Paper Title:

Managing Information Systems for Service Quality: A Study from the Other Side

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Abstract:

System quality, information quality, user IS characteristics, employee IS performance and technical support are identified as important elements that influence service quality. A model interrelating these constructs is proposed. Data collected through a national survey of IS departments in electric utility firms was used to test the model using regression and path analysis methodology. The results suggest that system quality, information quality, user IS characteristics through their effects on employee IS performance influence service quality while technical support influences service quality directly. The results also suggest that employee IS performance contributes more to service quality as compared to technical support. Implications of this research for IS theory and practice are discussed.

Keywords: Strategic Information Systems, Service Quality, Electric Utility, Systems Management, United States of America.

Word Count: 7, 583 words.

Managing Information Systems for Service Quality:

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INTRODUCTION

Service organizations are continuously endeavoring to improve their quality of service as it is of paramount importance to them [Berry and Parasuraman, 1997]. The improvement of the quality of services is one of the primary reasons organizations are investing in Information Systems (IS). It has been observed that improved quality is a most important output of information systems or that IS has substantially improved service sector performance. Still, most service companies encounter major problems in evaluating the impact of IS on service quality [National Research Council, 1994]. Thus, it is important and pertinent to understand how information systems impacts service quality.

In the recent management information systems (MIS) literature, quality of systems development [Austin, 2001; Ravichandran and Rai, 2000; Stylianou and Kumar, 2000] and customer service [Karimi *et al*, 2001] has received attention. There have also been many studies on information systems [IS] service quality [Jiang, Klein, and Carr, 2002; Jiang *et al*, 2000; Kettinger and Lee, 1997; Kettinger and Lee, 1999; Pitt *et al*, 1995; Pitt *et al*, 1997; Van Dyke *et al*, 1997;

Van Dyke *et al*, 1999; Watson *et al*, 1998]. Studies have also investigated the quality of system development using the Total Quality Management (TQM) concept [Ravichandran and Rai, 1999; Ravichandran and Rai, 2000]. Although these studies have investigated several aspects of quality, they have not addressed the issue of how information systems impacts service quality. This research considers how information systems impacts service quality. A research model is developed and then empirical data from the electric utility industry are used to validate the model.

The electric utility industry is presently undergoing a great deal of change in the US. In the future, one of the critical skills that will be required for a virtual utility is to consider information systems as the single most important strategic asset [Weiner *et al*, 1997]. Therefore, it is important for electric utility firms managing information systems to improve service quality. A model was developed using theoretical concepts and empirical studies from management information systems, communications and strategy. The hypotheses, based on the conceptual model, were validated using the survey data – which are based on the perceptions of IS Professionals - from the electric utility industry.

DEVELOPING THE CONCEPTUAL MODEL

Several approaches in understanding the impact of information systems in an organization have been taken. Approaches to measuring the effectiveness of

information systems that have been used in previous investigations include, for example, cost-benefit analysis, system usage estimation and user satisfaction [King and Rodriguez, 1978; Srinivasan, 1985]. However, there is no consensus among IS researchers on the conceptualization and operationalization of IS effectiveness [DeLone and McLean, 1992; Goodhue, 1992; Hamilton and Chervany, 1981; Ives and Olson, 1984; Miller and Doyle, 1987; Srinivasan, 1985; Zmud, 1979]. These approaches also do not assess the overall strategic benefits. Even in other related fields of research, one of these approaches has been criticized for the neglect of overall strategic benefits [Mechlin and Berg, 1980].

Studies have stressed the importance of organizational performance in evaluating information systems [Porter and Millar, 1985; Quinn and Baily, 1994]. Attempts to measure IS impact on overall performance are not often undertaken because of the difficulty of isolating the contribution of the information systems function from other contributors to organizational performance. Nevertheless, this connection is of significant interest to information system practitioners and to corporate management [DeLone and McLean, 1992].

IS success is an organizational level measure of an information system and, in general, represents the outcome of an information system. Several researchers have suggested that the success of a computer-based information system is not

a homogeneous concept and, therefore, attempt should not be made to capture it with a simple measure [Vanlommel and DeBrabander, 1975]. Ein-Dor and Segev [1978] have opined that a better measure of MIS success would probably be some weighted average. DeLone and McLean [1992] have written that MIS success is a multidimensional construct and that it should be measured as such. These studies have investigated the area of information system success, although, the factors, variables or measures are different. In spite of the fact that there are so many studies in this area, service quality has not been investigated in any of the studies. Of the few good studies [Kettinger and Lee, 1999; Pitt *et al*, 1997; Van Dyke *et al*, 1997; Watson *et al*, 1998] in IS where service quality has been researched, a theory or framework explaining how IS should be managed for service quality has not emerged. The present study has endeavored to fill this void in the literature.

