

Service Quality in Supply Chain: A Review

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ABSTRACT

Economic development of a country generally depends upon the growth amongst its agriculture, manufacture and service sectors. Part of service sector increasing day by day therefore quality of service is very important to maintain the economic growth of a nation. It is very easy to calculate the loss due to poor sale but it is very difficult to calculate the loss due to poor service quality. Good service always built up the confidence of the customer in the firm. In This paper the author has discussed the concept of service quality in supply chain and has given a core review. A three level development of service quality in supply chain has been explored and a relationship has been established between service quality, supply chain and service quality in supply chain.

Keywords: *service quality (SQ), service quality in supply chain (SQS)*

1. INTRODUCTION

There is consensus in the marketing literature that better service quality is a critical success factor in this era of intense competition. Service quality's conceptual and empirical link to customer satisfaction has turned it into a core marketing instrument (Venetis and Ghauri, 2004). Curiosity over the measurement of service quality is therefore high and researchers have devoted a great deal of attention to service quality research (Abdullah, 2006). Relationship of service quality with improved supply chain performance is widely accepted (Mentzer et al., 1999, 2001; Perry and Sohal, 1999) because satisfaction of each member of the supply chain can be increased only by putting aside the traditional arms-length relationship and by developing closer partnership type arrangements (Christopher, 2004). In the development of such partnership type arrangements, service quality is an important tool. Regardless of this universal recognition for realizing the importance of service quality in supply chains, it is little researched (Nix, 2001). Several authors (e.g. Sinha and Babu, 1998; Perry and Sohal, 1999; Seth et al. 2006) have attempted to expand the hypothetical sphere of service quality in a supply chain context. However, there have been very few studies (Beinstock et al.1997; Mentzer et al. 1999; Rafele, 2004) on the development of service quality measurement scales in supply chains. The rationale of this paper is to continue this extension of service quality scale development studies into the industrial supply chains context as this research develops a service quality measurement scale for the distributors-retailers interface of industrial supply chains. Industrial supply chains do not appear in previous supply chains specific service quality measurement scale development studies. In this paper, first the literature review is presented focusing on dimensions of service quality. From the literature review, research objectives are stated. The methodology and context are then discussed. Data analysis is

followed by conclusions, including limitations and directions for future research.

2. LITERATURE REVIEW

Whilst there has been considerable progress as to how service quality should be measured, there is little advancement as to what should be measured? Researchers generally have adopted one of two perspectives. These perspectives are the "Nordic perspective" and the "American perspective" (Brady and Cronin, 2001). The "Nordic perspective" was proposed by Gronroos (1984) and the "American perspective" was proposed by Parasuraman *et al.* (1985, 1988). In the "Nordic perspective", Gronroos (1984) identified 2 dimensions of service quality (technical quality and functional quality). He defined technical quality as "what the consumer receives as a result of interactions with a service firm" and identified employees technical ability, employees knowledge, technical solutions, computerized systems and machine quality as its 5 attributes. Gronroos (1984) defined functional quality as "the way in which the technical quality is transferred" and identified behavior, attitude, accessibility, appearance, customer contact, internal relationships, service-mindedness as its 7 attributes. He concluded that the technical and functional quality of service built up the corporate "image" of the company. The "Nordic perspective" of service quality was the first to be published in scholastic literature. However, the first seriously dedicated program of research to answer the questions "what's the best way to define service quality?" and "what's the best way to measure it?" was launched by Parasuraman *et al.* (1985,1988) (Schneider and White , 2004). This program developed the "American perspective" of service quality. Parasuraman *et al.*(1985) built up a 34-item service quality scale comprising 10 dimensions (reliability, responsiveness, competence, access, courtesy, communication, credibility, security,

understanding/knowing the customer and tangibles). Subsequent work by Parasuraman *et al.* (1988) resulted in the service quality measurement scale with 22-items on 5 dimensions. The dimensions reliability, responsiveness and tangibles were retained as identified in 1985 whereas communication, competence, credibility, courtesy and security merged as a new dimension “assurance”. Access and understanding / knowing the customer merged to form the dimension “empathy”. Parasuraman *et al.* (1988) codified this scale as SERVQUAL and defined its 5 dimensions as:

Tangibility: Appearance of physical facilities, equipment and communication material.

