THE RELEVANCE OF SIX-SIGMA TO INSURERS' OPERATIONS

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Abstract

Six-Sigma is a process capability improvement concept, developed by Motorola, USA in the 1980s to improve the quality of its manufacturing process. The original purpose was to measure the defects per million opportunities in the manufacturing process so that improvements could be made. Motorola developed this new standard and created the methodology and essential cultural change associated with it. Six-Sigma helped Motorola realize powerful bottom-line results.

Since then, hundreds of companies around the world have adopted Six-Sigma. Six-Sigma has evolved over time to be successfully applied to both manufacturing and non-manufacturing sectors. It is more than just a quality system: it is a way of doing business. Six-Sigma is many things: a vision; a philosophy; a symbol; a matrix; a goal; a methodology.

Having been successfully applied to non-manufacturing businesses, this paper examines whether the concept can be applied to insurers. The Insurance business consists of several tasks: surveying possible risks, quoting the rate for each risk, the underwriting process, introducing new insurance products, and processing claims. An effective information management system, and good quality customer service, are vital to survive in this business. Quality obviously is important as mistakes can affect the service provided to the insured clients.

However, the author has been unable to find any reported case of Six Sigma being tried by insurers. Therefore, this paper reports an original qualitative research study conducted in selected insurance companies in Thailand to test the feasibility of achieving a Six-Sigma breakthrough improvement in an insurance company. Thai insurers are now in a highly competitive global era, conscious of their need to streamline the costs of their operations. The heart of Six-Sigma is a change of mindset by employees: Insurers are increasingly aware that their employees must now be proactive and empowered, as it is the quality and skills of human resources which will determine success.

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What is Six-Sigma?

The roots of Six Sigma as a measurement standard can be traced back to Carl Frederick Gauss (1777-1885) who introduced the concept of the normal distribution curve. Six Sigma as a measurement standard in product variation can be traced back to the 1920's when Walter Shewhart showed that **three sigma from the mean is the point where a process requires correction**. Many measurement standards (e.g. Zero Defects) later came on the scene but credit for coining the term "Six Sigma" goes to a Motorola engineer named Bill Smith, and "Six Sigma" is a federally registered trademark of Motorola.

In the early and mid-1980s under Chairman Bob Galvin, the original purpose of this application in Motorola was to measure the defects (as accurately as possible) in the manufacturing process. However, Motorola engineers decided that the traditional quality levels -- measuring defects in thousands of opportunities - did not provide enough granularity. Instead, they wanted to measure the defects per million opportunities. Motorola developed this new standard and created the methodology and the essential cultural change associated with it. Six Sigma helped Motorola realize powerful bottom-line results in their organization - in fact, they documented more than $16 Billion in savings as a result of the Six Sigma efforts. Since then, hundreds of companies around the world have adopted Six-Sigma as a way of doing business. This is a direct result of many of America's leaders openly praising the benefits of Six Sigma. Leaders such as Larry Bossidy of Allied Signal (now Honeywell), and Jack Welch of General Electric Company.

Six-Sigma has evolved over time. It is more than just a quality system like TQM or ISO. It is a way of doing business. As described in Tennant (2001), "Six-Sigma is many things, and it would perhaps be easier to list all the things that Six-Sigma quality is *not*. Six-Sigma can be seen as: a vision; a philosophy; a symbol; a metric; a goal; a methodology".

Six-Sigma is a rigorous, focused and highly effective implementation of proven quality principles and techniques. Incorporating elements from the work of many quality pioneers, Six-Sigma aims for virtually error free business performance. Sigma, σ, is a letter in the Greek alphabet used by statisticians to measure the variability in any process. A company's performance is measured by the sigma level of their business processes. Traditionally, companies accepted three or four sigma performance levels as the norm, despite the fact that these processes created between 6,200 and 67,000 problems per million opportunities! The Six Sigma standard of 3.4 problems per million opportunities[1] is a response to the increasing expectations of customers and the increased complexity of modern products and processes.

