

Information Technology Usage to Improve the Perceived Quality of Healthcare Service

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Abstract

The concept of **Health Related Quality of Life** and its determinants have evolved since the 1980s. Although many researchers have published articles of technology usage in hospitals and the installation of technology based healthcare system, the research about applying the information technology to improve the patients' perceived quality of healthcare services is still limited.

In general, services are deeds, processes and performances that are essentially concerns of the consumer. The healthcare service quality depends on tangible factors, such as equipments, facilities, and the quality of hospital staff and also the intangible ones.

The main purpose of this work is to establish new model and find out the contribution of information technology to enhance the patients' perceived quality of healthcare service. We attempted to examine the main information technology related factors in 3 aspects, namely quality of information, the technology accessibility and the community that can improve patients' perceived quality of healthcare services.

Offline and online questionnaires were used to measure the patients' perceived quality and were distributed to 384 people in 2 countries, Laos and South Korea. A principle component analysis and multiple regressions were used to verify our model.

Results show that the use of information technology has partial positive effect on patient-physician interaction in both countries. However, patient knowledge and patient autonomy which are the 2 dimensions of patient-physician interaction has significant positive effect on patients' perceived quality of healthcare service.

Keywords : Information Technology Usage, Patient-Physician Interaction, Healthcare Service, Health-Related Quality of Life, Perceived Quality of Healthcare Service

1. Introduction

The term *quality of life (QOL)* references the **well-being** of individuals and societies; it is the perceived quality of an individual's daily life; an assessment of their well-being or lack of. The term is used in a wide range of contexts, including the fields of international development, healthcare, and politics. It was introduced in the early twentieth century and caught a lot of interest from many scholars, governments and organizations. Social reports have been published more and more regularly. The reports contain statistics and analyses of social change and social trends, presenting data on such areas as consumption, income, education, housing, and healthcare. These data collection and management have become more systematic from around the 1960s [Bonger, 2005].

In healthcare aspects, health-related quality of life (HRQoL) is an assessment of how the individual's well-being may be affected over time by a disease, disability, or disorder. A focus on quality of life helps medical providers see the big picture and makes for healthier, happier patients. In this case, patient-physician interaction is the most important one among many factors in improvement of quality of life of patient. The new model of patient-physician interaction, published in 2012 July, by Aakash Kumar Agarwal, D.O.I, and Beth Brianna Murinson, M.S., M.D., Ph.D introducing the new dimension in patient-physician interaction which are patient's value, patient's autonomy

and medical information in the patient centered clinical encounter. Their model explicitly addresses the historical problems and proposes the new paradigm that is fit with the current situation.

With the fact of technology has the potential to change the way to live of people, we cannot deny that technological developments in the past century have made fundamental improvements in many areas in our lives; telecommunication, transportation, work, healthcare and so on. Since the introduction of internet in 1945, the online application such as websites, blogs, forums, on-line communities, knowledge sharing services has basically altered the way of information gathering and had a profound influence on learning and human life style. The evolution of information and communications technology and its influence on the development of social communities and interpersonal interaction have become a popular domain of research in recent years. These days, due to the availability of network connection and wireless technology, people can access the internet anytime, anywhere unlike in the past, many limitations encountered by physical distance and restrictions on the formation. In particular, the increasing number of people who need to access the real time information became the advent of smart phone [Yang, 2010].

Although many researchers have published articles of technology usage in hospitals and the installation of technology based healthcare system, the research about applying the information technology to improve the patient-physician in-

teraction as well as quality of life of patient are still limited. This is especially true in the case of the countries that are making the first steps of fusing the technology with healthcare service.

The main propose of this study is to establish new model and find out the contribution of information technology to enhance the quality of life of patients. We are attempting to examine the main information technology related factors that can improve the quality of patient-physician interaction and healthcare services in 3 aspects namely quality of information, the technology accessibility and community. We conduct the research in 2 countries: Laos as the developing country and Korea as a highly industrialized society in order to see the patient's perspective and perception of each country in using information technology to deal with their doctors and hospitals when they are receiving the medical treatment. We aim to develop the better patient-physician interaction programs, improve the service quality as well as ton increase the satisfaction in health care service in different environment in the future.

2. Literature Review and Theoretical Framework

2.1 The Patient-Physician Interaction

The essential unit of medical practice is happened when patient feels he/she receives the advice of a doctor whom he or she trusts. This kind of meetings is a frequent and regular occurrence between general practitioners and their patients all over the world on every work-

ing day and a large number also taking place at a hospital level. Their success or failure depends not only on the doctors' clinical knowledge and technical skills, but also on the nature of the social relationship that exists between doctor and patient.