Reliability: Ability to perform the promised service dependably and accurately.

Responsiveness: Willingness to help customers and provide prompt service.

Assurance: Knowledge and courtesy of the employees and their ability to convey trust and confidence.

Empathy: The caring and individualized attention, organization provides to its customers.

While there is no global consensus that either the “Nordic perspective” or the “American perspective” is the more appropriate approach, the “American perspective” dominates the literature (Schneider and White, 2004) because the development of the “American perspective” generated a “cottage industry” of replicative studies in various conditions, sectors and countries. Parasuraman *et al.* (1988) claimed that the 5 dimensions and 22 items proposed in their “American perspective” are generic in nature and applicable to all service organizations. However, the service quality measurement scale developed by Parasuraman *et al.* (1988) has been the subject of criticism since its development (Johnston, 1995). Buttle (1996) provides a detailed critique of the issues surrounding the 5 dimensions of the Parasuraman *et al.* (1988) service quality scale, mainly on the basis of number of dimensions and contextual stability. Carman (1990) was first researcher who found that the 5 dimensions of service quality measurement scale proposed by Parasuraman *et al.* (1988) are not so generic that users should not add new dimensions they believe are important. He found that if a dimension is extremely significant to customers it is possible to be decomposed into a number of sub-dimensions and vice versa. Babakus and Boller (1992) also empirically assessed the scale proposed by Parasuraman *et al.* (1988) and suggested that the number of service quality dimensions is dependent on the service being offered. Mukherjee and Nath (2005) stressed that performance of a service organization on all the dimensions of service quality may not always move in the same direction. Seth *et al.* (2006) concluded that there seems to be no agreement on the measurement side (attributes) of service quality because different researchers propose different attributes for different applications. Chowdhary and Prakash (2007) also report variations from unidimensionality to two, three, four, six and

even eight factor structures in the previous service quality studies. Next is the issue of contextual stability. Cronin and Taylor (1992) suggest flexibility in the Parasuraman *et al.* (1988) service quality measurement scale items and argue that high involvement services such as healthcare or financial services have different service quality items than low involvement services such as fast food or dry cleaning. Researchers must also therefore consider the individual items of service quality for each service industry. Brady and Cronin (2001) also suggest that from a theoretical perspective, even if the 5 service quality dimensions proposed by Parasuraman *et al.* (1988) are generic, something specific must be reliable, responsive, empathetic, assured and tangible. To identify this “something” for each context is critical.

Moreover, this scale was developed in Western culture so its contextual stability across diverse cultures is also an issue (Parikh, 2006). Based on Hofstede’s dimensions of culture, Donthu and Yoo (1998) studied the effect of culture on consumer service quality expectations and concluded that as a consequence of cultural orientation, consumers differ in their overall expectations with regard to service quality dimensions. On the basis of this literature review, it may therefore be concluded that despite the fact that the “American perspective” dominates the service quality literature and many service quality studies are based on the service quality measurement scale proposed by Parasuraman *et al.* (1988), there is actually no generic scale for measurement of service quality. There is no universal set of dimensions and items that determine the service quality across a section of service industries in different cultures, so service quality measurement must be adapted to fit the context. Therefore there is a need for the development of context specific service quality measurement scales. Such context specific service quality measurement scales may help managers to gauge, manage and improve service quality in particular sectors with more simplicity and effectiveness. In today’s global marketplace, individual firms no longer compete as independent entities but compete as an integral part of supply chain links (Seth *et al.* 2006). Christopher (1992) also argued that a key aspect of business is that supply chains compete, not companies. According to Waters (2003), organizations do not work in isolation; they act as a customer when buy materials from their own suppliers and act as a supplier when they deliver materials to their own customers. A wholesaler for example acts as a customer when buying goods from manufacturers, and then acts as a supplier when selling goods to retailers. It is important to satisfy each member of the supply chain. There is a change in the landscape of supply chain management in recent years and satisfaction of each member of the supply chain can be increased only by putting aside the traditional arms-length relationship and by developing closer partnership type arrangements (Christopher, 2004). In the development of such partnership type arrangements, service quality is an important tool because the relationship of service quality with improved supply chain performance is widely accepted (Mentzer *et al.*, 1999, 2001; Perry and Sohal, 1999). Regardless of this universal recognition for realizing the importance of service quality in supply chains, it is little researched (Nix, 2001). Most of the previous service quality research has been aimed at the

