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A Study on Introducing Six Sigma Theory in the Library for Service Competitiveness Enhancement

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Abstract

By evaluating "user satisfaction index" for provided services, libraries are now collecting data which can be a basis for library management. This promotes research on reasonable and efficient evaluation tools for "user satisfaction" and "performance measurement." LibQUAL+ usage is currently increasing, which can be found in many documents. This study set out to draw and implement scientific and systematic improvement plans for a service area that failed to meet its goal or caused users' complaints.

Six Sigma means "a systematic innovative activity to statistically measure and analyze causes of defects that happen in all parts of management, and then remove those causes." According to Six Sigma, defects include all causes that interrupt process or service. It is a methodology to define a problem from the viewpoint of managers or

users as a defect and ascertain its causes in order to solve it.. As a theory it was originally used in manufacturing,. Today it applies to service areas.. This study is not only to do a simple quantitative analysis to evaluate library service but also to find out user complaint factors and reduce them. In this regard, this study intends to identify the application plans of Six Sigma and its significance in the library field.

The purpose of this study is to search for applications of Six Sigma as a solution for efficient knowledge management. It also aims to establish information infrastructure and secure service competitiveness, and finally to improve user satisfaction, the ultimate goal of libraries, through setting up and carrying out Six Sigma projects as well as continuing evaluation.

I. Introduction

A transformation is needed for libraries from focusing on the traditional information provider in the service operation system to focusing on the information recipient, that is, the customer. In particular, libraries are faced with radically changing user demands as well as environment changes. Thus new management strategies and techniques are required for libraries.

Knowledge management as a process can facilitate innovation for the library to acquire and store information and knowledge in the organization either internally or externally, to create and share knowledge, and to utilize, accumulate and reuse such knowledge. In short, knowledge management is a series of processes of the knowledge transformation and circulation. It should be regarded as the highest priority that the user is the center of all the processes from the initial phase of service planning to the final phase of evaluation, so the changing needs of the user are met and new ones are created. Along with consideration of the user priority, it is also important to secure a sufficient amount of information for decision making and to define and comprehend the cause based on the statistical analysis of this information. Moreover, it is essential to clarify knowledge elements relevant to the future core capacity , comparing it with the standard of the current organization and restructuring based on the result.

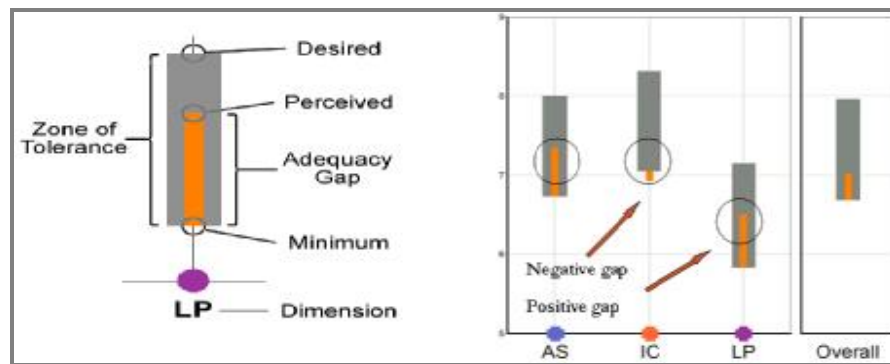
Accordingly, the purpose of this study is to present post-evaluation follow-ups which in general have been overlooked. At the moment, it is important to plan and execute new goals while evaluating and correcting errors and defects.. Hence this study aims to apply a statistical management technique and new quality management theory different from a conventional one to examine the possibility and viability of such application. To achieve this goal the theoretical background is reviewed including philosophy, key concepts and the application of the 'Six Sigma' method. Subsequently, the process is examined which enables user satisfaction improvement due to 'sigma quality' maintenance of the service.

II. Service Quality Evaluation

Service Quality Evaluation of the library is an analysis of service efficacy. Efficacy of the service quality evaluation is not restricted to the fact that service is simply provided to the user. It also focuses on the degree of utilization by the users demand for information and their satisfaction in terms of quality and quantity. If quality evaluation is the number of inquiries and answers recorded in the resource center of the library then service quality evaluation can be defined as how precisely the user inquiries are answered and how many answers actually helped the users. In fact, assessing the service quality is the most difficult phase of the evaluation.

Unlike tangible commodities that can be evaluated objectively, ‘service’ cannot be easily defined and measured due to its distinctive features. Therefore, service quality is a subjective quality rather than an objective one. It is defined as ‘perceived service quality by user’. Regarding evaluating the service quality of the library, a new evaluation method was required which focuses on the user. Accordingly, research has been conducted on the service quality evaluation model which has been studied in the service marketing field of management studies. Such research was applied to the library service quality evaluation and subsequently LibQUAL+ was developed as a new evaluation measure.

