

Full Length Research Paper

Applying six sigma to promote self-management ability in health clubs

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The purpose of this study is to contribute to a better understanding of self-management ability in health clubs. A DMAIC (Define, Measure, Analyze, Improve, Control) model of six sigma was introduced to define issues faced by employees when they conduct self-management and to construct an evaluation system for important factors of self-management and to analyze the reasons for poor self-management. In the end, measures for improvement are suggested and a monitoring procedure is used to modify errors. The result shows self-management ability of employees in health clubs are improved through the use of DMAIC model of six sigma.

Key words: Self-management, DMAIC model, six sigma, health clubs.

INTRODUCTION

Thanks to the knowledge economy, the management of “tangible assets” is not the only method to create value for businesses. Effective management of “intangible assets” has become extremely important. From the perspective of management, “people” is one of the most important intangible assets of an organization. Quality of personnel, leadership of managers, or group innovative capability all demonstrates the soft power of an organization. Along with changes in time and society, the focus of economic industries in countries around the world has been transferred to the service sector. Due to the environmental change of the service sector, customers are more aware of their own rights and it has become more difficult to develop customer loyalty. Therefore, it is now important that each member of the organization shall dedicate themselves to the task, role, and value as well as make an optimal contribution to the organization. It is now the objective of businesses to construct an environment for self-management.

In recent years, disputes between consumers and health clubs in Taiwan have occurred (Wu, Lin and Wu, 2004). Moreover, health clubs have also experienced a lot of operational problems. In 2005, Jiazi Health Club went bankrupt. In 2007, the Alexander Health Club encountered a financial problem, with the rights of more than one hundred thousand members affected and around one thousand staff losing their jobs. If the staff of a health club cannot immediately solve a dispute and give customers a satisfactory reply, it is difficult to recover the brand image of that health club. This not only affects their business image but also loses the trust of customers. As suggested by Kuo (2004), “environmental changes in health club organizations include demand-oriented supply, customer-oriented, value-oriented, over supply, and rapid changes. If this is not handled in time, major loss or disaster that is difficult to recover from may occur. At the same time, these situations may occur suddenly and require great responsive capability from first-liners who have to be equipped with the professional knowledge and experience to effectively solve problems in order to gain recognition from customers and to complete tasks. As a result, the management method shall

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emphasize self-management to satisfy the basic element of substantial management.”

Literature review also indicates that in the past, studies on health clubs mostly focused on service quality and consumer satisfaction (Alexandris, Dimitriadis and Kasiarab, 2001; Alexandris, Zaharaiadis, Tsobatzoudis, and Grouios, 2004; Lam, Zhang, and Jensen, 2005; Bodet, 2006), consumer behavior (Spangenberg, 1997; Kivetz and Simonson, 2000; DellaVigna, and Malmendier, 2004), and only few addressed the relationship between work and leisure from the perspective of employees (Waring, 2008). In terms of health club, first-line workers are the important factor for providing customers with a high quality consumption experience and thus, it is significant for them to have strong self-management ability to address changeable, uncertain, and complicated service users. In view of the intangibility, inseparability, variability, and perishability of the service industry (Rodie and Martin, 2001), interactions between customers and front-line staff directly affect service quality. Also, the service industry places more emphasis on intangible assets compared with the manufacturing industry.

Hsu (2007) points out that the main difference of the added value between the service industry and the manufacturing industry lies in the fact that the intangible assets can create higher added value than the manufacturing industry. Therefore, it is difficult to look for the measurements and drivers of the added value of the service industry. Many of the production-based added value in the manufacturing industry relies on investment in machinery, research and development, and the cultivation of employees. For the service industry, especially B2C service, the added value relies on the interaction between people or through the platform where people interact. This study, therefore, adopts the six sigma method to examine the improvement of self-management ability of health club employees. DMAIC from six sigma is also introduced to define issues faced by employees when they conduct self-management and to construct an evaluation system for important factors of self-management and to analyze the reason for poor self-management. In the end, measures for improvement are suggested and a monitoring procedure is used to modify errors.

LITERATURE REVIEW

Self-management

The concept of self-management is based on social cognitive theory and emphasizes a high degree of autonomy and decentralization. Jones and Svejnar (1982) also argued that self-management was applied to a form of participative management, where the self-management maintains a significant authority and responsibility over work but less control over strategic decision making. Garson (1997) contested that the term "self-management" came from the description of non-managerial workers

empowering themselves and taking on the responsibility of managers. This showed that self-management emphasized the workers' command of work and the environment. Relevant studies also propose diversified perspectives on how members of an organization shall cultivate their self-management ability (Snyder, Manz, and Laforge, 1983; Frayne, 1992; Tsui and Ashford, 1994). Studies on self-management have largely been attempted from the viewpoint of social learning. Daniel, James and Ken (1990) found 6 components required for a comprehensive self-management are (1) Self-monitoring, (2) Goal-setting, (3) Stimulus control, (4) Consequence management, (5) Rehearsal, (6) Self-contracting.

