

An Examination of the Quality of Customer Service at a Public Utility Organization in the GULF Region

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Abstract

The main purpose of this paper is to employ the SERVQUAL model to assemble systematic and objective first hand data on the quality of customer service at a Public Utility Organization in Dubai, U.A.E known as DEWA. Study results reveal that DEWA's customers attached greater importance to tangibles service elements rather than to service reliability or / to human interaction experiences. Invariably, all DEWA customers reported a substantial gap between the actual and expected or desired level of service quality. On the other hand, while most DEWA customers viewed service reliability as an important consideration, the residential customers placed a higher value on service reliability compared to commercial customers.

Keywords: service quality, SERVQUAL, customer satisfaction, public utilities, gulf region

1. Introduction

The present study employed the SERVQUAL model to assemble systematic data on the service expectations and perceptions of one of the largest utility organization in the Gulf region known as Dubai Electric and Water Authority, henceforth referred to as DEWA. When formed in 1992, DEWA's vision call for it "to become a world class utility organization" and its mission is, "to meet customer satisfaction and promote Dubai's vision through delivering water and electricity services by a competent workforce at world-class level of safety, reliability, and efficiency". This clearly suggests that DEWA intends to be viewed as a customer-driven organization. DEWA is one of the largest firms in U.A.E with total staff of well over 3,000 employees.

Over the last 20 years, the demand for DEWA services has increased markedly in both residential and commercial sectors thanks in large part to the new construction boom in Dubai. While DEWA has expanded its infrastructure and its human resources to respond to such increasing demand for its services, it continues to face considerable customer complaints. Most of such complaints relate to quality of the services rendered and around such issues as lack of staff responsiveness to customer needs, delays in power connections of new customers; Lengthy documentation required to commence service, multiplicity of the various inter-departmental entities involved in the provision of service to the public; Poor contingency planning to address power failure or water shortage; and lack of proper monitoring of service quality. Therefore, DEWA needs to take a systematic look at the concept of service quality, assess different aspects of quality and identify areas needing improvement. In short, DEWA must evaluate service quality as perceived by its customers. In addition, DEWA must supplement its customer satisfaction data which are generated through customer surveys and informal suggestions with a more objective instruments such as SERVQUAL with known validity and reliability records and is widely recognized as a proper measure of service quality than most informal, in-house measure used by some organizations for monitoring customer's feeling states about service quality.

It must be noted, however, that this does not imply that the use of SERVQUAL or any other competing measures of service quality such as SERVPERF or Expectancy-Disconfirmation Model (EDM) will automatically improve DEWA's service quality or reduce customer complaints. Rather, It is believed a better measure of service quality would more accurately capture the areas where problems exist, and this would in turn, guide DEWA's management towards developing appropriate action plans to address customer concerns in a more objective manner.

The present research paper is designed to achieve following objectives: (1) to determine the quality of service that DEWA's customers expect to receive; (2) to determine the quality of service & actual service as perceived by DEWA's customers; (3) to determine the nature of the gap between customers' service expectations and perceptions of the actual service; (4) to determine the overall level of customer satisfaction with DEWA's service; and to identify areas of dissatisfaction that must be addressed in future DEWA's future planning efforts; and (5) to link the gap between the expected and perceived service quality to respondents' demographic characteristics and their level of satisfaction with DEWA services.

To accomplish these objectives, a number of research hypotheses are developed and will be empirically tested with primary data collected from a represented sample of DEWA customers.

Unlike a typical monopoly, DEWA has taken several measures to learn about its customers' concerns and maintain a fairly good customer responsive-attitude. For instance, DEWA regularly seeks input from customers by means of customer satisfaction surveys, suggestions boxes, and informal feedback. DEWA has also established a customer complaint committee to review formal customer complaints. While DEWA might be pursuing these activities to meet the compelling requirements of the ISO certification, they can be regarded as initial steps to improve its service quality. However, despite these measures, DEWA continues to face a significant amount of complaints from both its residential and commercial customers.

For instance, a preliminary review of a sample of customer complaint by one of the authors of this paper suggest that a growing number of DEWA's customers demand greater reliability in service delivery and expect DEWA to deliver its services at the promised time. Perhaps, more importantly, they expect DEWA staff to be highly responsive and knowledgeable to answer their questions, able to understand their needs willing to help them, and give them personal attention.

Therefore, the significance of the present investigation stems from the fact that it is designed to generate general primary data on important dimensions of service quality and levels of customer satisfaction with DEWA's service. Thus, the SERVQUAL instrument used in this study will provide data on the five dimensions of service quality, namely: tangibles, reliability, responsiveness, assurance, and empathy. In addition, this study will generate data on DEWA customers' overall level of satisfaction with service quality; In short, the present investigation will allow a more precise assessment of areas of satisfaction as well as dissatisfaction among DEWA's customers.

While SERVQUAL will be the primary source of data, the present study also intends to review a sample of customer complaints to develop a better understanding of the special issues of special concern to DEWA's customers. Together the SERVQUAL feedback and complaint data will offer a more realistic and clearer look into areas of customer satisfaction and dissatisfaction.

2. Literature Review

Given the primary focus of the present paper on the utility company, we will review here only selective studies that have looked at the concept of quality in the context of public or private companies providing basic utility or related services such as telephone and telecommunication.

Over the past two decades, a number of research instruments have been developed to investigate services quality both from the point of view of customers and service providers. The scale referred to as SERVQUAL, developed and subsequently revised by Parasuraman, Zeithmal, and Berry (1988–1991) is perhaps one of the most widely used scales. While several alternative scales such as SERVPERF (Cronin & Taylor, 1992) and INTQUAL (Caruana & Pitt, 1997) have appeared since the publication of SERVQUAL in 1988, the SERVQUAL scale continues to be the most prominent one to assess customers' perception of service quality.

