

Analysis of Information Systems Applied to Evaluating Tourism Service Quality Based on Organizational Impact

Min Wei

School of Management, Xiamen University, Xiamen, China

Email: xiada2000@xmu.edu.cn

Abstract—Organizational impact on information systems plays an important role for tourism managers' attention towards improving tourism service quality. As tourism service quality depends on information systems, which is important to determine what aspects of organizational impact that are critical to the managers of tourism enterprises to devise effective tourism service quality improvement strategies. In this paper, the model of the relationship of information systems, tourism service quality and organizational impact is constructed to solve the problems of the correlation among them. The organizational impact is hypothesized in which information systems and tourism service qualities are high. Meanwhile, a positive relationship between information systems, tourism service quality can be drawn. Hereafter, the hypotheses can be tested with the survey data. Finally, the results of this paper show that the tourism service quality is the most influential variable in the model proposed, which highlighted the importance of information systems applied to tourism service quality based on organizational impact.

Index Terms—Organizational impact, information systems, tourism service quality

I. INTRODUCTION

Tourism service quality in an organization (tourism enterprises, such as travel agencies, hotels and other enterprises involved tourism) is defined in terms of quality of excellence, quality of value, quality of conformity to specifications, and quality as meeting tourism customer expectations. Tourism service quality can be understood using Liang (Liang, 2008). Due to the current number of tourism enterprises in the service of each quality system are lack of effective interface between subsystems mechanism, resulting in not to mention tourists for high-quality tourism products. Therefore, excellence in tourism service quality involved using service quality technology is becoming very important. The value of information systems can be realized by improving profit margins for the tourism enterprises, by which the useful applications and maintainable software can be provided. Information systems quality as conformance denotes designing the systems that conform to the end tourism consumers' information requirements. In order to meet the tourism customer expectations, the quality of information systems

is accomplished by offering appealing, user-friendly interfaces, entertaining user requests for change.

This study tried to compare with the previous service studies and testify whether the model could capture the study tourism service phenomena to find the importance of organizational impact in terms of the information systems being applied to tourism service quality. In fact, the information systems applied to tourism service quality represents the quality of information processing itself, a system offering key functions and features, and software that is user friendly, easy to learn, and easily maintainable. Information quality, a concept that is related to the quality of information system outputs, can be described in terms of outputs that are useful for business users, relevant for decision making, and easy-to-understand, as well as outputs that meet users' information specifications. Tourism service quality is defined as the level of tourism service delivered by information systems, which provide tourism consumers in terms of reliability, responsiveness, assurance, and empathy. These concepts of information systems in terms of tourism service quality are reflected through information systems meeting tourism consumers' expectations.

II. LITERATURE REVIEWS

Tourism service is a commodity whose quality depends on the aspects that are intrinsic attributes of several activities related with this kind of service: activities that happen from tourists' tourism consumption, such as arriving at airport, traveling in scenic zone, and so on. The quality of tourism service involved with tourism plays an important role in the process of delivery (Wyllie 2000) and thus is the standard used to assess the effectiveness of a particular leisure service agency, including the tourism service sector (Godbey 1997). Service quality is an intangible, but crucial, area of interest to travel service providers. As described above, the major service evaluation tool is SERVQUAL model, and Parasuraman et al. Parasuraman et al. (2005) developed a multiple-item scale (E-S-QUAL) based on theoretical foundations for evaluating the service quality delivered by Web sites in the process of placing an order. They collected 549 questionnaires through an online

survey. The findings revealed that two scales were possible for online customers: E-SQUAL (the basic scale) and E-RecS-QUAL. The former included 22 items of four components: efficiency, fulfillment, system availability, and privacy. The latter was relevant only to customers who experienced non-routine encounters and included 11 items with three components: responsiveness, compensation, and contact.

In spite the kinds of tourism service, the quality is essential. Therefore, more and more researchers try to study the contents of tourism service quality. See Figure 1.