In recent years, the concept of self-management has been gradually introduced to business organizations and as Manz and Sims (1980) stated, there has been increasing literature on the management of self-management. Studies on self-management have largely been attempted from the viewpoint of organizational competitiveness (Hackman, 1986; Mohrman and Cummings, 1989). Howard (1995) also pointed out that for better effectiveness in today's working environment, people need to take more responsibilities and have a higher level of self-management to learn how to fulfill a complicated role.

Six sigma

The six sigma method, initiated by Motorola in the 1980s, focuses on customer service and introduces statistics that help an organization obtain a higher quality level. Nonhaleerak and Hendry (2005) argued that whilst the basic concept has its origins in industry, its popularity has led to an increasing level of interest from the academic community, with a substantial rise in the number of academic papers published in recent years. Snee and Hoerl (2003) stated many businesses and organizations have adopted six sigma and received substantial feedback. However, some scholars have harshly criticized six sigma and regard it as quality management with a new name (Clifford, 2001; Dalglish, 2003). Chakravorty (2009) also pointed out flaws in the six sigma process but the contribution of six sigma to the improvement of manufacturing procedure or service quality cannot be denied. Although relevant literature uses six sigma to examine human resources (Wyper and Harrison, 2000; Heuring, 2004), yet none of them address relevant capacities of workers in the service industry.

Accordingly, this study applies DMAIC from six sigma to the improvement of self-management capacities of health club workers. First, this paper uses the self-management theory of Kuo (2004) and performance evaluation matrix of Hung et al. (2003) to define the problem and construct evaluation indicators as well as evaluates the discrepancy of "competence" and "importance" of self-management capacities of health club workers. In the analysis stage, this paper adopts a cause and

Table 1. The list in each construct of self-management questionnaire.

I. Recognition and attitude

When I volunteer to help others, I know:

1. What the priority is
2. How to evaluate one's achievement.
3. How to determine what is right and what is necessary.
4. How to be efficient to carry out the set policy, process and decision.
5. Ask for help if I have any doubt for the determined plan or I cannot complete the work by myself.
6. If mistake was found, I shall correct it and shall not leave the incomplete work to my successor.
7. How to face the problem from multi-directional or systematic angles.
8. How to analyze problems rationally.
9. How to conduct a workable plan and implement a project in a better way.
10. How to report work status constantly to my boss.

II. Personal behavior

When I volunteer to help others, I know:

11. How to communicate, coordinate, promote and execute the project in an active and rational way.
12. The personnel will contribute more to their works because of encouragement from the clients, working partners, family members and friends.
13. After earining the trust of the supervisors or the organization and being empowered, the personnel will be more active to raise their self-value, to carry out new mission and develop self-actualization based on their own knowledge and social relations.
14. How to bring the discussed contents into services and try to raise perceived-value of clients.

III. Interpersonal communication When

I volunteer to help others, I know:

15. How to try to avoid any problem that may have occurred and find the solutions. Discussion shall be held with working partners and supervisors for achieving a common solution.
 16. When a problem occurs, I shall analyze the causes rationally and find the solution with my working partners.
 17. How to try to satisfy client's need and be competitive. I shall be ready for any future projects.
 18. After implementing the project, feedbacks shall be shared and work experiences evaluated in order to calculate the cost benefit.
 19. Following mutual trust, competence and growth, achievement and work motivation could be met from team works.
 20. How to try to find a way to raise self-value from the routines and give myself more challenges for achieving the value.
-

and effect map to analyze the poor self-management capacities of health club workers and tries to find a strategy for improvement.

