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PREVIEW

**DEVELOPMENT OF A QUALITY MANAGEMENT INFORMATION SYSTEM
FOR HEALTHCARE ORGANIZATIONS**

BY

Ronghua Shan

A DISSERTATION

Presented to the Faculty of

The Graduate College at the University of Nebraska

In Partial Fulfillment of Requirements

For the Degree of Doctor of Philosophy

**Major: Interdepartmental Area of Business
(Management)**

Under the Supervision of Professor Sang M. Lee

Lincoln, Nebraska

August, 1998

UMI Number: 9903784

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Development of a Quality Management Information System for Healthcare Organizations

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University of Nebraska, 1998**

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This research develops a specialized type of information system to monitor service quality in healthcare organizations. Service quality is defined as patients' perceptions of the services they receive from hospitals. SERVQUAL, an extensively used service quality measurement instrument, and its application in hospitals, is used to measure service quality in this research. More precisely, service quality is measured by the following five dimensions: (1) tangibles—physical facilities, equipment, and appearance of personnel; (2) reliability—ability to perform the promised service dependably and accurately; (3) responsiveness—willingness to help patients and provide prompt service; (4) assurance—knowledge and courtesy of employees and their ability to inspire trust and confidence; and (5) empathy—the caring, individualized attention the hospital provides its patients.

A prototype of quality management information system (QMIS) is developed using a Web database. In the prototype system, patients are asked to input their opinions from the Web, and managers can browse both current and historical service quality from a place where the Web is available. The diagnosis standard of service quality data is as follows: service quality is superior if it meets or exceeds the patients' desired service level; good if it is between the patients' required adequate service and desired service levels; and bad if it is below the patients' required adequate service level.

A demonstration of QMIS in a Midwest hospital shows that the system is user-friendly and can help administrators to monitor and improve service quality in the hospital in a timely fashion.

ACKNOWLEDGMENTS

I want to express my deepest appreciation to my advisor, Professor Sang M. Lee for his great guidance, encouragement, and support of my studies. Words can never express my gratitude to him. I am also indebted to Professor Lester A. Digman and Professor Marc J. Schniederjans for their precious advice and guidance. I want to thank Professor James C. Impara for serving on my committee. Thanks also goes to Professor Scott R. Swenseth, all of my discussions with him were inspiring.

Mr. Chad Lauritsen warrants special thanks. Without his inestimable support, suggestions and careful proofreading, this dissertation would not have been possible. His help will always be remembered: he has been a great help and a great friend.

I would also like to thank Mr. Mark Harrington and my fellow graduate students and a number of people whose names are not listed here for their assistance.

Special thanks go to my parents and my sisters. Without their love and support, my pursuit of graduate studies would never have happened.

I thank my daughter, Amy, who joined our family during my doctoral studies, for her patience as she sacrificed time with Daddy. Finally, I am most indebted to my wife, Gewei Cheng. Without her love, encouragement and sacrifice, my graduate work and this dissertation would not have been possible.

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PREVIEW

CHAPTER 1

INTRODUCTION TO A QUALITY MANAGEMENT INFORMATION SYSTEM FOR HEALTHCARE ORGANIZATIONS

The search for quality was arguably the most important trend during the 1980s, yet much remains to be accomplished in management for quality in the 1990s and beyond, especially in the service industry (Babbar, 1991). Service quality is considered by many as the key to gaining a competitive advantage and its importance has been documented in a number of studies (Soteriou and Stavrinides, 1997). Today, the application of total quality management (TQM) in the service industry, especially in the healthcare industry, has become so popular that it is difficult to find a single hospital which has not initiated some kind of service improvement program. Nevertheless, even though the healthcare industry is convinced that total quality management will lead to an improvement in both the quality and efficiency with which health services are delivered, the effectiveness of the program varies greatly among organizations. More and more healthcare organizations have begun to realize that “access to customer information is essential to the success of their quality improvement effort” (Scholtes and Hacquebord, 1988).

Quality and corporate information systems are inextricably linked. The need for information systems for quality management has been argued convincingly by Garvin (1983) in his comparative study of the American and Japanese manufacturing industries. “Clearly, timely, specific, and detailed information is needed to determine

the cause of quality problems, to be able to trace the related quality problems and their impact anywhere in the company, to react quickly to these, and to use related information in all planning problems company wide.”