end-use customer (Faulds and Mangold, 1995; Perry and Sohal, 1999). There have been very few studies on the development of service quality measurement scales in supply chains (Beinstock *et al.* 1997; Mentzer *et al.* 1999, Rafele, 2004). These few studies are also confined to specific sectors and are based in developed countries. Generalization of findings of these studies in the global economy is not possible without further empirical research (Rafele, 2004). To reduce this research gap, this study is focused on service quality scale development at the distributors-retailers interface of the industrial supply chains in India. The distributors-retailers interface is chosen as it has many no contractual dimensions in contrast to the manufacturers-distributors interface of supply chains which is frequently characterized by contractual agreements (Mangold and Faulds, 1993). India (a developing country) is selected for this study because little work has been done to examine the applicability of service quality measurement scales to the service industries in developing countries (Jain and Gupta, 2004). The authors could find no studies on the development of supply chain specific service quality measurement scale studies in any of the developing countries. The aim of this research is to develop a scale for the measurement of service quality in the distributors-retailers interface of industrial supply chains using India as the context. This research will contribute to reduce the current lack of supply chain specific service quality scale development research into developing countries and into a new sector (distributors-retailers interface of industrial supply chains). The scale developed as an outcome of this research will assist managers in industrial distribution companies in India to gauge, manage and improve service quality.

The entire literature can be divided into three parts.

First, the models based on service quality are discussed. Total 23 models discussed from 1984 to 2011. Mostly models are based on the gap analysis model given by PZB in 1985 & modified in 1988 and considered as the milestone in service quality. The more details of all above said service models are given in table -1.

Second, the models based on supply chain management are discussed. These models show the relationship between various elements of supply chain and how latest technologies like IT used to communicate faster. More details of the supply chain models are given in table-2.

Third, the models based on service quality in supply chain are discussed. These are total three in numbers. These focus mainly on gap analysis in forward direction and backward direction. More details of these models are given in table-3 and concept of service quality in supply chain is given by fig. 1

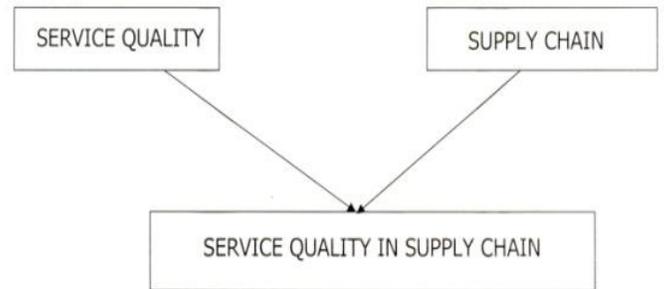


Fig.1 concept of service quality in supply chain

Fig 1 can be modified as fig 2 in the light of above discussed table.

Service quality in supply chain can also be considered as a three level development work as shown in fig 3. At first level of development there is only service quality, second stage has only supply chain management and third level of development is the combination of above said two i.e. service quality in supply chain.