METHODOLOGY

This study uses the self-management basis of Kuo (2004) and Shyu(2004) and a questionnaire based on literature review. There are three dimensions in the self-management ability scale of health club workers that are addressed with 20 questions; Likert's five-point scale and positive narration are adopted for scaling. Health club workers are requested to answer competence and importance questions according to five levels (not competent, not very competent, competent, fairly competent, and very competent) ranked 1, 2, 3, 4, and 5 points respectively. The higher scores indicate better self-management capabilities of health club workers. For the purpose of individually defining the "competence" and "importance" index of the 20 items in Table 1, this paper applies the method proposed by Hung et al. (2003).

$$I_{X_i} = \frac{\bar{X}_i - 1}{R} \quad (\text{competence})$$

$$I_{Y_i} = \frac{\bar{Y}_i - 1}{R} \quad (\text{importance})$$

where \bar{X}_i, \bar{Y}_i represent, respectively, the mean score calculated from that item in collected samples $i = 1, K, 20$ and $R = k - 1$. Thus, based on the 5-point Likert scale used in this paper, $R = 5 - 1 = 4$. $I_{X_i} = 0$ indicates that the acquirement of self-management for all health club employees is not proficient, i.e., the professionalism acquired is 0%, whereas $I_{X_i} = 1$ indicates that the acquirement of self-management for all health club employees is very proficient, i.e., the professionalism acquired is 100%. $I_{X_i} = 0.5$ means the acquirement of self-management for all health club employees is ordinary, i.e., the professionalism acquired is 50%, and so forth. The interpretation of the index for the category of importance is

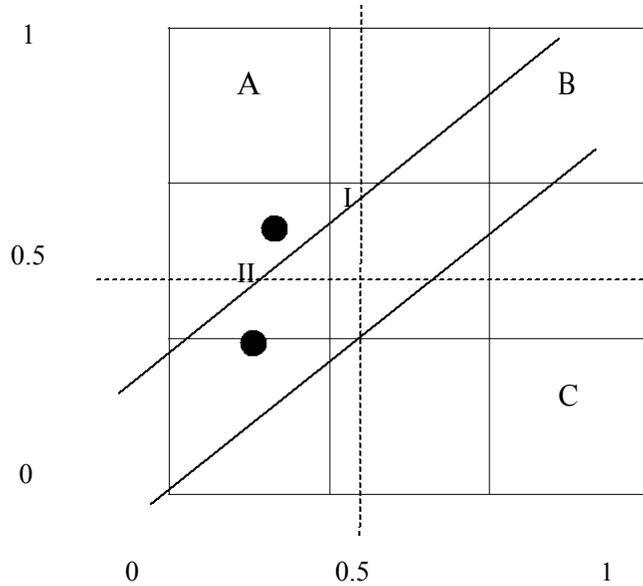


Figure 1. Performance evaluation matrix.

same, *mutatis mutandis*, as the interpretation for the acquirement.

In general, a performance evaluation matrix is beneficial in determining whether a firm's performance is good or bad, and in proposing strategies for performance improvement. To construct the performance evaluation matrix of self-management ability for health club employees, this article uses "importance" as the Y coordinate and "competence" as the X coordinate. A limitation of the performance evaluation matrix is that it often produces blind spots in judgment. For example, according to Lambert and Sharma (1990), point I falls into the area of being kept unchanged, and point II falls into the area of requiring improvement. Nevertheless, as shown in Figure 1, judgment regarding the locations of point I and point II indicate that the importance index is significantly greater than acquirement index for cardinal point I. In other words, topic item I is to be categorized as an item requiring improvement. Since the importance index is apparently not much different from the acquirement index for cardinal point II, topic item II is to be categorized as an item to be kept unchanged.

To resolve the blind spot regarding the locations of point I and point II, some scholars propose setting performance control lines with upper and lower limits (Lin, Chen, Lin and Wu, 2006; Hsia, Chen, and Chen, 2009). Then, the area with two oblique lines substitutes for the original three blocks and represents the reasonable area that does not require improvement. The distance between the upper and lower limit lines of performance control can be determined on the basis of perception of self-management ability. Personal behavior and interpersonal interaction among health club employees can be observed to determine issues that need improvement.

As shown in Figure 1, if health club employees cannot improve key issues influencing self-management ability, personal service quality and organizational performance will be significantly affected and the point indicating that "importance" is higher than "competence" will fall into area A. If perceptions of acquirement and professionalism regarding self-management ability among health club employees coincide, the point indicating that "importance" is equal to "competence" will fall into area B. Finally, if acquirement is perceived to be higher than importance with respect to self-management ability among health club employees, the point representing "importance" will be lower than "competence" and will fall

into area C. Items in this area are secondary items requiring improvement.

According to the above performance evaluation matrix, evaluated items falling into areas A and C indicate that improvement is required. Whether the issue pertains to front line employees or management, every issue that requires improvement may also be a six sigma project. If there are too many points falling into areas A and C, it is also necessary to measure the distance between each point and between the upper/lower limit lines of performance control. The farther the point is away from limit line, the more improvement needs to be prioritized. Using the above method, this paper determined the key issues influencing the self-management ability of health club employees and further defined the items that require improvement. For the purpose of easy application by health club employees, we define d_i as the distance between the coordinate

points (I_{X_i}, I_{Y_i}) of the topic item and the straight line equation.

