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AN EMPIRICAL STUDY ON INTEGRATION OF SERVQUAL AND KANO MODEL FOR MEASURING SERVICE QUALITY OF HOSPITALS IN AHMEDABAD

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ABSTRACT

To survive in this competitive market and to achieve competitive advantage, hospital should continuously measure and improve their service quality which leads to patient satisfaction. Lot of research has been carried out to measure service quality through SERVQUAL or modified SERVQUAL scale. But Literature has explored that SERVQUAL cannot directly relate performance with satisfaction level because it assumes a linear relationship between customer satisfaction and service attribute performance. But the factors that cause dissatisfaction are different from the factors that cause satisfaction. Kano Model can be used to classify service quality attribute based on satisfaction level. This research paper will emphasis on integration of SERVQUAL and Kano model to measure service quality of Private Multispecialty Hospitals in Ahmedabad, Gujarat to find out the major areas for improvement as per the service quality is concerned. Research has identified high service quality gap for the dimensions reliability, responsiveness, assurance and empathy on the other hand tangibility shown least service quality gap. Service quality gap was observed in Must be service quality attributes that shown that hospitals are lacking in proving basic services too. To satisfy patients, Private Multispecialty Hospitals in Ahmedabad should focus more on improving service quality.

Keywords*: Hospital Service Quality, SERVQUAL, Kano Model.*

Introduction:

Gujarat offers holistic medicinal services and cost effective treatment. Market for tertiary care is expected to grow at a faster rate due to rise in income levels, increasing adoption of health insurance and rise in complex in-patient ailments (heart diseases, kidney ailments, cancer). Upcoming trends in Gujarat state like increasing rate of medical tourism clinical research activities, public private partnership and medical equipment market also boost growth of health care sectors in Gujarat state. This ever increasing growth rate put pressure on hospital to measure and continuously improves health care service quality.[1] Researchers are having opinion that service quality plays an important role in achieving higher patronage, competitive advantage, sustained profitability (Brown, S. W. and Swartz, T. A., 1989; Headly, D. E. and Miller, S. J., 1993), corporate marketing, enhancing financial performance (Buttle, F., 1996). There is direct link between service quality and increased market share, profit and saving. (Devlin, S. J. and Dong, H. K., 1994). The 'Gap Model' of service quality was propounded by Parsuraman, A. *et al*. (1985) to measure service quality gap. As shown in figure 1, model identified following five service quality gaps. These gaps can be major obstacles to deliver a high quality service.

Gap 1: Consumer expectation- Management perception gap

Gap 2: Management perception- Service quality specification gap

Gap 3: Service quality specification- Service delivery gap

Gap 4: Service delivery –External communication gap

[1] Industries commisionerate, Government of Gujarat (2014). *Healthcare*. Gujarat: iNDEXTb.

These four gaps cause a fifth gap that is Gap 5.

Gap5 = f (Gap1, Gap2, Gap3, Gap4)

Gap 5: Expected Services-Perceived Services gap

Parsuraman, A. *et al*. (1988) developed SERVQUAL scale based on five service quality dimensions Tangibility- Infrastructural aspects of services and aesthetic of personnel, Reliability- Ability to execute services as per the promise, Responsiveness- Eagerness to help customers and providing fast service, Assurance- Trust and confidence generating ability of knowledgeable and courteous employees and Empathy- Trust and confidence generating ability of knowledgeable and courteous employees. SERVQUAL is concise multi item scale (22 item scale) with good reliability and validity. It is widely adopted approach to measure service quality in both manufacturing and service industry. When necessary it can be modified or supplemented to fit the characteristics of particular service (Parsuraman, A. *et al*., 1988). This instrument was administered twice to measure expectation and perceptions for each of the five service quality dimensions using seven-point Likert scale ranging from 1 (strongly disagree) to 7 (strongly agree). SERVQUAL is extensively adopted in both private and public service sectors such as retailing, healthcare, education, tourism and hospitality, financial services, B2B, real estate and government as well (Buttle, F., 1996). SERVQUAL provides better understanding about current service quality trends if applied periodically (Parsuraman, A. *et al*., 1988; Tan, K. C. and Pawitra, T. A., 2001). Areas of excellence and improvement can be identified and priorities through service gap using SERVQUAL. This provides basis for formulating strategy and tactics (Tan, K. C. and Pawitra, T. A., 2001). SERVQUAL assumes a linear relationship between customer satisfaction and service attribute performance but it is not necessary that paying more attention to a particular service attribute may always lead to higher customer satisfaction (Tan, K. C. and Pawitra, T. A., 2001) because the factors that cause dissatisfaction are different from the factors that cause satisfaction (Herzberg *et al.,* 1959). This limitation of SERVQUAL can be overcome using integration of SERVQUAL and Kano Model.

Kano Model - Theory of Attractive Quality

Dr. Noriaki Kano of Tokyo Rika University and his colleagues from Japan in 1984(Kano *et al.,* 1984) developed Kano Model to categorise the attributes of a product or service, based on how well products or services are able to satisfy customers' need (Berger *et al., 1993;* Witell, L. and Lofgren, M., 2007; Chen, Y. H. and Su, C. T., 2006). This model was developed on the basis Herzberg's 'Motivator-Hygiene Theory-M-H Theory' (Herzberg *et al.,* 1959; 1966). This model is also known as 'Kano's theory of attractive quality' (Kano *et al.,* 1984). Professor Kano proposed that sometimes quality attributes may reveal non-linear and two dimensional relationship with customer satisfaction (Kano, N. *et al.,* 1984; Birdogan, B. *et al.,* 2009; Witell, L. and Lofgren, M., 2007). Kano's model has been applied in quality management, product development, strategic management and employee management, business planning and service management (Witell, L. and Lofgren, M., 2007). In service sector, Kano model has been applied to investigate various services such as superstores (Ting, S. C. and Chen, C. N., 2002), web page design (Tan K.C. *et al*., 1999), health-care services (Jane ´, A. C. and Domı ´nguez, S. M., 2003), financial services (Bhattacharyya, S. K. and Rahman, Z., 2004), and electronic services (Fundin, A. and Nilsson, L., 2003). As shown in the figure 2, Horizontal axis in the Kano diagram express the physical sufficiency of an quality attribute and the vertical axis express the satisfaction with an quality attribute (Kano, N. *et al*., 1984). Quality attributes were classified in five Categories: "Attractive Quality", "One-Dimensional Quality", "Must-be Quality", "Indifferent Quality" and "Reverse Quality" (Witell, L. and Lofgren, M., 2007).