Parasuraman, Zeithmal, and Berry (henceforth referred to as PZB) developed SERVQUAL—a 22 item scale—for measuring consumers' perceptions and expectations of the service they received. PZB viewed service quality as a form of attitude, partly related to satisfaction, and resulting from a comparison of customers' expectations of service quality with their perceptions of service performance. Consistent with this view, PZB developed a gap model of service quality, and defined service quality as the degree and direction of the discrepancy between consumers' perceptions and expectations.

The SERVQUAL scale has been extensively used to measure service quality in different service context, such as health care (Lam, 1997); hospitality industry (Saleh & Ryan, 1991) tourism (Tribe & Snaith 1998; Hudson et al., 2004); Professional Services (Freeman & Dart, 1993); information systems (Kettinger & Lee, 1994), and business schools (Pariseau & McDaniel, 1997). The SERVQUAL scale has also been widely tested for its reliability and validity (Bolton & Drew, 1991; Cronin & Taylor, 1992; Babakus & Boller, 1992; Zhao et al.,

2002). However, no definite conclusion can be drawn from these studies. While in terms of their face value, the SERVQUAL scale and its five dimensions appear valid, the empirical studies, mentioned above, have provided only a modest support.

Furthermore, despite an extensive use of SERVQUAL in different settings and cultural contexts, its generability in different service industries still remain to be established (Coulthard, 2004). Likewise, the applicability of SERVQUAL across different cultures also continues to be seen as a serious issue. Since the SERVQUAL scale was developed in a western context and because of cultural differences, it is likely that cultural factors will influence its applicability (Donthu & Yoo, 1998; Zhao et al., 2002). However, despite all these weaknesses of SERVQUAL, there is a general agreement that the 22 items used in the scale are reasonably good predictors of service quality.

It is also significant to note that much of the empirical research using SERVQUAL has been heavily concentrated in the private sector. Consequently, little is known about the relevance of SERVQUAL to public sector organizations. In an earlier study of local government services in UK, Donnelly et al. (1995) considered several additional measure of service quality along with SERVQUAL. The authors conclude: "This scale (SERVQUAL), which has been the subject of considerable academic scrutiny and extensive private sector applications, merit serious consideration by government officials as a robust, adaptable, diagnostic instrument to measure service quality". In another study, Winiewski (2001) looked at the quality of service across a range of Scottish council services using a modified version of SERVQUAL. The results led Wisniewski to conclude that if adapted properly, SERVQUAL can be an effective measure of customers' perception of service as well as their expectations.

The general lack of research on the quality of utilities and other essential services provided by government owned and operated organizations (such as DEWA) may be attributed to several reasons. One reason is the monopolistic nature of government organizations (e.g., Athanassopoulos & Iliakopoulos, 1993). In this situation, the government service is delivered by one or two organizations in a given area, and dissatisfied customers have little choice to use alternative service organizations unless they move to a different geographic region. Since there is almost no defection of unhappy customers, Public utility organizations may develop a false notion about their service quality and customer loyalty. Such thinking tends to undermine the need for more systematic and critical examination of issues related to service quality and customer satisfaction (Jones & Sasser, 1995). Another important reason for lack of research in public sector organization may reside in the difficulties involved in obtaining the required data. Long delays in getting approval and support from top management and uncertainty surrounding the use of research findings are often seen as reasons for not undertaking costly and time-consuming research studies.

In addition, it is perhaps significant to note that much of the service quality research has focused on these services where customers have high level of personal involvement such as hospitality, travel and tourism, and training services. Apparently, customer feedback in these areas is viewed as more insightful, and thus more useful for planning purposes. On the other hand, customers of monopolies such as gas, water, electrical, and telephonic services are much less involved in the design and delivery of such services and as the result are viewed as somewhat passive and less informed and presumably not in a position to make informed assessment of service quality. They are likely to perceive service quality to have relatively simple domain rather than a multidimensional one (Babakus & Boller, 1992).

In recent years (due to the growing public pressure for privatization and the globalization of publicly owned organizations), this thinking is changing, however, and most public organizations have begun to feel that they are not insulated against the pressures to improve that service and meet customers' expectations. In fact, a growing number of customers have become quality conscious and demand better value for their money. Thus, as with private organizations, customers using public sector services expect government organizations to be proactive and willing to take appropriate measures to improve the quality of service. Indeed, this emerging thinking makes this study a timely and worthwhile effort.

Perhaps the only study that applied the SERVQUAL scale to measure service quality in an electric and gas – company was that of Babakus and Boller (1992). They identified four specific issues for examination namely: (1) the existence of five dimensions of the SERVQUAL scale as conceptualized by PZB; (2) the appropriation of defining service quality using gap scores; (3) possible effect of mixed item wording (negative and positive wording) on the underlying factor structure; and (4) the level of convergent and discriminate validity of the SERVQUAL scale.

Using only residential customer records as a sample frame, Babakus and Boller mailed the survey instrument to a systematic random sample of 2,375 customers. A total of 689 usable questionnaires resulted from this process (with a 29% return rate). An extensive analysis of data failed to produce the five dimensional structure of SERVQUAL. Separate analyses of the perceptions and expectations aspects of SERVQUAL produced a two-dimensional factor structure. The authors felt that these two dimensions appear to be determined by the direction of the item wording in that the negatively worded items loaded heavily on one factor and all positively worded items loaded on the other factor. The results of this benchmark study further indicated that service quality can be more accurately assessed in terms of customers' perceptions of services rather the gap scores. Finally, the SERVQUAL scale showed poor convergent and discriminate validity.

