the latest technologies.

C Company believes that a product’s competitiveness is based on quality, cost and on-time delivery.

No matter whether their product be computer notebooks, monitors or other newly emerging web communication products, C Company can quickly respond to design changes necessitated by a fast changing marketplace.
Case Study  

The implementation procedure and result

Define Phase

Problem description

(1) According to 2007 statistical data, there are about 22,413 IT help-desk issues that need to be improved.
(2) With 22,413 issues, it will take 3,766,142 min to solve all of them, while averaging 168 min per case.
(3) The processors are unable to handle requests that are raise at the same time, resulting in the congestion phenomenon.
(4) The help-desk has no complete control system to follow.

Project goal

(1) It is estimated that the processing time will be reduced by about 46%.
(2) A NTD 2.01 million reduction in payroll expense.
Case Study

The implementation procedure and result

Define Phase

Process indicator
(1) Total manpower equals five people.
(2) IT engineers’ average monthly salary: NTD 38,000
(3) Expected improvement: Reduce 46% of the process time

Financial indicator
(1) Help-desk repaired about 22,413 requests last year
(2) Present total process time = 3,766,142 min
The expected total process time = Total process time * 54% = 2,033,717 min
(3) we must hire at least 9.26 people. Due to the fact that there is no recruiting plan, we must improve the present procedures by using the Six Sigma quality improvement method.
(4) Hard savings = improvement – before improvement = 9.26 persons – 5 persons = 4.26 persons. Reduced payroll cost = NTD 1,942,560 per year.
Figure: Cause and Effect Matrix

‘IT Help-Desk Improvement’ is our best choice. It fits the three conditions: it consists of a proper set of team members, it is expected to save at least NTD 1.5 million and it is capable of being managed.
The PC, network and e-mail processes account for 74% of process time. In order to reduce the request time or process time, the service quality must be increased.
Case Study

The implementation procedure and result

Measure Phase

Figure: Help-desk SIPOC diagram
In the suppliers, inputs, process, outputs, customers (SIPOC) diagram it is discovered that:

(1) There is a substantial length in time between the point at which users submit requests and when they are solved. Therefore, in order to reduce this service time, it is necessary to improve IT service quality.

(2) The processes are unable to handle multiple requests at the same time, resulting in the congestion phenomenon.

(3) The results cannot be tracked, because there was a lack of effective working platforms and tools that caused different types of requests with different processing conditions to occur.

(4) The help-desk lacks a complete induction analysis for the knowledge library.
Case Study

The implementation procedure and result

Figure: Ideal Flow Chart
In order to estimate the efficiency of the solution, we estimated the process capability (Cpk) to be 0.69, and estimated the sigma level to be 2.07.
### Measure Phase

**Table: Summary of measure phase**

| Project goal selection and analysis | (1) According to the type of repairing request, choose the one that needs to be improved the least: (waiting time)  
  (2) Current Z value is 0.84 |
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Project goal</td>
<td>(1) Reduced present process time by 46%</td>
</tr>
</tbody>
</table>
Case Study

The implementation procedure and result

Analyse Phase

Figure 8. Process capability analysis for processing time.
Case Study  The implementation procedure and result

Analyse Phase

Current CPK?

Waiting Time: variance=86.047
mean=131
The variance is too high, need to be improved

Figure 9. Process capability analysis for waiting time.
Figure 10. Process capability analysis for working time.
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The implementation procedure and result

Analyse Phase

\[ Y_{(\text{processing time})} = Y_1_{(\text{waiting time})} + Y_2_{(\text{working time})} \]

\[ Y_{(\text{processing time})}: \mu = 165; \quad Y_1_{(\text{waiting time})}: \mu = 131; \]

\[ Y_2_{(\text{working time})}: \mu = 34 \]

\[ Y = f(Y_1:79\%, \ Y_2:21\%). \]

We discovered that processing time causes a great deal of variation and accounts for 79% of the total waiting time. Therefore, the goal is to decrease the variation in waiting time.
## Analyse Phase

Table 7. Summary of analysis phase.