The quality of the IS function has received greater attention in the recent IS literature than in the past [Ravichandran and Rai, 2000; Stylianou and Kumar, 2000]. There have also been several studies on information systems service quality, which is the quality of the service component of the IS function [Jiang, Klein, and Carr, 2002; Jiang *et al*, 2000; Kettinger and Lee, 1997; Kettinger and Lee, 1999; Pitt *et al*, 1995; Pitt *et al*, 1997; Van Dyke *et al*, 1997; Van Dyke *et al*, 1999; Watson *et al*, 1998]. This service component includes the quality of the customer-support function such as a help desk. The Pitt, Watson, and Kavan

model [1995] has been criticized for not being complete because it ignores several different factors [Stylianou and Kumar, 2000]. Other studies have investigated the quality of system development using the Total Quality Management [TQM] concept [Ravichandran and Rai, 2000; Ravichandran and Rai, 1999]. Although, these studies have investigated several aspects of quality they have not addressed the issue of how information systems impacts service quality. Hence to address this gap in MIS research, a model is developed and then empirical data from the electric utility industry are used to validate the model.

The conceptual model is partially based on DeLone and McLean's [1992] taxonomy of information system success. Their taxonomy, in turn, is based on the pioneering work of Shannon and Weaver [1949] in the area of communications theory and the subsequent refinements of their taxonomy by Mason [1978]. Thus, the various factors in the conceptual model fall in the different categories of technical level, semantic level and effectiveness level. Since the DeLone and McLean [1992] model is based on the Shannon and Weaver [1949] model, which is product-oriented, some changes were necessary here in order to make the conceptual model more relevant to a service organization. The conceptual model shown in Figure I was developed with the help of an in-depth case study. It elucidates various factors of information

systems that are directly or indirectly related to service quality. The hypotheses shown in Figure I are discussed in the next section.

The conceptual model (Figure I) elucidates the relationship between the various factors that comprise information systems and service quality. Service quality is a function of several factors. Factors such as system quality, information quality and employee IS characteristics affect service quality indirectly. Technical support influences the service quality directly. System quality, information quality and employee IS characteristics affect employee IS performance, which, in turn, impacts the service quality. Each factor is defined in detail in the following sub-sections, which have been titled as factor names. The various factors of the model are discussed using theoretical reasoning and/or empirical evidence.

The research model examines the relationship between how information systems (system quality and information quality) and its service manifestations (technical support), along with employee IS characteristics, impact the IS performance of employees. This factor in turn impacts the dimensions of service quality. Since this relationship is only visible to the IS Professionals, it is imperative that they evaluate the potential impact of IS on service quality. A study on SERVQUAL has investigated this issue from the other side (Jiang, Klein, and

Carr, 2002). It is also important to validate that this impact of IS on service quality exists through the customers, who are actually evaluating the service quality.

To understand how IS actually impacts service quality, one method is to measure the perceptions of the practitioners of information systems of their work on service quality dimensions. Customer contact employees or service employees are, in effect, intermediate customers of various support services and intermediate service quality problems result in problems at the consumer level [Zeithaml, Parasuraman, and Berry, 1990]. The present research deals with the first part of evaluating the relationship using perceptions of IS Professionals.

