Service Quality Models in the New Millennium: A Revisit & Critical Appraisal

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Abstract

Service quality is the overall impression of relative inferiority/superiority of the organization and its services to the consumers. This paper explores the multi-disciplinary nature of service quality, followed by an appraisal of 34 milestone models relevant to both goods and services. The main objective of this paper is to highlight the development of service quality measurement models proposed in the new millennium in a sequential manner and to carry out a critically examination highlighting limitations thereof. The paper aims to bring out a new standardized yardstick for measuring service quality. The article may appeal to new researchers since it not only appreciates the latest trends in service quality measurement, but also offers valuable help and directions to researchers and practitioners working in the area of service quality improvement.

Keywords: SERVQUAL, FAIRSERV, SERVDIV, E-S-QUAL, EduQual, Service Quality

Introduction

Service quality may be defined as the gap between customer's expectation and perception (Parasuraman *et al.*, 1985). Service quality has been the subject of concentration in academic and business context as organizations have increasingly paid more interest to the quality of services delivered to the customers. Over the past three decades or so, a number of service-specific models of service quality have been presented by the researchers. Upon summarizing the available studies of measurement of service quality since year 2000, it is revealed that mainly two types of tools have been presented. First, which develop some empirical models and second, which carry out empirical analysis and experimentation on the models developed by other researchers. Seth e*t al.* (2005) undertook a comprehensive analysis of key issues concerning 19 such paradigms developed over a period from 1984 to 2006. New breakthroughs have occurred in the understanding and measurement of service quality since then. The present paper attempts to examine 34 more recent popular service quality models applicable in diverse fields in the light of ever changing products and services scenario and appraise whether one standardized model can suffice all purposes.

Service quality as a multi-disciplinary perspective

In IEEE Case workshop held in August 2009, the presentation of IBM Corporation summarized the following multi-disciplinary perspectives of Service Quality:

- **Economics perspective** views Service Quality as a profitable investment made to reap benefits for the whole value chain.
- **Marketing perspective** views it as a win-win situation at every interface leading to satisfaction and loyalty.

- **Operational perspective** guides the managers towards process discipline thus enhancing the system efficiency.
- **Behavioural perspective** suggests the pleasing behaviour on the part of service delivery personnel which positively impacts customer behaviour, WOM (word-of-mouth) and intentions.
- **Servicescape perspective** indicates that a pleasant Service climate of service unit/workplace affects Service Quality.

Further submission in the presentation suggested that service quality in its conceptual context relates to:

i. **Objective/Manufacturing/Conformance based (Technical perspective)** – The product or service must meet some pre-determined standardized technical specifications promised by the provider, with no deviations permitted, as in "zero-defect" policy used in mass production system.
ii. **Subjective/Perception/User's Opinion based (Functional perspective)** – Service Quality is to be decided by the customer based on his/her "moment of truth" during interaction with the organization even if all technical yardsticks are satisfied.

This paper is focussed largely on the user's opinion based perspective of service quality. In pursuance to the ontological position, this paper deals with extant knowledge that exists on concepts and understanding of service science relevant to service and manufacturing organizations. The review findings are summarized in Table 1.

Table 1: Key issues in Service Characteristics and Classification of Services

Service Characteristics			
S. No.	**Author (s)**	**Year**	**Key Issues**
1.	Johne and Storey	1998	Service product differs from a physical product in four service characteristics - intangibility, heterogeneity, inseparability and perishability.
	Boyt and Harvey	1997	
	de Brentani	1991	
2.	Johne and Storey	1998	Service product is a set of predominantly intangible core attributes that affect customer's purchase.
	Martin and Horne	1992	
3.	Johne and Storey	1998	Inseparability refers to the difficulty of separating service product from delivery process and service provider, and production happens simultaneously with the consumption of a service.
4.	Edvardsson *et al*.	2000	A process that creates value for the customer, rather than outcome of that process.
5.	Gallouj and Weinstein	1997	A customer can act as a co-producer in provisioning service. Competences of a customer play a significant role in the production process and affect the quality of a service product.
	de Brentani	1991	
6.	Edvardsson *et al*.	2000	A customer can produce a service without any contact with the service provider.
7.	Gallouj and Weinstein	1997	Competences of customers as well as the characteristics of a service situation and the customer interaction are more difficult to manage. Therefore, services are said to be heterogeneous and difficult to standardize.
8.	Grönroos	1990	Quality of a service can be divided into the quality of the end product (technical quality) and the quality of the service processes (operational quality).