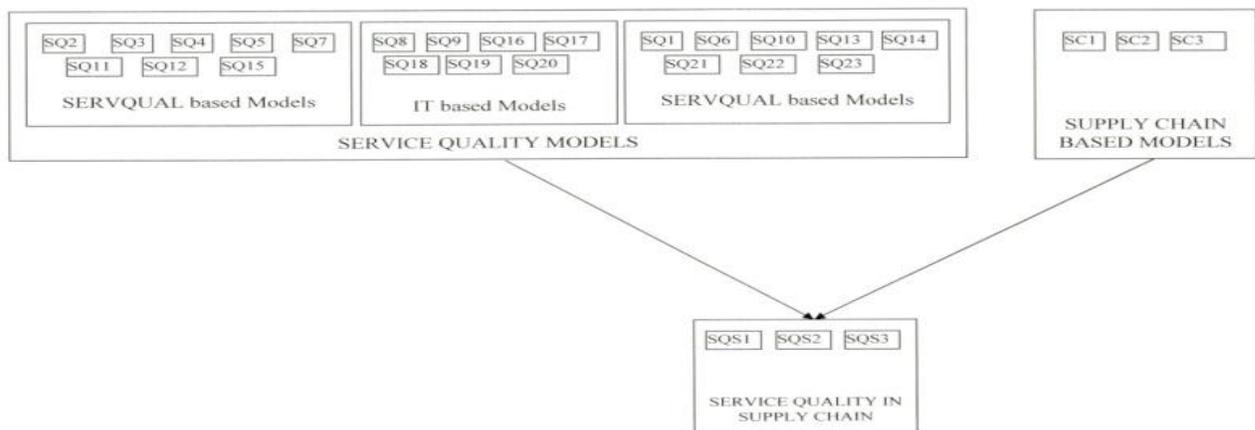


Fig 2. Modified concept of service quality in supply chain

Level-1

Quality of service discussed always and since inception but it become very popular among researchers, practitioners and professionals since last three decades. It is the Grönroos, who get the credit for this and followed by Parasuraman et al and many more.

Grönroos (1984, SM1) discussed the importance of word of mouth and define its impact on traditional marketing activities and emphasis on technical quality and functional quality and conclude that research on the consumer view of service quality in needed. Later Parasuraman et al (1985, SM2) proposed a conceptual model on the basis of gap analysis. They discussed consumer and marketer point of view and suggest that word of mouth communication is key contributor to the expected service and then developed a tool named SERVQUAL, which become the base of many service quality models. All the models of service quality can be classify into three categories

- 1) Gap analysis models in which any gap is find out
- 2) Use of latest technology like IT
- 3) Other models

Factors that affect the service quality are:

- a) Delivery of service often involves some form of contact between the consumer and service provider. The behavior of the service provider. The behavior of the service provider influences the consumers perception of quality also what the firm intends to deliver may be entirely different from what the consumer receives.
- b) Service operations depend on consumers to articulate their needs or provide information. The accuracy of the information and the ability of the service provider to interpret this information correctly have a significant influence on the consumer’s perception of service quality.
- c) The priority and expectation of the consumer may very each time he or she use the service. Priority and expectations may change during the delivery of the service.

Level-2

Supply chain management has become a primary business process (Quinn 1999). The phrase Supply Chain Management (SCM) was originally introduced by consultants in the early 1980s, and it has become popular since then. Martin Christopher, Professor of Marketing and Logistics at Cranfield School of Management, suggests that the supply chain is the network of organizations that are involved, through upstream (supplier end of the supply chain) and downstream (customer end of the supply chain) activities. The statement of supply chain is given by Stevens is “the connected series of activities which is concerned with planning, coordinating and controlling material, parts and finished goods from suppliers to the customer”

Level-3

Service quality in supply chain can be defined as how well an organization meets or exceeds the customer expectations in unidirectional or bidirectional for each element of a supply chain i.e. supplier, manufacturer, distributor, retailer and customer or end consumer. In today’s global market place, individual firms no longer compete as independent entities rather as an integral part of supply chain links.