The patient-physician relationship is not only the central aspect of the modern healthcare, but also provides the basis for the healthcare ethics. This relationship is very important since a patient must have confidence in the competence of their physician and must feel that they can confide in him or her. For most physicians, the establishment of good rapport with a patient is also significant. As seen above, it is pointless to establish hierarchy in the physician-patient relationship, as it holds the same importance to both sides. The better the relationship in terms of mutual respect, knowledge, trust, shared values and perspectives about disease and life, and time available, the better will be the amount and quality of information about the patient's disease transferred in both directions, enhancing accuracy of diagnosis and increasing the patient's knowledge about the disease. A poor relationship can lead to 1) hindrance in the assessment made by the physician as a result of the patient not trusting him fully, thus not cooperating fully; 2) distrust of the patient in the final diagnosis and the prescribed steps to overcome the health problems.

There are 4 typical types of the patient-physician interaction described by **Emanuel and Emanuel (MD. PhD 1992)**, **paternalistic**, **deliberative**, **interpretive**, and **informative**, distinguished by the formation of patient values,

assignment of decision-making responsibilities (autonomy), and physician disclosure of medical information.

- a) **The *paternalistic* scenario** : the traditional approach; describes a situation in which the patient has poorly formed values regarding the medical situation. The physician independently decides the interventions to be taken, providing the patient with minimal medical information. Indisputably, there are important medical scenarios where paternalistic care is still necessary, especially in the setting of acute or trauma care where immediate treatment must be rendered and, barring non-resuscitation orders, there is little room for negotiation.
- b) **The *deliberative* scenario** : represents a degree of increased patient involvement. The patient in this scenario has minimally formed values, but the physician works with the patient to discover and develop these values. The physician presents carefully selected medical information to the patient. Decision-making is a shared effort, but the physician encourages specific recommendations based on an interpretation of established health-related values.
- c) **The *interpretive* scenario** : continues in the direction of greater patient involvement in which the patient has inchoate values regarding the situation which the physician helps to elucidate. Substantial dialogue regarding the condition and interventions is exchanged between physician and patient. Once presented with the pertinent information, the patient makes the

decision, with the physician acting mainly as a counselor.

- d) **The *informative* scenario** : the patient autonomy is high and the patient has well-formed values; the patient alone takes on decision-making responsibilities. The physician's role is as a conduit of all relevant medical information.

2.2 Definition of Patient Values, Autonomy and Medical Knowledge

Patient values and patient autonomy are significant variables in many models of patient-physician interaction. In order to have fully understanding for further discussion, the term "Patient values and patient autonomy" should be clearly defined.

Patient's value : The beliefs or principles of a person or group that are used to guide decisions and way of life. Collectively, values give weight and worth to ideas and actions. The formation of these values is an important developmental task of young adults, but an individual's awareness of these values continues to develop over the course of a lifetime, a product of upbringing, interaction with others, and a variety of life experiences. *Health-related values* specifically describe a person's values relating to the medical sphere, and the impact of these values on treatment choice and commitment to health-sustaining activities

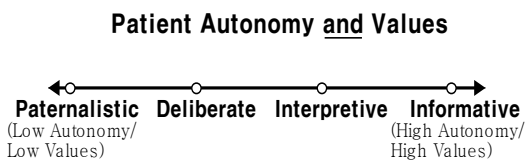
Patient's autonomy : The patient's right to get involved in the discussion and decision-making process during consultation. It can further be described as the patient's ability to make medi-

cal care decisions without being influenced too strongly by care providers or others. Respect for patient autonomy is an important tenet of ethical medical conduct and reflects a balance of the physician’s practice style with the patient’s inclinations.

Patient knowledge : Here we mean the subjective knowledge : the patient’s understanding of medical processes and diagnosis as well as the patient’s self-perceived level of medical knowledge.

2.3 Patient – Physician Interaction Models

In the past, the Emanuel and Emanuel model (See <Figure 1>) was widely used to describe the relationship of patient’s value and patient’s autonomy in each type of interaction. It implied that patient autonomy and decision-making involvement increase, the strength and formation of patient values increase as well.

