JORDANIAN PUBLIC UNIVERSITY QUALITY MEASUREMENT: USING STRUCTURAL EQUATION MODEL

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Abstract - This study designed to explore the relationship between higher education service quality dimensions and students' satisfaction. Self-administered questionnaire was used in this research to collect the related data to investigate the relationship between service quality and student satisfaction in Jordanian public universities. Data were collected through distributing 532 questionnaires among undergraduate students in Jordanian public universities. The Structural Equation Model (SEM) findings of this study showed that nine service quality constructs namely tangibles, reliability, responsiveness, assurance, empathy, lecturers, curriculum structure, university image, and registration were the most important dimensions and had significant positive relationship with student satisfaction in Jordanian public universities.

Index Terms - Jordanian public universities,higher education, service quality, students' satisfaction, Structural equation model.

I. INTRODUCTION

The Service industry exerts an immense influence on the economics all over the world. In the light of worldwide competition, qualifying service is deemed as a chief factor for success, in that lots of experts believe that service quality is the most influential competitive trend forming marketing and business strategy as well (Firdaus, 2006a).

Higher education is regarded as a sector providing intangible services since the sector dominates all distinctive qualities of services (DeShields et al., 2005). In modern business, Higher Education is counted as one of the most significant service domains. In addition, as Higher Education Institutions (HLIs) are client-centered service, they aim at establishing good relationships and offering essential service quality (Gronroos, 1994). Service quality measurements employed in the institutions of higher education are still under the process of development as those measurements are taken from various industries (Marimuthu and Ismail, 2012). During the past twenty years, researchers and academicians have paid a growing attention at the assurance of service quality employed in Higher Education (HE). Such increasing attention can be ascribed to the indispensable role played by quality education system in providing competent, skillful and highly prepared workers in the field of marketing (Tahar, 2008). Furthermore, it is agreed that there are two significant factors that their role is crucial in specifying a service organization's deficiency, namely; service quality and customer satisfaction (Durvasula, 2011). Service quality is considered as an essential factor help Jordanian Universities in measuring the degree of students' satisfaction with respect to services provided by the university (Othman, 2008). Measurement of service quality in Higher Education are still being regarded as complex and intrigue issue in which most assessments carried out by higher education placed a central emphasis on using tangible criteria (Hadikoemoro, 2001). Thus, the need arises to employ techniques that assess (HE) service quality and customer's satisfaction. The economy in Jordan can be regarded as a trade and services' economy. Based on the figures obtained from CIA (2010), Jordanian services sector accounts for 76% of total domestic product (GDP) and 77.4% of the workforce. Higher education field is deemed as the core of economy, contributing to 70% of the country's GDP. Therefore, there is an urgent need for Jordanian tertiary sector to employ suitable techniques, leading to assessing its quality services and level of customers' satisfaction. Public universities in Jordan are regarded as a significant source for providing experts of human resources (Arokiasamy et al., 2007).

In the last decade, there has been an increasing demand for tertiary education. This is best exhibited in the number of students' enrollment at public universities in Jordan, with annual rate of 18 percent increasing from 38,642 to 66,894 between the years 2000/2001 and 2010/2011. It could be said that the proportion of students enrolling at universities in Jordan is raising at considerable level. However, there is a concern that this may have a negative impact on the quality of given education and consequently influences the level of students' satisfaction. In the light of what has been mentioned above, the present study seeks to bridge a gap in literature by examining student satisfaction of service quality provided by Jordanian publicuniversities. The study also aims at providing explanation on how the different dimensions of service quality affect students' satisfaction within Jordanian publicuniversities setting. One more objective of the study is developing a conceptual framework addressing students' perception regarding service

quality rendered. This can be achieved via investigating several services quality constructs provided at Jordanian publicuniversities. This study provides a through insight into students' satisfaction of service quality as well.