What roles do information systems play in achieving total quality management in the service industry? According to Fuld (1992), examination of six critical quality factors and their information links can help us understand why information systems are so important in quality management in the service industry.

Factor 1: Customer focus. With information systems, a service company can stay close to the customer and do more than just make monthly visits. This means the company can also listen to what the customer is not saying, as well as to what the customer is saying. As a result, the company can maintain a constant information flow on its market place and its customers.

Factor 2: Meeting commitments. “Zero defects” goals are easier to suggest than to accomplish. Meeting quality, delivery and service commitments involves a complex coordination of goals and activities. Vital to making the “zero defects” goal work throughout the organization is a need for accurate, commonly understood information. If no standard for identifying services is established and each department serves customers its own way, then it will be extremely difficult to come to any conclusions about how the company should do to improve its service.

Factor 3: Process management and elimination of waste. In order to ensure that services are continually improved, data should be collected and analyzed on a continuing basis, with particular attention given to variations in service. Information systems can help monitor the causes of service variation and improve cost-effectiveness and accuracy.

Factor 4: Employee involvement and empowerment. Employee empowerment is one of the paramount interests to all organizations who want to achieve total quality goals. Providing information to employees makes goals explicit and helps direct worker behavior since the decision maker is more informed about the structure of the task. Information also provides workers with quick feedback, and encourages learning, which facilitates a quick identification of solutions by those who are most knowledgeable. Employees need informational tools if they are to make decisions along the way. Information systems can and do improve employee involvement by forcing the information flow to move in many directions throughout a company.

Factor 5: Continuous improvement. Organizations must recognize the need to constantly improve and fine-tune all activities in order to maintain total quality standards. They must also constantly watch the ever-changing business environment. Information becomes necessary for coordinating activities in a continuous improvement environment that maintains a tight relation between production goals and current production. Here information systems are also critical. A company must have the most current and reliable information upon which to base its decisions. If that information is

poor, out of date or just plain wrong, the company will be doing its total quality problem a disservice.

Factor 6: Drastic improvement. Some situations require that the company make a drastic change in its processes for the sake of quality. Information systems can provide continuous information assisting the company in making the drastic changes.

This dissertation is an exploration of the development of a quality management information system to support management for healthcare organizations. This chapter is designed to give a brief introduction and outline of this dissertation. The questions to be discussed are: *What is healthcare service quality? What is the research problem of this study? What is the purpose and contribution of this study? What is the function of a quality management information system in a healthcare organization?* An outline of the study is included at the end of this chapter.

1.1 Healthcare Service Quality

TQM's origins can be traced to a committee of the Union of Japanese Scientists and Engineers, formed in 1949, to improve productivity and enhance the postwar quality of life in Japan (Powell, 1995). The committee developed a statistical quality control course, and worked to disseminate the evolving Deming philosophy among Japanese manufacturers (Walton, 1986). Deming (1982), together with other pioneering researchers such as Juran and Gryna (1974), Crosby (1979), Feigenbaum (1983), Garvin

(1987), and many others who systematically studied this subject, increased the recognition of the importance of the role of quality management.

Quality is regarded as a multidimensional, value-laden construct (Davis 1991), so it is not surprising to observe in the literature wide differences regarding its conceptualization and subsequent operationalization. Effective quality management requires some measures of quality (i.e., quantifiable standards or indicators of performance), which can be monitored to tell a company how well it is doing (Cheng and Ngai, 1994). As Early (1991) says, “Quality improvement without measurement is like hunting ducks at midnight without a moon—lots of squawking and shooting with only random results and with a high probability of damage.”

The development of and use of valid and reliable instruments to measure the quality of care are critically important to quality assurance and to regulation in the healthcare industry (Institute of Medicine, 1986). There are so many different arguments about measuring the quality of healthcare service. There are generally two service quality measures: technical quality and functional quality.

Technical quality involves what the customer is actually receiving from the service and functional quality involves the manner in which the service is delivered (Gronroos, 1982). Various techniques for measuring technical quality have been proposed and are currently in use in health organizations (Joint Commission for Accreditation of Healthcare Organizations, 1987). Because this information is not generally available to

the consuming public, knowledge of the technical quality of healthcare services remains within the purview of healthcare professionals and administrators (Bopp, 1990).

