

**DEVELOPING A MODEL FOR PREDICTING CUSTOMER SATISFACTION IN  
RELATION TO SERVICE QUALITY IN UNIVERSITY LIBRARIES IN SRI LANKA**

**BY**

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## SUMMARY

Customer satisfaction, from the service quality perspective, has emerged as a new *modus operandi* for assessing customers' perceptions and/or expectations of services in order to re-orient and regulate existing services. University library administrators in Sri Lanka, realising the necessity of complying with customer perception of high quality service, have begun to search for alternative ways to satisfy their clientele on the basis of service quality. This study therefore aims to meet this need by developing a model to assess the extent to which service quality indicators and other explanatory attributes may be used to predict customer satisfaction, from a service quality perspective. The research process used in the study was the "onion model," which involved a combination of positivist and phenomenological inquiries that led to the use of qualitative and quantitative approaches in line with the purpose of the study, which was exploratory in nature and searched for causality. The design of the study involved two main stages: the exploratory stage and the main stage. In the exploratory stage, attributes and domain identification of service quality was carried out with a sample of 262 subjects. Based upon the exploratory study, four provisional models were constructed and tested in the main study, using a sample of 1840 subjects. The model based on the performance-only paradigm and the linearity assumption between the constructs was found to be the best parsimony model that provided for enhanced predictive performance, calibration and potential insight into attributes and domain relevance. Regarding overall satisfaction, responsiveness, supportiveness, building environment, collection and access, furniture and facilities, technology and service delivery as quality domains, involvement with the service, and knowledge of the customers as situational attributes and age, member category, university and gender as socio-demographic attributes were found to be significant. The final model may be used to design a simple measurement or monitoring process of library performance, and it may also be a useful tool for diagnosing service quality locally. This research further provides a keystone for other studies and may also stimulate the momentum of current research on service quality and/or customer satisfaction

**KEYWORDS:** Service quality, Customer satisfaction, Customer perceptions, Customer attitudes, Service marketing, Relationship marketing, Information marketing, Customer expectations, Customer needs, Customer desires, Disconfirmation, Performance-only, Expectancy disconfirmation, user satisfaction, University libraries, Sri Lanka

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## DECLARATION

Student number: 4338-872-8

I declare that this study, **Developing a model for predicting customer satisfaction in relation to service quality in university libraries in Sri Lanka** is my own work and that all the sources I have used or quoted have been indicated and acknowledged by means of complete references.

---

Signature

(Mr. Chaminda Chiran Jayasundara)

30<sup>th</sup> November 2009

Date

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## ABBREVIATIONS AND ACRONYMS

BLRA	:	Binomial Logistic Regression Analysis
BMS	:	Bartlett's Measure of Sphericity
CAS	:	Current Awareness Service
CIPFA	:	Chartered Institute of Public Finance and Accountancy
CTRP	:	Transit Cooperative Research Program
DT	:	Delphi Technique
EFA	:	Exploratory Factor Analysis
ELTU	:	English Language Teaching Unit
ISO	:	International Organisation for Standardisation
KMO	:	Kaiser-Meyer-Olkin measure of sampling adequacy
LIS	:	Library and Information Sciences
MLE	:	Maximum Likelihood Estimation
MLRA	:	Multiple Linear Regression Analysis
OPAC	:	Online Public Access Catalogue
PCA	:	Principle Component Analysis
P-E	:	Perception – Expectations
QAA	:	Quality Assurance and Accreditation
RQ	:	Research question
RUSL	:	Rajarata University of Sri Lanka
SDI	:	Selective Dissemination of Information
SLSI	:	Sri Lanka Standard Institute
SQ	:	Service Quality
TCRP	:	Transit Cooperative Research Program
UC	:	University of Colombo
UGC	:	University of Grants Commission of Sri Lanka
USJP	:	University of Sri Jayewardenepura
UR	:	University of Ruhuna
VIF	:	Variance-Inflation Factor
WTA	:	Work Through Audit

## **CHAPTER ONE: INTRODUCTION TO THE STUDY**

### **1.1 INTRODUCTION**

This chapter provides an overview of the study. It initially presents the conceptual and contextual background to the study, before proceeding onto the problem statement. The problem statement explains specifically why an analysis of customer satisfaction in relation to service quality is needed in the university libraries in Sri Lanka. Prior to justifying the selection of the research and its originality, the purpose of the study is outlined. Thesis further examines the philosophy, approach, and strategy adopted in the study and the methods employed. The area of study is then demarcated with a discussion on the scope of the study. The operational definitions and the structure of the thesis are subsequently presented, followed by a summary of the chapter.

### **1.2 BACKGROUND OF THE STUDY**

Gauging customer satisfaction through service quality studies has become one of the most popular marketing strategies, and it is an approach that infiltrates many academic disciplines, such as psychology, business and library science. As a result, many commercial service quality studies have been commissioned by numerous service providers (Azar 2007; Badri, Abdulla & Al-Madani 2005; Mazzeo 2004; Sivadas & Prewitt-Baker 2000), as it is critical for such service providers to prove their strength in business performance in a competitive business environment (Chowdhary & Prakash 2007: 238; Mehta, Lalwani & Soon 2000: 62; Park 2007: 238; Shemwell, Yavas & Bilgin 1998: 155).

Service quality, as a multi-dimensional concept with multi-attributes, might mean different things to different people (Brady & Cronin 2001; Dabholkar 1996: 30; Grönroos 1984: 38-40). Moreover, defining quality is also a difficult task due to its generic nature. Even though standards for the definition of quality may be set, these standards vary from phenomenon to phenomenon, culture to culture, and across time. As long as attributes of phenomena are quantifiable and may be measured and controlled, setting standards to establish quality will not be a problem, as in the case of establishing the quality of gold

on the basis of control procedures using carats. It becomes problematic when we attempt to measure and quantify qualitative attributes, such as excellence, luxury, satisfaction and delight (Snoj 1995: 96-98) because measurements of such aspects are quite often very subjective. Therefore, similar studies do not and cannot be consistent across different contexts.

Even though studies on customer satisfaction pertaining to several socio-economic sectors based on quality of service are available, specific studies on predicting customer satisfaction in university libraries in Sri Lanka, based on quality of services, are not available. Customer satisfaction through service quality has been widely researched in the academic world, however, a review of the literature reveals that the current body of knowledge regarding the prediction of customer satisfaction in relation to service quality in libraries by examining expectations and/or perceptions of their customers is limited in scope. Furthermore, very few studies have addressed such a perspective in university libraries across the world. As such, it remains the least researched subject area open to intense research. Hence, this study addresses this limitation by means of expectancy disconfirmation and performance theories, originating principally in the service marketing literature.

### **1.2.1 Conceptual perspectives**

Academicians and practitioners in service marketing, while accepting the meanings of the words ‘products’ and ‘services’, have conceded that quality—as it pertains to services—could be defined differently from the definition of quality of products. Service quality has been recognised as an abstract construct that is difficult to define and measure (Parasuraman, Zeithaml and Berry 1985; 1988: 13), and thus, it remains one of management’s most important problems (Cravens 1988, cited in Cronin & Taylor 1992: 55). Grönroos (2000: 7) and Parasuraman, Zeithaml and Berry (1985: 41; 1997: 66) propose that high quality service may allow an organisation to gain a competitive advantage, simply by achieving customer satisfaction. Recent research studies in the service marketing area highlight service quality as one of the most important priorities for current and future research (Edvardsson 2006; Svensson 2004). This is particularly



significant as the quality of service becomes an increasingly important differentiator among competing businesses, as stated by Parasuraman, Zeithaml and Berry (1988: 15).

However, researchers concur that service quality should be defined and measured from the customer's perspective. Ghobadian, Speller and Jones (1994: 45-46) and Enquist, Edvardsson and Sebhatu (2007: 386-387) posit that most service quality definitions fall within the "customer-led" category, and Juran (1999:21-23) elaborates further by defining customer-led quality as "features of products or service" that meet customers' needs and thereby provide customer satisfaction. The most widely accepted definition of service quality delineates the discrepancy between customers' expectations and their perceptions of service performance. Accordingly, service quality refers to the comparison customers make between their expectations and their perceptions of the service received (Grönroos 1998: 327; Howcroft 1992; Parasuraman, Zeithaml & Berry 1985: 42). This definition is based on the expectancy disconfirmation theory (Churchill & Suprenant 1982: 492; Oliver 1993: 422; Parasuraman, Zeithaml & Berry, 1994: 111), which is one of the eminent psychological theories available in the area of consumer behaviour in service marketing.

The underpinning paradigm of the expectancy disconfirmation theory is termed the "disconfirmation paradigm". According to the disconfirmation paradigm,

a customer's immediate reaction after consumption depends on a comparison of prior expectations and perceived performance, resulting in confirmation of expectations or in positive/negative disconfirmation when expectations and performance do not match. (Bitner 1990:71)

As illustrated, it is clear that the disconfirmation paradigm has three outcomes: confirmation, positive disconfirmation and negative disconfirmation of expectations. As the paradigm is based on the premise that a customer compares actual (perceived) performance with a standard (expectation), disconfirmation is the discrepancy between performance and expectation. As a result:

Disconfirmation (d) = Performance (P) – Expectation (E)

In terms of mathematical representations, this is as follows:

$$d = P - E \dots \dots \dots \text{(i)}$$

If performance exceeds expectations ( $P > E$ ), positive disconfirmation will occur, and if performance equals expectation ( $P = E$ ), confirmation will occur. On the other hand, if expectation exceeds performance ( $P < E$ ), negative disconfirmation will occur. In other words, confirmation occurs when performance matches expectations. If performance is better than expectations, it creates positive disconfirmation. In contrast, when performance is worse than the standard, it creates negative disconfirmation (Cadotte, Woodruff & Jenkins 1987: 305).

Earlier, Parasuramn, Zeithaml and Berry (1985: 17) devised the gap model of service quality based on the disconfirmation paradigm and defined service quality as “the degree and direction of discrepancy between consumers’ expectations and perceptions,” with regard to the services. In this context, the service quality—equal to performance minus expectation of services—in a given organisation is the disconfirmation/confirmation derivable from the disconfirmation paradigm. Accordingly,

$$\text{Service Quality (SQ)} = \text{Performance of service (P)} - \text{Expectation of service (E)}$$

In a mathematical representation, it is:

$$SQ = P - E \dots \dots \dots \text{(ii)}$$

As the disconfirmation is equal to the subtraction of performance versus expectation, as depicted in formula (i),  $SQ = (d)$ , it may be taken to mean that service quality is a function of disconfirmation (Hamer 2006: 219; Lee, Lee & Yoo 2000: 218). Mathematically, it is:

$$SQ = f(d) \qquad \qquad \qquad \text{[ Service quality is a function of disconfirmation.]}$$

The satisfaction theory is another concept, which has been borrowed from the area of consumer behaviour, to provide the foundation for a popular conceptualisation of service

quality. Zeithaml and Bitner (1996), cited in Burns and Graefe (2002: 122), describe satisfaction as a broad evaluation of a product or service that is influenced by perceptions of service quality.

Over the past few decades, the construct of service quality has received a significant amount of attention from service marketing researchers, mainly due to its influence on an organisation's success. Parasuraman, Zeithaml and Berry (1985: 41-42) opine that businesses or organisations can achieve customer satisfaction through high quality service.

Although early service quality researchers defined satisfaction as an antecedent of service quality, it has now been generally accepted that service quality is an antecedent of customer satisfaction (Chandrashekar *et al.* 2007: 161; Dabholkar, Shepherd & Thorpe 2000: 166; Herson & Altman 1998: 36). This relationship has been widely researched and discussed in the service marketing literature. In particular, academicians and practitioners alike have exhibited considerable interest in the issues that surround the measurement of service quality and the conceptualisation of the relationship between service quality and customer satisfaction (Brady, Cronin & Brand 2002: 17). A number of researchers such as Herson and Altman (1998: 36), Iacobucci, Ostrom, and Grayson (1995: 277), and Zeithaml, Berry and Parasuraman (1993: 2-3), have clearly articulated the fact that customer satisfaction is a function of service quality, while service quality is a function of disconfirmation.

Thus, over the last two decades, one of the most universally accepted methods of operationalising customer satisfaction has been the notion that customer satisfaction is also a function of disconfirmation (Oliver 1980: 461; Oliver & DeSarbo 1988: 495-496). Within this condition, a meta-analysis of empirical customer satisfaction studies conducted by Szymanski and Henard (2001: 33) has suggested that disconfirmation exhibits the strongest correlation with satisfaction, specifically indicating the importance of this association in predicting customer satisfaction. This aspect of customer satisfaction has also been incorporated in the theory of expectancy disconfirmation. It is

therefore apparent that expectations, performance and disconfirmation together contribute towards the formation of satisfaction among customers of any service.

Accordingly,

$SQ = f(d)$  [Service quality (SQ) is a function of disconfirmation(d)] (Lee, Lee & Yoo 2000: 218; Parasuraman, Zeithaml & Berry 1985: 47)

$CS = f(SQ)$  [Customer satisfaction (CS) is a function of Service Quality (SQ)] (Hernan & Altman 1998: 36; Iacobucci, Ostrom, & Grayson 1995: 277; Zeithaml, Berry & Parasuraman 1993: 2-3)

Hence,

$CS = f(d)$  [Customer satisfaction is a function of disconfirmation] (Davis & Heineke 1998: 65; Khalifa & Liu 2002: 33-34; Szymanski & Henard 2001: 33).

However, some researchers continue to vacillate between the use of disconfirmation scores and performance-only scores (Brady, Cronin & Brand 2002; Cronin, Brady and Hult 2000). This is because some customer satisfaction research studies have focused only on the performance of selected attributes, rather than obtaining the mathematical difference between performance and expectations, as depicted in the disconfirmation paradigm. This has led to the emergence of the “performance theory”. The theory states that satisfaction and service quality are directly related to the perceived performance characteristics of the service. Since this theory focuses only on the performance of a given service or product, the paradigm of this theory is called the “performance-only paradigm”. Thus, this paradigm expounds that:

Service quality (SQ) = Performance (P) of the service (Brady, Cronin & Brand 2002: 19-20; Cronin & Taylor 1992: 64)

The mathematical representation of the above is

$SQ = f(P)$  [Service Quality is a function of Performance/]

As  $CS = f(SQ)$   
Quality...

[As Customer Satisfaction is a function of Service

$CS=f(P)$

[Customer Satisfaction is a function of Performance.]

Nevertheless, in the absence of a perfect agreement, the question arises as to which of the two methodologies is supreme—that is, whether or not customer satisfaction is a function of disconfirmation or performance-only scores of service quality. At times, the disconfirmation paradigm is better, based on the expectancy disconfirmation theory, and at other times, the performance-only paradigm based on the performance theory has been recommended by a variety of researchers in different research contexts over the last two decades.

Under the circumstances that underpin these concepts, arguments and thoughts claimed by numerous researchers, the disconfirmation and performance-only paradigms—based on the expectancy disconfirmation and performance theories, respectively—guided this research in the context of university libraries in Sri Lanka. Researching the two concepts enabled the researcher to determine which paradigm would be the most appropriate means of predicting customer satisfaction related to this research agenda.

### **1.2.2 Contextualisation of the concepts**

In order to determine the suitability of the disconfirmation and performance-only paradigms in conceptualising customer satisfaction, university libraries in Sri Lanka were used as the case in which to ascertain the best workable paradigm to predict customer satisfaction regarding quality of services. This research strategy was expected to be the best-suited diagnostic methodology for determining the areas of service quality strengths and weaknesses of university libraries.

#### **1.2.2.1 Brief overview of Sri Lankan universities**

Universities in Sri Lanka are government-owned enterprises. Since 1945, free education has been established from kindergarten, up to the completion of the first university degree, in order to provide equal opportunities in education to all citizens. Undergraduate

students thus do not pay any fees, but at the postgraduate level, students are required to pay for tuition and other related facilities. Admission to undergraduate programs is based on the successful completion of the General Certificate of Education (G.C.E) (Advanced Level) Examination.

However, the selection procedure for university admissions, except for entry to the Open University of Sri Lanka, is based upon a comprehensive scheme. As there are insufficient places in the universities to accommodate all qualified candidates, besides using merit passes, a limited number of admissions are determined according to the percentage of the population resident in each district. The allocation of places is completed on the basis of different courses of study. These allocations are referred to as District Quotas. The latest mid-year population data available are used to calculate the allocation for each district every year.

At present, 40 percent of the places are decided on merit, 55 percent on District Quotas, and the balance allocated to those in underprivileged districts. The District Quota system is considered as an equity initiative to enable students who normally would not qualify for university admission on merit the opportunity to gain admission to universities. This system is said to give an advantage to students from rural districts, which have less access to schools with good resources.

The selection procedure of the Open University is different from the conventional universities, as student admissions are based on their experiences and qualifications, and sometimes, selections are made without the basic qualifications for some courses of study. Unlike in traditional universities, Open University students are required to pay for their studies.

In conventional universities, almost all the courses in the field of Science, Engineering and Medicine are conducted in the English medium, and courses of studies in other faculties are generally conducted in all three languages–Sinhala, English and Tamil. English is the second language in the country, and all students learn English from grade

three to G.C.E (Advanced Level). Undergraduate students are also required to qualify in the English language, and the English Language Teaching Units (ELTU) at all universities conduct English language programmes for academic purposes. All these universities have stipulated that passing the English language examinations at specified levels is required to obtain degrees.

The list of universities in Sri Lanka with information related to year of establishment, number of students and academic staff is presented in Table 1.1.

**TABLE 1.1: BASIC PROFILE OF SRI LANKAN UNIVERSITIES**

Name	Year established	Number of Students (2007)	Number of Academic Staff (2007)
University of Colombo	1942	10,870	472
University of Sri Jayewardenepura	1959	8,959	433
University of Kelaniya	1959	9,496	402
University of Peradeniya	1967	11,620	687
University of Moratuwa	1972	4,806	217
University of Jaffna	1974	5,021	266
University of Ruhuna	1978	7,211	396
Open University of Sri Lanka	1980	24,500	269
Eastern University Sri Lanka	1981	2,212	115
South Eastern University	1995	1,096	89
Rajarata University of Sri Lanka	1995	2,672	73
Sabaragamuwa University of Sri Lanka	1995	2,553	163
Wayamba University of Sri Lanka	1999	1,857	181
Visual and Performing Arts University	2005	245	75
Uva Wellassa University	2007	n.s.	n.s.

n.s. = No statistics are available

Source: University Grants Commission of Sri Lanka Statistics (2007)

According to Table 1.1, the Open University of Sri Lanka is the largest university on the basis of the student population, while the University of Peradeniya has the highest number of academic staff members in the teaching faculty. Students at the Open University are all part-time academicians who study their courses using the distance-learning mode. Since there are a number of levels of qualifications—such as the certificate level, diploma level and postgraduate level programmes and short-term courses—the number of students registered at the Open University is high compared to other

conventional universities in the country. However, among the conventional universities, the University of Peradeniya is the largest on the basis of the number of students registered as full-time.

#### **1.2.2.2 University libraries in Sri Lanka**

The first university library in Sri Lanka was established in 1942 at the University College in Colombo. Since then, the number has expanded to 31 libraries attached to 15 national universities, seven postgraduate institutions and nine other higher education institutes (University Grants Commission of Sri Lanka Statistics 2007). University libraries in Sri Lanka are managed within the framework of the Universities Act No. 16 of 1978. Each national university has a library, which is considered as one of the main departments in that university. It is administered by a librarian, who is one of the principal officers of the university, and supported by professionals, paraprofessionals and support staff. The mission of the university libraries is to provide the required support for teaching, learning and research by performing a variety of functions, such as the provision of textbooks, supplementary reading and reference materials, periodicals, and recreational resources.

It is a general belief among the public that libraries in the universities in Colombo have better facilities and better tangible and intangible resources, compared to university libraries in the outer districts of the country.<sup>1</sup> Thus, basic profiles of some university libraries in Colombo and outer districts in Sri Lanka are given in Table 1.2.

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<sup>1</sup> The idea was presented at the Quality Assurance Workshop conducted by the QAA council, Sri Lanka, held on 24-25 May, 2007.



**TABLE 1.2: BASIC PROFILES OF SOME UNIVERSITY LIBRARIES**

<b>Profile Details</b>	<b>University Colombo (Colombo District)</b>	<b>University of Sri Jaywardenepura (Colombo District)</b>	<b>University of Ruhuna (Matara District)</b>	<b>Rajarata University of Sri Lanka (Anuradhapura District)</b>
<b><i>Customers</i></b>				
Academic staff**	472	433	396	73
Undergraduates**	8,514	8,628	7,204	2,598
Postgraduates**	2,356	331	7	164
Others* **	146	68	23	16
<b><i>Employees</i></b>				
Professional staff	12	8	9	5
Administrative staff	2	1	1	0
Para-professionals	43	29	27	10
Support staff	42	28	29	13
<b><i>Collection</i></b>				
Books	280,101	187,359	148,000	63,800
Journals – Printed	567	270	83	148
Journals – Electronic****	4,780	4,780	4,780	4,780
Theses	321	146	48	21
Audio visuals	678	889	3,679	189
Rare materials	765	124	46	34
<b><i>Average customers (daily)**</i></b>				
Lending	224	167	220	87
Overnight Referencing	124	68	76	45
Referencing	647	880	310	300
<b><i>Facilities</i></b>				
Automation of library functions				
Circulation	N	N	Y	N
Cataloguing	Y	Y	Y	Y
AV systems	Y	Y	Y	Y
Computing facilities for accessing e-journals and others	Y	Y	Y	Y
Sanitary facilities	Y	Y	Y	Y
Air-conditioning	Y	N	N	N
Generator	Y	N	N	N
Cubicles for individual study	Y	N	N	N
Suggestions/ complaints box	N	Y	N	N
First aid box	Y	Y	N	N

<b>Profile Details</b>	<b>University of Colombo (Colombo District)</b>	<b>University of Sri Jaywardenepura (Colombo District)</b>	<b>University of Ruhuna (Matara District)</b>	<b>Rajarata University of Sri Lanka (Anuradhapura District)</b>
Network facilities with other libraries	Y	Y	Y	Y

\* Temporary customers (membership is granted for a maximum of three months)

\*\* Source: University Grants Commission of Sri Lanka Statistics 2007

\*\*\* As there are no correct statistics, these values are projected, based on the observations made from 25<sup>th</sup> January 2008 to 5<sup>th</sup> March 2008

\*\*\*\* e-Resources subscribed through country-wide consortium

Y = service available

N = service not available

Source as of March 5, 2008: Compilation by author

As illustrated in Table 1.2, the University of Colombo ranks the highest in all aspects of the profile compared to the other selected university libraries in Sri Lanka. The infrastructure facilities of libraries play a very important role in providing services to their customers. Table 1.2 provides an overview of the infrastructural facilities available in these selected libraries, and it appears that both conventional and contemporary facilities are available in all of them. The information services rendered by these libraries are given in Table 1.3.

**TABLE 1.3: SERVICES RENDERED BY THE SELECTED UNIVERSITY LIBRARIES**

<b>Service</b>	<b>University of Colombo</b>	<b>University of Sri Jaywardenepura</b>	<b>University of Ruhuna</b>	<b>Rajarata University of Sri Lanka</b>
<i>General</i>				
Circulation	Y	Y	Y	Y
Reading rooms	Y	Y	Y	Y
Reference	Y	Y	Y	Y
Periodicals	Y	Y	Y	Y
ILL	Y	Y	Y	Y
Discussion rooms	N	N	N	N
Conference/Seminar and Lecture rooms	Y	N	N	N
Opening hours (usual)	8.00 AM - 8.00 PM	8.00 AM - 8.00 PM	8.00 AM - 7.00 PM	8.00 AM - 6.00 PM
<i>Customer education</i>	Y	Y	Y	Y
General customer orientations	Y	Y	Y	Y

Service	University of Colombo	University of Sri Jayewardenepura	University of Ruhuna	Rajarata University of Sri Lanka
e-Information Literacy	Y	Y	Y	Y
General information literacy	Y	Y	Y	Y
<b>Information Dissemination</b>				
Conventional catalogues	Y	Y	Y	Y
OPAC	Y	Y	Y	Y
CAS	N	Y	Y	Y
SDI	Y	N	N	N
Xeroxing	Y	Y	Y	N
Abstracting	N	N	N	N
Translation	N	N	N	N
Microfilming	N	N	N	N
<b>Web-based Information</b>				
Internet	Y	Y	Y	Y
E-mail	Y	Y	Y	N
Tele-facsimile	Y	N	N	N
Web OPAC	Y	Y	Y	N
Library Website	Y	Y	Y	N
Bulletin board	N	N	N	N
E-journals	Y	Y	Y	Y
Document delivery	Y	Y	Y	Y
Downloading software	Y	N	Y	N
<b>Extra &amp; Promotional</b>				
Trial access for e-journals	Y	Y	Y	Y
Trial access for e-books	Y	Y	Y	Y
Other library membership facilities for readers	Y	N	N	N

Y = service available

N = service not available

Source: Compilation by author

The nature and efficiency of library and information services provided vary from library to library. Extending the library services to the wider customer community is fundamental in attaining the service quality of university information service provision. Table 1.3 illustrates that all the libraries provide basic services, network-based services and some bibliographical tools. It is also observed that all these selected libraries in Sri Lanka provide traditional library services to the customer community, such as lending, reference, periodical information services, inter-library loans and other services, while also providing emerging technology-based services, such as e-Journals, e-books, Web

OPACs, e-Mail, Internet and other allied services. Electronic media are becoming very popular within university libraries and are currently sought by a large number of customers (Damayanthi 2006: 150-151). The services provided vary from one library to another, owing to a whole range of interests of the customer community. By providing information services to customers, a university library is able to fulfil its aims and objectives in relation to the promotion of advanced learning and research in the country.

Furthermore, pressed by the demands of customers and guided by a desire to enhance their image, library administrators have started taking an interest in providing various documentation work and new services to the wider customer community. The motivation underlying this is that customer demands are continually growing, and the library administrators are keen upon proving that they too are important players in the teaching and learning process of the university.<sup>2</sup> All university libraries have started current awareness services, reference services, hands-on training sessions on information literacy, individualised information services and other related services (Nanayakkara 2008: 32). All the libraries are centrally located in the university premises and are kept open for longer hours, sometimes more than eleven hours a day, for customer use (University of Colombo Library 2002). The majority of the libraries use the Dewey Decimal Classification System (DDC) and the Universal Decimal Classification System (UDC) to catalogue and classify materials, thus ensuring a convenient arrangement of materials on the shelves of the libraries. Policy documents related to collection developments of university libraries in each university generally cover all subject fields that are to be developed in relation to the needs of the students and the staff of the university.

### **1.2.2.3 University library customers**

The customer categories/segments—such as undergraduates, postgraduates and academic staff—use university libraries for different purposes, viz, reading study materials,

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<sup>2</sup> This idea was put forth at the presentation entitled “The Teaching Role of Sri Lankan University Librarians in Light of the Changing Pedagogical Paradigm brought about by Education Policy Reforms,” by Wijetunge, P. (2004) at the Seminar on Priority Issues for an Effective Library and Information Network, organised by SCOLIS, UGC, Sri Lanka.

referencing books and accessing electronic information resources (Dambavinna 2005: 64). In most Sri Lankan university libraries, undergraduate students are the more regular customers than the other categories/segments, as they form the majority in the higher education sector (Dambawinna 2005: 64). However, the wider customer community of the libraries consists of faculty members, research scholars, postgraduate and undergraduate students. Faculty members primarily consist of the teaching staff, some of whom are permanent members, while others are temporary, casual or visiting members. Visiting scholars may be local or foreign students reading for degrees or postdoctoral level studies in other local or foreign universities/higher educational institutions. Administrative staff, clerical staff and allied grades, technical staff and minor staff—which comprise labourers, attendants, and binders—rarely visit the libraries to fulfil their specific informational needs.

As Sri Lanka is a multicultural society, all university libraries promote multiculturalism in their libraries. The library administrators believe that the libraries should provide fair and equitable multi-language and multicultural information service for their wider customer community as they belong to diverse cultural backgrounds in Sri Lanka.

#### **1.2.2.4 Service quality in university libraries**

Although a range of information and customer services is available in university libraries in Sri Lanka, their image is poor because they have failed to meet customer expectations of library services (Silva 1995: 22). He further articulates that the reason could be the lack of adequate funds provided by the government, as all the universities in Sri Lanka are government-owned. However, Nanayakkara (2008: 84) recently pointed out that the tangible resources and intangible services available at university libraries in Sri Lanka are of a high standard, compared to other libraries on the Indian subcontinent. She states that the quality of library materials and services in university libraries are of a reasonably good standard from the library customers' points of view. However, until recently, university libraries did not engage in the marketing of their services, offering knowledge and facilitating access to knowledge to different market segments governed by the market forces of supply and demand. Consequently, university libraries and their services have a

low status and are undervalued, a situation made more complex by the fact that benefits for customers derived from library services are difficult to measure and, hence, to manage.

The competitive position of university libraries in Sri Lanka is further complicated by the fact that, unlike many of their competitors—such as the libraries attached to non-governmental agencies, foreign missions, book publishers, and so on—they are financed by the state. In reviewing the financial statements of university libraries, the problems pertaining to state funding include shortage of funding, failure to fund at the proper time so that the orders—particularly for printed and electronic periodicals—cannot be placed, and sometimes, non-allocation of funds for the financial year (University of Colombo Annual Report 2003). On the other hand, some state authorities question the worthiness of allocating significant amounts of money for libraries instead of allocating those funds for development activities in the country. Therefore, in many ways, public opinion makers characterise the libraries as “white elephants,”<sup>3</sup> although those segments of society who are responsible for libraries argue in favour of their social importance. As education is free at all levels in Sri Lanka except the postgraduate level, the value of free library services is low and of little significance. In developed market economies, education services often have to be paid for directly by students, whose expectations of library services are consequently higher than those held by students paying indirectly through taxes (Broady-Preston & Preston 1999: 126).

While these circumstances prevailed in the university sector, a quality assurance scheme was introduced to the university sector in 2007, and libraries are now assessed by the Quality Assurance and Accreditation Council (QAA) of Sri Lanka. In recognising the importance of the quality of library services, the QAA (2008: 1-2) says:

It is a prediction for continuous quality improvement that the Universities and libraries develop and sustain a Quality Culture within their institutions. Quality Culture is the creation of a high level of internal institutional quality assessment mechanisms and the ongoing

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<sup>3</sup> The term white elephant is used to denote an enormously valuable possession, but whose usefulness is exceedingly diminutive compared to its upkeep expenses. Thus, it is a liability.

implementation of the results. Quality Culture can be seen as the ability of the library to develop quality assurance implicitly in the day-to-day work of the institution (library) and makes a move away from periodic assessment to ingrained quality assurance.

QAA has already recognised that there should be three main components for quality measurements of libraries: output indicators, process indicators and input indicators. Customer surveys of library services, which mainly focus on customer satisfaction, have been found to be an important output indicator for university libraries (Quality Assurance and Accreditation Council 2008: 2).

However, library quality is not an absolute. It is largely a construct of the individual customer (Browne & Edwards 1992: 88-90), and therefore, libraries favour the expectancy disconfirmation theory and performance theory. As a result, library administrators regard service quality to be that which satisfies customers. Emphasising the need for library assessment studies, Nicholas (1996: 5) argued that “recent political and economic events have dragged libraries into the value-driven environment, from which they are unlikely ever to escape.” University libraries in Sri Lanka are now on the same cost-conscious path as any other business, and as a result, they are subject to the same concerns, such as customer care, customer character, economic efficiency and cost benefits (Greenaway 1997: 226). Thus, library assessment helps university library administrators to understand what works well or poorly and to identify current strengths and weaknesses. Customer assessment can provide invaluable data to libraries for re-orienting their collections, services and activities in order to effectively meet the informational needs of their valued customers (Padmasiri 1997: 44; Shi & Levy 2005: 267).

Nicholas (1996: 6-8) believed that the traditional measures of library assessments—such as the number of books and serials on the shelves or titles bought per year and so on—were no longer valid. In Sri Lanka, quality of university library services is still measured by statistics that are reported annually to the university administration in the form of funds spent on collection development, number of professional librarians employed,

number of customers (external and internal) that utilised the service and the queries answered by librarians. Nicholas (1996:7) argues that these measures need to be changed because the success or effectiveness of a library can be determined only through customer satisfaction. Continuous interaction between library customers and information providers is essential for developing a better understanding of the informational needs of customers, acceptance and use of library collections, services and facilities, and their opinions on the utility of various information sources. Such feedback is necessary for conceptualisation, planning, and implementation of information systems and services for an institution (Verhoeven, Boerman & Jong 1995: 88).

Therefore, the researcher believes that the time has come to evaluate the quality and significance of university library services from the perspective of customers. Zeithaml, Parasuraman and Berry (1990: 16) suggest that:

... the only criteria that count in evaluating service quality are defined by customers. Only customers judge quality; all other judgments are essentially irrelevant. Specifically, service quality perceptions stem from how well a provider performs, that is, customers expectations about how the provider should perform.

In contrast, some researchers and/or practitioners may argue with the phrase that “all other judgments are essentially irrelevant”, meaning that professional judgments are also necessarily relevant in evaluating service quality (Minishi-Majanja 2008<sup>4</sup>). Even though professional opinions are relevant and appropriate for judging service quality, if the customers are reluctant to accept these judgments, the provision of services will not be founded on customer expectations. Thus, it will damage the whole marketing chain of the library, including the continuation of improved customer loyalty and greater customer retention, because it does not take into account customer expectations with regard to service delivery. As such, it is important to know that library services too depend on the interaction between customers and service providers in order to orient the strategic planning of the library towards meeting customer expectations.

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<sup>4</sup> Minishi-Majanja, MK. 2008. Personal communication through e-mail, 12 February 2008.