II. LITERATURE REVIEW

A. Customer (Students) Satisfaction

"customers always have the feeling of being wanted and appreciated without needing to make such a request, therefore, their perceptions on service quality are truly important and becoming more essential to the service industry" (Tan et al., 2010, p.1014). It is claimed that the perception of customers on service quality is indispensable as giving important feedback to managers regarding the progress that takes place with customer satisfaction (Seymour, 1992). Students are considered as the customers of tertiary education. Integral to this, determining the satisfaction level of students is a vital factor, highly demanded in competitive market. However, decrease in the rate of students' satisfaction leads the institution to certain decline (Kerlin, 2000). Customer satisfaction is a vague term since satisfaction is varied from a client to another and from a product to another (Munteanu et al., 2010). Many definitions for customer satisfaction have been advanced. One of the most common definitions is the comparison that can be carried out between client anticipations and understanding about the actual service rendered (Hoffman and Bateson, 1997). According to Kotler (1991) satisfaction can be deemed as the process of evaluating particular product after purchase or expectations about a service prior purchase. As described by Aydin et al., (2005) customer satisfaction is the outcome stems from the comparison made by customer regarding pre-purchase expectations with actual performance and cost of purchasing. One more definition of customer satisfaction is person's positive sentimental reaction that is made based on evaluation of particular situation (Kondou, 1999). Zeithaml et al., (2006) elaborate that the comparison implemented between client expectations and perceptions is based on the expectancy disconfirmation model. This model states that if there is conformity between clients' perceptions and expectations, then clients will be satisfied and consequently their expectations are fulfilled. In addition, when the difference between customer expectations and perceptions is relatively trivial, customers will evaluate a service as having a good quality. In other words, customers are fully satisfied with a service when the perceived performance outnumbers the expectations (Khodayari and Khodayari, 2011).Munteanu (2010) states that customer satisfaction is so helpful in determining the actual success of an organization in supplying the markets with products. Customer satisfaction is a significant differentiator of market strategy and based primarily on the level of product provided by a company, whether fulfilling or outstripping customer expectations. Satisfaction is now regarded as a chief indicator for the continuity of educational institutions such as "universities"(Marzo-Navarro et al., 2005a). Navarro et al., (2005) contends that the satisfaction of a student is a key factor in leading the student to remain in the university and attracting more students to the university in return. Customer satisfaction is a complicated and multi-dimensional concept, in that the qualities of customer satisfaction can be utilized in the field of higher education service (Hartman and Schmidt, 1995). Many studies (Brown and Mazzarol, 2009; Chitty and Soutar, 2004; Martensen et al., 2000) have employed and adopted as a model in the context of higher education. However, the findings of the aforementioned studies were not similar to the original model with respect to higher education, meaning that a new innovated model is required for the benefit of higher education field (Sultan and Wong, 2010).

B. Service Quality

Nowadays, organizations are attempting their level best to come up with high quality services to their clients and assessing the performance of the service provided to consumers. Accordingly, the success of an organization is highly tied to customer perception about services rendered (Mukesh et al., 2009). A wide range of definitions of service quality have been discussed in the literature. For instance, as defined by Oakland (1993) service quality is the degree to which a service fulfills the requirements or expectations of customers. Another definition for service quality presented Hoffman and Bateson (1997) as an attitude taken based on long-run assessment of a service performance. Therefore, service quality could be known as the contradiction that takes place between client service expectations and perceived service. To be more specific, in case that expectations are much higher than the actual performance, customer satisfaction is no longer confirmed (Parasuraman et al., 1985). Service quality is meant to meet the needs of customers during the service process, leading clients to make perceptions regarding the service rendered (Kong and Muthusamy, 2011). During the last thirty years, many attempts made by researchers to present a definition for the general dimensions of quality, specifically those relevant to services (Jain et al., 2011). Service quality scale (SERVQUAL) is a multi-items scale comprised of ten dimensions developed by (Parasuraman et al., 1985). This scale aims at assessing client perception with regard to the quality of provided service. The original SERVQUAL scale was revisited by Parasuraman et al., (1991) to include five dimensions, namely; Tangibles, Reliability, Responsiveness, Assurance and Empathy. Carman (1990) presented seven dimensions for measuring service quality. Mels et al., (1997) restricted the number of dimensions used to

measure quality to two. Moreover, Cronin and Taylor (1992) argue that service quality is multidimensional but not one-dimensional.

