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Modeling the effects of quality in a transformative health service

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Understanding the effects of service quality on economic (i.e., continuance intentions) and social (i.e., quality of life) outcomes is critical to extend the focus of transformative service research. This study specifies mHealth as a transformative service and models the impact of its overall quality on satisfaction, continuance intentions and quality of life. Based on cognition - affective - conation chain, the conceptual model explicitly identifies convenience, confidence, cooperation, care and concern as the primary dimensions of mHealth service quality. The study validates the higher-order quality model and its association with subsequent latent variables using PLS path modeling. The findings confirm that quality has a significant impact on satisfaction, continuance and QOL in the context of a transformative mHealth service.

Keywords

transformative, effects, health, quality, service, modeling

Disciplines

Business | Social and Behavioral Sciences

Modeling the Effects of Quality in a Transformative Health Service

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Abstract

Understanding the effects of service quality on economic (i.e., continuance intentions) and social (i.e., quality of life) outcomes is critical to extend the focus of transformative service research. This study specifies mHealth as a transformative service and models the impact of its overall quality on satisfaction, continuance intentions and quality of life. Based on cognition – affective – conation chain, the conceptual model explicitly identifies convenience, confidence, cooperation, care and concern as the primary dimensions of mHealth service quality. The study validates the higher-order quality model and its association with subsequent latent variables using PLS path modeling. The findings confirm that quality has a significant impact on satisfaction, continuance and QOL in the context of a transformative mHealth service.

Keywords: Service quality, satisfaction, continuance intentions and quality of life.

Modeling the Effects of Quality in a Transformative Health Service

Introduction

The global economy is becoming characterized by services with more than 70% contribution in the GDP from the service sector (Ostrom et al. 2010). Health care is one of the fastest growing sectors in this services economy (Berry & Bendapudi 2008). The growth of this sector is expected to be sustained through a critical evaluation of its impact on the success of firms, the well being of societies and the quality of consumers' lives worldwide. Though health care is arguably the most important service with a pervasive impact on daily life, it is a deeply troubled sector (Berry & Bendapudi 2008). In this context, the introduction of information and communication technologies (ICT), especially the application of mHealth, has created the potential to transform healthcare delivery by making it more accessible, affordable and available. "mHealth", a new healthcare paradigm, is the application of mobile communications—such as mobile phones and PDAs—to deliver right time health services to customers (or, patients). In the health care sector, mHealth is a transformative service for shifting the care paradigm from crisis intervention to promoting wellness, prevention, and self-management (Kaplan & Litewka, 2008). As a transformative service, mHealth centers on "creating uplifting changes and improvements in the well-being of both individuals and communities" (Ostrom et al., 2010).

Although mHealth creates positive changes around the world, there are growing concerns about the perceived quality and its overall impact on patient satisfaction, continuance intentions and quality of life (Dagger & Sweeney, 2006; Dagger et al., 2007; Akter & Ray 2010). However, research is scant in service marketing that has models to analyze these relationships (Ostrom et al., 2010). Thus, this study aims to model the impact of perceived service quality (SQ) on satisfaction (SA), continuance intentions (CI) and quality of life (QOL) in the context of a B2C mHealth services. This modeling extends the scope of technology-business alignment in transformative services research by developing an mHealth quality model and framing its overall impact on individual, economic and social outcomes.

Theoretical Framework and Hypotheses

The conceptual model (Figure 1) is based on the literature in marketing and information systems as we focus on a technology mediated service platform. In service research, such an interdisciplinary approach is important and necessary to adequately address the challenges and opportunities (Ostrom et al., 2010). The conceptual model elucidates an overview of associations in terms of cognitive-affective-conative framework (Oliver, 1997; Bhattacherjee, 2001; Taylor and Baker, 1994, Cronin and Taylor, 1992; Patterson, 1997; Woodside et al., 1989). The model links consumer beliefs, affect, and intention within the traditional consumer attitude structure. This relationship simplifies quality dominant decision making process for a transformative service platform (e.g., mHealth care) with an effect on economic (i.e., continuance intentions) and social (i.e., quality of life) outcomes. The model conceptualizes service quality as a higher order construct, which has an influence on satisfaction, continuance intentions and quality of life.

