The Effects of Service Quality Dimensions on Brand Equity: An Empirical Investigation in Turkish Telecommunication Industry

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ABSTRACT: *The impact of perceived service quality on brand equity is a subject of ongoing debate in academic literature. This article aims to examine the effects of service quality dimensions on brand equity in Turkish telecommunication companies. The study develops a reliable instrument to measure customer-perceived service quality, incorporating both service delivery and technical quality aspects. Data was collected from a convenience sample of 513 mobile phone service users in Istanbul, with 395 valid questionnaires used for analysis. Through confirmatory factor analysis, a six-dimensional service quality instrument was empirically tested for reliability and construct validity. The findings indicate a significant direct impact of service quality on brand equity, mediated through five dimensions: network quality, responsiveness, tangibles, reliability, and empathy. Notably, there was no direct effect of assurance on brand equity. This research provides valuable guidance for companies to improve their service quality and assess the effect of their efforts on brand equity. The study emphasizes the importance for telecommunication companies to prioritize improving service quality dimensions to enhance customer-based brand equity.*

KEYWORDS: *Service Quality, Tangibles, Reliability, Responsiveness, Assurance, Empathy, Network Quality, Brand Equity.*

I. INTRODUCTION AND LITERATURE REVIEW

In the present highly competitive market landscape, characterized by globalization and the effects of information technology, industrial marketers face the imperative to distinguish their products from competitors in order to generate value for customers and strengthen their brand reputation (Lai et al., 2010; Engizek & Yaşin, 2018).

The primary objective for any company is to establish a robust brand equity, and in today's business environment, the concepts of service quality and sustainability have emerged as pivotal elements in corporate management practices. These factors play a central role in shaping the way businesses operate and manage their relationships with customers.

Brand equity refers to the added value that a product possesses when associated with a recognizable brand name, as opposed to the same product without any brand affiliation (e.g., Aaker, 1991; Ailawadi et al., 2003; Keller, 2003). It represents the consumer attitudes and associations linked to a branded product (e.g., Aaker, 1991, 1996; Keller, 2003), which collectively result in specific outcomes such as increased sales volume, ability to charge higher prices, and improved profitability (Ailawadi et al., 2003).

Lewis & Booms (1983) defined service quality as "a measure of how well the service delivered matches customer expectations. Delivering service quality means conforming to customer expectations on a consistent basis." (p.100). (Parasuraman et al. 1991) "point out that service quality is an attribute that is extrinsically perceived based on the customers' experience of the service encounters". However, Jaiswal (2008) noted that "service quality is not only involved in the final product or service, but also in the production and delivery process, which requires the measurement of customers' perceptions after consumption".

The most prominent disconfirmation-based model is the SERVQUAL model (Service Quality Model; Parasuraman, Zeithaml and Berry 1988) categorized as the "American" perspective of the conceptualization of service quality measurement. Further, a SERVPERF model version has been extracted from the SERVQUAL model (Cronin & Taylor 1992), assuming only customers' perceptions when evaluating perceived service quality.