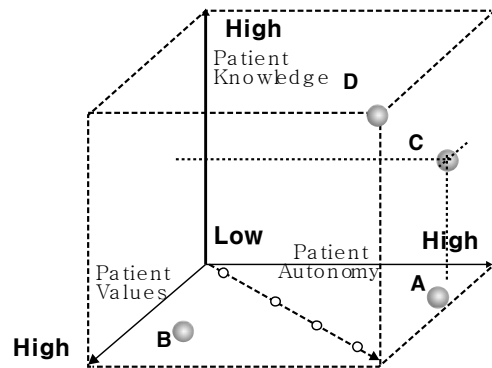


<Figure 1> The Emanuel and Emanuel Model

We can say that, this is true only when examining the specifics of their model, where a shift from completely unformed to fully formed values and a corresponding shift from low patient autonomy to high patient autonomy. However, this model’s weak point is the single axis cannot represent the reality of the complex nature of patients. Moreover, in the information

age, patients get much more easy access to information and so they are able to broaden their medical knowledge database. As such, the upper model also suffers some weaknesses.

Thus, Aakash Kumar Agarwal, D.O., and Beth Brianna Murinson, M.S., M.D., Ph.D [2012] proposed a new, multi-dimensional model (See <Figure 2>) that adds a greater focus to the patient’s knowledge factor and modifies the old model as follows :



<Figure 2> Multi-Dimension in Patient-Physician Interaction

Patient values, patient autonomy, and patient knowledge are the three axes in their model, emphasizing both their independence and interaction. Included also is the “Emanuel and Emanuel Reduced Axis,” which implies a mutual variability with patient autonomy and values, and plotted examples (A, B, C, D) highlighting the necessity of stepping away from the simplifications implied by past models. **A** : the patient with high levels of autonomy and relatively unformed health care-related values, and **B**, the patient from a very traditional culture where health care-related values are clear but personal autonomy is low; **C** : patients may

be selectively well-informed about specific diseases; **D** : Highly informed patient such as a physician.

Services are deeds, processes, and performances. Service sector includes all economic activities whose output is not a physical product or construction, is generally consumed at the time it is produced, and provides added value in forms (such as convenience, amusement, timeliness, comfort or health) that are essentially intangible concerns of its first purchaser [Zeithaml and Bitner, 1996].

The healthcare quality depends on tangible factors, such as equipment, facilities, the quality of the hospital staff - and intangible ones, amongst which we can mention the atmosphere, the trust, and the communication manners of the staff and so on [Laing et al., 2002]. Based on Parasuraman's five aspect of service quality, we developed the survey to measure patient's perceived quality of healthcare service. The survey consisted of.

- **Tangibility** : Appearance of physical facilities, equipment, personnel, and communication materials
- **Reliability** : Ability to perform the promised service dependably and accurately
- **Responsiveness** : Willingness to help customers and provide prompt service
- **Assurance** : Knowledge and courtesy of employees and their ability to convey trust and confidence
- **Empathy** : Caring, individualized attention the firm provides its customers

3. Information Technology

We are now living in the era of information technology which has the potential to change the way of life of people. Technological developments in the past century have made fundamental improvements in many areas in our lives; telecommunication, transportation, work, health-care and so on. Information technology (IT) is the application of computers and telecommunications equipment to store, retrieve, transmit and manipulate data. The term is commonly used as a synonym for computers and computer networks, but it also encompasses other information distribution technologies such as television and telephones. Several industries are associated with information technology, such as computer hardware, software, electronics, semiconductors, internet, telecom equipment, e-commerce and computer services.

In a business context, the Information Technology Association of America has defined information technology as "the study, design, development, application, implementation, support or management of computer-based information systems." The responsibilities of those working in the field include network administration, software development and installation, and the planning and management of an organization's technology life cycle, by which hardware and software is maintained, upgraded and replaced.

In this research we are examining the use of information technology in 3 aspects, namely : quality of data/information, the technology accessibility and community (patient to patient forum).

3.1 Characteristics of Data/Information Quality

Data quality is a perception or an assessment of data's fitness to serve its purpose in a given context. Quality of data/information provided by some organizations or individuals has great effect to people's decision making.

Management information systems (MIS) is an organized approach to gathering information from company operations and making a strategic management decision. Developing quality characteristics for gathering information is essential to making solid management decisions.

Depending on the circumstances, many scholars and organizations consider characteristics of good quality data differently. Here we identify 11 key characteristics of quality data in providing the good quality data to the user in health-care industry.