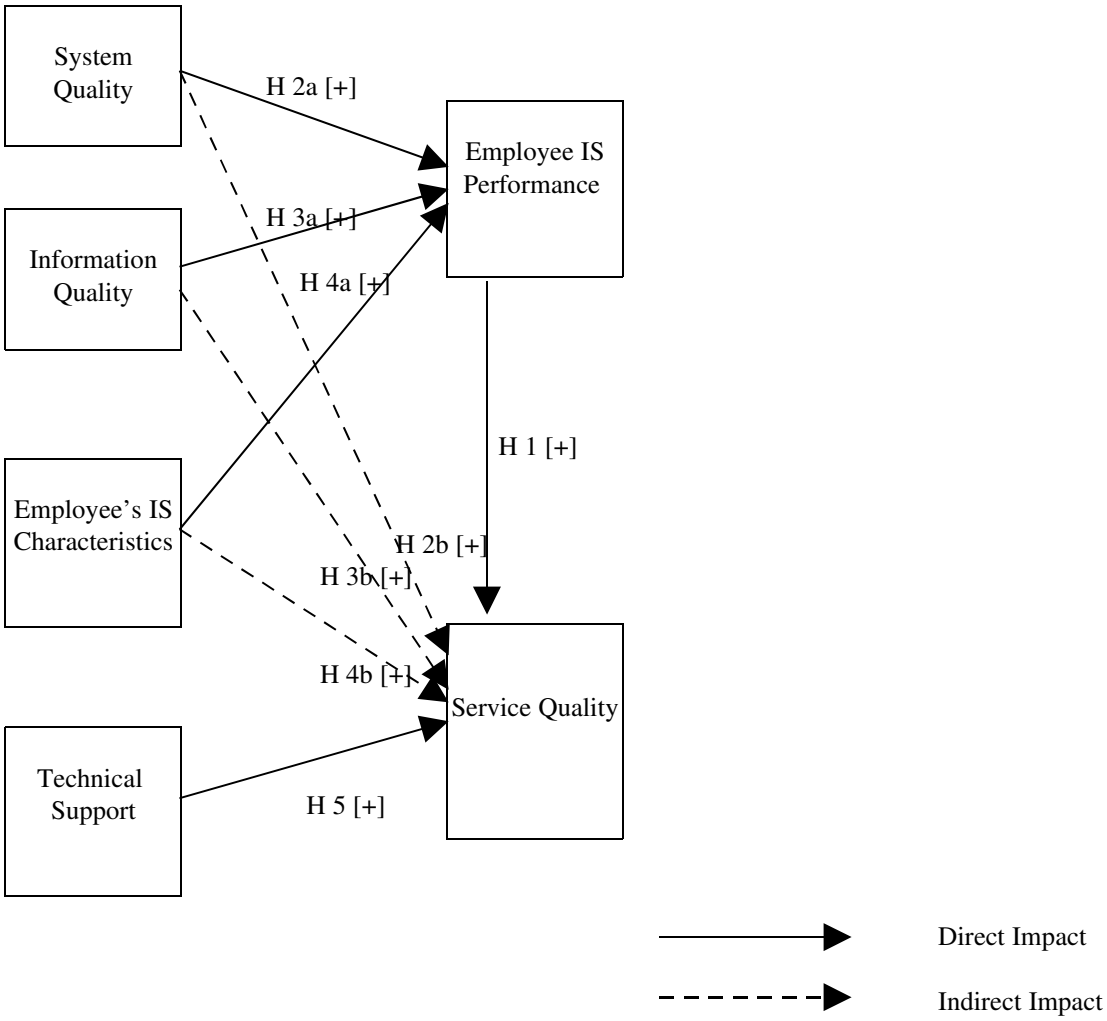

Figure I: Model for Managing Information Systems for Service Quality: A Study from the Other Side

Service Quality

The increasingly important role played by services and the inability of researchers to apply traditional manufacturing definitions to service quality has led to a new conceptualization of service quality. One definition of service quality has been considered most appropriate by service scholars [Gronroos, 1982; Parasuraman, Zeithaml and Berry, 1985]. That definition is governed by the extent to which a service met the expectations of customers [Reeves and Bednar, 1994]. Investigators have proposed various dimensions and approaches of service quality [Gronroos, 1982], the most widely used and accepted being those proposed by Parasuraman, Zeithaml, and Berry [1988].

The initial ten dimensions have been reduced to five and, subsequently, been developed into an instrument [Parasuraman, Zeithaml, and Berry, 1988]. The five dimensions are tangibles, reliability, responsiveness, assurance, and empathy. Tangibles include the physical evidence of the service. Reliability includes the ability to perform the promised service dependably and accurately. Responsiveness includes the willingness to help customers and provide prompt service. The other two dimensions, assurance and empathy include items from the seven original dimensions. Assurance includes the knowledge and courtesy of employees and their ability to inspire trust and confidence. Empathy includes the caring and individualized attention the firm provides its customers.

The gap model of service quality [Parasuraman, Zeithaml, and Berry, 1988] has been criticized because of some conceptual problems. There are also problems with the SERVQUAL instrument, which is the operationalization of the gap model. At the theoretical level, the perception-minus-expectation measure of service quality has been criticized, because it does not portray the cognitive process very well [Carman, 1990; Van Dyke, Kappelman, and Prybutok, 1997]. The perception-only measure of service quality has been found to be theoretically and empirically superior to perception-minus-expectation measure of service quality. The literature [Babakus. and Boller, 1992; Cronin and Taylor, 1992; National Research Council, 1994; Parasuraman, Berry and Zeithaml, 1993] reveals that perceptions-only scores are superior to the perceptions-minus-expectations difference scores in terms of reliability, convergent validity and predictive validity. Therefore, a perception only measure of service quality was employed here.

Another often mentioned conceptual problem with SERVQUAL concerns the applicability of a single instrument for measuring service quality across different industries. One study found that additional items needed to be added to SERVQUAL to make it relevant to a particular service industry [Carman, 1990]. A study of service quality for the retail sector also concluded that utilizing a single measure of service quality across industries is not feasible [Dabholkar, Thorpe, and Rentz, 1996]. The conclusion was that considerable customization is

required to accommodate differences in service settings [Van Dyke, Kappelman, and Prybutok, 1997]. The instrument requires some industry-specific adjustments in order to make it more applicable to the electric utility industry. Service quality in this model is measured based on the IS division's perception.

Employee IS Performance

The impact of the information system on the employee IS performance has an influence on the quality of service provided. The affect of information on the behavior of the recipient constitutes employee impact [DeLone and McLean, 1992]. Emery [1971] has written that information has no intrinsic value; any value comes only through the influence it may have on physical events and such influence is typically exerted through human decision makers. This is particularly true in the nature and variety of services delivered in the electric utility industry.