Table 1: Measures of Service Quality in Telecommunication Industry

Author(s)	Measurements
(Leisen & Vance 2001)	SERVQUAL dimensions (Reliability, Responsiveness, Assurance, Empathy, and Tangibles)
(Johnson & Sirikit 2002)	SERVQUAL dimensions (Reliability, Responsiveness, Assurance, Empathy, and Tangibles)
(Van der Wal et al., 2002)	SERVQUAL dimensions (Reliability, Responsiveness, Assurance, Empathy, and Tangibles)
(Wang & Po Lo 2002)	Service Quality dimensions (Tangibles, Reliability, Responsiveness, Empathy, Assurance, and Network Quality)
(Ranaweera & Neely 2003)	Service Quality perceptions were captured using performance-based measures SERVPERF, consisting of a total of 12 items.
(Kim 2004)	Service Quality dimensions (Call quality, Pricing structure, Mobile device, Value-added services, Convenience in procedures, and Customer support)
(Hodovic et al., 2017)	Perceived functional quality (SERVPERF: Tangibles, Reliability, Responsiveness, Assurance, and Empathy), Perceived technical quality (Network and Augmented)
(Engizek & Yaşin 2018)	Perceived quality was measured by 6 items from Washburn & Plank (2002)
(Akroush et al., 2019)	SERVQUAL dimensions in the studied countries are: reliability, interaction quality (empathy, assurance, and responsiveness), and tangibles in Jordan; and reliability, assurance-empathy, tangibles, and responsiveness in Yemen.
(Mohammed & Shahin 2020)	Service Quality dimensions (Technical quality, and Functional quality), Trust, and Loyalty.
(Choudhury 2021)	Service Quality (SERVQUAL dimensions: Awareness, Trust, Personalization, Fulfilment, Assurance, and Re-modelling) (SERVPERF dimensions: Trust, Personalization, Fulfilment, Assurance, and Re-modelling)
(Mohamed 2021)	Service Quality dimensions (Tangibles, Reliability, Responsiveness, Empathy, Network Quality)
(Samarakoon et al., 2021)	Service Quality dimensions (Reliability, Tangibility, Empathy, Responsiveness, and Assurance)
(Shahila & ArulPrasad 2021)	Service Quality dimensions (Reliability, Responsiveness, Assurance, Empathy, and Tangibility)
(Tarkang et al., 2021)	Service Quality dimensions (Tangible, Responsiveness, Reliability, Empathy, and Assurance).

In the Armawan (2021) study, it was discovered that both service quality and perceived value played a role in shaping brand loyalty and equity.

Choudhury (2021) found that the various dimensions of SERVQUAL and SERVPERF significantly impacted customer satisfaction. The five dimensions, including awareness, trust, personalization, fulfillment, and assurance, were strongly linked to customer satisfaction. Trust and assurance had a greater impact compared to fulfillment and re-modeling in SERVPERF, while awareness and assurance had a greater impact compared to fulfillment and re-modeling in SERVQUAL.

According to Khawaja et al. (2021), service quality and perceived value influenced customer satisfaction. Lesmana et al. (2021) observed a positive and significant direct effect of service quality on customer satisfaction. They also found that customer satisfaction fully mediated the relationship between service quality and customer loyalty.

In Mohamed's (2021) study, core service quality emerged as the most crucial driver of customer satisfaction. Samarakoon et al. (2021) noted that overall service quality had a positive influence on customer loyalty, with each service quality dimension (reliability, tangibility, empathy, responsiveness, and assurance) significantly impacting customer loyalty in the telecommunications industry in Sri Lanka. Perceived value also demonstrated a significant influence on customer loyalty, with service quality playing a positive role in shaping perceived value.

Additionally, Shahila and ArulPrasad's 2021 study found that tangibility and assurance strongly influenced brand equity among other brand equity variables. Reliability, assurance, and tangibility had a positive impact on brand equity, while responsiveness and empathy had a negative impact.

This leads to following hypothesis (based on SERVPERF):

H1: Tangibles is positively associated with Brand Equity.

H2: Reliability is positively associated with Brand Equity.

H3: Responsiveness is positively associated with Brand Equity.

H4: Assurance is positively associated with Brand Equity.
H5: Empathy is positively associated with Brand Equity.
H6: Network quality is positively associated with Brand Equity.
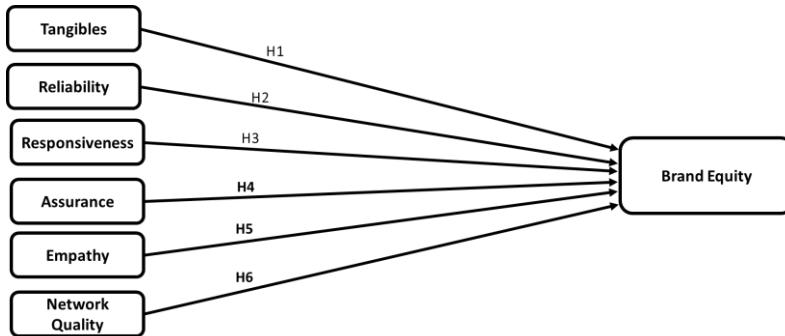
Figure 1: A Conceptual Framework for The Effect of Service Quality Dimensions on Brand Equity

II. RESEARCH OBJECTIVE, METHODOLOGY AND RESULTS

1.1 Research Objectives

The study aims to identify the key service quality dimensions that significantly influence brand equity in Turkish Telecommunication industry.

