

Comparison Analyses of Implementing 6 Sigma Management between China and Korea Companies : Korea side*

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Abstract

In this paper, we survey Six Sigma in Korea company real fields. Six Sigma itself are developed depend on each company culture and strategy. Our country has been more than 10 years since introduced Six Sigma in our country. Each company which work six Sigma are developed differ way depending on his company situation. Our country Six Sigma in our country is necessary to survey and analysis. Firstly, we survey how to use Six Sigma. Next, we survey to find success factor and failure factor by reports published by company and papers by published in journals.

Key Words: Six Sigma in Korea, How to use Six Sigma, Success Factor and Failure Factor

1. 6 Sigma Introduction

1.1 Background 6 Sigma born

If we know 6 Sigma, we should know background of 6 Sigma, which is Japan quality. The End of 2nd World War, there are no industry, there are 10 millions jobless, but they learn from USA Quality enthusiastically, specially they learned USE Quality Lesson by Juran, Deming who are expert Quality.

In 1950~1980, They make their Quality Way which are QCC, TQC, Robust Design and special Toyada Production System etc. They have many Quality Guru who are Ishigawa, Taguchi, Shigo, Yosida, Kano etc.

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In 1980, USA learned Japan Quality and make His Quality. It is famous, 24. June 1980, NBC TV send documentary program during 70 min "IF Japan can, Why can't we?", Which show, before, Japan are learned from Deming etc USE Quality expert, they do practice as learned lesson. Now, Japan Quality are too much better than USA Quality, by example Auto, Electronic products which cost are lower and life are longer. Specially, Japan CEO who are well know Quality and focused Quality Lesson, At result, USA CEO are shocked by the Japan CEO's Quality Action.

And late 1980, USA benchmark Japan and make their Quality Management(QM).

1.2 6 Sigma are born by Motorola

In 1979 Motorola Manager workshop, Art Sundry who marketing manager reported that Our quality are stinks, Japan products quality are the most case 1,000 times better than Motorola Quality. That time R. W. Galvin Motorola CEO who are quality leader, His action show quality is the First, declared "Quality is the first strategy in Motorola!", "In 5 years, improve 5 times in Quality!". Motorola create new method to accomplish their Goals which is 6 Sigma.

Dr. Mikel Harry who suggest new method to improve quality which is called **6 Sigma**. His method is 7 step as following:

- 1) Recognize: He recognize his Service
- 2) Inform: His core consideration inform to his customer
- 3) Find: He find his matter.
- 4) Define: He define his process
- 5) Remove: He remove his wrong effort by fool-proof system
- 6) Improve: He improve continuously by measure and analysis
- 7) Control: He control improved process

At 1988, Motorola reduce cost about 480 millions dollar, and they become winner Mal-colm Baldrige National Quality Award (MBNQA), Motorola 6 Sigma which are new methods, which is spread GE and some manufacturing field.

1.3 GE 6 Sigma

At 1995, Jack Welch who is General Electric(GE) CEO adopt 6 Sigma, who is the best leader 6 Sigma say "Quality are last chance to survive by competition. To accomplish our 6 Sigma goal to 2000, to give very hard and strong efforts" on 15. Oct. 1995. GE modify 6 Sigma road map (D-M-A-I-C) as following Table 1. Jack Welch who has practiced 6 Sigma enthusiastically, he is a missionary in 6 Sigma. GE use 6 Sigma all management process, and they succeed. After GE success, 6 Sigma spread many Big company, and 6 Sigma is

well known as efficient innovation methods in the world.

Table 1. 6 Sigma Road Map

| | |
|----------------|----------------------------------------------------------------------------------------------------------------------|
| Define | Define problem Fine Critical to Quality (CTQ) Define inner process to CTQ |
| Measure | Measure now Sigma level to CTQ by quantity measure Set Baseline "As-Is" |
| Analyze | Analyze and fine "Vital Few" ◦ define $CTQ(Y) = f(X_1, X_2, \dots, X_n)$ ◦ Core factor Key Xi's |
| Improve | Improve "Vital Few" for removing obstacle X's Find optimal level of Process condition show improve Sigma level |
| Control | Standardize improved process Control process |

1.4 6 Sigma evolution

GE 6 Sigma enlarge a scope application and evolution as following

- 1) In 1995, they are elevation of productivity, then core factor are Productivity.
- 2) In 1997, they satisfy to customer and to create new products design by DFSS, then core factor are Product Design.
- 3) In 1999, they focus customer, develop 6 Sigma of scope of project, expect effect and result proof and to be took part in customers, then core factor are Customer Focus.
- 4) In 2001, they make 6 Sigma as culture and way of work, then core factor are The Way of Work.
- 5) In 2003, they success continuously, make 4 main range 'Business Process Ys', concentrate manage of 6 Sigma theme, then core factor are Enabling Growth.
- 6) In 2004, They focus to 'lean 6 Sigma' which is new method, which is combined general 6 Sigma with reduce cycle time, then core factor are strong management risk and lower cost structure.