- 'Attractive Quality Attribute'- Surprise and delight attributes (Kano, N. *et al*., 1984). When this quality attributes achieved fully, customer satisfaction increases super linearity with increasing service attribute performance. However, there is no corresponding decrease in customer satisfaction with decrease in performance (Kano, N. *et al*. 1984, Tan, K. C. and Pawitra, T. A., 2001; Witell, L. and Lofgren, M., 2007). If these attributes delivered properly they lead to satisfaction. These are neither demanded nor normally expected so they are sufficient, but not a necessary condition for satisfaction (Kano, N. *et al*., 2001; Lilja, J. and Wiklund, H., 2006; Busacca, B. and Padula, G., 2005; Birdogan, B. *et al.,* 2009). To get competitive advantage and attract competitors' customer, 'Attractive attribute' works an element for an aggressive marketing strategy (Birdogan, B. *et al.,* 2009).
- 'One-Dimensional Quality Attribute': They lead to satisfaction when fulfilled and result in dissatisfaction when not fulfilled (Kano, N. *et al*., 1984; Witell, L. and Lofgren, M., 2007). It explains linear relationship between service attributes and customer satisfaction (Shen, X. X. *et al.,* 2000). These are called spoken needs (Gustafsson, A., 1998) and so they are both a necessary and sufficient condition for customer satisfaction (Busacca, B. and Padula, G., 2005).
- 'Must-be Quality Attribute': Customer satisfaction does not increase above neutral level even if these attributes fulfilled fully (Tan, K. C. and Pawitra, T. A., 2001) but result in dissatisfaction when not fulfilled (Kano, N. *et al*., 1984).
- 'Indifferent Quality Attribute': These attributes are neither good nor bad; they do not result in either

satisfaction or dissatisfaction (Kano, N. *et al*., 1984; Witell, L. and Lofgren, M., 2007).

- 'Reverse Quality Attribute': If these attributes achieved fully, they results in dissatisfaction and vice versa; if not achieved fully results in satisfaction. The reason behind this is not all customers are alike (Kano, N. *et al*., 1984; Gustafsson, A., 1998; Witell, L. and Lofgren, M., 2007).

Model also proposes that over the time an attribute changes from being 'Indifferent', to 'Attractive', to 'One-Dimensional', and, finally, to being a 'Must-be' item so timely and continual development /improvement and introduction of products or services with innovative and novel attributes are important to get competitive advantage (Shen, X. X. *et al*., 2000; Tan, K. C. and Pawitra, T. A., 2001). Figure 3, 4, 5 and 6 explains four different approaches for classification of quality attributes like 'Five level Kano Questionnaire', 'Three level Kano Questionnaire', 'Classification through Direct Question' and 'Classification through Dual-Importance Grid' (Witell, L. and Lofgren, M., 2007).

Literature Review:

Healthcare is a typical service that people need but do not necessarily wish for it (Berry, L. L. and Bengdapudi, N., 2007). According to Andaleeb, S. S. (2001), Health care is one of the fastest growing sectors in the service economy due to an aging population, mounting competitive pressures (Pai, Y. P. and Chary, S. T., 2013), increasing consumerism, emerging treatments and technologies (Ludwig-Beymer, P. *et al.*, 1993; O'Connor *et al.*, 2000). Patients and their family must be recognised as consumers in healthcare thus to offer them new products and services, a thorough understanding of their needs and expectations is significantly important (Pai, Y. P. and Chary, S. T., 2013). Translating the patient's view into actual service offering is one of the ways to make healthcare services more responsive to people's need (Rao, K. D. *et al.*, 2006). Globally there is a shift towards the private sector from the traditional charity state-run system in the delivery of health services (Marchand, M. and Schroyen, F., 2005). Various studies had been carried out in health care sector to measure service quality through SERVQUAL or modified SERVQUAL (Pai, Y. P. and Chary, S. T., 2013). Table 1 show major studies recently conducted in health care sector. SERVQUAL can be improved by integrating it with Kano Model. In the service industry Kano model has also been applied successfully alone or in integration with other approaches for investigating various services as Tv's and table Clocks (Kano, N. *et al.*, 1984), Skis (Matzler, K. *et al.*,1996; Matzler, K. and Hinterhuber, H. H., 1998), Web pages (Tan, K. C. *et al.*,1999), Television (Kano, N., 2001), Tourism (Tan, K. C. and Pawitra, T. A., 2001; Pawitra, T. A. and Tan, K. C., 2003), Education (Emery, C. R. and Tian, R. G., 2002; Hogstrom, C. *et al.*, 2010), Financial services (Bhattacharyya, S. K. and Rahman, Z., 2004), Logistics services (Birdogan, B. *et al.*, 2009) and health care services (Cardero-Ampiero, J. *et al.*, 2012; Sulisworo, D. *et al.*,2012; Momani, A. *et al.*,2014). It has been also applied in conjunction with SERVQUAL (Bhattacharyya, S. K. and Rahman, Z. 2004 ; Tan, K. C. and Pawitra, T. A., 2001; Pawitra, T. A. and Tan, K. C., 2003; Birdogan, B. *et al.*, 2009). Few researches had been conducted to further improve SERVQUAL by integrating it with Kano Model as mentioned in Table 2.

Research Gap:

It is of utmost importance for hospitals to concern about health care service quality provided by them. To provide best service, hospitals should continuously measure the voice of patients regarding service provided by them and their satisfaction towards the services. Increasing rate of medical tourism, rise in infectious and chronic degenerative diseases and lifestyle-related diseases has put pressure on healthcare service provider to get NABH or NABL accreditation as a basic requirement to become world class. Moreover to imbibe the best global practices in the value chain, there is a moral pressure on health care service providers to provide seamless patient care of highest quality in Gujarat state. To provide seamless patient care and compete in this competitive environment hospital should continuously measure and improve of service quality. Hospitals can measure their own service quality using SERVQUAL. But there is scope for improvement in SERVQUAL by integrating it with Kano model to achieve excellent service quality. Integrated model will help hospitals to relate service quality gap about and satisfaction level. Lots of research has been carried out to measure service quality of hospitals through SERVQUAL or modified SERVQUAL scale. Lack of literature is observed in the area of integration of SERVQUAL and Kano model in Healthcare sector.

