Determinants of Customer Satisfaction in the Architectural Engineering Industry

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[Abstract] This paper aims to measure a customer satisfaction level in the architectural engineering industry, and to find out factors that affect clients' expectations. The paper proposes a model that shows relationships between four main elements required for the project (design, service quality, staff and cost) and customer satisfaction. It also shows that the ability of the firm to meet customers' needs shapes customers' expectations. The findings reveal that the design process of the engineering consultancy, and costs of the projects do affect customer satisfaction of the architectural engineering firm. This study is one of few that measures customer satisfaction level in an architectural engineering industry, and in particular in Bahrain.

Introduction

Meeting customer's expectations is the main factor that makes customers satisfied as it builds a strong and innovative organization capable of surviving during the times of change and tough situations. In order for companies to succeed in the long term, they should work on customer retention and expand their customer base (Gagnon and Ward, 2001). Obviously, there is a clear link between the success of any organization and its ability to satisfy its customers, especially in the service sector. In addition to that, recognition of factors that directly and indirectly affect customer satisfaction has been considered to better understand customer needs and improve service delivery processes (Dovaliene et al., 2007).

In the past few years, the competition in the engineering industry has been increasing relatively as a result of the economic growth that has been revived after the last financial crisis in 2008-2009. And because of that, the engineering consultancies have been in a tough race between each other, and their most important goal is to satisfy their customers to gain their loyalty and get an excellent reputation in the industry. Arab Architects is a premium architectural and engineering consultancy firm based in Bahrain. The firm was established in the year 2005, and since then it has been envisioning and breathing life into a various number of projects. Arab Architects has a design philosophy which inspires individual works of art in every single project, a grand design that is beautifully unique. Boosted by experience and passion, the firm has assisted in numerous milestone projects in Bahrain and holds a reputation for excellence (Arab Architects, 2015).

Since the early 1970's, the realization of the importance of customer satisfaction has led to an impressive volume of researches on this subject (Yi, 1991; Churchill & Surprenant, 1982), but few research were conducted in the field of engineering (Karna et al., 2004). The main purpose of this study is to measure customer satisfaction level of Arab Architects' customers. A happy customer is extremely valuable to any company as it most probably leads to customer loyalty. This study contributes in measuring the customer satisfaction level of Arab Architects firm operating in an engineering industry in Bahrain. Therefore, this research aims to investigate the customer satisfaction levels of Arab Architects. The research focuses on Arab Architects' clients as being customers of the engineering industry in Bahrain. It also aims to identify the factors that lead the clients to set their expectations. Building on the introduction, which has briefly explained the research topic and purpose, the remainder of this paper is organized as follows: first, our conceptual framework and research hypotheses are outlined, second, the

research method is described, third, findings are presented and discussed, and finally, conclusions are reached at, along with study limitations and suggestions for future research.

Conceptual Background

With the current assertion on services as a competitive tool, delivering customer satisfaction has become a key strategic issue (Hill, 1996). Customer satisfaction has become one of the key success factors for companies in their efforts to improve quality in the competitive marketplace. According to Yi (1991), customer satisfaction could be looked at as an outcome or result and as a process that concentrates on a perceptual, psychological and evaluative part of satisfaction. Moreover, Tse and Wilton (1988) stated that customer satisfaction is the response of customer evaluation of the perceived conflict between previous expectations and actual performance of a product or service.