Researchers have divided service quality inti two main groups; that is technical and functional (Gronroos, 1984; Parasuraman et al., 1985, 1988, 1991). A current view of service quality perceives it as multidimensional and hierarchical construct (Dagger et al., 2007; Lu et al., 2009). Accordingly, several researchers reached at the conclusion that dimensions used for measuring service quality are rather situational (Holdford and Patkar, 200(In a similar way, Al-allak and Bekhet (2011) implemented an exploratory study using important models for measuring service quality such as SERVQUAL, SERVPERF, and the Human-Societal Element (HSE) model. The researchers arrived at the conclusion that SERVQUAL modified models were not actual dimensions for measuring service quality that influence client's satisfaction. As a result, the researchers recommended that additional dimensions of service quality are required in any coming models aiming at measuring service quality.

C. Service Quality in Higher Education

Studies implemented about the quality of service in the field of higher education are still new relative to their counterparts in commercial field (Sultan and Wong, 2010). Previous studies indicated that the SERVQUAL model is appropriate to evaluate the performance of higher education (Soutar and McNeil, 1996; Quinn, et al., 2009; Gallifa, and Batalle, 2010. Some more studies attempted at making a correlation between satisfaction and factors of SERVQUAL. Al-Allak and Bekhet, (2012) arrived at the conclusion that the correlation between assurance, reliability and students' satisfaction is positively reflected. It is worth indicating that those dimensions are highly significant for service quality. Ahmed et al., (2010) states that the factors tangibles, assurance and empathy are highly relevant to student's satisfaction, whereas tangible, responsiveness and assurance are connected to students' motivation.Tahar (2008) utilized the means information resources with SERVQUAL to evaluate the expectations and perception of students about service quality provided by faculty of graduate studies. The researcher concluded that service quality dimensions that were chosen by the students are the most significant among the six dimensions of service quality Arambewela and Hall (2006) argues that tangible construct influences to a large extent the overall of students' satisfaction.

With respect to service quality models, Vaughan and Wooduffe (2011) employed a new model for disabled, service user-specific service quality ARCHSECRET compared to a modified SERVQUAL model. For the purpose of measuring practically the quality of service respecting disabled students at tertiary level. The researchers concluded that ARCHSECRET is suitable in terms of reliability and validity and possesses better predictive power to evaluate the experience of disabled students at tertiary level. Sultan and Wong (2010) investigated SERVQUAL and SERVPERF in the field of tertiary education with regard to dimensionalities and scale of service quality. The results showed that it is of a paramount importance to place more emphasis on higher education field. Salvador-Ferrer (2010) examined SERVQUAL vs. ESQS within the framework of universities' services. The researcher concluded that the analysis of service quality provided by ESQS is highly accurate and can be adapted more effectively at universities. Helgesen and Nesset (2011) examined whether LibQUAL+TM is able to explain the loyalty of students to the universities or not. The results displayed that the following three dimensions of LibQUAL (information control, effect of service and library as a place) account for 85% of the variance in the loyalty of students to their universities.

III. METHODOLOGY

A. Data collection

This study is designed to assess higher education service quality in Jordanian public universities and gain better understanding of the student's satisfaction toward the service quality in Jordanian higher education. Therefore, this study utilizes a relational research design in an effort to examine and measure the relationship between the service quality and students satisfaction. The target population is mainly students from Jordanian public universities. Data were collected by means of a self-administered questionnaire filled out by 532 full-time undergraduate students studying at Jordanian publicuniversities during the academic session 2015/2016. The required data was personally collected by the researcher and total of 371 questionnaires were received with a response rate of 69.7% which is considered as acceptable (Krejcie et al., 1970).