In the case of employee IS performance, many different variables have been used in various studies. In an information system framework [Chervany, Dickson, and Kozar, 1972] decision effectiveness was used. Efficiency of task completion, which is a measure of speed of completion, has also been used with different variations in several studies [DeBrander and Thiers, 1984; Sanders and Courtney, 1985]. Other measures such as decision confidence [Goslar, Green, and Hughes, 1986; Guental, Surprenant, and Bubeck, 1984; Zmud, Blocher, and Moffie, 1983] and time-to-decision [Belardo, Karwan and Wallace, 1982;

Benbasat, Dexter, and Masulis, 1981; Hughes, 1987] have also been employed. These measures were used to measure employee IS performance.

Hypothesis 1: Good employee IS performance will positively contribute towards service quality.

System Quality

System quality represents the quality of the information system itself. Broadly speaking, this quality is a manifestation of system hardware and software. Therefore, the quality of the system is manifested in the system's overall performance, which can be measured by individual perceptions. Perceptual measures such as ease of use [Belardo, Karwan, and Wallace, 1982], convenience of access [Bailey and Pearson, 1983], system reliability [Srinivasan, 1985] have been used in the survey instrument to measure system quality.

Hypothesis 2a: Good system quality will positively contribute to employee IS performance.

Hypothesis 2b: Good system quality will positively contribute to service quality through effects on employee IS performance.

Information Quality

The information provided by the information system is important and, consequently, quality of information has been discussed a great deal, in the IS

literature. Gallagher [1974] has used user perception of the value of information system to determine the information quality of the system. The value of an information system is estimated by the decision-maker. In another study [Larcker and Lessig, 1980], the perceived importance and usableness of information is underscored. Some researchers have proposed multiple information attributes, reflecting information system value [King and Epstein, 1983]. Information quality has also been emphasized in research on service quality [Berry and Parasuraman, 1997]. In some studies, information quality has not been considered separately but as an integral part of user satisfaction [Bailey and Pearson, 1983] or user information satisfaction [Iivari, 1987]. The measures that have been used for information quality are information accuracy [Bailey and Pearson, 1983; Mahmood, 1987; Miller and Doyle, 1987; Srinivasan, 1985], information completeness [Bailey and Pearson, 1983; Miller and Doyle, 1987], information relevance [Bailey and Pearson, 1983; King and Epstein, 1983; Miller and Doyle, 1987; Srinivasan, 1985] and information timeliness [Bailey and Pearson, 1983; King and Epstein, 1983; Mahmood, 1987; Miller and Doyle, 1987; Srinivasan, 1985].

Hypothesis 3a: Good information quality will positively contribute to employee IS performance.

Hypothesis 3b: Good information quality will positively contribute to service quality, through effects on employee IS performance.

Employee IS Characteristics

Employees perception of IS is a key factor in determining the performance of the employees. Attitudes and feelings of the employees toward IS, the feeling they have toward IS [Bailey and Pearson, 1983; Goodhue, 1986], the experience they have had in the information systems and the training they have had in the information systems constitute employee IS characteristics. The case study was instrumental in adding this factor to the model.

Hypothesis 4a: Favorable employee characteristics in regard to information technologies will positively contribute to employee IS performance.

Hypothesis 4b: Favorable employee characteristics in regard to information technologies will positively contribute to service quality, through effects on employee IS performance.

Technical Support

The information systems department in a firm is also a provider of service to the users, specifically technical support. This service is an integral part of the complete set of IS products and/or service provided by the IS department. Irrespective of whether a user interacts with one or multiple information systems, the quality of technical support can influence service quality. The technical support, thus, is of importance to the user as well as to the ultimate customer. The technical support has an impact on service quality, especially when the information systems is critical to the performance of the firm. Technical support

responsiveness, competence and dependability have been employed as measures of technical support in several previous studies [Jiang *et al*, 2000; Kettinger and Lee, 1999; Pitt, Watson and Kavan, 1995; Pitt *et al*, 1997; Van Dyke *et al*, 1997; Van Dyke *et al*, 1999; Watson *et al*, 1998].

Hypothesis 5: Good technical support will positively contribute towards service quality.

METHODOLOGY

In information systems research, a combination of research methods has been stressed. A study of survey research methodology in MIS has suggested that more mixing of research methods is desirable in MIS survey research [Pinsonneault and Kraemer, 1993]. Pinsonneault and Kraemer [1993] have especially recommended the use of case studies and field observations with surveys. In the present research, the triangulation method, a combination of case study and survey, was used to study the research hypotheses. An in-depth case study was conducted of Duquesne Light Co. in Pittsburgh, PA, the details of which have been published separately.

The survey was operationalized based on the literature, as discussed in the previous section. A pre-test of the survey was conducted before the administration of the survey. Thereafter, the survey was customized according to

services provided and information technologies used in the electric utility industry. Electric utility firms were selected from the American Business Database. This database lists all the firms in the US by industry according to SIC codes. The SIC codes were used to develop the list of electric utility firms. This information source was supplemented by other sources of information such as the Electric Power Research Institute and Edison Electric Institute websites. The survey was sent to firms in the electric utility industry.