Since patients are often unable to accurately assess the technical quality of healthcare service, functional quality is usually the primary determinant of patients' quality perceptions (Donabedian, 1980, 1982; Kovner and Smits 1978). There is growing evidence to suggest that perceived quality is the single most important variable influencing customers' value perceptions. These value perceptions, in turn, affect customers' intentions to purchase products or services (Bolton and Drew, 1988; Zeithmal, 1988). The measurement developed by this dissertation uses the functional definition of service quality.

1.2. The Quality Management Information System

Service quality management is the consistent provision of services throughout the customer's relationship with the company. Service design, marketing, sales, delivery, customer services, billing, and many other aspects all have a direct or an indirect effect on quality, customer satisfaction and continued customer loyalty.

An information system for service quality management is designed to supply the data that help to define quality standards, to assist in the development of quality improvement programs, to monitor performance, to enable more effective and efficient activities and to enhance the services provided to customers.

The Quality Management Information System (QMIS), which will be developed in Chapter 4, is a straightforward, easy to understand, user-friendly query management information system that is designed to fill a void associated with TQM in the healthcare industry.

1.3. Purpose of the Study

Concerns about the growth of healthcare costs and the rising utilization of advanced facilities have spurred interest in quality as a means of controlling spending growth and improving service (O'Leary and Walker, 1994). According to the report of Levit et al. (1994), healthcare accounts for about 14 percent of the gross domestic product (GDP). Employers, providers, governments, and customers are becoming more vocal about their opposition to paying more for healthcare, facing restricted access to care, or receiving less appropriate care. All of these require improved quality of service in healthcare organizations.

On the other hand, dynamic changes in the healthcare industry also have contributed to the rise of the health quality movement. Continued mergers, consolidation of health plans, and growth of managed-care arrangements have created a highly competitive environment. In order to compete and survive, health plans must provide high-quality care (Furse et al., 1994).

As a result, accurate quality-assessment and patient-satisfaction measures are needed to improve care and service. A successful quality information system for healthcare organizations can provide the information links vital for success in attaining the highest standards of service quality. It can present hospital executives committed to service quality with a useful measurement tool, can track quality improvements. In summary, it contributes to the total service quality effort in a number of ways:

- a. By monitoring patients, it can bring the hospital closer to understanding patients' needs, revealing why patients use competing services.
- b. By knowing the competitors, it can provide the hospital useful information about how to compete in a dynamic environment and how to develop a world-class organization.
- c. By speeding up the flow of internal information through the hospital, a quality information system can provide an important contribution to the total quality effort.
- d. By identifying quality problems, it can help focus on those most significant factors that are vital to the health of the organization.

1.4 Contribution of the Study

This dissertation is an exploratory study of the development of a quality management information system in healthcare organizations. The contributions of this study can be summarized as follows:

- a. Examination of the relationship between healthcare service quality management and the role of information systems.
- b. Detection of silent patient signals and translating them into usable information in order to meet the standards of quality that patients want.
- c. Avoidance of delayed decisions stemming from misinterpretation and delayed processing of information, because delayed decisions may lead to gaps in service quality.
- d. Monitoring of quality performance in healthcare organizations in a timely fashion.
- e. Development of the process for designing the infrastructure of a quality management information system for healthcare organizations.

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1.5 Outline of the Dissertation

This dissertation contains seven chapters. Figure 1.1 shows the organization of the dissertation. Following is a brief description of each chapter.

Chapter 1 has described the purpose of the study and the contribution of the research and has provided a brief introduction to a quality management information system in healthcare organizations.

Chapter 2 provides relevant literature reviews on customer satisfaction, the relationship between customer satisfaction and service quality, the measurement of service quality in healthcare organizations, and existing studies on information systems to support healthcare management.

Chapter 3 addresses the research methodology that is used in this dissertation. The prototyping method used is also explained in this chapter.

Chapter 4 describes the detailed development process of a quality management information system (QMIS) in healthcare organizations. More specifically, this chapter discusses the following issues: 1) the architecture of QMIS; 2) the components of QMIS; 3) the design considerations; and 4) functions and explanations of QMIS.