Research Methodology:

Objective of this research was to measure service quality of Private Multispecialty Hospitals of Ahmedabad, Gujarat, India and to classify service quality attributes using Kano model to relate service quality attributes performance and customer satisfaction. This research began with exploratory research design as its immediate purpose was to explore service quality attributes for further research. For making the study conclusive after exploratory research, descriptive research design-single cross sectional design was used. Both secondary and primary data were collected in this study. Secondary data was collected from books, magazines, journals, newspaper, published

report like economic survey and other government published data and computerized data base like SSRN, Proquest and Emerald. For collecting primary data to achieve research objective, patients were surveyed based on structured questionnaire in Ahmedabad, Gujarat. Target population was patients who were benefiting (continuously being administered at least for three days) / had benefited (within last three months and administered at least for three days) from the service of Private Multispecialty Hospitals. There are approximately 53 Private Multispecialty Hospitals in Ahmedabad. Survey of Total 232 patients from 22 hospitals of Ahmedabad were conducted using non-probability convenience sampling technique. The data collected from the survey was analyzed through reliability statistics, descriptive statistic, paired sample t-test and three levels kano classification for service quality attributes. Total 50 service quality attributes were found out based on literature review to design a questionnaire. Following two research scale were used.

1. Kano three Level Questionnaire approach was used to classify service quality attributes based on following two scales.

Feeling if service quality attribute available: S- Satisfied, N- Neutral, D- Dissatisfied

Feeling if service quality attribute not available: S- Satisfied, N- Neutral, D- Dissatisfied

2. SERVQUAL scale as proposed by Parasuraman, A. *et al*. (1988) was adapted and modified in this research to develop structured questionnaire based on five service quality dimensions Tangibility, Reliability, Responsiveness, Assurance and Empathy. Five point likert scale was used to measure expectation and perception of patient's about service quality attributes.

Once the questionnaire was constructed, a small pilot study was conducted among 50 respondents bearing the same demographic profile as the final sample of the study. Their feedback and comments are incorporated in the study.

Findings and Discussion:

Respondent's Profile: Table 3 explains detail respondent profile.

Reliability of scale: Reliability analysis allows a researcher to determine the extent to which a scale produces consistent results, if the measurements are repeated. Cronbach's alpha is a statistic used to determine the internal consistency. As shown in Table 4 Cronbach's alpha for all five dimensions of four different measure of patient's questionnaire were greater than 0.7 indicating that the construct was reliable.

Kano classification: As shown in Table 5 service quality attributes were classified on the basis of three level Kano questionnaire using mode value. Table 5 shows classification of total 50 service quality attributes in different Kano category. From total 50 service quality attributes 13 service attributes were classified as 'Must be' category, 34 service attributes were classified as 'One dimensional' category and 3 service attributes were classified as 'Attractive' category.

Gap analysis: Paired sample t-test was carried out to find out P-E gap for each service quality attribute. As per the table 6 there is no significant P-E gap was observed for five Service quality attributes 'uniform /professional appearance of staff' , 'laundry facilities available within the premises', 'clean drinking water', 'well furnished/decorated/ventilated/clean wards' and 'adequate, comfortable and clean bathrooms and toilets' because their p-value as per the paired sample t-test was greater than 0.05. As per the paired sample t-test, p-value of rest of other service quality attributes was less than 0.05 which shows significant P-E gap, so hospital should try to overcome this service quality gap. As per Table 7 P-E gap was observed for all five service quality dimensions. Tangibility shows least gap which proves that Private Multispecialty Hospital of Ahmedabad are good at tangibility aspects but these tangibility aspects cannot be ignored as some of the service quality attributes related to tangibility aspects are falling in 'Must be' category. Research found that hospitals are lacking in providing other four service quality dimensions like reliability, responsiveness, assurance and empathy. Highest service quality gap was observed for assurance aspect of hospital service.

Integration of SERVQUAL and Kano model: Table 8 shows integration of SERVQUAL and Kano model for service quality attribute which shows significant P-E gap. The table shows the P-E gap with its classification in Kano category.

'Attractive service quality attribute' which shows highest service quality gap was 'Willingness of hospital personnel to help patients (Responsiveness) '. 'Blood bank within the premises (Tangibility)' and 'Fixing operation timings according to requirement (Empathy)' also shows service quality gap in this category. These service quality attribute create delight for patient. When above mentioned attractive quality attribute are fully provided by Private Multispecialty Hospital, patient satisfaction increases super linearly with increasing service quality attribute performance. There is, however, no corresponding decrease in patient satisfaction with decrease in such service quality attribute performance. These service quality attributes are neither demanded nor normally expected, but when properly delivered, they bring satisfaction. So they are desirable, but not a necessary condition for satisfaction. To achieve competitive advantage, Attractive service quality attribute can be used as an element of an aggressive marketing strategy by private multispecialty hospital.

'Must be service quality attribute' are taken for granted when fulfilled but result in dissatisfaction when not provided by private multispecialty hospital. However patient satisfaction does not increase above neutral level even if these service qualities attributes

are provided fully. These service quality attributes are generally expected by patients' and they view them as basic, so it is possible that they are not going to tell hospital about these service quality attributes when asked about their expected quality attribute. Thus it is compulsory for every Private Multispecialty Hospital in Ahmedabad to fulfill 'Must be' services in their organisation. 'Must be service quality attribute' which shows highest service quality gap were 'Provide all the required information and instructions regarding admission, Treatment, and discharge clearly to patients and attendants (Reliability)', 'Error free and fast retrieval of documents (Reliability) ', 'Fast and Computerized registration and billing procedures (Tangibility)' , 'Pharmacy within the premises (Tangibility)', 'Pathology laboratory and or imaging centre within the premises (Tangibility)' , 'Canteen with hygienic food (Tangibility)', 'Continuous electricity and water supply (Tangibility)' , 'Staff with appropriate name badges (Tangibility)' and 'Promotional information material (Tangibility)'. Service quality attributes having Tangibility service aspects observed least service quality gap but as they are classified as 'Must be' category each and every hospital must have these attributes.