Figure 2. Research on tourism service quality

Total Quality Management (TQM) influences organizational performance as quality of products and services has been found to be the most important factor determining businesses' long-term success (Anderson and Zeithaml, 1984). By TQM, the productivity, knowledge, skills, self-awareness and corporate identity and sense of responsibility of the employee in tourism enterprises can be improved (Tu, 2010). TQM uses a broad definition of quality. It is not only related with the final product, and also with organizations such as the any delivery, how to quickly respond to customer complaints, how to provide for our customers to better after-sales service for all relationships (Zhang, 2008). Systems are designed and constructed accurately for the system development process (Geoffrey Wall, 2005). Nevertheless, application of IS quality management techniques such as the Capability Maturity Model (CMM) has resulted in improved system development productivity. Organizations can achieve improvements in system quality, development cost, and project schedule with IS quality management practices. Some of these practices include institutionalization of quality management practices, senior management leadership, and establishment of performance standards for system development activities with the employee of tourism enterprises (Choy, D.J.L., 1995). However, an integrated approach in the application of TQM techniques in the IS context is lacking; in particular, there has been less emphasis on the application of quality management techniques for improvement of information quality and service quality. In spite of their importance, information systems quality issues have not been given adequate emphasis by IS researchers (Luk S T K, R Layton, 2002).

Petter et al. (2008) believed that there is insufficient empirical evidence to evaluate most of the relationships at the organizational level.

Collier and Bienstock (2006) extended service quality research on e-service quality to include both Website interactivity and outcome quality. Unlike the previous studies, this study used a formative model instead of a factor model including three second-order dimensions to conceptualize e-service quality. Three hundred and thirty eight college students participated in the survey. The results found that customers evaluated the design, information accuracy, privacy, functionality, and ease of use of a Web site in the process for placing orders. This process quality had positive impact on their perception of the outcome quality of the transaction. In addition, the handling of service is recovery positively influenced customer satisfaction. Lastly, they found that there was a mediating effect of customer satisfaction on the relationship.

Between recovery and outcomes to behavioral intentions. Getty J M, R L Getty (2003) believed that existing tourism service focused on the information systems department to improve the quality of tourism service. With an increasing percentage of information systems budgets being devoted to tourism services to improve tourism service quality, more emphasis is being given to the service dimension of information systems. The SERVQUAL instrument (Alvin, 2005) has been validated and used in the information systems context and validated this instrument with direct measures for applicability in the IS context. An updated information systems success model was proposed in 2003 by DeLone and McLean, which includes IS service quality. Knutson, B, Stevens, P, Wullaert, C, Patton, M, & Yokoyama, F. (1990) replaced the individual impact and organizational impact constructs of the original information systems success model with constructs in the model, which can be applied to the multiple levels of analysis. Petter et al. (2008) analyzed the relationships between the six constructs of the model by reviewing 180 articles related to information systems success during the period of 2000–2009. They determine the relationship between information systems success variables, user-related constructs, and context-based constructs. Bradley et al. (2006) studied the impact of plan quality on organizational impact through the intermediary variables of system quality and information quality. They concluded that variations in information systems success are explained by variations in plan quality and corporate culture exhibited by the tourism enterprises. The relationship between system quality and organizational impact was significant for tourism enterprises in a limited way but not significant for formal tourism enterprises.

The recent study analyzed the relationship between leadership, information system, service quality, and net benefits of tourism enterprises through a field survey of a municipal model, which showed support for the relationship between overall tourism service quality and overall net benefits of tourism enterprises in this setting. The net benefits construct used is not solely an

organizational impact instrument as it has three questions relating to individual satisfaction, individual performance, and organizational performance. As the tourism service quality measure they used is a combination of the three quality aspects, the respective impacts of system quality, information quality, and service quality on the dependent variable are not known. The organizational impacts of interest would be different for this type of organization compared to typical tourism business organizations.

III. ORGANIZATIONAL IMPACT

The organizational impact that information has on organizational performance is difficult to isolate amidst many other factors, both internal and external to the firm. Some researchers have attempted to look at the value of technology investments through quantifiable financial measures such as investment and ROI, market share, cost, productivity analysis, productivity paradox, and profitability.

The quality of information systems has been grouped by previous researchers into 6 factors: system quality, software quality, hardware quality, data quality, information quality, as well as, service quality in improving the tourism service quality. See Figure 2.