To gain maximum customer satisfaction it is very important for a service provider to determine the level of customers' expectations and work out to meet or exceed these expectations (Dutta & Dutta, 2009). According to Higgs and Ringer (2007), customer expectations are mental categories used by customers to evaluate the service performance. The most important sources of expectations are word of mouth, customer previous experience, personal needs, price and brand. This paper concentrates on four main determinants of customer satisfaction that are relevant to an engineering field. The research model consists four independent variables; Design, Service Quality, Staff, and Cost, and one dependent variable which is Customer Satisfaction. These constructs are depicted in Figure 1 of the conceptual model, along with study hypotheses.
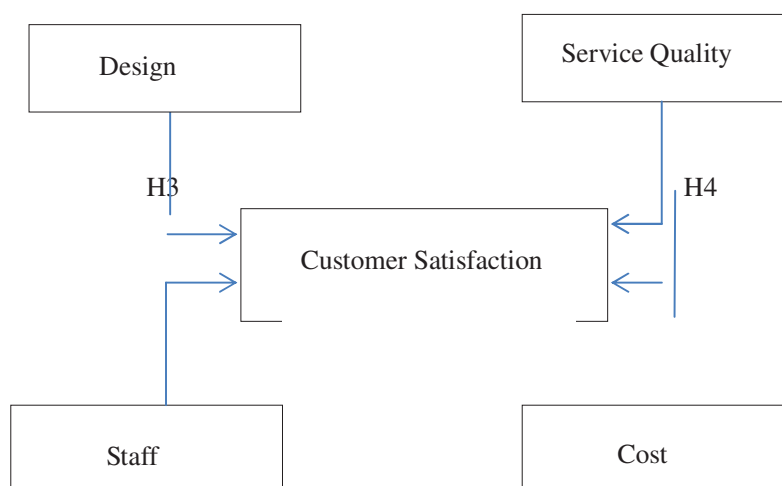

Figure 1. Conceptual model design

The design process is defined as a series of activities that transforms a design problem from an initial specification to an accomplished artifact that meets the requirements of a particular specification. In general, the design process of any project affects customer satisfaction, but the effect may vary between design activities. The time spent on the preparation of the first design and the ability to understand the needs and requirements have a great positive effect on customer satisfaction. Other activities may also affect customer satisfaction but not in the same manner and strength (Jain & Sobek, 2006). Thus, we hypothesize H1 as follows: ***H1.*** *There is a relationship between project design and customer satisfaction.*

Service Quality
In the service quality a company should offer better service than what customers expect. Most of the

researchers found that service quality affects customer satisfaction (Osman, 2013). In addition to that, Anderson and Sullivan (1993) found that the quality that falls short of customer's expectations has a greater negative impact than the quality that meets customer's expectations. This is why organizations must avoid providing their customers with low quality services (Lewis 1988; Anderson and Sullivan, 1993). Based on the above discussion, the following hypothesis is proposed: ***H2. There is a relationship between service quality and customer satisfaction.***

Staff
Customers visiting the same shop are most likely to be satisfied when they are treated well by the staff. The employees of any company have a great effect on customer satisfaction. Companies are becoming interested in customer relationship management (CRM), which focuses on developing programs that teach the staff on how to attract and retain the right customers and meet their individual needs as valued customers (Rahman et al., 2012; Kotler & Keller,2012). Hypothesis H3 is therefore postulated: ***H3. There is a relationship between consultancy of staff and customer satisfaction.***

Cost
Customer satisfaction also depends on the reasonability or fairness of cost of the items to be purchased by the customer. Price or cost is a crucial factor in a buying process, especially in the service sector. It is important for organizations to set and manage the price of the product/service as it directly influences the inflow of resources and satisfies the customer at the same time. The quality of service and cost are always the key competitive advantage to retain customer loyalty (Rahman et al., 2012). We therefore hypothesize that: ***H4. There is a relationship between cost of the project and customer satisfaction.***

Method
Research is a way of thinking, besides being a set of skills (Kumar, 2014). However, researchers classify research methods into two main categories, namely quantitative research and qualitative research. Quantitative research is considered to be a research that addresses the research objectives by empirical assessments which involve numerical measurements and analysis (Zikmund et al., 2013). On the other hand, qualitative research employs an interpretive and naturalistic approach to its subject matter. It is based on data collected through natural settings and experiences and aims to make sense of phenomena through an exploration of the meaning people bring to the researchers (Trumbull, 2005). It is suggested to use a mixed method approach in research, because no single method is best. Using multiple research methods to study the same problem, reveals repeated patterns or consistent relationships among variables and avoids relying on one specific data source or measurement type and its potential weaknesses (Abowitz & Toole, 2010).