All the service quality attributes other than above mentioned 'Attractive' and 'Must be' service quality attributes were classified in 'One Dimensional' category. These service quality attribute result in satisfaction when fulfilled and result in dissatisfaction when not fulfilled. There is a linear relationship between service quality attribute and patient satisfaction. They are explicit and are ones with which hospitals can compete and so they are both a necessity as well as a primary condition for patient satisfaction. 'One dimensional' service quality attribute which observed highest service quality gap was 'Doing correct diagnosis right at the first time (Reliability)'; ' Feeling safe regarding cost of treatment and medicines (Assurance)'; 'Consistency of charges (Empathy)'; 'Keeping the patients informed and listening to them (Empathy)' and 'Understanding the specific needs of the patients (Empathy)'. As this service attributes are more important and leads to dissatisfaction of patient if not delivered, hospitals should try to improve quality of these service attributes on continuous basis. 'One dimensional service quality attribute' having tangibility aspects observed least service quality gap which shows that most of the hospital are satisfactorily performing in this aspects.

Conclusion:

This study puts forward that patients define hospital service quality in terms of five service quality dimensions like Tangibility, Reliability, Responsiveness, Assurance and Empathy. Through this study SERVQUAL appears to be a consistent and reliable instrument to measure and find out areas for attention to improve service quality of Private Multispecialty Hospital in Ahmedabad city. The negative SERVQUAL Gap between perception and expectation across all the dimensions clearly shows that there is an opportunity for improving service quality in Private Multispecialty Hospital in Ahmedabad city. Highest service quality gap was observed for the aspect Assurance while the least gap was observed for dimension Tangibility which indicates that most of the Private Multispecialty Hospitals in Ahmedabad city are performing satisfactorily on Tangibility aspect and not providing satisfactory service for the services related to assurance aspect. While framing strategy, Private Multispecialty Hospital of Ahmedabad should focus more on 'Attractive service quality attribute' to achieve competitive advantage. It is compulsory for each and every hospital to provide highest quality of services which are classified as 'Must be' category because these are the basic need of Patients. As service quality gap was observed for all one dimensional service quality attributes, hospitals should try to continuously improve these service quality attributes to increase the satisfaction level of patient and reduce the gap between perception and expectation.

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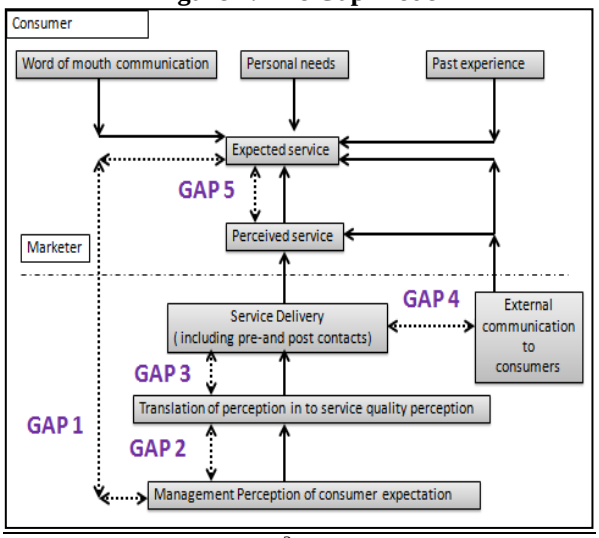
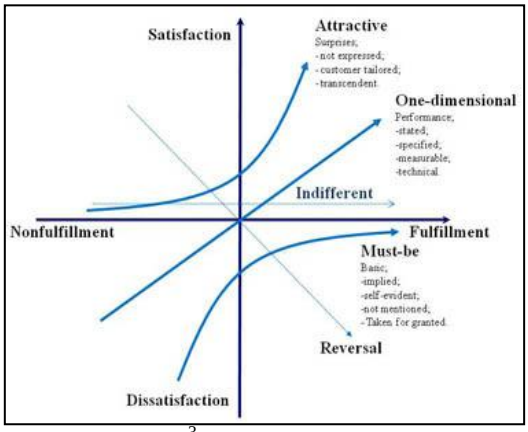
APPENDIX

Figure 1: The Gap Model



Source: Reproduced from Bedi (2011)[2]

Figure 2- The Kano Diagram



Source: Reproduced from Berger, C., et al. (1993)[3]

Figure 3: Five Level Kano Questionnaire

If you can order cinema tickets online, how do you feel?	**1. I like it that way.**
	2. I am expected to be that way.
	3. I am neural.
	4. I can accept it to be that way.
(Functional Form)	**5. I dislike it that way.**
If you can not order cinema tickets online, how do you feel?	**1. I like it that way.**
	2. I am expected to be that way.
	3. I am neural.
(dysfunctional Form)	**4. I can accept it to be that way.**
	5. I dislike it that way.

[2]Bedi, K. (2011). *Quality Management.* New Delhi, India: Oxford University Press.

[3] Berger, C., Blauth, R., Boger, D., Bolster, C., Burchill, G., DuMouchel, W., et al. (1993). "Kano's method for understanding customer-defined quality". *The centre for quality management Journal , 2* (4), 2-36.

If you can order cinema tickets online, how do you feel? **(Functional Form)**	**1. I like it that way.** **2. I am expected to be that way.** **3. I am neural.** **4. I can accept it to be that way.** **5. I dislike it that way.**
If you can not order cinema tickets online, how do you feel? **(dysfunctional Form)**	**1. I like it that way.** **2. I am expected to be that way.** **3. I am neural.** **4. I can accept it to be that way.** **5. I dislike it that way.**

Customer Requirement → / ↓		Dysfunctional				
		Like	Expect	Neutral	Accept	Dislike
Functional	Like	S	A	A	A	O
	Expect	R	I	I	I	M
	Neutral	R	I	I	I	M
	Accept	R	I	I	I	M
	Dislike	R	R	R	R	S

Customer requirement	A	M	O	R	S	I	Total	Grade
1	1						1	A
2								
3								
.....								

Source: Reproduced from Witell and Lofgren (2007)[4]

Figure 4: Classifications through Three Level Kano Questionnaire

If you can order cinema tickets online, how do you feel? **(Functional Form)**	**1.** I am Satisfied. 2. I am neural. 3. I am dissatisfied .
If you can not order cinema tickets online, how do you feel? **(dysfunctional Form)**	1. I am Satisfied. **2.** I am neural. 3. I am dissatisfied .

[4] Witell, L., & Lofgren, M. (2007). Classification of quality attributes. *Managing Service Quality , 17* (1), 54-73.

Customer Requirement → ↓		Dysfunctional		
		Satisfied	Neutral	Dissatisfied
Functional	Satisfied	S	A	O
	Neutral	R	I	M
	Dissatisfied	R	R	S

Customer requirement	A	M	O	R	S	I	Total	Grade
1	1						1	A
2								
3								
.....								