Six Sigma's magic is not in its statistical nature. It relies on tried and true methods that have been around for decades. In fact, Six Sigma discards a great deal of the complexity that characterized Total Quality Management (TQM). By one expert's count, there were over 400 TQM tools and techniques. Six Sigma takes a handful of proven methods and trains a small cadre of in-house technical leaders, known as Six Sigma Black Belts, to a high level of proficiency in the application of these techniques. To be sure, some of the methods used by Black Belts are highly advanced, including the use of up-to-date computer technology. But the tools are applied within a simple performance improvement model known as DMAIC, or Define-Measure-Analyze-Improve-Control[2]. DMAIC can be described as follows:

D	**Define** the goals of the improvement activity. At the top level the goals will be the strategic objectives of the organization, such as a higher ROI or market share. At the operations level, a goal might be to increase the throughput of a production department. At the project level goals might be to reduce the defect level and increase throughput. Apply data mining methods to identify potential improvement opportunities.
M	**Measure** the existing system. Establish valid and reliable metrics to help monitor progress towards the goal(s) defined at the previous step. Begin by determining the current baseline. Use exploratory and descriptive data analysis to help you understand the data.
A	**Analyze** the system to identify ways to eliminate the gap between the current performance of the system or process and the desired goal. Apply statistical tools to guide the analysis.
I	**Improve** the system. Be creative in finding new ways to do things better, cheaper, or faster. Use project management and other planning and management tools to implement the new approach. Use statistical methods to validate the improvement.
C	**Control** the new system. Institutionalize the improved system by modifying compensation and incentive systems, policies, procedures, MRP, budgets, operating instructions and other management systems. You may wish to utilize systems such as ISO 9000 to assure that documentation is correct.

Six-Sigma's Infrastructure

A very powerful feature of Six Sigma is the creation of an infrastructure to ensure that performance improvement activities have the necessary resources. Six Sigma makes improvements and changes the full-time job of a small but critical percentage of the organization's personnel. These full-time change agents are the catalyst that institutionalizes change.

Six Sigma involves changing major business value streams that cut across organizational barriers. It is the means by which the organization's strategic goals are to be achieved. This effort cannot be led by anyone other than the CEO, who is responsible for the performance of the organization as a whole. Six Sigma must be initiated from the top and then implemented by all.

The followings are the important positions that each organization needs to assign in its human resources in order to achieve Six Sigma goals.

1. Champions and Sponsors
   Six Sigma champions are high-level individuals who understand Six Sigma and are committed to its success. In larger organizations Six Sigma will be led by a full-time, high level champion, such as an Executive Vice-President. In all organizations, champions also include informal leaders who use Six Sigma in their day-to-day work and communicate the Six Sigma message at every opportunity. Sponsors are owners of processes and systems who help initiate and coordinate Six Sigma improvement activities in their areas of responsibilities.

2. Master Black Belt
   This is the highest level of technical and organizational proficiency. Master Black Belts provide technical leadership of the Six Sigma program. Thus, they must know everything the Black Belts know, as well as understand the mathematical theory on which the statistical methods are based. Master Black Belts must be able to assist Black Belts in applying the methods correctly in unusual situations. Whenever possible, statistical training should be conducted only by Master Black Belts. Otherwise the familiar "propagation of error" phenomenon will occur, i.e., Black Belts would pass on errors to green belts, who pass on greater errors to team members. If it becomes necessary for Black Belts and Green Belts to provide training, they should do so only under the guidance of Master Black Belts. For example, Black Belts may be asked to provide assistance to the Master during class discussions and exercises. Because of the nature of the Master's duties, communications and teaching skills are as important as technical competence.

3. Black Belt
   Candidates for Black Belt status are technically oriented individuals held in high regard by their peers. They should be actively involved in the process of organizational change and development. Candidates may come from a wide range of disciplines and need not be formally trained statisticians or engineers. However, because they are expected to master a wide variety of technical tools in a relatively short period of time, Black Belt candidates will probably possess a background including college-level mathematics and the basic tool of quantitative analysis. Coursework

in statistical methods may be considered a strong plus or even a prerequisite. As part of their training, Black Belts receive 160 hours of classroom instruction, plus one-on-one project coaching from Master Black Belts or consultants.