Service quality refers to collective effort of service performance, which determines the degree of satisfaction of user of all the services. The degree of consumer satisfaction bears a direct relation with quality of service where good quality of service gives better customer satisfaction and bad quality of service lead to dissatisfaction of the customers (Ramanigopal & Mani, 2011).

Service quality in supply chain starts from the work of Seth et al (2006). Very few papers have been published during last five years.

For detailed review and critique of service quality models, one may refer to the works of Ghobadian et al (1993), Asubonteng et al (1996), Butte (1996) and Seth et al (2005).

3. CONCLUSIONS

There is consensus in the literature that better service quality is a critical success factor in this era of intense competition. Service quality’s conceptual and empirical link to customer satisfaction has turned it into a core business instrument. In this paper an attempt has been made to investigate the service quality in supply chain at various levels as industrial supply chains do not appear in previous supply chains specific service quality measurement scale development studies. The service quality models reveal that it is the area of focus since the inception. In the development supply chain, service quality is an important tool. The concept of service quality was introduced by Oliver in 1980 but it has got momentum after the pioneering work of Parasuraman et al. in 1985 & 1988.

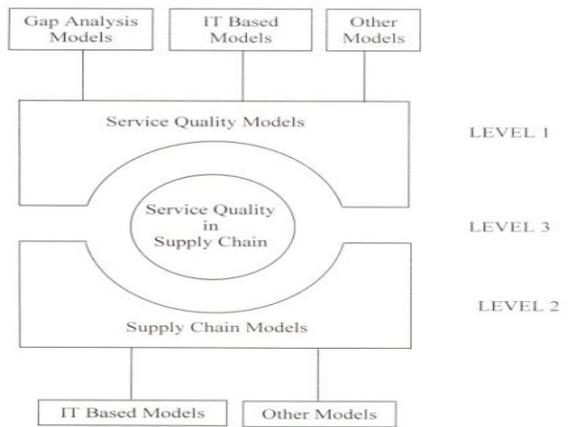


Fig. 3 Three Level Model of Service Quality in Supply Chain

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Table-1: Summary of Models based on Service Quality