Source: Reproduced from Witell and Lofgren (2007)[5]

Figure 5: Classifications through Direct Question

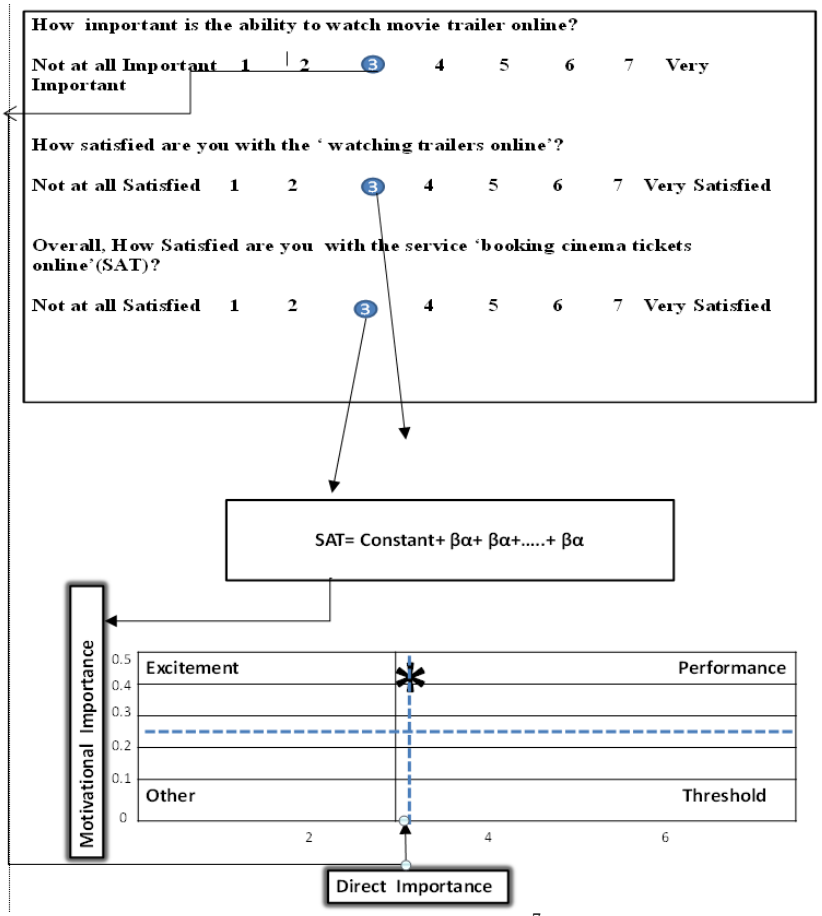
How would you classify the ability to watch movie trailers online?
A. Attractive quality
B. One dimensional quality
C. Must-be quality
D. Indifferent Quality
E. Reverse Quality
F. Other

Customer requirement	A	M	O	R	S	I	Total	Grade
1	1						1	A
2								
3								
.....								

Source: Reproduced from Witell & Lofgren (2007)[6]

[5] Witell, L., & Lofgren, M. (2007). Classification of quality attributes. *Managing Service Quality , 17* (1), 54-73.
[6] Witell, L., & Lofgren, M. (2007). Classification of quality attributes. *Managing Service Quality , 17* (1), 54-73.

Figure 6: Classification through Dual- Importance Grid



Source: Reproduced from Reproduced from Witell & Lofgren (2007)[7]

Table 1: Literature Review of SERVQUAL

Author / Area of Research	Sample size / Sampling Technique / Research Instrument / Data Analysis	Scale	Final Dimensions with its Reliability
Lim, P. C., & Tang, N. (2000) Singapore	252 Convenience sampling Questionnaire Gap Score	25 items; P-E Score Five point likert scale	Tangibles(5),Reliability (5), Responsiveness (4), Assurance (4), Empathy (4), Accessibility and affordability (3)} R- 0.71 to 0.81
Sohail, M. S (2003) Malaysia	150 Mailed Questionnaire EFA and CFA	15 items; P-E Score Five point likert scale	Tangibles(4),Reliability (2),Responsiveness (2), Assurance (4), Empathy (3) R- 0.6321 to 0.8669
Kilbourne, W. E. *et al.* (2004) USA and UK	195-US ,99-UK Questionnaire CFA	22 items; P score Seven point likert scale	Tangibles(3), Reliability (3), Responsiveness (3), Empathy (4) R- US- 0.7 to 0.87 R-UK- 0.6 to 0.76
Kara, A. *et al.* (2005)	139 Questionnaire	34 items; P-E Score	Tangibles(9),Reliability (5),Responsiveness (8), Assurance (5), Empathy (2), Courtesy (5)

[7] Witell, L., & Lofgren, M. (2007). Classification of quality attributes. *Managing Service Quality , 17* (1), 54-73.

Author / Area of Research	Sample size / Sampling Technique / Research Instrument / Data Analysis	Scale	Final Dimensions with its Reliability
Turkey	EFA, SEM	Seven point likert scale	R- 0.6797 to 0.8652
Rao, K. D. *et al.* (2006) India	2480 Convenience sampling Questionnaire EFA	23 items; P score five point likert scale	Medicine Availability (2),Medical Information (3), Staff Behavior (2),Doctor Behavior (5),Clinic Infrastructure (4) R- 0.7 to 0.88
Rohini, R., & Mahadevappa, B. (2006) India, Bangalore	500 Stratified random sampling Questionnaire EFA, ANOVA	22 items; P-E Score Seven point likert scale	Tangibles(4),Reliability (5),Responsiveness (4), Assurance (4), Empathy (5) R- 0.884 to 0.934
Bakar, C. *et al.* (2008) Turkey	472 Questionnaire Gap Score	15 items; P-E Score Five point likert scale	Tangibles(3),Reliability (3),Responsiveness (3), Assurance (4), Empathy (2) R- 0.89 to 0.96
Duggirala, D. *et al.* (2008) India	100 mail Questionnaire Gap score CFA	86 items, P-score, Seven point likert scale	Infrastructure, personal quality, process of clinical care, administrative process, safety indicator, overall experience of medical care, social responsibility R- 0.775 to 0.906
Ramsaran-Fowdar, R. (2008) Mauritius	260 Convenience sampling Questionnaire EFA	47 items; P-score, Seven point likert scale	Tangibility, Reliability, Responsiveness, Assurance/empathy, Core medical services/professionalism/skill/competence, equipment and records, Records of medical history R- 0.72 to 0.97
Karassavidou, E.*et al.* (2009) North Greece	137 Questionnaire EFA	26 items; P-E Score Seven point likert scale	Human aspects (16), Physical environment and infrastructure (7), Access (2) R- 0.758 to 0.996
Aagja, P. J., & Garg, R. (2010) India, Ahmedabad	201- scale development 200- scale validation Convenience sampling questionnaire EFA and CFA	75 items; P-E Score Seven point likert scale	Admission, Medical Services, Overall service, discharge, social responsibility R- 0.5880 to 0.8904
Butt, M. M., & Run, E. C. (2010) Malaysia	340 Random sampling questionnaire Correlation, EFA, CFA	17 items, P-E Score Seven point likert scale	Tangibles(3),Reliability(4),Responsiveness(4), Assurance(3), Empathy(3)
Narang, R. (2010) India, Lucknow	500 Questionnaire EFA	20 items; P-score, five point likert scale	Human Personal Practices and Conduct(6), Adequacy of resources and services (5), Health care delivery (5), Access to services (4) R- 0.325 to 0.789
Aaron A. A. and Roger A. A (2013) Ghana	250 Questionnaire t-measures and factor analysis	22 items; P-E Score five point likert scale	Tangibles(4),Reliability (5),Responsiveness (4), Assurance (4), Empathy (5) R- 0.80 to 0.84
Olgun K.,*et al.* (2014) Turkey	369 Questionnaire SEM, CFA	21 items; P-score, five point likert scale	Tangibility (6), Assurance (4), Empathy (2), Reliability (3), Responsiveness (3), overall satisfaction , ward of mouth, repurchase intention R- 0.70 to 0.86