As already described in the conceptual background, two dominant theories—that is, expectancy disconfirmation and performance-only—can be used to predict customer satisfaction, even if the service quality perspective enables policymakers and administrators in the system to contemplate possible improvements and re-orientation of services in a customer-led approach. It is also evident from the prevailing literature on library and information sciences that a customer-led and customer-centric approach is one of the most suitable channels for evaluating the quality of library services (Broady-Preston & Preston 1999: 126; Shi & Levy 2005: 267).

While the disconfirmation paradigm has received widespread acceptance and support in the literature, some studies found that the performance-only paradigm is the most optimal (Cronin & Taylor 1992:64; Kassim & Bojei 2002; Witkowski & Wolfinbarger 2002). The mixed evidence, however, does not indicate that some studies are incorrect, but suggests that the satisfaction formation process is more complex than that captured by existing theories (Oliver 1980: 461; Oliver & DeSarbo 1988: 495-496; Parasuraman, Zeithaml & Berry 1985: 42). Sometimes, the disconfirmation paradigm is found to exhibit the strongest correlation with satisfaction in a particular context (Kassim & Bojei 2002; Witkowski & Wolfinbarger 2002), while in other cases, the paradigm of performance-only is found to be more significant regarding satisfaction (Brady, Cronin & Brand 2002; Cronin, Brady & Hult 2000; Ford 2003). It is therefore apparent that there is no perfect agreement on the best theory in predicting customer satisfaction in relation to service quality, which is exclusively based on customers' perspectives.

The treatise presented above demonstrates the paucity of research studies on customer satisfaction in relation to service quality in library and information sciences. The prevailing literature, which addresses the abovementioned theories, shows that researchers have not simultaneously investigated the relative efficacy of these paradigms in predicting customer satisfaction. Further, as indicated by the circumstances prevailing in the university libraries, a well-formed research study for the prediction of customer satisfaction in relation to service quality by a customer-led and customer-centric approach is both necessary and useful. The discussion attempted to identify the strengths

and weaknesses pertaining to the quality of the existing library services in order to recommend the possible re-orientation of available resources, services and facilities to meet higher customer satisfaction standards by service quality determinants in Sri Lankan university libraries.

### **1.3 STATEMENT OF THE PROBLEM**

Business organisations are making concerted efforts to improve the quality of their services to meet customer expectations, satisfaction and reactions. Although customer satisfaction can be predicted by service quality attributes, very few empirical research studies have been carried out in the field of library and information sciences (Shi & Levy 2005: 268). As a result, many questions still remain unanswered. Some such questions: “Do library customers vary in their preferences for and perceptions of various aspects of library services?” “Can service quality based on the existing disconfirmation or performance-only paradigms result in improved prediction of customer satisfaction in libraries?” need to be more thoroughly investigated to improve the quality of services in university libraries.

Administrators in the libraries of the Sri Lankan universities are left to ponder ways and means of satisfying customers and providing good quality service that meets customers’ perceptions.<sup>4</sup> The different indicators of service quality in the university library sector are not always understood. The use of customers’ expectations and perceptions of performance and the analysis of the differences between expectations and performances of various service quality attributes are essential to determining the most effective means of predicting customer satisfaction.

Although apparently adequate resources, facilities and staff are made available at university libraries in Sri Lanka, the emphasis on the delivery of quality service is lacking.<sup>5</sup> Library administrators consider emphasis on predicting customer satisfaction in relation to service quality as very critical. This is underscored by the librarians at the

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<sup>5</sup> The idea was presented at the Quality Assurance Workshop conducted by QAA council, Sri Lanka held on 24-25 May, 2007

University of Colombo and University of Sri Jayewardenepura, who stress that “if we as librarians are not thinking about our customers’ satisfaction and service quality in our libraries, we should not think of the future sustainability of our libraries to any further extent.”<sup>6</sup> In spite of such statements, made by some library administrators in Sri Lankan universities, the researchers have been slow to embrace the idea of predicting customer satisfaction. The failure to incorporate these concepts in service models has resulted in studies that cannot adequately explain customer needs, expectations and satisfaction.

#### **1.4 PURPOSE OF THE STUDY**

This study aims to develop a model for assessing the extent to which service quality indicators and other explanatory attributes can be used to predict customer satisfaction from the perspectives of the customers of university libraries. In order to address the purpose of the study, the objectives are outlined as indicated below.

##### **1.4.1 Objectives**

- To analyse what constitutes service quality in academic libraries in Sri Lanka;
- To examine what constitutes customer satisfaction in relation to service quality in university libraries in Sri Lanka;
- To establish service quality attributes and particular service quality domains, which impact customer satisfaction of university libraries in Sri Lanka; and
- To determine which socio-demographic and situational attributes predict customer satisfaction, which help library administrators and policymakers to better understand these influential determinants of different customer groups.

##### **1.4.2 Research questions**

The gap identified in the review of conceptual and contextual literature in sections 1.2.1 and 1.2.2 and the current momentum in management practices of library and information services in the university library sector in Sri Lanka have led to the formulation of four

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<sup>6</sup> This idea was presented at the Quality Assurance Workshop conducted by QAA, Sri Lanka, held on 24-25 May, 2007.

objectives for this research study. These objectives constitute the basis for developing ten research questions that motivated the present study.

- Why is it necessary to contemplate customer satisfaction in relation to service quality?
- What are the available theories and paradigms that can be used to predict customer satisfaction in relation to service quality?
- What are the service quality attributes that may impact customer satisfaction?
- What are the service quality domains that may impact customer satisfaction?
- What provisional customer satisfaction models can be constructed, based on the disconfirmation and performance-only paradigms?
- Are individual service quality attributes strong predictors of their respective service quality domains?
- Are individual service quality domains significant predictors of overall customer satisfaction in libraries?
- Are individual service quality attributes strong predictors of overall customer satisfaction?
- What socio-demographic attributes impact overall customer satisfaction regarding library services?
- What situational attributes impact overall customer satisfaction regarding library services?

Table 1.4 summarises the objectives, research questions and possible sources of data of the study. This table was therefore employed to guide the data collection and analysis in all stages of the research.

**TABLE 1.4: RESEARCH PROPOSITIONS**

<b>Objectives</b>	<b>Research questions</b>	<b>Possible sources of data</b>
To analyse what constitutes service quality in academic libraries in Sri Lanka	<p>1. Why is it necessary to contemplate customer satisfaction in relation to service quality?</p> <p>2. What are the available theories and paradigms that can be used to predict customer satisfaction in relation to service quality?</p>	Literature survey
To examine what constitutes customer satisfaction in relation to service quality in university libraries in Sri Lanka	<p>3. What are the service quality attributes that may impact customer satisfaction?</p> <p>4. What are the service quality domains that may impact customer satisfaction?</p> <p>5. What provisional customer satisfaction models that can be constructed, based on the disconfirmation and performance-only paradigms?</p>	<p>Literature survey</p> <p>Focus groups discussions</p> <p>Structured questionnaire</p>
To establish service quality attributes and particular service quality domains, which impact customer satisfaction with university libraries in Sri Lanka	<p>6. Are individual service quality attributes strong predictors of their respective service quality domains?</p> <p>7. Are individual service quality attributes strong predictors of overall customer satisfaction?</p> <p>8. Are individual service quality domains significant predictors of overall customer satisfaction?</p>	Structured questionnaire
To determine which socio-demographic and situational attributes predict customer satisfaction, which help library administrators and policymakers to better understand these influential determinants of different customer groups	<p>9. What socio-demographic attributes impact overall customer satisfaction regarding library services?</p> <p>10. What situational attributes impact overall customer satisfaction regarding library services?</p>	Structured questionnaire

Source: Compilation by author

## **1.5 STATEMENT ON THE ORIGINALITY OF THE RESEARCH**

Within the last two decades, research in the field of library and information sciences has significantly matured and moved towards conceptually and contextually better research studies, as is evident from the available literature. This has helped to make research in the library and information science discipline more cumulative in nature, allowing for broader conceptual progress from one study to another. However, the researcher was motivated to carry out the study due to the paucity of prevailing research studies in the field, and the researcher was also encouraged to select his subject of research due to the validity of the concept/s across different cultures.

To resolve deficiencies in emerging contemporary research studies, this research aims for a greater degree of reliability and validity through a robust and comprehensive framework of research methods, in order to approach the problem area while maintaining a rigorous conceptual framework appropriate for the study. In examining the literature for studies relating to the field of library and information sciences, it was found that employment of a methodological approach suggested by this research has not been done in other similar studies, which indicates the methodological novelty of this research topic.

As the service marketing concept continues to evolve, a tendency is expected to grow to establish rigorous methodological approaches to undertake thorough investigations of different phenomena and to incorporate context-specific issues into the global body of knowledge for possible generalisation. Most of the previous research studies relevant to this research have been carried out in North American, Europe, and in a few Far Eastern Asian countries. It was therefore considered important and pertinent to investigate the Sri Lankan scenario, thus contributing to and enriching the existing body of knowledge for worldwide application and empirical generalisation, which would in turn be another original contribution to the body of knowledge in the said field. Furthermore, the unique contextual distinctiveness of Sri Lankan universities—providing free education at the undergraduate level, with all universities being government-owned, and functioning in

multi-cultural surroundings—provided a new dimension and insights into the said field of study to predict customer satisfaction in relation to service quality.

Further, Walker (1997: 150-152) charts a number of routes to demonstrate the originality of research, such as the development of new methodologies, tools and/or techniques, new areas of research, new interpretations of existing material, new applications of existing theories to new areas, or new blends of ideas. Drawing upon this background, the contribution to knowledge of this research could be principally viewed as a theoretical contribution because the identification and development of appropriate measures—based on the best-suited theory for predicting customer satisfaction of university libraries, especially within the issues surrounded on the university libraries in the context of Sri Lanka—were yet to be explored. Thus, the expected key outcome of this study was to develop a model for predicting customer satisfaction in relation to service quality in university libraries for the purpose of helping library administrators and policymakers in the higher education sector to make managerial decisions related to service quality in their respective libraries.

There are two major underlying reasons for the development of a new model. One is that the prevailing literature explicates that the existing models of customer satisfaction based on service quality, which do not account for quality attributes particular to a specific context, can lead to erroneous conclusions (Brady, Cronin & Brand 2002: 19; Brown, Churchill & Peter 1993: 138). The second reason is that in reviewing the literature, it was discovered that none of the research studies had been carried out to comprehend the relative efficacy of disconfirmation and performance-only paradigms in conceptualising customer satisfaction in the context of university libraries. Thus, this current study specifically evaluates the benefits of applying disconfirmation and performance-only paradigms to the milieu of university libraries to model satisfaction of their wider community of customers in relation to service quality. The results of the analysis therefore demonstrate a divergent view of emerging customer satisfaction based on these two paradigms, and as a result, a better parsimonious model for the prediction of

satisfaction can be derived by selecting the optimal paradigm; this demonstrates another aspect of novelty in this study.

Extending the implications of the study to more general service marketing contexts can also suggest that researchers throughout the marketing field need to re-evaluate the established models in the literature, which assume that the generic domain structure introduced by Parasuraman, Zeithaml and Berry (1988: 26) can be utilised for all types of organisations. Carman (1990), Finn and Lamb (1991), cited in Abdullah (2006: 572), concur that in organisations such as libraries, service quality measures are more viable research strategies compared to generic measurements, which have been introduced by SERVQUAL and SERVPREF models. Thus, it makes sense to generate quality measures from the real-life environment, and they should not be based on the generic models already introduced. Abdulla (2006: 572) further articulates that:

... the generic measures of service quality may not be a total adequate instrument by which to assess perceived service quality in higher education although their impact in the service quality domain is undeniable.

Overall, service quality attributes in the proposed model are proven useful as components for examining the predictive power, which has not been extensively investigated in the previous LIS literature on the subject of service quality in relation to customer satisfaction. These factors provide theoretical and empirical explanations regarding the application of the conceptual framework of customer satisfaction and service quality used in business industries to the non-profit library service sector, and specifically, to university libraries.

## **1.6 RESEARCH DESIGN AND METHODOLOGY**

The research design and methodology applied in the research are described in this section. The design of the research study involved several steps, syndicated in two main stages:

1. Stage One: Exploratory study

Attributes/domain identification were completed. (see Table 1.5)



## 2. Stage Two: Main study

Provisional model building and testing were completed. (see Table 1.6)

Given the research problem outlined in section 1.3, the basic philosophy underlying this study is positivism. For the generation of service quality attributes specific to the Sri Lankan university environment, focus group discussions were employed (see Table 1.5) to ascertain the dynamism of the context. Thus, stage one follows the phenomenological approach, too. The first stage of the study used a combination of inductive and deductive approaches. The inductive approach was mainly used to understand the underpinning theories and to generate attributes pertaining to service quality, primarily through a number of focus group discussions, as indicated in Table 1.5 (see steps 1 and 2). Next, it used the deductive approach to refine the quality attributes for possible identification of pertinent quality domains particularly applicable to university libraries, as indicated in steps 3 and 4 of Table 1.5. However, the second stage of research was purely based on the deductive approach, as it adopts positivist inquiry to achieve predictive values, as illustrated in Table 1.6.

The research was mainly exploratory in nature and demonstrates its causal research characteristics in relation to the attributes and constructs of customer satisfaction and service quality. The survey research method was used in this study because the intention of this research was to gather data regarding customer attitudes about service quality and customer satisfaction of university libraries. Two surveys—an exploratory survey and a main survey—were conducted in the study and administered to stratified random samples, as depicted in Tables 1.5 and 1.6.

**TABLE 1.5: METHODOLOGICAL DESIGN FOR THE ATTRIBUTES AND DOMAIN IDENTIFICATION**

<b>STEPS IN RESEARCH STAGE ONE: EXPLORATORY STUDY ATTRIBUTES AND DOMAIN IDENTIFICATION</b>	
<b>Step 1:</b>	Specifying the area of service quality and customer satisfaction (literature survey)
<b>Step 2:</b>	Generating a list of service quality attributes that can be utilised for the prediction of customer satisfaction (literature survey, focus groups and experts' opinions)
<b>Step 3:</b>	Developing a questionnaire to identify the degree of importance of the attributes
<b>Step 4:</b>	Refining the service quality attributes and service quality domains through an exploratory survey
<b>EXPLORATORY SURVEY</b>	
<ul style="list-style-type: none"> <li>• <b>Sample and Sampling technique:</b> <ul style="list-style-type: none"> <li>○ The method of “five subjects for one attribute” was used for the determination of sample size, and 263 subjects were selected through the purposive sampling technique from the University of Colombo, University of Sri Jayewardenepura, University of Ruhuna and Rajarata University of Sri Lanka. The strata were based on second, third and fourth year undergraduate students, postgraduate students, and academic staff members of the Faculties of Arts.</li> </ul> </li>   <li>• <b>Data gathering technique:</b> <ul style="list-style-type: none"> <li>○ A structured questionnaire was used based upon multidimensional scaling, which is a combination of Likert, numerical and categorical scales (Cooper &amp; Schindler 2006: 373; Kotler 2000: 110).</li> </ul> </li>   <li>• <b>Data analysis:</b> <ul style="list-style-type: none"> <li>○ Refinement of attributes and domain identification were done through exploratory factor analyses (EFA), the Kaiser-Meyer-Olkin measure of sample adequacy and Bartlett's Measure of Sphericity.</li> <li>○ Cronbach's alpha was used for reliability testing.</li> </ul> </li> </ul>	

Source: Compilation by author

The problem area of the study was initially investigated through a comprehensive literature survey of a variety of areas, including library and information sciences, and service quality and customer satisfaction in the service marketing arena. The selection of quality attributes for the study was initially based on the literature survey. The identified attributes were then discussed at focus group meetings to select more appropriate attributes in the context of the university libraries in Sri Lanka. Subsequently, a questionnaire was designed, based upon the attributes identified by the focus groups, to gather data for refining the attributes and to identify pertinent quality domains for the main study described in stage two (see Table 1.6).

The methodological design of the second stage of the study for provisional model building and testing is illustrated in Table 1.6.

**TABLE 1.6: METHODOLOGICAL DESIGN FOR PROVISIONAL MODEL  
BUILDING AND TESTING**

<b>STEPS IN THE RESEARCH STAGE TWO: MAIN STUDY PROVISIONAL MODEL BUILDING AND TESTING</b>	
<b>Step 5:</b>	Developing provisional models based on the identified attributes, quality domains and the conceptual model
<b>Step 6:</b>	Conducting a survey to gather data on customer satisfaction and service quality
<b>Step 7<sup>a</sup>:</b>	Testing the models with data gathered from a larger sample
<b>Step 7<sup>b</sup>:</b>	Testing other research questions with the data gathered from a larger sample
<b>MAIN SURVEY</b>	
<ul style="list-style-type: none"> <li>• <b>Sample &amp; sampling technique</b></li> </ul> <p>Sample size was determined through the selection of sample size method developed by Krejcie &amp; Morgan (1970: 608), and 1840 subjects were chosen by means of the purposive sampling technique from the Faculties of Arts of the University of Colombo, University of Sri Jayewardenepura, University of Ruhuna and Rajarata University of Sri Lanka. The strata were based on second, third and fourth year undergraduate students, postgraduate students, and academic staff members.</p>	
<ul style="list-style-type: none"> <li>• <b>Data gathering technique:</b></li> </ul> <p>A structured questionnaire was used based on multidimensional scaling, which is a combination of Likert, numerical, categorical and dichotomous scales (Cooper &amp; Schindler 2006: 373; Kotler 2000: 110).</p>	
<ul style="list-style-type: none"> <li>• <b>Data analysis:</b></li> </ul> <p>Multiple regression analyses, viz, BLRA and MLRA, were employed for</p> <ul style="list-style-type: none"> <li>○ Identification of relationships between quality domains and the service quality attributes; and</li> <li>○ Identification of relationships between quality domains and quality attributes in predicting overall satisfaction.</li> </ul> <p>Adjusted R<sup>2</sup> was employed for the models based on MLRA and Cox and Snell R<sup>2</sup> and correctness were used for the BLRA models to identify the best predictive models in each technique. Mean residual analysis was employed to identify the final model that demonstrates the highest predictability.</p>	
<b>Step 8</b>	Determining the best parsimony model for predicting customer satisfaction in the context of university libraries in Sri Lanka

Source: Compilation by author

Based upon attributes found in the first stage of the study, four provisional models were developed, and then a major empirical investigation was carried out by employing a large sample. The aim of this stage was to test these models with the objective of discovering the best parsimonious model to predict customer satisfaction in university libraries in Sri Lanka.

### **1.7 SCOPE AND DEMARCATION OF THE STUDY**

The aim of this section is to define the boundaries of the study and to set the parameters of the research undertaken. Recently, customer satisfaction and service quality as core concepts have come into prominence, attracting the attention of academics in the library and information science sector, as well as customers themselves. There are many interpretations of the concepts of customer satisfaction and service quality. However, interpretations that are appropriate and relevant to the study may be obtained from observed library practices. Such interpretations serve as bridges or linchpins bonding library administrators as service providers with their valued customers. This conceptual framework, with its demarcated boundaries, was adopted by the researcher, and he deliberately established two delimitations for this study, which are briefly explained below.

The research problem of this study on customer satisfaction and service quality was investigated on the basis of two different paradigms—namely, the disconfirmation paradigm and performance-only paradigm that underpin customer satisfaction in relation to service quality in the university libraries of Sri Lanka. Provisional models were therefore derived on the basis of these two paradigms. Although there are some other prominent paradigms existing in the literature, the use of the disconfirmation and performance-only paradigms has been widely accepted in customer satisfaction literature in different contexts. This research therefore focused only on these two dominant paradigms, based on expectancy disconfirmation and performance theories, to determine the best means for the university library sector to predict customer satisfaction from the service quality perspective.

This study focused on two universities located in Colombo, the capital of Sri Lanka—more specifically, the University of Colombo and the University of Sri Jayewardenepura, in addition to two universities located in the outer regions—the University of Ruhuna in the southern province, and the Rajarata University of Sri Lanka, located in the north central province, in order to include a wider representative sample from the entire university system in Sri Lanka. To conduct in-depth studies, only the Faculties of Arts from each of the selected universities were selected as samples. All postgraduate students, second year, third year and final year undergraduate students and permanent academic staff members were used as the sample population for the study. Some of the permanent academic staff members were management representatives in charge of academic affairs, who are designated as academic administrators in the universities in Sri Lanka and they provided more information on what academic administrators expect from their university libraries. As experience is an influential factor in assessing the quality of services, only students in second, third and fourth years were selected for the sample. Academic staff with a minimum of one year's experience was included in the sample, and temporary academic staff members who are generally difficult to trace, as they are not in permanent positions at the universities, were excluded. Non-academic staff members were also excluded due to their low library usage.

## **1.8 JUSTIFICATION FOR THE RESEARCH**

This research study is important in many ways. While having the potential to improve the quality of library services to improve customer satisfaction and thereby economically contribute to higher benefits, this study also serves as a useful instrument to predict customer satisfaction through service quality in university libraries, and principally in Sri Lanka.

These quality indicators may also serve as tools of reference to library administrators and particularly to policymakers in the higher education sector, giving them the basis by which to gauge levels of overall customer satisfaction and to measure the specific elements that determine levels of customer satisfaction in different service quality domains. The indicators developed will also provide the means by which internal library

operations may be tested on their functional efficiency and allow the application of appropriate corrective or regulatory measures. Therefore, this study—besides being an original empirical research study—will also serve as a very useful tool for university libraries, which seek to improve the quality of service to enhance customer satisfaction because the final model of the research is a comprehensive model applicable to university libraries in Sri Lanka. This study has also introduced an academic audit process by undertaking a survey of service quality and customer satisfaction and by setting up a more rigorous quality assurance scheme for university libraries in Sri Lanka, falling in line with the current quality assurance system and the relevant policy adopted by the UGC applicable to university libraries.

Furthermore, there is a dearth of research studies on customer satisfaction in relation to service quality in the higher educational library sector in Sri Lanka. Of particular importance is the need to increase understanding and knowledge relating to customer behaviours and expectations in the library sector. Therefore, it is particularly important to have a clear understanding of the expectations, attitudes and beliefs of library customers. While the literature is replete with empirical studies on service quality in general, there is a scarcity of empirical studies relating specifically to predicting customer satisfaction with university libraries. This research makes a contribution to the existing sparse body of knowledge and to theory development and confirmation.

There is also a need to look into quality attributes for each country, as each country has its own unique set of quality attributes (Gayatri *et al.* 2006; Jabnoun & Khalifa 2006: 375; Prayag 2007: 494; Tsoukatos & Rand 2007: 468; Zhao, Xie & Leung 2002: 323-325), with different levels of importance (Feinburg & de Ruyter 1995: 63). Library customers' attitudes towards the services of university libraries are grounded in Sri Lankan culture. Therefore, any findings from previous studies carried out in other countries may be of limited relevance to Sri Lanka, hence the necessity to conduct context-specific investigations to improve the quality of services in university libraries.

## 1.9 OPERATIONAL DEFINITIONS

The operational definitions used in this thesis as a basis for understanding the conceptual and contextual concepts related to the stated research problem are given below.

**Customer:** The term “customer” refers to the consumer of any types of services in any organisation, including library services.

**Customer satisfaction:** Oliver (1997: 13) defined customer satisfaction as the customer’s fulfilment of response. “It is the judgement that a product or service feature, or the product or service itself, provided (or is providing) a pleasurable level of consumption related fulfilment, including levels of under or over fulfilment.” As this is indubitably a generic definition of customer satisfaction, in this study, the term “customer satisfaction” refers to the judgment that service quality indicators itself in a university library, “provided (or providing) a pleasurable level of consumption related fulfilment including the level of under fulfilment or over fulfilment” (Oliver 1997: 13). This definition is a modification of Oliver’s (1997) definition to produce a more authoritative definition.

**Explanatory attributes:** This term is used in the thesis at hand to designate all socio-demographic, situational attributes and service quality attributes pertaining to the subject of the study. Thus, the explanatory attributes fall into three categories: socio-demographic, service quality and situational attributes.

**Exploratory study:** This refers to the research employed to develop a preliminary understanding of service quality and customer satisfaction. It is also employed to identify the quality attributes, domains, situational and socio-demographic attributes.

**Library administrators:** This refers to all levels of librarians, such as assistant librarians, senior assistant librarians, deputy librarians, chief librarian and those who administer the university library.



**The model:** This refers to the final model, which was devised from a provisional model after rigorous empirical testing to confirm that the model does have higher predictability of customer satisfaction in relation to service quality.

**Multicollinearity:** If there are more than one explanatory attribute, there would be a possible problem, viz. although one or more attribute/s may explain the dependent attribute well, it/they may be closely correlated with each other. This could mean that is difficult to distinguish the individual effects of both variables. Thus, Multicollinearity refers to the case when there are very high correlations among attributes. Garson (2008) explains

multicollinearity refers to excessive correlation of the predictor variables. When correlation is excessive (some use the rule of thumb of  $r > .90$ ), standard errors of the b and beta coefficients become large, making it difficult or impossible to assess the relative importance of the predictor variables.

**Paradigm:** The term “paradigm” is used to denote a theoretical framework or model, which underpins a particular theory (Merriam-Webster 2006). “A paradigm shapes the formulation of theoretical generalisation” (Lovelock & Gummesson 2004: 21).

**Parsimony:** The term “parsimony” denotes

simplicity in explaining the phenomena or problems that occur, and in generating solutions for the problems; it is always preferred to complex research frameworks that consider an unmanageable number of factors. (Sekeran 2003: 26)

**Predictability:** The definition of predictability is “something you know that is sure to happen” (Jones 2008). According to Changind (2007), “it is a normal part of the human condition to be constantly forecasting ahead. We build internal models of the world based both on our experiences and what others tell us, and then use these to guess what will happen next.”

**Provisional Models:** Based upon the fuzzy conceptual model and the results of the exploratory study, fairly comprehensive customer satisfaction models have been

developed. These models have not been tested statistically to ascertain whether they are viable in the particular contextual setting.

**Quality attributes:** These are measurable factors or criteria related to service quality, for example, staff helpfulness, courtesy, promptness, etc. Each attribute corresponds to a question asked from the library customers in the survey. Some of these attributes are similar across sectors, but others are specific. Even if they are identical, their importance may vary between sectors.

**Quality domains:** A number of related attributes have been aggregated into domains. In other words, a domain groups a few strongly related attributes through factor analysis. The aggregation of attributes into domains is based on assumptions about the logical relationship between them, derived from the empirical investigation based on factor analysis. The results of the exploratory survey have confirmed the logic of the proposed grouping.

**Service quality:** According to Grönroos (1984:37), service quality is the outcome of an assessment process, in which the customer compares his/her expectations with the service he/she perceives he/she has received. Parasuraman, Zeithaml and Berry (1988: 15) agree with this notion, and they define it as the “overall assessment of a specific service firm that results from comparing the firm’s performance with the customer’s general expectations of how firms in that industry should perform.” However, since all these definitions are subjectively based on the disconfirmation paradigm, they do not correspond to a general definition, which suits the term “service quality” in an objective manner. Specifically, the concept of service quality closely relates to customer satisfaction. Service quality is defined in this thesis as a service’s conformance to customer needs or the capability of a particular service to satisfy the customer needs, as expected by library customers in universities.

**Service quality indicators:** This report brings into play the term “service quality indicators” to commonly denote all service quality attributes and domains inherited in the milieu of university libraries.

**Situational attributes:** Situational attributes are conditions, circumstances and states of affairs pertaining to the subjects of this study, for example, a customer’s prior library experience, awareness of library services and situationally produced expectations.

## **1.10 STRUCTURE OF THE THESIS**

This thesis is divided into seven chapters:

**Chapter 1 – Introduction** – The motivation for study and a brief overview of the conceptual and contextual backgrounds to the research study are discussed in this chapter. The research objectives, research questions, potential contribution, demarcation and outline of the thesis are discussed.

**Chapter 2 – Conceptual review** – This chapter reviews the existing theories in relation to customer satisfaction on the outlook of service quality and the theoretical frameworks, which comprise underpinning relationships to be addressed in this study. The chapter concludes with the theories needed to be empirically tested in accordance with the research problem and its objectives.

**Chapter 3 – Contextual research review** – This chapter reviews the prevailing research literature in the context of customer satisfaction in relation to service quality. This specifically addresses the contextual applicability of the conceptual framework identified in Chapter Two to substantiate its viability within the contextual environments put forth by a vast array of the existing literature. It principally provides the scholarly research information required to build the emerging frame of reference for the study. The identification of pre-acclaimed service quality and situational attributes were carried out for possible model building and model purification. The merits and demerits of the existing frameworks were also demonstrated, particularly in addressing the research questions of the study.

**Chapter 4 – Research design and methodology** – This chapter consists of two major parts: the study’s framework, and research strategy and methods. The framework of the study is a guide to the empirical aspect of the study. The research strategy and methods present the research methodology of the study. The sampling procedure, data collection procedure and analytical procedure used to empirically test the research questions, including possible measurement development and refinement, have also been presented.

**Chapter 5 – Exploratory study: Data analysis and findings** – Chapter Five details the results of the data analysis of the first stage of the research design—that is, the exploratory study. The broad aim of this exploratory study is to identify service quality attributes and aggregate them into quality domains by means of the factorial analysis technique. This stage employs four steps from the research design, and it identifies and refines the quality attributes. Then, it identifies the pertinent quality domains by means of an exploratory survey and presents them in order to carry forward the findings into the second stage.

**Chapter 6 – Main study: Data analysis and findings** – This covers the data analysis of the second phase of the study—that is, the main study. This section also presents the statistical justification of the scales and analytic methods used in the study. The procedures for the validity and reliability checks are also discussed in detail.

**Chapter 7 – Summary, discussions, implications and conclusions** – First, a summary of the thesis is presented. Then, the chapter introduces the selected optimal parsimonious model and discusses the findings of the study in general. Afterwards, the managerial, methodological and theoretical implications of the findings are discussed comprehensively. The chapter concludes with suggestions for future research.

## **1.11 REFERENCING STYLE AND REFERENCES**

The most commonly accepted way of acknowledging the work of other authors is to use a referencing style. Thus, this study correctly references all paraphrasing and direct quotations of other authors using the Harvard convention of referencing. The list of references was sorted by name and date.

A large portion (47%) of references in the thesis is older than ten years, while only 28% is less than five years old. Conversely, 53% of references is less than ten years old. However, the generally accepted procedure regarding the use of references for a thesis is that two-thirds of the references should have been published within the last five years period from the submission date of the final thesis to the university for examination purposes. However, the researcher had to be exempted from this rule because of some distinctive reasons specific to this study as indicated below.

1. This study is mainly based upon established theories related to service quality and/or customer satisfaction in the sphere of consumer behaviour, and the thesis principally tested the theories to select the best for developing a model to predict customer satisfaction. The research mainly used performance-only and expectancy disconfirmation theories, which were developed in the 1980s. Thus, a large number of research studies on these theories were conducted during the 1980s, and therefore, the study used original articles of these research studies when referring to particular theories in the thesis. Thus, by reviewing the literature that emerged between 1980 to 2000, it is apparent that a large number of good research studies on service quality and/or customer satisfaction have been carried out within this period of time.

2. There is a dearth of contemporary research studies to be found in the contextual area, where the research problem at hand resides. The quality of some of the studies based on service quality and/or customer satisfaction in libraries is also questionable because most of them have not used the established theories correctly, as indicated in section 3.5 of Chapter Three. However, it was extremely difficult to find current research articles that are relevant to the construct of “customer satisfaction in relation to service quality in libraries”, compared to studies carried out in other disciplines during the 1980s and 1990s.

3. Since the latest research has also linked to studies conducted in the 1980s and 1990s, the researcher believes that it is very important to see the original articles before citing

them in the text, rather than citing them as “cited in”, which may lessen the overall quality of the thesis.

Given the above circumstances, a number of dated sources were used for this research study, as there were no options to integrate the latest research and particularly to maintain the high quality of the thesis.

## **1.12 SUMMARY**

Chapter One provided an overview of the study. This is the culmination of the study, which belongs to the general area of library and information science and marketing management. This study aims to examine different indicators of service quality in the university library sector, and to determine the most effective means of predicting customer satisfaction. The research is therefore concerned with modelling customer satisfaction in relation to service quality, by developing a robust model for possible predictions concerning this specific phenomenon. The next chapter reviews the conceptual fundamentals and paradigms to formulate the conceptual underpinning, which supports a study of how organisations orient towards and proceed with customer satisfaction relating to service quality. The review summarises the pertinent conceptual base and gives a suitable framework for the study to address the research problem.

## **CHAPTER TWO: CONCEPTUAL REVIEW**

### **2.1 INTRODUCTION**

In Chapter One, pertinent concepts and context were introduced, the problem identified and the aim and purpose of this study established. Chapter Two is concerned with the review of the conceptual literature, which underpins the study to provide a conceptual foundation that supports a study of how libraries are oriented towards and proceed with customer satisfaction in relation to service quality. It also strives to discuss the main theories underlying the problem domain in order to form an integrated conceptualisation of customer satisfaction, which will form the conceptual base of this study. First, the literature regarding the conceptual framework of customer satisfaction and service quality is discussed in this chapter. The nature of service quality and customer satisfaction are defined and discussed, before proceeding to a comprehensive discourse on the theoretical paradigms that underpin the constructs. Based upon these theoretical paradigms, the theoretical models already developed in the discipline of service marketing area and critiques of those concepts and constructs, as presented in various research studies, are comprehensively reviewed. Reviews of the paradigms mentioned above facilitated the development of a notional theoretical framework to understand customer satisfaction on service quality perspective. Such understanding best begins with basic broad concepts, such as service marketing and service quality.

### **2.2 SERVICE MARKETING**

The advancement of innovations—particularly, the technical developments of the knowledge era—have made a significant contribution to the market economy in changing the face of its services. The service component of today's market economy is similar in importance to goods. Until recently, service organisations lagged behind manufacturing organisations in their use of marketing strategies. When customers purchase physical goods, they become the owners of these goods because ownership is transferred from the vender to the customer. In contrast, a service customer receives the right to that service for only a specified amount of time (Kandampully 2002; Lovelock & Wright 1998: 5), and it cannot be returned (Gaster & Squires 2003: 97; Schneider & White 2004: 7). Thus,

it is apparent that marketing strategies were not widely used by service organisations in early period of time.