6 Sigma are the most famous innovation management methods, 40% company of Fortune Global 500 company adopt 6 Sigma, which are proved efficient methods by great company as GE, AOV, 3M, SONY, SAMSUNG etc. About 40% company in the world adopt 6 Sigma methods as management development methods. After 2001, china also most of Large company are adopted 6 Sigma. Service company, government, non-profit company, public enterprise are adopted 6 Sigma, Many Hospital are adopted 6 Sigma, Many University give lecture 6 Sigma matter and America Society of Quality give many 6 Sigma training course.

2. Korea 6 Sigma

2.1 In Korea, 6 Sigma

Mikel Harri took part in conference 6 Sigma on Nov. 2005 Ritz-Carlton Hotel Korea, who say Korea 6 Sigma is the most active in the world, Minitab marketing in Korea are the second in the world and the most of big company adopt 6 Sigma as management method as following Table 2.

Table 2. In Korea, Big Company use 6 Sigma

| | 1997~1999 | 2000~2002 | 2003~2004 |
|-------------------|-----------------------------------------------|------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------|
| Manufacturing | LG Samsung Doosan GS Hankook Tire | Hyundai Kia Daewoo Posco Dongbu | Pacific |
| Financial | Dongyang LG Capital and financial | Kyobo Life Bank of Hana Samsung Card and Capital Shinhan Bank | Samsung life Kookmin Bank Hyundai Capital |
| Telecom | LG Telecom | | KT DACOM KTF |
| Service Public | | Everland Nonghyub KTX CJ Metro | Jungilbo Gov. of IMM Power Plants Korea Highway Co. Seoul Subway Co. Daegu Subway Co |

Specially, Government also adapt 6 Sigma as following;

- 1) MIC (2003), ME (2006), MOHW (2007), MAF (2007)
- 2) Korea intellectual Property Office, Supreme Prosecutors Office (2005)
- 3) Air force (South War Headquarter)
- 4) National Emergence Management Agency (consider)
- 5) Korea Customs Service (consider)

2.2 In Korea, 6 Sigma 3 waves

In Korea, 6 Sigma flow is 3 waves as 1st remove variation, 2nd leadership and strategy and 3rd competition and new production. We can figure as following Figure 1.

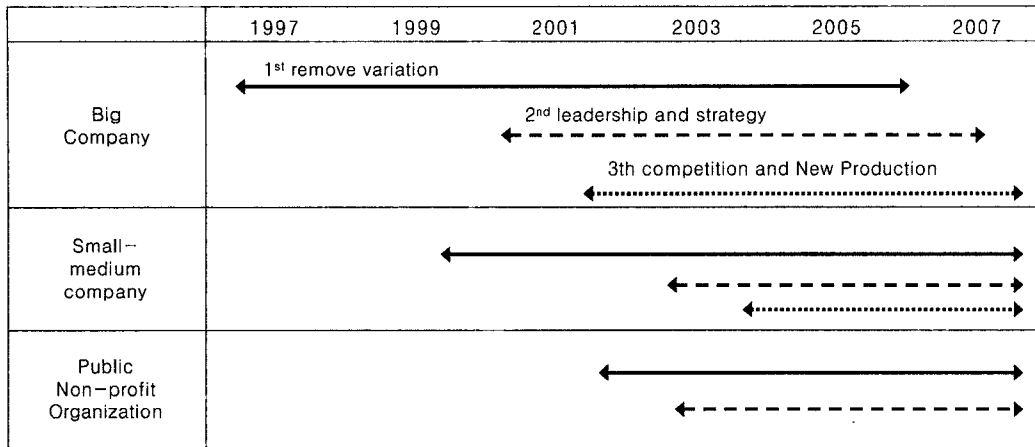


Figure 1. 6 Sigma flow is 3 waves in Korea

- 1) **1st wave remove variation** which just get effect, reduce waste cost and get profits, Most of Manufacturing are success, DMAIC road map are adapted as good methods, Employee are encouraged by training and CEO agree, but 2~3 years after, most company need another methods, After visual process problem are solved, difficult theme, which isn't solved easily by before method, are remained, DMAIC road map is not right method Service Company. If few numerical data, DMAIC are useless, Without BB, GB, then many employee don't agree 6 Sigma. We need 2nd wave.
- 1) **2nd Wave Leadership and Strategy** which success depend on CEO. Some company which CEO are not interest 6 Sigma, they give up 6 Sigma. Success company interpret and modify 6 Sigma as his company situation, many company use same DMAIC, but meaning are different, specially not manufacturing company, Success company 6 Sigma, their CEO are interest to 6 Sigma as work way and culture by his leadership and strategy. Now, culture of company are more importance than reduce variation which 1st 6 Sigma goal
The 2nd wave are composed 4 Factor which are difference 1st wave which are Methods, Experts, Enlarge, Integrate.