Table 2: Literature Review of integration of SERVQUAL and Kano Model

Author	Research Industry	Integrated Model	Classification of Quality Attributes
Pawitra, T. A., & Tan, K. C. (2001; 2003)	Tourism Singapore	Kano ,SERVQUAL & QFD	Five Level M,O,A
Bhattacharyya, S. K., & Rahman, Z. (2004)	Bank Services	Kano and SERVQUAL	Basic, performance, Excitement
Birdogan, B. *et al.* (2009)	Logistics services Turkey	Kano, SERVQUAL and QFD	Five Level A,M,O,I,R,Q
Sulisworo, D. *et al.* (2012)	Healthcare Service private hospital in Indonesia	Kano and SERVQUAL	Five Level A,M,O,I,R,Q

Table 3: Respondent Profile

Demographic variables	Category	Frequency	%
Age	18-33	53	22.8
	34-49	69	29.7
	50-65	77	33.2
	+ 66	33	14.2
Gender	Male	149	64.2
	Female	84	35.8
Marital Status	Married	195	84.1
	Unmarried	37	15.9
Education	No formal Education	6	2.6
	Primary School	44	19.0
	Secondary/Higher secondary school	47	20.3
	Graduates/Diploma	62	26.7
	Post Graduates	53	22.8
	Professional Course	20	8.6
Occupation	Student	17	7.3
	House wife	32	13.8
	Farmer	13	5.6
	Businessman	47	20.3
	Government Employee	32	13.8
	Private Employee	54	23.3
	Retired Pensioner	11	4.7
	Retired Non Pensioner	26	11.2
No. of visit in a year	One	99	42.7
	Two	69	29.7
	Three	42	18.1
	Four	10	4.3
	Five and More	12	5.2
Medical Insurance Policy	Yes	122	52.6
	No	110	47.4
If yes	Cashless	86	37.1
	Reimbursement	36	15.5
Type of Medical Insurance Policy	Corporate	32	13.8
	Personal	90	38.8
Yearly Household Income	2,00,000	37	15.9
	2,00,001-4,00,000	72	31.0
	4,00,001-6,00,000	71	30.6
	6,00,001-8,00,000	31	13.4
	8,00,001	21	9.1

Table 4: Reliability Statistics- Cronbach's alpha

Dimension	Expectation	Perception	Feeling if Service quality attribute	
			Available	Not available
Tangibility	0.876	0.929	0.914	0.823
Reliability	0.749	0.918	0.736	0.764
Responsiveness	0.729	0.921	0.711	0.700
Assurance	0.821	0.924	0.760	0.774
Empathy	0.820	0.937	0.701	0.777

Table 5: Service Quality Classification based on Three Level Kano Questionnaire

Dimension	Service Quality Attributes		Feeling if Service quality attribute available Mode Value	Feeling if Service quality attribute not available Mode Value	Kano Category
Tangibility	TA1	All staff members with uniform /professional appearance of staff	2.00	3.00	M
	TA2	Staff with appropriate name badges	2.00	3.00	M
	TA3	Fast and Computerized registration and billing procedures	2.00	3.00	M
	TA4	Pathology laboratory and or imaging centre within the premises	2.00	3.00	M
	TA5	Blood bank within the premises	1.00	2.00	A
	TA6	Pharmacy within the premises	2.00	3.00	M
	TA7	Easily accessible Location of hospital	1.00	3.00	O
	TA8	Latest devices, technologies and medical equipments	1.00	3.00	O
	TA9	Systematic layout of Hospital departments (easier for the patients to access services especially for physically challenged, elderly & emergency patients)	1.00	3.00	O
	TA10	Proper safety and comfort measures (e.g: handrails in aisles, rooms and bathrooms, ramps suitably designed for wheelchairs and stretchers, elevators and spacious corridors)	1.00	3.00	O
	TA11	Continuous electricity and water supply	2.00	3.00	M
	TA12	Canteen with hygienic food	2.00	3.00	M
	TA13	Laundry facilities available within the premises	2.00	3.00	M
	TA14	Good Housekeeping and sanitation facilities	1.00	3.00	O
	TA15	Comfortable conditions such as temperature, ventilation, and odour	1.00	3.00	O
	TA16	Clean drinking water	2.00	3.00	M
	TA17	Ambulance services with minimal cost	1.00	3.00	O
	TA18	Promotional brochures, service tracking documents etc.	2.00	3.00	M