Service Quality

Service quality is an important and particularly relevant construct in virtually all service business (Voss et al., 2004). It is a powerful concept because of its strong relationship with customer satisfaction (Cronin and Taylor, 1992; Oliver, 1993; Taylor and Baker, 1994), continuance intentions (Akter et al. 2010) and quality of life (Dagger & Sweeney 2006; Dagger et al. 2007). In health care, customers or patients play a critical role in defining quality and designing the service delivery systems (Donabedian, 1992). Thus most of the studies generally confirm that service quality should be defined from consumers' point of view and its dimensions should be multi dimensional (Grönroos, 1984; Parasuraman et al. 1988), hierarchical (Rust and Oliver, 1994; Brady & Cronin, 2001), and context specific (Dagger et al. 2007).

Satisfaction

Satisfaction becomes an important cornerstone for service-oriented business practices around the world (Szymanski & Henard 2001). In healthcare, patient satisfaction is a major indicator in measuring the effects of quality or, overall service performance (Dagger et al. 2007; Saila et al., 2008). Satisfaction also leads to favorable results, such as higher rates of patient retention and higher profits (Zeithaml, 2000). Whereas service quality is a cognitive construct, satisfaction is an attitudinal construct (e.g., Brady and Robertson, 2001; Cronin and Taylor, 1992). This distinction suggests a casual model that identifies service quality as an antecedent to satisfaction (Choi et al., 2004). In health care settings, numerous studies support this causal linkage between service quality and satisfaction (Dagger et al., 2007; Andaleeb, 2001). Thus, given the important link between service quality and satisfaction, this study models satisfaction as a function of perceived service quality in the context of mHelath services:

H1: Service quality has a positive impact on customer satisfaction in mHealth services.

Continuance Intentions

The success of a technology mediated service platform, such as mHealth, depends a lot on the ongoing usage rather than initial acceptance (Bhattacherjee, 2001, Limayem et al., 2007). As such, an increasing body of research in this domain depends on continuance theory (Akter et al., 2011). This study defines continuance as a usage stage when technology based service use (e.g., mHealth) transcends conscious behavior and becomes part of normal routine activity. Continuance decision is similar to consumers' repurchase decision, which is primarily based on satisfaction of a particular product or service (Anderson and Sullivan, 1993; Oliver 1980, 1993). Most health care platforms show interests about these relationships because the level of continuance intentions indicates their overall financial performance or, economic viability (Bernhardt et al., 2000; Eskildsen et al., 2003). Hence, we posit that:

H2: Customer satisfaction has a positive impact on continuance intentions.

H3: Service quality has a positive impact on continuance intentions.

Quality of Life (QOL)

Quality of life refers to the well-being and happiness of an individual (Ferrans and Powers, 1992). Quality-of-life perceptions, therefore, determine an individuals' evaluation of the life and the positive or negative attributes that characterize the life condition, including health status. Thus, this study views quality of life as a subjective, individual, and experiential concept. Given the healthcare context of the present study and the significance of healthcare as a vital component in quality of life , this study defines QOL as a sense of overall well being in health (Dagger & Sweeny, 2006). Straub and Watson (2001) indicate that any technology based service platform should focus on increasing the quality of its users' lives. Here, the study designates QOL as an alternative outcome variable and intends to explore how overall service quality and satisfaction contribute to quality of (health) life of an individual. Also, research is scant in measuring the critical impact of QOL on CI. Thus the study hypothesizes that:

H4: Satisfaction has a positive impact on quality of life.

H5: Service quality has a positive impact on quality of life.

H6: Quality of life has a positive impact on continuance intentions.

Methodology

This study focuses on mobile telemedicine services in Bangladesh, which is one of the leading mHealth service providing developing nations (Akter & Ray, 2010). We obtained qualitative data from 3 focus group discussions conducted with mHealth consumers in Bangladesh. A total of 24 participants, 8 per focus group, were involved in the focus group sessions. In each case, respondents were asked to evaluate their mHealth experiences. In qualitative study, service quality was frequently identified as a multidimensional and context specific concept. Throughout this process, we found support for five primary service quality dimensions in mHealth, that is, convenience, confidence, cooperation, care and concern on privacy.