Figure 2. Improving the tourism service quality

Of these, system quality and software quality are closely related as both relate to the technical aspects of a software system. Organizational impact represents the benefits of tourism enterprises received by an organization because of information systems applications. An information system impacts the tourism enterprises by changing the markets, products and services or the economics of tourism service. An instrument for organization has impacted the business value of information system on various business activities within the value chain. The six dimensions used by this paper are process planning and support, supplier relations, service and operations, service enhancement, marketing support, and customer relations.

service and operations, service enhancement, marketing support, as well as, customer relations. The above dimensions were intended to span all value chain activities on the premise that information system impacts both primary and secondary activities of a value chain. See Figure 3.



Figure 3. The six dimensions of organizational impact involved information system

An instrument for organizational impact in the context of tourism enterprises systems success is proposed by Ekinici Y(2002) that included items such as cost reduction, productivity improvements, increased capacity, and tourism business process change. Bradley et al. (2006) categorized organizational impact into three levels: strategic impact emphasizes organizational goals, strategies, policies, and objectives; tactical level impact focuses on resource allocation and performance monitoring; operational impact deals with resource use and labor productivity. A recent study by Rai et al. (2006) analyzed the impact of IT-enabled supply chain integration on organizational performance. The authors used three constructs for IT impact: operational excellence, customer relationship, and revenue growth. These measures are aimed at assessing the competitive advantage of a firm compared to its competitors in the industry.

Organizational impacts are always related to organizational performance, which means to improve the tourism service quality in terms of the organization of tourism enterprises. For example, ESPS include the contact number of factors, sense of mission, the evaluation of superiors and colleagues, communication, personal training and development, and five aspects of the workplace to explore how the hotel's internal service quality management(Qi Ling, Shi Yingping,2006) . There are five indicators that compose the construct of organizational impact, two of which are related to internal impacts and three to external impacts. Tourism service cost control is concerned with reduction of costs of new tourism service designs. Internal organizational efficiency is related to efficiency considerations of the decision

making process, internal communication, strategic planning, and profit margin. Tourism service supplier search costs reflect the ease with which alternate supply sources and alternate tourism services can be found and the cost effectiveness of the suppliers handling the tourism enterprises' business. Tourism service enhancement was defined in terms of the extent to which information systems improves the quality and availability of tourism services to tourism customers. Market information support was defined as the information provided to the firm with respect to tourism customer needs, market trends, and new markets. See Figure 4.

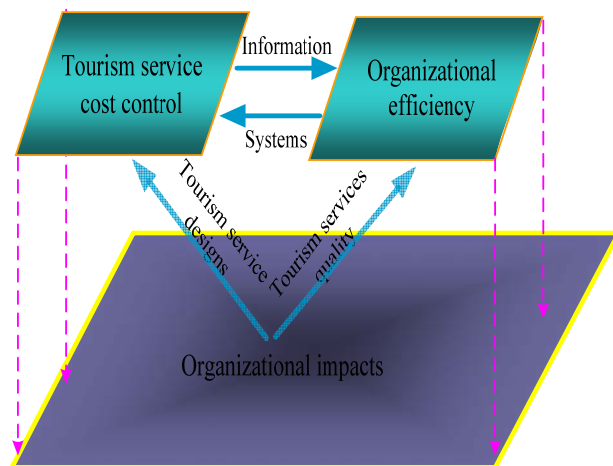


Figure 4. The organization impacts of tourism service cost control and organization efficiency

In addition to strategic impacts, the M&S instrument covers operational impact (through internal organizational efficiency) and tactical impact. Wong, A., Alison, O., White, C. (1999) believed the M&S instrument is very long, for which a shorter and more parsimonious instrument is needed for organizational impacts because of the additional constructs for system quality, information quality, and service quality needed for the research. Therefore, the instrument for organizational impact construct by including only those items that are relevant to each indicator. For the tourism service cost control indicator, three items from the economics of production construct of M&S are related to costs. The quality of service involved with tourism plays an important role in the process of delivery (Wyllie 2000) and thus is the standard used to assess the effectiveness of a particular leisure service agency, including the tourism service sector (Godbey 1997). Service quality is an intangible, but crucial, area of interest to travel service providers.

For internal organizational efficiency, the items from the same construct of M&S adapted to the model with slight modifications for better clarity. The 3 items for the tourism service supplier search cost construct were drawn from the tourism service suppliers construct of M&S. See Figure 5.