Since $\frac{I_{X_i} + aI_{Y_i} - ab}{a^2 + 1}, \frac{aI_{X_i} + a^2I_{Y_i} + b}{a^2 + 1}$ is the projection

point of (I_{X_i}, I_{Y_i}) on this straight line equation, the distance

between the two points, d_i , can be calculated as follows:

$$d_i = \frac{|aI_{X_i} - I_{Y_i} + b|}{\sqrt{a^2 + 1}}$$

The study of Hung et al (2003) proposes the straight line equation that we identify as $y = x$. Set $a = 1$ and $b = 0$. Then,

$$\frac{I_{X_i} + I_{Y_i}}{2}, \frac{I_{X_i} + I_{Y_i}}{2}$$

is the projection point of (I_{X_i}, I_{Y_i}) on

the straight line. The distance between these two points is thus determined:

Table 2. Distribution of sample frequency and probability.

Item	Response					Sum
	1	...	<i>i</i>	...	<i>k</i>	
Competence	$n_{11} \theta_{11}$...		$n_{1i} \theta_{1i}$...		$n_{1k} \theta_{1k}$	$n \theta_{1\cdot}$ b.
Importance	$n_{21} \theta_{21}$...		$n_{2i} \theta_{2i}$...		$n_{2k} \theta_{2k}$	$n \theta_{2\cdot}$
Sum	$n_{\cdot 1} \theta_{\cdot 1}$...	$n_{\cdot i} \theta_{\cdot i}$ a	...	$n_{\cdot k} \theta_{\cdot k}$	$N(1)$

$$d_i = \frac{|I_{X_i} - I_{Y_i}|}{\sqrt{2}}$$

$$k \sqrt{\quad}$$

Measure

Measurement is the second step of the six sigma method. Self-management ability items with high competence but low importance, and vice-versa, were found according to the point of fall for each self-management item in the ability evaluation matrix. Thus, the paper defined key issues that require improvement among health club employees and completed the first step in the six sigma definition.

Table 2 exhibits the distribution of sample frequency and probability.

$$\bar{n}_{\cdot i} = \sum_{j=1}^k n_{ji} \text{ means the sum of values in the row, and } \theta_{\cdot i} = \frac{\bar{n}_{\cdot i}}{N} \text{ means the sum ratio of the row based on } i = 1, K, k.$$

$$\bar{n}_{i \cdot} = \sum_{j=1}^k n_{ij} \text{ means the sum of values in the column, and } \theta_{i \cdot} = \frac{\bar{n}_{i \cdot}}{N} \text{ means the sum ratio of the column based on } l = 1, 2.$$

For each service item, this paper further measured the customer-perceived sum, (*M*), of variation between competence and importance of self-management among health club employees. The paper referred to the approach of Chen, Chen, Chang and Hsu (2009) for the measurement index and the definition of *M*.

customer-perceived competence and importance of self-management among health club employees using a *k* rating scale for each item. A smaller *M* means that customers consider competence close to importance. If *M* equals 0, customers consider competence as identical to importance. Based on the concept of an accept region in the performance evaluation matrix, a slight variation between competence and importance is allowed. Assume the risk error is δ . Evaluation can then be conducted to determine if the variation between competence and importance is a less than tolerable error. If $M \leq \delta$, indicating that the error is less than tolerable, the assumption is described as follows:

$$M = \sum_{i=1}^k |\theta_{1i} - \theta_{2i}| \quad (1)$$

In Table 2, θ_{1i} and θ_{2i} represent, respectively, the ratios of customer-perceived competence and importance of self-management among health club employees using a *k* rating scale for each item. A smaller *M* means that customers consider competence close to importance. If *M* equals 0, customers consider competence as identical to importance. Based on the concept of an accept region in the performance evaluation matrix, a slight variation between competence and importance is allowed. Assume the risk error is δ . Evaluation can then be conducted to determine if the variation between competence and importance is a less than tolerable error. If $M \leq \delta$, indicating that the error is less than tolerable, the assumption is described as follows:

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$$H_0: M \leq \delta_k$$

$$H_A: \text{Reject } H_0 \quad (2)$$

Because δ is the accumulated value of errors between θ_{1i} and θ_{2i} , assume ω_i represents the ratio of the *i* item shared in variation between competence and importance. Then,

shared in variation between competence and importance. Then,

$$\sum \omega_i = 1 \text{ and } \theta_{1i} - \theta_{2i} = \omega_i M, i = 1, \dots, k.$$

so we can get

$$\sum_{i=1}^k |\theta_{1i} - \theta_{2i}| = \sum_{i=1}^k \omega_i M = M \quad (3)$$