9.	Edvardsson *et al*.	2000	Special attention required to the usability of the production and delivery process in those parts that are visible to the customer.
10.	Jobber	2001	Distinction between service and physical offering in a continuum, where the ratio of tangible and intangible elements varies from a pure service to a pure good.
Classifications of services			
11.	Lovelock	1983	Four types: • tangible goods/services that are directed at people's bodies. • intangible services that are directed towards people's minds. • tangible services directed at goods or other physical possessions. • intangible services directed towards intangible assets.
12.	Lovelock	1983	Classification that combines the nature of service delivery (continuous delivery vs. discrete transactions) and types of relationships (membership relationship vs. no formal relationship). Classification that compares the degree of customization to the extent to which customer contact staff is able to exercise judgment in defining the nature of the service received by an individual customer.
13.	Schmenner	1986	Divides service business into different categories according to their customer interaction, service customization and labour intensity (ratio of labour costs vs. costs of plant and equipment).
Conceptual models for a service product			
14.	Gallouj and Weinstein	1997	Service product can be divided into three groups of characteristics: Final characteristics (Y), Technical characteristics (X), and Individual or team competences (C).
15.	Fahnrich *et al*.	1999	Three models: product model, resource model and process model.
	Bullinger *et al*.	2003	
16.	Edvardsson	1997	The prerequisites of a service are divided into three parts: • The first one is service concept, which defines the primary and secondary needs of a customer that are satisfied and how they are after satisfied. • The second one is a service system, which utilizes all the required needed entities in order to provide a service; • The third part includes the description of a service process. These prerequisites are the outcomes of service development process and act as a prototype of the service.
	Edvardsson *et al*.	2000	
	Corresponds to models of (Fahnrich *et al*.,1999); (Bullinger *et al*.,2003)		
17.	Clark *et al*.	2000	Four dimensions into service model:

	Johnston and Clark	2001	• Service operation, describes how a service is delivered. • Customer's service experience. • Service outcome, i.e. the results and benefits of a service for a customer. • Value of the service for a customer by comparing the benefits against the costs of service.

Reviewing Service Quality Models

In this section, the paper makes an attempt to evaluate 34 recent models of service quality in diverse fields under continuously evolving business environment and identifies the best suited model for measuring service quality. Each model is analyzed through the major observations made by these models and the limitations outlined. This section further evaluates each of the models with regard to various factors.

The following models have been selected from the marketing literature:

SQ 01. Antecedents and mediator model (Dabholkar *et al*., 2000)
SQ 02. Internal service quality (ISQ) model (Frost *et al.,* 2000)
SQ 03. ISQ Data envelope analysis model (Soteriou *et al.,* 2000)
SQ 04. The Hierarchical approach (Brady *et al.,* 2001)
SQ 05. Internet Banking Model (Broderick *et al.,* 2002)
SQ 06. IT-based model (Zhu *et al*., 2002)
SQ 07. Reverse SERVQUAL Model (Behara *et al*., 2002)
SQ 08. E-service quality model (Santos *et al.,* 2003)
SQ 09. Modified Grönroos's model (Kang *et al.,* 2004)
SQ 10. E-S-QUAL Model (Parasuraman *et al*., 2005)
SQ 11. Service Quality Model on Airline Image (Park *et al*., 2005)
SQ 12. Mass Service model (Olorunniwo *et al.,* 2006)
SQ 13. Service Factory model (Olorunniwo *et al*., 2006)
SQ 14. Service quality model for Sports Tourism (David *et al.,* 2006)
SQ 15. Kang's hierarchical structure model (Kang *et al.,* 2006)
SQ 16. Service Quality in Supply Chains (Seth *et al*., 2006)
SQ 17. FAIRSERV model (Carr *et al.,* 2007)
SQ 18. Edu-QUAL model (Mahaputra *et al.,* 2007)
SQ 19. GIQUAL model (Tsoukatos *et al.,* 2007)
SQ 20. A Hierarchical Model for Health Service Quality (Dagger *et al*., 2007)
SQ 21. Chinese Banking Service Quality model (Guo *et al*., 2008)
SQ 22. Socially Responsible Customer SERVQUAL Model (Somyot *et al.,* 2008)
SQ 23. Commitment and Trust based Service Quality model (Ghosh *et al.*, 2009)
SQ 24. Service quality model for Real Estate Brokerage Industry (Kuo *et al.,* 2009)
SQ 25. Sports Service Quality model (Suk *et al.,* 2010)
SQ 26. SERVDIV model (Kelkar *et al.*, 2010)
SQ 27. Gap Model of service quality in Life Insurance Industry (Siddiqui *et al.*, 2010)
SQ 28. Service Quality in Automotive Industry (Prakash, 2011)
SQ 29. Service quality model for Life Insurance Business (Prakash *et al*., 2011)
SQ 30. E-Governance Model (Mukhopadhyay *et al.,* 2012)
SQ 31. Service Quality in Technical Education as hierarchical Model (Jain *et al*., 2013)
SQ 32. Bus Service Quality Model (Das *et al.,* 2014)

SQ 33. System Approach to Service Quality Environment (Gupta *et al.*, 2015)
SQ 34. Service Quality Index value model (Gupta *et al.,* 2017)

The following section 'critical appraisal' aims to develop linkages between the above mentioned models, followed by carrying out their evaluation against select features collected from literature.