1.2 Research Methodology and Data Analysis

Data was collected through a field survey of (Turkcell, Vodafone, and Turk Telecom) customers in Istanbul. A sample of 513 mobile phone service users, a total of 395 (77%) valid questionnaires were collected and used for analysis.

Table 2: shows the community demographics.

Group	Frequency	Percentage
Gender		
Male	207	52.4
Female	188	47.6
Age		
Below 30 years old	124	31.3
Between 30 – 40 years old	149	37.6
Above 40 years old	123	31.1
Education		
High school	108	27.3
Bachelor degree	170	43.1
Master degree	92	23.2
Doctoral degree	25	6.4
Mobile Service Provider		
Turkcell	161	40.8
Vodafone	124	31.4
Türk telekom	110	27.8

Before conducting the final survey, a preliminary study was conducted with a sample size of 50, to judge the applicability of instrument items. For this purpose, statements of the SERVQUAL instrument were modified (Parasuramanet al., 1991; Sharma & Ojha 2004; Negi, 2009) to best fit in the context of the Turkish setting, and additional dimensions related to service quality were asked of the respondents by using open-ended question. The study survey consisted of two sections: service quality dimensions, measured using 20 items; brand equity, measured using three items. Respondents are asked to indicate their agreement level of each item of the sections on the five-point Likert scale anchored by "strongly agree (=1)" to "strongly disagree (=5)".

Exploratory Factor Analysis was conducted to define possible relationships of observed variables for service quality dimensions, The results revealed the presence of six distinct dimensions of service quality.

A confirmatory factor analysis (CFA) was conducted to empirically test the measurement model. Multiple tests on construct validity and reliability were performed, resulting in the elimination of items with low loading. Specifically, one item from the Tangibles dimension, one item from the Reliability dimension, and one item from the Assurance and Empathy dimensions were removed. The model fit was evaluated using the maximum likelihood (ML) method.

Reliability and Convergent each of the constructs was assessed for their reliability and validity. Reliability is assessed using Cronbach's alpha, composite reliability (CR) and average variance extracted (AVE), whilst for validity using construct, including convergent and discriminant. Table 3 represents the result of Cronbach's alpha and convergent validity for the final iterative CFA models.

Table 3: Results of Cronbach Alpha and Convergent Validity for Measurement Model

Construct	Item	Final Factor Loading	Average Variance Extracted (AVE)[a]	Composite Reliability (CR)[b]	Internal Reliability Cronbach Alpha
SQ: Tangible (TAN)	TAN1	0.991	0.986	0.993	0.992
	~~TAN2~~	0.452[c]			
	TAN3	0.995			
SQ: Reliability (REL)	REL1	0.982	0.806	0.929	0.928
	REL2	0.970			
	REL3	0.716			
	~~REL4~~	0.157[c]			
SQ: Responsiveness (RES)	RES1	0.629	0.679	0.889	0.885
	RES2	0.610			
	RES3	1.001			
	RES4	0.972			
SQ: Assurance (ASS)	ASS1	0.999	0.794	0.917	0.916
	ASS2	0.994			
	~~ASS3~~	0.205[c]			
	ASS4	0.629			
SQ: Empathy (EMP)	EMP1	0.997	0.983	0.991	0.991
	EMP2	0.986			
	~~EMP3~~	0.239[c]			
SQ: Network Quality (NEQ)	NEQ1	0.901	0.558	0.704	0.705
	NEQ2	0.551			
Brand Equity (BE)	BE1	0.943	0.887	0.959	0.957
	BE2	0.923			
	BE3	0.959			

"[a]: Average Variance Extracted = (summation of the square of the factor loadings)/{(summation of the square of the factor loadings) + (summation of the error variances)}.

[b]: Composite reliability = (square of the summation of the factor loadings)/{(square of the summation of the factor loadings) + (square of the summation of the error variances)}.

[c]: denotes for discarded item due to insufficient factor loading below cut off 0.5."