RESULTS

The surveys were targeted to the information systems divisions of the electric utility firms. Accordingly, the unit of analysis was the information systems division of the firm. The questionnaire was sent to the electric utility firms who agreed to participate in the research study. The investigator presented a brief overview of the study after calling the electric utility firms and requesting the firms to participate in the research study. One person per IS division in the electric utility was asked to complete the survey, although, the level of the person who filled the survey varied based on the size of the firm. Surveys were sent to 320 IS divisions within 101 electric utilities. The usable response rate for the survey questionnaire was 25 percent. Thus, there were 80 respondents with 39 percent of electric utilities responding to the survey. This response represents a substantial number of firms in the US electric utility industry.

Of the total respondents, 53% were from pure electric utilities, 36% from electric and gas utilities and 6% from electric, gas and water utilities. The respondents were distributed over different firm sizes as measured by the total regulated and unregulated revenues of the firm. A majority of the respondents [56 %] were from a utility with revenues ranging from $ 1 to 3 billion and 22% in the greater than $ 3 billion range. Ten percent and 9% of the respondents belonged to the $ 500 million to $ 1 billion and $ 100 million to $ 500 million range, respectively.

Table I: Correlation Analysis of Variables

Hypothesis	Variable	Variable	Pearson Correlation
H1	Employee IS Performance	Service Quality	0.57*
H2a	System Quality	Employee IS Performance	0.70*
H2b	System Quality	Service Quality	0.58*
H3a	Information Quality	Employee IS Performance	0.69*
H3b	Information Quality	Service Quality	0.56*
H4a	Employee IS Characteristics	Employee IS Performance	0.65*
H4b	Employee IS Characteristics	Service Quality	0.53*
H5	Technical Support	Service Quality	0.52*

* $p < .01$

Correlation analysis was performed on the variables that were part of each hypothesis. This was done to demonstrate how the variables in each hypothesis were associated. The Pearson's correlation coefficients are displayed in the results. The correlation analysis results reveal [Table I] that the variables in the

hypotheses are correlated and that the results are significant. As expected, the correlation coefficient is positive in each hypothesis.

The reliability of test instruments was evaluated using the Cronbach's alpha coefficients. Cronbach has stressed the importance of reliability [Cronbach, 1970]. The Cronbach's alpha coefficients have been computed and summarized [Table II] for all the variables. The high values of these Cronbach's alpha coefficients suggest that each group of items/questions represent a common variable.

Table II: Reliability Test of Variables

Variables	Cronbach Alpha	
	Raw Variables	Std. Variables
Service Quality	0.69	0.71
Employee IS Performance	0.88	0.89
System Quality	0.81	0.80
Information Quality	0.85	0.85
Employee IS Characteristics	0.95	0.95
Technical Support	0.91	0.91

Multiple regression was performed on the data to further understand the relationships between the variables. Table III shows the results of the regression analysis. Path analysis is a form of applied multiple regression analysis that uses path diagrams to guide problem conceptualization or to test a complex hypothesis. It enables the calculation of direct and indirect influences of independent variables on dependent variable [Kerlinger, 1992]. This technique has been used to explain the results of the multiple regression analysis.

Table III reveals that the regression model of service quality is significant. It shows the relationship between service quality, employee IS performance and technical support. The coefficients are positive for both employee IS performance and technical support, and the result is significant. Table III also shows that the regression model of employee IS performance is significant. The coefficients are positive and significant for system quality, information quality and employee IS characteristics.

Path analysis was employed to explain results of the regression analysis and an integrated model is presented in Figure II. This model depicts the impact of different variables on service quality directly and indirectly through the effects on employee IS performance. As shown in Figure II, system quality, information quality and employee IS characteristics positively impact employee IS performance. Employee IS performance has a positive impact on service quality. Hence, indirectly, system quality, information quality and employee IS characteristics positively impact service quality. Technical support also has a positive impact on service quality.

Table III: Multiple Regression Analysis of Variables
[Models: Service Quality and Employee IS Performance]

Variable	**Model: Service Quality**	**Variable**	**Model: Employee IS Performance**
Employee IS Performance	0.38*	System Quality	0.32*

Technical Support	0.29*	Information Quality	0.35*
		Employee IS Characteristics	0.34*
R-Square	0.42*	R-Square	0.62*