This study is mainly based on quantitative research as we believe that this method is the most suitable approach that makes it easier to explain and find out the level of customer satisfaction in "Arab Architects" engineering consultancy. During this study, some data collection techniques were extensively used to gather enough information. A simple-designed questionnaire was used to collect data from respondents. The research instrument was designed in simple English language, as it was short and to the point to get accurate information. The questionnaire consists of three main parts; the first part asks for personal information, the second part calls for general information about the architectural Engineering in Bahrain, and the third part focuses on questions about Arab Architects performance.

In addition to that, fixed-alternative questions (closed-ended questions) were used, for respondents to give certain, limited-alternative responses (Zikmund et al., 2013). The most important scale that was used is the Likert scale, which is a measure of attitudes that allow the respondents to check and rate how strongly they agree or disagree with precisely constructed statements. Respondents generally choose from approximately five response alternatives, although the alternatives may range from three to ten or even more (Vagias, 2006). In addition to Likert scale, the category scale was also used in this questionnaire, which is a simple rating scale that consists of several categories of response, often providing the

respondents with alternatives in order to indicate positions on a continuum (Zikmund et al., 2013).

Besides the questionnaire, the face-to-face interview method was also used, which involved talking and seeking solutions from the targeted person. This method is time effective and it can gather a lot of information concerning the market at a time, hence economical to the person in need of the information (Kumar, 2014; Seidman, 2006). Finally, the telephone interview data collection method was used in this study to support the data allocated from the previous methods. Those interviews are personal interviews, carried over telephone. The quality of the data collected from the telephone interviews is comparable to the quality of the face-to-face interview data. In such kind of interviews, the respondents are willing to provide detailed and reliable information, even more than the face-to-face interviews (Zikmund et al., 2013).

The targeted respondents were "Arab Architects" clients such as residence owners, personal developers and non-personal developers. The population frame was around 200 and the sampling method used in this research was a stratified random sampling. According to Cook (2008), the potential respondents in this method are organized into several categories, and then randomly sampled using either simple or systematic sampling within the categorized groups to make sure that specific subgroups of interest are included and represented in the sample. Out of 140 targeted clients, 140 responses were received, making the response rate 100%, 4 questionnaires were excluded from the analysis because they were incomplete making the 136 questionnaires ready for analysis.

Table 1 shows that the survey questionnaire has 5 items for design, 7 items for service quality, 6 items for staff, 5 items for cost and 4 items for customer satisfaction. The Alpha Cronbach's test as a measure of sampling adequacy was carried out for each variable to test the reliability of the questionnaire, the variables that exceeded 0.7 considered reliable (Hair et al., 2006). The pilot test was carried out by distributing questionnaires to a small sample of 16 respondents and the results showed that the Coefficient Alpha values for these scale items as follows; design .933, service quality .951, staff .932, cost .961 and customer satisfaction .728. In addition to that, the coefficient α on the all 27 items was 0.917 indicating the instrument was reliable. The variables and their corresponding items used in this study were taken from previous research with some modifications to suit research objectives. For example, the design variable was taken from Jain and Sobek (2006), service quality taken from Osman (2013), staff variable from Qureshi et al. (2012), and cost variable from Singh and Strivatava (2013).

Table 1
Cronbach's Alpha Test Result

Reliability Statistics		
Variable	Cronbach's Alpha	N of Items
Design	0.933	5
Service Quality	0.951	7
Staff	0.932	6
Costs	0.961	5
Customer Satisfaction	0.728	4
All the Variables	0.917	27

Findings and Discussion

The respondents were asked about the most important factor that shapes their expectations. According to figure 2, around 39% of Arab Architects' clients stated that the first and most important factor that shapes their expectations before choosing the engineering consultancy is the consultancy's ability to meet their