Survey data were collected from Bangladesh under a global mHealth assessment project from January 07 to March 17, 2010. In the absence of lists for drawing a random sample, a total of 623 respondents were approached using area wise cluster sampling, of which 480 (77%) surveys were ultimately completed. Of the total number of completed surveys, seven were considered problematic and excluded. Finally, 473 surveys were analyzed.

The questionnaire consists of previously published multi-item scales with favorable psychometric properties and items from qualitative research. All the constructs in the model, except satisfaction, were measured using 7 point likert scale (e.g., strongly disagree - strongly agree). Satisfaction was measured using bi-polar semantic differential scale (e.g., very dissatisfied - very satisfied). This study uses component based SEM (or, PLS path modeling) because it is suitable for hierarchical modeling to ensure more theoretical parsimony and less model complexity (Wetzels et al. 2009). The study uses manifest variables two times: for the first-order latent variable (i.e., convenience, confidence, cooperation, care and concern) and for the second-order latent variable (i.e., service quality).

Findings

Measurement Model

The findings confirm that all the item loadings, Cronbach's alphas, composite reliabilities (CRs) and average variance extracted (AVEs) of both first order (i.e., convenience, confidence, cooperation, care and concern) and second order (i.e., service quality) measurement models exceed the cut off values of 0.7, 0.7, 0.7 and 0.5 respectively, which ensure adequate scale reliability (see Table 1). In addition, this study calculates the square root of the AVE that exceeds the intercorrelations of the construct with the other constructs in the model to ensure discriminant validity. This process also paves the way for testing all the hypotheses and proving the research model.

Table 3: Psychometric Properties of the Constructs							
Constructs			Convergent Validity			Discriminant Validity	Nomological Validity
Constructs	Items	Loadings	Alpha	CR	AVE	$AVE > R^2$	$Q^2 > 0$
Convenience	CV1-CV3	0.81-0.83	0.76	0.86	0.67	Fulfilled	Fulfilled
Confidence	CF1-CF3	0.81-0.90	0.82	0.89	0.73	Fulfilled	Fulfilled
Cooperation	CO1-CO4	0.93-0.95	0.94	0.96	0.89	Fulfilled	Fulfilled
Care	CA1-CA3	0.86-0.93	0.88	0.93	0.82	Fulfilled	Fulfilled
Concern on Privacy	CN1-CN3	0.90-0.95	0.92	0.95	0.87	Fulfilled	Fulfilled
Overall service quality*	(CV+CF+CO+CA+CN)	0.81-0.95	0.91	0.94	0.52	Fulfilled	Fulfilled
Satisfaction	SA1-SA4	0.93-0.95	0.96	0.94	0.89	Fulfilled	Fulfilled
Continuance Intentions	CI1-CI3	0.93-0.95	0.92	0.95	0.86	Fulfilled	Fulfilled
QOL (Quality of Life)	QOL1-QOL3	0.90-0.93	0.90	0.95	0.83	Fulfilled	Fulfilled

*Overall service quality is a second order construct, consists of five first-order components (convenience, confidence, cooperation, care and concern) representing 15 (3×5) items.
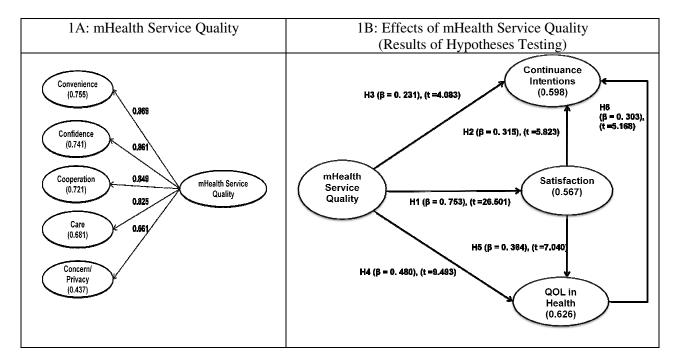
Structural Model

In order to assess the research model, this study first estimates the higher order service quality construct and its relationship with primary dimensions (1A). It shows that overall service quality has a significant association with all the primary dimensions. The study then estimates the impact of overall quality on satisfaction, continuance and QOL (1B). The study confirms that all the hypotheses (H1-H6) are significant at $P < 0.001$. Overall, the variance explained by the model in terms of R^2 is 0.567 for customer satisfaction, 0.598 for continuance intentions and 0.626 for QOL, which are significantly large according to the effect sizes defined for R^2 by Cohen (1988).