Based on Equations (3), (4) and (1), we may modify the assumption of Model (2) to be

$$H_0: |\theta_{1i} - \theta_{2i}| \leq \omega_i \delta, \text{ for } i = 1, \dots, k$$

$$H_A: \text{Reject } H_0 \quad (4)$$

As for model (5), a test statistic may be obtained from the goodness-of-fit test of Pearson.

$$T = \sum_{i=1}^k \frac{(\hat{n}_{1i} - n\theta_{1i})^2 + (\hat{n}_{2i} - n\theta_{2i})^2}{n\theta_i} \quad (5)$$

Where $\hat{n}_{li} = \sum_{j=1}^k n_{lji}$. Equation (6) may be modified as T, according to

Table 2:

$$T = \sum_{i=1}^k \frac{(\hat{n}_{1i} - n\theta_{1i})^2 + (\hat{n}_{2i} - n\theta_{2i})^2}{n\theta_i}$$

$$= \sum_{i=1}^k \frac{\frac{n_{1i}^2}{N} - \frac{n_{1i}n_{2i}}{N} + \frac{n_{2i}^2}{N} - \frac{n_{1i}n_{2i}}{N}}{\frac{n_{1i} + n_{2i}}{N}}$$

$$= \sum_{i=1}^k \frac{n_{1i}^2 - \frac{n_{1i}n_{2i}}{2} + n_{2i}^2 - \frac{n_{1i}n_{2i}}{2}}{\frac{n_{1i} + n_{2i}}{2}}$$

$$= \sum_{i=1}^k \frac{(n_{1i} - n_{2i})^2}{n_{1i} + n_{2i}}$$

The test statistic may be similar to the level in the Chi-squared distribution with $k-1$ degree of freedom. If the α test rejects H_0 then the reject region is defined as: $\Omega = \{T | T \geq \chi_{(1-\alpha)}^2(k-1)\}$. Further, based on Model (2) and Equation (3),

$$\begin{aligned}
 M \leq \delta &\Leftrightarrow |\theta_{1i} - \theta_{2i}| \leq \omega_i \delta \\
 &\Leftrightarrow (\theta_{1i} - \theta_{2i})^2 \leq (\omega_i \delta)^2 \\
 &\Leftrightarrow \frac{(n_i \theta_{1i} - n_i \theta_{2i})^2}{n_i} \leq n_i (\omega_i \delta)^2 \\
 &\Leftrightarrow \frac{(n_{1i} - n_{2i})^2}{n_i} \leq n_i (\omega_i \delta)^2
 \end{aligned} \tag{7}$$

From Equation (8), we get

$$\begin{aligned}
 \sum_{i=1}^k \frac{(n_{1i} - n_{2i})^2}{n_i} &\leq \delta^2 \sum_{i=1}^k n_i \omega_i^2 \\
 \Leftrightarrow T &\leq \delta^2 \sum_{i=1}^k n_i \omega_i^2
 \end{aligned} \tag{8}$$

The reject region is defined as G based on Equation (9), and $W = \sum_{i=1}^k n_i \omega_i^2$ is a function of (ω_1, K, ω_k) . An extreme value is found using mathematical programming as shown below:

$$\begin{aligned}
 \text{maximum } W &= \sum_{i=1}^k n_i \omega_i^2 \\
 \text{Constrain } \sum_{i=1}^k \omega_i &= 1
 \end{aligned} \tag{9}$$

W represents the extreme value found by using mathematical programming. The reject region found by substituting the collected

samples into the equation is: $\Omega_0 = \{T | T \geq \chi_{(1-\alpha)}^2(k-1) + \delta_0 \hat{W}\}$, and δ_0 is the initial value.

This study sets the measure procedure as follows:

1. Formulate the result of each topic item shown in Table 2 according to the collected samples.
2. Choose the δ_0 value and use mathematical programming to calculate \hat{W} and then $\Omega_0 = \{T | T \geq \chi_{(1-\alpha)}^2(k-1) + \delta_0 \hat{W}\}$, and conduct a comparison with the set significant level $\alpha = 0.05$.
3. Determine if service quality meets the requirement using the following methods:

- i. If $T(obs) \notin \Omega_0$, then accept H_0 i.e., competence and importance of self-management among health club employees follows the expected criteria that we set.
- ii. If $T(obs) \in \Omega_0$, then do not accept H_0 , i.e., competence and importance of self-management among health club employees does not follow the expected criteria that we set, and immediate

improvement is needed.