* $p < .01$

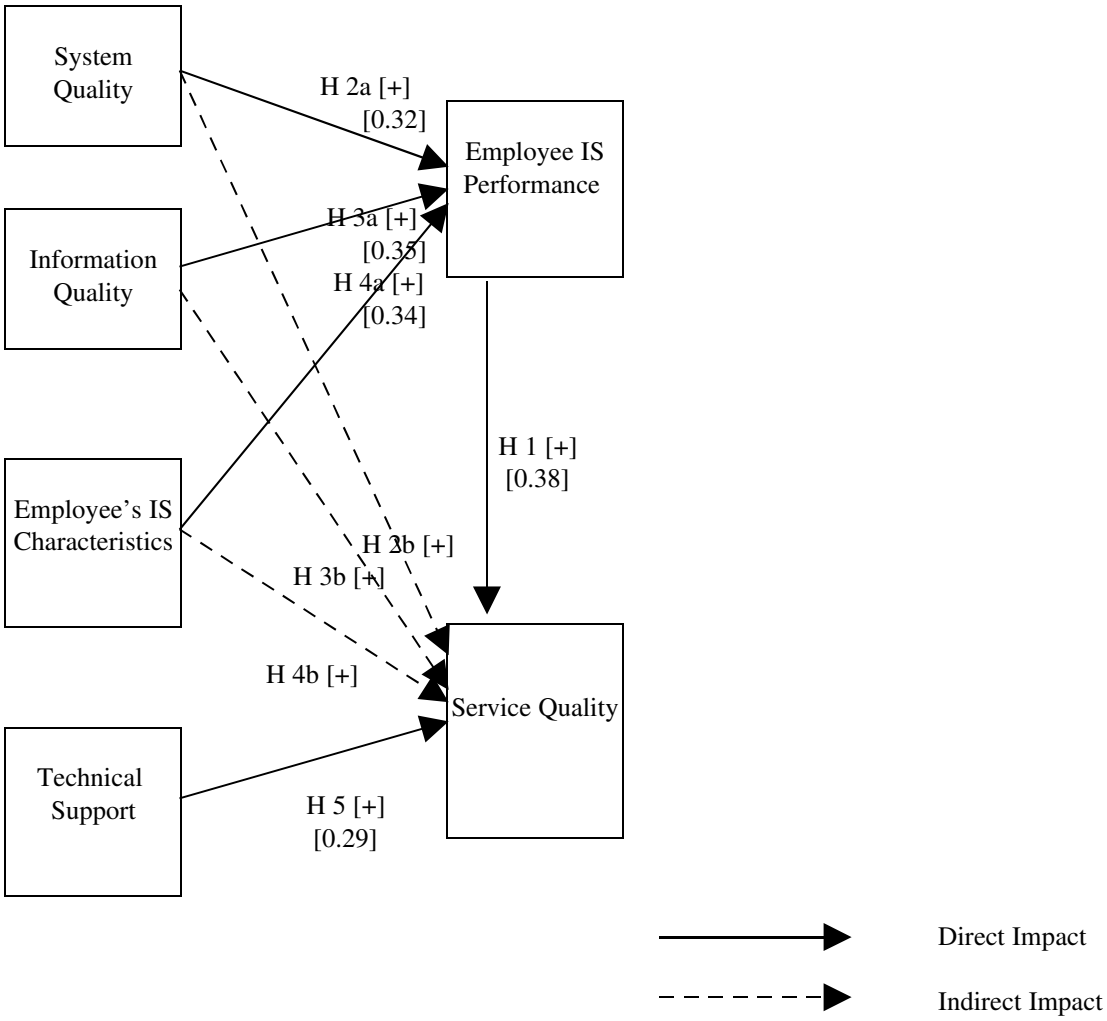

Figure II: Model for Managing Information Systems for Service Quality: A Study from the Other Side [with results]

LIMITATIONS

There are some limitations of the study. First, the point of view taken in this study has been from the individual organization's perspective. Thus, the study, which is based on perceptions of IS Professionals, has focused on how the firm can impact the services provided by the organization. Second, the qualitative and quantitative data collected in the research study represents the opinions and perceptions of the IS Professionals in the electric utility firms. Although these persons are knowledgeable and experienced, the results are nonetheless still based on their perceptions and not on measurable output. Third, since the surveys were mailed to the respondents this causes a bias because the respondents tend to give a positive evaluation of their own information systems projects. This bias is not characteristic of this research but rather applicable to all similar survey research. Fourth, the quantitative data were collected using a survey instrument. Since this was a correlational study no causal relationships can be drawn among the variables. But as part of this research, an in-depth case study of an electric utility firm was used to develop and strengthen the causal relationships.

DISCUSSION AND RESEARCH IMPLICATIONS

Service quality itself has been a subject of intense research in management, especially in marketing, although in the area of management

information systems research studies have focused largely on service quality of the IS function. There have been no research studies that have investigated how information systems contributes to the service quality in an organization. The objective of the present research was to contribute to the theoretical and practical understanding of how IS impacts the service quality of an organization. The approach in achieving this objective has been to draw on theories of IS success, service quality and communications, and, then, developing and testing a theory for management of IS for service quality.