Dimension	Service Quality Attributes		Feeling if Service quality attribute available Mode Value	Feeling if Service quality attribute not available Mode Value	Kano Category
	TA19	Well furnished, decorated, well ventilated and clean wards	2.00	3.00	M
	TA20	Adequate, comfortable and clean waiting rooms	1.00	3.00	O
	TA21	Adequate, comfortable and clean clinical and diagnostic test rooms	1.00	3.00	O
	TA22	Adequate, comfortable and clean pre-operative and post-operative (or patient/resident ward) rooms	1.00	3.00	O
	TA23	Adequate, comfortable and clean intensive care units	1.00	3.00	O
	TA24	Adequate, comfortable and clean bathrooms and toilets	1.00	3.00	O
Reliability	RI1	Provides services by a certain date as per the promises (e.g. Test, follow-up checks, surgeries etc...)	1.00	3.00	O
	RI2	Problem solving with sincere interest (Registration, calling a concerned doctor to attend the case etc...)	1.00	3.00	O
	RI3	Provides services like emergency care at the time they promise	1.00	3.00	O
	RI4	Provides services like casual services at the time they promise	1.00	3.00	O
	RI5	Doing correct diagnosis right at the first time	1.00	3.00	O
	RI6	Services provided at appointed time	1.00	3.00	O
	RI7	Error free and fast retrieval of documents	2.00	3.00	M
	RI8	Provide all the required information and instructions regarding admission, Treatment, and discharge clearly to patients and attendants	2.00	3.00	M
	RI9	Availability of related medical and paramedical facilities	1.00	3.00	O
Responsiveness	RE1	Accurate information regarding when services are to be provided by hospital personnel (e.g admissions, ward facility, visiting hours etc…)	1.00	3.00	O
	RE2	Prompt services to patients by hospital personnel (e.g. Good reception, housekeeping, nursing, speed and ease of admissions and discharge)	1.00	3.00	O
	RE3	Willingness of hospital personnel to help patients (ever smiling, kind hearted staff)	1.00	2.00	A
	RE4	Availability of hospital personnel to respond to patients' requests always (attending immediately	1.00	3.00	O

Dimension	Service Quality Attributes		Feeling if Service quality attribute available Mode Value	Feeling if Service quality attribute not available Mode Value	Kano Category
		whenever called)			
Assurance	AS1	Confidence generating behavior of hospital personnel. (Convincing briefing by specialist, doctors, and nurses)	1.00	3.00	O
	AS2	Feeling safe while dealing with hospital as per the cost of treatment is concerned	1.00	3.00	O
	AS3	Feeling safe while dealing with hospital as per medicines are concerned	1.00	3.00	O
	AS4	Feeling safe while dealing with hospital as per trust with the personnel etc. Is concerned	1.00	3.00	O
	AS5	Hospital personnel treat their patients with courtesy (patient treated with dignity and respect, impartial treatment, sympathetic approach etc…)	1.00	3.00	O
	AS6	Enough Knowledge of hospital personnel to answer patients questions (e.g. Thoroughness of medical conditions, proper advice in their respective areas etc...)	1.00	3.00	O
Empathy	EM1	Individual attention given to the patient by hospital. (e.g. Bed side care, proper diet requirement, politeness of physicians, nurses and other staff)	1.00	3.00	O
	EM2	Convenient operating hours for e.g. 24 hours service facility	1.00	3.00	O
	EM3	Fixing the operation timings according to requirement	1.00	2.00	A
	EM4	Good sympathetic care	1.00	3.00	O
	EM5	Consistency of charges	1.00	3.00	O
	EM6	Understanding the specific needs of the patients. (e.g. Receiving, investigating and sending them to specific department for treatment)	1.00	3.00	O
	EM7	Keeping the patients informed and listening to them (e.g. Operations details, explaining nutritional needs, pre-operative and post-operative care)	1.00	3.00	O

Note: 1- Satisfied, 2-Neutral, 3- Dissatisfied
A-Attractive service quality attributes, O- One Dimensional service quality attributes, M-Must be service quality attributes

Table 6: Service Quality Gap Analysis

Paired Samples Test					
		Paired Differences (Perception-Expectation Gap) Mean Difference	t	df	Sig. (2-tailed) p value
Pair 1	TAD1 - TAA1	0.1810	1.7962	231	0.0738*
Pair 2	TAD2 - TAA2	0.2284**	2.2411	231	0.0260
Pair 3	TAD3 - TAA3	-0.7888	-7.6043	231	0.0000
Pair 4	TAD4 - TAA4	-0.5345	-7.3200	231	0.0000
Pair 5	TAD5 - TAA5	-0.8103	-10.3009	231	0.0000
Pair 6	TAD6 - TAA6	-0.5991	-7.6617	231	0.0000
Pair 7	TAD7 - TAA7	-0.7241	-8.8066	231	0.0000
Pair 8	TAD8 - TAA8	-1.0690	-12.9194	231	0.0000
Pair 9	TAD9 - TAA9	-0.7457	-9.5029	231	0.0000
Pair 10	TAD10 - TAA10	-1.0345	-12.8427	231	0.0000
Pair 11	TAD11 - TAA11	-0.1983	-2.6288	231	0.0091
Pair 12	TAD12 - TAA12	-0.4310	-4.3226	231	0.0000
Pair 13	TAD13 - TAA13	0.0776	0.7842	231	0.4337*
Pair 14	TAD14 - TAA14	-0.6034	-7.5593	231	0.0000
Pair 15	TAD15 - TAA15	-0.7500	-9.3409	231	0.0000
Pair 16	TAD16 - TAA16	0.0172	0.2823	231	0.7780*
Pair 17	TAD17 - TAA17	0.1767**	2.2667	231	0.0243
Pair 18	TAD18 - TAA18	0.3879**	3.7384	231	0.0002
Pair 19	TAD19 - TAA19	-0.1466	-1.6654	231	0.0972*
Pair 20	TAD20 - TAA20	-0.4440	-5.8068	231	0.0000
Pair 21	TAD21 - TAA21	-0.7629	-9.8431	231	0.0000
Pair 22	TAD22 - TAA22	-0.6466	-8.3800	231	0.0000
Pair 23	TAD23 - TAA23	-1.0431	-13.9054	231	0.0000
Pair 24	TAD24 - TAA24	-0.0776	-0.9182	231	0.3594*
Pair 25	RID1-RIA1	-1.4181	-16.1260	231	0.0000
Pair 26	RID2-RIA2	-1.6164	-19.2750	231	0.0000
Pair 27	RID3-RIA3	-1.7802	-21.6070	231	0.0000
Pair 28	RID4-RIA4	-1.2802	-13.6590	231	0.0000
Pair 29	RID5-RIA5	-2.0000	-19.9610	231	0.0000
Pair 30	RID6-RIA6	-1.2845	-14.0930	231	0.0000
Pair 31	RID7-RIA7	-1.4526	-16.0770	231	0.0000
Pair 32	RID8-RIA8	-1.5776	-16.4550	231	0.0000
Pair 33	RID9-RIA9	-1.3750	-15.8290	231	0.0000
Pair 34	RED1-REA1	-1.4957	-16.2860	231	0.0000
Pair 35	RED2-REA2	-1.7155	-20.2340	231	0.0000
Pair 36	RED3-REA3	-1.8621	-22.0100	231	0.0000
Pair 37	RED4-REA4	-1.6681	-18.8110	231	0.0000
Pair 38	ASD1-ASA1	-1.8190	-18.8240	231	0.0000
Pair 39	ASD2-ASA2	-1.9612	-19.4540	231	0.0000
Pair 40	ASD3-ASA3	-1.9440	-19.0810	231	0.0000
Pair 41	ASD4-ASA4	-1.5000	-15.3460	231	0.0000
Pair 42	ASD5-ASA5	-1.6078	-15.6270	231	0.0000
Pair 43	ASD6-ASA6	-1.6983	-18.1560	231	0.0000
Pair 44	EMD1-EMA1	-1.6207	-17.7930	231	0.0000
Pair 45	EMD2-EMA2	-1.2457	-14.8130	231	0.0000
Pair 46	EMD3-EMA3	-0.7500	-8.4770	231	0.0000
Pair 47	EMD4-EMA4	-1.4785	-16.9880	231	0.0000
Pair 48	EMD5-EMA5	-1.9440	-17.6210	231	0.0000
Pair 49	EMD6-EMA6	-1.8233	-18.8810	231	0.0000
Pair 50	EMD7-EMA7	-1.9310	-20.9600	231	0.0000