While the results of Babakus and Boller's research caution against uncritical acceptance of the SERVQUAL scale, the authors' initial assessment of the SERVQUAL's item content with input from both customers and management suggest that "the scale was appropriate for utility services". Babakus and Boller also note the special nature of utility services which might have produced a different factor structure of SERVQUAL. They feel that customers receiving service from a monopolistic organization with low involvement with the service provider may be expected to perceive service quality to have a relatively simple domain as opposed to a more complex and multidimensional domain. Therefore, the current study examines some of the issues raised by Babakus and Boller, especially those relating to factor structure of the SERVQUAL scale in greater detail with first hand data from DEWA's customers.

Likewise, the findings of studies in a related services sector (i.e, telecommunication industry) will be briefly outlined here to gain further insights into customer perceptions and expectations of service quality. Bolton and Drew (1991b), for instance, applied a variation of the SERVQUAL model to residential customers' assessment of local telephone service. The study used survey data from a national probability sample of 1,408 residential telephone subscribers. The result indicated that residential customers' assessment of service quality and value were primarily "a function of disconfirmation arising from discrepancies between anticipated and perceived performance levels" (1991b: 375). Bolton and Drew (1991b: 383) conclude: "consistent with prior exploratory research concerning service quality, a key determinant of overall service quality is the gap between performance and expectations (i.e., disconfirmation)". Perceived telephone service quality largely dependent on the disconfirmation caused by perceived changes in existing services or changes in service providers. In another study, Bolton and Drew (1991A) used a longitudinal model to look at the impact of service changes on customer attitudes about service quality. The data used came from a field experiment in the telephone industry with three survey waves. The authors found that service changes do exert a major influence on customer evaluation of service quality through their effect on customer perceptions of current performance and disconfirmation. Bolton and Drew (1991A) feel that their findings "should be generalized to other continuously provided services (e.g., cable television, utilities, banking and transportation services)".

3. Hypotheses Development

While it is generally agreed that service quality is a multi-dimensional or multi-attribute construct, much of the existing research does not reveal the five dimensions that PZB have identified. The most common pattern is that these five dimensions cluster into two categories, One involving tangibles and the other interaction with service providers (Harrison-walker, 2002) or what PZB calls the "human dimension" of service. Suresh Chandar et al., (2001), for instance, conclude that most of the SERVQUAL items relate to the component of "human interaction / intervention" in the service delivery and the remaining items relate to the tangibles facets of the service. They further argue that the SERVQUAL scale leaves out certain important aspects of service quality such the features associated with the service itself, like that service product or the core service and the image or goodwill a firm might establish for itself in terms of being socially responsible to the larger society in which it operates.

These findings in combination with PZB's research on the importance of service quality dimensions would suggest that the following three dimensions of service quality are of central importance and are more likely to occur in an empirical analysis of the SERVQUAL scale: human interaction (responsiveness, assurance and empathy), reliability, and tangibles.

Given the nature of DEWA's service, the tangibles do not seem to be an important consideration. Instead DEWA customers are more likely to be concerned with on-time delivery of service (reliability) and a meaningful interaction with DEWA and its employees (human dimension). However, it is important to recognize the possible variation in the concerns of residential and commercial customers of DEWA. In general, the complaints of most residential customers tend to be focused on routine matters such as inaccurate meter-reading, billing errors, difficulties relating to reconnections of power and water lines as they change their residence. They expect

greater responsiveness, assurance and empathy from DEWA employees to resolve such problems as quickly as possible. This suggests that residential customers might place more weight on the human side DEWA's services.

The commercial customers, by contrast, are likely to be more concerned with service reliability. Often commercial customers have to meet tight deadlines to complete their projects on certain specific dates. Even a minor delay in the availability of water and power services can cost substantial amount of money to general contractors and their clients. Thus, commercial customers expect DEWA employees to deliver the service on time as specified in the service requisition submitted to DEWA.

While these tentative assumptions are based on our initial review of DEWA's complaint data, further empirical testing is required to establish their validity. The present study is designed to do just that. More specifically, we would like to state the following tentative hypotheses, which are grouped into three different sets.

The first set of Hypotheses deal with the relative importance of five dimensions of service quality among DEWA customers. They include **two** main hypotheses:

H₀₁: *On the whole, DEWA customers are **not** more likely to attach greater importance to service reliability and human interaction (assurance and empathy) than to tangible service elements.*

H₀₂: *On the whole, DEWA is **not** more likely to score lower on both the human dimension of service quality (assurance and empathy) and service reliability than the tangibles.*

The second set of Hypotheses: The gap between expected as perceived service quality on SERVQUAL. It includes the following five hypotheses:

H₀₃: *DEWA customers are **not** more likely to show a significant gap between their expectations and perceptions of the **tangibles** dimension.*

H₀₄: *DEWA customers are **not** more likely to show a significant gap between their expectations and perceptions of the **reliability** dimension.*

H₀₅: *DEWA customers are **not** more likely to show a significant gap between their expectations and perceptions of the **responsiveness** dimension.*

H₀₆: *DEWA customers are **not** more likely to show a significant gap between their expectations and perceptions of the **assurance** dimension.*

H₀₇: *DEWA customers are **not** more likely to show a significant gap between their expectations and perceptions of the **empathy** dimension.*

The third set of Hypotheses deal with the possible difference between commercial and residential DEWA customers in assessing the relevant dimensions of service quality. In addition, this set includes hypotheses on the potential impact of DEWA Customers' level of education, length of service experience, and nationality on their level of satisfaction with DEWA services. This group of hypotheses includes the following eight hypotheses.