Linkages among models and critical appraisal

In the new millennium, akin to the the earlier period, the development of various measures of service quality has been sequential. The select models seem to have learnt from the observations of predecessor models and carried out updations. A number of these models are conceptual, whereas other are empirical and application based.

In year 2000 (Dabholkar *et al*. 2000) (SQ 01) proposed a breakthrough by suggesting that service quality construct should be measured by its antecedents and not its components, as being practiced during early years. (Kumar *et al.,* 2000) (SQ 02) suggested the role of 'intrinsic (internal) service quality' of service provider's organization and attempted to understand its relationship with 'extrinsic (external) service quality'. (Soteriou *et al.,* 2000) (SQ 03) offered Data envelope analysis based model to maximize intrinsic service quality with the resources available to the unit. (Brady *et al.,* 2001) (SQ 04) in their landmark model conceptualized service quality as a multi-dimensional hierarchical construct obtained by superimposing European model upon American model, since neither of two fully explains the construct. (Kang *et al.,* 2004) (SQ 09) also endorsed service quality as the multidimensional construct but validated the classical Nordic (European) school of thought, as they conclude that the image of service provider unit mediates in the user's perception of overall service experience. Since then, the construct service quality has remained mostly hierarchical and has been endorsed by (Dagger *et al*., 2007) (SQ 20). It was again extended in (Suk *et al.,* 2010) (SQ 25) study on Measurement Model of Sport Service.

(Broderick *et al.,* 2002) (SQ 05) included information and communication technology (ICT) as an essential attribute to add value in the service-profit chain resulting in improved customer satisfaction. This model further triggered other IT-based models by (Zhu *et al*., 2002) (SQ 06); (Santos *et al.*,2003) (SQ 08). (Mukhopadhyay *et al.,* 2012) (SQ 30) examined and assessed the adequacy of existing service quality literature and its application to those different types of e-Governance services. (Behara *et al*., 2003) (SQ 07) were the first to apply neural networks to study Reverse SERVQUAL Model.

Structural Equation Modeling (SEM) was applied to develop a valid and reliable E-S-QUAL model first by (Parasuraman *et al*., 2005) (SQ 10). The same methodology was replicated by Park *et al*., (2005) (SQ 11) to develop a model for airline service quality. (Olorunniwo *et al.,* 2006) (SQ 12) used SEM and concluded satisfaction fully mediates the impacts of service quality on behavioral intension while studying mass services, and later in they extended the model in a Service Factory of (Olorunniwo *et al*., 2006) (SQ 13). Following the similar methodology, Service Quality model for Sports Tourism and healthcare were developed by (David *et al.*,2006) (SQ 14); (Dagger *et al*.,2007) (SQ 20). While these models only depicted the second-order factor structure, (Kang *et al.*,2006) (SQ 15) introduced a new latent variable construct viz. 'service quality perception' to directly influence both conformance and user based quality.

(Mahapatra *et al.,* 2007) (SQ 18) evaluated service quality in Technical Education system (TES) for studying improvement in customer satisfaction. (Jain *et al*., 2013) (SQ 31) evaluated service quality in Technical education and presented a reliable and valid hierarchical structural model. (Tsoukatos *et al.*,2007) (SQ 19) conducted a landmark study in Greek insurance sector by taking cues from the revised SERVQUAL scale and developing a structural model. Service Quality in life insurance is studied only in two other models by Siddiqui and Sharma (2010) (SQ 27); (Prakash *et al*., 2011) (SQ 29). Whereas (Siddiqui *et al.,* 2010) checked only ensured face validity of the responses collected, (Prakash *et al*., 2011) (SQ 29) adequately checked the model for all types of validity.