<table>
<thead>
<tr>
<th>Summary of analysis phase</th>
<th>Y(processing time) = Y1(waiting time) + Y2(working time) = Y1(μ = 131) + Y2(μ = 34)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cpk baseline</td>
<td>Y(μ = 165) = f(Y1:79%, Y2:21%)</td>
</tr>
<tr>
<td>Goal</td>
<td>Z: 1.5; DPMO = 16,7725 (DPMO, Defects per million opportunities)</td>
</tr>
<tr>
<td>Indicator</td>
<td>USL = 200, μ = 70, σ = 86</td>
</tr>
<tr>
<td>Description of goal setting</td>
<td>Z = (X - μ)/σ = (200 - 70)/86 = 1.5, promote the Z value from 0.81 to 1.5</td>
</tr>
<tr>
<td>Variable</td>
<td>Waiting time</td>
</tr>
</tbody>
</table>
Case Study

The implementation procedure and result

Improve Phase

Figure 11. The solution conception – cause and effect diagram.
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The implementation procedure and result

Figure 12. eHelp-desk flowchart.
**Case Study**

**The implementation procedure and result**

**Improve Phase**

### Table: Summary of Improved phase

| Generate the solution: | (1) Generate the solution conception.  
| | (2) Produce and decide the solution.  
| | (3) Implement the solution. |
## Case Study

The implementation procedure and result

### Control Phase

Table 9. The optimisation procedure indicator.

<table>
<thead>
<tr>
<th></th>
<th>AS-IS</th>
<th>TO-BE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Zst</td>
<td>0.81</td>
<td>1.5</td>
</tr>
<tr>
<td>Sigma level</td>
<td>0.84</td>
<td>2.07</td>
</tr>
<tr>
<td>DPMO</td>
<td>310,603</td>
<td>167,725</td>
</tr>
</tbody>
</table>
## Control Phase

Table 10. The benefit appraisal of finance.

<table>
<thead>
<tr>
<th></th>
<th>AS-IS</th>
<th>TO-BE</th>
<th>Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Avg. wait time (min)</td>
<td>131</td>
<td>71</td>
<td>60</td>
</tr>
<tr>
<td>Manpower</td>
<td>9.26</td>
<td>5</td>
<td>4.26</td>
</tr>
<tr>
<td>Sigma level</td>
<td>0.84</td>
<td>2.07</td>
<td>1.23</td>
</tr>
<tr>
<td>Hard saving (month)</td>
<td></td>
<td></td>
<td>NTD 199,800</td>
</tr>
<tr>
<td>Potential saving (month)</td>
<td></td>
<td></td>
<td>NTD 26,856</td>
</tr>
</tbody>
</table>
(1) Hard savings: reduction of manpower cost NTD 199,800/monthly
   Hard savings = Reduction of manpower (MP) x average salary (NTD/MP x month)
   = (9.26-4)(MP) x 38000(NTD/MP x month)
   = NTD 199,800/month

(2) Potential savings: reduction of waiting time cost NTD 26,856/monthly
   Potential savings = improvement time (min/call) x number of issues (call/month) x average salary (NTD/min) x influenced percentage
   = 60 (min/call) x 600 (calls/month) x 3.73 (NTD/min) x 20%
   = NTD 26,856/months
## Control Phase

### Table: Summary of control phase

| Procedure control plan | Using the important factor (e.g. The question submission method, processes tool and so on), to generate the procedure control plan. |
The case company indeed gained a substantial financial benefit and also the dramatic improvement to service quality.
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Findings

Research Contribution

- Information System
- IT Facility

Improve Service Quality & Enhance Customers
Case Study

**Findings**

For service engineers: increase system efficiency

For managers: marketing related affairs, customer satisfaction

For researchers: six sigma concept
Case Study

Six Sigma: DMADV

- Definition
- Measurement
- Design
- Analysis
- Verify

Future Work
THANK YOU!