There are also professional service organisations about which professionals previously believed it unprofessional to use marketing strategies to put their commodities up for sale in the marketplace (Kotler 2000). There are other service organisations, such as schools, libraries and hospitals, which have not resorted to marketing their services because of the lack of competition they faced, until recently. However, this situation has now changed, and a growing need for service marketing has distinctly emerged in all kinds of service organisations in the service sector. With the developments of technologies, specifically the Internet and market competition, a growing need for service marketing has evolved to face the ever increasing competition and organisational success in the broad spectrum of the marketing world. The most important decision factors for purchasing goods and services, which influences the customer's buying decision, are product and service quality, which also contribute to market-share and return on investment. Thus, every service organisation was required to adopt sophisticated marketing strategies to thrive in the sector.

One of the most central distinctions between goods and services is that “goods” are “things” and a “service” is an “act”. The fact that a service is a process rather than a “thing” means a service firm theoretically has no products, but only interactive processes (Grönroos 2001: 150). According to Kotler (2000: 467):

A service is any act or performance that one party can offer to another that is essentially intangible and does not result in the ownership of anything. Its production may or may not be tied to a physical product

Kotler (2000: 468) identified four key characteristics to describe a service:

- **Intangibility:** services cannot be seen, touched, felt or smelled before they are purchased;
- **Inseparability:** services are more often than not produced and consumed simultaneously;



- **Variability:** service depends on who provides it, and also where and when it is provided; and
- **Perishability:** services cannot be inventoried, stored or warehoused.

Service marketing may therefore be described as a set of acts that has the traits delineated by Kotler (2000). Palmer (2005: 3) defines service marketing as the “refining of marketing to allow the principles to be organised more effectively in the service sector.” Service marketing started to become a legitimate sub-stream within the discipline of marketing in the 1970s, but has since grown exponentially. With increasing recognition of the importance of service marketing, studies in the field have realised within the last two decades the indispensability of this type of marketing for business and non-business enterprises.

Although the traditional marketing concept is defined as “the task of finding and stimulating buyers for the firm’s output, which involves product development, pricing, distribution and communication” (Kotler & Levy 1969: 10), the essence of service marketing is more complicated than the traditional so-called 4 “Ps”, viz, price, place, promotion and product approach (Kotler 1972: 52). It requires a systematic approach by service firms, in which the marketing message is directed at both employees and customers (Kotler & Armstrong 1991: 260). In view of the complexity of service marketing, Grönroos (1998: 324-325) argues that service marketing requires not only external marketing, but also internal and interactive marketing. External marketing describes the normal work done by companies to prepare, price, distribute, and promote the service to customers. Internal marketing describes the work done by companies to train and motivate their employees to serve the customers well. Interactive marketing describes the employees’ skill in serving the customers, as customers judge the quality of services (Kotler 2000). Thus, this situation calls for an integration of all three components to form a successful service marketing strategy for an organisation.

Researchers in this area of service marketing have demonstrated that services are unique and a totally different phenomenon, requiring their own marketing paradigms (Grove,

Fisk & John 2003: 107; Lin 2007: 364; Parasuraman, Zeithaml & Berry 1985: 34). The focus of marketing has been revolutionised from the early emphasis on the provision of goods to the new emphasis on the provision of services, based upon the concept of economic exchange. This suggests that goods should be marketed in a service context, rather than vice versa (Lovelock & Wirtz 2004: 23; Vargo & Lusch 2004: 5-6). According to Sheth, Sisodia and Sharma (2000), cited in Vargo & Lusch (2004: 6), “service centered view of marketing is customer centric.” Wright (1995: 37) observed that “firms ... need marketing skills to cope with the increasing competitive environment and rising consumer expectations.”

Grönroos (1998: 324-325) and Schneider (2004:144) explain the difference between product-oriented and service-oriented marketing approaches comparatively. Grönroos (1998: 324-325) differentiates the two concepts in the following diagrams.

**FIGURE 2.1: THE PRODUCT-ORIENTED PERSPECTIVE**



Source: Grönroos (1998:324)

**FIGURE 2.2: THE SERVICE-ORIENTED PERSPECTIVE**



Source: Grönroos (1998:325)

The marketing process in a service organisation is depicted in Figure 2.2, while product marketing is depicted in Figure 2.1. A comparative perusal of both diagrams shows that most elements in the two figures are different. In the diagram depicting the service-oriented approach, human resources, technology, knowledge and customer's time are presented, while the product component is missing. In reality, however, some of the tangible products have been integrated with the major service function in many service organisations. For instance, in libraries, product elements such as monographs, audio-visual materials, electronic journals, databases, on-line manuals and other related features are also found as integral parts of the service process. They are one type of resource found among other types that need to be integrated to become a functioning service process.

The success of the service marketing strategy is, however, linked with the quality of services rendered to customers. It underscores the fact that to reach customers and satisfy

them with the services of organisations, there is an urgent need to improve the quality of service.

### **2.3 SERVICE QUALITY**

The number of research studies on different services is rapidly increasing. Among those research studies, one might note that scholars and library administrators in particular have shown considerable interest on issues related to the quality of service and its measurements. Significant conceptual advances have been made by a number of researchers from different academic disciplines. Thus, the theoretical paradigms in conceptualising service quality have always been invigorated by numerous forms of theoretical reasoning, supported by a variety of research studies.

A close perusal of business industries in the 1980s revealed that the concept of service quality had received a great deal of interest as a key strategic factor for product differentiation, and for increases in market share and profits (Bolton, Lemon & Verhoef 2004: 278; Luo & Homburg 2007: 113; Newman & Cowling 1996, cited in Maddern *et al.* 2007: 999). It also revealed that the concept of service quality is primarily based on the quality of services as perceived by customers. When service providers understand how services are assessed by their customers, it becomes possible to identify how to manage these assessments and how to influence them in a positive direction (Gaster & Squires 2003: 57; Seth, Deshmukh & Vrat 2005: 914). Although it is difficult to define the authenticity of service quality (Brown & Swartz 1989: 93; Schneider & White 2004: 9), some researchers have reached a consensus on the fact that service quality should be defined and measured from the customer's perspective. Thus, service quality appears to be predominantly defined from the perspectives of customers in a given service organisation. Many definitions of service quality maintain that this is the result of an assessment process, whereby customers compare their expectations about a service with their perception of the service to be received (Haywood-Farmer 1988: 19). Zeithaml and Bitner (1996: 117) also define service quality as the "delivery of excellent or superior service relative to customer expectations."

However, the most widely accepted definition of perceived service quality is that it represents the discrepancy between customers' expectations and their perceptions of the service performance, which is basically founded on the expectancy disconfirmation theory (Churchill & Suprenant 1982: 492; Oliver 1993: 422; Parasuraman, Zeithaml & Berry 1994: 111; Tse & Wilton 1998: 208). Therefore,

Service Quality (SQ) = Perceptions of the performance of service quality (P) – Expectations of service quality (E)

This can be mathematically represented as:

$$SQ = P - E$$

### **2.3.1 Nature of service quality**

Two different perspectives of the conceptualisation of service quality can be found in Nordic and North American literature. Researchers such as Lehtinen and Lehtinen (1991), Brady and Cronin (2001) and Schneider and White (2004), who follow the “Nordic” perspective, have defined the area of service quality in global terms. Some of the earliest Nordic work on conceptualising service quality can be traced back to Grönroos's (1990: 37) technical and functional service quality framework. He argues that service quality can be divided into two generic domains: technical quality that denotes what is provided, and functional quality that denotes how the service is provided. Subsequently, Grönroos (1990: 47) identified six specific domains in which service quality could be measured: professionalism and skills, reliability and trustworthiness, attitudes and behaviour, accessibility and flexibility, recovery and reputation, and credibility.

Grönroos (1984: 38-40) also suggests that in the context of services, functional quality is generally perceived to be more important than technical quality, assuming that the service is provided at a technically satisfactory level. He further points out that functional quality domains can be perceived very subjectively. However, these domains have not been thoroughly subjected to rigorous empirical testing, although a number of studies have used some of the domains anchored in the principles put forward (Grönroos 1990; Lehtinen & Lehtinen 1991). Lehtinen and Lehtinen (1982) (cited in Kang & James 2004:

267) define service quality in terms of physical quality, interactive quality and corporate (image) quality. Physical quality relates to the tangible aspects of the service. Corporate quality involves the company's image or profile, and interactive quality is derived from the interaction between contact personnel and customers, as well as between customers.

On the other hand, according to the “North American” perspective, service quality is conceptualised as a “service encounter”, which describes service encounter characteristics, such as reliability, assurance, or empathy (Brady & Cronin 2001: 36-37). A service encounter is defined as any aspect of a service organisation with which a customer interacts (Driver & Johnston 2001: 132). The definition of a service encounter is broad and includes a customer’s interaction with customer-contact employees, machines, automated systems, physical facilities and other ‘service provider’ visible elements. When identifying the service quality of a given service, the service encounters must have quality characteristics, such as characteristics of employees’ responses and reliability of automated systems. All these quality characteristics,<sup>6</sup> including responsiveness, reliability and other aspects, have been aggregated into domains by some empirical research studies. Parasuraman, Zeithaml and Berry (1985: 47) identified ten domains of service quality from a qualitative study and later reduced them to five domains through empirical research. The five domains include tangible, assurance, reliability, responsiveness, and empathy (Parasuraman, Zeithaml & Berry 1988: 26). It is thus apparent that the Nordic and North American perspectives of conceptualising the domains of service quality overlap.

For the period of developing the concept of service quality in service industries, a similarity between service quality and customer satisfaction was also discovered because these two constructs are structurally similar and are examined using the same framework of expectations and/or perceptions (Hernon 2002).

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<sup>6</sup> These quality characteristics are referred to as quality attributes in forthcoming chapters of this thesis.

## **2.4 CUSTOMER SATISFACTION**

The rapidly increasing amount of literature on customer satisfaction straddles many academic disciplines. The review given below initially defines the term customer satisfaction in reference to concepts derived from the prevailing literature, before examining the nature of satisfaction. In this connection, it discusses the theories that are considered as the antecedents and consequences of the construct of customer satisfaction.

The concept of customer satisfaction has been defined in various ways. Zeithaml, Berry and Parasuraman (1993: 7) suggest that customer satisfaction is a function of the customer's assessment of service quality, product quality and price. Woodruff, Cadotte and Jenkins (1983: 297) consider satisfaction to be an emotional reaction by customers in response to an experience with a product or service. However, Iacobucci, Ostrom and Grayson (1995: 295-296) examine a number of definitions derived from well-developed research studies and distinguish between the concepts of consumer value and customer satisfaction. They state that customer satisfaction, best judged after purchase, is experiential and takes into account the qualities and benefits, as well as the costs and efforts associated with a particular purchase.

However, Gerson (1996: 24) suggests that a customer is satisfied whenever his or her needs, real or perceived, are met or exceeded. From the existing definitions of customer satisfaction, two generic means of definitions can be identified: customer satisfaction as an outcome, and customer satisfaction as a process. Some definitions assume that customer satisfaction is simply an outcome resulting from the consumption experience. In this line of thought, Oliver (1981: 27) argues that it is the summary of the psychological state, resulting when the emotions surrounding disconfirmed expectations are coupled with the customer's prior feeling on consumption experience. To support the notion that customer satisfaction is a process, some researchers (Gupta & Zeithaml 2006: 720; Rust & Chung 2006: 570; Tse & Wilton 1988: 204) state that it is the process connected to the response of customers towards the assessment of the perceived discrepancy between prior expectations and actual performance of the product/service, as perceived after its consumption.

### **2.4.1 Nature of customer satisfaction**

Understanding the nature of satisfaction is essential for the possible conceptualisation of the customer satisfaction construct. Johnson, Anderson and Fornell (1995), cited in TCRP Report 47 (1999), state that “the modeling of customer satisfaction depends critically on how satisfaction is conceptualized.” Padgett and Allen (1997: 52), and Mano and Oliver (1993: 465) have identified satisfaction as a cognitive, affective and behavioural reaction connected with a specific service event. Thus, it brings into play the conceptualisation of customer satisfaction, based on the nature of satisfaction founded on the theories that underpin the construct of satisfaction. Therefore, in any search for definitions of customer satisfaction, many notions of customer satisfaction, based on the theoretical nature of satisfaction, emerge. Many of these definitions are founded upon renowned theories that have dominated service quality and customer satisfaction literature in the service marketing area. The theories that provide the basis for satisfaction can thus be depicted as follows:

**1. Equity theory** – This is also known as Adams' Equity Theory, which attempts to explain relational satisfaction in terms of perceptions of fair/unfair distributions of resources within interpersonal relationships (Oliver & DeSarbo 1988: 496). According to the equity theory, satisfaction occurs when a given party feels that the ratio of the outcomes of a process is in some way balanced with such inputs as cost, time and effort (Oliver & DeSarbo 1988: 496).

**2. Attribution theory** –

Attribution theory, on the other hand, comes into play when products or services fail to meet customer expectations and assumes that people search for causes of events, such causes being either buyer-related or seller-related. Buyer and seller may infer different reasons for failure so leading to conflict which results in dissatisfaction. (Newsome & Wright 1999)

Generally, customers utilise three factors—controllability, locus of causality and stability—to determine the effect of attribution on satisfaction.



- Controllability: Is the outcome caused by events outside the control of the service provider/customer, or could the provider have prevented it?
- Locus of causality: Is the outcome attributable to the customer (internal) or the service provider (external)?
- Stability: Is the incident caused by a freak outlier in an otherwise stable environment, or do the processes used by the provider appear unstable?

Controllability indicates the poor outcome in a consumption experience that may lead to the dissatisfaction of the customer with the service provider, only when the customer understands that the service provider had the capacity—that is, the control—to perform in a better fashion. The locus of causality is either attributed to factors that are internal or external. For example, buyers' perceived buying abilities are internal. On the other hand, the external locus of causality is attributed to the difficulty of the task of buying or of other people's efforts. Causes that are persistent tend to have a greater impact upon satisfaction because consumers are generally more merciful towards service failures that appear to be rare events (Oliver & DeSarbo 1988: 496).

**3. Performance theory** – Customer satisfaction is directly related to the perceived performance characteristics of products or services. Performance is defined as the customers' perceived level of product/service quality, relative to the price they pay. As such, satisfaction is equated with value, where value equals perceived quality divided by the price paid (Johnson, Anderson & Fornell 1995: 699,700-701). On the other hand, some researchers (Cronin & Taylor 1992: 65) explicate the term customer satisfaction as a function of the performance of service quality attributes. In short, it may be said that customer satisfaction is directly associated with the objectively perceived performance of the product/service.

**4. Expectancy disconfirmation theory** – This theory has been tested and confirmed in several studies (Iacobucci, Ostrom and Grayson 1995: 278; Oliver 1981: 35; Oliver & DeSarbo 1988: 495), which generally explicate that customers purchase goods and services with pre-purchase expectations regarding anticipated performance. In other

words, customers develop expectations of product or service performance prior to purchase. When the product/service is bought and used, the expectations are compared with actual performance, using a 'better-than' or 'worse-than' expression. To simplify it further, once the product or service has been purchased and used, outcomes are compared against expectations.

According to Schneider and White (2004: 53), most researchers agree that the primary model of customer satisfaction is the expectation-disconfirmation model. This model describes a three-step process, as follows.

- (i) Customers form expectations about a specific product or service.
- (ii) They use that product or service to form perceptions about its performance.
- (iii) They assess its perceived performance against their original expectation in order to determine the degree of confirmation with their expectations.

When the outcome matches expectations, confirmation occurs. Disconfirmation occurs when there are differences between expectations and outcomes. Negative disconfirmation occurs when the product/service performance is less than expected. Positive disconfirmation occurs when the product/service performance is better than expected (Johnson, Anderson & Fornell 1995: 700). Satisfaction is caused by confirmation or by positive disconfirmation of consumer expectations, and dissatisfaction is caused by negative disconfirmation of consumer expectations.

In the expectancy disconfirmation theory, customers may use multiple types of expectations in their satisfaction assessment processes (Brady, Cronin & Brand 2002: 17; Cadotte, Woodruff & Jenkins 1987: 305; Churchill & Surprenant 1982: 491; Tse & Wilton 1988: 204). These types are generally referred to as predictive expectations and normative expectations. Predictive expectations are usually defined as customer beliefs about the level of service that a specific service organisation would be likely to offer. These are frequently used as a standard of reference against which satisfaction judgements are made (Churchill & Surprenant 1982; Oliver 1980: 461; Wu *et al.* 2006:

222). Normative expectations are generally conceptualised as customers' ideas about the level of service that can also be referred to as desires.

Even though the underpinning paradigms of these equity and attribution theories present a better method by which to form customer satisfaction, they have not received the same level of attention in the prevailing literature as the expectancy disconfirmation theory and performance theory. Although these theories—other than the expectancy-disconfirmation and performance theories—show potential, the equity and attribution theories have not been thoroughly researched in the different contextual surroundings. The expectancy disconfirmation and performance theories, however, have been extensively applied in a vast array of research studies in various areas of academic interest. They have further proven their enhanced applicability in modelling service quality and customer satisfaction in different contextual settings.

From the foregoing discussions in relation to customer satisfaction theories, it appears that the performance theory may be more suited to modelling customer satisfaction in university libraries, rather than the expectancy disconfirmation theory, because it stands to question whether or not university clientele have a clear perspective of expectations with regard to library services. In many developing countries, it may be assumed that library patrons are educated with regard to what to expect from the library when they join the university. However, this leads to a new call for research studies in the discipline of library and information sciences, to determine which theory is best-suited to this research study.

## **2.5 CONCEPTUAL PARADIGMS FOR CUSTOMER SATISFACTION**

This section reviews the existing customer satisfaction paradigms in the light of their theoretical foundations. The purpose of this review is to identify the applicability of the paradigms to the current research. Thus, prior to analysing the pertinent paradigms on the construct of customer satisfaction in relation to service quality, it is necessary to explicate the causal association between customer satisfaction and service quality to understand the causative relationship.

### **2.5.1 Conceptual relationship between customer satisfaction and service quality**

Due to the urgent need for the development of a working model to elaborate upon the conceptual relationship between customer satisfaction and service quality (Rust & Oliver 1994: 14), many research studies have been conducted in different areas to determine whether customer satisfaction is influenced by service quality or vice versa. Boulding *et al.* (1993: 8) state that service quality and customer satisfaction are treated as one and the same by the business press. However, a dynamic process model is required to examine the subject from expectation to behavioural intentions. Nevertheless, an attempt to combine customer satisfaction and service quality as one entity or process was considered problematic by Taylor and Baker (1994: 176), who strongly advocate that customer satisfaction and service quality are separate and distinct. Strong arguments have been made by other researchers to consider customer satisfaction judgments to be at the very least causal antecedents of service quality (Bitner 1990: 79).

However, researchers and practitioners alike have exhibited considerable interest in the issues that surround the measurement of service quality and the conceptualisation of a cohesive relationship between quality and satisfaction (Brady, Cronin & Brand 2002: 17; Schneider & White 2004: 53). The most important aspect of this relationship is the causality between the two constructs. Which one is the antecedent to the other? Does satisfaction cause quality judgment, or does quality judgment cause satisfaction? Through the improvement of a conceptual foundation and empirical research findings, most researchers have now concurred that quality judgments cause satisfaction—that is, service quality is the antecedent to satisfaction (Cronin & Taylor 1992: 65; Dabholkar, Shepherd & Thorpe 2000: 166; Iacobucci, Ostrom & Grayson 1995: 279). Thus, there is a current consensus among researchers with regard to the causal order of these two constructs.

In considering the dependable statistical correlation between the constructs, the majority of studies have disclosed a linear relationship between customer satisfaction and service quality (Andreassen 2000; Cronin & Taylor 1992: 64; Parasuraman, Zeithml & Berry 1988). Most models of service quality, together with SERVQUAL and SERVPREF, also assume a linear relationship between the effect of various causes, including satisfaction and quality. However, a few studies have shown that the relationship between the

constructs is non-linear, which is specifically evident in a curvilinear function (Ting 2004). However, customer expectations and their perceptions may vary over time. It follows that the relationship between the constructs may diverge over time, but this has not yet been considered by any study in the field of library and information sciences to map the relationship between satisfaction and quality over the time construct.

## **2.5.2 Modelling customer satisfaction in relation to service quality**

The prevailing conceptual literature contains some significant paradigms, such as disconfirmation, performance-only, evaluated performance and normed quality, mainly derived from satisfaction theories. As identified by the conceptual relationship between customer satisfaction and service quality, the satisfaction process can be modelled through the paradigms described in section 2.4.2.1.

### **2.5.2.1 Disconfirmation paradigm**

One of the leading paradigms that has dominated the service quality and customer satisfaction literature since 1980 is the disconfirmation paradigm, adapted from the concept of consumer behaviour, which suggests that customers' post-purchase perceptions of a product or service are a function of their pre-purchase expectations (Churchill & Surprenant 1982: 503; Grönroos 1993: 51; Wu *et al.* 2006: 224). This is merely based on the expectancy disconfirmation theory, as identified in section 2.4.2.1. In other words, this model explains that a customer compares his or her experience with pre-consumption expectations (before the consumption of a service) and post-consumption experience (after the consumption of the service). On the basis of this comparison, an attitude of satisfaction or dissatisfaction towards specific service is conjectured.

Adapting the disconfirmation paradigm, Parasuraman, Zeithaml and Berry (1985: 44) proposed a "gap model" operationalised as a comparison of the quality of a service that customers expect to receive from the service provider with the actual level of perceived service performance. According to Iacobucci, Ostrom and Grayson (1995: 278), this is referred to as a "disconfirmation paradigm" in the customer satisfaction literature, and as a "gap model" in the service quality literature.

On par with the disconfirmation paradigm/gap model, service quality is a function of disconfirmation (Lee, Lee & Yoo 2000: 218; Parasuraman, Zeithaml & Berry 1985: 47; Parasuraman, Zeithaml & Berry 1988: 15), which can be modelled as:

$$\text{Service Quality} = f(\text{disconfirmation})$$

$$SQ = f(d)$$

Where SQ = Service Quality; d=disconfirmation  
 As disconfirmation is Performance (P) – Expectation (E),  
 $SQ = f(P - E)$

Furthermore, this can be rewritten as

$$SQ = \sum_{j=1}^k (P_{ij} - E_{ij})$$

where

$SQ$  = Service quality

$P_{ij}$  = Performance perception of stimulus  $i$  concerning attribute  $j$

$E_{ij}$  = Expectation of service quality for attribute  $j$ , which is the relevant norm for stimulus  $i$

$k$  = number of attributes

Research studies defining satisfaction hold that customer satisfaction is a function of service quality (Athanasopoulos 2000: 191; Bitner, Booms & Tereault 1999, as cited in Kassim & Bojei 2002: 845; Chandrashekar *et al.* 2007: 161; Guo, Duff & Hair 2008: 305; Hernan & Altman 1998: 36; Iacobucci, Ostrom, & Grayson 1995: 277; Schneider & White 2004: 10; Zeithaml, Berry & Parasuraman 1993: 2-3).

Customer Satisfaction = f (Service Quality)

$$CS = f(SQ)$$

Where CS = Customer Satisfaction; SQ = Service Quality

Since service quality is a function of disconfirmation, customer satisfaction is also a function of disconfirmation (Davis & Heineke 1998: 65). Thus,

$$CS = f(d)$$

Thus, CS = f (performance – expectation)

$$CS = f(P - E)$$

This dominant theoretical paradigm used in many satisfaction research studies is also termed “disconfirmation paradigm,” which has its roots in social and applied psychology (Oliver 1997: 23). Therefore, the disconfirmation paradigm presents its satisfaction judgments in three ways:

1. Satisfaction;
2. Higher satisfaction; and
3. Dissatisfaction.

When performance is greater than the customers’ expected level of performance of the service, higher customer satisfaction will result because the service performs better than expected (Harris *et al.* 2006: 426). Customer dissatisfaction occurs when the performance is less than the customers’ expected level of service, as the service performs poorer than the customers’ expected level. A confirmation of expectations, or zero disconfirmation, is considered a state of satisfaction. A negative disconfirmation indicates that their expectations were not met and yields a state of dissatisfaction.

### **2.5.2.2 Performance-only paradigm**

The performance-only paradigm is also a dominant theoretical paradigm in service quality and customer satisfaction research studies. This paradigm is anchored in the performance theory discussed in section 2.4.2.1. It appears that customer satisfaction is based on the performance of services, rather than receiving discrepancy scores between performance and expectations of a specific service. As the disconfirmation paradigm has been questioned by some researchers in measuring service quality, the performance-only paradigm has been proposed as an alternative approach. According to the performance-only paradigm, service quality depends primarily on the customers’ perceptions of service performance. The emerging literature extensively supports the performance-only paradigm over the disconfirmation paradigm (Boulding *et al.* 1993: 24; Briggs, Sutherland & Drummond 2007: 1006; Cronin & Taylor 1992: 64-65). In 1993, Boulding *et al.* (1993: 24) stated:

Our results are incomplete with both the one-dimensional view of expectations and the gap performance for service quality. Instead, we find that service quality is directly influenced only by perceptions of performance.

It shows that service quality can be conceptualised as performance of the service. Thus, service quality is defined as a function of service performance (Brady Cronin & Brand 2002; Cronin & Taylor 1992: 64; Dabholkar, Shepherd & Thorpe 2000: 146; Montoya-Weiss *et al.* 2003: 449). Accordingly,

Service Quality = f (Performance)

$$SQ = f(P)$$

Where SQ = Service Quality; P = Performance

Mathematically, this translates to:

$$SQ = \sum_{j=1}^k P_{ij}$$

where

$SQ$  = Service quality

$P_{ij}$  = Performance perception of stimulus  $i$  concerning attribute  $j$

$k$  = Number of attributes

As customer satisfaction is a function of service quality (Athanasopoulos 2000: 191;

Chandrashekar *et al.* 2007: 161; Herson & Altman 1998: 36; Iacobucci, Ostrom &

Grayson 1995: 277; Zeithaml, Berry & Parasuraman 1993: 2-3), it can be presented as

$$CS = f(SQ)$$

In addition, research has demonstrated that customer satisfaction is also a function of performance (Davis & Heineke 1998: 66). Thus,

$$CS = f(\text{performance})$$

$$CS = f(P)$$

Given the above, satisfaction results when service performance is higher, and dissatisfaction occurs when service performance is lower. The demarcation of the higher and lower margins is decided by the perception of the customer.



### 2.5.2.3 Weighted paradigms

There are some criticisms of the disconfirmation and performance-only paradigms, particularly in the aspect of conceptual formation. Cronin and Taylor (1992:65) are particularly emphatic in their critiques because service quality attributes are not expected to be equally important in all kinds of service organisations. Some researchers have suggested the inclusion of weights based on the importance of each attribute to be decidable by customers on service quality measurement scales (Cronin & Taylor 1992: 65; Parasuraman, Berry & Zeithaml 1991a; Parasuraman, Zeithaml & Berry 1985, 1988). This can be accomplished by allocating scores (weights) to the attributes of existing disconfirmation and performance-only paradigms. The new paradigms are therefore termed “weighted disconfirmation” and “weighted performance-only” paradigms. Thus, the weighted paradigms are not distinct paradigms, but are basically legitimate extensions of the disconfirmation and performance-only paradigms, the difference being the importance given on the basis of weightage.

#### (i) Weighted disconfirmation paradigm

In this paradigm, disconfirmation is multiplied by the importance of the attribute. Customers are asked to rate the importance of each attribute, and the disconfirmation is subsequently multiplied by a particular importance score.

Service quality = (Performance – Expectation) x Importance

$SQ = (P - E) \cdot I$  where I = Importance

Thus,  $SQ = d \cdot I$

In a more explorative way, this can be denoted as follows:

$$SQ = \sum_{j=1}^k (P_{ij} - E_{ij}) I_{ij}$$

where

$SQ$  = Service quality

$P_{ij}$  = Performance perception of stimulus  $i$  concerning attribute  $j$

$E_{ij}$  = Expectation of service quality for attribute  $j$  which is the relevant norm for stimulus  $i$

$I_{ij}$  = Importance of stimulus  $i$  concerning attribute  $j$

$k$  = Number of attributes

Since customer satisfaction is a function of service quality, as demonstrated in section 2.5.2.1, satisfaction occurs through quality of service. For example, if service quality of a given service is higher, customer satisfaction with the service will also increase.

**(ii) Weighted performance-only paradigm**

In this paradigm, performance-only scores are multiplied by the importance of the attribute. Customers are requested to rate the importance of each attribute, and then the performance score is multiplied by a particular importance score. Accordingly,

Service quality = Performance x Importance  
 $SQ = (P).I$  where I is importance

This is mathematically represented as:

$$SQ = \sum_{j=1}^k (P_{ij})I_{ij}$$

where

$SQ =$  Service quality

$P_{ij} =$  Performance perception of stimulus  $i$  concerning attribute  $j$

$I_{ij} =$  Importance of stimulus  $i$  concerning attribute  $j$

$k =$  Number of attributes

As discussed in section 2.5.2.2, customer satisfaction is a function of service quality. Thus, satisfaction with service here also correlates with quality of service.

**2.5.2.4 Evaluated performance and normed quality paradigm**

Since there are some problems regarding the validity of gap models (P-E), specifically with regard to its conceptual and operational aspects, Teas (1993) developed a new model based on the same expectancy disconfirmation theory. In this paradigm, he proposes two kinds of frameworks—namely, the evaluated performance and normed quality frameworks.

### (i) Evaluated performance (EP) framework

With the assumption that an individual evaluates object (I) with perceived certainty, and that the object (I) has a constant amount of each attribute, the Minkowski space parameter equals unity. Therefore, the perceived quality of object I is:

$$Q_i = -\| \sum_{j=1}^m w_j | (A_{jk} - I_j) \|$$

where

$Q_i$  = Perceived quality of object  $i$

$w_j$  = Importance of attribute  $j$

$A_{jk}$  = Perceived amount of attribute  $j$  possessed by object  $i$

$I_j$  = The ideal amount of attribute  $j$  as conceptualised in classical ideal point attitudinal models

$m$  = Number of attributes

Thus, it is assumed that perceived service ability to deliver ultimate satisfaction can be conceptualised as the service's relative similarity with the customer's ideal service features.

### (ii) Normed quality framework

The quality of another object  $i$ ,  $Q_i$ , is relative to the quality of the excellence norm, the normed quality (NQ):

$$NQ = [Q_i Q_e]$$

$Q_i$  = Normal quality index for object  $i$

$Q_e$  = The individual's perceived quality of the excellence norm object

For infinite ideal points, normed quality is

$$NQ = \sum_{j=1}^m W_j (A_{ij} - A_{ej})$$

$A_{ej}$  = individual's perceived amount of attribute  $j$  possessed by excellence norm  $e$

Even in this paradigm, it is recognised that customer satisfaction is a function of service quality—that is,  $CS = f(SQ)$ .

However, it was found that evaluated performance and normed quality paradigms are not dominant models in the service marketing literature, and thus, their validity, reliability

and appropriateness in diverse contextual environments have not been widely researched in contemporary research studies.

## **2.6 SERVICE QUALITY MODELS FOR MEASURING CUSTOMER SATISFACTION**

A few conceptual models and paradigms have been postulated in the field of customer satisfaction in relation to service quality, as shown in section 2.5. Even though early quality models concentrated primarily on goods, the enormous growth of the service sector in Western economies after the Second World War has resulted in a growing body of literature on service quality. Although the definition and modelling of service quality are generally acknowledged to be more difficult than modelling the quality of goods because of the intangible nature of services (Bergman & Klefsjo 1994, cited in Hofman & Worsfold 1996), there are two popular service quality models that are being used worldwide to measure service quality. These are SERVQUAL and SERVPREF.

### **2.6.1 SERVQUAL Model**

The SERVQUAL model was developed by Parasuraman, Zeithaml and Berry (1988), based on the disconfirmation paradigm referred to as the “gap model,” underscoring the expectancy disconfirmation theory. The gap model defines service quality as a function of the gap between customers’ expectations of a service and their perceptions of the performance of actual service delivery by an organisation.

SERVQUAL quickly became an instrument of choice to measure service quality in the service sector. The initial model consisted of ten domains: tangibles, reliability, responsiveness, competence, courtesy, credibility, security, access, communication and understanding customers (Parasuraman, Zeithaml & Berry 1988: 17). However, using several empirical analyses, these three researchers were able to redefine the scale by eliminating some domains from the original scale to consolidate several overlapping quality domains. Table 2.1 shows the correspondence between the ten original domains and the five new domains. While three of the domains remained the same, the remaining two were redefined, as indicated below.

**TABLE 2.1: CORRESPONDENCE BETWEEN SERVQUAL DOMAINS AND THE ORIGINAL TEN DOMAINS**

Original ten domains	New five domains				
	Tangibles	Reliability	Responsiveness	Assurance	Empathy
Tangibles					
Reliability					
Responsiveness					
Competence Courtesy Credibility Security					
Access Communication Understanding the customer					

Source: Zeithaml, Parasuraman & Berry (1990: 25)

Based upon the five domains—tangibles, reliability, responsiveness, assurance and empathy—Parasuraman, Zeithaml and Berry (1988: 23) posited that service quality could be measured by obtaining the difference between perceptions of performance and the expectations in those domains. The five domains of service quality in SERVQUAL are depicted by 22 attributes. The SERVQUAL questionnaire consists of two sections: one for identifying the customer’s perceptions of the performance of these 22 attributes, and the other for identifying customer expectations of the same attributes. The questionnaire was developed through comprehensive empirical psychometric testing and trials, making it applicable across a broad range of service industries (Chen, Chang & Lai 2009: 222; Parasuraman, Zeithaml & Berry 1988). Therefore, this model is generic and can be applied in the context of any service organisation to measure service quality, by modifying its domain structure as to the specific characteristics of any particular service setting.

Using the SERVQUAL model, the difference between the perception of the performance and the expectation scores for each of the 22 attributes in the instrument is calculated.