needs. Around 37% of them said that the quality of the project is the factor that they focus on while choosing the engineering consultancy. And finally, the cost, time and cost-quality ratio got around 7- 9% of the respondents answers, which means that only a small percentage of the clients pays attention to those factors. Furthermore, the study revealed that more than 86% of Arab Architects were satisfied with the quality of work and customer service of the consultancy.
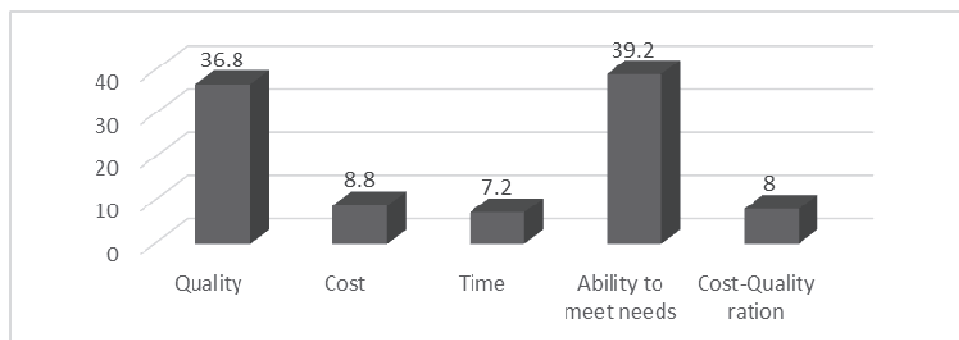

Figure 2. The factors that shape clients' expectations

Two statistical methods were used in the study, mean and standard deviation as shown in table 2. The mean is the most commonly used method of describing the central tendency, which is an estimate of the center of a distribution of values. In addition to the central tendency, the standard deviation is a more accurate estimate of dispersion, which is the spread of the values around the central tendency. The standard deviation shows the relation between a set of scores and the mean of the sample (Trochim, 2006). Two tests of path analysis were used in the analysis; one way ANOVA and independent sample T-test. One-way analysis of variance (also known as one-way ANOVA) is a technique used to compare means of two or more samples (using the F distribution) and it can be used only for numerical data. On the other hand, the independent-samples t-test (known as independent t-test) compares the means between two unrelated groups on the same continuous, dependent variable (Trochim, 2006).

Table 2
Path Analysis of the Variables

	One-Sample Test			
	Mean	Std. Deviation	t	Sig. (2-tailed)
Design	4.3687	0.56720	89.159	0.000
Service Quality	4.4071	0.51545	98.973	0.000
Staff	4.3863	0.45717	103.825	0.000
Costs	4.2663	0.53896	91.290	0.000
Customer Satisfaction	4.1213	0.53605	88.998	0.000

The one-sample t-test was taken to check the variables of the questionnaire, the mean of each variable (greater than 3) and the standard deviation (more than 0.45717). It shows that the respondents are almost satisfied with all variables being tested in this study. In addition to that, Zikmund et al. (2013) stated that there are three conditions to be fulfilled in order to accept the variables of any questionnaire; the t-value of each variable at a significance level of 0.05 must be positive, higher than 1.65, and the sig. value must

be less than 0.05 for all the variables. Hence the above conditions were fulfilled; we can confirm that all the variables in our study were accepted. In order to test the research hypotheses shown in Table 3, the one sample t-test was used in this study, and the main equation used is shown as follows:

Customer Satisfaction= α + β_1Planning&Design + β_2ServiceQuality + β_3Staff&Supervision + β_4Cost + ε
Where: α = Constant β = Regression slope ε = Random Error

Table 3

Hypotheses Testing

	Coefficients						
Model/Hypothesis	**Unstandardized Coefficients**		**Standardized Coefficients**		**t**	**Sig.**	**Hypothesis Status**
	β	**Std. Error**	**Beta**				
(Constant)	1.291	0.352			3.669	0	-
H1- Design	0.433	0.110	0.457		3.920	0	Accepted
1 H2- Service Quality	-0.095	0.122	-0.091		-0.777	0.438	Rejected
H3- Staff	0.060	0.126	0.055		0.477	0.634	Rejected
H3 - Costs	0.256	0.103	0.257		2.498	0.014	Accepted

R: 0.636, R^2: 0.404, F: 21.700, Sig: 0.000

A multi regression model was used in order to test study hypotheses. By looking at the above table, we can clearly find out that the relationship between the independent variables as a whole and the dependent variable (customer satisfaction) is highly positive and equal to 63.6% (R=0.636), which means that there is a strong relationship between the variables and the customer satisfaction. In addition, the value of R^2, which is also called the coefficient of determination, indicates that the effect of the independent variables on the customer satisfaction is equal to 40.4%, which means that if all variables are increased by 100%, the customer satisfaction will increase by 40.4% which is considered to be a high rate. Moreover, the sig. value which is equal to (0.000) and less than (0.05) confirms that independent variables jointly affect customer satisfaction as a dependent variable.