B. Statistical Methods

The structural equation model (SEM) is similar in many ways to multiple regression and path analysis, but there are important differences. The set of equations representing the full SEM model is solved simultaneously rather than serially, using an iterative procedure for estimating model parameters. More importantly, when combined with a measurement model, the structural model should be more accurate than a path or regression model, because the measurement model eliminates measurement error and its effect of attenuating regression coefficients (Joreskog, 1976; Joreskog&Sorbom, 1989). Descriptive research is used to assess the attitudes or opinions of individuals, organisations, events, or

procedures (Gay et al., 2005). Thus, descriptive analysis was used to analyze the demographic data of the respondents, and mean score of survey items.Each of the factors is further examine by using reliability analysis to test the internal consistency and stability of the instruments used to measure the variables. According to Cronbach (1946) that Cronbach's Alpha reliability analysis; the closer Cronbach's Alpha to 1.0, the higher the internal consistency and reliability. The researched investigated the instrument's validity to assess the data collected for appropriateness, meaningfulness, and usefulness. Therefore, Confirmatory Factor Analysis (CFA) for individual model was employed to determine construct validity, and select the most related constructs in the study, reduce the variables, and make it manageable. Statements with a factor loading below 0.6 were deleted, and statements with a factor loading greater than 0.6 were retained (Awang, 2012).

IV. ANALYSIS RESULTS

A. Reliability of the Study Instrument

Reliability estimates the stability of the measures and the internal consistency of the measurement instruments. In the other words, reliability is the correlation of an item, scale, or instrument with a hypothetical one that truly measures what it is supposed to be. Therefore, Alpha reliability coefficients were performed in this study using the Cronbach alpha coefficients method to determine the internal consistency of each factor. Table below shows that Cronbach alpha coefficients ranged from 0. 80 to 0. 928 with an overall coefficient of 0.975 for public university constructs. In summary, the reliability of the instruments was greater than 0.75 for all factors in the study. Therefore, the results reveal acceptable reliabilities for each of the items.

Tangibles	0.844
Reliability	0.889
Responsiveness	0.856
Assurance	0.874
Empathy	0.928
Tuition Fees	0.901
Lecturer	0.819
Curriculum Structure	0.853
Information Resource	0.872
Image	0.873
Location	0.801
Registration	0.902
Student Satisfaction	0.915
Total	0.975

Table 1:Cronbach Alpha Coefficients of the Instruments

B. Demographic characteristics

Table 2 below explains the demographic variables of Jordanian public universities. It can be observed that with regard to the respondents' genders, in the public universities there were 123 males (34.4 %) and 235 females (65.6%). Regarding the respondents' ages, there were 329 between 18-24 (91.9%), 24 between 25-32 (6.7%), five between 33-40 (1.4%), and no one over age 40. Regarding marital status, the table shows that in public universities, a majority of the respondents is single (88%), with (11.5%) married and the rest divorced (0.6%). Regarding student status, there were 89 first-year respondents (24.9%), 134 second-year respondents (37.4%), 65 third-year respondents (18.2%), and 70 fourth-year respondents (19.6%). With regard to the enrollment status in public universities, there were 126 full-time students (35.5%) and 231 part-time students (64.5%). Regarding ethnic background, the Jordanian respondents in public universities were 307 (85.8), and 50 (14%) others.