The research model used here was partially based on the work of DeLone and McLean [1992], who built their model on the work of Shannon and Weaver [1949] and Mason [1978]. According to their theory, the impact of information systems is at different levels, and the impact at the organizational level is through IS's impact on other previous levels. Therefore, the model explaining the impact of IS on service quality, which was validated using qualitative and quantitative data, has also supported the theory of DeLone and McLean [1992] that the information systems has an impact on an organization at different levels. First, it has an impact at the technical level and semantic level, which is represented by system quality and information quality respectively. Then, system quality and information quality, along with employee IS characteristics, have an impact on the individual level, i.e. employee IS performance. The individual level, in turn, has an impact on the organizational level, i.e. service quality. The present

research reinforces the notion that the impact of information systems is at different levels, and that the impact at the organizational level is through IS's impact on other preceding levels. Therefore, the theoretical contribution of the research here is that it supports the theory of DeLone and McLean [1992].

The analysis of quantitative data has supported the hypotheses of the study. The empirical data, based on the perceptions and opinions of IS Professionals, have aided in the development of a model to explain how information systems effects service quality. The study used theoretical and empirical evidence to propose a framework and, then, validate it using quantitative data from the electric utility industry. The validated framework suggests which factors of information systems impact service quality directly and which factors impact service quality indirectly. The results have demonstrated that system quality, information quality and employee IS characteristics influence employee IS performance, which, in turn, affects the service quality. Therefore, it is important to note that a change in service quality of an organization can be as a result of the effects of information quality, system quality or employee IS characteristics on employee IS performance. On the other hand, technical support has a direct effect on service quality.

The results also suggest that system quality, information quality and employee IS characteristics have an almost equal influence on the IS

performance of the employees. As system quality, information quality and employee IS characteristics individually and jointly affect service quality through employee IS performance, their contribution to service quality is similar. Employee IS performance has a greater affect as compared to technical support on service quality.

The present study has proposed and validated an integrative and parsimonious framework that not only explains the impact that information systems has on service quality, but also provides a framework that might be used, after some modification, to explain the impact of information systems on service quality in other industries. The study found that technical support effects service quality directly. In the electric utility industry, most of the service is delivered through employees and the employees are dependent on IS to deliver these services. If the responsiveness of technical support is inadequate, it hampers the ability of employees to provide service, hence negatively impacting service quality. Thus, technical support effects service quality directly and not through its effects on employee IS performance.

The research here has several implications for information systems practice. IS managers in organizations are constantly endeavoring to manage information systems so that desired effects can be achieved in the organization's performance. In service organizations, it is imperative to improve or maintain the

level of service. The study found that system quality indirectly impacts service quality. Therefore, managers should ensure that for service quality, adequate attention is given not just to the quality of the system, but also to employee IS performance as well in order to ensure adequate service quality. In the electric utility industry, the ease with which the system can be used by customer service representatives helps the representatives to service customers better. This, in turn, aids in improving the quality of services that the organization is providing. Information systems and user IS characteristics have an impact on service quality through their effects on individual IS performance. So, as an instance, information usableness and IS attitudes of employees will impact IS performance of employees and which, in turn, influences service quality. Thus, this will help IS professionals and managers decide what aspects of IS they should focus. It is usually difficult to understand the impact IS has on service quality because the effect is obfuscated by several other factors. The research model developed here will help provide this insight.

A modified framework can be used to explain how service quality is effected in other service organizations because the impact varies by the nature of the service provided. In the case of e-services, for example, a modified version of this framework can be used, although, the exact framework will be function of the type of service being delivered. For instance, one of the aspects of the model

that might have to be rethought is individual IS performance because in e-services there is an absence of employees in the service delivery process.

FUTURE RESEARCH

The research framework presented here explains the relationship between IS and service quality. A significant amount of future research will be required before this framework will be robust. Research can be done to further this study. First, more empirical and theoretical studies should be conducted in the electric utility industry to make this framework more robust. In empirical studies, both the qualitative and quantitative data should be used to enhance this framework.

Second, research studies should be conducted to assess how information systems are impacting actual service quality at the organizational level by extending the research framework. Figure III illustrates the path information systems takes to effect the service quality of an organization. The figure is divided into three different parts and each part is shown along with a box with references. The first section depicts various factors and how they impact IS division perception of service quality. The second section reveals how IS division perception of service quality should map to IS customer perception (internal customer i.e. employees) of service quality. Finally, the third section portrays how IS customer perceptions of service quality should contribute to the firm's customer's perceptions of service quality. This long causal chain needs to be

investigated in order to understand the complete and real impact of IS on service quality. Very little work has been done to understand this causal chain. Figure III presents references for selected research that has been done throughout this causal chain. The present research is the only study that has been done to understand the relationship between IS and IS division perceptions of service quality. Accordingly, more work should be done (research gap A). Apparently, no work has been done to understand the relationship between either IS division perceptions of service quality and IS customer perceptions of service quality (research gap B) or IS customer's perceptions of service quality and firm's customer's perception of service quality (research gap C). However, as the references in Figure III reveal there has been some work done in the area of IS customer's perceptions of service quality and firm's customer's perceptions of service quality.