Successful candidates will be comfortable with computers. At a minimum, they should understand one or more operating systems, spreadsheets, database managers, presentation programs, and word processors. As part of their training they will be required to become proficient in the use of one or more advanced statistical analysis software packages. Six Sigma Black Belts work to extract actionable knowledge from an organization's information warehouse. To ensure access to the needed information, Six Sigma activities should be closely integrated with the information systems (IS) of the organization. Obviously, the skills and training of Six Sigma Black Belts must be enabled by an investment in software and hardware.

4. Green Belt

   Green Belts are Six Sigma project leaders capable of forming and facilitating Six Sigma teams and managing Six Sigma projects from concept to completion. Green Belt training consists of five days of classroom training and is conducted in conjunction with Six Sigma projects. Training covers project management, quality management tools, quality control tools, problem solving, and descriptive data analysis. Six Sigma champions should attend Green Belt training. Usually, Six Sigma Black Belts help Green Belts define their projects prior to the training, attend training with their Green Belts, and assist them with their projects after the training.

Staffing Levels and Expected Returns

According to Pyzdeck (2003), the number of full time personnel devoted to Six Sigma is not large. Mature Six Sigma programs average about one-percent of their workforce as Black Belts. There is usually about one Master Black Belt for every ten Black Belts, or about one Master Black Belt per 1,000 employees. A Black Belt will typically complete 5 to 7 projects per year. Project teams are led by Green Belts, who, unlike Black Belts and Master Black Belts, are not employed full-time in the Six Sigma program. Black Belts are highly prized employees and are often recruited for key management positions elsewhere in the company. After Six Sigma has been in place for three or more years, the number of *former* Black Belts tends to be about the same as the number of *active* Black Belts.

Estimated savings per project varies from organization to organization. Note that these are not the huge mega-projects pursued by Re-engineering. Yet, by completing 5 to 7 projects per year per Black Belt, the company will add in excess of US$1 million per

year per Black Belt to its bottom line. For a company with 1,000 employees the numbers would look something like this:

Master Black Belts: 1
Black Belts: 10
Projects: = 50 to 70 (5 to 7 per Black Belt)
Estimated saving: US$9 million to US$14.6 million (US$14,580 per employee)

An interested organization should calculate what Six Sigma could do for its bottom line. Because Six Sigma savings impact only non-value added costs, they flow directly to the company's bottom line.

Six-Sigma Impmentation

Researchers have found that successful deployment of Six Sigma involves focusing on a small number of high-leverage items. The critical elements of Six Sigma can be distilled into six themes (Pande and Holpp 2002). These themes, or principles, give a preview of what Six Sigma could look like in an interested organization.

1. Genuine focus on the customer
2. Data- and fact- driven management
3. Processes are where the action is
4. Proactive management
5. Boundaries collaboration
6. Drive for perfection; tolerate failure

If an interested organization has already created some of these themes, that is a good start As stated by Pande and Holpp (2002), Six Sigma is not new. What is new is its ability to bring together all these themes into a coherent management process.

The general steps required to successfully implement Six Sigma are:

1. Successful performance improvement must begin with senior leadership. Start by providing senior leadership with training in the principles and tools they need to prepare their organization for success. Using their newly acquired knowledge, senior leaders direct the development of a management infrastructure to support Six Sigma. Simultaneously, steps are taken to "soft-wire" the organization and to cultivate an environment for innovation and creativity. This involves reducing levels of organizational hierarchy, removing procedural barriers to experimentation and change, and a variety of other changes designed to make it easier to try new things without

fear of reprisal.

2. Systems are developed for establishing close communication with customers, employees, and suppliers. This includes developing *rigorous* methods of obtaining and evaluating inputs from customers, employees and suppliers. Base line studies are conducted to determine the starting point and to identify cultural, policy, and procedural obstacles to success.
3. Training needs are rigorously assessed. Remedial skills education is provided to assure that adequate levels of literacy and numeracy are possessed by all employees. Top-to-bottom training is conducted in systems improvement tools, techniques, and philosophies.
4. A framework for continuous process improvement is developed, along with a system of indicators for monitoring progress and success. Six Sigma metrics focus on the organization's strategic goals, drivers, and key business processes.
5. Business processes to be improved are chosen by management, and by people with intimate process knowledge at all levels of the organization. Six Sigma projects are conducted to improve business performance linked to measurable financial results. This requires knowledge of the organization's constraints.
6. Six Sigma projects are conducted by individual employees and teams led by Green Belts and assisted by Black Belts.
7. Although the approach is simple, it is by no means easy. But the results justify the effort expended. Research has shown that firms that successfully implement Six Sigma perform better in virtually every business category, including return on sales, return on investment, employment growth, and share price increase.