Discussion

The main thrust of this study was to model the impact of mHealth service quality on satisfaction, continuance intentions and quality of life. As such, the study develops a second order service quality model on five primary dimensions (i.e., convenience, confidence, cooperation, care and

concern). The study also confirms the impact of overall service quality on satisfaction, continuance intentions and QOL. In particular, the findings suggest that all the primary service quality dimensions have a significant positive association with overall service quality. Among these dimensions, 'convenience' emerges as the strongest component, followed by confidence, cooperation, care and concern for privacy. The study confirms that overall service quality (SQ) is a significant predictor of satisfaction (explaining 57% of variance), continuance intentions (explaining 60% of variance) and quality of life (explaining 63% variance). This finding is consistent with the service dominant logic (Vargo & Lusch 2004), which implies that exchange process in business should focus on economic (i.e., continuance) and social outcomes (i.e., QOL).

1A: mHealth Service Quality	1B: Effects of mHealth Service Quality (Results of Hypotheses Testing)

The mHealth service context emerges as an example of business and technology alignment in transformative services research, which aims to create uplifting changes of both individuals and communities through continued consumption. Since transformative service (e.g., mHealth) is a new area in service research, scholars still strive to frame its impact on critical service outcomes. Research is scant in this sector in terms of quality model and its impact on economic and social outcomes. Thus, this study extends the scope of transformative service research by developing an mHealth service quality model on five dimensions (Convenience, confidence, cooperation, care and concern) and framing its overall impact on satisfaction, continuance intentions (economic outcome) and quality of life (social outcome). The implications of this research are highly relevant to practitioners. For managers of mHealth services, the findings of the study improve an overall understanding of how customers evaluate mHealth service quality. These findings also make it clear that increased service satisfaction provides a way for managers to ensure positive continuance intentions and quality of life. This study has several limitations. First, the context of the study is single provider, single country based. Future research could examine the sensitivity of the findings over multiple service providers in a cross country setting. Second, the study is based on cross sectional design, which contains typical limitations associated with this kind of research methodology.

References

Akter S. & Ray, P. 2010. mHealth-an ultimate platform to serve the unserved. IMIA Yearbook of Medical Informatics, Germany: Schattauer, pp. 94-100.

Akter, S., D'Ambra, J., & Ray, P. 2011. Trustworthiness in mHealth Information Services: An Assessment of a Hierarchical Model with Mediating and Moderating Effects using Partial Least Squares (PLS), Journal of American Society for Information Science and Technology, 62(1), 100-116

Andaleeb, S.S. 2001. Service Quality Perceptions and Patient Satisfaction: A Study of Hospitals in a Developing Country, Social Science and Medicine, 52 (9), 1359-1370.

Anderson, E.W., Sullivan M.W. 1993. The Antecedents and Consequences of Customer Satisfaction for Firms, Marketing Science, 12 (2), 125-143 (Spring).

Bernhardt, K.L., Donthu N. and Kennett P.A. 2000. A Longitudinal Analysis of Satisfaction and Profitability. Journal of Business Research, 47, 161-171.

Berry, L. L & Bendapudi, N. 2008. Healthcare: a fertile filed for service research, J Serv Res, 10 (2), 111-122

Bhattacherjee, A. 2001. Understanding information systems continuance. An expectation–confirmation model, MIS Quarterly, 25 (3), 351–370.

Brady, M.K., Cronin J. J. 2001. Some New Thoughts on Conceptualizing Perceived Service Quality: A Hierarchical Approach, Journal of Marketing, 65, 34-49 (July).

Choi, K.S., Cho W.H., Lee, S., Lee, H. K, Kim, C. 2004. The relationships among quality, value, satisfaction and behavioral intention in health care provider choice: a South Korean study. Journal of Business Research, 57(8), 913–21

Cronin J.J., Taylor S.A. 1992. Measuring service quality: a re-examination and extension. Journal of Marketing, 56, 55 – 68 (July).

Dagger, T.S., Sweeney, J.C., Johnson L.W. 2007. A hierarchical model of health service quality: scale development and investigation of an integrated model. Journal of Service Research, 10 (2), 123–142.