- 1) Relevance
- 2) Actuality
- 3) Accuracy
- 4) Completeness
- 5) Demand satisfaction factor
- 6) Clearness (not confusing)
- 7) Comprehensibility
- 8) Price worthiness
- 9) Reliability
- 10) Scope
- 11) Organization

3.2 Technology accessibility

Data and information are essential to rational decision making and the good management of the health services delivery systems in any

country. The restructuring of health systems world-wide is impacted by these concepts. The information systems necessary to provide data and information can be characterized by a number of interdependent domains. Data Management is central because data provides the binding principle : Applications are processing Data, Technology is transferring data, and Methodology is identifying how data is captured and where it is used in order to minimize the cost of data as a resource. The whole purpose is to serve the Business of Health Services Delivery. Each domain is interdependent with the others at an intersection between the domains.

In this research, what we mean by technology accessibility is the ways how data would be transferred to patients. It describes the available channels and means to access desired medical information. This deals with media like : web-sites, magazines, call centers, broadcast, etc. It also contains the issue of compatibility of certain medical information providers with the available technological platform; web browsers, operating systems and devices. Lastly it also refers to the actual technical skills of users.

3.3 Community

In our view, community refers to knowledge sharing where many people can participate and leave some questions, describing his/her symptoms about health issues; sharing the medial experiences as well as to exchange their opinion toward some certain topics. We use term 'Patient to patient Forum' as the representative of this aspect. It can be an online board where a community of patients can describe their own

experiences and impressions about medicines, therapies and diagnoses in the respective sub forums. It also includes an offline forum that is made by certain group to discuss about health-care issues. Although the patient to patient forum is not an objective source of information, it represents the patient’s viewpoint. This factor, as well as the anonymity of the forum, can fortify the self-confidence of an individual battling with a certain medical problem and improve his autonomy in deciding which step to take towards the solution. Accessibility of this forum to the general populace is a requirement. (An example for this kind of forums can be www.medhelp.org).

4. Research Model and Hypothesis

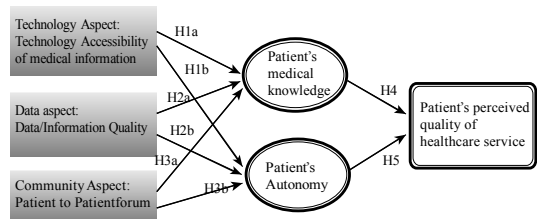
In this research, we attempt to examine the main information technology related factors that can improve the quality of patient-physician interaction and healthcare services in 3 aspects namely quality of information, the technology accessibility and community. We conduct the research in 2 countries; Laos as a developing country and Korea as a highly industrialized society in order to see the patient’s perspective and perception of each country in using information technology to deal with their doctors and hospitals when they are receiving the medical treatment. Based on the suggestion from prior researches with our interest, a set of hypothesis is formulated as below

- H1a : Technology Accessibility of medication information has positive effect to

patient’s knowledge

- H1b : Technology Accessibility of medication information has positive effect to patient’s autonomy
- H2a : Data/information quality has positive effect to patient’s knowledge
- H2b : Data/information quality has positive effect to patient’s autonomy
- H3a : Patient-to-patient forum has positive effect to patient’s knowledge
- H3b : Patient-to-patient forum has positive effect to patient’s autonomy
- H4 : patient’s knowledge has positive effect to patient’s perceived of healthcare service
- H5 : patient’s autonomy has positive effect to patient’s perceived of healthcare service

<Figure 3> Shows the Research Model



<Figure 3> Research Model

Variables have been performed based on existing researches

<Table 1> Variables Operationalization

Variables	Definition	Researcher
Technology accessibility to medical information	<ul style="list-style-type: none"> • Applications • Magazine • Call center 	<ul style="list-style-type: none"> • GEORGE DEMIRIS, PHD. • LAWRENCE B. AFRIN, MD • STUART SPEEDIE, PHD • KAREN L. COURTNEY, RN, PHD