(Guo *et al*., 2008) (SQ 21) developed a nested model for Chinese corporate banking comprising two main attributes- functional quality and technical quality and four sub-attributes- reliability, human capital, technology and

communication. Ghosh *et al,* (2009) (SQ 23) measured customer's perception of service quality dimensions in Indian banking and extended the consequences to study commitment, and trust. (Kuo *et al.,* 2009) (SQ 24) studied Service Quality model for Real Estate Brokerage sector and measured the impact of soft/hard service practices, on relationship quality and behavior intension. (Somyot *et al.,*2008) (SQ 22) used both qualitative and quantitative techniques to develop a scale measuring the "social responsibility dimension" in the evaluation of service quality. (Kelkar *et al.,* 2010) (SQ 26) developed a new scale labeled SERVDIV by picking a code of conduct called "*Atithi Devo Bhavah* (Customer is God)" from an ancient Indian scripture, 'Atharva Veda'. (Pandit *et al.,*2014) (SQ 27) developed a method to determine the transit service delivery levels using the concept of users' and potential users' minimum acceptable service and desired service level. It is suggested, based on the availability of resources, service providers need to prioritize certain service areas for immediate improvement.

The applicability of service quality studies in manufacturing sector started with pioneering work by (Seth *et al*., 2006) (SQ 16) which provided a practical framework for service quality improvements to advantage across the supply chain as a sustained growth differentiation strategy. (Prakash, 2011) (SQ 28) synthesized various models to study the impact of service quality attributes on loyalty and competitive advantage in the large scale Indian automotive units. (Gupta *et al.,* 2017) (SQ 33) (SQ 34) developed a system approach by identifying five drivers of a two-wheeler manufacturer supply chain namely- supplier, organization, distributor, retailer and customer using diagraph approach. They further measured overall supply chain index value using ANN approach.

It comes out from the review that:

i. There is neither a universally-accepted definition of service quality construct, and nor there is any generally accepted standardized yardstick to measure its value.

ii. However, most of the above models evaluate service quality either by comparing the customer's expectations with their respective perceptions or by service experience (perceptions) only. The summary evaluations of these models in respect of their findings and weaknesses are presented in the following table 2:

Table 2: Summary evaluations of service quality models.

Model No.	Key Findings	Limitations
SQ 01 (Dabholkar *et al*., 2000) Antecedents and mediator model	• Besides making an evaluation of determinants of service quality, consumers do make an overall evaluation of the service quality, which may not be simply the sum of individual factors. • The model attempts at providing a thorough qualitative understanding of service perceptions and their formations. • Customer satisfaction was recognized as a construct different from the service quality and the model confirms its mediation role to predict customer's behaviour intention.	• Antecedents of customer satisfaction are not investigated. • The model indicates behavioral intentions and not the actual behavior. • A generalized standard scale is not provided, thus the model cannot be emulated in different service situations.
SQ 02 (Frost *et al.,* 2000) Internal service quality (ISQ) model	• The model postulated the role played by perceptions and expectations of intrinsic customers. • The intrinsic service provider & intrinsic service customer play a major role in recognizing the level of service quality perceived.	• It needs to be generalized for all kinds of intrinsic environments. • The effect of variations in extrinsic environment is not taken into account.
SQ 03	• This model indicates the input resources like	• The model does not bring out

(Soteriou *et al.*, 2000) ISQ Data envelope analysis model	personnel, space, time, etc. • The above resources should be more efficiently utilized to produce higher service quality level perceived by the internal employees of the branch.	attributes of service quality, and only guides how available resources can be utilized for improved ISQ experiences. • Traditional measures are not incorporated in the model.
SQ 04 **(Brady *et al.*, 2001)** The Hierarchical approach	• The model attempts to combine the two classical schools of thought - the European and the American and conclude that neither fully captures the construct. • Service quality is a multidimensional hierarchical construct having three prime attributes- output, quality of interaction and environment.	• No empirical evidence has been provided for this hierarchical structure. • It does not propose an instrument to evaluate service quality.
SQ 05 **(Broderick *et al.*, 2002)** Internet Banking Model	• The model brings out two implications for managing service quality- first, within the service interface and second with the management for increased customer role. • The model suggested that degree of customer participation has the greatest influence on the quality of service experience and highlighted that customer's "zone of tolerance" has a significant impact on perceived service quality.	• Not much of the empirical work is carried out. • The model is based on the basis of user's perceptions of one website only and needs more elaboration.
SQ 06 **(Zhu *et al.*, 2002)** IT-based model	• Service quality has a direct influence on three SERVQUAL determinants namely reliability, responsiveness & assurance. • IT tools can aid service providers to enhance higher levels of client/user satisfaction.	• Less number of determinants were selected to measure the feeling of satisfaction and comfort. • It does not propose an instrument to evaluate IT-based service quality.
SQ 07 **(Behara *et al.*, 2002)** Reverse SERV-QUAL Model	• Different definitions of service quality measurement are modeled using the neural network approach. • It gives a Reverse SERVQUAL model for possible neural networks.	• Due to noisy data, the research had limited success with sensitivity analysis.
SQ 08 **(Santos *et al.*, 2003)** E-service quality model	• It offers a better understanding of e-service quality for achieving customer satisfaction leading to customer retention followed by profitability. • This model can be useful to organizations using e-commerce.	• It involves exploratory study. The model does not provide specific measurement scales. • No statistical analysis is carried out.
SQ 09 **(Kang *et al.*, 2004)** Modified Grönroos's model	• Technical, and functional service features in conjunction with image of service provider organization may fully capture the construct of overall service quality. • Both the Grönroos's model (1984) and PZB SERVQUAL (1988) models are tested and empirically validated. • The model assumes that customers are enough	• Places too much emphasis on technical quality • The model overlooks the dominance of functional quality as compared to technical quality in certain situations.