Model No.	Name of model	Author & year	Respondents/ Test audience	Method of data collection	Response Scale	Method of analysis	Key findings/ applications	Limitations	Summary of paper
SM 1	Technical, functional and image model	Gronross (1984)	219 from banks, insurance, hotels, restaurants, shipping, airline, cleaning and maintenance, car rental companies, travel agencies, engineering Consultants, architects, business consultants, advertising agencies and a range of institution from public sector.	Survey questionnaire approach through random sampling	Five point Likert scale	Basic statistical analysis	Out of the two quality dimensions, functional quality dimension is more important than technical quality dimension. Word-of-mouth (WoM) is an important parameter and should not be under estimated.	It does not provide any scale to measure the two dimensions and their importance level.	Any firm will compete successfully only when it can understand the customer perception of the quality and the way service quality is influenced.
SM 2	Gap analysis model	Parasuraman et al (1985)	Ranged from 298 to 487 from credit card, retail banking, securities brokerage and product repair and maintenance	Survey questionnaire through personal interviews	Seven point Likert scale	Factor loading matrix following oblique rotation	it is very useful to find the difference between expected and perceived service quality. it can be prove most analytical tool to managers and researchers.	There is a need to develop an instrument to measure consumer service quality perceptions. More work in needed to find the association between perceived service quality by customer sand its determinants.	Service quality is a function of expectations and performances
SM 3	Quality attribute service model	Haywood – Farmer (1988)	*	*	*	*	This model diverse the service organizations in to three dimensions for better management of quality. Good quality of service can be achieved by mixing of all three elements and carefully balanced.	It does not provide any scale to measure the service quality. It does not provide any practical procedure to improve service quality which helps the managers. It needs additional work.	a service organization has high quality if it meets customer preferences and expectations consistently
SM 4	Synthesised service quality model	Brogowicz et al (1990)	*	*	*	*	This model serves as a guide for evaluating the success or failure of a service offering. This model gives idea to managers for determining what customers expect and how they expect to receive the service offering.	It requires empirical verification. It needs additional work for different types of services.	Identify the dimensions associated with service quality in a traditional managerial framework of planning, implementation and control.
SM 5	Performance based model	Cronin and Taylor (1992)	660 from customer of banks, pest control, dry cleaning and fast food	Survey questionnaire through in-home personal interview	Seven point Semantic differential scale	Principal axis factor followed by oblique rotation and LISREL VII	It reduces 50% number of items for measuring the performance of service. Managers and researchers must consider the individual dimensions of service quality while making the cross sectional comparisons. service quality is antecedent of consumer satisfaction and put a strong influence on purchase.	It needs additional work for different types of services. Low involvement service categories were used.	service quality is evaluated by perceptions only without expectations and without importance weights
SM 6	Ideal value based model of service quality	Mattsson (1992)	40 from customers of two luxury hotels of Sweden	Survey questionnaire approach through Manager of Hotels	Nine point Likert scale	Pearson moment correlation, pair wise intra nad inter sample median test and chi square test	This model suggest that negative disconfirmation is the major determinant of consumer satisfaction	very less no. of respondents used for value and customer satisfaction more research is needed to found good result and needs to diverse for all types of service.	value approach to service quality, modeling it as an outcome of satisfaction process
SM 7	Evaluated performance and normed quality model	Teas (1993)	120 from customers of discount stores	Personal interview	--	Confirmatory qualitative assessment correlation and t-test	This model raised many questions for conceptual & operational definitions of expectations & revised expectations	Sample size is very limited. Service settings are very narrow.	Development of Evaluated performance framework and Normed quality model separately.
SM 8	IT investment model	Berkley and Gupta (1994)	*	*	*		This model describe that how the use of It improves the service quality and customer satisfaction in the key service quality dimensions like reliability, responsiveness, competence, access, communication, security and knowing the customer	This model does not indicate the level of IT for any particular industry for a particular key dimension. This model does not indicate how IT based key service dimensions are measured.	This model links the service and information strategies of the organization with IT for improving the service quality through a number of case studies from different sectors.
SM 9	Attribute based and overall affect model	Dabholkar (1996)	505 from under graduate students	Scenario and questionnaire approach	Seven point Likert scale	Confirmatory factor analysis LISREL 7	Attribute based model suggest to used technology based self service option for saving the time & money. The overall affect also supported but it does not add further explanatory power to the attribute based model.	It needs to be generalized for different types of self service options.	proposed two alternative models of service quality for technology based self service options
SM 10	Perceived service quality and satisfaction Model	Spreng and Mackoy (1996)	273 from under graduate students	Survey questionnaire approach through	Seven point Likert scale	Confirmatory factor analysis LISREL 8 (Pre test & Post test analysis)	Expectations have a negative effect on satisfaction through disconfirmation, but a positive effect on both satisfaction and perceived service quality through perceived performance. Desire congruency not only influence satisfaction but it is an important antecedent of customer satisfaction.	It does not tell how the managers balance the negative and positive effects of expectations. This model does not provide any guideline about how the service quality is achieved & operationalized.	highlights the effect of expectation disconfirmation on overall service quality and consumer satisfaction
SM 11	PCP attribute model	Philip and Hazlett (1997)	*	*	*		Service productivity and quality depend not only on the performance of the service providers but also on the performance of the consumer. It may be used for any service sector as it is simple to understand and effective and general to assess.	It needs to be validate. It does not discuss about the method of achieving the discussed three attributes.	author propose a model based on three main classes of attributes- pivotal,, core and peripheral
SM 12	Retail service quality and perceived value model	Sweeney et al (1997)	1016 respondents from electrical appliance stores	Survey questionnaire approach through shoppers	Seven point Semantic differential scale	Confirmatory factor analysis with LISREL VIII	Technical service quality is an important contributor to product quality and value perception as such it directly influencing people's willingness to buy. Functional service quality	Out of several dimensions of value, only value for money was used and discussed in this study.	two models were discussed which indicate value for money