		<ul style="list-style-type: none"> • MANU SONDHI, MD, MPH, • VIVIAN VIMARLUND, PHD • CHRISTIAN LOVIS, MD, • WILLIAM GOOSSEN, RN, PHD. • CECIL LYNCH, MD, MS [2008]
Data/information quality	<ul style="list-style-type: none"> • Actuality • Accuracy • Completeness • Demand satisfaction factor • Clearness • Comprehensibility • Price worthiness • Reliability • Scope • Organization 	Wang and Strong [1996] Lee, Kanh, Strong and Wang [2002]
Forum	<ul style="list-style-type: none"> • Trustworthiness in the forum • Forum contribution in medical knowledge • Forum contribution in decision making • Willingness to continue using forum 	
Medical knowledge	<ul style="list-style-type: none"> • Self evaluation about medical knowledge before seeing doctor • Self evaluation about medical knowledge during consultation • Self evaluation about medical knowledge after seeing doctor 	<ul style="list-style-type: none"> - Aakash Kumar Agarwal - Beth Brianna Murinson, M.S., M.D., Ph.D [2012]
Autonomy	<ul style="list-style-type: none"> • Treatment information expectation from doctors • Medicine information expectation from doctors • Free own choice for prescription • Understanding benefit of each choice of treatment • Self involvement in decision making 	<ul style="list-style-type: none"> - Myfanwy Morgan [2008] - Aakash Kumar Agarwal - Beth Brianna Murinson, M.S., M.D., Ph.D [2012]
Patient's perceived quality of healthcare service	<ul style="list-style-type: none"> • Tangibility • Reliability • Responsiveness • Assurance • Empathy 	<ul style="list-style-type: none"> • Parasuraman, [1985] • Phokham Phommavong • Sysomphet Khanopphet [2012]

5. Methodology

In this study, offline and online questionnaire were used to measure patient's perceived service quality and was distributed to 384 patients in 2 countries. The survey instrument consisted of seven sections : (1) items focusing on the availability of medias to access the medical information, (2) items focusing on quality of data/information provided by hospital, (3) items focusing on patient to patient forum, (4) items focusing on self evaluation about medical knowledge, (5) items focusing on the power and confidence in making decision for treatment, (6) items focusing on perceived quality of hospital service and (7) demographic data about the respondents (gender, age, monthly income, education level, and occupation).

The items in the questionnaire were measured on a 5-point Likert scale ranging from "strongly agree," coded as five, to "strongly disagree," coded as one. To complete their answers, respondents were asked to tick the number that best matched their opinion. The items of the scale were pre-tested for wording, layout and comprehension.

The random samples of 384 patients were requested to complete the survey questionnaire regarding their experiences and perceptions of the service quality of their hospital circumstances.

Data collection took place during July to middle of November, 2013. In case of Laos, of the overall sample of 208 respondents, 52.4% were male, 47.6% were female.. Most of the respondents were in the age of 20s and 8.2% had income of below 1,000,000 Kip (approximately

US\$125). Furthermore, the majority of the respondent education was reasonably well-educated, as would be expected from this sector, with 73.1% having achieved secondary school or undergraduate degree, with only 2.9% having only primary school level of education.

In case of Korea, female respondents were 51.1%, and 47.8% were male; 59% of respondents were in the age of 20s and most of them were well educated. 50% were student with 38.8% earned less than 1,000,000 won (approximately US\$1,000) per month. Some survey items have been omitted because respondents did not provide information.

<Table 2> and <Table 3> show the descriptive demographic data from Laos and South Korea respectively

Collected questionnaires were checked for completeness and then transformed into spreadsheet data for analysis by SPSS.

<Table 2> Descriptive Demographic Data of Laos

		Frequency	Percent
Gender	Male	109	52.4
	Female	99	47.6
Age	Under 20	6	2.9
	20~29	117	56.3
	30~39	71	34.1
	40~49	11	5.3
	50~59	3	1.4
Education	Primary	6	2.9
	Secondary	18	8.7
	Diploma	18	8.7
	Bachelor	116	55.8
	Graduate	50	24.0
Salary	Under \$125	17	8.2
	\$125~\$375	89	42.8
	\$375~\$625	41	19.7
	Over \$625	57	27.4

<Table 3> Descriptive Demographic Data of South Korea

		Frequency	Percent
Gender	Male	85	47.8
	Female	91	51.1
Age	Under 20	2	1.1
	20~29	105	59.0
	30~39	42	23.6
	40~49	20	11.2
	50~59	6	3.4
	60 or above	1	.6
Education	diploma	12	6.7
	attending bachelor	78	43.8
	finished bachelor	30	16.9
	graduate	56	31.5
Occupation	student	89	50.0
	public officer	6	3.4
	company employee	40	22.5
	businessmen/unemployed	8	4.5
	etc	33	18.5
Salary	Under 1,000,000 won	69	38.8
	1,000,000~2,000,000 won	55	30.9
	2,000,000~4,000,000 won	28	15.7
	4,000,000~7,000,000 won	13	7.3
	over 7,000,000 won	5	2.8