The evaluation factor of LibQUAL+ is the perceived difference or gap between user expectation and actual satisfaction after using the service. LibQUAL+ analyzes the difference (Figure 1). When a user intends to use library service, he or she is bound to have a certain level of expectation on the content and quality of the service, even if the aspects or types of such expectation might vary among individuals. Users hold such expectation unconsciously in various ways and it is called ‘pre-expectation.’ It exists prior to the actual experience of the library service. On the other hand, user satisfaction is evaluated after the user receives the library service. By comparing the pre-expectation and actual experience of the user, quality recognition of the library service can be measured.



<Figure 1> LibQUAL+ gap analysis

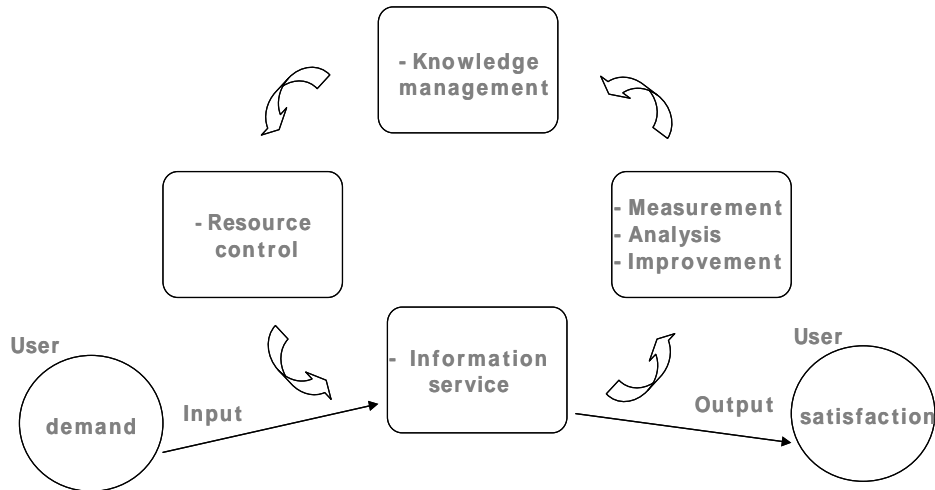
Meanwhile the user demands must be examined in order to evaluate efficacy of the library. They can be identified based on the user service that is currently conducted in the library. User demands are defined in accordance with following categories: the degree of satisfaction regarding the current service and any particular demand or suggestion from the user relevant to the library objectives. In short, user satisfaction with the library can be assessed through the quantitative measurement of the difference between user expectation or customer desire and the actual service experienced by the

user and production of the measurement index. User satisfaction varies by the degree of pre-expectation and actual service quality. The higher pre-expectation is, the greater the difference becomes on the service result. It is difficult to objectively evaluate service quality, for such service is assessed rather subjectively depending on the user. Thus recognizing the difference between pre-expectation of the user and actual service satisfaction experienced and perceived by the user is a preceding condition of the quality evaluation.

There are several reasons for the user to recognize a discrepancy between expectation and actual quality of the service provided by the library. For example, when the service provider's perception fails to meet the user expectation regarding library service or when the service provider fails to effectively provide services which fully satisfies user expectations. The ultimate goal of the library is to satisfy every demand of every user. However, it is impossible to fully and perfectly satisfy each and every user demand. Consequently, it is reasonable to define the categories of the service relevant to the library objectives and reflect immediate demands which realistically maximize the user satisfaction within the limited resources of the current environment.

The basics of the service quality evaluation include the premise that the best result is obtained by the user who is satisfied with the library service and who evaluates the service positively. If the user expectation is not met with satisfaction, the library should improve the service quality. This should produce higher user satisfaction when evaluated in the future. Service quality improvement is always in a cycle that reflects the reciprocal relation and it aspires to fulfill the ideal objectives of the library. Thus libraries should keep devising plans to enhance their service quality and focus on providing institutions which support or finance them with significant and convincing accomplishments.

As a tool for measuring the quality of library service it is suitable for the new library environment. The LibQUAL+ model measures and compares the service expectation provided for the user and the actual service quality perceived by the user. If the result of the measurement is 'unsatisfactory' with a significant discrepancy between the service expectation and actual experience then causes of such discrepancy and problems should be identified, studied and analyzed. Accordingly, suggestions can be made to enhance the user satisfaction and service quality improvement (Figure 2).



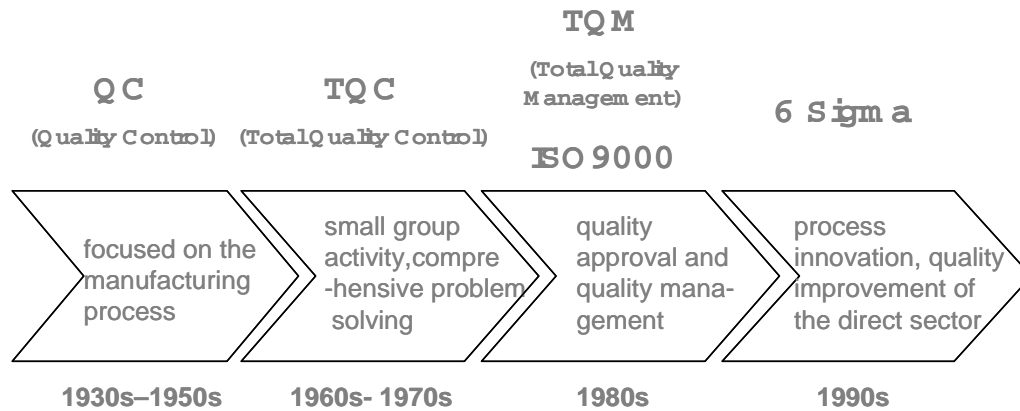
<Figure 2> Quality management process in library