The definition of each domain is shown in Table 2.2. A smaller gap score between the expectations and the perceptions of the performance of these attributes means the service is being perceived as higher in quality. Negative gap scores indicate weakness in that particular attribute or domain, while positive gap scores mean the service provider is able to fulfil or exceed customer needs equivalent to expectations. Thus, negative gap scores end with customer dissatisfaction with the service quality attributes or domains, and positive gap scores end with customer satisfaction regarding the service quality attributes or domains.

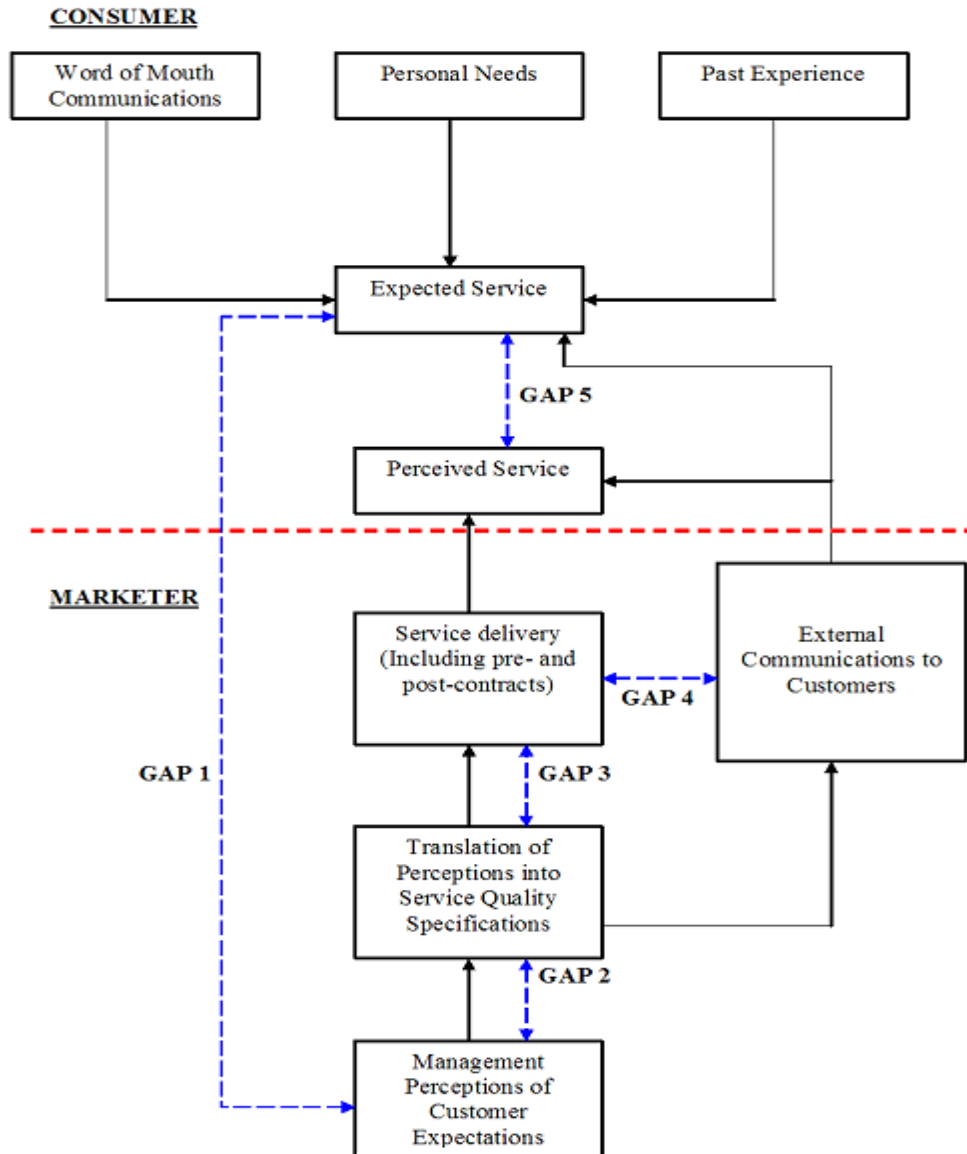
**TABLE 2.2: DOMAINS IN SERVQUAL MODEL**

<b>Domains</b>	<b>Definitions</b>
Tangibles	The appearance of physical facilities, equipment, personnel, and communication materials
Reliability	The ability to perform the promised service dependably and accurately
Responsiveness	The willingness to help customers and provide prompt service
Assurance	The knowledge and courtesy of employees and their abilities to inspire trust and confidence
Empathy	The caring, individualised attention the firm provides to its customers

Source: Parasuraman, Zeithaml and Berry (1988: 23)  
Parasuraman, Berry and Zeithaml (1991b: 41)

This model further concentrates on five gaps for measuring service quality and customer satisfaction, as depicted in Figure 2.3.

**FIGURE 2.3: SERVQUAL MODEL**



Source: Parasuraman, Zeithaml and Berry (1985: 44)

*Gap 1: The discrepancy between customers' expectations and management's perceptions of these expectations*

Management must predict the customer's expectations from the service to be delivered. According to Parasuraman, Zeithaml and Berry (1988: 12-13), this is the most important gap of the SERVQUAL model because the managers of organisations can bring their customers closer to this gap in order to identify their views and ideas about the services.

Subsequently, the management of the organisation can implement some possible remedies for identified deficiencies.

*Gap 2: The discrepancy between management's perceptions of customers' expectations and service quality specifications*

The difference between what managers think customers expect and the actual specifications they establish for service delivery leads to the second gap. Reasons for the emergence of this gap are inadequate commitment to service quality, lack of perception of feasibility, inadequate task standardisation, and absence of goal-setting.

*Gap 3: The discrepancy between service quality specifications and actual service delivery*

The discrepancy between service specifications and the actual service delivered creates this gap. Generally, this gap is created when employees are unable and/or unwilling to perform the service at the desired level, for various reasons: role ambiguity, role conflict, poor employee-job fit, poor technology-job fit, input deficiencies and inappropriate supervisory control systems, leading to an appropriate assessment/compensation system, lack of perceived control on the part of employees, and lack of teamwork.

*Gap 4: The discrepancy between actual service delivery and what is communicated to the customer about the discrepancy*

The difference between what an organisation promises about a service and what it actually delivers is described as Gap 4. Two factors contribute to this gap: inadequate communication among operations, marketing, and human resources, as well as across branches; and over-promising in communication.

*Gap 5: The discrepancy between customers' expected services and perceived service delivery*

Gaps 1 to 4 contribute to the development of Gap 5, which is the difference between what customers expect to receive from the service, and what they believe they actually



received. Customers' perceptions are influenced by many sources, which include word-of-mouth communications, personal needs, past experiences, and communications from the service organisation. This is the most important gap because if the perceived service falls short of the customers' expectations, they will become disappointed and dissatisfied. The model is also process-oriented because it identifies the gaps that may arise in various parts of the service process, which eventually affect the difference between the customers' expected and perceived quality.

SERVQUAL is significantly distinct from other conceptual models in that it describes one or more determinants of a quality service encounter (Brady & Cronin 2001). Although SERVQUAL has been extensively criticised on theoretical, operational and methodological grounds (Buttle 1996: 10-23), including multicollinearity (Chen, Gupta & Rom 1994: 26) and psychometric problems (Brown, Churchill & Peter 1993:131), it continues to remain the dominant framework for studies of service quality and to be widely applied in different settings (De Ruyter, Bloemer & Peeters 1997: 390; Liou & Chen 2006: 929; Vos 2003: 102).

### **2.6.2 SERVPREF Model**

SERVPREF, developed by Cronin and Taylor (1992), is an instrument to measure service quality and customer satisfaction. It contains the same domains used in the SERVQUAL model. Cronin and Taylor (1992) developed this model to study four service sectors: banking, pest control, dry cleaning, and fast food.

Its framework is based upon the performance theory and is a modification of the SERVQUAL model. The only difference between SERVQUAL and SERVPREF is that the SERVPREF does not take into account customer expectations. It brings into play only customer perceptions of service performance. Therefore, this model does not have a disconfirmation scale, which is the gap between expectations and perceived performance of service. It has only one part, which is the perceived performance of service. In this instrument, customers rate their perceptions of performance of the same attributes that are covered in the SERVQUAL model.

The five domains—tangibles, reliability, responsiveness, assurance and empathy—identified in the SERVQUAL model are equally applicable to the SERVPREF model. According to Cronin and Taylor (1994), SERVPREF can provide managers with a summary overall service quality score, which can then be plotted in relation to time and specific customer segmentations related to consumer characteristics, for example, demographic subcategories and individual constituencies. The SERVPREF scale thus provides a useful tool for measuring the overall service quality attitudes of service managers. However, they suggest that great care should be exercised by managers of service organisations in attempting to derive more specific information from data captured by the SERVPREF scale for strategic decision making (Cronin & Taylor 1994).

SERVPREF is less complicated, more concise, more precise and easier to administer than SERVQUAL. However, White, Abels and Nitecki (1994: 40) argue that the SERVQUAL model is the more attractive model because it is more comprehensive and provides better diagnostic information. Nevertheless, SERVPREF explains more of the variation in customer perceptions of service quality than SERVQUAL, as measured by  $R^2$  statistics.  $R^2$  can be obtained by regression analysis, wherein the single item overall service quality measure is the dependent attribute, and the deduced five domains are the independent attributes.

## **2.7 THE IMPACT OF SITUATIONAL ATTRIBUTES**

The researcher believes that some situational attributes may have the power to influence customer satisfaction in a given situation. The potential situational attributes need to be examined when modelling customer satisfaction in relation to service quality. Principally, the experience of customers may affect overall satisfaction because some prior studies have highlighted the importance of experience in the process of satisfaction formation (Woodruff, Cadotte & Jenkins 1983: 297; Zeithaml & Bitner 2000: 75). LaTour and Peat (1979: 588) state that prior experience is one of the important determinants of customer satisfaction because it is most vivid and salient.

Previous research has revealed that customer experience can be primarily measured by knowledge or familiarity with the service (Patterson 2000). While the knowledge pertaining to library service is referred to as the customers' perceptions of how much he or she knows about the service (Scribner & Weun 2000), familiarity is referred to as the service-related experience of the customer (Alba & Hutchinson 1987). Thus, it is apparent that knowledge and familiarity basically denote the experiences of customers.

## **2.8 CONCEPTUAL CRITIQUE**

In reviewing the existing literature, some pertinent and highly relevant arguments against the conceptual foundation of service quality models can be found in the service marketing area. This critique is principally based upon existing criticisms made by marketing, library and information science theorists, and the researcher's own arguments to provide a synthesis of various viewpoints on customer satisfaction and service quality with logical reasoning. This is not to seek conformity with the opinions and arguments already made, but to put forth issues to formulate a coherent conceptual foundation for the current study.

As indicated by the expectancy disconfirmation theory, disconfirmation occurs by subtracting the expectation from the performance, that is,  $P-E$ , as specified in section 2.5.2.1. The disconfirmation concept underscores both quality and satisfaction, when modelling customer satisfaction in relation to service quality. However, this disconfirmation concept is rather open to some criticism due to its cognitive nature and algebraic formulation. For example, human beings generally have high expectations and are prone to rate expectations consistently higher than the maximum performance of a given service. As such, it vindicates the fact that the disconfirmation paradigm falls short of using the standards for expectations. Conversely, since service quality and customer satisfaction are attitudinal concepts that mainly fall into the category of psychological constructs, van Dyke, Prybutok and Kappelman (1999) (cited in Ladhari 2008: 67-68) articulate that the disconfirmation ( $P-E$ ) concept is a poor choice by which to measure psychological paradigms because there is little evidence of customers' actual assessments

of service quality, in terms of performance-minus-expectation scores (Kibourne *et al.* 2004, as cited in Ladhari 2008: 67-68).

Brady and Cronin (2001) also critique the *P-E* concept, suggesting that service quality should be a performance-based construct and more appropriately measured with perceptions, rather than expectations. They question the validity of the *P-E* specification introduced in the disconfirmation paradigm (Cronin & Taylor 1992: 57), suggesting this concept is a potentially misleading indicator of service quality perceptions.

There is another conceptual argument, which is also based upon the *P-E* concept. Buttle (1996: 11) highlights the fact that Service Quality [(SQ) = Performance (P) – Expectations (E)] is based upon disconfirmation, rather than customer attitudes. The idea behind disconfirmation is that service quality depends not on the absolute level of performance experienced, but on performance compared to expected performance. Assessments of service quality are based on the difference between the customer's perception of what was expected and what was experienced. Thus, there has been an extensive debate that the performance-minus-expectation specification is possibly a flawed and incoherent measurement of the assessment of service quality against a given backdrop (Cronin & Taylor 1992: 55).

The concept of expectation has also been criticised by some researchers, as there is no widely-accepted notion regarding the definition of expectations. “Desires”, “wants”, “what a service provider should offer”, “the level of service that the customer hopes to receive”, “adequate service”, “normative expectations” and “ideal standards” are some of the explanatory words/phrases subsumed within definitions of expectations (Ladhari 2008: 67-68). As these different definitions are open to multiple interpretations, it is necessary to delineate a universal definition for the term “expectations” in modelling and evaluating service quality and customer satisfaction. While the effect of expectations on service quality levels is debatable, it is nevertheless interesting to understand what affects expectations. Thompson and Kaminski (1993) point out the psychographic factors that may lead to different service expectations. According to Clow and Vorhies (1993),

expectations are only slightly affected by the passage of time prior to service consumption. However, immediately after service consumption, non-neutral episodes produce an expectation shift. Customers therefore experience positive service consumption. Negative service consumption thus generally causes customers to overstate their prior expectations. This is indirectly supported by ongoing debates about the applicability of expectations for the constructs of service quality and customer satisfaction (Cronin & Taylor 1992; Schneider & White 2004: 33).

There is no complete and universal notion about the best paradigm for predicting customer satisfaction and/or service quality. The disconfirmation paradigm has been challenged by some researchers (Brady, Cronin & Brand 2002; Cronin & Taylor 1992; Dabholkar, Shepherd & Thorpe 2000), conveying the view that the performance-only score is an ideal *modus operandi* for predicting service quality and customer satisfaction. However, following an empirical investigation, Bolton and Drew (1993), cited in Robinson (1999: 24), claim that although performance has been substantiated as a greater determinant of service quality, the disconfirmation paradigm has confirmed improved predictability, compared to the performance-only paradigm. On the other hand, Parasuraman, Zeithaml and Berry (1994: 113), who developed the SERVQUAL model that was built on the basis of the disconfirmation paradigm, proclaim that this model was formulated from focus groups discussions that captured not only the attributes of service quality, but also the underlying psychological process by which customers form judgements on service quality and satisfaction. This is one of the essences of this greatly exclusive model.

In spite of the conceptual criticisms pertaining to the disconfirmation paradigm, which is the foundation of SERVQUAL, another issue has also been raised by some researchers on its dimensionality. The problem raised by Teas (1994:133) is whether SERVQUAL domains are vectors or ideal points. On closer examination, it becomes difficult to conceptualise some domains in the SERVQUAL model, such as empathy on a linear scale. It is equally difficult to see how this instrument can be of any use in quality assurance, unless its domains are easy for the average customer to grasp.

Available service quality and customer satisfaction models have generally been criticised for the composition and number of domains they contain. All these measures consist of pre-defined domain attributes that are generic to all service organisations. Babakus and Boller (1992) suggest that service quality may be complex in some industries, and unidimensional in others. Thus, the predefined domains and attributes are not universal and are likely to require contextualisation with respect to the measurements of attributes and the industry being studied (Buttle 1996; Schneider & White 2004: 38). Hence, a closer look at these models reveals that they underrepresent the construct of customer satisfaction in relation to service quality. In other words, the models do not have a framework required for the holistic understanding of customer satisfaction in relation to service quality in a given environment, as expected. These existing models are static and generic in nature and have not been specifically developed for a particular environment, for example, university libraries in Sri Lanka, commercial banks in Singapore, or life insurance companies in South Africa. Thus, these models are common and standard for every type of service organisation.

In the usual course of events, a standard model that can be used for measuring service quality and/or customer satisfaction is an oversimplification and particularly a predefinition of what customers generally seek (Schembri & Sandberg 2002). Thus, the distinctive characteristics of a particular environment may not be correctly represented in the model. SERVQUAL and SERVPREF can therefore be described as somewhat myopic in their outlook, and their applicability may generate some problems in gauging service quality and customer satisfaction. Thus, it can be limited in practical usage. This creates an urgent need to develop a new framework for measuring customer satisfaction directly from the dynamic environment. In other words, the framework must be principally derived from the pragmatic environment in which the problem domain resides, in order to arrive at a greater holistic understanding of the dynamism of the problem environment, using a combination of qualitative and quantitative research methods.

Nevertheless, it is also important to note that the literature supports both the disconfirmation paradigm and the performance-only paradigm (Buttle 1996: 10; Cronin & Taylor 1992: 64-65; Oliver 1993: 419). Researchers (Brady, Cronin & Brand 2002: 26; Harris *et al.* 2006: 426; Zhu, Sivakumar & Parasuraman 2004: 495) emphasise that the value of service, the physical environment in which the service is delivered and other uncontrollable factors associated with the service encounter, such as emotions and behaviour, should also be included in the assessment of service quality aimed at customer satisfaction.

Using a single indicator to denote customer satisfaction has also been questioned in relation to its validity and the reliability (Davis & Heineke 1998: 67). If a model exercises a single measure for complex constructs, the validity and reliability of the model are considered suspect. Since the SERVQUAL and SERVPREF models utilise a single measure for assessing the construct of customer satisfaction, problems pertaining to validity and reliability may arise. Therefore, as customer satisfaction is a complex phenomenon, a multi-item approach is expected to be used in a model that measures the construct to ensure its higher reliability and validity. In order to overcome the aforementioned problem, the formation of a composite attribute that consists of some attributes denoting the construct of satisfaction can be utilised to designate the customer satisfaction attribute.

Based on the conceptual critiques made by different researchers in the literature, it may be concluded that both paradigms are distinct, and that there is no universally accepted notion on the optimal paradigm to conceptualise customer satisfaction in relation to service quality. Thus, investigating the two paradigms will enable the researcher to determine which paradigm would be the most appropriate to predict customer satisfaction regarding services provided by university libraries.

## **2.9 CONCEPTUAL FRAMEWORK FOR THE STUDY**

A conceptual framework was established for the study based upon the review of the concepts put forth in the previous section. The conceptual framework of this study

presented here is an integration of the concepts relevant to the problem domain, key conceptual issues, criticisms, and issues of integration that were identified over the course of the conceptual review. The framework attempts to focus on particular areas when integrating each of the concepts/strands mentioned above into a cohesive whole. The conceptual framework of this research study therefore employs the frame of reference that defines the concepts and constructs for this research study, as given below.

Satisfaction has been defined as a customer's emotional feelings about a particular consumption experience (Schneider & White 2004: 53). This implies satisfaction, consequent to a mental assessment of what customers experience and the resulting outcome of the services provided. Service quality is a cognitive construct, while satisfaction is an affective reaction to a specific service experience as a consequence of an assessment process. This distinction between service quality and customer satisfaction, along with the cognitive-affective consideration, suggests a causal order that would position service quality as an antecedent to satisfaction. Accordingly, customer satisfaction can be broadly considered as an assessment of service quality in an organisation, based on performance and/or expectations.

The aim of designing this conceptual framework is to establish a conceptual notion that leads to possible predictions of customer satisfaction in relation to service quality. A thorough examination of the prevailing literature was conducted with the specific purpose of identifying the theoretical paradigms pertinent to customer satisfaction, limited to service quality. To facilitate the review process, two broad criteria were employed. First, the paradigms should address customer satisfaction, particularly in relation to service quality. Second, models should be apposite to model the customer satisfaction process in relation to service quality in academic libraries. Based on the conceptual critique, it is apparent that the underpinning theoretical paradigms of the generic models, such as SERVQUAL and SERVPREF, can be appropriately used to model customer satisfaction in the problem area, although they do not exclusively model customer satisfaction. Accordingly, two widely accepted theories that describe customer satisfaction were



identified as the theoretical paradigm underpinning the study, including the disconfirmation paradigm and the performance-only paradigm.

The disconfirmation paradigm, based on the expectancy disconfirmation theory, suggests that satisfaction is determined by its intensity and the direction of the gap between expectations and perceived performance. Thus, disconfirmation theorists contend that service quality can be conceptualised as the discrepancy between expectations and performance of actual service delivery. These theorists concur that service performance exceeding some standards lead to satisfaction, while performance falling below these standards results in dissatisfaction. With this hierarchical relationship between quality and satisfaction, some researchers postulate that an appropriate method of assessing satisfaction is to utilise a disconfirmation process that measures service quality from the customers' points of view. Some satisfaction research is based upon the performance-only paradigm, which has been derived from the performance theory for modelling customer satisfaction in relation to service quality.

Conversely, the underlying theoretical base of disconfirmation and performance-only paradigms are commendable for use as investigative instruments, even if there are some conceptual arguments regarding the theoretical soundness of these paradigms. Importantly, there is no universally accepted, common notion among these arguments, apart from an ongoing debate about this conceptual accumulation. Thus, the researcher strongly believes that these paradigms could be utilised to determine which conceptual foundation is best suited for predicting customer satisfaction in relation to service quality in the university library sector in Sri Lanka. This study therefore focuses on the search to establish the level of enhanced predictability of these paradigms to identify the most optimal paradigm. The theoretical paradigms of the study were tested by using two pathways—more specifically, disconfirmation and performance-only. The notional base of the conceptual framework is given in Table 2.3.

**TABLE 2.3: CONCEPTUAL BASE FOR THE FRAMEWORK**

<b>Paradigms underpinning the conceptual framework</b>	<b>Role of the paradigms in the study</b>	<b>Mathematical formulation</b>
Disconfirmation paradigm	Main theoretical paradigm	$SQ = \sum_{j=1}^k (P_{ij} - E_{ij})$ $CS = f(SQ)$
Performance-only paradigm	Main theoretical paradigm	$SQ = \sum_{j=1}^k P_{ij}$ $CS = f(SQ)$

CS = customer satisfaction, SQ = Service Quality, P = Performance, E =Expectations

Source: Compilation by author based on the literature

Although assessments of the psychometric and methodological soundness of the two paradigms have been investigated, the diagnostic ability to predict customer satisfaction has not been explicitly established. Even though the psychometric and methodological facets of a paradigm are crucial considerations in a good paradigm, overlooking the assessment of the diagnostic power of the paradigm cannot be accepted. Thus, this conceptual framework guides the research study in the contextual environment, focusing on the diagnostic ability of the best-suited paradigm to predict customer satisfaction in relation to service quality. Even though numerous studies have been undertaken to assess the superiority of these two paradigms, consensus has not been reached on identifying which of the two paradigms is the best. This situation therefore calls for designing a specific theoretical model that incorporates the inherent dynamism of customer satisfaction in relation to service quality in the university library sector in Sri Lanka. Schembri and Sandberg (2002: 190) say that generic models, such as SERVQUAL and SERVPREF, have failed to capture the real dynamism of the pragmatic environment on the perspectives of customers on service quality, due to their standards and static nature. Therefore, it suggests that an objective measure of customer satisfaction, based on service quality, is needed to conceptualise customer satisfaction in a particular environment. As the core purpose of this research is to produce the best parsimony model to predict customer satisfaction in university libraries in Sri Lanka, all the specific characteristics pertaining to customer satisfaction and service quality of Sri Lankan university libraries

must be adequately represented in the proposed model. Thus, context-specificity is important for modelling customer satisfaction to accommodate the legitimate dynamism of the research problem used in the study at hand.

Since this research is based upon the use of quantitative techniques to develop a model, it generally embraces the positivist origin for empirical analysis, leading to causality of the dimensionality. Nevertheless, even if the research follows the philosophical paradigm of positivism, it must also address the philosophy of phenomenology for attribute generation and possible validation of the conceptual model, in drawing context-specific applicability of the model, to designate the inherent dynamism of customer satisfaction in Sri Lankan universities.

As Dabholkar, Thorpe and Rentz (1996) have demonstrated, the researcher too espouses the notion that service quality perceptions are multilevel and multidimensional. Carman (1990) is perhaps the first to note that customers tend to break service quality domains into various attributes. Such a structure accounts for the complexity of human perceptions (Dabholkar, Thorpe & Rentz 1996). There is theoretical support for a multidimensional, multilevel model (Dabhalkar, Thorpe & Rentz 2000: 169; Dabholkar, Thorpe & Rentz 1996; Parasuraman, Zeithaml & Berry 1991a: 440), but there has been little effort to identify the attributes and/or domains that define customer satisfaction. The identification of the quality attributes was made by an approach that leads to deductive and inductive attribute generations. These attributes were refined by means of an exploratory study to find the most appropriate attributes and domains.

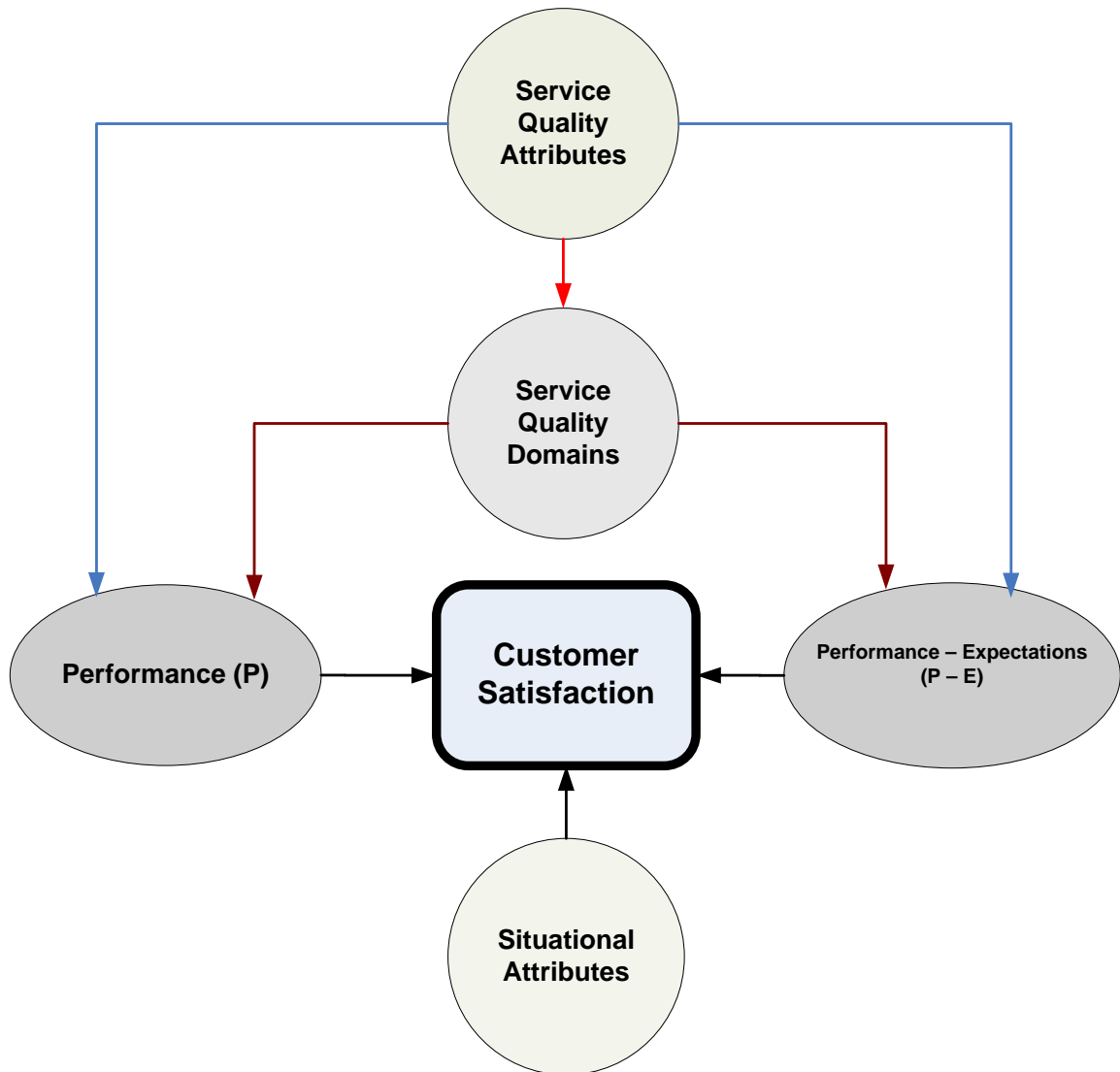
However, even if there has been very little empirical research recorded in the existing literature to link the dimensions of customer satisfaction and service quality with situational and socio-demographic attributes, it seems that these attributes may have an impact on customer satisfaction. Thus, these attributes are also incorporated into the conceptual framework.

### **2.9.1 Conceptual model**

Based on the foregoing conceptual framework, a fuzzy conceptual model developed for the study is presented in Figure 2.4. As this model is mainly derived from conceptual paradigms, criticisms and arguments, it is an ambiguous model that requires further refinements from contextual research findings in this area of study, in order to render it more comprehensive, contextualised and viable for the study of the research problem at hand.

This model is theoretically parsimonious rather than comprehensive, reflecting the scientific theoretical conceptualisation of the customer satisfaction construct in relation to service quality. Thus, this will be refined further by support directions obtained from the prevailing research literature in Chapter Three, primarily to ensure its applicability for resolving the problem identified in this study. Then, the model will be examined in focus group discussions to ascertain its suitability to the problem domain, and finally, to revise it along with the contextual issues to make it more comprehensive and viable.

**FIGURE 2.4: FUZZY CONCEPTUAL MODEL**



Source: Compilation by author

The model has a number of unique and idiosyncratic features that make it suitable for empirical testing, which would yield interesting results for academicians and practitioners. The model explicates the two paradigms of disconfirmation and performance-only in order to accomplish the development of a final model for customer satisfaction in relation to service quality, which will be the ultimate outcome of this study. The conceptual model illustrates three major relationships between endogenous predictive attributes and exogenous satisfaction attributes, as indicated below.

1. Individual service quality attributes may act as predictors of their respective service quality domain. For example, if there were a domain called “responsiveness”, some quality attributes may act as predictors of overall quality of responsiveness in a given phenomenon. This is proposed in the conceptual model to demonstrate the relationship between quality attributes and the domains (see the relationship in red in Figure 2.4).
2. Individual service quality attributes may act directly as significant predictors of overall customer satisfaction. This is proposed in the conceptual model in demonstrating the relationship between quality attributes and overall customer satisfaction (see the relationship in blue in Figure 2.4)
3. Individual service quality domains may act as significant predictors of overall customer satisfaction. This is proposed in the conceptual model to demonstrate the relationship between quality domains and overall satisfaction (see the relationship in brown in Figure 2.4)

All these relationships are based on either the disconfirmation paradigm or performance-only paradigm. It illustrates that the disconfirmation paradigm supports the notion that customers perceive service quality as a comparison of what they think a service should offer, and their perceptions of the actual performance of the service provider. This model adapts the definition to denote the disconfirmation paradigm that service quality is the difference between customers’ expectations of services and their perceptions of the actual performance of services. Mathematically, the equation is expressed as

$$SQ = \sum_{j=1}^k (P_{ij} - E_{ij}),$$

where  $i$  is a service quality attribute, and the sum is over  $k$  service quality attributes or domains. Customer satisfaction (CS) is a function of service quality,

$$(CS = f(SQ)),$$

as well as a function of disconfirmation. Therefore,  $CS = \sum_{j=1}^k (P_{ij} - E_{ij})$ .

The model illustrates the performance-only paradigm, only measuring perception of service performance. Mathematically, the equation is expressed as  $SQ = \sum_{j=1}^k (P_{ij})$ , where  $k$

is the number of attributes, and  $P$  is perception of the individual ‘ $i$ ’ with respect to

performance of a service organisation on attribute 'j'. As customer satisfaction (CS) is a function of service quality,  $CS = f(SQ)$ , customer satisfaction is also the function of

performance. Hence,  $CS = \sum_{j=1}^k (P_{ij})$ .

In addition, the conceptual model suggests that there is possibly an observant relationship between situational attributes and customer satisfaction. Explicitly, these situational attributes are expected to have an impact on predicting customer satisfaction in relation to service quality in the real environment.

## **2.10 SUMMARY**

There is a consensus among service marketing researchers on the causal sequence/order of the concepts of customer satisfaction and service quality. Through conceptual improvement and empirical findings of past studies, most researchers have concurred on the fact that quality judgments cause satisfaction, leading to the finding on service quality being the antecedent of customer satisfaction. The formation of satisfaction in relation to service quality is generally based on some significant theories identified in the literature—that is, attribution, equity, performance and expectancy disconfirmation. Regardless of the limitations identified in the theoretical paradigms of these theories, two significant lines of reasoning may be drawn from the preceding conceptual review. Firstly, it recognised two dominant theoretical paradigms, disconfirmation and performance-only, which can be duly used for modelling customer satisfaction through the service quality perspective in organisations, enabling them to perform possible customer-led service quality assessments. Secondly, the review more closely examined the potentiality of the prevalent service quality and customer satisfaction models, such as SERVQUAL and SERVPREF, to understand the customer satisfaction process in the context of service quality. These models were, however, not adequately qualified to confirm their strong applicability for the modelling of the satisfaction process in different organisations. It is thus evident that more research is needed, by utilising these dominant paradigms identified in the literature, rather than testing the generic models—such as SERVQUAL and SERVPREF—already developed in the service marketing area. The next chapter reviews the existing research literature to address the applicability of the fuzzy

conceptual model contextually and to substantiate its viability within contextual environments, supported by prevailing interventionist research literature.



## **CHAPTER THREE: CONTEXTUAL RESEARCH REVIEW**

### **3.1 INTRODUCTION**

The conceptual literature underpinning the problem domain was reviewed in Chapter Two by discussing issues relevant to the disciplines of service marketing, customer satisfaction and service quality. The schema for this conceptual review was to examine the construct of customer satisfaction in relation to service quality, thus defining concepts, theories, key conceptual trends and issues of integration in the broad spectrum of service marketing.