A principal component analysis with VARIMAX rotation was conducted only on the 40 items measuring the technology accessibility, quality of data/information, patient to patient forum, patient's medical knowledge and patient's autonomy. The objective of the analysis was to summarize the information contained in the 40 variables into smaller sets of explanatory composite factors, which define the fundamental constructs assumed to underlie the variables. Factors with an Eigenvalue equal to or greater than 1 were chosen for interpretation. Only variables with factor loading coefficients of 0.5 were considered; that is, items with less than 0.5 were excluded. For the items of patient's perceived quality of healthcare

service were grouped into 1 construct and using mean score of each factor extracted from factor analysis to perform multiple regressions. A reliability analysis (Cronbach's alpha) was performed to test the reliability and internal consistency of each of the construct. Alpha scores range from 0 to 1 and measure the internal consistency of multi-item scales. The closer that the Alpha score is to 1, the more reliable the results are considered to be. A coefficient alpha of 0.7 or higher is considered to be reliable for group data purposes.

6. Findings

6.1 Validity and Reliability Tests

SPSS was used to perform the analysis using principal component procedure including a transformation with varimax rotation similar to comparable studies. The test results were acceptable with a significance level of 0.01.

6.2 Validity

The combination of 2 datasets was used to find out the construct of model. Most of the survey items are considered to be an appropriate basis for using the Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy, which was calculated to be 0.865. This is an index that is used to examine the appropriateness of factor analysis. High values lie between 0.5 and 1 and indicate that the factor analysis is appropriate. The Bartlett's test for Sphericity was significant at the 0.05 level (See <Appendix 1>), indicating that factor analysis was appropriate. Factor

analysis identifies 5 antecedent factors consistent to the design of research : technology accessibility to medical information, data/information quality, patient to patient forum, medical knowledge and autonomy (See <Appendix 2> for more details).

6.3 Reliability

Cronbach's Alpha in extraction factors was calculated to be almost above 0.7, which was considered to be reliable basis for reliability and refers to the degree of dependability, consistency and stability of a scale. Only technology accessibility factor was 0.568 which is relatively low but it theoretically is the important variable, so we decided to retain it. The internal consistency of the scales used was confirmed by Cronbach Alpha's [Cronbach, 1951] value of more than 0.7, which is considered to be reliable (Nunnally, 1978). <Table 4> shows the result of reliability test.

<Table 4> Result of Reliability Test

Variable	Number of item	Cronbach's Alpha
Technology accessibility	3	0.568
Data/information quality	10	0.909
Patient to Patient forum	5	0.851
Patient's medical knowledge	3	0.737
Patient's autonomy	5	0.791
Patient's perceived quality of healthcare service	11	0.902

6.4 Result of Hypothesis Tests

We examined hypothesis of our research model using multiple regression analysis. <Table 5> shows the result of the multiple regression analysis from overall data (combination data of Laos and South Korea). As can be seen from the table, Hypothesis H2a, H3a, H3b, H4 and H5 were supported ($p < 0.01$). Hypothesis H2b was supported ($p < 0.05$). Hypothesis H1a and H1b were rejected.

In <Table 6>, result of multiple regression analysis for Laos' data is presented. There are 5 Hypothesis (H3a, H2b, H3b, H4 and H5) were supported with the p value < 0.01 . The rest Hypothesis were rejected.

We also performed the multiple regression analysis to see the relationship of the use of information technology in 3 aspects in South Korea as well as the effect of patient-physician interaction on the perceived quality in South

<Table 5> Result of Overall Regression Analysis

Dependent Variable	Independent Variable	Beta	T	Sig	H	Supported/rejected
Patient's medical knowledge	Constant		10.019	.000		
	Technology accessibility	-.166	-3.251	.001	H1a	Rejected
	Data/information quality	.204	4.103	.000	H2a	Supported
	Patient to patient Forum	.258	4.918	.000	H3a	Supported
Patient's autonomy	Constant		8.536	.000		
	Technology accessibility	.052	1.020	.308	H1b	Rejected
	Data/information quality	.112	2.255	.025	H2b	Supported
	Patient to patient Forum	.300	5.704	.000	H3b	Supported
Patient's perceived quality of healthcare service	Constant		9.371	.000		
	Medical_knowledge	.327	6.488	.000	H4	Supported
	Autonomy	.141	2.807	.005	H5	Supported