Demographic Variables		Frequency	Percent
Gender	Male	123	34.4
	Female	235	65.6
Age	18-24	329	91.9
	25-32	24	6.7
	33-40	5	1.4
	40+	0	0
Marital status	Single	315	88.0
	Married	41	11.5
	Divorced	2	0.6
Student status	1st year	89	24.9
	2nd year	134	37.4
	3rd year	65	18.2
	4th year	70	19.6
Enrollment Status	Full time	126	35.2
	Part time	231	64.5
Ethnic background	Jordanian	307	85.8
	Other	50	14.0

Table 2: Demographic Characteristics of the Sample

C. Descriptive Analysis

Descriptive analysis illustrates the responses for the key variables studied. The descriptive analysis includes the mean and standard deviation of the dependent variables and independent variables. The next table presents the results of the descriptive analysis of public universities constructs.

Table 3 above presents the mean score and standard deviation for the 13 variables of the study. The mean scores for Jordanian public universities ranged from a

low of 3.2616 (Location) to the highest mean score of 3.6285 (Assurance). In terms of standard deviation, the public universities construct ranged from a low of .87969 (Curriculum Structure) to the highest standard deviation of 1.22054 (Location).

Constructs	Mean	
	Mean	Std. Deviation
Tangibles	3.3785	.95683
Reliability	3.3793	1.00938
Responsiveness	3.4392	.97175
Assurance	3.6285	.96139
Empathy	3.3464	1.09730
Tuition Fees	3.4267	1.16558
Lecturer	3.3757	1.00450
Curriculum Structure	3.4620	.87969
Information Resource	3.4413	.95342
University Image	3.5263	1.00304
Location	3.2616	1.22054
Registration	3.2996	1.20318
Student Satisfaction	3.6082	1.18610

Table 3: Descriptive Statistics for Public Universities Constructs

D. Normality

The normality assessment of the constructs in the data are based on measurements of the skewness value and the kurtosis value, where criteria in the normal area (the skewness value) should be less than 2.0 and for the kurtosis value, less than 7.0 (Kline, 1998; Tabachnick&Fidell , 2007; West, Finch, & Curran, 1995). According to Table below the study concludes that all constructs in the research variables have a skewness value of <2 and a kurtosis value of < 7, while the mean overall of the constructs are distributed in the normal data. The maximum and minimum values for each item are within the theoretical range (1-5) for each item.

Constructs	Skewness	Kurtosis	Std. Deviation
Tangibles	-.328	-.604	.95683
Reliability	-.350	-.708	1.00938
Responsiveness	-.286	-.768	.97175
Assurance	-.807	.227	.96139
Empathy	-.379	-.776	1.09730
Tuition Fees	-.500	-.834	1.16558
Lecturer	-.350	-.737	1.00450
Curriculum Structure	-.367	-.184	.87969
Information Resource	-.637	.033	.95342
University Image	-.643	-.191	1.00304
Location	-.423	-.836	1.22054
Registration	-.203	-1.037	1.20318
Student Satisfaction	-.648	-.513	1.18610
Std. Error	.129	.257	

Table 4: Normality Test Results

E. Confirmatory factor analysis

Confirmatory factor analysis was performed to verify the reliability and validity of latent variables (Hair et al., 2006). The results of the CFA will determine whether the indicators really represent each latent construct. In addition, goodness-of-fit indices for the measurement model as a whole are examined. The literature suggests that any item having a factor loading of less than 0.6 and an R square of less than 0.4 should be deleted from the measurement model. Also, in this stage of analysis, the variables should be treated individually to obtain the accepted level of fitness indices. According to Awang (2012), the accepted level of RMSEA $\leq$ 0.08, GFI > 0.9, CFI > 0.9, and Chisq/df $\leq$ 5.0. Therefore, all public universities constructs as mentioned in Table 5 below have achieved the goodness of fit required values.