Why Six-Sigma in Insurance Companies?

Insurers might raise these questions: "Why do we have to apply this Six-Sigma? What is the ultimate goal of applying it? What will we get from Six-Sigma?

To answer the first question "Why Six Sigma?" Motorola, the originator of Six Sigma, answers with a very simple word: **survival**. Motorola came to Six Sigma because it was being consistently beaten in the competitive marketplace by foreign firms that were able to produce higher quality products at a lower cost. The situation here now in Thailand is quite similar to that time in U.S. The number of local Thai insurance companies in Thailand is countable. Plus, the foreign firms are stronger in term of finance and technology. It is known that AIG and Prudential are applying both SEI-CMM and Six Sigma to their insurance software development arenas.

It would be a mistake to think that Six Sigma is about quality in the traditional sense. Quality, defined traditionally as conformance to internal requirements, has little to do

with Six Sigma. Six Sigma is about helping the organization to make more money. To link this objective of Six Sigma with quality requires a new definition of quality. For Six Sigma purposes, the author defines quality as the value added by a productive endeavor. Quality comes in two flavors: *potential quality and actual quality*. Potential quality is the known maximum possible value added per unit of input. Actual quality is the current value added per unit of input. The difference between potential and actual quality is waste. Six Sigma focuses on improving quality (i.e., reducing waste) by helping organizations to produce products and services better, faster and cheaper. Therefore, to answer the second question above "What is the ultimate goal of applying it?", Six Sigma efforts target three main areas:

1. Customer satisfaction improvement
2. Cycle time reducing
3. Operational defect reducing

In more traditional terms, Six Sigma focuses on defect prevention, cycle time reduction, and cost savings. Unlike mindless cost-cutting programs, which reduce value and quality, Six Sigma identifies and eliminates costs which provide no value to customers: these are waste costs.

For non Six-Sigma companies, these costs are often extremely high. Companies operating at three or four sigma typically spend between 25 and 40 percent of their revenues fixing problems. This is the cost of poor quality. Companies operating Six Sigma typically spend less than 5% of their revenues fixing problems (Figure 1). The dollar cost of this gap can be huge. General Electric estimated that the gap between three or four sigma and Six Sigma was costing them between $8 billion and $12 billion per year.

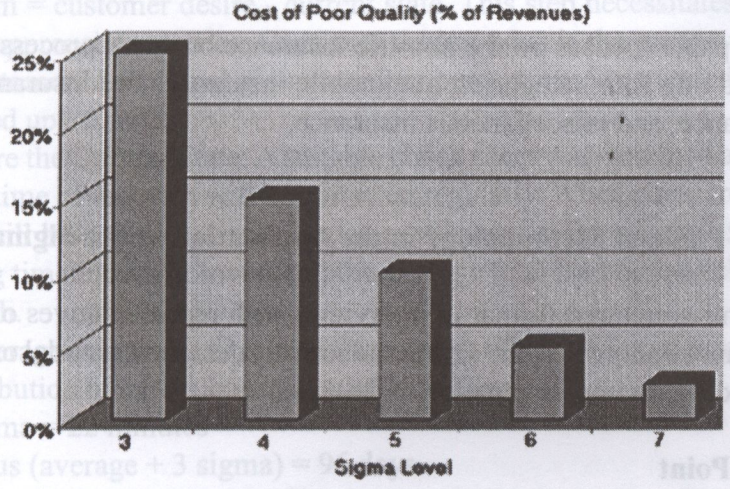


Figure 1: Cost of Poor Quality versus Sigma Level *Source*: Pyzdeck, 2003

Six Sigma is distinguished from any other quality concept because of its key characteristics:

1. Six-Sigma is customer focused
2. Six-Sigma project produces major return of investment
3. Six-Sigma changes how management operates

Thai Local Non-Life Insurance Operations

Let us briefly look at the Thai insurance market, the focus of this research paper. The local Thai non-life insurance business process normally consists of some activities that can be classified into two main sub-processes. The first sub-process, the author calls the 'inbound process' which includes (1) receiving the requirements and objectives of applying for an insurance policy from clients (potential Insured), (2) site-visiting to the prospective insured place (if any), (3) quoting for the yearly premium rate, (4) getting a percentage of insurance acceptance from contracted reinsurers, (4) getting acceptance by the prospective insured, and (5) initiating the insurance policy.