Dagger, T.S. and Sweeney, J.C. 2006. The effect of service evaluations on behavioral intentions and quality of life. Journal of Service Research, 9(1), 3–18.

Eskildsen, J. and Kristensen, K. 2003. The predictive power of intangibles. Measuring Business Excellence, 7(2), 46-54.

Ferrans C.E. and Powers, M. J. 1992. Psychometric Assessment of the Quality of Life Index, Res Nurs Health, 15, 29-38.

Gronroos, C. 1984. A service quality model and its marketing implications. European Journal of Marketing, 18(4), 36–44.

Kaplan, B., and Litewka, S. 2008. Ethical challenges of telemedicine and telehealth. Cambridge Quarterly of Healthcare Ethics, 17, 401–416.

Limayem, M. Hirt, S.G. and Cheung C.M.K. 2007. How habit limits the predictive power of intention: the case of information systems continuance. MIS Quarterly, 31(4), 705–737.

Oliver, R. L. 1980. A Cognitive Model for the Antecedents and Consequences of Satisfaction, Journal of Marketing Research, 17, 460-469

Oliver R. L. 1993. A conceptual model of service quality and service satisfaction. In: Swartz TA, Bowen DE, Brown SW, editors. Advances in services marketing and management. Research and practice ; 2: 65– 80, Greenwich, CT: JAI Press.

Oliver R.L. 1997. Satisfaction: a behavioral perspective on the consumer. Boston, MA: Irwin-McGraw-Hill.

Ostrom A. L, Bitner M.J., Brown S.W., Burkhard K. A, Goul M., Daniels V. S, Demirkan, H.and Rabinovich, E., 2010. Moving forward and making a difference: Research priorities for the science of service, J Serv Res, 13 (1), 4-36.

Parasuraman, A., Zeithaml, V. A., & Berry, L. L. 1988. SERVQUAL: a multiple-item scale for measuring consumer perceptions of service quality. Journal of Retailing, 64(1), 5–6.

Patterson P.G. and Spreng R.A. 1997. Modeling the relationship between perceived value, satisfaction, and repurchase intentions in a business-to-business, services context: an empirical examination. Internation Journal of Service Industry Management, 8(5), 414 – 34.

Rust, R. T. and Oliver, R.L. 1994. Service Quality: Insights and Managerial Implications from the Frontier, in Service Quality: New Directions in Theory and Practice, Roland T. Rust and Richard L. Oliver, eds. Thousand Oaks, CA: Sage, 1-19.

Saila, T., Mattila E., Kaila M., Aalto P. and Kaunonen M. 2008. Measuring patient assessments of the quality of outpatient care: a systematic review. J Eval Clin Pract 2008; 14(1), 148–154.

Straub, D. & Watson, R.T. 2001. Research commentary: transformational issues in researching IS and net-enabled organizations. Information Systems Research, 12(4), 337–345.

Szymanski, D.M., Henard, D. H. 2001. Customer satisfaction: a meta analysis of the empirical evidence. Journal of Academy of Marketing Science, 29(1), 16-35.

Taylor, S.A. and Baker, T.L. 1994. An assessment of the relationship between service quality and customer satisfaction in the formation of consumers' purchase intentions. Journal of Retailing, 70 (2), 163 –78.

Vargo, S. L., & Lusch, R. F. 2004. Evolving to a new dominant logic for marketing. Journal of Marketing, 68, 1–17 (January).

Voss C. A, Roth A.V., Rosenzweig E.D., Blackmon K., Chase R. B. 2004. A Tale of Two Countries' Conservatism, Service Quality, and Feedback on Customer Satisfaction, 6(3), 212-230.

Wetzels M., Schroder G.O. and Oppen V.C. 2009. Using PLS path modeling for assessing hierarchical construct models: guidelines and empirical illustration. MIS Quarterly, 33(1), 177–195.

Woodside A.G., Frey L.L, Daly R.T. 1989. Linking service quality, customer satisfaction, and behavioral intention. Journal of Health Care Marketing, 9(4), 5 –17.

Zeithaml, V.A. 2000. Service quality, profitability, and the economic worth of customers: what we know and what we need to learn. Journal of Academy of Marketing Science, 28(1), 67 –85.