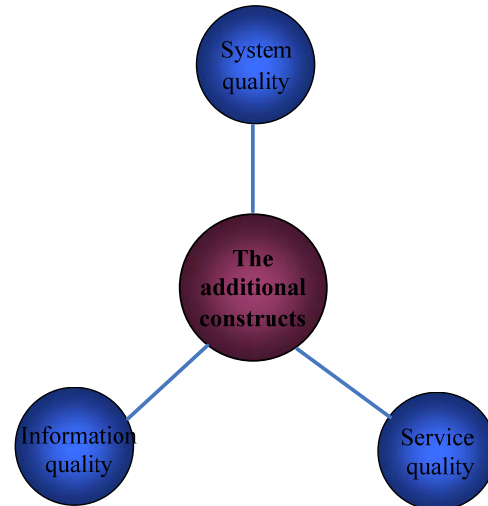


Figure 5. The additional constructs

Three items mentioned above from the M&S tourism service suppliers can be dropped to construct on the grounds of redundancy. For the tourism service enhancement construct, the shorter items can be adopted from the tourism services construct of M&S with slight rewordings. The three items for the market information support construct were obtained using the items related to tourism customer information and needs of the market construct of M&S, while the other items are not included as they are not directly related to market information support or because of the infrequent use in prior research. Through the above process, 23-item, five-dimensional instrument for organizational impact can be proposed by this paper.

IV. TOURISM SERVICE QUALITY

A. System Quality

In tourism enterprises, system quality represents the quality of the information system processing during the business, which includes software and data components. System quality is related to whether there are bugs in the system, the consistency of tourism users' interface, quality of documentation, as well as, sometimes, quality and maintainability of program code. System quality is measured by attributes such as ease of use, functionality, reliability, data quality, flexibility, and integration. A comprehensive instrument for system quality was developed and validated, which resulted in nine attributes – ease of use, ease of learning, user requirements, system features, system accuracy, flexibility, sophistication, integration, integration, and customization. Measures of system quality typically focus on performance characteristics of the system under study. Some research has looked at resource utilization and investment utilization, hardware utilization efficiency, reliability, response time, ease of terminal use, content of the database, aggregation of details, human factors, and system accuracy.

B. Information quality

Information quality refers to the quality of outputs the information systems produces, which can be in the form of reports or online screens. It is defined with four dimensions of information quality: accuracy, completeness, consistency, and currency. Accuracy is agreement with an attribute about a real world entity, a value stored in another database, or the result of an arithmetic computation. Completeness is to be defined with respect to some specific application, and it refers to whether all of the data relevant to that application are present. While consistency refers to an absence of conflict between two datasets, currency refers to up-to-date information. Researchers have used a variety of attributes for information quality. See Figure 6.

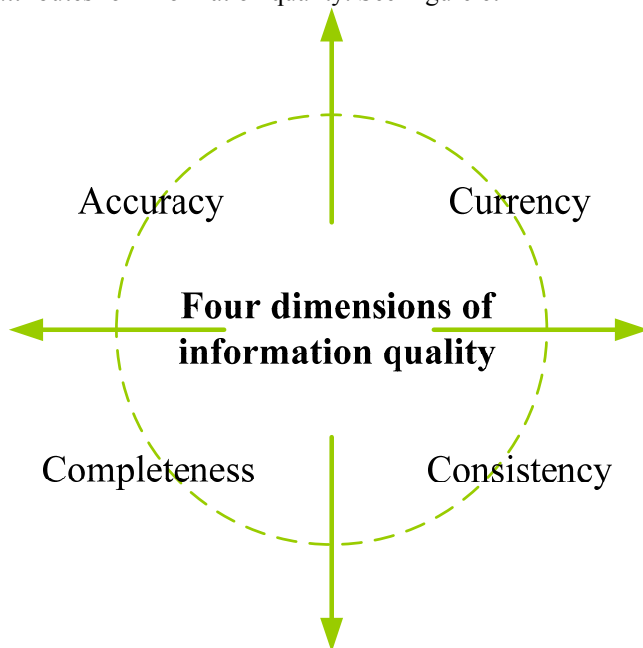


Figure 6. Four dimensions of information quality

In this paper, ease of use and timeliness are included in system quality because they are influenced by the hardware/software system itself. Thus, two broad categories for information quality can be drawn, which are both information content and information format. Information content measures the relevance of the information presented to the user in the report/inquiry screens and the accuracy and completeness of the information. Information format measures the style of presentation of information and whether information is provided in an easy-to-understand format.