							influences technical service quality, in the perception of manner in which the service is delivered affect consumer's perceptions of the technical service quality offered.		
SM 13	Perception, Service quality, customer value and customer satisfaction model	Oh (1999)	545 from customers of two luxury hotels in a northeastern US city	Survey questionnaire approach through direct contact	Six point scale	Path analysis with LISREL VIII using variance – covariance matrix	Customer value is an important variable which must be considered in service quality and consumer satisfaction studies or vice versa. Perceived price have no relationship with perceived service quality.	More rigorous tests are needed. Needs to be generalized for different types of service settings.	focus mainly on post purchase decision process
SM 14	Antecedents and mediator model	Dabholkar et al (2000)	397 from undergraduate and post graduate students	Telephonic interview conducted twice	--	Regression structure equation modeling using LISREL	Customer satisfaction is a better predictor of behavioral intentions. Antecedents model of overall service quality can provide better feedback. Both qualitative and quantitative techniques are used.	This model measure behavioral intention rather than actual behavior. Needs to be generalized for different types of service settings.	examination of its antecedents, consequences and mediators to provide a deeper understanding of conceptual issues related to service quality
SM 15	Internal service quality model	Frost and Kumar (2000)	604 from Singapore Airline staff of different level	Personal Interview and questionnaire	Seven point Likert scale	Split half reliability coefficient approach	Perceptions and expectations of internal customers and internal suppliers play a major role in recognizing the level of internal service quality perceived. Expectations and perceptions scale used to assess the magnitude of the gap between staff perception & expectations.	Needs to be generalized for different types of service settings.	author develop a model based on Gap model of Parasuraman et al., 1985
SM 16	Internal service quality based DEA model	Soteriou and Stavrinidis (2000)	194 from 26 branches of bank	survey questionnaire approach through personal discussion	*	Data envelope analysis	DEA is the benchmarking for bank. Better service quality may be obtained due to proper utilization of resources.	This model consider only one output i.e. Service quality. More work is required to find the relation between SQ, profitability and operating efficiency.	Authors try to provide directions to a bank branch for optimal utilization of its resources.
SM 17	Model of perceived service quality	Smith and Ennew (2001)	224 from higher education students from a university of UK	Survey questionnaire approach through post	Seven point scale	Factor analysis, principal component extraction and varimax rotation	This study provides evidence of the beneficial effect of service quality on word of mouth. This model suggests that functional aspects are more influential although technical quality has a marked impact on willingness to recommend.	Needs to be generalized for different types of service settings.	
SM 18	Internal banking model	Broderick and Vachirapornpuk (2002)	160 incidents on 55 topic episodes posted from UK internet website community	Partial observation and narrative analysis	--	Qualitative approach	this model suggest that level & nature of customer participation had the greatest impact on the quality of the service expectation & issues such as customer's zone of tolerance, the degree of role understanding by customers and emotional response potentially determined, expected and perceived service quality.	Needs to be generalized for different web based service as this study based on only one web. Needs to be focus over more service areas.	authors propose and test a service quality model of internet banking
SM 19	IT based service model	Zhu et al (2002)	185 from customers of bank having past experience of using IT services of bank like ATM, 24 hours call line etc	survey questionnaire approach through postage paid return envelope	Seven point Likert scale	Factor analysis and structured equation modeling using LISREL VIII	IT based services have a direct impact on the SERVQUAL dimensions and an indirect impact on customer perceived service quality and customer satisfaction. IT based services had a direct positive influence on overall service quality dimension including reliability, responsiveness and assurance.	Less number of items used for measurement the IT based services Needs to be generalized for different types of service settings	use of IT in service to reduce cost and create value added services for their customers
SM 20	Model of e-service quality	Santos (2003)	30 focus group	Interviews and personal discussion	--	Qualitative approach	It provides a direction to launch and successful run a new web site. E-model can beneficial to understand e-service quality and to achieve higher customer retention, customer satisfaction & profitability.	It did not provide any specific scale for measurement. Statistical analysis is also required.	A conceptual model was proposed
SM21	Functional, Technical and Image model	Kang and James (2004)	464 from cell phone users of two companies of Korea	Survey questionnaire approach through random sampling	Seven point Likert scale	LISREL 8.52	Functional quality had a stronger influence on image. Previous image of service provider and customer plays an important role in service quality	It does not provide a full description for technical quality. More work is needed to fully develop technical quality. It can not be used for all types of customers. More work is needed with diverse customer group	
SM 22	SQ, SAT and BI model	Olorunniwo et al (2006)	311 from employee of major corporations, state and federal government establishments, member of different religious organizations and MBA students	Survey questionnaire approach through convenience sampling	Seven point Likert scale	CFA	The impact of behavior plays important role in customer satisfaction.	It focuses only on service industries. Needs to be generalized.	
SM 23	Integration SERVQUAL model and performance control	Chen et al (2011)	329 from employees of hot spring industries of Taiwan	Survey questionnaire approach through random distribution	Five point likert scale	Performance control matrix with SPSS	This study use employees to collect the data rather than the customers. This study correlate the relation between service quality & employee satisfaction.	It needs to be generalized or different types of industries.	Focus on quality attributes that require improvement then applies the employee satisfaction index to determine the priority of these items for improvement.