H₀₈: *Commercial customers are **not** more likely to see a significant gap between expected and perceived tangibles than residential customers.*

H₀₉: *Commercial customers are **not** more likely to see a significant gap between expected and perceived reliability than residential customers.*

H₀₁₀: *Commercial customers are **not** more likely to see a significant gap between expected and perceived responsiveness than residential customers.*

H₀₁₁: *Residential customers are **not** more likely to see a significant gap between expected and perceived human dimension of service quality (assurance and empathy) than commercial customers.*

H₀₁₂: *DEWA customers with higher level of education are **not** more likely to show a lower level of overall satisfaction with DEWA services.*

H₀₁₃: *DEWA Customers with more years of service experience are **not** more likely to show a lower level of overall satisfaction with DEWA services.*

H₀₁₄: *The expatriate customers are **not** more likely to show a lower level of overall service satisfaction with DEWA services than the UAE nationals.*

H₀₁₅: *Customers who perceive DEWA services of low quality on the SERVQUAL scale are **not** more likely to show greater overall satisfaction with DEWA services.*

To affirm, the above stated fifteen (15) hypotheses cover a broad range of key issues relating to service quality that the present study intends to explore.

4. Research Methodology

This section of paper describes briefly the key research design decisions including the derivation of sample, survey instrument, measures of study variables; data analysis methods, and assessing the reliability, validity, and the factor structure of the SERVQUAL scale.

4.1 Study Sample

One of the co-authors of this study has been working with DEWA for several years. Based on his work experience, it was estimated that DEWA receives between 800–1,000 customers in a given month in its different branches with most customers visiting the main office building in Dubai city. This number roughly constituted the sampling frame of the present study. Thus, out of this group of customers a sample of 300 individual was considered an appropriate target for this study. Accordingly, it was decided to devote about three weeks to data collection, and distribute the questionnaire to customers as they visit DEWA's main office during this time period. However, for several reasons such as customers being in rush, too busy to fill questionnaire, or refusal to participate in the survey, the initial plan did not produce the expected number of respondents (i.e. 300). Consequently, it was decided to extend the survey period to three months. Such an extension resulted in completion of 120 personal interviews with DEWA's customers who visited the main office between March–May 2006. Three (3) questionnaires were incomplete and therefore were excluded from the analysis giving us a total of 117 completed questionnaires to be used as the database for this report with a 39% response rate.

4.2 Development of Questionnaire

The present study used a descriptive research design involving a questionnaire – based survey as a data collection method. Accordingly, a comprehensive questionnaire was developed to collect the needed data. The questionnaire was translated from English to Arabic using the back – tracking method. The final draft of the questionnaire included two forms of the SERVQUAL scale, one measuring respondents' expectations about the service quality provided by a top quality water and electricity organization (which we called, "ABC Water and Power Organization") and assess each question on a 5-point scale anchored as "strongly agree" (5) and "strongly disagree" (1). The second form of the questionnaire contains similar information measuring customers' perceptions of the actual service they are currently receiving from DEWA. In addition, the questionnaire included a series of questions on the respondents' overall perception of the quality of services, level of service satisfaction, frequency of problems experiences with DEWA, and frequency of written complaints made to DEWA.

The survey instrument also included several questions on the background of the respondent, including in particular, respondent's level of education, occupation, nationality and gender. Other data obtained through the survey included information on length of respondent's dealing with DEWA, whether the services received was of residential or commercial nature, and the sector (private or government) receiving the commercial service.

Before implementing the survey questionnaire, it was pre-tested on a small number of DEWA customers (N=10). This was done to get some feedback on the wording of questions, clarity of intended meanings and the layout and overall flow of the questions. Following the pre-test, the questionnaire was revised to incorporate respondents' suggestions and a final copy was printed in two languages: Arabic and English to launch the data collection phase.

4.3 Measures of Study Variables

Given the focus of this study to assess DEWA customers' expectations and perceptions of the quality of services they received from DEWA, it was decided to use the SERVQUAL scale developed by Parasutmann et al. (1988). Based on their application of the SERVQUAL scale to four different organizations (bank, a credit card company, a repair and maintenance company, and a telephone company), Parasurmann et al. (1988) concluded that SERVQUAL scale can be used with minor modification of the items included in the original scale, in a broad range of service organizations operating in different contexts. The SERVQUAL is a 22-item scale and measures five different dimensions of service quality namely: Tangibles, Reliability, Responsiveness, Assurance and Empathy.

Following Parasurmann et al. (1988), the variable of service quality was defined as the gap between expected (E) and perceived (P) level of service. Accordingly, the gap score in this study was computed by subtracting the

perceived scores from the expected scores. The service gap for DEWA was assessed for the SERVQUAL scale as a whole, its five sub-dimensions, and its individual items.

Importance rating of SERVQUAL dimensions: After completing the expected perceived versions of the SERVQUAL, the study respondents were asked to allocate a total of 100 points among the five SERVQUAL dimensions based on their perceived importance to the respondents. Following this, the respondents were further asked to identify the first most important factor of the five dimensions, the second most important factor, and the least important factor. The two-fold question provided us with a measure of importance rating of each SERVQUAL dimension.

Overall Service Quality: In addition to SERVQUAL, the following question was included in the Customer Feedback Survey to assess the overall quality of services provided DEWA: "Overall, how would you rate the quality of service provided by DEWA?" The respondents were given the following five point scale to rate the service quality: Excellent, very good, good, average, and poor.

Level of satisfaction with DEWA services: Here, respondents were asked "overall how would you rate your level of satisfaction with the service you receive from DEWA?". The response categories provided with this question included: very satisfied, satisfied, neutral, dissatisfied, and very dissatisfied.

Length of service experience: This variable was measured by the following question: "Since how long have you been dealing with DEWA?" the responses were recorded as follow: "Less than a year, 1–3 years, 4–6 years, 7–9 years, and 10 years and more."

Type of service: The respondents were asked to indicate the nature of service requested from DEWA and accordingly they were classified in two distinct categories: residential versus commercial customers.

Level of education: respondents' level of education was recorded as follows "High School or less; diploma / certificate; College / University; degree; and Advance University degrees".

Nationality: Respondents' nationality was recorded into two categories: - U.A.E nationals and expatriates.