<Table 6> Result of Laos' Data Regression Analysis

Dependent Variable	Independent Variable	Beta	T	Sig	H	Supported/rejected
Patient's medical knowledge	Constant		6.807	.000		
	Technology accessibility	-.076	-1.095	.275	H1a	Rejected
	Data/information quality	.128	1.810	.072	H2a	Rejected
	Patient to patient Forum	.321	4.595	.000	H3a	Supported
Patient's autonomy	Constant		7.847	.000		
	Technology accessibility	-.205	-3.198	.002	H1b	Rejected
	Data/information quality	.226	3.454	.001	H2b	Supported
	Patient to patient Forum	.421	6.512	.000	H3b	Supported
Patient's perceived quality of healthcare service	(Constant)		9.371	.000		
	Medical_knowledge	.327	6.488	.000	H4	Supported
	Autonomy	.141	2.807	.005	H5	Supported

<Table 7> Result of South Korea's Data Regression Analysis

Dependent Variable	Independent Variable	Beta	T	Sig	H	Supported/rejected
Patient's medical knowledge	Constant		7.042	.000		
	Technology accessibility	-.063	-.813	.418	H1a	Rejected
	Data/information quality	.117	1.484	.140	H2a	Rejected
	Patient to patient Forum	.257	3.131	.002	H3a	Supported
Patient's autonomy	Constant		5.900	.000		
	Technology accessibility	.152	1.958	.052	H1b	Rejected
	Data/information quality	.315	4.024	.000	H2b	Supported
	Patient to patient Forum	-.084	-1.028	.305	H3b	Rejected
Patient's perceived quality of healthcare service	(Constant)		6.283	.000		
	Medical_knowledge	.207	3.146	.002	H4	Supported
	Autonomy	.492	7.475	.000	H5	Supported

Korea's healthcare service. Result is presented in <Table 7>.

7. Conclusion

As we know, the quality of life is concern with the living standard of all the members of the family. In one hand, quality of life includes the overall standard of the nation, on the other hand it represents the standard of different classes like high, low, medium, old, children, male and female etc. We can say, though, that one of the theoretical roles of society should be the constant improvement if the lives of its members. This work attempts to find a new model in information technology usage to improve certain aspects of quality of life. As healthcare is undoubtedly one of the core areas regarding one's life quality, we focused on improvements exclusively in this area. We believe that by focusing on quality of life helps medical providers to see the big picture and makes for healthier, happier patients. In this case, patient-physician interaction is the most important

one among many factors in improvement of quality of life of patient.

Based on the result of analyses conducted in this study, we found the similarities impacts on patient's knowledge and Patient's perceived quality of healthcare service in both countries and also some differences in relationship in patients autonomous. The explanation and conclusion come as following.

The facts that analysis results have shown the negative effect of technology accessibility in both countries on patient's medical knowledge can be deceiving. This just pointed out that patients' self perceived medical knowledge seems to be higher when they have more limited access to the technology and they might evaluate themselves in lower level when they realize there are many available knowledge sources to acquire. However, we still believe that, the availability of technology will not decrease the actual knowledge of patients, it only effects on patients' confidence to assess or judge what they think they know less or more

than others.

Additionally, technology accessibility has significant negative effect on Lao patients' autonomy which is opposite from our assumption. The result shows the patients with high technology accessibilities tend to rely on the doctors when it comes to decision making while patient who have less chance to access to the technology are highly autonomous. This could be explained by the low income population with limited access to technology tends to favor traditional medical treatments in certain cases over western medicine doctors. The folk medicine has a strong rooted tradition in many countries in Asia, so it should be a considerable factor in interpreting our data. Alternately, the higher autonomy of the said portion of the population can be explained by possible economic reasons. For a university educated high-income patient the quick and efficient recovery will be the highest priority. On the other hand, the low-income individuals will seriously consider their economic limitations when comparing different treatment methods and choosing between them. The fact that the health insurance coverage in Laos is only partial contributes to this, as people without insurance may tend to avoid costly medical solutions. Thus, the combination of cultural and economic factors can be seen as a plausible explanation for the negative value in the case of Laos.

In the case of South Korea, Technology accessibility is not significant factor in predicting the level of patient's medical knowledge as well as to their autonomy. The reason of the seeming unimportance of the technology aspect could

be the good and sufficient IT infrastructure in South Korea where people can access to the low price or free internet almost anywhere, anytime. Patients, while seeking relevant information or guidelines for choosing the right medication, view the technology as a medium or tool. As such they tend to weight more importance to the content while lessening the importance of technological aspect.