The other sub-process, the author calls the 'outbound process', which can be the heart or the main activity of insurance business. That is because the only time clients or prospective clients will see the company's product is when a loss happens. The claim process typically starts from (1) receiving the documented claim together with necessary and supporting documents from the insured, (2) acquiring from the database the insurance policy of that specific client, (3) surveying the client's site where the loss occurred, (4) estimating the value of loss in monetary term, (5) processing the decision making based on fact, whether or not the loss is covered by the insurance policy, and (6) making payment as compensation to the insured, or owner of the lost/damaged property.

This research paper focuses on the non-life insurance business process, which is typically classified into four categories, automobile insurance, fire insurance, marine and aviation insurance, and miscellaneous insurance.

Planned Methodology in the Application of Six-Sigma

By using a semi-structured format in interviews with representatives of the Thai local non-life insurance companies, the author inductively designed a model or planned methodology of Six Sigma implementation, as follows.

The Starting Point

A two-day (as appropriate) introductory training program covering the concepts, cases, implementation strategies and imperatives of Six Sigma should be conducted for all

senior personnel of the organization. This program will provide simple, interesting and powerful interactive exercises and real life case studies to excite the interest and enthusiasm of the group. The meeting should also commit resources for a demonstration project facilitated by an external consultant. If the improvements were large enough then the full program would be undertaken.

From here, the narrative follows the seven steps of problem-solving in the same sequence as occurred during the project:

Step 1: Define the Problem

- *Selection of the theme* (CTQ: Critical To Quality) and the customer line to be tackled. A meeting of the senior management of the company will be held and a brainstorming session to produce a list of over 20 problems. These can be allocated between two categories:
  - o End result problems faced by external customers in the insurance industry
  - o Internal problems that were causes of customer problems, rather than basic problems themselves.

  The realization that the first category (customer focus) of problems has to be attacked will come spontaneously. Prioritization using a weighted ranking system and a quick discussion produced consensus on the CTQs - e.g. consistency of Quality, flexibility or timeliness of claim process.

  Among the CTQs, one of them should be identified to be addressed first. The largest volume practice (Practice A) will be chosen for attack and a suitable cross-functional team will be formed by this time.

- *Precise definition of the problem as per the equation*:
  - o Problem = customer desire - current state. This step necessitates the definition of the appropriate metrics. Customer desire: what is the turnaround desired by the customer? Individual group member perceptions are queried, recorded and summed up
  - o Measure the Current State: A suitable check sheet was designed and data for the actual time of dispatch will be collected regularly. When compared to the target there will be a wide variation in the performance. For example: If we are discussing timeliness improvement, the average total lead time of claim process is 1 month.

    Average delay = 30 days, and the concept of variability, sigma and quality as a distribution is introduced. Calculations shows that:

    sigma = 22 minutes

    Thus (average + 3 sigma) = 96 days.
  - o **Problem definition: For 99.7% on time delivery, we would need to reduce 96 days to zero.**

Step 2: Analyze the Problem - Why? Why? Why? Why? Why?

- A brainstorming session produces a variety of causes: absenteeism, peaking of loads on some days, inefficient surveyor not delivering the expected outputs, etc.
- Attempts to relate one or other to the data collected led to confusion, as the data was not detailed enough. A more detailed data collection will be therefore undertaken to unearth the vital causes of the problems. A check sheet will be developed to record the following: start time of processing, input loads, surveyors allocated and present, capacity per surveyor, and the finishing time.
- These have to be observed for several days.
- The query such as "Can processing begin earlier?" might prompt the reply, "the data comes from the underwriter department, and the surveyor tends to dictate his report at the end of the day when the underwriter will be busy with rate quoting and reinsurance negotiation.Therefore, not much data is available for processing during the afternoon".
- Suddenly the old mindsets were shattered and new ideas could begin forming.