4.4 Data Analysis

A series of statistical techniques were used to conduct data analysis including in particular frequency analysis, paired-means comparison test, zero-order correlations, ANOVA, and regression analysis. In addition, both confirmatory and exploratory factor analysis techniques were employed to assess the factor structure of the SERVQUAL scale and the scale based on the gap scores. All survey generated data was computer processed and analyzed using version 13.0 of SPSS software package (SPSS, 2006).

4.5 Reliability, Validity, and the Factor Structure of the SERVQUAL Scale

The SERVQUAL scale and its sub-dimensions were the only composite (multi-item) measures that called for an assessment of the reliability and validity of these measures. Reliability in the present study was gauged with Cronbach's alpha correlation coefficient (Cronbach, 1970). The alpha coefficient is widely used statistical technique to determine the degree to which the items to be included in a scale or an index comes from a common pool. Nunnally and Bernstein (1994) have suggested a threshold alpha value of .7 for a scale to be reliable. An explicit test of reliability was conducted on the 22-items of the SERVQUAL scale and all its five dimensions. It yielded fairly high alpha values (close to .90) documenting the reliability of the SERVQUAL scale used in the present study.

Similarly, this study attempted to assess SERVQUAL scale's content as well as its convergent validity. Content or face validity of the items used to measure the five main constructs used in this investigation was judged to have sufficient face and content validity. This is so because the items included in the SERVQUAL were selected after a thorough review of the literature in addition to the extensive scrutiny of DEWA's customer relations staff who concluded that all the SERVQUAL scale items (with some slight modifications and adaption) seemed appropriate and relevant for assessing customers' expectations and perceptions of service quality. In fact, while much of the subsequent research – to the publication of PZB study in 1985 has questioned SERVQUAL scale on a range of methodological grounds, most critics seems to agree that SERVQUAL has fairly good face and content validity (Barbakus & Boller, 1992; Wisniewski, 2001).

Consequently, the present study attempted to examine the construct validity of SERVQUAL scale. Two statistical approaches widely used for assessing construct validity are convergent and discriminant validity. In the present study, only convergent validity was assessed by correlating the SERVQUAL scale with the responses received asking respondents to rate the overall quality of DEWA services on a five point ranging from poor to

excellent. The correlation results obtained revealed that the SERVQUAL and its five dimensions had a fairly high (.53 to .59) and consistent correlations with the study variable of “Overall service quality”.

After assessing the reliability and validity of the SERVQUAL scale, an attempt was made to look at its factor structure. Confirmatory factor analysis was employed to determine if the perceived SERVQUAL scale produces the five-factor structure, consisted of tangibles, reliability, responsiveness, assurance, and empathy; as predicted by Parasuramann et al. (1988). The result of conducting this analysis did not generate a five-factor structure as expected. Instead, it produced a two – factor structure in that Factor One combined most of the items relating to tangibles, reliability and responsiveness, while Factor Two consisted of most items relating to assurance and empathy dimensions, which were referred to as “human dimensions of service” in the present study.

In a further effort to look at the factor structure of the SERVQUAL scale, additional factor analysis was conducted of the GAP scores using Varimax rotation method with a five-factor limitation. This analysis, too, fails to reveal a five factor structure with a clustering of items without any overlap. However, somewhat consistent with our previous analysis, the gap scores analysis generated Factor One, which again combines both assurance and empathy dimensions, suggesting once again the importance of the human side of service quality. As in the previous analysis, Factor Two includes six items, four items that belongs to tangible dimension while two items belong to the reliability dimension. The subscales of reliability (Factor Three) and responsiveness (Factor Four) each has three items which distinctly cluster together. Factor five does present a clear platform as it includes one item from responsiveness subscale and two from the assurance subscale.

However, despite the occurrence of inconsistent findings on the factor structure of the SERVQUAL scale, the 22-item, scale and its five dimensions show a very strong reliability and convergent validity and do support our choice of using the SERVQUAL scale as the primary instrument for measuring the variable of service quality in this study.

5. Study Results

The First set of Hypothesis deals with the important rating of service quality. It includes H_{01} & H_{02} .

H₀₁: On the whole, DEWA customers are not more likely to attach greater importance to service reliability and human interaction (assurance and empathy) than to tangible service elements.

After expressing their expectations and perceptions on the SERVQUAL scale, the study respondents were asked to indicate the importance of the five SERQUAL dimensions. They were requested to allocate 100 pints among the five factors according to their importance. The five factors presented for rating were summarized versions of the five dimensions of SERVQUAL. The results are presented in Table 1. The rating scores are arranged from high to low.

The data summarized in Table 1 indicates a fairly broad range of rating with a score of 20 occurring as the most frequently assigned rating (a mode value). However, as can be seen, the tangibles dimension of SERVQUAL received slightly higher importance rating (with 7.3% respondents giving it a rating of 50 and 40 scores) than each of the other dimensions. The reliability and responsiveness were given somewhat higher rating than assurance and empathy. This pattern does support our null hypotheses (H_{10}) suggesting that DEWA customers are not more likely to attach greater importance to service reliability and human dimensions of service (assurance and empathy) than the tangibles dimensions.

Moreover, following the rating of the five dimensions of SERVQUAL, the respondents were also asked to indicate the first most important factor, the second most important factor and the least important factor among the five SERVQUAL factors. The results related to this question, as shown in TABLE 2 cast some additional light on H_{01} . An interesting albeit somewhat conflicting picture (relative to data shown in TABLE 1), emerges from the data presented in TABLE 2. For instance, a large proportion of respondents choose responsiveness and reliability as both the first and second most important factors. On the other hand, an equally larger percentage of respondents (29.4%) considered tangibles as the least important factor. The other least important factors considered included assurance (25.7%) and empathy (18.3%), both viewed as representing the human dimensions of service quality. Together, the data listed in Tables 1 and Table 2 does support the null hypotheses H_{01} .