C. Service Quality

The construct of tourism service quality has been defined as the degree of discrepancy between tourism customers' normative expectations for tourism service and their perceptions of service performance. A supply chain performance appraisal method that is aimed at the subjective judgment and appraisal result fuzziness when we perform the multi-essential factors appraisal of the supply chain (Zou, 2005). According to the fuzzy theory,

we establish the fuzzy synthetic performance appraisal model that can handle incorrect information, thus it is helpful to correctly appraise the performance level of the supply chain and diagnose existent questions, which culminated in the development of the SERVQUAL instrument.

In the present study, the tourism service quality construct was measured by four indicators: reliability, responsiveness, assurance, and empathy. The choice is consistent with the choices of previous researchers (Liu, 2008) who excluded tourism administrative departments should manage innovation and service innovation to effort to eliminate the travel information asymmetry, protecting the legitimate rights and interests of tourists. Responsiveness includes items that measure the extent to which the IS staff are willing to help users and provide prompt service. Assurance is the ability of the IS staff to build users' confidence. While the original construct for assurance has five items, two of the items were merged into one based on pre-testing of the instrument, resulting in four items for this construct. The empathy construct measures the personal attention and caring provided by the IS staff. The original construct for empathy has five items, but this paper used four items because of a possible duplication in meaning between two of the items.

V. METHODOLOGY

The study of tourism service quality indicates that it might be possible to create service quality evaluations that are more accurate instruments for evaluating the quality of service in the various service sectors which is applied to the tourism enterprises, as Crompton et al. (1991) suggested. Moreover, for the best indicators of service quality in the tourism sector, the tourists' experience, to some extent, might be the key methodology for measuring tourism quality, for which the tourism enterprises are essentially for serving for customers (tourism consumers). Therefore, this paper will evaluate the tourists' experience for tourism quality evaluation and measurement. Tourism service quality can serve as a template for other researchers to use in their investigation of recreational service quality. The present study reveals the service quality dimension of tourism in Kerala. The above literatures speak on the service quality of marketing but there is research gap between the service quality marketing and service quality of tourism.

The tourism service quality can be measured by the tourists' experience through information systems and organizational impacts. Following the above researches, the analysis was considered to be one or more information systems engaged by tourism consumers. The method of this paper follows construct measurement for the information quality constructs and organizational impact as well as the data collection procedure for empirical testing from some selected tourism enterprises. The methodology includes the measurements of tourism service quality, the data mining for instrument validation and hypothesis testing, as well as, the instrument validation and testing. See Figure 7.

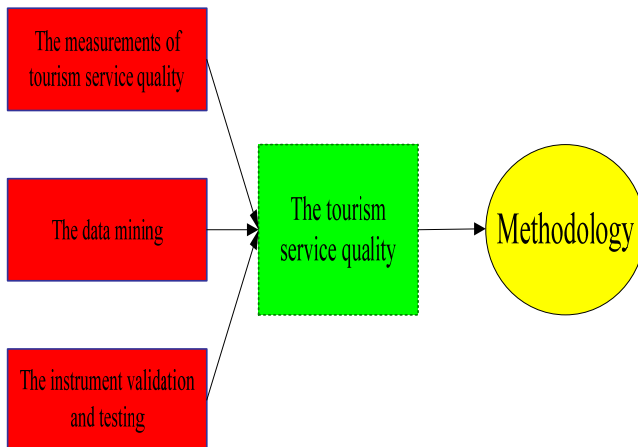


Figure 7. The Methodology for measuring the tourism service quality

A. Measurements

The measurements of tourism service quality are applied to this paper are system quality, information quality, service quality and organizational impact. For each construct, the underlying domains of construct are identified to represent each domain. The constructs for their psychometric properties were tested at last.