Constructs	Chisq/df	GFI	CFI	RMSEA
Tangibles	.051	1.000	1.000	.000
Reliability	2.173	.988	.994	.057
Responsiveness	.179	1.000	1.000	.000
Assurance	1.441	.998	.999	.035
Empathy	2.476	.989	.996	.064
Tuition Fees	.569	.998	1.000	.000
Lecturer	.024	1.000	1.000	.000
Curriculum Structure	1.187	.995	.999	.023
Information Resource	.270	.999	1.000	.000
University Image	2.182	.991	.994	.058
Registration	.428	.999	1.000	.000
Student Satisfaction	.001	1.000	1.000	.000

Table 5: The Individual Assessment of Fitness for Public Studied Constructs

F. Measurement Model

Name of index	Recommended value	Index value	Comments
RMSEA	Should be ≤ 0.08	0.041	The required level is achieved
GFI	Should be > 0.9	0.830	The required level is NOT achieved
CFI	Should be > 0.9	0.944	The required level is achieved
Chisq/df	Should be ≤ 5.0	1.590	The required level is achieved

Table 6: Fitness Index for the Measurement Model

To evaluate the overall public measurement model, the researcher linked exogenous and endogenous variables together. The results of run the model showed that most of fitness indices were acceptable values (Chi/Df, 1.590; CFI, 0.944; RMSEA, 0.041).

In contrast, the value of GFI (0.830) was under the acceptable level, therefore, the researcher intends to get over this issue through deleting some items or variables in next section (Modified Measurement Model).

G. Modified Measurement Model

It is rare that a proposed model fits well at first testing; therefore, the purpose of this stage was to modify and improve the proposed measurement model (Byrne, 1998). According to the model goodness of fit, all model specifications were acceptable, excluding the GFI. To cope with that, the researcher had to delete some items and variables to achieve the required goodness of model fit, as showed in Table 7 below.

Variables	Items
Tuition Fees	TA4
Information Resource	REL5
Location	RES4
	AS3
	E4
	LEC4
	CS3
	CS4
	UI2
	REG4

Table 7: Variables and Items Deleted

H. Convergent Validity

Convergent Validity (CV) is achieved when all items in a measurement model are statistically significant. Convergent Validity could also be verified by computing the Average Variance Extracted (AVE) for study constructs. AVE was calculated using Stats Tools Package (STP) developed by James Gaskin (2012) included this formula: AVE = Average Variance Extracted = $\sum$ (factor loading of every item) ^{2}/ (number of items in a model). The AVE value should be 0.5 or higher to achieve the Convergent Validity (Awang, 2012). According to the table 8 below the required AVE values were achieved for all public constructs.

Construct	AVE
Tangibles	0.574
Reliability	0.661
Responsiveness	0.604
Assurance	0.584
Empathy	0.736
Tuition Fees	DELETED
Lecturer	0.574
Curriculum Structure	0.561
Information Resource	DELETED
Image	0.612
Location	DELETED
Registration	0.698
Student Satisfaction	0.736

Table 8: Average Variance Extracted of Public Constructs

I. Structural Model

The structural equation model (SEM) is similar in many ways to multiple regression and path analysis, but there are important differences. The set of equations representing the full SEM model is solved simultaneously rather than serially, using an iterative procedure for estimating model parameters. Accordingly, Figure 1 below shows the results of executing the structural equation model of public data. Accordingly, the results indicate that the standardized beta estimate for the effect of the independent variables (tangibles, reliability, responsiveness, assurance, empathy, lecturers, curriculum structure, university image, and registration) on the dependent variable (student satisfaction), as follows 0.13, 0.19, 0.15, 0.17, 0.23, 0.09, 0.15, 0.13, and 0.23. Moreover, the value of the coefficient of determination R^2 is 0.92, which means the contribution of the exogenous constructs in estimating student satisfaction in public universities is 92%. In the same way, the public structural model presents the results of $R^2$and the loading factor for all items, which are within the acceptable values. Similarly, also shows acceptable level of fitness indices, where the results of fitness indices of public structural model were as follow RMSEA 0.035, GFI 0.903, CFI 0.975, and Chisq/df 1.427.