Table 1. Importance rating of SERVQUAL dimensions (n= 109*)

Rating Score	F1		F2		F3		F4		F5	
	Tangibles	%	Reliability	%	Responsiveness	%	Assurance	%	Empathy	%
	N		N		N		N		N	
50	8	7.3	4	3.7	2	1.8	2	1.8	-	-
45	-	-	2	1.8	-	-	-	-	-	-
40	8	7.3	4	3.7	7	6.4	1	.9	2	1.8
35	1	.9	1	.9	-	-	-	-	1	.9
30	17	15.6	23	21.1	12	11.0	9	8.3	3	2.8
25	7	6.4	3	2.8	5	4.6	4	3.7	7	6.4
20	33	30.3	45	41.3	49	45.0	52	47.7	39	35.8
15	8	7.3	9	8.3	9	8.3	12	11.0	12	11.0
10	25	22.9	17	15.6	24	22.0	27	24.8	36	33.0
5	2	1.8	1	.9	1	.9	2	1.8	3	2.8
0	-	-	-	-	-	-	-	-	6	5.5
Total	109	100.0	109	100.0	109	100.9	109	100.0	109	100.0

Note: Eight (8) survey participants did not answer this particular question.

Source: An Evaluation of DEWA Services: A Customer Perspective (A self-administered Customer Survey of DEWA Conducted among 117 Customers During 2006).

Table 2. Most and least important SERVQUAL dimensions (N= 109*)

	Factors	First important Factor		Second Most Important Factor		Least Important Factor	
		N	%	N	%	N	%
1	Tangibles	19	17.4	13	11.9	32	29.4
2	Reliability	28	25.7	37	33.9	13	11.9
3	Responsiveness	42	38.5	31	28.4	16	14.7
4	Assurance	8	7.3	24	22.0	28	25.7
5	Empathy	12	11.0	4	3.7	20	18.3
	Total	109	100.0	109	100.0	109	100.0

Note: Eight (8) survey participants did not answer this particular question.

Source: An Evaluation of DEWA Services: A Customer Perspective (A self-administered Customer Survey of DEWA Conducted among 117 Customers During 2006).

H₀₂: On the whole, DEWA is not more likely to score lower on both the human dimensions of service quality (assurance and empathy) and service reliability than tangibles.

The data presented in the Table 1 is also relevant to H₀₂. Thus to test this null hypothesis (H₀₂), the frequency data from TABLE 1 was converted into mean scores and a pair-wise comparison of mean values was conducted. The results are shown in Table 3.

As can be seen, there is no statistically significant difference between DEWA customers' importance rating of tangibles and reliability and between tangibles and responsiveness. This would mean that respondents attached much the same level of importance to these dimensions of service quality. However significant difference in importance emerged between tangibles and assurance and between tangibles and empathy. *These comparisons clearly show that DEWA customers accorded greater importance to tangibles than assurance and empathy aspects of service quality.*

In conclusion, these results lend some partial support to H₀₂ since it reveals significantly lower rating scores for both assurance (P < .001) and empathy (P < .001) than tangibles (< .01).

The second set of Hypotheses deal with the gap between expected and perceived service quality on SERVQUAL. They Include:

H₀₃: DEWA customers are not more likely to show a significant gap between their expectations and perceptions of the tangibles dimension.

H_{04} : DEWA customers are **not** more likely to show a significant gap between their expectations and perceptions of the reliability dimension.

H_{05} : DEWA customers are **not** more likely to show a significant gap between their expectations and perceptions of the responsiveness dimension.

H_{06} : DEWA customers are **not** more likely to show a significant gap between their expectations and perceptions of the assurance dimension.

H_{07} : DEWA customers are **not** more likely to show a significant gap between their expectations and perceptions of the empathy dimension.

As can be inferred, all of the five hypotheses presented above predict the size of gap between respondents' expectations and perceptions of service quality on the SERVQUAL scale. The following section conducts gap analysis to test the above null stated hypotheses.

Table 3 summarizes the means and standard deviations of SERVQUAL scale. The five dimensions shown in the table are theoretical dimensions as defined by Parasuramann et al. (1988) and are created by adding the scores on individual items relating to a given dimension.

Table 3. Mean values and standard deviations of SERVQUAL dimensions (n = 117)

DIMENSIONS	Expectations		Perceptions		Gap (P - E)		T	P
	Mean	St. Dev	Mean	St. Dev	Mean	S. Dev.		
Tangibles	16.57	4.25	15.20	3.23	-1.21	4.19	-3.06	.01
Reliability	21.04	4.93	17.92	4.45	-3.02	5.20	-6.17	.001
Responsiveness	16.55	4.63	14.35	3.55	-2.18	4.71	-4.96	.001
Assurance	16.75	4.33	14.59	3.59	-2.13	4.58	-4.97	.001
Empathy	20.92	5.52	18.16	4.64	-2.75	5.70	-5.18	.001
Total (all items)	91.78	21.44	80.61	17.07	-10.00	20.04	-5.19	.001

Source: *An Evaluation of DEWA Services: A customer Perspective*. (A Self-Administered Customer Survey of DEWA, Conducted among 117 Customers during 2006).

As can be seen from Table 3, all five SERVQUAL dimensions show a fairly sizeable statistically significant discrepancy between DEWA customers' expectations and perceptions of service quality. The largest gap is shown by reliability, which may be taken to indicate that most study respondents consider service reliability is important and feel that DEWA falls short of their expectations. On the whole, these results support all five alternative hypotheses on the nature of service gap as stated above, and thus lead us to reject all the null hypotheses (H_{03} to H_{07}) claiming no difference between the expected and perceived service quality.