Third, although the framework was developed for the electric utility industry, it can possibly be used in other service industries. Since there are commonalties between various sectors in the service industries, the model can likely be used as a starting point in developing a framework for a particular sector in the service industry. Another reason is, since this framework was developed from concepts that are more widely applicable, it would probably be of value in designing models for other service industries. The research framework is made specifically for the electric utility industry and does reflect how services are

organized in that industry. It could be applied with minimal modifications to industries in which the services are organized similarly. For other industries, where services are organized in very different ways, more modification would be required.

Finally, research should also be conducted using measurable quantitative data collected from the electric utility industry or some other service industry. But this data are very difficult to access because operational level data are not available from most firms. If this data were to become available, however, then several statistical techniques could be used to investigate the relationship between quantifiable/measurable outputs of information systems and service quality.

CONCLUSION

This research began with the issue of how to improve service quality using information systems. A model was developed and validated using data from the electric utility industry. The results reveal that the impact on service quality is direct as well as indirect. The indirect impact of IS on service quality is through the individual level. This research represents a significant effort at integrating varied, but complementary literature, to develop a theory in a new and important area of MIS research. The results will advance understanding in this area of MIS research, i.e. managing information systems for service quality. The research

also provides insight for IS Professionals on how to manage information systems in order to improve service quality in their organizations.

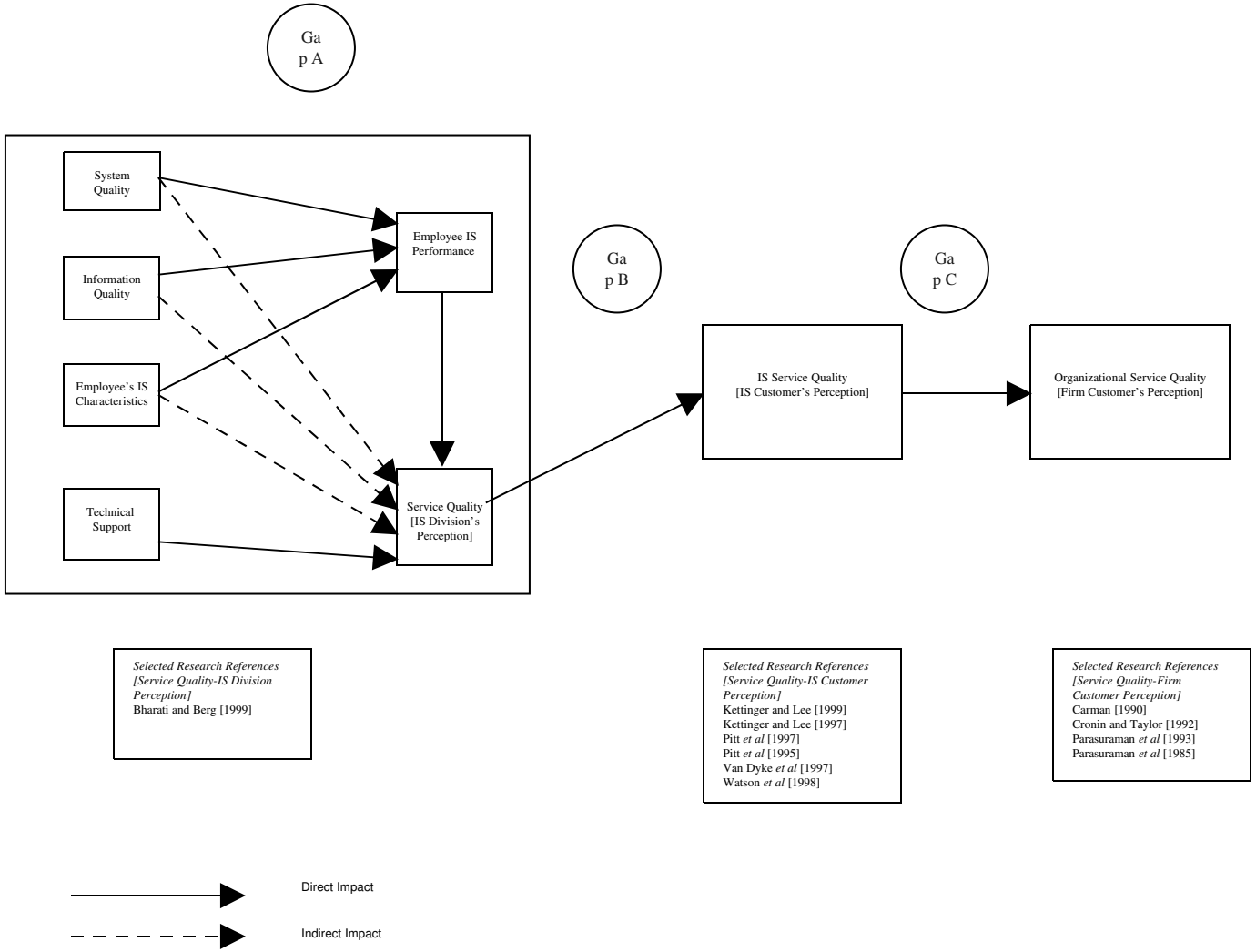

Figure III: Gaps in Management of Information Systems for Service Quality Research

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