Table 3 shows that the AVE, which reflects the overall amount of variance in the indicators accounted for by the latent construct, was 0.986, 0.806, 0.679, 0.794, 0.983, and 0.558 for SQ (Tangible, Reliability, Responsiveness, Assurance, and Network Quality respectively), and 0.887 for Brand Equity (BE). All these values were above the cut-off 0.5 as suggested by (Nunnally & Bernstein, 1994).

Content and discriminant validity: The Discriminant validity was examined to assess how truly distinct a construct is from other constructs. In the case of discriminant validity, the correlations between factors in the measurement model do not exceed 0.85 as recommended by Kline (2010), the validity was checked based on

comparisons of the correlations between constructs and square root of the average variance extracted for a construct (Fornell & Larcker, 1981). Table 4.9 represents the discriminant validity of the measurement model.

Table 4: Discriminant validity for Measurement Model

	REL	ASS	NEQ	EMP	RES	TAN	BE
Reliability (REL)	**0.898**						
Assurance (ASS)	0.325	**0.891**					
Network quality (NEQ)	0.079	0.012	**0.747**				
Empathy (EMP)	0.078	0.053	0.056	**0.992**			
Responsiveness (RES)	0.393	0.767	0.037	0.027	**0.824**		
Tangibles (TAN)	0.156	0.296	0.005	0.004	0.403	**0.993**	
Brand Equity (BE)	0.092	0.007	0.654	0.101	0.016	0.045	**0.942**

"Note: Diagonals represent the square root of the average variance extracted while the other entries represent the square correlations."

The inter-correlations between the twelve constructs ranged from 0.004 to 0.767, which were below the threshold 0.85 as recommended by Kline (2005). Further, as shown in Table 4.9, the correlations were less than the square root of the average variance extracted by the indicators demonstrating good discriminant validity between these factors (Kline 2005).

Table 5: GOF Indices of Measurement Model

Fit index	Modified Model	Recommended Values	Acceptable Values	Source
CMIN χ^2/df	3.816	≤ 3.00	≤ 5.00	(Bagozzi & Yi 1988)
GFI	0.978	≥ 0.90	≥ 0.80	(Hoyle 1995, Hair et al. 2006 & Kline 2010)
AGFI	0.962	≥ 0.80	≥ 0.80	(Chau & Hu 2001)
CFI	0.986	≥ 0.90	≥ 0.90	(Bagozzi & Yi 1988; Byrne, 2013)
TLI	0.972	≥ 0.90	≥ 0.90	(Hair et al., 2006; Ho, 2006)
IFI	0.986	≥ 0.90	≥ 0.90	(Hair et al., 2006; Ho, 2006)
RMSEA	0.085	0.05 to 0.08	≤ 0.10	(Schumacker & Lomax, 2010)

1.3 Findings and Interpretation

Structural model: using AMOS 24, the researcher determines the path coefficients. Table 2 shows the Results of structural model.

Table 6: Examining Results of the Hypotheses

Path	Standardised Estimate Beta	P-value	Hypothesis Result
Tangibles → Brand_equity	0.204***	0.000	H1) Supported
Reliability → Brand_equity	0.146***	0.000	H2) Supported
Responsiveness → Brand_equity	0.383***	0.000	H3) Supported
Assurance → Brand_equity	0.049	0.584	H4) Rejected
Empathy → Brand_equity	0.102***	0.000	H5) Supported
Network_quality → Brand_equity	0.495***	0.000	H6) Supported

"*p< 0.05 , **p< 0.01, ***p< 0.001"

The analysis revealed that Network Quality had a significant positive effect on Brand Equity (β=0.495, p<0.000), confirming Hypothesis 6 (Table 6). Similarly, Responsiveness exhibited a positive effect on Brand

Equity (β=0.383, p<0.000), providing support for Hypothesis 3. Additionally, Tangibles displayed a positive effect on Brand Equity (β=0.204, p<0.000), thus supporting Hypothesis 1. Furthermore, Reliability demonstrated a positive effect on Brand Equity (β=0.146, p<0.000), confirming Hypothesis 2. Lastly, Empathy showed a positive effect on Brand Equity (β=0.102, p<0.000), providing support for Hypothesis 5.