To be sure, Table 4 offers a more detailed gap analysis by way of comparing respondent's expectations and perceptions on individual items. It is interesting to note that on each item, respondents' expectations are significantly higher than their perception of service quality. On a five-point scale, mean values of expectations are higher than a score of four, while mean values for perceptions are all lower than four. Thus, the statistically significant difference between expected and perceived service quality on each individual item lead further support to the above hypotheses (H_{03} to H_{07}) suggesting the existence of a larger gap between customer expectations and perceptions on all five dimensions of SERVQUAL.

The Third set of Hypotheses: deal with predictors of service quality gaps and customers satisfaction: This group of hypotheses can be subdivided into three different subgroups of dependent and independent variables: -Customer type designation as predictor of service quality gap (H_{08} to H_{011}).

Level of education, length of service provision and nationality as predictors of customer satisfaction with DEWA services (H_{012} to H_{014}).

Perception of service quality as a predictor of customer satisfaction with DEWA services (H_{015}).

An in-depth analysis of each subset of these eight hypotheses will be presented herewith.

Customer type designation as predictor of service quality gap (H_{08} to H_{011}).

H_{08} : Commercial customers are **not** more likely to see a significant gap between expected and perceived tangibles than residential customers.

H_{09} : Commercial customers are **not** more likely to see a significant gap between expected and perceived reliability than residential customers.

H_{010} : Commercial customers are **not** more likely to see a significant gap between expected and perceived responsiveness than residential customers.

H_{011} : Residential customers are not more likely to see a significant gap between expected and perceived human dimensionsof service quality (assurance and empathy) than commercial customers.

Study data relating to H_{8_0} to H_{11_0} is presented in Table (5). One-way analysis of variance (ANOVA) was conducted to test their hypotheses. The dependent variables in this analysis the five theoretical dimensions of SERVQUAL which are composed of GAP scores (P – E). The independentvariable (or predictor) used in this analysis was the type of customers, which we classified into residential (1) and commercial (2) customers.

Table 4. SERVQUAL scale: the gap between expectations and perception on individual items (mean values)

Dimension	Items	Expectation	Perception	Mean Difference	T	P
Tangibles	Q1	4.17	3.87	.30	2.88	0.1
	Q2	4.09	3.76	.32	2.92	.01
	Q3	4.03	3.74	.29	2.23	.05
	Q4	4.21	3.82	.39	3.66	.001
Reliability	Q5	4.27	<u>3.63</u>	.65	<u>5.47</u>	.001
	Q6	4.25	<u>3.61</u>	.63	<u>5.50</u>	.001
	Q7	4.14	<u>3.54</u>	.60	4.96	.001
	Q8	4.22	<u>3.62</u>	.59	5.08	.001
	Q9	4.15	<u>3.50</u>	.65	5.43	.001
Responsiveness	Q10	4.18	<u>3.48</u>	.69	5.47	.01
	Q11	4.18	<u>3.64</u>	.54	4.40	.001
	Q12	4.09	<u>3.66</u>	.43	3.31	.001
	Q13	4.08	<u>3.57</u>	.51	4.47	.001
Assurance	Q14	4.20	<u>3.63</u>	.57	5.05	.001
	Q15	4.23	<u>3.70</u>	.53	4.59	.001
	Q16	4.11	<u>3.56</u>	.55	4.30	.001
	Q17	4.20	<u>3.71</u>	.49	3.95	.001
Empathy	Q18	4.21	<u>3.58</u>	.63	5.58	.001
	Q19	4.23	<u>3.68</u>	.55	4.43	.001
	Q20	4.15	<u>3.60</u>	.55	4.75	.001
	Q21	4.13	<u>3.63</u>	.50	4.18	.001
	Q22	4.20	<u>3.67</u>	.52	4.57	.001

Source: An Evaluation of DEWA Services: A Customer Perspective (A self-administered Customer Survey of DEWA Conducted among 117 Customers During 2006).

As can be seen from Table 5, there is no difference between residential and commercial customers with respect to tangibles, responsiveness, assurance and the composite scale of SERVQUAL as these four variables do not produce F values meeting the minimum requirement of statistical significance (i.e., $P < .05$). Therefore, we reject the alternative hypotheses and accept the null hypotheses suggesting no difference between commercial and residential customers in terms of the gap between expected and perceived tangibles, responsiveness,

assurance and SERVQUAL scale. The other two aspects of SERVQUAL, namely reliability and empathy revealed statistically differences between commercial and residential customers.

However, a separate analysis of mean differences indicated that unlike our prior expectation, the residential (not the commercial) customers see a larger gap between expected and perceived service reliability. Consequently H_{9_0} is accepted. On the other hand, the difference between residential and commercial customers with respect to empathy alone (excluding the assurance aspect) is in the predicted direction, i.e. the residential customers see a larger gap between expected and actual empathy more so than commercial customers. This finding provides a partial support for H_{011} .

Table 5. Type of customers (residential and commercial) and the service gap on the SERVQUAL scale (ANOVA) (N = 117)

SUM OF SQUARES		df	Mean Squares	F	P
Tangibles					
Between groups	3.53	1	3.53	.19	.66
Within Groups	1910.69	103	18.55		
Total	<u>1914.22</u>	<u>104</u>			
Reliability					
Between groups	105.13	1	105.13	3.86	.05
Within Groups	2830.30	104	27.21		
Total	<u>935.43</u>	<u>105</u>			
Assurance					
Between groups	54.57	1	54.57	2.68	.10*
Within Groups	2136.42	105	20.35		
Total	<u>2190.99</u>	<u>106</u>			
Empathy					
Between groups	125.98	1	125.98	4.28	.04
Within Groups	3120.98	106	29.44		
Total	<u>3245.96</u>	<u>107</u>			
Servqual					
Between groups	1111.84	1	1111.84	2.80	.09*
Within groups	39339.17	99	397.36		
Total	<u>4.451</u>	<u>100</u>			

*F values that do not reach statistical significance at .05 level of significance.

Source: An Evaluation of DEWA Services: A Customer Perspective (A Self-administered Customer Survey of DEWA Conducted AMONG 117 Customers During 2006).