	competent to assess technical quality.	
SQ 10 (Parasuraman *et al.*, 2005) E-S-QUAL Model	• The model develops a multiple-item scale (E-S-QUAL) to measure the service quality offered by two chosen websites amazon.com and Walmart.com enjoying high frequency of visits. • The basic scale comprises four attributes and 22 item, whereas E-RecS-QUAL scale (involving recovery) has three attributes and 11-item scale.	• Robust and sturdy websites were chosen for survey which had low incidents of problem encounters. • Valid for goods only and pure-services are out of scheme of this model.
SQ 11 (Park *et al.*, 2005) Model on Airline Image	• The model confirms that service quality must be enhanced to make passengers' experience a delight. • Two most significant determinants were churned out namely, "in-flight service" "convenience and accessibility". • The above dimensions have a significant effect on airline image, which in turn has a significant effect on passengers' behavioral intention.	• The determinants of reliability and customer service were not tested for validity. • Only economy class- domestic passengers were included in survey.
SQ 12 (Olorunniwo *et al.*, 2006) Mass service quality model	• The service managers must develop operational strategies that focus on various aspects of service quality. • Customer satisfaction fully mediates the impact of service quality on behavioral intention.	• The study is conducted for mass services only. • The work uses only one organization for data collection.
SQ 13 (Olorunniwo *et al.*, 2006) Service Factory Model	• Although the direct effect of service quality on behavioral intention is significant, the indirect effect is a stronger driver for behavioral intentions mediated through satisfaction.	• The study uses only one industry (hotel industry). • It partly attempts to validate classification scheme of Schmenner (1986, 2004).
SQ 14 (David *et al.*, 2006) Service quality model for Sports Tourism	• The study confirms service quality as a multi-dimensional construct which significantly impacts users' perceptions of satisfaction as well as return to a sporting event at a particular location. • One interesting conclusion coming from study is that users are not overly concerned about the "Value" they get while attending the event.	• It uses survey research, hence, some and some respondents may provide only socially acceptable answers. • The study is limited in scope as only sports tourists with four basic dimensions are covered under its purview.
SQ 15 (Kang *et al.*, 2006) Kang's hierarchical structure of service quality	• The model endorses PZB (1988) American school of thought and validates dimensions of functional (subjective) quality. • This model gives empirical evidence for its hypotheses regarding technical quality and functional quality components.	• The proposed hierarchical structure is not empirically validated. • It does not propose an instrument to evaluate service quality.
SQ 16 (Seth *et al.*, 2006) Service Quality in	• This research offers managers with a practical framework for service quality improvements that measures service quality. • The work suggests the ways to achieve customer	• Environmental factors are not considered in study. • The items linking to organization's strategy are not

Supply Chains	satisfactions and focuses on sustained growth differentiation strategy for supply chain.	included in this framework.
SQ 17 (Carr *et al.*, 2007) FAIRSERV model	• The model accepts PZB (1988) service quality model using perceptions-only scale though it uses equity (fairness) in addition as a significant determinant. • The service seekers (customers) are essentially concerned if they get what they are getting the desired value, and in contrast to other customers availing the same service.	• The study was limited to intrinsic service quality only. • Generalizations are not possible since items on extrinsic service quality were not included in survey.
SQ 18 (Mahapatra *et al.*, 2007) Edu-QUAL model of Service Quality	• Since the requirements of various stakeholders from education system were found to be different, "a common minimum quality items suitable to all stakeholders" were identified to develop a scale and improve customer satisfaction. • This led to the development of Edu-QUAL for using neural networks for evaluating service quality for each stakeholder.	• Upon sensitivity analysis, the model was not found to be enough robust.
SQ 19 (Rand *et al.*, 2007) GIQUAL model of service quality	• The purpose is to investigate the path service quality leads to customer satisfaction, which further leads to loyalty. • The work held did not confirm 5-dimensions of PZB (1988) scale. • Both Non-tangibles and tangibles determinants were modelled. "Tangibles" don't affect customer while "Word of Mouth" is an antecedent of repurchasing intention, with satisfaction not directly impacting the latter.	• Only one single service industry was surveyed. • The researchers had no control over sampling method used.
SQ 20 (Dagger *et al.*, 2007) A Hierarchical Model of Health Service Quality	• This research designed and fully validated a multidimensional hierarchical service quality scale suitable for health services. • Satisfaction and favorable behavioral intentions were included as outcome variables in the study. • The conclusions support the hypothesis that that service quality mediates the relationship between SQ dimensions and intention.	• The cross-sectional design of the study may pose a problem and limits generalization. • The study doesn't provide a dynamic model of service evaluation.
SQ 21 (Guo *et al.*, 2008) Chinese Banking Service Quality Model	• The work brings out two second-order variables (i.e. functional quality and technical quality) and four lower-order items (i.e. reliability, human capital, technology and communication) through EFA.	• The results of this research are not generalizable in other contexts.
SQ 22 (Somyot *et al.*, 2008) Socially Responsible Customer	• The study explores "social responsibility" determinant for measuring the service quality using second order CFA. • The study differentiated highly socially responsible customers from those less socially responsible ones.	• It was not convenient to identify the respondents. • Aspects like, "service personnel appearance" and "store accessibility" are difficult to recall, post experience.