Based on the initial criteria set for the experiment, the significance level may be a loose level of significance ($\alpha = 0.1$), general level of significance ($\alpha = 0.05$) or strict level of significance ($\alpha = 0.01$).

Analyse

The service sector is not only diversified but also very different from

other sectors. Along with changes in leisure and free time, the health club industry faces fierce competition. Staff in the service industry interacts with their customers very frequently and with a high service quality to distinguish their club from competitors. A health club's customer type also determines the nature of service experience provided. Thus, staff becomes one of the service items. Kuo (2004) suggested that to attain operational self-management, members of an organization should be equipped with certain characteristics involving the perception, attitude, personal behavior, and interpersonal interaction of tasks. Hence, this study through a cause and effect map analyzes factors that affect the self-management capacities of health club workers.

Recognition and attitude

If self-management ability is to be developed, workers should first be aware of this goal. In the social dimension, health club workers should understand the self-management concept and required skills in order to present a professional image in front of customers while as individuals they must understand the impact of self-management ability on individual development and the effectiveness of self improvement as well as demonstrate self-management behavior and long-lasting emotional orientation. The perception and attitude of health club workers should include the following three points:

1. Time management: Self-management concept emphasizes that health club workers shall understand their priority tasks and the implementation of the most effective method to complete them. As a result, time management plays a very important role.
2. The ability to make a decision: The ability to make a decision illustrates that health club workers are able to carry out existing policy, process, and decision effectively. They are also able to plan a feasible action or make decision based on the comprehensive consideration of the demands of customers and report in a timely manner to their superiors.
3. Systematic thinking ability: When facing various types of customers, health club workers will rationally analyze the cause and effect of difficulties and look for relevant resources and effective solutions.

Personal behavior

The expression of individual behavior is determined by the willingness of health club workers. In other words, if health club workers believe that self-management ability is important, they will demonstrate this belief with positive behavior and are more willing to behave accordingly. The individual behavior of self management of health club workers can be described in the following three points:

1. The ability to coordinate: Health club workers will rationally and actively communicate with customers and have the ability to promote the objectives of their organization. They shall coordinate resources and look for complete solutions.
2. Good working attitude: Health club workers are able to actively communicate and discuss with each other according to their own