The aim of this chapter is to investigate quality attributes, the applicability of conceptual models in the area of library and information sciences, and to identify the knowledge gap shown in the prevailing contextual literature. This aim is achieved in three steps. The first step uses the conceptual framework identified in Chapter Two and evaluates its applicability to model customer satisfaction regarding the service quality perspective in an academic library setting. The second step attempts to unfold the contextual issues necessary for possible adjustments to be made in the conceptual framework supported by the literature. The aim of the last step is to identify the quality attributes and domains in global library settings obtained from past research studies for the purpose of refining them to suit real-life environments, upon which provisional models may be developed to predict customer satisfaction in a dynamic university library setting. This chapter therefore reviews the contextual research literature pertaining to service quality and customer satisfaction from the service quality perspective in libraries. The review provides a theoretical framework for the development of a contextual understanding of customer satisfaction, and a revised fuzzy conceptual model—incorporating existing research findings—is ultimately offered to conceptualise the formation of the customer satisfaction process related to service quality in Sri Lankan university libraries.

### **3.2 DEFINING QUALITY IN LIBRARIES**

One of the first researchers to begin the definition process of quality in libraries was Richard Orr (Nitecki 1996). In his pioneering publication of 1973, Orr made a distinction

between library quality and the value of library services. He suggests that library quality pertains to "how good the service is," while library value refers to "how much good it does."

The measurement of quality has traditionally been a part of the measurement of effectiveness (Hamburg *et al.* 1974: 319; Hernon & McClure 1990: xv; Pritchard 1996). The measurements of effectiveness were utilised to evaluate library quality, as library practitioners and researchers in the 1970s believed that the core of effectiveness was quality. As a result, when the library became more effective, the provision of high quality service to its wider customer community was expected. Orr (1973) (cited in Nitecki 1996) introduces four key areas for library effectiveness—resources, capability, utilisation and beneficial effects—upon which a specific definition could be based. These areas continue to be valid to date. The terms used for quality in the earlier period ranged from “technical efficiency measures to vague statements of goodness but most have focused on goal achievement, efficiency, customer satisfaction, personnel management and the ability of the organization to survive” (Pritchard 1996: 574).

With the evolution of the quality concept from the view of effectiveness, the need for quality in libraries became very important due to the global digital environment and increasing competition. As a result, libraries have begun to recognise the importance of improving service quality to survive in a competitive world (Cullen 2001). Until recently, however, library quality has been assessed in terms of library collections—size, diversity and comprehensiveness of subject coverage (Dugan & Hernon 2002; Nitecki 1996). Hernon and Altman (1998) and Shi and Levy (2005: 267) emphasise that most traditional statistics regarding libraries lack relevance and do not measure the library’s performance in terms of characteristics important to customers. These statistics have particularly failed to describe the performance of the library or to indicate whether or not the quality of the library is good, indifferent or bad. Moreover, they hardly indicate/recommend/suggest any action that library administrators and other responsible stakeholders could or should take to improve service performance. This partly explains why Dugan and Hernon (2002) perceive quality as a multi-faceted concept that focuses on collections, services and the place of the library in the learning process, within a given context.

In the literature, there is no single, unequivocally accepted definition of quality. Quality in libraries has been perceived from several perspectives. The traditional measures of quality, such as statistics on printed collections, journal holdings and so on, are no longer adequate to reflect library excellence and to impact its aims and objectives (Weiner 2005). These more traditional measures of library quality are considered to be of secondary importance (Nitecki 1996). Thus, a need for an alternative approach to such traditional quality measures has emerged to gauge the quality of libraries more objectively.

### **3.3 SERVICE QUALITY IN LIBRARIES**

The application of managerial tools in academic libraries should enable libraries to enjoy the same benefits as in the business sector (Hernon & Altman 1996; 1998). Successful businesses can model their efficient resource deployment, and likewise, a library can also deploy resources efficiently to reap the same benefits through successful business performances. Businesses generally aim to satisfy their key stakeholders, such as suppliers, customers and employees. Similarly, no library will easily survive if it fails to recognise the needs of its customers and other stakeholders. This underscores the need to provide a broad range of service quality in the library sector to achieve greater customer satisfaction.

There are four models used to measure the effectiveness of library services in different organisations. These models, which have been derived from management literature, are related to quality of services and/or satisfaction of stakeholders. They are:

**1. Goal attainment model:** The organisation measures its effectiveness based on the attainment of specific goals set by the organisation. This model has achieved some degree of success in academic libraries, but those libraries using it often fail to include all those involved in the library decision making process (Linn & Linn 1975: 608-9).

**2. Systems resource model:** The systems resource model analyses the decision maker's capability to distribute resources efficiently among various needs of the subsystems. This

model, which defines the organisation as a network of interrelated subsystems (Bernat 2005), has been used with limited success in academic libraries (Giappiconi 1995: 105-106).

**3. Internal process or systems model:** This model, which uses stability and internal control processes as measures of performance, is primarily an efficiency model that can often become internally focused and system driven, and it tends to exclude client expectations of service (Cullen & Calvert 1995: 439-440).

**4. Constituency satisfaction model:** This model evaluates an organisation based on the degree to which its stakeholders are satisfied. It is based on the premise that all stakeholders have needs and expectations that must be fulfilled, and it is up to the organisation to meet those needs consistently over time (Cullen 1998; Cullen & Calvert 1995: 439; Pritchard 1996). This model is of potential use to academic libraries, but the measures of satisfaction used are very broad for use in the library sector to enable service enhancement (Hernon & Altman 1996:11). In most cases, the impact of the quality of service is still under assessment on the basis of an internal set of standards, as defined by the library or by the profession, and not by the customers (Childers & Van House 1993: 5, 93).

Therefore, it may be said that the applications of these models in the library and information service sector have not been significantly successful (Hernon & Altman 1996: 11). More specifically, when measuring library effectiveness, service quality and satisfaction approaches based on customers' perspectives have not been taken into account in these models. Sabath (1978:26) argues that customer service levels are generally higher than when a customer would set them and recommends that the service should "banish the costly misconception that all customers seek or need improved service." However, Markham and Aurik (1993: 56) explain that selecting when to meet and when to exceed customer expectations is key. Most customers accept a relatively wide range of performance in any given service dimension. These arguments reinforce

the opinion that organisations should use a customer-led approach to raise the service quality of libraries and to seek to satisfy customers.

To strive towards the improvement of the services of libraries, and identifying appropriate criteria for evaluating the quality of services rendered to customers is essential. Among the currently available literature, a number of books and research articles published over the last two decades treat the subject of service quality of libraries. One of the earliest and most comprehensive publications among those is “Customer service in the information environment” by Guy St. Clair (1993) (cited in Quinn 1997), which refers to the importance of the views of customers in providing quality service to the wider customer community in libraries. Quinn (1997) emphasises the importance of seeing library users as customers, for they justify the existence of libraries. Providing quality service means being able to view services from the customers’ points of view and then meeting their expectations because they form the most important segment in the library community, as those who can define and judge value. A customer is defined as:

A person who brings his/her wants to the organization. It is the organization’s function to handle them profitably to both the satisfaction of the customer and the organization. (Peter & Austin (1987) cited in Sinyenyeko-Sayo 2006:17)

It is apparent that customers are the most crucial group to evaluate the quality of service in any given organisation. Even if service quality is defined in a number of different ways in other academic disciplines, the concept of service quality used in libraries and information sciences is that service quality is meant “...to examine the difference between a customer’s expectations and the customer’s perceived sense of actual performance” (Calvert 2001: 732). Calvert and Hernon (1997: 408) also mention: “Most typically, service quality is defined in terms of reducing the gap between customer expectations and actual service provided.” Hernon (2002: 225) concluded that:

...service quality focuses on the interaction between customers and service providers, and the gap or difference between expectations about service provision and perception about how the service was actually provided.

Thus, it appears that the most significant criteria in evaluating service quality are exclusively defined by customers.

According to Herson and Nitecki (2001), there are many reasons why libraries are interested in service quality. Most libraries are attached to parent institutions: universities, corporations, government agencies and schools. Some parent institutions have made commitments to be accountable to customers and compete for their loyalty. Customers who share information about their expectations also offer an opportunity for libraries or other service providers to establish closer personal contact with them. This relationship should result in libraries providing a better service to customers. It may therefore be construed that library staff are more knowledgeable about their expectations and on how to translate that knowledge into services that satisfy customers and create loyalty.

Herson and Nitecki (2001) further emphasise that paying attention to service quality generally enables an organisation to develop a partnership with its customers to gain a competitive edge. Besides competing with other service providers, present day libraries may find a sharp decline in the statistics depicting in-house library usage because customers find other avenues to access information, rather than visiting their local libraries. Therefore, a service organisation like the library should have a motivated staff, committed to the provision of excellent service, remotely and locally, and empowered to work directly and continuously with customers in the delivery of such services.

In the case of a library, since the customers are the library users, simple user surveys generally enable library administrators to monitor and assess customer expectations and perceptions systematically in order to formulate a basis upon which to develop an informed approach to improve the services. Calvert and Herson (1997: 408) describe various measures, such as simple user surveys that library administrators can utilise to measure the level of service quality, by comparing customer expectations with the level of service performance rendered by the staff. They recommend supplementing the survey with focus groups that probe customer expectations more thoroughly, thus gaining

more detailed insights into the perceptions of a particular constituent group. They also suggest using focus groups to probe the reactions of library staff to the survey results and to help develop new ways to satisfy customer expectations (Calvert & Herson 1997). It thus appears that a phenomenological inquiry would help the researcher to identify the required qualitative insights into what comprises service quality in the problem area.

### **3.4 CUSTOMER SATISFACTION IN UNIVERSITY LIBRARIES**

The university library has been described as the “heart” of the learning community, providing a place for students and faculty to carry out their information searching pursuits to advance their knowledge. The librarians and library support staff provide numerous services to meet the diverse informational needs in terms of the requirements and interests of the customers.

According to Filiz (2007), customer satisfaction is an important measure of service quality in libraries. Customers’ perceptions about libraries seem to have been largely ignored by library management in developing countries, as is evident from the paucity of literature in the field. The assessment of service quality provides an important feedback for libraries to assess and improve the service provided to its customers. Furthermore, he says:

The survival of a library very much depends on the benefits it brings to customers. Its existence will be in question when customers begin looking for alternatives to library services. One way to show value is by providing quality service. It is therefore important for the library to be aware of changing customer expectations, and to continually strive to provide quality service to its customers. (Filiz 2007: 9)

As cited by Cullen (2001), it was Altman and Herson (1996) who introduced the idea of “customer satisfaction” in libraries. According to them, service quality in higher education libraries is usually associated with the question of customer satisfaction, which in turn is based on customer perceptions of service quality. The relationship between service quality and customer satisfaction is a complex one, in which the service quality is defined as a component of customer satisfaction. Cullen (2001) further cites Elliot

(1995), who also makes use of this term and defines customer satisfaction as the emotional reaction to a specific transaction or service encounter. She points out that satisfaction may or may not be directly related to the performance of the library on a specific occasion. Customers can receive an answer to a query, but be dissatisfied because of an upsetting or angry service provider. Conversely, even if the query might remain unanswered, another customer might feel satisfied because the service provider was pleasant, and the helper was interested and courteous.

Employing customer assessment of library services has been a widely accepted concept since the last decade (Harwood & Bydder 1998: 161; Martensen & Granholdt 2003: 140; Nitecki & Franklin 1999: 485; Shi, Holahan & Jurkat 2004: 122). Although the quality element has been firmly established in the academic library sector for at least two decades, measuring customer satisfaction from the service quality perspective has not been comprehensively used in the university library sector. Customer satisfaction is usually not a popular topic in the discipline of library and information sciences, and there are not many research studies yet associated with the university library sector that have been carried out to identify the predictors for satisfaction. Cullen (2001) recounts that research studies analysing customer satisfaction in relation to service quality tended to suggest that very few libraries can understand the importance of quality and satisfaction to retain their customers, in the context of the competitive global digital environment. She further states that the examination of research literature has shown that:

1. There is a body of research on service quality and the role of customer satisfaction, which shows consistent results and patterns of responses by customers in different places and different types of libraries;
2. There are significant gaps between customers' expectations and perceptions of service performance in some of the key areas of library services. These are "quality of collections and access to the collocations", "provision of a study environment", "services and equipment which meet customer needs" and "willingness of staff to help customers"; and



3. Urgent remedial action is needed in the areas identified to increase customer satisfaction, at the micro and macro levels.

However, there are some models developed and mainly used in business industries to extensively measure service quality to a greater extent and customer satisfaction to a lower extent. These models may also be successfully used to model customer satisfaction in the academic library sector.

### **3.5 ANALYSIS OF THE APPLICABILITY OF EXISTING MODELS**

This section analyses the applicability of the generic service quality models identified in Chapter Two, with the objective of discovering the extent to which these models are valid to gauge customer satisfaction in relation to the service quality of library and information services.

Table 3.1 indicates the dissemination of various aspects of service quality studies that have made some significant contribution towards propagating the knowledge emerging from the past research studies. It further provides opportunities for possible exploration of the conceptualisation, methodologies and interpretation of the research.

**TABLE 3.1: APPLICATIONS OF SERVICE QUALITY MODELS IN LIBRARY SETTINGS**

<b>Author</b>	<b>Paradigm</b>	<b>Respondents / test audience</b>	<b>Method of data collection</b>	<b>Scale used</b>	<b>Method of analysis</b>	<b>Protocol for measuring service quality</b>	<b>Link between service quality and customer satisfaction</b>
White, Abels & Nitecki (1994)	Disconfirmation	A random sample of 150 participants from two special libraries in Washington	Survey questionnaire approach	Seven-point Likert	Exploratory Factor Analysis, followed by oblique rotation	Modified version of SERVQUAL with 26 statements; Grouped by original SERVQUAL domains vis-à-vis tangibles, reliability, responsiveness, assurance and empathy	Identified that service quality affects customer satisfaction
Nitecki (1996)	Disconfirmation	Application to the academic library services of Inter Library Loans (ILL), Reference service and Reservation service; Randomly selected 564 customers who had used one of the three services	Survey questionnaire approach	Ten-point semantic differential scale	Exploratory Factor Analysis, and no indication about rotation	22 items, same as SERVQUAL, grouped by original SERVQUAL domains This study suggests a three factor structure, rather than the proposed five factor model.	Identified (perception – expectation) gaps in three library services, ILL, references and reservations; Overall customer satisfaction for all three services were 7.452 (where 1= extremely poor and 10= extremely good)
Calvert & Hernon (1997)	Expectation only	459 customers, 306 at Victoria University and 153 at Lincoln University, including academic staff, general staff and external borrowers in New Zealand	Survey questionnaire approach and focus group discussions	Seven-point Likert	Exploratory Factor Analysis by Varimax rotation	Ten domains were identified as guidance, waiting time, electronic services, correct place, equipment, timeliness, library environment, furniture and other facilities, and material for course needs	Customer satisfaction not discussed

<b>Author</b>	<b>Paradigm</b>	<b>Respondents / test audience</b>	<b>Method of data collection</b>	<b>Scale used</b>	<b>Method of analysis</b>	<b>Protocol for measuring service quality</b>	<b>Link between service quality and customer satisfaction</b>
Calvert (1998)	Expectation only	Staff of four polytechnic libraries in Singapore	Focus group discussions	Seven-point Likert	No indication	85 service quality attributes were identified under four domains vis-à-vis resources, services, physical surroundings and service delivery by staff	This is an expectation-only survey and has not researched the customer satisfaction
Harwood & Bydder (1998)	Disconfirmation	Random sample of 400 students of the University of Waikato library	Survey questionnaire approach	Seven-point Likert	Only gap analysis	No domains used, only the attributes have been employed	Identifies five areas that have high discrepancies/ low satisfaction: materials in proper place, OPAC accuracy, range of materials in the library, seven day recall and good order copiers
Calvert (2001)	Expectations only	Peking and Tsinghua University in China; sample of 135 university students	Survey questionnaire approach and focus group discussions	Likert	Principle component analysis, followed by Varimax rotation	Six factors were produced vis-à-vis study environment, materials, equipment, organisation of materials, service provided, and staff attributes	Customer satisfaction not discussed; Stated academic library customers have similar expectations of services when compared with customers in different countries

<b>Author</b>	<b>Paradigm</b>	<b>Respondents / test audience</b>	<b>Method of data collection</b>	<b>Scale used</b>	<b>Method of analysis</b>	<b>Protocol for measuring service quality</b>	<b>Link between service quality and customer satisfaction</b>
Tuomi (2001)	Disconfirmation	Customers of three universities in Vaasa, Finland; University students of business studies, social sciences, humanities and pedagogies	Survey questionnaire approach	Seven-point Likert	Only gap analysis (gap between means)	Modified version of SERVQUAL instrument with tangibles, reliability, responsiveness, assurance and empathy domains	Most satisfied quality domain was reliability, and least satisfied was tangibles
Nimsomboon & Nagata (2003)	Disconfirmation	2,139 students, faculty members and researchers from the Thammasat University library in Thailand	Survey questionnaire approach	Seven-point Likert	Principle component analysis by oblique rotation.	Modified version of SERVQUAL instrument; Discovered factors were affect of service-organisational, collection and access, affect of services-personal	Customers were highly satisfied with domain affect of services-personal. Least satisfied with the attribute "Access to digital collection from PC"
Woo (2005)	Disconfirmation	University of Hong Kong sample of 2,564 academic staff members and students	Online survey questionnaire approach	Five-point Likert	Ranked performance vs. importance, and importance vs. performance	Questionnaire included five categories: service quality, facilities, equipment and physical environment, resources, electronic resources and new services	Customers were highly satisfied with attributes, such as customer education, new e- resources and library orientation courses/workshops

<b>Author</b>	<b>Paradigm</b>	<b>Respondents / test audience</b>	<b>Method of data collection</b>	<b>Scale used</b>	<b>Method of analysis</b>	<b>Protocol for measuring service quality</b>	<b>Link between service quality and customer satisfaction</b>
Moon (2006)	Disconfirmation	305 academic staff members, and 6,245 students were used as the sample	Online survey questionnaire approach	Nine-point Likert	Comparison of means between gaps	22 statements of LibQUAL (2003 version) model; Main three domains: affect of service, information control, and library as place	Respondents were asked three questions about treatment at the library, library support for learning, research, and/or teaching needs. and overall quality of the service provided by the library; Satisfaction scores for all three questions were higher for academics, administrative and support staff than for undergraduates and postgraduates
University of Sydney library client survey report (2006)	Disconfirmation	4,102 clients from the University of Sydney, including undergraduates, postgraduates and faculty members	Survey questionnaire approach	Seven-point Likert	Gap analysis (gap between means) and comparison of results with 2004 survey	35 statements considered critical to the continuing success of the University of Sydney library	Overall, customers appear to be generally satisfied with the University of Sydney library; 55% of respondents identified their level of satisfaction as extremely high, 29% giving a rating of 5; Only 3% indicated their level of satisfaction as extremely low (rating of 1 or 2)

<b>Author</b>	<b>Paradigm</b>	<b>Respondents / test audience</b>	<b>Method of data collection</b>	<b>Scale used</b>	<b>Method of analysis</b>	<b>Protocol for measuring service quality</b>	<b>Link between service quality and customer satisfaction</b>
Sinyenyeko-Sayo (2007)	Disconfirmation	Survey conducted at academic libraries in South Africa; 1,000 randomly selected sample from UWC library customers, and 1000 customers from the Stellenbosch University library, including under graduates, post-graduates, academic staff and general staff	Online survey questionnaire approach	Seven-point Likert	Comparison of means of LibQUAL surveys between two universities, and comparison of LibQUAL and SERVQUAL instruments	The questionnaire was based on the SERVQUAL instrument, and at a later stage, the study compared the LibQUAL results of the survey that was conducted by the University of the Western Cape	The findings from both surveys (SERVQUAL and LibQUAL) show that undergraduates were satisfied with most of the services provided to them, although the quality of service did not always meet their every expectation; These results could have been affected (biased), should some of the students have come from disadvantaged backgrounds; Based on the study, however, some customers were not happy with the business hours

<b>Author</b>	<b>Paradigm</b>	<b>Respondents / test audience</b>	<b>Method of data collection</b>	<b>Scale used</b>	<b>Method of analysis</b>	<b>Protocol for measuring service quality</b>	<b>Link between service quality and customer satisfaction</b>
Filiz (2007)	Disconfirmation	450 randomly selected students at the Osmangazi University library and Anadolu library in Turkey	Survey questionnaire approach and interviews	Seven-point Likert	Principle component analysis. with Varimax orthogonal rotation method	Modified version of SERVQUAL instrument; Five factors were identified as quality of library services, quality of information and library environment, reliability, quality of online catalogue system and confidence	All five factors were significant predictors of library satisfaction: quality of library services, quality of information and library environment, reliability, quality of online catalogue system and confidence
Sahu (2007)	Performance-only	Total sample of 100 (70 students and 30 faculty staff) at the Javaharlal Neru University (JNU) library	Survey questionnaire approach	Five-point Likert	Hypotheses tested using Chi-square	Instrument developed using the attributes suggested by Parasuraman and Zeithaml (1988); It consisted of 47 structured, open-ended and close-ended questions, reflecting six determinants of service quality: reliability, responsiveness, assurance, access, communications and empathy	Customers of JNU library are satisfied with factors such as reliability, assurance, access, and empathy except responsiveness and communication

Source: Compilation by author based on the literature

Table 3.1 clearly demonstrates that the majority of the studies are based on the disconfirmation paradigm, which comes under the expectancy disconfirmation theory in the service marketing literature. An interesting finding in this instance is that some studies, such as Calvert and Herson's (1997), and the studies carried out by Calvert in 1998 and 2001 focused only on the expectation scores, rather than researching either disconfirmation (gap) scores or performance-only scores. These studies are neither based upon the expectancy disconfirmation nor the performance paradigm. They are mainly anchored in expectations-only scores. Thus, it is apparent that these studies, rather than measuring overall customer satisfaction and service quality, expect to receive feedback only from library customers about their expectations of the prevailing services.

Only one study based on the performance-only paradigm can be found in the existing literature, which is Sahu's (2007) study. Sahu's research has not employed the existing SERVPREF model and has used only the underpinning performance-only paradigm.

However, the disconfirmation paradigm has been widely used in the library and information sciences to ascertain service quality in academic libraries, but it has not primarily focused on researching the relationship between customer satisfaction and service quality. In general, the majority of the work has mainly observed the situation regarding whether quality attributes have impacted overall service quality. Moreover, these studies have failed to research the impact of quality domains and attributes on the construct of customer satisfaction (Nitecki 1996; White, Abels & Nitecki 1994). Therefore, these well-known studies are not linked to the construct of customer satisfaction, which needs to be empirically investigated to identify the issues pertaining to satisfaction with service quality.

The majority of the studies are case studies. Thus, the generalisation of the results would be problematic. Garson (2008) says, "Unlike random sample surveys, case studies are not representative of entire populations, nor do they claim to be." He further states that "the case study researcher should take care not to generalise beyond cases similar to the one(s) studied." Rowley (2002: 20) recounts that generalisation can be performed if the case



study is appropriately informed by a previously developed theory. Even if the case study were informed by the theory, it would not be a statistical generalisation, but an analytical generalisation with which to compare the empirical results of the study, since the theory acts as a template for the study. However, if a study employs multiple embedded cases that have been carefully selected from the population to represent all cases, generalisations can be made reasonably (Minnema *et al.* 2006; Rowley 2002: 21). Nevertheless, in the context of the studies depicted in Table 3.1, no research studies have been carried out on multiple embedded cases. The majority of the studies have employed the technique of factor analysis, based on Varimax or oblique rotational techniques.

Common issues that can be derived from these numerous studies depicted in Table 3.1 are that low priority and attention have been given to the performance-only paradigm. It indicates that more research is required to test the paradigms of disconfirmation and performance-only in the library and information service sector, in order to identify the most germane paradigm that can be used for possible predictions of satisfaction when gauging customer satisfaction with service quality in university libraries.

### **3.5.1 SERVQUAL applications in library sector**

Within the last decade, the focus of the customer-oriented library service concept has been developed in order to support demanding customer needs. The Association of Research Libraries (ARL) in the United States of America has recognised the importance of library assessment as a key driver for change through its principal objective to “describe and measure the performance of research libraries and their contribution to teaching, research, scholarship and community service” (Kryillidou 1998: 8). Therefore, the “service quality” concept was used as one aspect of the library assessment to measure the performance of libraries. Consequently, some researchers such as Nitecki and Hemon (2000) combined the SERVQUAL model with the local environment in which the research problem resides, thus identifying the service quality attributes in university library settings. However, this contextualisation with the local environment was very much limited towards only the domains defined in the SERVQUAL model. Because of the inflexibility of SERVQUAL, contextualisation is not possible beyond these domains

in the model. However, the researchers used the data collected from surveys and focus groups to modify the SERVQUAL model in order to develop a robust survey instrument for the measurement of service quality. The instrument includes a service quality checklist designed to evaluate several aspects of quality in libraries, with suggestions on how they might best be monitored.

Edwards and Browne (1995) use the SERVQUAL instrument in an academic library setting to determine whether there are differences between customer expectations of service (faculty members) and providers' perceptions of those expectations (librarians). The results indicated that while there were some discrepancies between providers' perceptions and customers' expectations, an overall congruence was observable.

Nitecki (1996) conducted a study to determine the applicability of the SERVQUAL instrument to university libraries. Reference, Inter-library Loans, and Reservation Services were studied in this research. The collected data supported the reliability and validity of the SERVQUAL model for use in academic libraries as an accurate measure of service quality. However, the data did not support the existence of five domains of service quality, as reported in the generic SERVQUAL model. The data were less clear for the domains of assurances, empathy and responsiveness. Nitecki's study is, however, primarily important due to its methodological approach and its statistical testing of the validity and reliability of the instrument for use in an academic library setting.

Hernon and Calvert's (1996) study succinctly outlines how academic libraries can implement a service quality programme using a survey instrument. These researchers have carefully developed and pre-tested a questionnaire that measures library customers' expectations. The instrument was purposely designed to be flexible enough so that libraries could adapt it to their local needs, service objectives and policies (Hernon & Calvert 1996). Through the use of factor analysis on more than 100 attributes in New Zealand, Calvert and Hernon (1996) identified ten domains of service quality: guidance, waiting times, electronic services, library staff, equipment maintained in good working order, material arriving within a set time, the building and the library environment,

library furniture and facilities, and materials for course needs. However, this study also failed to support the generic quality domains introduced in the SERVQUAL model.

All these research studies are important for current and future research projects because of their methodological components, which are based on the disconfirmation paradigm, attitudinal scaling and analytical techniques, specifically for possible modifications to the existing SERVQUAL instrument. Different modified versions of the orthodox SERVQUAL model have been used by several scholars (Filiz 2007; Nimsomboon & Nagata 2003; Sahu 2007; Sinyenyeko-Sayo 2007; Tuomi 2001) to assess the service quality of university libraries. However, the generic domain structure introduced by the original SERVQUAL model—tangibles, reliability, responsiveness, assurance and empathy—were not discovered by these studies. For example, Filiz (2007) discovered that there are five service quality-related domains: quality of library services, quality of information and library environment, reliability, quality of online catalogue system and confidence applicable to academic libraries. Sahu's (2007) study reflects six domains of service quality: reliability, responsiveness, assurance, access, communications and empathy. Some critical issues pertaining to the reliability of the model are also available.

The research findings from Nitecki's doctoral dissertation (1995), cited in Nimsomboon and Nagata (2003), explain that among the five domains of SERVQUAL, the customers rated reliability as the most important, and tangibles as the least important domain in its factor structure. They further express that "this finding is parallel to those of Srisard (1997), Abdallah (2002) as well as Ford (1994), which found that the customers reported high expectation on reliability." Most findings reflected that reliability is the most important quality domain when evaluating library services, and this finding has also been confirmed in a similar study of Finnish academic libraries, of which the aim was also to investigate academic library services from the customer's point of view (Tuomi 2001).

The studies referred to above clearly demonstrate that different domain structures specific to each study are easily identifiable. These domains are substantially divergent from the five collapsed domains, which the designers of SERVQUAL and SERVPREF models

identified from the applications in other contextual settings. It is therefore evident that due to the changing domain structures from one research project to another, a universally accepted instrument is not available for the assessment of service quality in academic libraries.

However, there is potential for international collaboration on assessing library service quality, as seen from a cross-cultural study comparing perceptions of service quality among library customers in New Zealand and China. The study unequivocally concluded that there are global commonalities in the way customers think about library service quality. Marked similarities in results show that there is perhaps a global set of customer expectations that can be used to measure academic library service quality (Calvert 2001). At the symposium on service quality conducted by the Association of Research Libraries (ARL) in October 2000, Philip J. Calvert compared studies of customer expectations in China and New Zealand to determine whether or not culture is a factor that influences service expectations (Calvert 2001). The results revealed that cultures of nations were not a factor, and that library customer expectations were similar across the countries, such as the United States, New Zealand, Singapore and the People's Republic of China (Calvert 2001). However, the results of other research studies indicated in Table 3.1 reveal the opposite, pointing out the discrepancies noticeable in this regard from culture to culture (Karatepe, Yavas & Babakus 2006; Payne-Palacio & Theis 2005: 155-156; Raajpoot 2004: 189; Spears & Gregoire 2004: 61).

Concluding with the applicability of the SERVQUAL model in the library and information service sector, an assortment of results connected to different domain structures and attributes were produced. It is therefore clear that SERVQUAL is not the best model for measuring the customer satisfaction construct and/or service quality construct in the discipline of library and information sciences. Moreover, current research trends, in relation to customer satisfaction in the area of service marketing, suggest that SERVQUAL, due to its primary concern with gauging service quality in a given scenario, has not been used to measure customer satisfaction to any great extent. In this context, it is pertinent to point out that, though SERVQUAL is a generic model common to all kinds

of organisations, it requires thorough customisation for use within library settings. As a consequence, LibQUAL has emerged to fill the deficiency gaps of the SERVQUAL model.

### **3.5.2 LibQUAL**

Since the 1990s, many researchers have tried to use SERVQUAL to measure library service quality in different settings, but failed to produce reliable and valid results. LibQUAL, which is a modified version of SERVQUAL, was designed by library and information science researchers on the basis of the underlying methodology of SERVQUAL. LibQUAL is a Web-administered library service quality assessment protocol that has been used worldwide in different types of libraries (Cook, Heath & Thompson 2001). In October 1999, LibQUAL was developed into a tool for library service quality assessment by the Association of Research Libraries (ARL) in the United States of America. The domains of the tool are as follows:

- **Affect of Service:** It combines three of the service domains identified by SERVQUAL into one. These domains are assurance, empathy, and reliability;
- **Reliability:** Ability to perform the promised service dependably and accurately;
- **Access to Information:** Access is ensured through the provision of comprehensive collections and ubiquity of access, or the provision by all means possible of barrier-free access to information when needed;
- **Library as Place:** Ability to meet community requirements and provide space for study, collaboration, or rendezvous; and
- **Self-reliance:** Ability to foster self-reliant, information-seeking behaviour through instruction, mentoring, signage and other means (Cook, Heath & Thompson 2001).

LibQUAL is a suite of services that libraries use to solicit, track, understand, and act upon customers' opinions of service quality (LibQUAL 2008). It has been rigorously tested through a Web-based survey combined with training to help libraries assess and

improve their services, change their organisational culture, and market their services.

The goals of LibQUAL are to:

- “Foster a culture of excellence in providing library services,
- Help libraries better understand customer perceptions of library service quality,
- Collect and interpret library customer feedback systematically over time,
- Provide libraries with comparable assessment information from peer institutions,
- Identify best library service practices,
- Enhance library staff members' analytical skills for interpreting and acting on data” (LibQUAL 2008).

The original LibQUAL presents 41 statements, accompanied by a three-column rating format consisting of minimum service expectations, desired service expectations, and the perception of service performance of the library reviewed. Heath, Cook and Thompson (2001) assert that these statements examine three domains (affect of service, reliability or service efficiency and tangibles) and introduce a fourth domain: resources. These researchers claim that these attributes better reflect the service quality domains of research libraries than the original SERVQUAL set of factors and domains developed across service industries.

After rigorous testing of the LibQUAL protocol over a three-year period, the survey was standardised to include the following key elements (LibQUAL 2008):

- Twenty-two core items spanning 3 domains - Affect of Service, Information Control, and Library as Place;
- Eleven additional items covering information literacy outcomes, general satisfaction with library service, and library usage trends;
- General demographic items; and
- A comments box for open-ended customer comments.

A related case study by Walters (2003:98) highlights several advantages over earlier assessment instruments. He finds that:

- LibQUAL is designed to elicit responses from a random sample of both library customers and non-customers;
- It accounts for respondents’ minimum and desired levels of performance, rather than relying solely on their perceptions of current conditions;
- It provides multiple benchmarks for the comparison of institutions;
- It meets established criteria for reliability and uses questions derived from in-depth interviews with library patrons; and
- It identifies the various facets of perceived quality and provides an overall rating for each.

The original five domains of the LibQUAL were changed with the passage of time (see Table 3.2), and in 2003, this resulted in three domains. In the LibQUAL model, “Library as Place” refers to the physical environment, “Affect of Service” reflects the warmth, empathy, reliability and assurance of library staff , and “Information Control” is the ability to control the information universe efficiently (LibQUAL 2008).

**TABLE 3.2: DOMAINS OF LIBRARY SERVICE QUALITY IN LibQUAL**

2000	2001	2002	2003
41 items	56 items	25 items	22 items
Affect of service	Affect of service	Service affect	Service affect
Reliability	Reliability	Library as a place	Library as a place
Library as a place	Library as a place	Personal control	Information control
Provisions of collections	Self-reliance	Information access	
Access to information	Access to information		

Source: LibQual 2008

This model is also common to all forms of libraries, and thus, it is a generic model, which is inflexible for deep customisation for a specific kind of library—for instance, the university library or the public library. LibQUAL’s factor structure has been changed several times to form a new generic model, which was implemented in 2003. As the conceptual formation of this model is the same as SERVQUAL, the issues pertaining to the conceptual criticisms are also commonly applicable to this model.