2.2.1 Method

Methods of 6 Sigma are Integrated with many innovation methods which are used other fields. Themes of 6 Sigma are complicated and confused many different areas. Many variety of 6 Sigma theme are given, then which is solved by other methods which is not used manufacturing. Develop DMAIC methods, DMAIC, each stage are developed with many methods, Every year, DMAIC are improved by different ways, Conference of 6 Sigma, they

say different road map 6 Sigma depend on company situation, Each company, each consultant have his only methods.

2.2.2 Experts

CEO and Director became 6 Sigma expert, Most Director study and trained 6 Sigma methods, When Promotion of employee, they should get 6 Sigma belt certification, CEO use 6 Sigma as leadership, All employee training, All employee are learned and trained by inner or outside expert, Most company have system of 6 Sigma e-learning training course.

2.2.3 Combine Strategy

6 Sigma are connected company strategy, Business Alignment Program and KPI are combined 6 Sigma results, Most 6 Sigma theme are assessed by KPI, Appraisal of 6 Sigma results are developed. Mega project, CEO and Director decide his working as 6 Sigma theme, then theme are divided are given his team member by small 6 Sigma theme, Company find all theme as mid-term strategy as 3~5 years, and select important theme and solve firstly

2.2.4 Enlarge

Service/Transaction/Public co. adopt 6 Sigma, Non manufacturing fields as service, transaction, etc, adopt 6 Sigma methods as innovation solution methods, Hospital, Financial also used 6 Sigma, they get good results. Strategy/Planning department, Planning and R&D Dept. use 6 Sigma method as DFSS, Using DFSS methods are different by company.

2.2.5 3th Wave competition and New Production

Using 6 Sigma as Competitive Methods, Blue Ocean strategy, which are competitive methods as new production. Competitions are Creative Thinking, New Products are competition, which is possible to have creative thinking, Company survival depend on changeable ability, Success changeable are creative ability

3. Success and Failure Factor of 6 Sigma

General is well known success factor of 6 Sigma as following;

- 1) Consider 6 Sigma as thinking structure not methods. Toyota's success is modification US Quality as their Quality, Think Structure are more important than technical knowledge, Customizing to his company by modifying 6 Sigma method, which is possible they have think structure.
- 2) CEO Mind, All success 6 Sigma company, their CEO are interest 6 Sigma and became expert, CEO use 6 Sigma as leadership, Working way as 6 Sigma lead com-

- pany culture, All employee make expert.
- 3) Continuous lesson and training.
 - 4) National encourage program for small-medium co.
 - 5) Large company aid program their collaborator co.

We can find many articles and reports for success factor of 6 Sigma. Here we give as following Tables.

Table 3. Success Factor of 6 Sigma in Big Company By submitted by reports in 2000~2006

| Success Factors | No. |
|--------------------------|-----|
| Customer Focus | 3 |
| All Employee participant | 3 |
| CEO Leadership | 2 |
| Culture | 2 |
| Director Leadership | 2 |
| Combine others method | 1 |
| Global | 1 |
| Visual Goal | 1 |
| Incentive | 1 |
| Inner expert | 1 |
| Right People BB | 1 |
| Training | 1 |

Table 4. Success Factor of 6 Sigma by academic suggestion By submitted papers in 2000~2006

| Success Factors | No. |
|----------------------|-----|
| 6 Sigma Training | 8 |
| CEO Leadership | 8 |
| System | 7 |
| Statistical training | 7 |
| Right People | 5 |
| Incentive | 5 |
| Culture | 4 |
| Customer Focus | 3 |
| Visual Goal | 2 |
| Prepare | 2 |
| collaborator | 2 |

We need Failure Factor of 6 Sigma as like as success factors. <Table 5> is failure factor of 6 Sigma.

Table 5. Failure Factor of 6 Sigma by academic suggestion By submitted papers in 2000~2006

| Failure Factors | No. |
|---------------------------------|-----|
| Right People insufficient | 6 |
| knowledge Mistake | 4 |
| Statistic Only focused | 3 |
| CEO Not interest | 3 |
| training insufficient | 2 |
| Traing Method Mistake | 2 |
| Theme failure | 2 |
| System insufficient | 2 |
| short term result | 2 |
| participant insufficient | 2 |
| Data insufficient | 2 |
| continuous control insufficient | 2 |

4. Conclusion

In this Paper, We survey 6 Sigma history, and evolution of 6 Sigma in Korea and Success and failure factor 6 Sigma management. We know 6 Sigma has changed continuously, depend on using Company and Experts. 6 Sigma is not theory as like Science theory, but which is social technical method which can be changed.

We propose, Someone who use 6 Sigma his company, firstly he study 6 Sigma basic theory and he modify 6 Sigma depend his situation. When his situation is not good control of variation, then he use 1st wave which reduce variation, other situation, then he use other wave.

In this paper, we focused 6 Sigma in Korea, but in near future we survey 6 Sigma in China and we compare analyses of Implementing 6 Sigma Management between China and Korea Companies.

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