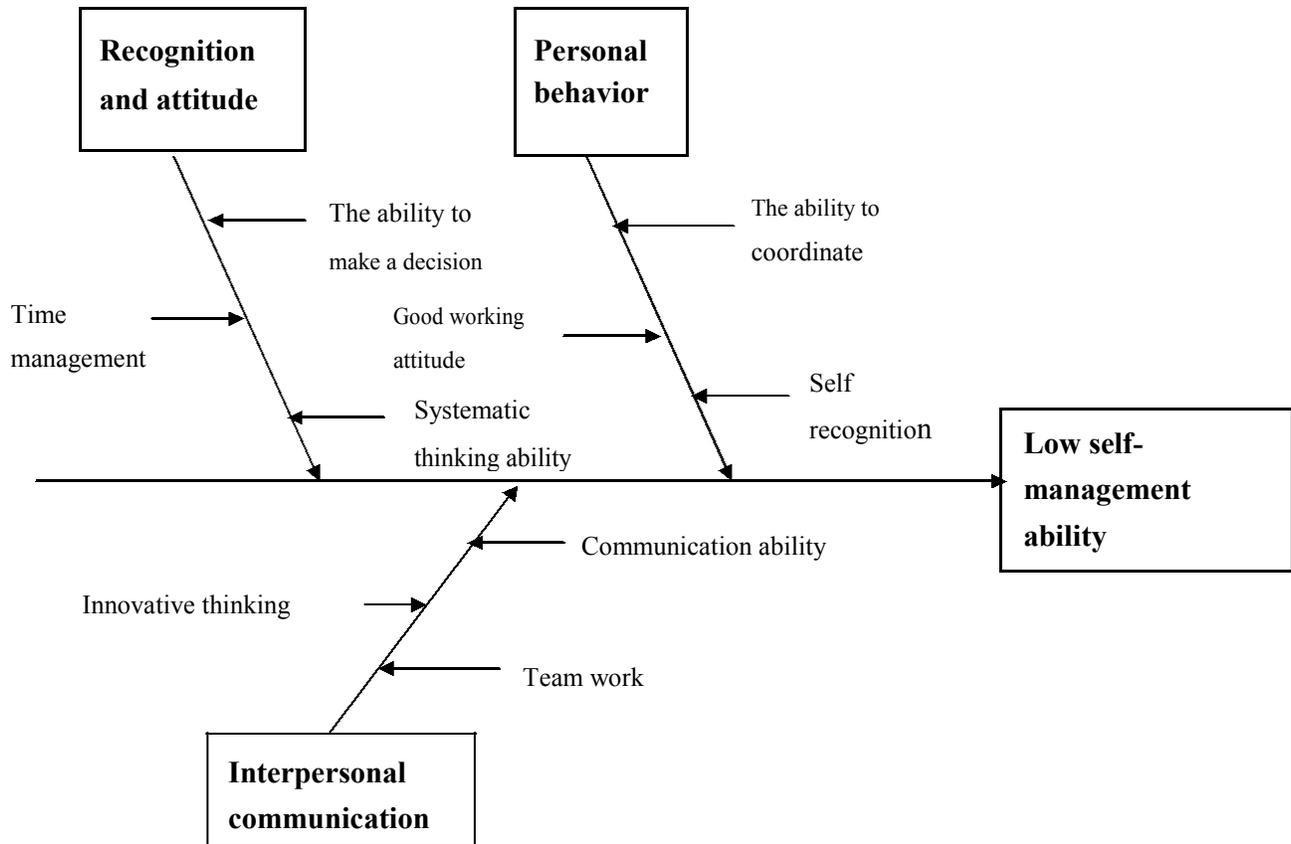


Figure 2. Cause and effect of self-management in health club.

work nature to improve the value of customer perception.

3. Self recognition: When recognized, trusted, empowered by organizations or superiors, health club workers will utilize their own professional knowledge and skills to present ways to improve the value of customers and themselves as well as to win the recognition of customers and co-workers.

Interpersonal interaction

Interpersonal interaction refers to the psychological and behavioral exchanges between customers and co-workers in which correct messages are delivered through language, facial expression, and attitude to communicate effectively. Under self management, interpersonal interaction of health club workers can be described in the following three points:

1. Communication ability: In terms of group operational effectiveness, health club workers shall actively propose responsive measures or solutions related to organizational strategy and initiatives through discussions with co-workers and managers to reach consensus and look for concrete answers.
2. Team work: To maximize customer satisfaction, health club workers should think about ways to improve customer value and organizational competitiveness for the preparation of implementation of future initiatives or improvement.
3. Innovative thinking: Health club workers shall brainstorm together to acquire experience and insights during execution. A new management model will be developed from the accumulation of service and innovative energy.

Improve

The analysis stage shows the important factors that affect the self-management ability of health club workers. This study proposes concrete improvement strategies for each factor:

Recognition and attitude

Figure 2 of the cause and effect map shows the influence of time management, the ability to make decision, and systematic thinking ability on self-management perception and attitude and therefore, in terms of improvement strategies for time management, health club workers have to understand time is not a problem and the key to accomplishing tasks is effective management. As pointed by Wang (2004), time management is not to manage time but to manage self. Schneider, Ehrhart, Mayer, Saltz and Niles-Jolly (2005) stated that employees shall arrange their service time and activities in order to help with the enhancement and control of their service quality. Hence, on service sites, in addition to proper planning and preparation, the objectives regarding when to do, what to do, and how to do something shall also be precise; for example, the waiting time of customers will affect service quality provided by health clubs. As a result, health club workers must have good command of time scheduling and arrange priority tasks; through control of service procedure, self efficacy will be maximized.

In terms of the ability to make decisions, customers and health club workers have face to face interaction and therefore, to respond to the demands of customers, health club workers have to make timely responses. Usually in health clubs, first-line workers have to

report to their superiors in different levels and act upon instructions given by superiors. But this process results in a service gap that sometimes is hard to repair. The managers of health clubs should empower first-line workers to solve problems for customers immediately in order to obtain a high level of customer satisfaction. Moreover, managers should be willing to promote self management because in a self-management environment, managers need to acquire information from subordinates so that solutions may also be accepted by subordinates in order to be implemented. Meanwhile, decision making within the organization should be from the bottom up so that the speed of workers to act on a solution shall be rapid.

Systematic thinking ability relates to the ability of health club workers to understand cause and effect. In particular, in this fierce competitive environment, health club workers continuously deal with customer problems and try to resolve them all. But even for questions that must be solved in a timely manner, whether there is a better resolution or better strategy shall be considered by all health club workers. For instance, for customer claims, will health club workers ask relevant questions and be able to analyze rationally? Through the analysis and filing of different case studies, organizational members will be able to identify questions clearly and propose the best solution possible by utilizing relevant resources of the organization.