Level of education, length of service provision and nationality as predictors of customer satisfaction with DEWA services (H_{012} to H_{014}).

H_{012} : DEWA customers with higher level of education are **not** more likely to show a lower level of overall satisfaction with DEWA services.

H_{013} : DEWA customers with more years of service experience are **not** more likely to show a lower level of overall satisfaction with DEWA services.

H_{014} : The expatriate customers are **not** more likely to show a lower level of overall satisfaction with DEWA services than the UAE nationals.

Table 6 examines the relationship respondents' level of education, length of service experience with DEWA, nationality, and customer satisfaction. Counter to our hypotheses predictions, respondents with higher level of education and those who used DEWA's services for a longer period of time expressed more satisfaction with DEWA services. The ANOVA results did not support the predicted differences between expatriate and national customers with respect to their level of service satisfaction. Based on these results, we reject H_{12} , H_{13} , and H_{14} and accept the null hypotheses (i.e., H_{012} , H_{013} , and H_{014}).

Table 6. Relationship between respondents' characteristics and customer satisfaction with DEWA services (ANOVA) (N = 117)

	Sum of Squares	df	Mean Squares	F	P
Level of education					
Between groups	7.44	3	2.48	2.93	.03
Within Groups	90.66		107.87		
Total	98.10	110			
Length of Service (in years)					
Between groups	8.70	4	2.17	2.64	.03
Within Groups	90.46	110	.82		
Total	99.16	114			
Customer Nationality*					
Between groups	.37	1	.37	.42	.51**
Within Groups	2136.42	105	20.35		
Total	2190.99	106			

*UAE National = 1, Expatriate=2

**F values not significant at .05 level of statistical significance

Source: An Evaluation of DEWA Service: A Customer Perspective (A Self-administered Customer Survey of DEWA Conducted Among 117 Customers During 2006).

Perception of service quality as a predictor of customer satisfaction with DEWA services (H_{015}).

H_{015} : Customers who perceive DEWA services of low quality (Overall quality on SERVQUAL scale are **not** more likely to show greater overall dissatisfaction) with DEWA services.

Table 7. Relationship between service quality (overall and SERVQUAL–Gap Scores) and customer satisfaction with DEWA services (Pearson) (N = 117)

Factors	Customer Satisfaction	
	R	Level of Significance
Tangible	-.17	.06
Reliability	-.25	.01
Responsiveness	-.23	.05
Assurance	-.24	.01
Empathy	-.19	.05
SERVQUAL	-.19	.05
Overall service quality	.79	.001

Source: An Evaluation of DEWA Services: A Customer Perspective (A self-administered Customer Survey of DEWA Conducted among 117 Customers During 2006).

Hypothesis H_{015} is tested with zero order correlation analysis shown in Table 7. The results support the alternative hypothesis suggesting that DEWA customers who perceive service quality in a positive light are more likely to show greater satisfaction with DEWA services. Data on SERVQUAL and its dimensions also support the alternative hypothesis (H_{15}). As can be seen, respondents who saw larger gap in expected and perceived services were more likely to show a higher level of dissatisfaction.

6. Summary, Conclusion and Recommendations

The primary objective of the present study was to collect first-hand data on DEWA customers' feelings about the water and electricity services they perceive from DEWA. To achieve this objective, the authors obtain data both on DEWA customers' perception of the service quality and their expected or desired level of service quality. By gathering data on perceived and expected quality of service, the present study aimed to determine the size of gap between DEWA customers' expectations and perceptions of service quality.

The study used the SERVQUAL scale, originally developed and tested for broad applicability by Parasuraman et al. (1988). Despite certain methodological limitations, the SERVQUAL scale has been widely used because of

its known psychometric and the relative ease in implementing the scale to obtain data on respondents' perceptions and expectations in the same survey.

Using SERVQUAL as the primary survey instrument, the present study developed 15 different of hypotheses for empirical examination. A Total of eight such hypotheses link DEWA customers' background characteristics to their perception of service quality.

A comprehensive customer feedback survey, consisting of both SERVQUAL and context-specific questions, was developed and administered to a sample of 120 DEWA customers who visited DEWA's main office between March–May 2006. The survey questionnaire was self-administered by DEWA customers on the company premises. A total of 117 useable questionnaires were available for analysis. The survey data was processed and analyzed using the SPSS software program. Some of the important study conclusions may be summarized as follow:

- 1) DEWA customers accorded considerable importance to tangibles, reliability, and responsiveness dimensions of SERVQUAL.
- 2) DEWA customers gave somewhat lower rating to the human dimensions of services namely assurances and empathy.
- 3) DEWA customers saw a substantial gap between the actual and expected or desired level of service quality. This gap was reported with respect to each of the five dimensions of the SERVQUAL scale as well as to each of the 22-items embodied in the scale.
- 4) Both commercial and residential DEWA customers perceived much the same level of gap between the actual and the desired level of tangibles, service responsiveness, and assurance.
- 5) DEWA's residential customers reported a larger gap in the expected and perceived level of service reliability and empathy than the commercial customers.
- 6) Customers with higher education showed greater satisfaction with DEWA's services than those with lower level of education.
- 7) DEWA's long term customers were also satisfied with DEWA services than customers who had relatively short service experience with DEWA.
- 8) Both expatriate and national customers expressed the same level of overall satisfaction with DEWA's service quality.
- 9) DEWA customers who gave higher rating to DEWA's overall service quality expressed greater overall satisfaction with DEWA's services. Likewise, DEWA customers who scored high on the perceived SERVQUAL scale, showed higher level of satisfaction with DEWA's services.
- 10) In all, the findings of this study are expected to motivate future research on public utilities customers' service expectations and their level of satisfaction of the services rendered. Future studies should also consider replicating the findings of this study with larger samples.

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