Table-2: Summary of Models Based on Supply Chain Management

Model No.	Name of model	Author & year	Respondents/ Test audience	Method of data collection	Response Scale	Method of analysis	Key findings/ applications	Limitations	Summary of paper
SC 1	Linear & Amorphous supply chain	Ritchie and Brindley, (2002)	*	*	*	*	This study suggest an increasing awareness of the potential opportunities and risk concerning the new supply chain relationships and recognition of the new global competitive structure and processes that are emerging.	More research is needed to provide improved understanding of the dynamics. An improved insight is required into appropriate skills, culture and decision making approaches to managing strategic development of the supply chain and managing the ensuring risks.	This paper emphasis to forge a direct relationship with the hardwood suppliers and to resolve specific issues or problems
SC 2	IT based supply chain	Liu et al, (2004)	*	*	*	*	Different suppliers have different ontologies and mapping between them is not easy i.e word-for-word mapping is not available in ontology translation. Rapid change of business process requires the addition of an adaptive workflow system.	It needs to be generalized for different types of industries.	by using latest technologies like IT for connecting the all suppliers, distributors and customers make communication faster and without gap and saved a lot of time, energy and money.

Table-3: Summary of Models Based on Service Quality in Supply Chain

Model No.	Name of model	Author & year	Respondents/ Test audience	Method of data collection	Response Scale	Method of analysis	Key findings/ applications	Lmitations	Summary of paper
SQS 1	Third party logistic (TPL) model	Seth et al (2006)	*	*	*	*	this model find the gap between logistic user, logistic service provider and customer this model based on quantitative data	it needs to study the bi-directional gap and sub gaps vary with products, functional responsibility or organization more work is needed to generate various dimensions of service quality with TPL	gap between TPL and various elements of SCM
SQS 2	Bidirectional gap analysis model	Seth et al (2006)	*	*	*	*	This model suggest to find the forward gap and reverse gap between any two level This model helps to understanding the existing gap in SC.	It does not establish the impact of each bidirectional gap. It does not provide a complete procedure for identifying critical and non critical gap in total supply chain. It needs additional work.	
SQS 3	ISQ and ESQ model	Prakash (2011)	156 respondents from three North Indian automobile industries.	Survey questionnaire approach through snow ball sampling	Five point Likert Scale	SPSS v 13 and LISREL v 8.7	It demonstrates the flow of service elements embedded in the flow of products is a source of value addition for the focal organization and influences the supplier focal organization dyad.	This paper uses unweighted “performance only” measure for analysis of service quality. It can not be used for all types of customers.	