The perceptual measures instead of objective measures were applied to measuring the organizational performance of tourism enterprises because it is difficult to isolate the organizational performance effects due to information systems quality as changes in profits and market share. Tallon et al. (2000) argued that executives' perceptual measure is a good substitute for objective data from the selected tourism enterprises. Furthermore, researchers have employed tourism consumers' perceptions about the organizational impact of information systems in prior researches. Recently, some concerns on the measurements of tourism service quality have been raised regarding the usage of perceptual measures for both independent and dependent variables as it may create a common method variance (CMV) phenomenon. As information systems researches often deals with specific and concrete items that are IT-related (as compared to psychology, sociology, or education), information systems researches are less susceptible to CMV. Accordingly, in this research, as we measure items that are less ambiguous, there is less risk of CMV.

The organizational impact construct in tourism enterprises is measured by five indicators, as described in the previous sections: supplier search costs, service enhancement, market information support, product cost control, and internal organizational efficiency. As each indicator has multiple questionnaire items, the average of the items is taken as the measure of that indicator variable. System quality is measured by two indicators, flexibility and sophistication, with three and six items, respectively. Information quality is measured with indicator variables of content and format. Tourism service quality has four indicator variables: reliability, responsiveness, assurance, and empathy. See Figure 8.

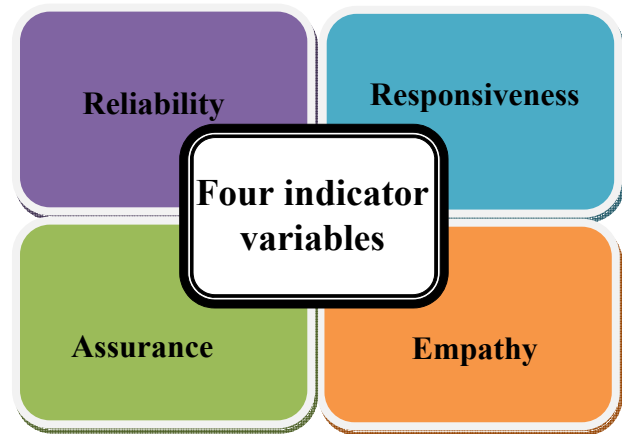


Figure 8. The four indicator variables of tourism service quality

As the organizational impact construct for the tourism service, the indicators for information system quality constructs are computed through averages of the questionnaire items relevant to those indicators, tourism consumers and tourism enterprises.

B. Data Mining

The data mining for instrument validation and hypothesis testing were collected through a field survey of tourism enterprises in Xiamen, China. A questionnaire was used as the primary means of data collection. The questionnaire was pre-tested with several experienced managers to increase the face validity of the research instrument. These managers had knowledge of both business and information technology and similar backgrounds to the actual respondents. Respondents were selected to examine the each scale items to suggest areas of improvement. The overall consensus of the respondent panel with respect to both the constructs and items suggested that the measurement scales had adequate face validity. The final questionnaire was prepared 400 copies which are randomly sent to the managers of tourism enterprises from the China. They were chosen because we needed the target respondents to possess both information system knowledge and overall business knowledge relevant to their companies. For they regularly use accounting information systems for tourism management, they are familiar with information system quality issues and tourism business performance for tourism service quality. Functional managers may not be a good choice because they are familiar with their own function only and are generally unaware of information system features.

In addition to background information system, the questionnaire included items that asked respondents about their perceptions of tourism business impact, system quality, information quality, and tourism service quality. Regarding organizational impact of tourism enterprises, the respondents were to give on a 7-point scale (1 means strongly disagree, while 7 means strongly agree) their perceptions regarding a statement. Respondents of tourism enterprises in Xiamen, China

were asked to return the questionnaire either in written form. A reminder was sent to non-respondents two weeks after the initial mailing. Approximately 19 respondents were not usable because either the questionnaires were returned through the mail as undeliverable or the completed and returned questionnaires were incomplete. At last, a total response of 381 usable questionnaires was useful, representing approximately a 95% response rate. See Table 1 and Table 2.