Step 3: Generate Ideas

- Applying the Lean principle of Batch to Flow, a time arrangement can be processed.
- After the brainstorming of pros and cons, one best idea must be chosen.

Step 4: Testing The Idea

- After Trial-And-Error, the idea must be rolled out.

Step 5: Implementation Plan

Regular operations will be commenced. The record of process timings might rapidly improve as smaller operating issues are ironed out. A very useful by-product of the effort resulted: On the occasions when the data inflow for Practice A is low and the surveyors are idle, some data from other practices will start to be fed to them for processing.

- The "flow" will start spreading through the entire operation by this time. Flexibility between operators might grow, and the timings of all practices will start to improve.

Step 6: Review The Results

Once the operation has settled down, data is collected. The third week after the changes will be compared to the week before the project began and reveal a dramatic improvement in claim process time (as an example).

The project objective should be achieved by this time.

Step 7: Standardize Control And Document The Improvement Story

A six-day moving average control chart (weekly) is introduced to monitor the process

and ensure that deterioration in process performance was quickly detected and resolved.

- A special training session entitled "Grind it in!" was conducted with the line personnel, and provided instruction on how to plot the control charts. A format was prepared for a regular quality report to senior management, and a Standard Operating Procedure was developed to ensure regular review of performance. Finally, a quality improvement story was compiled by the project leader for training purposes and to help motivate employees in other practices.

Further Action

Just as the journey towards quality never ends, improved performance only creates even higher customer expectations. The group has now resolved to improve the quality (i.e., reduce errors) for this practice, to unleash the Lean-Six Sigma connection. Improving the quality will reduce rework and inspection (waste) and thereby further improve productivity and turnaround.

And last but not least, official recognition of the good work done by the group and Six Sigma's impact on the company was made in an evening get-together of the employees and senior management. At this meeting the benefits from the Six Sigma approach were narrated and the resolve to continue using it was communicated. The process had taken root.

A Qualitative Survey of Some Insurers in Thailand

To conclude this investigation into the relevance of 6-Sigma to insurance companies, the author conducted semi-structured interviews with six managers who work for separate insurance companies in Bangkok. Standard qualitative methodology was used for this, as described, for example, in Rudestan and Newton (1992) and Miles and Huberman (1994). Four prepared questions were asked, after an initial explanation of the research. Follow-up questions were asked to explore items of interest and relevance. The condensed results are described below, and for simplicity are grouped as answers to the four questions. (To preserve confidentiality, the people interviewed are only distinguished by a letter of the alphabet).

1. Have you heard of 6-Sigma? Where / How / When?

   Mr. A had heard about it, within the company and from a book in 2001.

   Mr. B had also heard of 6-Sigma from reading a book about 2 years ago.

   Ms. C had heard of it, from a book and from within the company.

Mr. D had read about it in a book 11 years ago, and from another manager.

Mr. E has never heard about it.

Mr. F has never heard about it.

2. Is it used in your company? Where / How / When/ Who introduced it?

Mr. A's company has implemented 6-Sigma at the head office level, and the branch offices have to follow this process too. The company began its implementation in the processing department four years ago, and implemented it in the accounting and claim departments in 2007.

Mr. B's company does not use this concept as a management tool.

Ms. C's company does not use 6-Sigma.

Mr. D's company has not implemented this concept yet, and has other management tools such as ISO. However, there will be some restructuring of the working process in the future and the company may then use Six Sigma. This manager has used this concept personally at his department level but only in his work process (risk management).

Mr. E 's company does not use 6 -Sigma.

Mr. F 's company does not use 6-Sigma.

3. What is your opinion of it?

Mr. A thinks that Six Sigma has the following advantages:

- saves costs
- increases work flow efficiency
- people have more multiple skills
- more customer satisfaction.

Mr. B thinks that if his company plans to reduce costs, 6-Sigma would not help because the administrative work would then increase, and staff would have to spend time on this project rather than concentrating on their jobs. The time spent in finding defects may need a lot of extra manpower. Therefore, he thinks that it may not be worthwhile for the intended result. He

thinks that this is a useful management tool but has these concerns about the data collection cost. Moreover, insurance products are intangible and it may be difficult to measure the outcomes.