### **3.5.3 SERVPREF applications in library sector**

SERVPREF is merely a subset of SERVQUAL. The rationale behind the development of this instrument was that:

- (i) measuring customers expected service level, prior to the service delivery, is impossible.
- (ii) measurement of expected service level after service delivery may be inaccurate, as the customers' expectations, by then, have already been biased by the service.

Using this rationale, Cronin and Taylor (1992) proposed an alternative instrument, which used 22 questions with respondents' perception-only scores to measure service quality instead of SERVQUAL's disconfirmation scores. The SERVPREF instrument is therefore identical to SERVQUAL, with the exception that SERVQUAL has 44 items (22 items for expectation of service quality and 22 items for performance of service quality), while SERVPREF has 22 items addressing only actual performance. A replicated study with the new dataset also showed the superiority of the performance-only approach as a measurement of service quality (Brady, Cronin & Brand 2002; Einasto 2009: 14).

However, the SERVPREF model has not been adequately researched in the contextual settings of libraries. The attributes nevertheless covered by both models, that is, SERVQUAL and SERVPREF, are the same and seem appropriate for libraries. White, Abels and Nitecki (1994), state that both models are flexible, and they can be modified to suit special libraries. However, according to Hernon and Nitecki (2001) and Martin (2003: 19), SERVPREF has rarely been used in libraries, and researchers have shown a clear preference for SERVQUAL, which has the facility for broad application to service industries. The obvious theoretical and methodological formation of these models have been criticised by a number of researchers and have not been resolved to date.

### **3.6 CONTEXTUAL RESEARCH CRITIQUE**

A number of critiques have been presented regarding the SERVQUAL, LibQUAL and SERVPREF models in the last two decades by researchers in the service marketing area



belonging to different academic disciplines. Apart from the conceptual deficiencies described in Chapter Two, contextual weaknesses that include operational and functional deficiencies and limitations, can also be identified in these measurements.

### **3.6.1 Operational critique**

All investigators work with predetermined scales when using measurement instruments. It has been demonstrated by several researchers in the fields of psychology (Allport 1961), business (DeSarbo *et al.* 1994) and artificial intelligence (Cronin & Taylor 1992) that scales for the measurement of perceptions are not symmetrical, and the length of each interval within the scale may not be equal. This point indicates a drawback, similar to a conversion of a Likert scale into an ordinal scale.

SERVQUAL, SERVPREF and LibQUAL measures are static, in that they do not consider the history of the service, and they fail to capture the dynamics of the changing expectations. Parasuraman, Zeithaml and Berry (1994: 115) point out that some respondents may not possess the necessary knowledge to respond to some of the SERVQUAL and SERVPREF items and therefore record a rating of 'four' (the mid-point of a seven-point scale) on the perceptions scale. The final gap score may then indicate something other than what it should mean. Moreover, Babakus and Mangold (1992: 773) reported that despite the absence of a "don't know option" on SERVQUAL, non-responses on the perceptions aspect are quite common. Krosnick 2000 (cited in Morrison 2004: 488) point out that when mid-points are perceived as representing neutral responses, respondents may be induced to select them to enable the quick completion of the task—a 'satisfying' strategy, that is, one that is merely satisfactory or that suffices. The indicated response may not therefore truly reflect the respondents' actual expectations or perceptions.

The other apparent drawback in SERVQUAL and SERVPREF models is also related to their measurement scales of constructs. Both models use a Likert scale to measure service quality attributes and domains, while a semantic differential scale is utilised to measure overall satisfaction. Different measurement scales may, however, lead to some empirical

errors because of its measurement inconsistency. Furthermore, as the SERVQUAL scales have no verbal labels for scale points two to six, Nanayakkara (2008: 43) suggests that if a scale does not have verbal labels, respondents may overuse the extreme end-points that have verbal labels. This will particularly affect the 10-point semantic differential scale due to its enormity. Verbal labelling of all of the scale points may be less subject to such bias and may accurately record the respondent's intended response.

In criticising the application domain of the SERVQUAL model in the library sector, some arguments against the validity of the model can also be found. Criticisms include the use of different scores, applicability, dimensionality, lack of validity and so on. Nitecki and Hernon (2000), cited in Hernon and Calvert (2005: 382), say:

...given the focus on instrument development, the investigators did not pursue external validity or the generalisability of findings to the customer or broader university community. Nor did they limit the study to those statements having local relevance. Rather, they developed an instrument consistent with ones discussed in the literature review.

Carman (1990: 34) found a larger number of domains and highlighted the multi-faceted nature of some services. He further says that the SERVQUAL scale fails to elicit the importance of all five factors in some special cases of tyre stores, placement centres and dental clinics. In the library sector, Andaleeb and Simmands (1998), cited in Cook, Heath and Thompson (2001: 148), point out that "various studies in the information service sector have also demonstrated that the domains introduced in SERVQUAL have not been confirmed." Furthermore, they argue that additional factors need to be integrated to SERVQUAL to measure some other important domains on customers' perspectives of library service quality. Hernon and Nitecki (2001: 698) stress that

...believing that SERVQUAL does not sufficiently address local expectations and priorities, Peter Hannon and his colleagues in the United States and New Zealand developed a generic set of expectations that individual libraries could use as a guide for deciding on those statements that they might treat as priorities.

Furthermore, they emphasise that “central to their approach is the belief that whatever expectations probed should result from local review and the input of library staff and some customers.” Their research was focused on the library or service location and did not attempt to determine the relevance of statements across institutions or over time (Hernon & Nitecki 2001: 698).

As LibQUAL is currently the most popular and widely used assessment tool in different libraries, even though it was principally developed for research libraries, its theories and applications in library assessment processes warrant further analysis. As previously noted, LibQUAL was introduced into the library sector as an expansion of the SERVQUAL model. Accordingly, the customers’ perceived quality of library services in LibQUAL is the customers’ judgment about their overall experiences with the services. This determination is based on the degree and direction of discrepancy between the customer’s perceptions and expectations. The underlying theory of SERVQUAL and LibQUAL is the same, even though there are some modifications in its domain structure. Therefore, it is quite apparent that the same theoretical inconsistencies and issues apply to both instruments.

### **3.6.2 Functional critique**

From the point of view of a decision making process, instruments based on SERVQUAL do not show a clear linkage between customer satisfaction and managerial decisions for the reason that the output cannot be easily translated into decisions. There is no suggestion on how management can use these instruments as a strategic lever and better decide what in fact needs to be changed, how to connect these measures to changes and goals achieved, and how customer expectations are updated, because it is widely known that perceptions vary over time.

LibQUAL is one of the instruments used to measure library service delivery performance, but the literature reports that there are functional issues, such as costs in developing and administering the survey on an individual and institutional basis (Hiller 2001). Walters (2003:99) also raises two questionable assumptions that are not clear in

the LibQUAL instrument: first, whether the library customers have the necessary expertise to make accurate assessments of quality, and second, whether perception serves as valid indicators of objective conditions. This suggests that, given the above reasons, students' lack of experience with academic libraries may result in an inability to make valid assessments of quality. Some researchers such as Cuthbert (1996) argue that library customers can recognise excellent service from poor service only once they have been exposed to both levels of service, and also only if they are taught the difference between high and low quality. For example, in the case of LibQUAL, responses of the faculty staff may be significantly more useful than those of the undergraduate students (Walters 2003: 99).

Rajan and Ravi (2001), cited in Sahu (2007: 236), point out some limitations and deficiencies in SERVQUAL, for example, because the domain structure of the model has not been confirmed by rigorous studies and replicative studies carried out in the field of library and information sciences. The underlining cause is that this model was originally designed for the commercial environment and not for non-profit philanthropic service industries, like libraries and museums. Moreover, they suggest that some adaptations must be completed in order to design a more sophisticated, reliable and effective instrument ensuring higher applicability in the library sector.

Even though service quality is a new concept in the library and information service sector in Sri Lanka, most academic libraries have now begun to enhance service quality from customers' perspectives and the quality standards introduced by ISO, the Sri Lanka Standards Institute (SLSI), and QAA council in Sri Lanka. However, there is a dearth of research studies in the area of customer satisfaction from the service quality perspective, not only in Sri Lanka, but also in the South Asian region. More attention is therefore needed to substantiate the applicability of these models in different cultural settings in the world.

### **3.6.3 Sampling critique**

The relevance of the sample with respect to the population has not been made clear in the majority of relevant studies. The sample is important to draw valid conclusions on a

larger population (Ngulube 2005: 132). Thus, a number of methodological issues are associated with studies on customer satisfaction and service quality in the library and information service sector. Ngulube (2005: 132) further points out that “researchers should be encouraged to report their sampling techniques because the appropriateness of the sampling strategy has a bearing on the validity of the research output.” Table 3.3 summarises the issues on sampling found in the literature.

**TABLE 3.3: SAMPLE SIZES OF SERVQUAL RESEARCH IN LIBRARY SECTOR**

<b>Author</b>	<b>Sample</b>
White, Abels & Nitecki (1994)	A random sample of 150 participants from two special libraries in Washington.
Nitecki (1996)	Randomly selected 564 customers
Calvert and Herson (1997)	459 customers—306 at Victoria University and 153 at Lincoln University, including academic staff, general staff and external borrowers in New Zealand.
Harwood & Bydder (1998)	Random sample of 400 students at the University of Waikato library.
Calvert (2001)	Peking and Tsinghua University in China. Sample: 135 University students. No indication pertaining to sampling technique is available.
Nimsomboon & Nagata (2003)	2,139 customers from students, faculty members and researchers from the Thammasat University library in Thailand. The target population was 27,901.
Woo (2005)	University of Hong Kong sample of 2,564 customers of academic staff and students.
Moon (2006)	Total population of the Rhodes University, South Africa was taken as the sample. Accordingly, 6,245 students and 305 full-time faculty members were employed as the subjects.
University of Sydney library client survey report (2006)	4,102 clients from the University of Sydney, including undergraduates, postgraduates and faculty members. The sampling technique used was not mentioned in the study.
Sinyenyeko-Sayo (2007)	1,000 randomly selected sample from University of Western Cape library customers, and 1,000 customers from the Stellenbosch University library, including undergraduates, postgraduates, academic staff and general staff.
Filiz (2007)	450 randomly selected students at the Osmangazi University library and Anadolu library in Turkey.
Sahu (2007)	Total sample of 100 (70 students and 30 faculty staff) at the Jawaharlal Nehru University library.

Source: Compilation by author based on literature

Firstly, as depicted in Table 3.3, several studies conducted in the library sector have utilised small sample sizes (Calvert 2001; Sahu 2007; White, Abels & Nitecki 1994). The results of these studies therefore need to be interpreted with caution, as they may not be representative of a wider population of customers in the library environment.

Secondly, the majority of studies have mainly focused on the case study method, and they have failed to generalise the findings for the reason that the studies are primarily based on one specific organisation (Calvert 2001; Harwood & Bydder 1998; University of Sydney library client survey report 2006; Moon 2006; Nimsomboon & Nagata 2003; Woo 2005), which is too small to represent the whole population in a given environment. The majority of studies (Filiz 2007; Sinyenyeko-Sayo 2007; Moon 2006) have employed the single case study method, which is appropriate

...when the case is special in relation to established theory for some reason. This might arise when the case provides a critical test to a well-established theory, or where the case is extreme, unique, or has something special to reveal. (Rowley 2002:21)

However, as indicated in Chapter Two, these cases have not been adequately informed by any established theory, as there is no universally agreed upon notion of the best theory for the formation of service quality and/or customer satisfaction. No study—as indicated in Table 3.3—has used the multiple embedded case study method, which can be marshalled to test and build theories (Rowley 2002: 21), in order to generalise the outcomes of the research in an objective way. However, there is an ongoing debate regarding the generalisation, indicating whether or not generalisation is important. Rowley (2002:25) argues that generalisation is necessary for a research study. Thus, a new forum of discussion is needed to debate this issue in order to find a lasting solution.

Thirdly, there is a need to explore the quality attributes for each country, as each country may have its own set of quality attributes (Zhao, Xie & Leung 2002: 323-325), with different levels of importance (Feinburg & de Ruyter 1995: 63). Library customers' attitudes towards the services of university libraries may be associated with the Sri Lankan culture, and therefore, any findings from previous studies carried out in other countries may have limited relevance.

### **3.7 A THEORETICAL MODEL FOR CUSTOMER SATISFACTION**

The conceptual and contextual reviews combine a theoretical justification and contextual applicability of the conceptual underpinnings to examine customer satisfaction in relation to service quality, in the context of library and information sciences. In the following section, the researcher presents a more comprehensive theoretical framework for this study, based on the conceptual framework identified in Chapter Two, which was supported by the prevailing contextual research literature. The interrelationships of past theoretical and empirical efforts have enabled the researcher to propose a revised conceptual model, which was initially designed in Chapter Two. This fuzzy conceptual model, refined on the basis of findings from the prevailing contextual literature, has enabled the researcher to validate it during focus group discussions at the data collection stage. The quality attributes, domains and other related attributes identified were also incorporated into the provisional models designed in the main study because of their prevalence in the literature and their use in describing the basic process of customer satisfaction behaviour in university libraries.

#### **3.7.1 Identification of service quality attributes/domains**

Following a thorough examination of studies in the areas of service quality and customer satisfaction in the library sector, it appears appropriate to examine the attributes that affect the measurement of service quality in library settings. The quality attributes, domains and pertinent settings used in past studies of service quality and/or customer satisfaction are presented in *Appendix I*. As illustrated in *Appendix I*, it is apparent that the United States, Singapore, New Zealand, China, South Africa, Finland, India and Thailand have dominated the studies in customer satisfaction and service quality. A conclusion that may be drawn from *Appendix I* is that service quality attributes are becoming important aspects in emerging research in the said subject area for the reason that most of the attributes are found to be common to all contextual environments in numerous nation states. These studies seem to emphasise similarities, while most of the quality domains of the reported studies remain remarkably different in varying cultural settings.

Extensive research on testing customer satisfaction models and theories has been undertaken worldwide. Indeed, the results of such testing would be rather interesting to library administrators in Sri Lanka, wherein the differences across nations are attributed to culture or other factors. Culture-specific validation of customer satisfaction theories has important implications for the advancement of the satisfaction theory. Similarly, several studies have focused on involvement levels, yet the conclusion that higher levels of involvement lead to greater use of both affective and cognitive decision making heuristics in different cultures provides an interesting conclusion on customer behaviour.

*Appendix I* also illustrates the diverse service quality attributes that are influenced by different research settings. However, this issue related to the influence of service quality attributes on customer satisfaction needs to be cautiously addressed in this study because these research studies are mainly based on the service quality construct, rather than the construct of customer satisfaction.

### **3.7.2 Socio-demographic, purposive and situational attributes**

A close study of the existing literature—undertaken with the objective of identifying socio-demographic, purposive and situational attributes that may affect overall customer satisfaction and/or service quality in library services—has not conveyed in any way that these attributes contribute to the determination of customer satisfaction. However, a number of research studies significantly indicate that some of these attributes have a direct influence on customers' good use of libraries. Whitmire (2001) stresses that library administrators need to identify the factors that influence academic library use, with the intention of deploying adequate resources and effective services for the customer community. In some of the literature, it is apparent that various attributes, such as age, experience and other related attributes that may be categorised into broad categories of socio-demographic, purposive and situational attributes, have an effect on the use of academic library services in different organisations.



### 3.7.2.1 Socio-demographic attributes

There is no clear indication as to what socio-demographic attributes promote library use. Berelson (1949) identified education as the most important attribute affecting library use, and age, economic status and educational level were positively related to library use. According to CIPFA Plus (2000) (cited in Hawkins, Morris & Sumsion 2001), ethnic minorities are more active customers than ethnic majorities of the population. CIPFA Plus (2000) (cited in Hawkins, Morris & Sumsion 2001) further say that library use also varies by gender. However, most previous studies have discussed socio-economic and demographic attributes, along with the service quality attributes, to assess the service quality of libraries. Some common attributes used in past service quality research in the field of library and information science are:

- Gender of the customer - (Filiz 2007; White, Abels & Nitecki 1994);
- Age of the customer - (Harwood & Bydder 1998; Nimsomboon & Nagata 2003);
- Course enrolled - undergraduate course, graduate course (Harwood & Bydder 1998);
- Duration - Full-time student, part-time student (Harwood & Bydder 1998; Sinyenyeko-Sayo 2007);
- Customer group - faculty/researcher, undergraduate, postgraduate (Nimsomboon & Nagata 2003; Sinyenyeko-Sayo 2007; Woo 2005);
- School/faculty of the customer - education, humanities, law, management, science and so on (Filiz 2007; Harwood & Bydder 1998; Woo 2005);
- Major subject area - (Harwood & Bydder 1998; Nimsomboon & Nagata 2003); and
- Year of study at university - (Filiz 2007; Harwood & Bydder 1998; Nimsomboon & Nagata 2003).

Harwood and Bydder (1998) used two customer groups—namely, full-time students and part-time students—to assess student expectations of and satisfaction with the university library. According to them, part-time students scored questions quite differently from other respondents. They further state:

Part-time students appear to be more concerned about the availability and performance of staff than other customers, and less concerned about the breadth and depth of the collection. Part-time students are more likely to use the library when assistance in the use of electronic resources is unavailable. (Harwood & Bydder 1998: 165)

The reason for this is that they rely more heavily on staff expertise because they have little time to familiarise themselves with the resources (Harwood & Bydder 1998). According to the study by Nimsomboon and Nagata (2003), all desired expectations lagged behind the actual service perception, and there are different perspectives among the three customer groups. In the faculty/researcher group and graduate student group, larger gaps exist in the domain of “Collection & Access”. The attribute designated as “Access to Digital Collection from PC” demonstrated the largest gap between performance and expectation. For the undergraduate group, the staff attributes show larger gaps, followed by those of domains entitled “Collection & Access” and the library place. From this study, it is clear that customer categories have an influential control on customer satisfaction.

Filiz (2007) discovered similarities and differences among customer categories. According to him, customer communities in academia are not homogeneous clusters in the way they use the libraries or in their needs for library resources and services. In addition to differences between faculty and students, there may also be significant differences between those in different academic areas, or by gender or some other demographic component. These have important implications when identifying customer needs, concerns and issues that may be missed when analysing aggregate results (Filiz 2007). In the findings by Filiz (2007), there were no significant differences in the perceptions of library service quality or in the importance of library service quality between faculties. Moreover, survey results did not show statistical differences in perceptions of library service quality by gender and by the students of Osmangazi University and Anadolu University. This indicates that customer expectations and perceptions do not depend on either the faculty or the gender and age of the customer, even if it is a dependant customer category.

### **3.7.2.2 Purposive attributes**

Even though there are no studies directly related to purposive attributes and customer satisfaction, Burks (1993) found that students use libraries to complete their school projects. In addition, several researchers (Hiller 2001: 613; Maughan 1999: 356; Belefant-Miller & King 2001: 100) found that exploring literature for research studies was the most important reason for the information-seeking behaviour of academics. Chelton and Rosinia (1993) identified three reasons for young adult students using public libraries. The purposes identified were to meet personal needs, complete school assignments and to find a place to meet friends. Blazek (1975) identified the teachers' influences that impact the use of libraries. Jirojwong and Wallin (2001: 70) say journals and textbooks are the preferred printed media.

Ducat, Mancall and Drott (1983), cited by Burks (1993), say that the public library is used by students to complement the school library. Massey-Burzio (1998: 212) identifies that lack of time has also affected the non-use of library and information services by students. In 1980, Lucus examined the relationships between library use, reading interests, life interests, human relationships and physical activities, and found that the more active an individual tends to be, the more likely it is that he or she uses library facilities (Bolton 1982: 967).

### **3.7.2.3 Situational attributes**

Quarton (2003: 120) and Zondi (1992: 204) observe that students do not use library resources adequately because of their lack of skills in the use of information. According to Liu (1993: 27), poor language competency—particularly, the English skills of students in developing countries—has impacted the use of libraries. Furthermore, Ball and Mahony (1987: 160) say that foreign students find it difficult to approach 'strangers' at the reference desk due to their linguistic and social shortcomings. Some research studies (Enujoike 1994; Powell, Taylor & McMillen 1984; Razzano 1985) show that the majority of library customers who visited libraries as children continued to visit libraries as adults, while individuals who did not visit libraries as children were found to be less likely to develop that habit. Frequency of library use also impacts the good use of libraries

(Harwood & Bydder 1998; Nimsomboon & Nagata 2003; Sinyenyeko-Sayo 2007; White, Abels & Nitecki 1994; Woo 2005).

Following the discussion presented above, it may be concluded that socio-demographic, situational and purposive attributes may impact customer satisfaction on service quality. It is therefore prudent to integrate these attributes into the conceptual model for further empirical investigation in order to show the impact on ultimate customer satisfaction.

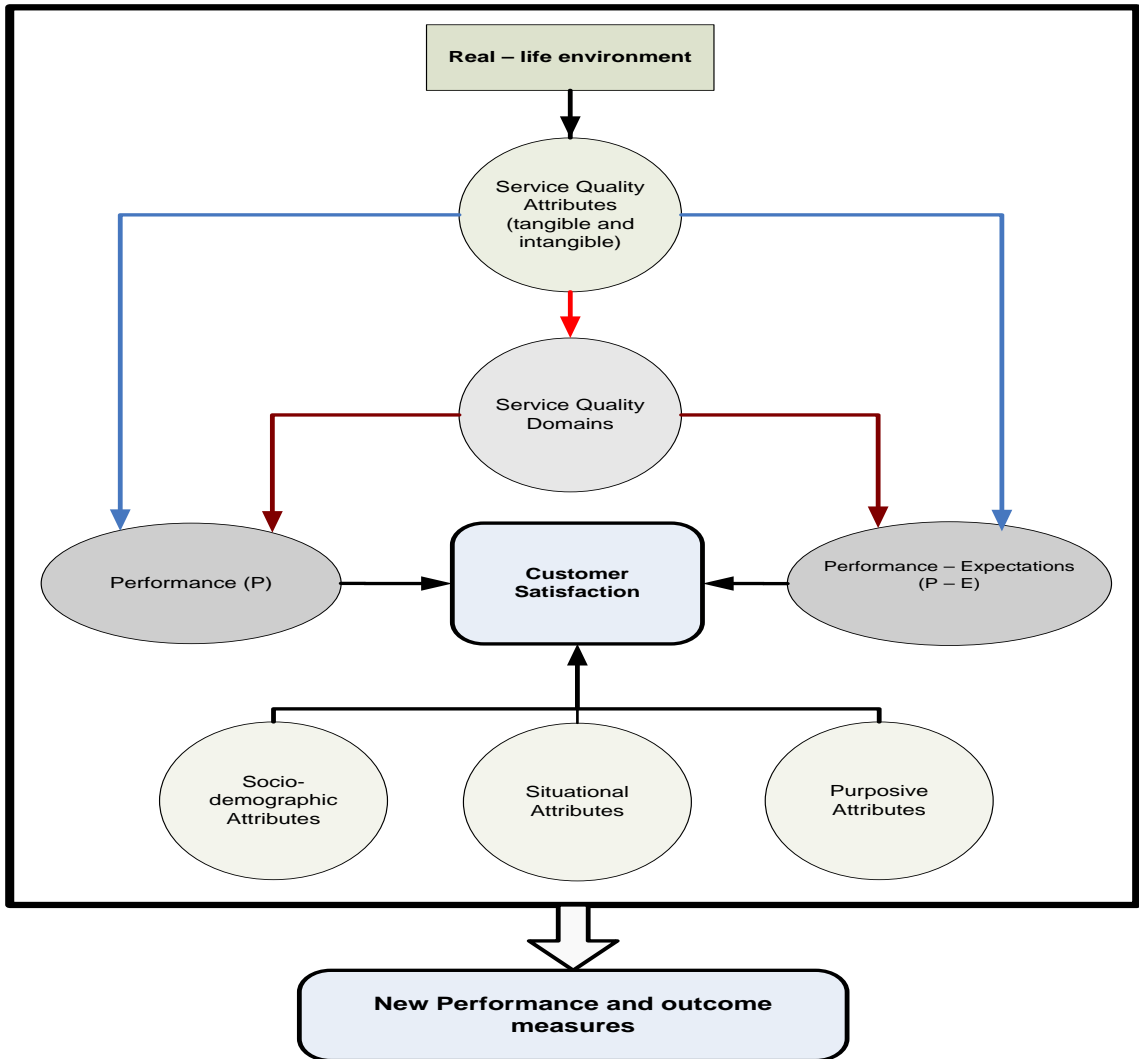
### **3.8 NEW CONCEPTUALISATION AND IMPLICATIONS**

This section outlines and discusses the fuzzy conceptual model that has been revised based on issues that emerged from the contextual research review of theoretical and empirical contributions of previous studies and of the review itself.

#### **3.8.1 Revised fuzzy conceptual model**

The existing literature reveals that the initial fuzzy model depicted in Figure 2.4, which was derived from the conceptual review in Chapter Two, offers an incomplete description of the customer satisfaction process of libraries. While complete in aggregate, in isolation, some of the components of this fuzzy model do not reflect the real picture of the contingency patterns of the formulation of customer satisfaction. This fuzzy model is inadequate in detail and requires further justifications and modifications. Thus, it incorporates two groups of attributes, that is, socio-demographic and purposive, which enable the model to be reconceptualised to address the issues identified in the research literature. In addition, it calls for a need to derive the attributes directly from real-life phenomenon for possible exhaustive refinements. It also calls for the need to identify the quality domains that are particular to the legitimate phenomenon in which the problem resides. In all of the frameworks identified earlier in the literature, the operating environment is implicit, rather than explicit. The revised model for conceptualising the construct of satisfaction of library customers is offered in relation to service quality, as depicted in Figure 3.1.

**FIGURE 3.1: REVISED FUZZY CONCEPTUAL MODEL**



Source: Compilation by author

Once a robust model for the prediction of customer satisfaction in relation to service quality is established, it should enable practitioners to formulate new performance and outcome measures for university libraries. Thus, this revised fuzzy model acknowledges multi-conceptuality, multi-dimensionality, temporality, subjectivity and relativity, and it offers a process-based view of customer satisfaction with university libraries.

### 3.8.2 Research implications

This chapter showed numerous areas wherein research relating to customer satisfaction, in terms of service quality in university libraries, was needed. On the whole, fourteen significant research issues of academic and managerial importance were identified from the review (see Table 3.4). Each of these areas was identified based on issues arising from either the theoretical basis of existing research or on the empirical basis. These issues were then translated into seventeen research implications, which have been used to focus the research design in Chapter Four, wherein a comprehensive description of how to manage these research implications is presented. Table 3.4 summarises these implications.

**TABLE 3.4: ISSUES IDENTIFIED FROM THE REVIEW AND RESEARCH IMPLICATIONS FOR THE STUDY**

Research issue	Research implications
1. Conceptual foundation of customer satisfaction	1. Whether or not to use the disconfirmation (E-P) paradigm or performance-only (P) paradigm
2. Development/modification of exiting models	2. Whether or not to develop a new model for measuring customer satisfaction in relation to service quality or to modify one of the existing tools for the purpose
3. Relationship between the constructs of customer satisfaction and service quality	3. Whether or not to assume that the relation between customer satisfaction and service quality is linear or non-linear
4. Prediction of customer satisfaction in relation to service quality	4. As the prediction of customer satisfaction has not been incorporated into the major part of the existing models, even if the key role of these models is to measure service quality, what precautions need to be undertaken for the research design to predict customer satisfaction in relation to service quality?
5. Accommodation of complex dynamism of the constructs	5. What precautionary measures are needed to prescribe for the unaccommodating complex dynamism of the problem domain?
6. Dimensionality of service quality	6. Whether to use the same attributes and domains presented in the SERVQUAL/SERVPREF and LibQUAL models or to generate a deductive and/or inductive approach of item generation from the real life phenomenon
7. Dimensionality of situational attributes	7. What situational attributes need to be investigated in the study?

Research issue	Research implications
8. Dimensionality of purposive attributes	8. What purposive attributes need to be used for the study?
9. Dimensionality of socio-demographic attributes	9. What socio-demographic attributes need to be integrated into the study?
10. Resource quality	10. As the library consists of tangible information resources and the demand for these materials from customers is high, how do we give significant attention to receiving customer perceptions regarding resource quality intangibly?
11. Measurement scale	11. Whether or not to use a semantic differential scale or a Likert scale for attitudinal questions 12. Whether or not to use a five-point, seven-point or ten-point scale. 13. Whether or not to use the same point scale for measuring/identifying service quality, purposive and situational attributes and overall satisfaction 14. Whether or not to use extremity labels
12. Research approach	15. Whether or not to use the case study or survey method.
13. Sample size	16. What is the proportion of sample size needed from the population?
14. Reliability of the measurement	17. What types of measures are needed as remedies for problems pertaining to reliability?

Source: Compilation by author

**Issue 01:** Since there are some theoretical paradigms underlying customer satisfaction, it is necessary to decide which of the paradigm/s are appropriate for the research problem of this study. The disconfirmation (gap score) paradigm and performance-only paradigm have particularly shown their capability to model service quality and customer satisfaction. However, a compelling argument raised by Bolton and Oliver (1989), cited in Bolton and Drew (1991: 376), states that only customers' assessment of continuously provided services, which may depend on performance assessment, deserves attention. As libraries are services provided continuously and considered in general to be a public service, it is important to research this issue. Some studies prove the superiority of perception-only measures in terms of predictive power and ability to explain the variance

in overall perceptions of service quality (Cronin & Taylor 1992). However, the researchers who developed SERVQUAL do not discard their model because the conceptualisation of service quality as a perception-expectation gap is not only rooted in a dominant theory in service marketing, but has also been supported in their focus group studies.

**Issue 02:** Many researchers (Brown & Swartz 1989; Carman 1990; Bojanic 1991; Babakus & Mangold 1992) have applied the SERVQUAL model to various business and non-business industries. SERVQUAL quickly became a promising instrument for measuring service quality and customer satisfaction in the service sector. According to White and Abels (1995: 38):

SERVQUAL has become the most widely used instrument for measuring service quality in profit and non-profit organizations. No other (marketing) instrument has been tested as stringently and comprehensively as SERVQUAL

Despite the unprecedented support for the use of SERVQUAL, its methodological approach has been widely criticised, and some researchers agree that the performance-only paradigm is superior to the disconfirmation paradigm (Cronin & Taylor 1992: 64-65). It generates mixed results and raises the question as to which model is better suited for modelling/measuring customer satisfaction. It is apparent, therefore, that there is still no generally accepted, universal model, and thus, it points to the development of a new model for a selected industry based on the underpinnings of theoretical paradigms.

**Issue 03:** Reviews of the existing literature on customer satisfaction in relation to service quality suggest that the current understanding of the relationship between customer satisfaction and service quality is problematic (Taylor & Baker 1994, cited in Jamal & Naser 2002: 146). Even if different models have been developed and extended to provide better measurements of service quality and customer satisfaction, a consensus on the relationship between these two constructs cannot yet be found. Although many researchers have proved the linear relationship between these two constructs (Andreassen 2000; Cronin and Taylor 1992), some researchers have started to explore the possibility



of a non-linear relationship between customer satisfaction and service quality (Ting 2004: 407). A study by Basadur and Head (2001) (cited in Ting 2004: 409) argues that the relationship between these constructs is a curvilinear function. Ting's (2004) findings supported the notion by empirical investigation of a curvilinear relationship between customer satisfaction and service quality. This conflicting empirical evidence highlights the need for research on the causality between customer satisfaction and service quality.

**Issue 04:** In order to provide a greater customer service, libraries can help enhance service quality by predicting customer satisfaction in relation to service quality. The increased importance of library services today motivated the researcher to understand more thoroughly how this is evaluated by service customers, and how their assessments affect overall customer satisfaction. From the conceptual and contextual research reviews, it is very clear that there are no well-accepted and well-established conceptual models for predicting customer satisfaction in relation to service quality, even though there are some generic models, such as SERVQUAL, SERVPREF and LibQUAL. These models particularly focus on service quality and have not given priority to the construct of customer satisfaction.

**Issue 05:** As the existing models are static in nature, they fail to accommodate the inherent dynamism of customer satisfaction and service quality in a given context. They seek objective measurements for universal prediction in a robust positivistic approach. However, the attempt has failed to present a more objective measurement because of the models' static and generic natures. The focus of the delineation of customer satisfaction is more general, and the research therefore neglects the customers' real perspectives in relation to their specific contextual environments. Consequently, there should be a genuine reflection of the customers' view on satisfaction in relation to service quality. The pre-developed theoretical framework based on the prevailing literature, which consists of the customer satisfaction construct with pertinent attributes and domains, can be validated and/or redefined with the customers' views on satisfaction and service quality in a given environment.

**Issue 06:** In 1990, Carman (1990: 34) found that the SERVQUAL attributes and domains were inconsistent across industries and suggested that the scale should be customised for each service industry. In addition, many researchers (Andaleeb & Simmonds 1998, cited in Cook, Heath & Thompson 2001: 148; Carman 1990: 34) have applied SERVQUAL in various industrial settings, but failed to confirm its five-domain structure. As SERVQUAL, LibQUAL and SERVPREF are generic models, they have not been particularly developed for a specific industrial sector, for example, university libraries in Sri Lanka. Furthermore, since the service quality instruments indicate that the factor structure may show a discrepancy across different industries (Babakus & Boller 1992: 253, 264; Badri, Abdulla & Al-Madani 2005: 842; Schneider & White 2004: 33), researchers such as Cronin and Taylor (1994: 130) propose:

.... to assess the factor structure implicit in a data set derived from SERVQUAL and SERVPREF measures to ensure that the hypothesized five- factor structure identified by PZB (1998) can be replicated specific to their own research setting. They therefore recommend customizing the attributes and domains in accordance with the industrial circumstances.