In general, libraries are interested in ‘quality management’ focused on the customer satisfaction as a new management strategy for the improvement of their current ‘quality level’ which is fallen far behind. Quality management is an approach to improve management efficiency and resilience as a whole. It emphasizes people who produce products tailored to the customer demands and process of such production. In other words, quality management is the management philosophy highlighting the importance of perfectly fulfilling customer demands and of performing such task based on the proper procedure from the very beginning. Within the context of such development ‘Six Sigma Movement’ for quality innovation was recently introduced to the service sector and ‘Six Sigma Theory’ is regarded as a systemic and innovative quality control method. Through the evaluation of the library service quality and the improvement plans made as a follow-up measure, libraries can enhance their competitiveness which will facilitate realization of knowledge management.

III. Six Sigma for the Service Quality Improvement

‘Six Sigma Management’ is defined as follows : it is a systemic and innovative activity that assesses the causes for the defects and errors occurred in every sector of the management based on the statistical measure, analyzes the causes and ultimately eliminates them. Definition of the ‘defects’ in the Six Sigma Management includes all factors that hinder process or service. Unlike the conventional innovation methodology which focuses on minimizing defects in the manufacturing venue or on the problem-solving in the specific field, the Six Sigma defines defect as any problem arising in all sectors of the company that is perceived problematic by the management or by the

customer. Thus the Six Sigma is a methodology that thoroughly pinpoints the causes of such defects and eliminates them fundamentally.



<Figure 3> Evolution and Development of the Six Sigma

Quality Control (QC) played important role in improving the product quality of Japanese manufacturers in the 1980s. However, Quality Control was applied only to the manufacturing venue. It focuses on the proficiency of the work performance for a specific process. Total Quality Control (TQC) and Total Quality Management (TQM) expanded the criteria of the quality improvement movement in order to overcome the limit of QC. Nevertheless such expansion was applied partially. On the other hand, the Six Sigma is ‘innovation’ activity for the entire management sector as a whole, instead of focusing on the specific sector.

Introduction of the ISO 9000 Series and the development of the TQM did not attract much attention of the quality management. It failed to develop into a proper management strategy for the work procedure standardization. Under this circumstance the Six Sigma emerged as a scientific quality innovation strategy at Motorola in the USA. The Six Sigma approaches quality innovation based on the statistics and systematically conducts personnel training and quality improvement activities as a management strategy.

Regarding the concept of ‘defect,’ the Six Sigma is distinguished from QC, TQC and TQM. The major difference of the Six Sigma from the existing quality improvement movements is the fundamental elimination of the possibility of defects. It aims to eliminate defects from the very beginning thus it is a total quality improvement movement true to its literary meaning. In short it is a method to control the cause instead of reviewing the result afterwards. It also emphasizes scientific management

based on the objective data. In the Six Sigma all the processes are evaluated quantitatively and it is required to calculate 'Sigma Quality' standard. The ultimate goal of the Six Sigma is to achieve 'Six Sigma Level'.

The term, Sigma, is a sign indicating values that measure dispersion in statistics and it originates from the small letter sigma in the Greek language. The premise of the Six Sigma method is to understand this statistic terminology, sigma, as a 'target value' to be achieved by corporate management. Accordingly, the Six Sigma as a management technique is a long-term corporate strategy in which a superior goal of the minimum defect or error ratio is set to the level of 3.4 / 1,000,000 and the company strives to achieve such high standard. Furthermore it is defined as a statistical method in which the customer demands are identified, transformed into the task to be solved and optimal specification is determined based on the interrelation among each task (Defeo, 1999). It refers to a management innovation technique that applies scientific statistical techniques in all processes for the user satisfaction, achieves high product quality and contributes to the enhancement of the management performance.

One of the most significant characteristics of the Six Sigma application is the importance of the 'measure'. Regardless of the objects subjected to the improvement, something should be 'measured' first in order to be improved. Similarly it is difficult to define or understand if something cannot be articulated as numbers and objective data. It is the core philosophy of the Six Sigma that the project or task must be clearly defined first in order to control it.

Through the transformation of the attitude and work culture in the organization, the Six Sigma encourages employees to work 'smart' instead of merely emphasizing hard-work. It does not demand high standard improvement immediately but it prompts employees to explore and realize the problems to be improved. It is one of the most important factors for the successful management of the company.