SERVQUAL Model		
SQ 23 Ghosh *et al.*, 2009) Commitment and Trust based Service Quality model	• The major contribution of the study was the identification and measurement of customer's perception of service quality dimensions and their relative importance for increasing loyalty, commitment, and trust. • They organization pay attention to these variables to strengthen competitiveness in an extremely competitive market.	• Other variables like pricing, technology, logistics etc. should have been considered in study. • A relatively sample size was used. • Findings are not generalizable.
SQ 24 Kuo *et al.*, 2009) Model for Real Estate Brokerage Industry	• The findings show that the soft (non-core service) service attributes have a significant influence on hard (core service) service attributes. • The results have positive relationship between service attributes and relationship quality. Perceived performance Excellence (PPE) mediates between soft service quality and relationship quality. On the other hand, customer perceived providers' performance will enhance customer' satisfaction and trust. • Relationship quality has a significant influence on behavioral intention. That means customers' satisfaction and trust established will improve positive word- of-mouth and repeated patronage.	• The study is performed in a single small sector. • This study adopted the classified service attributes by Auh (2005) and proposed a conceptual model to explore the direct and indirect effect between the customer perceived service attributes and behavioral intention.
SQ 25 Suk *et al.*, 2010) Measurement model of Sports Service Quality	• The study developed a model in contrast to an earlier existing model and checked if satisfaction and attitude act as mediating variables.	• The data were collected from four fantasy sports websites, and hence the findings of this paper may not be generalizable to other context. • The study used convenience sampling technique.
SQ 26 Kelkar *et al.*, 2010) SERVDIV model	• Kelkar (2010) developed a new scale labeled SERVDIV by taking cues from ancient Indian scripture Atharva Veda guideline, "Guest is divine (Customer is the king)" • The three attributes suggested to "serve (worship) the divine guest (customer) are through the paths of knowledge, action and submission".	• It model states a hypothetical proposition. • No statistical analysis is carried out.
SQ 27 Siddiqui *et al.*, 2010) Gap Model of service quality in Life Insurance Industry	• The study highlights inefficient and non-productive use of resources in Indian Insurance sector. • The PZB (1988) gap model is checked for reliability but is not found to be a valid instrument for assessing perceived service quality in the select sector.	• This study does not involve the causal relationship between service quality, customer satisfaction, loyalty and retention.
SQ 28 (Prakash *et al.*, 2011)	• The model is developed using ANN approach and has been adequately validated for all stakeholders in the service network.	• This convenience sampling and anonymous survey- based research pose limitations to