However, Patient to Patient Forum plays an important role in both countries when it comes to patient's medical knowledge gaining method. It implies that people are likely to search and gain medical knowledge from others who have experience about the same medical issue.

In Patient's Autonomy, quality of data/information provided by hospital has significant positive effect on the way South Korean patients choose to go for treatment. It implies that South Korean patients trust the verified scientific data in making decision while Lao patients are more likely to rely on the suggestion from other patients in patient to patient forum.

Consistent with our hypothesis, the perceived quality of healthcare service of patient in both countries has significant relationship with the interaction between patient and doctor. The analysis result demonstrates that patients' medical knowledge and patient's autonomy has significant positive effect on it. Patient's satisfaction is influenced by how much knowledge about medication, treatment as well as self-confidence of decision making patients have. Therefore measuring patient's satisfaction is a useful method to evaluate quality of services. When patients' satisfactions rise, it implies that from their point of view the quality

of services has been improved. So we suggest that, healthcare provider should take these aspects of interaction in consideration.

Another suggestion is, as we have seen from the results of the data analysis, while the raw scientific data represent a significant authority in determining the patients' choices, the forum providing valuable experience reports about a treatment or a particular medical institute has the lion's share in both knowledge acquiring and autonomy processes.

Possibly the most plausible approach would be to create a standardized format database with subordinate, complex forums for particular medical cases. Ideally the forums should have the following qualities :

- 1) International format and core information about the medical condition
- 2) Local (and in later stage of development international) patient forums under the administration of non-hospital or institute aligned, qualified staff
- 3) Assessment on worldwide situation of the medical condition- the level of medical proficiency on it in different countries, the different therapies approached in different countries etc.
- 4) Localization aspect : for example in the case of Asia, the forum should have space for traditional medical approaches towards the treatment of the condition

As said before, the database should have internationally unified format and its core content accessible in multiple languages, with the available palette being constantly updated.

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〈Appendix〉

〈Appendix 1〉 KMO and Bartlett's Test

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.865
Bartlett's Test of Sphericity	Approx. Chi-Square	6454.421
	df	780
	Sig.	.000

〈Appendix 2〉 Result of Factor Analysis

onstruct	Variable	Component				
		1	2	3	4	5
Data/information quality	X13 : data clearness	.831	.047	.094	.001	-.069
	X10 : data accuracy	.767	-.025	.008	.220	-.154
	X16 : data reliability	.757	.180	.105	.026	-.149
	X18 : data organization	.750	.024	.043	.144	.005
	X11 : data completeness	.744	.016	.013	.002	.066
	X12 : data satisfaction level	.738	.064	-.027	.052	.066
	X15 : data price worthiness	.710	.135	.124	-.054	.036
	X14 : data comprehension	.708	.083	.206	.038	-.006
	X9 : data actuality	.678	.042	-.117	.205	.009
X17 : data scope	.634	.239	.061	.017	.245	
Patient to patient Forum	X22 : forum contribution in decision making	.138	.815	.116	.161	.010
	X23 : willingness to continue using forum	.055	.803	.214	.199	.109
	X21 : forum contribution in medical knowledge	.163	.803	.074	.155	.061
	X20 : trustworthiness in the forum	.184	.720	.005	-.074	.067
	X28 : Knowledge from forum	-.052	.623	.216	-.094	.437
Patient's autonomy	X39 : understanding benefit of each choice	.099	.051	.747	.098	.245
	X40 : self-involvement in decision making	.096	.048	.709	.298	.000
	X36 : treatment information expectation from doctors	.092	.303	.701	.134	-.101
	X38 : free own choice for prescription	.006	-.034	.691	-.002	.297
	X37 : medicine information expectation from doctors	.064	.219	.679	-.006	-.178
Patient's medical Knowledge	X29 : medical information research before seeing doctor	.198	.055	-.012	.787	-.020
	X31 : medical knowledge for better communication	.098	.108	.244	.708	-.092
	X30 : medical information research after seeing doctor	.068	.223	.354	.688	-.022
Technology accessibility to medical information	X5 : application	.035	.043	-.215	.293	.710
	X2 : magazine	-.020	.122	.206	-.178	.689
	X4 : call center	.011	.262	.165	-.349	.613

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