TABLE I.
FREQUENCY DISTRIBUTION OF TOURISM BUSINESS TYPES

<i>Business type</i>	<i>Frequency</i>	<i>Percentage</i>
Hospitality	112	29.4
Travel agency	48	12.6
Transportation	36	9.4
Scenic spots development	22	5.8
company	42	11.0
Entertainment	70	18.4
Tourism Goods shop	51	13.4
Other enterprises related to tourism		

TABLE II.
FREQUENCY DISTRIBUTION OF TOURISM ENTERPRISE SCALE

<i>Number of employees</i>	<i>Frequency</i>	<i>Percentage</i>
<20	103	27.0
21-50	122	32.0
51-100	81	21.3
100-200	55	14.4
>200	20	5.3

C. Instrument Validation and Testing

The psychometric properties of the constructs were tested using confirmatory factor analysis (CFA) using SmartPLS 2.0 M3. SmartPLS is similar to PLS-Graph and is a component-based path modeling program based on partial least squares (PLS). In this paper, PLS modeling was applied to validating the constructs of system quality, information quality, tourism service quality, and organizational impact and to test the hypotheses. Reliability is used to evaluate the internal consistency of a construct. Convergent validity can be examined through CFA within PLS modeling. The three criteria recommended for establishing convergent validity are that all indicator factor loadings should be significant and exceed 0.725 so that over one half of the variances were captured by the latent construct. Furthermore, construct reliabilities should exceed 0.7, as well as, average variance extracted (AVE) by each construct should exceed 0.5. Factor loadings for all 13 items (belonging to four latent constructs) in the CFA model were significant at $p = 0.001$, and all items had factor loadings greater than 0.725, only one item was below 0.7,

which was also deemed acceptable as it is well above 0.6. Composite reliability of all four constructs exceeded 0.7. Finally, all AVEs exceeded 0.50. Thus, convergent validity was established.

For testing the discriminated validity of hypothesized scales, There are two criteria: one is the square root of AVE for a construct should be larger than their corresponding inter-construct correlation coefficients, and the other is the within-construct item loadings should exceed the inter-construct cross loadings by at least 0.10. As the tested in this paper, the AVEs range from 0.62 to 0.85 and each AVE is much larger than the corresponding squared inter-construct correlations. See Table 3.

TABLE III.
TESTING FOR DISCRIMINANT VALIDITY

	System quality	System quality	System quality	System quality
System quality	0.78			
Information quality	0.74	0.85		
Tourism service quality	0.81	0.70	0.83	
Organizational impact	0.72	0.74	0.62	0.65

VI. CONCLUSION

The analysis model of this paper is then empirically validated using data collected from a field survey of tourism enterprises in Xiamen, China. The model reveals that the service quality depends up on the tangibility service made any tourist sectors. The hypotheses reveal that the tangibility is mediating factors for service quality in the domestic tourist. The responsiveness and tangibility are very important for sustainability tourism development in India. 86 percent is influenced in the service quality as responsiveness. The assurance is very low influence in the service made by tourism service. There is no invariance between the reliability and tangibility. Hence the tourism service should follow above dimension for improving the service in he tourism.

The study has two key contributions for information system research applied to improving tourism service quality. On one hand, it provides a link between system quality, information quality, tourism service quality and organizational impact using comprehensive instruments; On the other hand, the research question for this study was whether system quality, information quality and tourism service quality impact organizational performance measures. Overall, the findings show significant direct or indirect organizational impacts of system quality, information quality, and the service quality. System quality does not have a significant direct association with organizational impact, but it is a measure of the extent to which the system is technically sound, error-free, easy to learn, user friendly, well documented, flexible, etc. These features of an information system are

only remotely related to organizational impact. Another reason for the insignificant association is the mediator variable of information quality. Therefore, the research on system information applied to tourism service quality based on organizational impact can improve the tourism service quality at last.

ACKNOWLEDGMENT

The authors wish to thank Gao Xianying. This work was supported in part by a grant from National Social Science Fund of China(10CGL038).

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Min Wei (1975-).

He graduated with Doctor's of Economics from Xi'an Jiaotong University, Shanxi, China, 2005.

In 2005, he joined the School of Management of Xiamen University as a lecturer, and being promoted to Associate Professor of Management in 2007. His current research interests include Tourism Information System and Tourism Management.

Email to: twxpaper@163.com

Correspondence to: The School of Management, Xiamen University, No.422, the South Siming Road, Xiamen City, P.R.China.