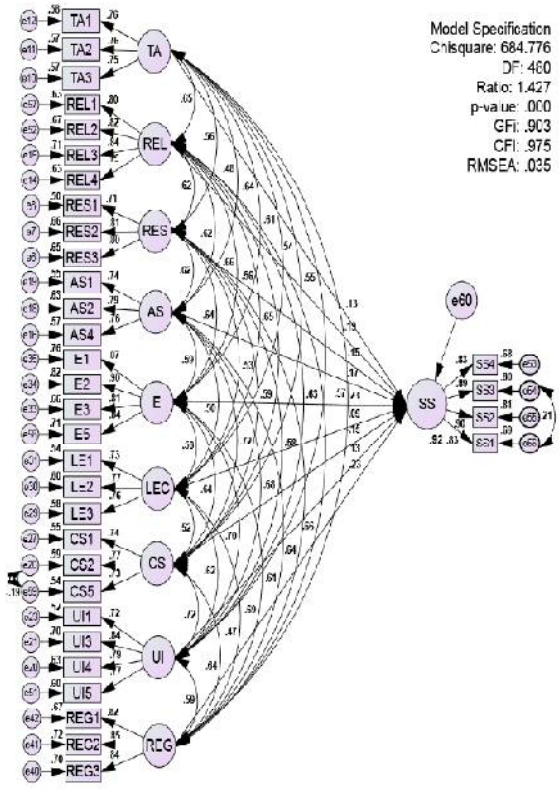

Figure 1: Structural model

V. FINDINGS AND DISCUSSIONS

This study investigated the relationship between 12 independent variables -- tangibles, reliability, responsiveness, assurance, empathy, tuition fees, lecturers, curriculum structure, information resources, university image, location, and registration -- and student satisfaction in Jordanian public universities. The SEM results showed that nine service quality variables -- tangibles (β) =.131, C. R = 2.801 and p=.005 ($p \leq 0.05$); reliability (β) =.189, C. R = 4.013 and p=0.00 ($p \leq 0.001$); responsiveness (β) =.151, C. R = 3.363 and p=0.00 ($p \leq 0.001$); assurance (β) =.166, C. R = 3.196 and p=.001 ($p \leq 0.001$); empathy (β) =.228, C. R = 4.685 and p=0.00 ($p \leq 0.001$); lecturers (β) =.091, C. R = 2.116 and p=.034 ($p \leq 0.05$); curriculum structure (β) =-.155, C. R = -2.776 and p=0.06 ($p \leq 0.05$)); university image (β =.126, C. R = 2.393 and p=.017 ($p \leq 0.05$)); and registration (β) =.232, C. R = 4.917 and p=0.00 ($p \leq 0.001$)) -- have a significant relationship with student satisfaction.

CONCLUSION AND POLICY IMPLICATIONS

The present research paper aims to examine three main aspects of service quality and student satisfaction. First, to gain more insight into the concepts of service quality and students' satisfaction. Second aim is to examine variety dimensions of higher education service quality. Third, to explore the correlation taking place between service quality dimensions of higher education and students' satisfaction within Jordanian public context. Moreover, the current study employed SEM to find out the correlation between higher education service quality and students' satisfaction in Jordanian public universities. The results of analysis displayed that nine factors were positively significant with students' satisfaction. On contrast, three service quality variableshave no significant relationship with student satisfaction in Jordanian public universities due to model goodness of fit.

Based on the results of the study, it could be said that there is a significant positive relationship between service quality and students' satisfaction. Therefore, the level of students' satisfaction can increase via the improving the quality of rendered service, giving additional support to the results of the study. As a result Jordanian Public Universities should seek to provide a better service quality with respect to the variables (tangibles, reliability, responsiveness, assurance, empathy, lecturers, curriculum structure, university image and registration) in order to survive at both the local and international level and to meet the needs of students. It is recommended that the scope of investigation is expanded by future studies to include all public and private universities in Jordan in order to establish competitive benchmarks, track student defections to other institutions.

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