**Issue 07:** There has been growing interest in customer experience (Hernon & Altman 1998: 182; Wilson & Sasse 2004; Woodruff, Cadote & Jenkins 1983: 297; Zeithaml & Bitner 2000: 75), which can also influence customer satisfaction. Customer experience has become a significant factor in customer satisfaction because the customer often pays for a service, which indicates that service characteristics—such as perceived service quality, usefulness, appeal and value for money—must match or exceed customer expectations of the service (Wilson & Sasse 2004). From this perspective, assessing customers' experience is essential for many services (Riley 2007: 409-10; Wilson & Sasse 2004), and further research is needed to investigate the impact of customer experience on customer satisfaction, which may have an effect on the customers. There are some other situational attributes that may affect customer satisfaction to a great extent. The literature suggests that potential situational attributes will have substantial power in forming the customer satisfaction process. None of the models that have already been employed in the library environment to ascertain customer satisfaction

and/or service quality have been investigated to determine whether or not these attributes impact overall customer satisfaction.

**Issue 08:** Purposive attributes, like situational attributes, may affect customer satisfaction, and this needs to be generated from the problem environment in real-life. Due to the other contextual specificities, the research aimed to develop a more realistic approach to understanding customer satisfaction in relation to service quality.

**Issue 09:** Even though there may be no direct impact from the socio-demographic attributes on customer satisfaction, it is necessary to use them to find relationships by which the management of libraries may cater to these specific customer segments in order to enable them to achieve greater satisfaction.

**Issue 10:** Most services fall between tangible and intangible continuums—tangible includes materials, while intangible refers to personnel (Schneider & White 2004: 7). In academic libraries, customers receive a combination of both materials and personnel services. The material service refers to one that is more tangible in nature, and they are more technical and objectively measurable products, such as books, journals and so on. It is therefore apparent that library services lie closer to both material and personnel continuums. Thus, it implies that the balance between material service (tangibles) and personnel service (intangibles) is essential in libraries to provide a better service to customers (Schneider & White 2004: 7) and to meet customer needs effectively.

**Issue 11:** It is apparent that the measurement scales used in SERVQUAL and SERVPREF are also dubious. There is no perfect agreement between these instruments on the issue of measuring attributes by a Likert scale or a semantic differential scale, or by a Likert scale with overall satisfaction measured by a semantic differential scale. SERVQUAL and SERVPREF use these two different scales—that is, the Likert scale and semantic differential scale. Since these two scales are used in one instrument, the researcher believes that this may lead to some empirical miscalculations. On the other

hand, a number of researchers raise the question as to what is the most appropriate number of scale points that will maximise reliability (Gilmore & Carson 1992: 6).

**Issue 12:** According to past research, many studies were based on the case study method, limiting them to a single organisation. The method has not been expanded to cover a number of similar organisations to generalise the research findings. It thus raises the question as to which method should be used for this research, whether it is the case study or survey method.

**Issue 13:** A majority of studies in the field of library and information science have utilised small sample sizes, as shown in Table 3.3. Therefore, the results of such studies may not be representative of a wider population of customers in the whole library/libraries, as the small sample size prevents the researcher from making such inferences (Groebner *et al.* 2005: 13; Kotler 2000: 140-141). This would severely affect the data analysis function of the research, in terms of reliability of the research and final generalisation.

**Issue 14:** Reliability refers to the instrument's consistency and is defined as "an assessment of the degree of consistency between multiple measurements of a variable" (Hair *et al.* 1998: 117). As Nunnally (1967: 191-196) suggests, a series of diagnostic measures may be utilised to assess reliability—specifically, the reliability coefficient assessing the consistency of the entire scale, in which Cronbach's alpha is the one most often used. As customer satisfaction is very complex, it is necessary to maintain the reliability and validity of the construct. A single measure for identifying customer satisfaction has been questioned in relation to the reliability and validity of the constructs of service quality and customer satisfaction (Davis & Heineke 1998: 67).

In the light of the significant issues identified in the reviews, a new research study that may help to overcome concerns raised over the conceptual and contextual settings is warranted.

### **3.9 SUMMARY**

This chapter reviewed research studies relating to customer satisfaction and service quality in the library and information service sector. Few studies were found to address service quality and customer satisfaction in the university library sub-sector, with little or no consistency in the findings. On the whole, service quality and customer satisfaction assessments in the existing literature reveal numerous conflicting results, as no study has simultaneously compared the relative efficacy of the two paradigms identified from the conceptual review– disconfirmation and performance-only–relating to the university library environment. The identified gap should be addressed in a comprehensive study using both qualitative and quantitative methodologies. The chapter proposes the application of a revised fuzzy model based on the contextual research literature, focusing on the disconfirmation and performance-only paradigms and the moderating roles of situational, socio-demographic and purposive attributes in the relationship between satisfaction and service quality. Fourteen research issues have been identified in this contextual research review, and their implications have been incorporated in the research design and methodology presented in Chapter Four. Chapter Four outlines the research design and data collection strategies to be employed in obtaining the required data for analysis.

## **CHAPTER FOUR: RESEARCH DESIGN AND METHODOLOGY**

### **4.1 INTRODUCTION**

In Chapter Three, the conceptual model of this study was refined on the basis of the outcomes of rigorous contextual research studies prevailing in the literature, with the objective of redefining or validating it within real-life settings. Chapter Four presents the research design and methodology employed in the study to address the research problem of developing a model to predict customer satisfaction in terms of service quality. The research methodology initially includes the identification of systemic rules and procedures of the research agenda. The collected data are subsequently interpreted, and the findings evaluated on the basis of the said agenda.

To situate the ensuing discussion in the proper context, the research issues and their implications identified in Chapter Three are presented at the beginning, to be followed by a description of the research framework that emerged from the management of these research issues. The research design for the thesis is presented thereafter in two stages. In the first stage, which is the exploratory study, the pertinent quality attributes and domains are identified, and in the second stage, which is the main study, provisional models are developed to select the best parsimonious model through statistical testing. These two stages of the research study treat the design issues as similar and unique to the two stages of the study in the overall thesis. Finally, the chapter is summarised and concluded as a prelude to the exploratory study contained in Chapter Five.

### **4.2 MANAGEMENT OF RESEARCH ISSUES**

In view of the lack of attention to customer satisfaction in university libraries, the research problem of this study has received little attention in the literature. Particularly, the research implications pertaining to the process of customer satisfaction in relation to service quality in libraries have not yet been adequately addressed. The proposed study principally addresses the research issues identified in Chapter Three under section 3.8.2. This research agenda was oriented towards discovering new knowledge, rather than

justifying the existing knowledge. Thus, the identified research issues within the contextual research backdrop were managed as follows:

### **Issue 1: Conceptual foundation of customer satisfaction**

The two concepts—disconfirmation and performance-only paradigms—that have been principally developed in the business environment have also proven their applicability in non-business philanthropic areas, including libraries (Hernon & Nitecki 2001; Hernon & Schwartz 1996). However, the performance-only paradigm has not been widely applied in the library and information service sector. Thus, it was the purpose of this study to bring these two paradigms into the field of library and information sciences, with the objective of determining whether customer service can be enriched by the identification of determinants of customer satisfaction within the university library and information service sector. This study primarily addressed the research questions presented in Chapter One, based upon the expectancy disconfirmation and performance theories, to identify the best applicable theory relevant to the formation of customer satisfaction in terms of service quality in university libraries.

### **Issue 2: Development/modification of existing models**

Although SERVQUAL and SERVPREF take into account the five gaps—that is, management perception, quality specification, service delivery, market communication and perceived service quality (Parasuraman, Zeithaml & Berry 1985: 44) —this research only addressed the gap directly in relation to expectations and perceptions from customers' perspectives. The stand taken by the researcher was based on the consensus among prominent service quality researchers on the fact that service quality should be defined and measured from the customer's perspective (Enquist, Edvardsson & Sebhatu 2007: 386-387; Ghobadian, Speller & Jones 1994: 45-46). Furthermore, researchers posit that service quality refers to the comparison customers make between their expectations and their perceptions of the service received (Grönroos 1998: 327; Howcroft, 1992; Parasuraman, Zeithaml & Berry 1985: 42). Thus, the researcher's philosophy is that it is unwarranted to investigate all the gaps introduced by Parasuraman, Zeithaml and Berry (1995) in the SERVQUAL model, but service quality and customer satisfaction can be

evaluated by the judgments of customers on the relevant services. The researcher reiterates that it is not necessary to take into consideration the service providers' or other stakeholders' points of views to evaluate customer satisfaction in relation to service quality. Therefore, this research considered only the underpinning paradigms of the generic SERVQUAL and SERVPREF models—namely, the disconfirmation and performance-only paradigms—in order to build the best parsimonious model to gauge customer satisfaction from the viewpoint of customers' perceptions of service quality in university libraries.

### **Issue 3: Relationship between the constructs of customer satisfaction and service quality**

Past research studies have taken the debate into a new area of work, in which the relationship between customer satisfaction and service quality has been questioned. The majority of studies on customer satisfaction use a linear function to measure the service quality determinants of satisfaction (Andreassen 2000; Cronin and Taylor 1992), and some studies suggest that service quality determinants have a non-linear impact on satisfaction (Ting 2004: 407). There is no generally agreed notion on a relationship based on either linearity or non-linearity between these two constructs. The bona fide relationship between these constructs has also not been identified for developing a model to predict customer satisfaction in relation to service quality. Therefore, the coefficients of the final model (Ting 2004: 418) may in fact be dysfunctional.

Some researchers (Ting 2004: 407) highlight the relationship between service quality and customer satisfaction as an inverted U-shaped curvilinear association, showing increasing levels of service quality up to a point of satisfaction, and thereafter depicting a decrease in the levels of satisfaction. This curvilinear relationship is, however, considered inapplicable to the context of this research due to the nature of university library customers. Nonetheless, it may be possible to observe a curvilinear relationship in the long run, when the service quality gradually increases, and subsequently a drop in the satisfaction levels occurs due to the customers becoming less sensitive to it at a certain point/level of satisfaction. This often happens over quite a long period of time.



The curvilinear relationship is therefore not appropriate to this study because it is mainly concerned with university library customers, consisting predominantly of students who have a short period of four years of library service consumption, unlike other services that are continuously provided with long-lasting durables (Bolton & Oliver 1989, cited in Bolton & Drew 1991: 376). Library customers on the whole are very sensitive to quality enhancement of the library, and therefore, when quality improves, satisfaction will increase positively, pointing to the fact that the use of the inverted U-shaped curvilinear relationship is not appropriate. In this instance, there is a possibility that another type of non-linearity close to linearity may exist and be useful. To ascertain the relationship between the constructs, however, the research employed both linearity and non-linearity assumptions in applying a positivistic inquiry to gauge the relationship between customer satisfaction and service quality in Sri Lankan university libraries.

#### **Issue 4: Prediction of customer satisfaction in relation to service quality**

Since the existing models of customer satisfaction and service quality have not been linked adequately with each of the constructs, the need arose to develop a new model based on these two constructs. In other words, it became apparent that no customer satisfaction model has been developed based on service quality, and no service quality model has given priority to the construct of customer satisfaction. This research study therefore developed a robust, comprehensive and causally relational model based upon these two constructs to predict customer satisfaction in relation to service quality.

#### **Issue 5: Accommodation of complex dynamism of the constructs**

As the existing models are static in nature and fail to accommodate the complex and legitimate dynamism of the constructs in practical environments, there is a need to obtain customers' views on satisfaction in relation to service quality in order to assimilate the inherent dynamism of these constructs within the problem area. Satisfaction should be derived from real-life phenomena and not generic. This proposition was thus managed by the phenomenological research inquiry that the researcher conducted to build a rigorous theoretical framework. Thus, the pre-developed conceptual framework, termed as a revised fuzzy model in section 3.8.1 of Chapter Three, remains validated and/or redefined

with the customers' views on satisfaction and service quality, considered in the context of the Sri Lankan university library environment. Therefore, this pre-defined conceptual model is translated into a research framework that permitted the researcher to build provisional models to accommodate the dynamic nature of customer satisfaction in relation to service quality.

#### **Issue 6: Dimensionality of service quality attributes**

To measure customer satisfaction, it is necessary to foresee which service quality attributes in the library and information service sector customers generally utilise in their overall assessment of satisfaction. The major objective of this phase was to obtain valuable and valid information, mainly from the customers, regarding which attributes need to be included in the model. Thus, this research brought into the analysis the different service quality attributes from the customers' perspectives, which are principally relevant to university library settings in Sri Lanka. To incorporate these attributes into the provisional models, the literature survey, focus groups discussions and experts' opinions were used.

#### **Issue 7 and 8: Dimensionality of situational attributes; dimensionality of purposive attributes**

The existing literature suggests that potential situational and purposive attributes may have substantial influences on the formulation process of customer satisfaction (Scribner & Weun 2000; Woodruff, Cadote & Jenkins 1983: 297). As none of the existing models have benefited from these attributes in the formation of customer satisfaction, this research took upon itself the task of developing a more realistic approach, consisting of deductive and inductive attribute generation procedures, in order to discover potential quality, situational and purposive attributes that may affect customer satisfaction.

#### **Issue 9: Socio-demographic attributes**

Socio-demographic attributes identified under Section of 3.7.3.1 of Chapter Three are discussed in the section on focus group discussions in order to identify the potential attributes that may be included in this study. Additional attributes that were relevant and

more specific to Sri Lankan universities were also generated at focus group discussions, with the objective of assimilating them into the provisional models.

#### **Issue 10: Resource quality**

Customers receive both materials (information resources) and services from a library. Therefore, the quality of those goods and services must be carefully balanced to ensure quality of service. As a result, this study considered all the tangible and intangible information resources available to evaluate their quality with a view to ensure the occurrence of adequate customer satisfaction relative to these resources.

#### **Issue 11: Measurement scale**

In order to overcome the problem of reliability of the data gathering procedure, a five-point Likert scale was applied in this study (Cooper & Schindler 2006: 373; Kotler 2000:110). This scale had extremity labels ranging from “very important” to “very unimportant” for expectations, and “very satisfied” to “very unsatisfied” for performance, as indicated below.

##### *For expectations*

0. Don't know
1. Very unimportant
2. Unimportant
3. Slightly important
4. Important
5. Very important

##### *For performance*

0. Don't know
1. Very unsatisfied
2. Unsatisfied
3. Slightly satisfied
4. Satisfied
5. Very satisfied

In this application, when the attribute indicated a “Don’t know” response, there was a separate place to indicate this choice, which was not found in the Likert scale. (See the two questionnaires used in Research Stages One and Two in Appendices II and VIII, respectively). The same scale used for performance was also employed to measure overall satisfaction in order to maintain the consistency and accuracy of the study results, so that they can be conveniently interpreted.

### **Issue 12: Research approach**

Garson (2008) says that “unlike random sample surveys, case studies are not representative of the entire populations, nor do they claim to be.” Thus, the results are cumbersome to interpret and generalise in the case study approach, if the study does not utilise carefully selected, multiple embedded cases from the population that represents the whole set of events/subjects (Rowley 2002: 20). Even though the majority of past studies of service quality have relied on the case study approach, this study applied the survey method, which allows reasonable generalisations to be made and facilitates the development of a communal model.

### **Issue 13: Sample size**

Since the first stage of the study is primarily based on the factor analysis technique, the minimum sample size should be determined to execute the factor analysis procedure. However, there is very little agreement in the literature on the minimum sample size required for factor analysis. In this regard, Gorus (1983: 332) says that no one has developed a suitable ratio of the number of subjects to the attributes. However, Hair, Anderson and Black (1995), cited in Okoroafo (1997), suggest that the number of questionnaire items (attributes) in the questionnaire multiplied by five is a proper guide to determine the minimum number of subjects for undertaking a factor analysis. Using this argument, five subjects per attribute were therefore used in the first stage of the study, and Krejcie and Morgan’s (1970: 608) pre-defined sample size was employed in the second stage to maintain the minimum requirements of the statistical analysis in the main survey.

#### **Issue 14: Reliability of the measurement**

Since it is difficult to gauge the construct of customer satisfaction by a single measure, a composite measurement may be employed to reflect the real dynamism of the construct (Chin, Marcolin & Newsted 2003: 194). Therefore, the study employed a composite measurement composed of a multi-attribute scale to measure the customer satisfaction construct, thus ensuring high reliability and validity. Each customer was asked two questions to identify his/her overall satisfaction with the existing services. These attributes were then combined and averaged through statistical analysis to form a single composite measure of the construct.

#### **4.3 RESEARCH FRAMEWORK**

Theory is a set of unified concepts that facilitates a systematic view of phenomena. Theory guides practice and research. Practice makes possible the testing of the theory and the formulation of research questions. Research contributes to either theory building or tests existing theories to select practice guidelines. This research is primarily focused on testing the existing theories to create new knowledge in the discipline of library and information sciences.

In the deductive reasoning approach, the researcher can use two directions: conceptual or theoretical frameworks. These two directions are distinguished from each other on the basis of the structure that needs to be created anew, or whether the structure has been created already by someone else. If it is a conceptual framework, it is a structure of concepts and theories that are combined into a map for the study. If it is a theoretical framework, it is a structure of concepts that already in the literature as a readymade map for the research. This study created a conceptual framework by incorporating the expectancy disconfirmation theory and the performance theory described in Chapter Two. However, the progress in designing and developing a framework within which to measure customer satisfaction from the service quality perspective was hampered by the unique characteristics associated with the university library and information service in Sri Lanka. Thus, the conceptual framework developed in Chapter Three was refined according to the contextual situations specific to the university library sector in Sri

Lanka, upon which a theoretical framework was initiated and developed. The entire research process of the study was guided by this theoretical framework.

The design of the research study involved several steps, and the research strategy mainly comprised two main stages, each composed of different steps. These stages were:

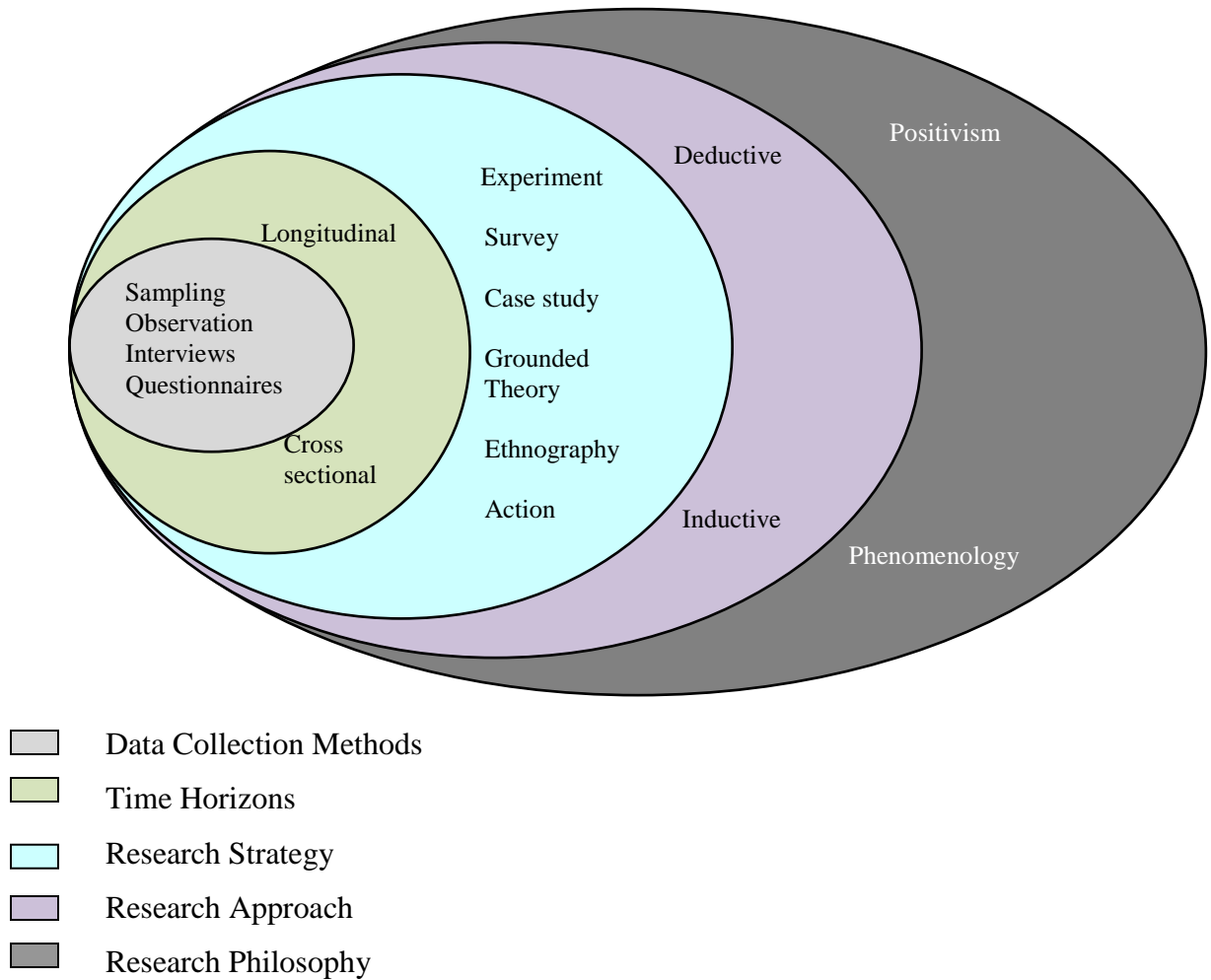
1. Exploratory study: attributes/domain identification; and
2. Main study: provisional model building and testing.

The exploratory study dealt with attributes and domain identification. The main study, based on the conclusively revised fuzzy conceptual model identified in Chapter Three, constructed provisional models together with pertinent service quality attributes and domains found in the first stage of the research study. Authentic statistical assessments—multiple linear regression, logistic regression analysis and parametric and nonparametric statistical tests—were carried out on these models to determine the best model for the prediction of satisfaction among library customers in Sri Lankan universities. Based on the results of the tests, a parsimonious model was presented, finally providing enhanced predictive performance, calibration and potential insight into the relevance of attributes and domains.

#### **4.4 RESEARCH PROCESS**

The research process was based on the “onion model” proposed by Saunders, Lewis and Thornhill (2000: 85), as depicted in Figure 4.1. This process enabled the presentation of a detailed description of the research design of the study and provided the basis to justify the issues that emerged when different data gathering techniques were employed (Saunders, Lewis & Thornhill 2000: 84).

**FIGURE 4.1: THE ONION RESEARCH PROCESS**



Source: Saunders, Lewis and Thornhill (2000: 85)

#### **4.4.1 Research Philosophy**

Research philosophy is very important as a foundation at the ground level of research planning. Carson *et al.* (2001: 1) highlight what, how and why research is completed. The “consideration of the philosophy of research helps to contribute a deeper and wider perspective of research so that our own specific research projects can have a clear purpose within a wider context” (Carson *et al.* 2001: 1). This implies that the philosophy helps to understand every aspect of the investigation, the overall mechanism and pertinent procedures of the study. The knowledge of research philosophy can also help the researcher to identify and create designs that may be beyond the researcher’s past

experience. Thus, a philosophical approach is needed to streamline the research process of a study.

It was found that two major research philosophical approaches are popular among social science research studies—the positivist research paradigm and the phenomenological research paradigm. Positivism contends that the world, including the social world, exists externally, and its characteristics should be studied using objective methods totally independent of the observer (Carson *et al.* 2001: 6). However, since this research is intended to validate the quantitative results and to establish causal relationships that explain dominant regularities between customer satisfaction and service quality within the university library sector in Sri Lanka, the positivist paradigm was the better choice.

This research also aimed to examine the deeper complexity of the relationship between service quality and customer satisfaction, based on two existing theories in the context of university libraries. It was recognised that these relationships were complicated and needed to be understood in qualitative terms to uncover the real dynamism of customer satisfaction in relation to service quality in the Sri Lankan context. Thus, the more advantageous phenomenological research paradigm was used in this study to ascertain the inherent dynamism of the problem area. The phenomenological paradigm presents the world as a socially constructed and subjective phenomenon and considers the observer as part of the phenomenon observed, not as something outside it, and holds that science in general is driven by human interests (Easterby-Smith, Thorpe & Lowe 1991: 27). On the basis of this philosophy, the research approach is based on the understanding of meanings of the philosophy and on it occurring in the real world in which the research problem prevails.

Easterby-Smith, Thorpe and Lowe (1991: 27) present the key features of the two philosophical paradigms, as shown in Table 4.1.



**TABLE 4.1: KEY FEATURES OF RESEARCH PARADIGMS**

<b>Key features</b>	<b>Positivism</b>	<b>Phenomenology</b>
Basic characteristics	The world is external and objective Observer is independent Science is value-free	The world is socially constructed and subjective Observer is part of what is observed Science is driven by human interest
Focus	Focus on facts Look for causality and fundamental laws Reduce phenomenon to simplest elements Formulate hypotheses and test them	Focus on meanings Try to understand what is happening Look at the totality of each situation Develop ideas through induction from data
Measurement	Operationalising concepts so that they can be measured taking larger samples	Using multiple methods to establish different views of phenomena Small samples investigated in-depth or over time

Source: Easterby-Smith, Thorpe and Lowe (1991: 27)

Although positivism and phenomenology are two different and opposing paradigms, the researcher strongly believes that the combination of both would be helpful to design a reliable and valid plan for the study. To capture the holistic and dynamic quality attributes associated with the experiential consumption of library services for achieving greater reliability and validity, a combination of positivism and phenomenological research paradigms was found to be the best method for such research designs (Cooper-Martin 1992; Hirschman & Holbrook 1986). Anderson (1983: 25) argues that no single best research paradigm can be found in any science, and specifically, it is not possible to find a single paradigm to evaluate marketing phenomena.

The major challenge in developing a methodology for this study was selecting an appropriate philosophy capable of capturing the dynamic and holistic nature of customer satisfaction in relation to service quality in the university setting in Sri Lanka. Consequently, the researcher came to the conclusion that qualitative identification of the inherent dynamism of the customer satisfaction construct is possible through the use of the phenomenological approach. The empirical modelling and testing part of the study can be achieved by the positivist approach. Thus, a unique paradigm, combining features of both positivist and phenomenological approaches, emerged. Therefore, the empirical

findings of the study contributing to theoretical knowledge have the methodological rigour that challenges the traditional approach of a single paradigm.

The phenomenological approach was used in the first three steps of the exploratory part of this research—that is, specification of the domain of service quality and customer satisfaction, generation of service quality attributes that can be used to predict customer satisfaction, and development of a questionnaire to identify the degree of importance of the attributes, as perceived by customers (see Figure 4.2). The approach was used to produce rich qualitative data, despite the fact that the gathering process was subjective, given the degree of the researcher's involvement.

The positivist approach was used in the final step of the first stage and in the entire second stage of the study (see Figures 4.2 and 4.3):

- (i) to produce quantitative data by quantifying (operationalising) the constructs of customer satisfaction and service quality, as expected in a quantitative approach; and
- (ii) to predict customer satisfaction based on the causal relationship functioning within a framework of universal laws explaining dominant regularities.

Anderson (1983: 25) says that “a sole means of theory justification cannot be maintained as a viable description of the scientific process or as a normative prescription for the conduct of scientific activities.” This study totally supports this notion. The study belonged to the basics of library and information sciences and marketing, and both are driven by human interests; thus, sociological implications had to be considered. Consequently, the observer was inevitably a part of the process, and the influence created by the researcher's presence and the possible bias introduced when analysing the results and collecting data in the exploratory part of the study were carefully considered. The formulation and testing of the research questions were done without bias in the process of challenging the theoretical constructs of customer satisfaction and service quality.

#### **4.4.2 Research approach**

Mason's (2002: 179) description of the research approach as to deciding what theories are applicable to research issues helped the researcher to adapt the research design to adjust to various constraints, such as insufficient understanding of the phenomenon, to form hypotheses (Saunders, Lewis & Thornhill 2000: 89). The research was basically an empirical investigation, though it briefly used non-empirical approaches in the preliminary steps of the exploratory study.

The first three steps of the first stage of the research (see Figure 4.2) used an inductive approach because it specifically focused on studying the experiential aspects of human behaviours and the processes underlying them. Within this approach, studies do not begin with a theory to deduce the hypotheses to be tested. They begin with the identification of the phenomena of interest, and then make observations within that area, after which the researcher looks for emergent patterns and explanations that offer ways of conceptualising the processes underlying the phenomenon. These conceptualisations can stand alone or can be further explored using a range of other methods, such as focus groups and expert opinions. Hence, the first three steps of stage one used an inductive approach to collect data and validate/refine the conceptual model on the basis of data gathered through focus group discussions. The data gathered in the first three steps were basically qualitative. Since there was the possibility of the context of the study influencing the outcome of the study, the inductive approach was utilised to ensure that all necessary dimensions required to understand the inherent dynamism of customer satisfaction and service quality in university libraries in Sri Lanka were covered. This approach endeavours to explore the real world state of affairs pertaining to customer satisfaction with the involvement of the researcher. This stage is therefore accepted as subjective.

The fourth step in the exploratory study and the main study adopts the deductive reasoning approach. Deductive reasoning begins with a structure that guides "what's there". Research questions 3 to 10, listed in section 1.4.3 of Chapter One, required deductive reasoning of a quantitative inquiry. There are a number of important

characteristics in the deductive approach, which mirror positivism. It identifies specifically causal relationships between the constructs and the attributes and domains of the constructs to ensure higher validity and reliability. The adoption of a positivist inquiry led to the use of a quantitative research paradigm, and this was guided by the purpose of the study, which is explanatory and causal in nature. Therefore, the quantitative approach was the best-suited protocol to address the purpose of the study, the main concern of which was to establish the relationship with quality, situational, purposive, socio-demographic attributes and customer satisfaction to develop a parsimonious predictive model.

#### **4.4.3 Research strategy**

Research design can be described as a blueprint showing the preparation of conditions for collecting, measuring and analysing the data by combining relevance to the research objectives with economy of procedure (Gable 1994). Although there is a pedagogical debate over the relative merits and demerits of qualitative and quantitative research approaches, this research used a combination of both qualitative and quantitative methodologies. This study is an in-depth empirical investigation that seeks to assess the extent to which service quality indicators and other explanatory attributes can be used to predict customer satisfaction from the perspective of customers in university libraries in Sri Lanka. As this study involved multiple stages, each of which was set to follow a specific methodology from among a variety of research methods, it may be considered as a multi-method research approach (Gable 1994).

In essence, this study used the survey research strategy. Surveys are the most well-suited techniques for the collection of primary data compared to other data collection techniques, such as observations and experiments particularly, in the fields of marketing and the social sciences (Baker 2001: 395). Surveys were regarded as being inherently quantitative and originate from the positivistic tradition (May 2001). The two major forms of survey strategies, namely, the descriptive and the explanatory (Burns 2000: 566), were selected based on Cohen and Manion's (1994) presentation on their appropriateness. The descriptive survey strategy was selected to describe the nature of

existing conditions or situations around the constructs of customer satisfaction and service quality, and to identify the standards against which existing conditions or situations can be compared. The explanatory survey strategy was selected to encounter the relationships that exist between the constructs of customer satisfaction and service quality in Sri Lankan university libraries.

Since the descriptive survey strategy aims to explore the nature of existing conditions and situations around customer satisfaction and service quality in university libraries, the first three steps of the exploratory study of the research adopted it. On the other hand, since the explanatory survey strategy seeks to establish a cause-effect relationship, the fourth step in the exploratory study and the main study adopted it. Thus, the use of the survey method was found to be the only viable and best-suited strategy for the study undertaken.

The first three steps of the exploratory study adopted the qualitative research strategy, which is an interpretative qualitative research method that is “valuable for in-depth understanding of phenomena in the marketing domain in managerial and customer contexts” (Carson *et al.* 2001: 64). The fourth step of the exploratory study and the entire main study of the research used a quantitative research strategy because it is mainly an empirical investigation.

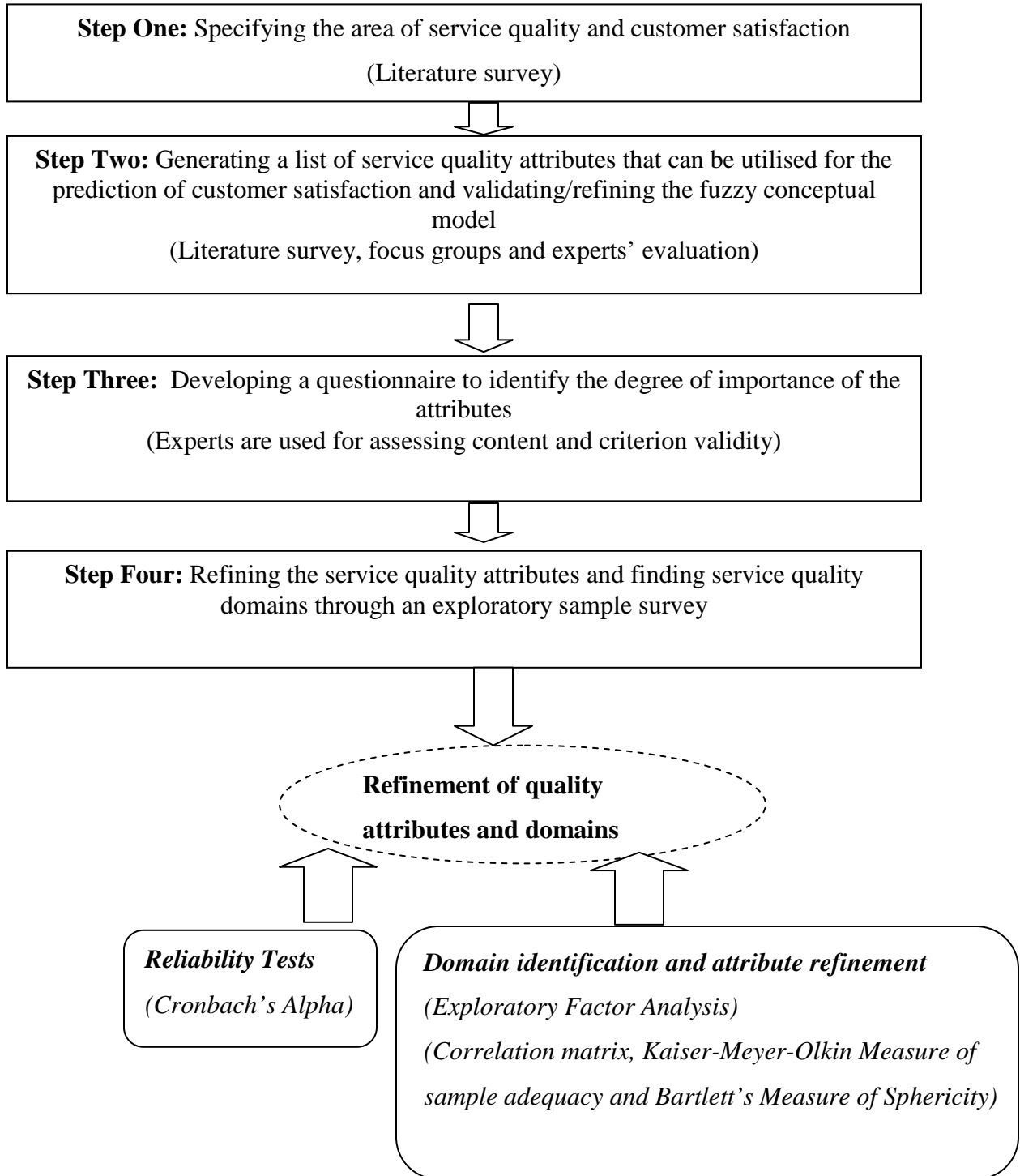
#### **4.4.4 Time horizon**

The time horizon of this research is cross-sectional, with the research design focused on different organisations and/or situations over a short period of time. It primarily focused on a small number of organisations, four universities, over a brief period of time.