Service quality model for Life Insurance Business	• The study reveals that best–fit model does not contain the construct of patronage intention, which means. This conclusion challenges the traditional viewpoints prevailing in this sector.	results of this model. • Single service industry has been surveyed for conducting the study.
SQ 29 (Prakash , 2011) Service Quality in Automotive Industry	• The models endorses the conclusions drawn by Seth *et al*. (2006) in the supply chains of three select large scale automobile organizations. • It models both intrinsic and extrinsic service quality at different dyads of supply chain and develops linkages between the two. • The study proposes complete structural model with loyalty, competitive advantage and unit's performance used as outcome variables.	• Only three automotive units under study and snowball sampling method diminish generalizability of the findings. • The research doen't consider technical quality attributes into consideration.
SQ 30 (Mukhopadhyay *et al.*, 2012) E-Governance Model	• Assessed whether there is a need to classify e-Governance services and developed separate approaches to service quality assessment. • Examined and assessed the adequacy of existing service quality literature and its application to those different types of e-Governance services.	• This research relies on extensive field studies, observations, surveys and interviews for data gathering. Some of the findings are thus snapshots of situations that continue to evolve. • The study is confined to a single state, and thus may not represent all the implementation across the nation.
SQ 31 (Jain *et al*., 2013) Service Quality in Technical Education	• The study evaluates service quality at an overall level, a dimensional level, and at a sub-dimensional level. The proposed hierarchical structure of the service quality model fills the gaps that exist in the conceptualization of service quality in technical education. • The scale developed can be used by management as a benchmark for differentiating service delivery.	• The use of judgmental sampling technique is a limitation of the study • The generalization of the model in a global scenario is not possible.
SQ 32 (Das *et al.*, 2014) Bus Service Quality Model	• In this research, a method has been developed to determine the transit service delivery levels using the concept of users' and potential users' minimum acceptable service and desired service level. • It is suggested, based on the availability of resources, service providers need to prioritize certain service areas for immediate improvement.	• The scale developed in this research is based on users' perceived service levels which may differ from the actual service levels. • Ordered categorical scales limited the use of 'median' only to aggregate the results.
SQ 33 (Gupta *et al*., 2015) System Approach to Service Quality Model	• The study considered five drivers of a two-wheeler manufacturer supply chain namely, supplier, organization, distributor, retailer and customer. A model was developed which depicts the relations between all these drivers using GTA.	• This study used survey method and is restricted to North India, whereas the application of this methodology in other regions may change the result predicted by this study.
SQ 34	• The study extended the earlier model by relating	• Structural model is not

(Gupta *et al.*, 2017) Service Quality Index Value Model	service quality of five drivers with customer satisfaction and customer loyalty using ANN. • The customer satisfaction and customer loyalty were 48.75 % and 29.68% which was found to be significant.	prepared.

Discussion & Findings

It comes out from the above review that service quality models have been developed with respect to situation/sector under consideration with desirable modifications incorporated as learning from previous studies/or remodeling and finally testing the findings.

We find that the methodology adopted in these models in the last 17 years have been, the Structural Equation Modelling, ANN, AHP, Multiple Regression, ANOVA, GTA with SEM being most widely applied. Most of the studies have included the dimensionality of service quality besides the multidimensional hierarchical structure of service quality. The salient learning points are summarized as follows:

i. Most of the authors have admitted service quality as a hierarchical construct comprising various sub-dimensions. Future research could extend scholarly understanding of service quality by undertaking empirical studies of hierarchical multidimensional conceptions of service quality in different settings.

ii. However, the number and nature of the dimensions varied, depending on the service context; indeed, they varied even within the same service industry. Scholars should therefore describe the empirical context in which a particular factor was developed and the context in which it can be applied. Future studies should replicate these measure in different context to ascertain whether the number and nature of dimensions are applicable in other settings.

iii. Very few studies have attempted applicability of model posited by them suitability for a variety of other services or to serve as the generic model/benchmark for different service contexts.

iv. The business environment has changed dramatically over the 17 years, leading to the need for greater adaptability and flexibility found with very few studies only through arguments where they have not used and applied simulation.

v. All studies on service quality have provided the direction for improvements that imply the core of the service quality modeling focus on an argument based service improvement priorities that are most important.

vi. Many researchers have attempted to establish linkages of service quality with satisfaction and customer loyalty leading to trust and commitment. Some studies have attempted to formulate its relation to the overall performance/competitive advantage of firm/service-provider unit.

vii. The use of IT and e-commerce has become predominant, as indicated by many researches.

viii. Consideration of internal service quality issues has been continuously increasing.

ix. Artificial intelligence approach using neural networks have been tried in service quality. They can be used to model complex relationships between inputs and outputs or to find patterns in data.

x. Multiple stakeholders in supply chains have different background and varied behavioral patterns. The service quality items may be likely to differ among stakeholders, but the attempt can be made to bring out a

standardized construct, (with items capturing it) that fulfills the requirement of all the stakeholders of supply/value chain.

xi. Though most of the service quality studies have reported factors using Exploratory factor Analysis followed by Confirmatory Factors Analysis a few have attempted to apply SEM in totality for empirical validation of the developed multiple-item scale.

xii. Most of the service quality models can be used as a criteria for benchmarking provided the quantitative measures are agreed and applied. However, none of the studies have used Monte Carlo simulation to identify key drivers.