* Service quality attributes whose p-value as per the paired sample t-test was greater than 0.05 so there is no significant gap between perception and expectation **Service quality attributes which shows positive Perception-Expectation Gap but their p-value as per the paired sample t-test was lesser than 0.05 so there is significant gap between perception and expectation

Table 7: Gap Analysis P-E Gap

Dimensions	Perception Mean Score	Expectation Mean Score	P-E Gap
Tangibility	3.7532	4.1841	-0.4309
Reliability	2.8482	4.3798	-1.5316
Responsiveness	2.6422	4.3276	-1.6854
Assurance	2.7282	4.4842	-1.7560
Empathy	2.6761	4.218	-1.5419

Table 8: Integration of SERVQUAL and Kano model

Dimensions	Service Quality Attributes		P-E Gap	Kano Category
Reliability	RI8	Provide all the required information and instructions regarding admission, Treatment, and discharge clearly to patients and attendants	-1.5776	M
Reliability	RI7	Error free and fast retrieval of documents	-1.4526	M
Tangibility	TA3	Fast and Computerized registration and billing procedures	-0.7888	M
Tangibility	TA6	Pharmacy within the premises	-0.5991	M
Tangibility	TA4	Pathology laboratory and or imaging centre within the premises	-0.5345	M
Tangibility	TA12	Canteen with hygienic food	-0.4310	M
Tangibility	TA11	Continuous electricity and water supply	-0.1983	M
Tangibility	TA2	Staff with appropriate name badges	0.2284	M
Tangibility	TA18	Promotional brochures, service tracking documents etc.	0.3879	M
Reliability	RI5	Doing correct diagnosis right at the first time	-2.0000	O
Assurance	AS2	Feeling safe while dealing with hospital as per the cost of treatment is concerned.	-1.9612	O
Assurance	AS3	Feeling safe while dealing with hospital as per medicines are concerned.	-1.9440	O
Empathy	EM5	Consistency of charges	-1.9440	O
Empathy	EM7	Keeping the patients informed and listening to them	-1.9310	O
Empathy	EM6	Understanding the specific needs of the patients	-1.8233	O
Assurance	AS1	Confidence generating behavior of hospital personnel	-1.8190	O
Reliability	RI3	Provides services like emergency care at the time they promise	-1.7802	O
Responsiveness	RE2	Prompt services to patients by hospital personnel	-1.7155	O
Assurance	AS6	Enough Knowledge of hospital personnel to answer patients questions	-1.6983	O
Reliability	RE4	Availability of hospital personnel to respond to patients' requests always	-1.6681	O
Empathy	EM1	Individual attention given to the patient by hospital	-1.6207	O
Reliability	RI2	Problem solving with sincere interest	-1.6164	O
Assurance	AS5	Hospital personnel treat their patients with courtesy	-1.6078	O
Assurance	AS4	Feeling safe while dealing with hospital as per trust with the personnel etc. is concerned.	-1.5000	O
Responsiveness	RE1	Accurate information regarding when services are to be provided by hospital personnel	-1.4957	O
Empathy	EM4	Good sympathetic care	-1.4785	O
Reliability	RI1	Provides services by a certain date as per the promises	-1.4181	O

Dimensions	Service Quality Attributes		P-E Gap	Kano Category
Reliability	RI9	Availability of related medical and paramedical facilities	-1.3750	O
Reliability	RI6	Services provided at appointed time	-1.2845	O
Reliability	RI4	Provides services like casual services at the time they promise	-1.2802	O
Empathy	EM2	Convenient operating hours for e.g. 24 hours service facility	-1.2457	O
Tangibility	TA8	Latest devices, technologies and medical equipments	-1.0690	O
Tangibility	TA23	Adequate, comfortable and clean intensive care units	-1.0431	O
Tangibility	TA10	Proper safety and comfort measures	-1.0345	O
Tangibility	TA21	Adequate, comfortable and clean clinical and diagnostic test rooms	-0.7629	O
Tangibility	TA15	Comfortable conditions such as temperature, ventilation, and odour.	-0.7500	O
Tangibility	TA9	Systematic layout of Hospital departments	-0.7457	O
Tangibility	TA7	Easily accessible Location of hospital	-0.7241	O
Tangibility	TA22	Adequate, comfortable and clean pre-operative and post-operative	-0.6466	O
Tangibility	TA14	Good Housekeeping and sanitation facilities	-0.6034	O
Tangibility	TA20	Adequate, comfortable and clean waiting rooms	-0.4440	O
Tangibility	TA17	Ambulance services with minimal cost.	0.1767	O
Responsiveness	RE3	Willingness of hospital personnel to help patients	-1.8621	A
Tangibility	TA5	Blood bank within the premises	-0.8103	A
Empathy	EM3	Fixing the operation timings according to requirement	-0.7500	A
Note: A-Attractive , O- One Dimensional , M-Must be				

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