III. CONCLUSIONS AND IMPLICATIONS

The study successfully created a dependable and accurate tool to evaluate customer perceptions of service quality in cellular mobile services. This instrument was developed through an extensive literature review, exploratory investigations, and rigorous validation procedures.

The most significant predictors or determinants of Brand Equity among Turkish consumers in the Turkish Telecommunication Industry are as follows: Network Quality, Responsiveness, Tangibles, Reliability and Empathy, in that order. The study stresses the need for telecommunication companies to focus on improving service quality dimensions (network quality, responsiveness, tangibles, reliability and empathy).

The study's findings offer valuable insights for mobile service providers, shedding light on the primary factors that drive brand equity. Examining each dimension individually, customer perceptions of network quality emerged as the most significant predictor of customer-based brand equity. To enhance brand equity, service providers should prioritize delivering satisfactory network coverage, ensuring clear voice quality, and actively working to minimize network congestion.

Furthermore, the dimension of responsiveness emerged as the second crucial factor in predicting customer-based brand equity. It is recommended that contact employees address customer complaints promptly and give sincere attention to their inquiries. This highlights the importance for cellular mobile service providers to empower their contact employees and equip them with the necessary resources to take immediate action on customer queries. To achieve this, companies should ensure that employees have the authority to make important decisions regarding customer needs at their level, thereby ensuring sufficient responsiveness.

For the third important dimension in predicting customer-based brand equity is tangibles which refer to the physical or observable aspects of a service that customers can perceive and evaluate. It involves the tangible elements or cues that customers encounter during their service experience, such as physical facilities, equipment, materials, and the appearance of service personnel. It is recommended to align tangibles with the brand identity to reinforce brand equity.

Additionally, reliability factor also appeared at the third important place in predicting overall customer satisfaction, thus, the service providers need to focus on performing the service right the first time, providing the services at the promised time.

Lastly, empathy factor also plays a role in prediction customer-based brand equity, which refers to the service provider's ability to understand customers' needs, provide individual attention, and demonstrate a genuine concern for their well-being. It involves creating a connection with customers, anticipating their expectations, and delivering a personalized service experience.

IV. LIMITATION AND FUTURE RESEARCH

The study was conducted in Istanbul, a city characterized by high income levels and population density, which may limit the generalizability of the findings to other regions within the country or to other countries. Furthermore, the results specifically pertain to the mobile phone service industry and may not be directly applicable to other service businesses. To address this limitation, future research should explore the impact of service quality dimensions on brand equity across diverse geographic regions, cultures, and industries. Including additional cities in the study can provide a more comprehensive understanding of the relationship between service quality and brand equity.

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V.   APPENDIX. QUESTIONNAIRE, AND VARIABLE ITEMS

Service Quality Dimensions: (He & Li., 2011)

Tangibles:
1.   The physical facilities are visually appealing.
2.   Materials associated with the mobile service are visually appealing.
3.   The employees are well dressed and neat in appearance.

Reliability:
4.   When X promises to do something by a certain time, it does so.
5.   When customers have a problem, X shows a sincere interest in solving it.
6.   X delivers its services at the times it promises to do so
7.   X always performs the service right the first time

Responsiveness:
8.   The employees tell me exactly when services will be performed.
9.   The employees give me a prompt service.
10.   The employees are always willing to help me.
11.   The employees are never too busy to respond to my requests.

Assurance:
12.   The employees instil confidence in customers.
13.   Customers feel safe in transactions with the service provider.
14.   The employees are consistently courteous with customers.
15.   The employees have knowledge to answer customers' questions.

Empathy:
16.   The service provider gives customers individual attention.
17.   The service provider has its customers' best interests at heart.
18.   The employees understand customers' specific needs.

Network quality:
19.   The quality of the specific chosen network is always good.
20.   The call quality of the specific chosen network is always good.

Brand Equity: (He & Li., 2011)

1.   It makes sense to buy X instead of any other brand, even if they are the same.
2.   Even if another brand has same features as X, I would prefer to buy X.
3.   If there is another brand as good as X, I prefer to buy X.