Based on critical appraisal made in previous section, following issues/ aspects seem befitting to carry out a relative comparative evaluation of the service quality models (Prakash *et al*., 2011; Seth *et al*., 2005):

A. Hierarchal structure comprising first and second-order determinants
B. Identification of attributes to capture service quality
C. Applicability for different services/goods produced by the service provider unit/firm
D. Flexibility as per change in customer's perceptions/expectations
E. Directions for enhancing service quality
F. Establishing linkage with customer satisfaction/loyalty
G. Indicates the need for imparting training/skills to service delivery personnel
H. Flexibility to accommodate modification as per the changes in conditions
I. Focus upon both upstream and downstream partners
J. Identifies the need for better resource utilization or development of infrastructure
K. Usage of ICT in services
L. Use of Artificial Neural Networks (ANN)
M. Collects multiple expectations from customers
N. Ability to serve as a criteria for benchmarking
O. Reporting of the Exploratory Factor Analysis
P. Sound theoretical background
Q. Development of measurement model
R. Suitable selection of scale
S. Presentation of the structural model
T. Depiction of model modification process
U. Showing path coefficient in the best structural model
V. Use of the second-order structure model
W. Use of Monte Carlo simulation to identify key drivers
X. Applicability to manufacturing sector
Y. Utility in managing operations across the Supply Chain
Z. Validity for SMEs

Table 3: Presents an attempt to compare and contrast the models against above-mentioned parameters A-Z.

Table 3: Comparison of service quality models against select parameters

Time- line	2000	2000	2000	2001	2002	2002	2002	2003	2004	2005	2005	2006	2006	2006	2006	2006	2007	2007	2007	2007	2008	2008	2009	2009	2010	2010	2010	2011	2011	2012	2013	2014	2015	2017
Issue #	SQ01	SQ02	SQ03	SQ04	SQ05	SQ06	SQ07	SQ08	SQ09	SQ10	SQ11	SQ12	SQ13	SQ14	SQ15	SQ16	SQ17	SQ18	SQ19	SQ20	SQ21	SQ22	SQ23	SQ24	SQ25	SQ26	SQ27	SQ28	SQ29	SQ30	SQ31	SQ32	SQ33	SQ34
A	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*		*	*	*		*	*
B	*	*	*	*			*		*	*	*	*	*		*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
C	*			*					*			*			*	*	*						*			*		*		*	*		*	*
D		*		*		*			*			*			*	*	*						*			*		*		*	*			
E	*	*	*	*	*	*	*	*	*	*	*	*	*		*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
F	*					*			*		*	*	*			*	*			*			*		*	*			*	*	*		*	*
G	*			*				*	*						*		*	*					*		*	*	*	*	*	*	*		*	*
H	*	*		*				*	*								*	*	*	*	*		*		*				*			*	*	*
I		*						*									*	*	*	*	*				*	*			*	*			*	*
J			*	*			*	*	*						*		*	*			*		*		*	*			*	*	*	*	*	*
K			*	*	*	*	*	*		*		*		*	*	*	*	*	*				*						*	*	*		*	*
L								*										*								*			*	*				*

Table 3: Evaluation of service quality models…Contd.

M				*					*						*		*	*					*			*			*	*	*			
N	*	*	*	*	*	*	*		*	*	*	*	*		*	*	*	*	*			*	*		*	*		*	*	*	*	*	*	*	*
O	*	*	*	*	*	*			*	*		*	*		*	*	*				*	*	*	*	*	*	*	*	*	*	*		*	*
P	*		*						*	*		*	*	*		*	*					*	*	*	*	*		*	*	*	*			
Q	*		*	*						*		*	*	*		*	*						*		*			*	*	*	*			
R	*		*	*						*		*	*				*						*		*	*		*	*	*	*	*	*	*
S	*		*							*		*	*	*		*	*						*		*	*			*	*	*		*	*
T	*		*						*	*		*	*	*	*	*	*						*			*		*	*	*	*	*			
U	*		*	*							*	*	*	*			*					*	*	*		*			*	*	*		*	*

V	*		*					*	*	*	*	*		*	*	*****			*			*****			*****			*	*****	*****		*****	*****
W																																
X														*		*****						*****					*****		*****				
Y								*								*****						*****			*****		*****		*****				
Z								*						*		*****						*****					*****						

Conclusions

This paper makes an effort to provide a bird's eye view of the 34 significant models of service quality developed since year 2000. After reviewing these models, it may be noticed that

i. Despite the changes already incorporated, there is still a need to make further modifications in the service delivery processes along the whole supply/value chain, more in the developing countries.
ii. There has been considerable noticeable changes in the expectations of the users/clients over the period of evolution of these models and development of service quality concept.
iii. The above measures were designed and developed in a particular culture and field under consideration and generalizations form part of their 'future scope'.
iv. No reliable universal yardstick has yet been established for the objective measurement of service quality.

In a nutshell, it is acknowledged that service quality is a multidimensional and hierarchical construct characterized by multiple stakeholders in the supply/service-profit chain.

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