   For H1, design, the table shows that t value is positive, which means that there is a strong positive relationship between the design of the projects and customer satisfaction. Moreover, we can generally say that the design of the project affects customer satisfaction in all the engineering consultancies everywhere because the sig. is less than 0.05, and therefore we can generalize this finding. Similar to this, Sobek and Jain (2006) found that the design process strongly affects customer satisfaction.

   For H2, the table shows that the t value of service quality is negative, and the sig. = 0.438 > 0.05. We can say that the relationship between the service quality and customer satisfaction is negative and the sig. = 0.438. On the other hand, Osman (2013) and Malik (2012) found that service quality has a positive and significant direct effect on customer satisfaction. Moreover, Naeem et al. (2009) found that service quality is a strong predictor of customer satisfaction which proves the strong relationship between the service quality and customer satisfaction. This dissimilarity in the findings in our study may be due to the different environments that the survey was taken in and the type of industries.

   For H3, the staff variable was also tested to find out its effect on customer satisfaction, and found that the t value was positive, and the sig. = 0.634 > 0.05. Thus, there is a positive relationship between the staff of the consultancy and customers satisfaction, but this relationship is not strong enough to affect the customer satisfaction, and since the sig. = 0.634 then we cannot generalize this finding on all the engineering consultancies. Unlike Dhakal (2012) who found that the staff of any organization and their supervision has a direct impact on customer satisfaction. It may not be the main reason behind their

satisfaction or dissatisfaction, but it directly affects the overall satisfaction of the customers in many different sectors.

For H4, the t value is positive, which means that there is a strong positive relationship between the cost of the project and customer satisfaction, and the sig. = 0.014 < 0.05. In addition to that, we can generally say that the project's cost affects customer satisfaction in all engineering consultancies because the sig. is less than 0.05, and therefore we can generalize this finding. It is well known that the cost of any product/ service affects customer's opinion and it may increase either his satisfaction or dissatisfaction accordingly. A previous research conducted by Singh and Srivatava (2013) stated that the cost has a significant impact on overall customer satisfaction.

Conclusion

Our research findings answer the main point of the study which is measuring customer satisfaction level of Arab Architects' clients, as it can clearly said that more than 86% of such clients are satisfied. Moreover, the data analysis stated that there are many factors that affect customers' expectations in this field of engineering such as project quality, costs, and completion time. But the most important factors based on the study were the consultancy's ability to meet customers' requirements, and project quality. The study hypotheses were set to find out factors that directly affect the customer satisfaction in the engineering industry in general and Arab Architects in particular.

Based on the findings, the responses clearly indicate that two factors directly affect customer satisfaction of Arab Architects which are project design and project cost. On the other hand, the results found that service quality and the staff do not really affect customer satisfaction. It is visible that the factors that are related to specific project service directly affect customer satisfaction, while factors that are related to service provider do not directly affect customer satisfaction. This means that clients in engineering field are concerned more with service rather than service provider. Since project design and project costs have high effect on customer satisfaction, maintaining and enhancing them will have more positive results. Data analysis indicates that Arab Architects has two main competitive advantages that motivate clients to deal with it, and these are; good way of project supervision by the staff and the creative project design that the firm provides to its clients along with an efficient planning system.

Limitations and Future Research
The most obvious limitation of the study was the time limit to collect and analyze data, followed by lack of information about the architectural engineering in Bahrain. The intended focus of this research was to better understand customer satisfaction in the architectural engineering industry in Bahrain, based on customers' expectations. However, this study was limited in scope as it was narrowed to the clients of Arab Architects' consultancy. A much larger sample that may include customers of all engineering consultancies in Bahrain would help to widen the scope of future research and may reveal interesting findings that can broaden the understanding of the customers in the engineering industry. In addition to that, this study is limited to only four independent variables that may affect customer satisfaction in the targeted industry. However, future research may include more variables that would affect customer satisfaction of the engineering industry, which may uncover more interesting findings in the architectural engineering field.

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