Personal behavior

Figure 1 of the cause and effect map shows the factors that influence the individual behavior of health club workers including the ability to coordinate, good working attitude, and self recognition. In terms of the ability to coordinate, the individual power of health club workers are limited and thus, when facing different types of consumer complaints, they have to integrate relevant resources and information to accurately and rapidly deliver service and to convey correct messages to customers. Gibson and Birkinshaw (2004) also indicated that the organization should have the ability to coordinate and to enable workers to work for common objectives and award their workers after completion. Organizational workers should improve their ability to coordinate and to think of problems from the perspective of customers to facilitate mutual understanding and make adjustments in order to respond according to the actual situation.

Good working attitude relates to the willingness of workers toward work that not only helps to accumulate work experience but also develop potential. In terms of improvement strategy for working attitude, health club workers shall not only have a good command of their work and equip themselves with professional knowledge and skill, but also receive regular training. In addition to good service, ethical principles shall also be observed to provide professional service for consumers.

In terms of an improvement strategy for self recognition, a self-management oriented health club emphasizes self growth opportunities for workers through empowerment. As a result, health club workers shall understand whether their career development goals match those of the organization so that they are able to develop their professional knowledge and skill accordingly. Organizational members shall support and encourage each other based on mutual trust, besides organizational members will not only focus on self value but also care for others with the same attitude.

Interpersonal interaction

Due to their diverse sets of customers and services, interaction between health club workers and customers affects satisfaction level. Good relationships between organizational members help with the formation of an informal social support network that becomes the easiest resource for helping individuals when they

encounter difficulties. Through the cause and effect map in Figure 1, the ability to communicate, encourage team work, and think innovatively affects the interpersonal interaction of health club workers. With regards to improving communication skills, in situations with consumers, health club workers have to collect information according to actual problems in order to rationally analyze and judge clearly and correct messages should be delivered either verbally or visually. It requires much time and the accumulation of practical experience to develop this ability and therefore, managers should encourage organizational members to participate in relevant courses and use different communication methods to enhance consumer satisfaction.

In terms of improvement strategy of team work, in the 21st century competitive service industry, demands for commodity quantity has become slow and shifted to quality. For health clubs, organizational members are the key factor to the high quality consumption experience of customers and therefore, methods for providing customers with the best service experience need to be used through team work. In other words, through team work, health club workers are able to integrate organizational resources and intelligence and conduct necessary coordination for organizational objectives to stimulate the responsive ability of the team and think together about how to improve customer value and organizational competitiveness strategies.

Innovative thinking emphasizes the process of knowledge and idea generation by the intelligent and innovative thinking of organizational members. As a result, during the formation of innovative thinking, health club workers need to understand the past and predict the future and convert or store successful experience and knowledge. For example, more and more service businesses focus on women marketing and health clubs can integrate purchasing procedures and a distinct preference for females into their products through product innovation. Improvement strategies with innovative thinking shall work on a model that is different from old ones to absorb large volume of information.

Control

Key issues during the control period are to standardize the improved process and ensure the achievement of an improved process through effective monitoring approaches. Continuously performing investigation and improvement through the DMAIC model may also achieve the effect of continuous control. This paper applies the concept of a performance control chart to establish the variation control model of competence and importance in self-management ability among health club employees. The control limits are shown herein. The paper measures the variation index, M , between competence ability and importance ability, the statistic T , and the X^2 distribution with a degree of freedom.

$$UCL = \bar{X}_{(k-1)} + \frac{\sigma}{\sqrt{2}} \hat{W}^2$$

$$CL = \bar{X}_{(k-1)} + \bar{\delta}_0 \hat{W}^2$$

$$LCL = \bar{X}_{(k-1)} - \frac{\sigma}{\sqrt{2}} \hat{W}^2 + \bar{\delta}_0 \hat{W}^2$$

RESULTS AND CONCLUSION

When compared with other industries, the development of health clubs is new and along with an increase of free time and change in leisure behavior, service content of health club members are diversified in order to meet

various demands. Both yoga and body combat classes as well as professional equipment provide consumers with different leisure experiences but the service provision of health clubs still need to be offered by professional organizational members. The self-management concept focuses on the empowerment of organizations and management of personal skills and behavior for making good decisions on service sites and enable consumers to enjoy a highly satisfactory experience.

This paper is based on the self-management theory of Kuo (2004) and the six sigma method. It uses a questionnaire designed according to literature review to investigate the perception of health club workers toward self-management competence and importance. A performance evaluation matrix is used to identify poor self-management competence factors. A cause and effect map is also used for proposing a concrete improvement strategy. In the end, modification is conducted at the control stage. Analysis of this study shows that in addition to the self-management responsibilities of workers, organizations shall also build a self-managing and flexible environment to emphasize the service culture of an empowered organization and the enhancement of customer satisfaction.

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