Ms. C says that she has only a very superficial understanding of 6-Sigma, but believes it is an aspect of a KPI system that uses statistical methods to measure the level of deviation compared to a benchmark. The benchmark is always based on customer expectation and satisfaction. Ms. C is of the opinion that 6-Sigma would be useful to manufacturers, but not necessarily so to insurers.

Although Mr. D's company does not use this concept, Mr. D thinks that this is a very good management tool, because if the company wants to achieve the 6-Sigma goals, it should have a good process and can then mange the company with facts. Everything that the company wants to achieve can be measured by the figures and statistics. The best advantage of Six Sigma to the company is cost reduction while still maintaining customer satisfaction and thus customer loyalty.

Mr. E has no comments because he has no knowledge of 6 Sigma.

Mr. F has no comments because he has no knowledge of 6 Sigma.

4. Do you think it can be applied to insurance companies? Why?

Mr. A thinks that this concept can be implemented in every insurance company especially in the accounting department in terms of paying and receiving money. He can see the advantages of Six Sigma at his company because the company already uses this concept and the result is very good. By using this concept, the company knows the cost per unit. Therefore; they can calculate the premium accurately to reflect the coast and the risk so the company will achieve a good bottom line.

Mr. B thinks that this concept cannot be applied with insurance because the data is not sufficient.

Ms. C thinks that it may be possible to apply the concept to insurance companies to reduce the error rate. However, the application must be executed with care since the industry has a special nature and also the concept might not necessary be applicable to all insurance products. For example, it may be

practical to apply it to personal lines (such as motor insurance) and to the processes of policy issuance and claims, as these could be considered as mass production methods. However, for commercial lines which need special consideration for policy wordings and have technically complicated claims and need skilled negotiation, too much concern on any KPI could potentially create more loss to the company rather than improving profit.

Mr. D thinks that this concept can be implemented in insurance companies in general because most of the companies have advanced management tools such as Strategic Planning and BSC and have indicators, such as KPIs to measure to improve their bottom line. Therefore, the concept of Six Sigma can also help the company to achieve the same goals.

Mr. E has no comments because he has no knowledge of 6 Sigma.

Mr. F has no comments because he has no knowledge of 6 Sigma.

Discussion and Conclusion

It could be said that these results show that insurance managers have heard of 6-Sigma and understand its benefits. However, because of the small sample in qualitative surveys, it is not possible to make summaries such as "one-third agreed and two-thirds disagreed" which it is proper to do in quantitative surveys. Here, we can only point out concepts and speculate on reasons. There is an issue of manpower cost, and indeed whether it can be relevant to such an intangible product as insurance. There are differences between these managers, and these could be due to a manager's area of responsibilities, personal reasons, or the size and nature of the companies for which they work, or a mixture of these four variables. One insurer is a very large international insurer, four are Thai companies. One aspect of these differences, mentioned by one manager, is the difference between personal insurance and commercial insurance, Six-Sigma being probably applicable to the former but not to the latter. Further research is needed, both qualitative and quantitative, to reach firmer and more specific conclusions: this research has opened up the topic, prepared the ground.

The Six Sigma concept is rather new, not only for Thai local insurance companies, but most of the industries in Thailand. For that reason, it is very difficult for the author to really implement even a pilot working group. The author, therefore, has produced the steps of implementation of Six Sigma to fit into the culture of Thai insurance companies. However, there is no proof that these implementation steps are effective unless implementation is actually launched. The author takes this opportunity to claim that

this paper can be used as a ticket for Thai insurance companies for a journey into Six Sigma.

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Numbered Notes in the Text:

1. Statistical note: The area the area under the normal curve beyond Six Sigma is 2 parts-per-billion. In calculating error rates, Six Sigma presumes that over the long term processes will drift by as much as 1.5 sigma. Thus you will find 3.4 PPM in the area beyond 4.5 sigma on the normal curve.
2. This performance improvement model is analogous to the older TQM model known as PDCA, Plan-Do-Check-Act, by Deming's philosophy.