### **4.5 RESEARCH STAGE ONE: EXPLORATORY STUDY**

The methodological design for the attributes and domain identification are depicted in Figure 4.2.

**FIGURE 4.2: METHODOLOGICAL DESIGN FOR THE EXPLORATORY STUDY**



Source: Compilation by author

#### **4.5.1 Step one: Specifying the area of service quality and customer satisfaction**

The area of the study was investigated by a comprehensive literature survey that included library and information services, customer perceptions, service quality, customer satisfaction and so on.

#### **4.5.2 Step two: Generating a list of service quality attributes that can be utilised for the prediction of customer satisfaction and validating/refining the fuzzy conceptual model**

The objective of this step was to generate a pool of attributes that were specific to the construct under investigation, covering the full dimension of construct without straying into other dimensions (Churchill 1979). The pool of attributes were generated inductively, due to lack of an available theory, by asking respondents to describe their attitudes and feelings in relation to service quality, and deductively from the previous research studies carried out by other researchers (Hinkin 1995; Hinkin, Tracey & Enz 1997).

##### **4.5.2.1 Deductive attribute generation**

A deductive approach used the existing theory to generate the attributes and for a review of the relevant literature. The literature review was used to identify the relevant service quality attributes in the library and information service sector. Thus, the initial service quality attributes were compiled using an extensive literature survey, which is a common form for determining attributes for testing (Churchill 1979: 67; Zaichkowsky 1985: 342). The first stage of this research project evaluated the literature to find the related research studies to identify pertinent attributes. This was also deemed essential for establishing a basis upon which to enrich the study with contemporary research findings.

##### **4.5.2.2 Inductive attribute generation**

An inductive approach was used to generate attributes for the construct of service quality, and then, an analysis of the data was completed to identify the themes of commonality (Leedy 1993). This approach was used in focus groups and expert opinions.

### **a) Focus groups**

Focus groups were used to explore the relevant attributes being analysed for the development of provisional models. Focus groups have gained considerable credence as a way of extracting the complexities of consumer research decision making, without creating a threatening environment (Kruger 1994: 254; Morgan 1996), and are often used as an initial research technique and as a precursor to a larger research project (Churchil & Iacobucci 2002, cited in Smith, Smith & Clarke 2007: 348; Threlfall 1999: 103;). The focus group size in this study was seven customers in a particular library. Morgan (1996) recommends six to ten participants for a group, whilst Asquith (1997: 2) suggests a group of less than eight participants. Four focus groups, one from each university, were used in the study to gather data.

Focus groups were utilised for this research because the existing literature does not provide a sound conceptual foundation of service quality from the customer perspective of university libraries and its impact on customer attitudes. Flick (1998) and Neuman (1997), cited in Santos (2003: 237) and Churchill (1979: 67), suggest that focus groups are useful in exploratory research or in generating new ideas for hypotheses in a permissive, non-threatening environment (Krueger & Casey 2000: 5). The approach employed here was consistent with procedures recommended for marketing theory development by several researchers (Deshpande 1983; Zeithaml, Berry & Parasuraman 1993). Thus, even though the focus group discussions follow a phenomenological research approach, a number of warm-up sessions were conducted to stimulate informal interaction to encourage active participation during the ongoing discussions.

Each set of focus groups was composed of three senior undergraduates, two postgraduate students and two academic staff members, and each individual was asked to think of any particular service in a library of their choice. This step was taken in order to give the focus group members an opportunity to better understand the stages of the service encounter. It was also designed to assist the focus group members to visualise and develop a Walk-Through-Audit (WTA) (Bojanic 1994: 5), which traces the experience of a customer and his/her impression of the service quality from the first to last stages of a



service encounter. Next, the focus group participants were requested to identify the quality attributes through the WTA. A total of four focus group discussions from four selected universities were held with each group, consisting of seven members with library experience, that is, a minimum of one year as a customer of the library because the experience of the customer is a decisive factor in gauging quality (Walters 2003: 99). The conceptual model defined in Chapter Three and the service quality attributes identified through the literature survey were extensively debated in the focus group discussions in order to examine their applicability to both Sri Lanka and the university sector in particular.

The aim of the focus group discussions was to produce these two requirements:

1. Generation of a pool of quality attributes; and
2. Validation/redefinition of the conceptual model.

These two requirements were used to generate quality attributes and to establish a deeper understanding of what comprises the inherent dynamism of the customer satisfaction construct, leading to potential model development.

In view of the appropriate length of dialogues, all focus group discussions were conducted until no new information was revealed, which served as an indication that sufficient research has been conducted, as suggested by Berg (1998). For each focus group discussion, the researcher noted the relevant facts during the discussions and transcribed them immediately following the discussions. At the completion of all focus group conversations, a content analysis of the discussions was facilitated through the identification of the content elements (Berg 1998; Easterby-Smith, Thorpe & Lowe 1991: 108; Gremler 2004: 66). Busch *et al.* (2005) have explained two types of content analysis, which can be used for the identification of content elements: conceptual analysis and relational analysis. Conceptual analysis was the method used for the content analysis of this study because it is well-suited to discover themes and concepts from the focus group discussions and it summarises the qualitative data (Busch *et al.* 2005). In conceptual analysis, concepts/themes are chosen from the transcribed notes of the focus

group discussions and the analysis involves quantifying of their presence. This strategy was chosen because it helped the researcher to analyze the focus group discussions by recording the frequency and occurrences of certain concepts [quality requirements] expressed by the participants. In other words, the focus of this conceptual analysis was on looking at the number of occurrences of quality requirements stressed by the participants in each focus group discussion.

#### **b) Expert opinions**

The attributes identified by focus group discussions were reviewed by three library and information professionals who are professional university librarians in Sri Lanka. These three library professionals had more than fifteen years experience in university libraries, as professional librarians, and they held professional qualifications at the master's level and above. The objective of this review process was to remove unclear, biased or repetitive attributes identified in the focus group discussions.

In summary, selecting quality attributes for the study was based upon a comprehensive methodology consisting of three methods. Firstly, a number of attributes was generated through the existing literature, and then these attributes were reviewed by focus groups to discover more applicable attributes to the university libraries in Sri Lanka, while identifying more quality attributes that cannot be found from the existing literature. The focus groups were used as the key methodology for selecting the appropriate attributes. Finally, the content and face validity of the attributes were evaluated by a panel of experts to identify the most appropriate attributes to the study.

#### **4.5.3 Step three: Developing a questionnaire to identify the degree of perception/importance of the attributes**

Based upon the attributes found in step two, a questionnaire was formulated to identify the degree of perception/importance of the service quality attributes that were relevant to university libraries in Sri Lanka. The draft questionnaire was tested with subjects selected for the expert evaluation to determine whether quality attributes used for the questionnaire were clear and correct. Further, it investigated the clarity and

comprehensibility of the questionnaire instrument, confirming the validity of content and criterion. At this stage, the researcher and experts reviewed the initial pool of attributes. The objective of this stage was to ensure the attributes reflected both the face validity and content validity and to remove ambiguous and repetitive attributes (Bryman & Bell 2003: 77). According to Churchill (1979) and DeVellis (2003), the use of attributes in provisional models is recommended after expert panel evaluation. The attributes selected for retention were then transformed into the questionnaire in *Appendix II*.

#### **4.5.4 Step four: Refining the service quality attributes and identifying quality domains through an exploratory sample survey**

The aim of this exploratory survey was to identify the important service quality attributes, as perceived by customers. It was also used for the identification of pertinent quality domains. The exploratory survey was based on the following methodology.

##### **4.5.4.1 Sample**

The method of “five subjects for one attribute” was used for the determination of the total number of subjects for the sample of the exploratory survey (Hair, Anderson & Black 1995, cited in Okoroafo 1997). The method of five subjects for one attribute denotes that the sample size should be five times as large as the number of total attributes identified, following the attribute refinement process of the study. Since there were 50 attributes identified/refined by the panel of experts, in compliance with the above requirement, the sample size should be 250. However, with a 5% contingency rate to compensate for potential non-responses, 263 subjects were used as the sample. Undergraduate students, postgraduate students and academic staff in the Faculties of Arts of the two universities located in the Colombo metropolitan area—the University of Colombo and University of Sri Jayewardenepura—and two other universities in remote areas in the country, the University of Ruhuna and Rajarata University of Sri Lanka, were used as the sample population. The strata factor in this case was different customer segments—undergraduate students, postgraduate students and academic staff members. The total sample of 263 was proportionately split into strata of undergraduate students, postgraduate students and academic staff, based upon the composition of the population. The subjects were then

selected for the survey for the collection of data for the study, as per inclusion criteria given below.

- a) Subject had to be a registered customer of the relevant library;
- b) Subjects in the undergraduate students category should not be first year students, as they do not have adequate knowledge (experience) to evaluate the quality of service;
- c) Individual subjects should declare that he/she is a regular library customer; and
- d) Subjects in the academic staff category should be permanent university teachers with a minimum of one year's experience.

#### **4.5.4.2 Exploratory study data collection**

Data collection was carried out through a structured questionnaire developed in the third step of the research, which contained a five-point Likert scale. The Likert scale was quick and efficient in capturing multiple aspects of satisfaction and quality domains, and specifically, avoided redundant questions (Cooper & Schindler 2006: 373; Kotler 2000: 110). The resultant survey instrument (*see appendix II*) was distributed to a sample of university undergraduate and postgraduate students and academic staff members, based upon the inclusion criteria explained in section 4.5.4.1. The data gathered through the exploratory survey were used for the refinement of attributes and identification of domains.

#### **4.5.4.3 Exploratory study data analysis**

The data were initially cleaned by removing invalid responses. Thereafter, the data normality was checked by examining the skewness of distribution (Hair *et al.* 1998: 104). The procedure for theoretical validity and construct validity was subsequently carried out to limit errors and to enhance the validity and reliability of the process. Subsequently, the processes of identification of domains and purification of attributes were completed by using rigorous analytical techniques to determine the correlations among the attributes identified and to ascertain the pertinent quality domains. The techniques used for data analysis were as follows:

#### **4.5.4.3.1 Attribute refinement and domain identification**

The exploratory part of this research incorporated the Exploratory Factor Analysis (EFA) and reliability analysis to refine the attributes and to identify the pertinent quality domains.

##### **(i) Exploratory Factor Analysis**

The Exploratory Factor Analysis technique was used to examine the service quality attributes across the university library service sector in Sri Lanka. As factor analysis is a multivariate analysis technique that determines underlying factors (domains) in a set of correlated attributes (Hair *et al.* 2003; Nannually & Bernstein 1994), EFA was the most appropriate method to identify the quality domains and the pertinent correlated attributes. The preliminary purpose of the factor analysis was to simplify the understanding of the data, which can be achieved from either an exploratory or a confirmatory perspective (Hair *et al.* 2003). Therefore, the process of EFA in this study involved five key steps, that is, pre-analysis checks, sampling adequacy, factor extraction, factor rotation and factor interpretation.

##### **a) Pre-analysis checks**

Prior to using EFA, a pre-analysis check was conducted so that:

- a stable population factor structure emerges from the sample;
  - items are scaled correctly and bias free; and
  - the dataset is appropriate for the factor EFA (Ferguson & Cox 1993: 85).
- 
- **Stable factor structure**

Ferguson and Cox (1993: 85) propose that four types of heuristics need to be satisfied to ensure a stable factor structure in EFA, as indicated in Table 4.2.

**TABLE 4.2: TYPE OF HEURISTICS FOR STABLE FACTOR STRUCTURE**

<b>Rule</b>	<b>Range</b>	<b>Advocate</b>
Subject to attributes ratio (N/p ratio)	Between 2:1 to 10:1	Gorsuch (1983), Kline (1996), Nunnally (1978)
Absolute minimum number of subjects (N)	100 to 200	Kline (1996), Comerry (1978)
Relative proportions of attributes to expected factors (p/m ratio) and subjects to expected factors (N/m ratio)	Between 2:1 and 6:1	Cattell (1978)

Source: Ferguson and Cox (1993: 85)

Accordingly, this research study utilised the general rule introduced by Hair *et al.* (1998: 99) and Hair, Anderson and Black (1995), cited in Okoroafo (1997), which suggests that the sample size be at least five times as large as the number of attributes in the study. This complies with the requirements made by Kline (1996) and Gorusch (1983), as indicated in Table 4.2. In addition, this study complied with the second heuristic rule for the reason that the total sample size was more than 100, as it was expected to use a minimum of thirty attributes. However, because it was difficult to determine the factor structure before the exploratory part of the study, the third set of considerations was not applied.

- **Item scaling**

As Likert scales are generally deemed appropriate for attitudinal studies (Ferguson & Cox 1993; Cooper & Schindler 2006: 373; Kotler 2000: 110), this study adopted a five-point Likert scale to provide the interval data making the attribute appropriate/fit the factor analysis.

- **Appropriateness of dataset**

Factor analysis should use the attributes in univariate normality. The attributes are required to show normal distribution. This research therefore adopted this technique to maintain univariate normality through skewness, as  $\pm 2.0$  (Muthen & Kaplan 1985: 175).

**b) Sampling adequacy**

The Kaiser-Meyer-Olkin (KMO) test of sampling adequacy was run on the sample to comprehend whether or not the factor analysis was appropriate for the study (Garson 2008; Pett, Lackey & Sullivan 2003). A value of 0.60 or above on the KMO measure of sampling adequacy test was used to denote the adequacy of data available for EFA (Tabachnick & Fidel 2001).

**c) Factor extraction**

The factor extraction was performed by means of the extraction method and by applying the criteria from the following to select the factors/domains.

\* Method of factor extraction

Since many marketing studies have chosen the Principal Component Analysis (PCA) method over the Common Factor Analysis (CFA) method for the extraction of factors, the PCA method was also selected for this study to extract the factors that explain the relationships among data (Ferguson & Cox 1993).

\* Criteria for selecting the factors

Since values with an Eigenvalue of greater than or equal to 1.0 were considered to be significant (Ferguson & Cox 1993), this study utilised the premise of Eigenvalue = 1.0 as the cutoff point for the selection of each factor.

**d) Factor rotation**

Selection of the best rotational method aided the interpretation of factors, and because the underlying attributes of the service quality were discrete, the Varimax procedure of orthogonal rotation was employed in this research. According to Hair *et al.* (1998: 150-151), the Varimax procedure is preferred because it minimises the correlation across factors and maximises it within the factors.

**e) Factor interpretation**

The cutoff point for factor loading is arbitrary, and it varies among studies. For instance, loadings of less than 0.4 are considered weak, more than 0.6 as strong, and 0.4-0.6 as

moderate (Garson 2008). For dichotomous items, however, a loading of 0.45 is regarded as high, but for Likert scales, 0.6 is high (Garson 2008). Therefore, this study employed 0.5 as the cutoff point for factor interpretation.

#### **4.5.4.3.2 Reliability**

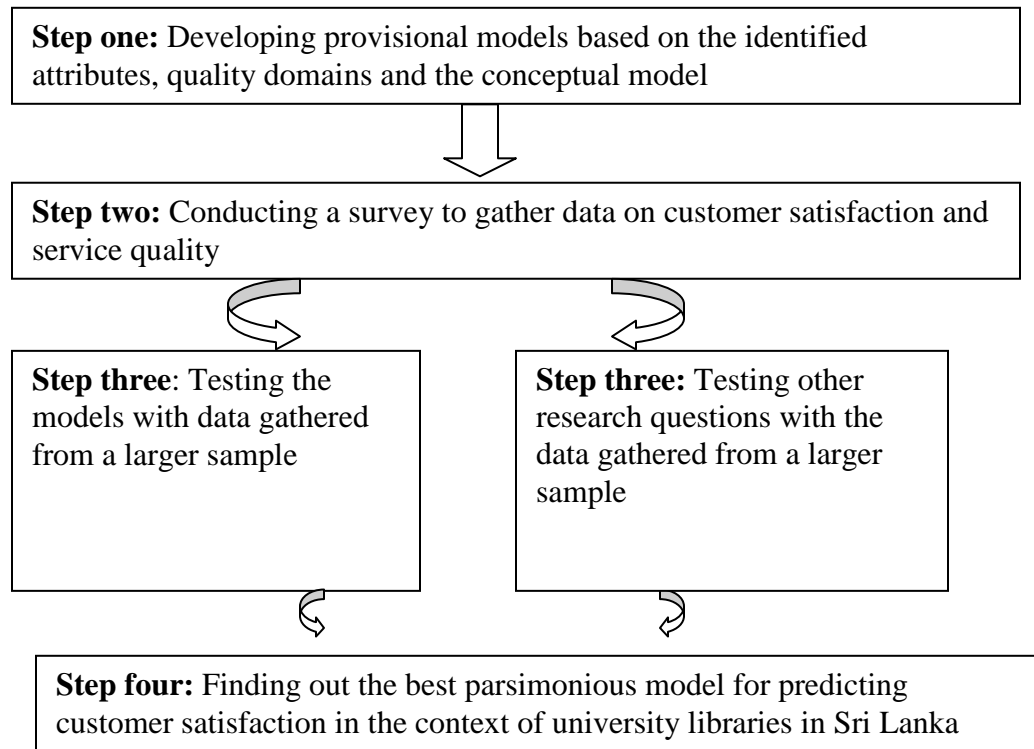
A useful coefficient for assessing internal consistency is Cronbach's alpha, as proposed by Cronbach. Duhachek, Coughlan and Iacobucci (2006: 294), Nunnally and Bernstein (1994: 212) and Patterson (1994: 382) considered it the best method, stating that it provides an actual estimate of reliability. In supporting the argument made by these two, Flynn and Percy (2001: 418) argued that "reliability for the theoretical scale is best assessed with Cronbach's alpha because high internal consistency is important for model fit." However, Cronbach's alpha is not a statistical test, but merely a coefficient of reliability, which shows the amount of correlation between the attributes on the scale and thus serves to ascertain whether they are appropriate for measuring service quality and customer satisfaction. A commonly adopted convention is to claim adequate internal consistency if alpha is greater than 0.7 (Nunnally & Bernstein 1994: 264-265), which was principally used in this research study as the cutoff point.

## **4.6 RESEARCH STAGE TWO: MAIN STUDY**

The methodological design for provisional model building and testing used in the main study is depicted in Figure 4.3



**FIGURE 4.3: METHODOLOGICAL DESIGN FOR RESEARCH STAGE TWO**



Source: Compilation by author

#### **4.6.1 Step one: Developing provisional models based on the identified attributes, quality domains and the conceptual model**

Based upon the attributes, domains and the conceptual model identified by the exploratory survey in the first stage of the study, four provisional models were developed. The final conceptual model based on the literature and refined by the exploratory study was used to map out the area of the research, which involved a theoretical development of these provisional models. In this research, such models were developed in order to assess comparatively customer satisfaction and the service quality perspective, with the objective of identifying the best-suited model for the said problem.

#### **4.6.2 Step two: Carrying out a survey to gather data on customer satisfaction and service quality**

Surveys are specifically utilised to gather data from large populations observed directly and in new research areas, in which little theory has been developed (Newsted, Huff & Munro 1998: 553; Smith, Smith & Clarke 2007: 348). In this step, a major empirical investigation was conducted to test the constructed provisional models and the research objectives established in Chapter One. The survey method approach, which seeks to identify common patterns and relationships in organisations, was used, and this gave the necessary confidence to the researcher to generalise the results in an acceptable manner (Gable 1994). The methodology used for the survey was as follows:

##### **4.6.2.1 Population**

The population of the research is defined as the totality of cases, which can form the designated specifications. These specifications define the subjects that belong to the target group and those that are to be excluded. Thus, all the students in the undergraduate and postgraduate programmes and academic staff members in the fields of humanities and social sciences in the Faculties of Arts of two universities located in the Colombo metropolitan area, the University of Colombo and University of Sri Jayewardenepura, and of two other universities in remote areas, the University of Ruhuna and Rajarata University, were used as the sample population. The underlying criterion for selecting these universities was that they are a fair representation of all fifteen universities in Sri Lanka. As it is generally believed by the public that libraries in the universities in Colombo have better tangible and intangible resources compared to more remote university libraries in Sri Lanka, the study selected two major universities in Colombo, of which one was the oldest in Sri Lanka, and two universities from remote areas as being reasonably representative of the whole system of universities in the country. The study population is depicted in Table 4.3.

**TABLE 4.3: SAMPLE POPULATION OF THE STUDY**

University	Faculty	Customer segment	No. of total subjects	Percentage (%)
University of Colombo	Arts	Undergraduates	1,907 (322)*	17
		Postgraduates	471 (214)*	45
		Academic staff	152 (113)*	74
University of Sri Jayewardenepura	Arts	Undergraduates	1,518 (310)*	20
		Postgraduates	135 (103)*	76
		Academic staff	152 (113)*	74
University of Ruhuna	Arts	Undergraduates	1,409 (306)*	22
		Postgraduates	3 (3)*	100
		Academic staff	99 (80) *	81
Rajarata University of Sri Lanka	Arts	Undergraduates	733 (254)*	35
		Postgraduates	0	0
		Academic staff	22 (22)*	100
<b>Total</b>			<b>6,601 (1,840)**</b>	<b>28</b>

\* Number of subjects from this stratum selected for the sample of study

\*\* Size of the sample

Source: Compiled by author from statistics available on each university

#### 4.6.2.2 Sampling and the sample

Details on the sample population, the derived sample size and the sampling techniques used for the study are given below:

##### (i) Sample size

The sample size was determined from the chart of pre-defined sample sizes developed by Krejcie & Morgan (1970: 608). Since the sample population was 6,601 subjects, the sample size was 1,840 subjects.

##### (ii) Inclusion criteria

The same inclusion criteria used for the selection of customers to the sample that was used in the exploratory study and described in section 4.5.4.1 were also employed in the main study.

##### (iii) Sampling techniques

A stratified random sampling method was utilised to determine the number of subjects required from each stratum. The strata factor in this case was the different customer

groups, that is, undergraduate students, postgraduate students and academic staff. Each stratum sample consisted of a proportional number of customers of the library. Following that, the simple random sampling method was used to select a pre-determined number of subjects, as indicated in Table 4.3, from each stratum, based upon the inclusion criteria.

**(iv) Sample**

The total number of subjects, excluding first year students, in the sample was proportionately distributed among each stratum. Table 4.4 indicates the size of the sample derived for each stratum.

**TABLE 4.4: SAMPLE OF THE STUDY**

University	Faculty	Customer segment	Year of study	Total no. of subjects	No. subjects in the sample	Percent age (%)
University of Colombo	Arts	Undergraduates	2	416	129	31
			3	387	120	31
			4	237	73	31
		Postgraduates	*	471	214	45
		Academic staff	NA	152	113	74
University of Sri Jayewardenepura	Arts	Undergraduates	2	558	120	22
			3	549	119	22
			4	330	71	22
		Postgraduates	*	135	103	76
		Academic staff	NA	152	113	74
University of Ruhuna	Arts	Undergraduates	2	410	102	25
			3	421	105	25
			4	397	99	25
		Postgraduates	*	3	3	100
		Academic staff	NA	99	80	81
Rajarata University of Sri Lanka	Arts	Undergraduates	2	139	73	53
			3	217	114	53
			4	128	67	52
		Postgraduates	*	0	0	0
		Academic staff	NA	22	22	100
<b>Total</b>				<b>5,223</b>	<b>1,840</b>	<b>35</b>

NA = Not Applicable

\*All postgraduate programmes, such as postgraduate diploma, master's and doctoral, in each faculty were taken as a single entry, NOT year-wise

Source: Compilation by author based on statistics available in each university

The total sample size was 1,840 subjects. Since the utility value of data obtained as final results through this study depends on the overall quality of the sampling design of the study, it is necessary to know about some of the sampling and non-sampling errors that may have occurred during data collection. Thus, one must be cautious when interpreting the results. The errors that occurred through non-responses and wrong responses were managed by the study, and the next chapter discusses the methods employed to address such issues.

#### **4.6.2.3 Main study data collection**

The second stage, the main study, adopted a quantitative survey research strategy by means of a questionnaire. To address the research objectives, given the time, resource constraints and analytical appropriateness, a structured questionnaire was considered the most appropriate data collection method. This questionnaire consisted of three sections, as explained in the following section 4.6.2.3.1, to elicit data on personal and situational information, customer perceptions, customer expectations, overall service quality and on data related to the direct evaluation of identified service quality domains. It was particularly concerned with the following characteristics of this measurement technique:

##### **a. Validity:**

This refers to whether a test measures what it actually intends to measure. External validity refers to the ability to generalise the conditions obtained through the measurement across persons, settings and times, whereas internal validity refers to whether a research instrument measures what it is supposed to measure (Cooper & Schindler 2006: 231).

##### **b. Practicality:**

The operational requirement of the instrument should be practical. It needs to be economically, administratively and interpretably feasible (Cooper & Schindler 2006: 240) because of the large number of participants to the study, vis. 1,840. In considering the above criteria, a particular aspect of the questionnaire development process was chosen as a measurement format (DeVellis 2003; Hinkin, Tracey & Enz 1997; Wegener

& Fabrigar 2004) because of the quantitative nature of the study. At this stage, it determined the clarity of instructions and questions, repetitiveness and sensitivity of questions, coherence of format and layout, and appropriate length. Since pre-testing of the questionnaires is strongly recommended to detect deficiencies in design, administration and wording of questions (Oppenheim 1992: 210; Robson 1993: 67), it was evaluated for content and face validity by a panel of experts who were initially employed to evaluate the quality attributes in the first stage of the study. On the other hand, the questionnaire was mainly tested by the same panel of experts to confirm the expectations regarding the psychometric properties of the measure (Hinkin, Tracey & Enz 1997: 105). Sommer and Sommer (1991:138) state that economy in the questionnaire is partially offset by the researcher's inability to clarify the meaning of terms. Therefore, pre-testing the questionnaire was also done by the same experts.

#### **4.6.2.3.1 Structure of the main study questionnaire**

The survey instrument was a close-ended questionnaire, which consisted of three sections and is summarised in Table 4.5. A structured questionnaire provides quantifiable results that could be helpful in empirical investigations, and informants find it quicker and easier to answer the questions (Neuman 2003: 223, 261). The contents of the questionnaire were formatted in relation to the objectives of the study, and multiple questions were also included for the purpose of triangulation. The structure of the questionnaire is depicted in Table 4.5. Refer to *Appendix VIII* for the complete version.

**TABLE 4.5: STRUCTURE OF THE MAIN QUESTIONNAIRE**

<b>Section</b>	<b>Scale</b>
A	Questions pertaining to socio-demographic attributes
B	<ul style="list-style-type: none"> <li>• Questions pertaining to the expectations and perceptions of service quality attributes and domains</li> <li>• Questions pertaining to overall customer satisfaction</li> </ul>
C	Questions pertaining to situational attributes

Source: Compilation by author

This research utilised quantitative surveys for data collection, which is compatible with the positivist nature of the enquiry discussed in Section 4.4.1. This survey instrument was a self-administered questionnaire that used a relatively simple and straightforward approach to elicit information on attitudes, beliefs, and motives and to solicit information from the sample, conducted with strict data standardisation and control (Diamantopoulos & Schlegelmilch 1996; Whitley 1985). The researcher used for this study a comparatively large sample size, consisting of 1,840 customers forming 28% of the total sample population, because the available literature demonstrated that a number of studies suffered from small sample sizes, with the statistical analyses based on those samples yielding meaningless results/outcomes.

The questions designed to measure expectations and perceptions of customers to adjudge service quality, customer satisfaction and so on were placed at the interval level, using a 5- point Likert scale for multivariate quantitative analysis. The identified quality attributes and quality domains in the first stage were used to determine service quality and customer satisfaction. The customers were asked to indicate their levels of agreement on two sets of identical statements, which covered the quality attributes and domains. One set of questions asked the customers to state their perceptions on the service rendered by their library. In other words, the customers were asked to rate their perceptions in relation to the actual performance of the library and its information services. Another set of questions asked the customers to state their expectations of the library and its information service. In addition, another set of questions asked the customers to indicate their levels of agreement in relation to the domains and overall satisfaction.

#### **4.6.2.3.2 Main study data collection procedure**

The sample of undergraduates from the Faculties of Arts of the selected universities was invited to participate in the study in November 2008. Postgraduate students of the same faculty, drawn from each postgraduate programme, were also invited to participate. Questionnaires to the academic staff members of the Faculties of Arts were personally

distributed, and the staff were requested to return the duly completed questionnaires within ten days' time.

The researcher participated in person when data was collected. He met the undergraduates outside lecture rooms/halls to collect data from them. During data collection, the questionnaires were personally distributed to each of the students who met the inclusion criteria. Once the criteria were met, the students were asked whether or not they preferred to participate in the survey. Thereafter, only those students who agreed to participate were requested to complete the questionnaire and post the same to the researcher in a stamped, self-addressed envelope supplied by the researcher within ten days' time. Questionnaires to academic staff members from the other selected universities were also personally distributed by the researcher to be duly completed and returned by post to the researcher within ten days' time. This method of data collection provided the opportunity to the researcher to explain the purpose of the investigation and to answer queries raised by the subjects/customers. This method was also adopted to ensure a good response from the sample.

#### **4.6.2.4 Main study data analysis**

The in-depth details of the tests used for the data analysis are given where appropriate in Chapter Five, and this section discusses the general issues and tests employed in the analysis.

##### **4.6.2.4.1 Profile analysis**

A complete descriptive profile of the respondents was prepared by analysing the data using descriptive statistics. According to Cooper and Schindler (2006: 427-430), descriptive statistics can be used to measure the location (mean, median and mode), the dispersion of variability (variance, standard deviation, range and quartile deviation), and the shape (skewness) of the data distribution.



#### **4.6.2.4.2 Multivariate regression analysis**

Multivariate regression analyses are the best statistical techniques to analyse the relationship between a single dependent attribute and a number of independent attributes to predict the single dependent using the observed independents. As there is no general agreement as to which relationship—that is, linear or non-linear—between customer satisfaction and service quality explicates the optimal way to predict customer satisfaction in relation to service quality, this research employed both linear and non-linear assumptions to test the provisional models developed in the main study (see Figure 4.3). As there were a number of independent explanatory attributes (for example, quality attributes, situational attributes and socio-demographic attributes) factored into the dependent customer satisfaction construct, the multivariate regression analysis technique was used for the data analysis.

Accordingly, (a) Multiple linear regression analysis, which is mainly based on the assumption of linearity between the constructs; and (b) Binomial logistic regression analysis, which assumes a nonlinear relationship between the constructs, were utilised in the study to examine

- (i) the relationships between identified domains and the service quality attributes;
- (ii) the role of the domains and items in predicting the overall satisfaction; and
- (iii) the relationship of situational attributes and overall customer satisfaction.

The first two examinations were based on the disconfirmation analysis and performance-only analysis to determine the strongest quality attributes of overall customer satisfaction.

The disconfirmation analysis process involved in calculating "gap scores" for each of the quality attributes was operationalised as the difference between a respondents' level of importance of an attribute and their perception of performance of the same attribute. The second method of examining satisfaction was based on the use of performance-only

measures. A performance score was determined for each individual satisfaction attribute, regardless of the expectation score associated with that attribute.

**(i) Multiple linear regression analysis (MLRA)**

Multiple linear regression analysis is considered to be one of the most appropriate methods for this study because it provides an assessment of the degree and direction, which may be positive or negative, of the linear relationship between independent and dependent attributes (Hair *et al.* 1998: 215). Studenmund (2001: 172) says that the linear regression analysis is a statistical technique that explains the movements of one attribute, the dependent attribute, as a function of movements in a set of other independent or explanatory attributes. Therefore, regression analysis describes the degree of relationship between a single dependent (criterion) attribute and several independent (predictor) attributes. This analysis was used to predict the direction and the magnitude of the linear relationship among service quality and situational attributes (the independent attributes) and customer satisfaction (the dependent attribute). This was particularly used to measure the strength of the gap scores and performance-only scores in their respective domains and overall satisfaction. The gap scores were then compared with the performance-only scores of the identified service quality attributes to determine the best predictors of overall satisfaction. In addition, respondents' situational attributes in different customer segments were used to determine whether there are significant differences between the different customer groups.

In order to calculate statistical predictions, the regression technique seeks to establish a rectilinear relationship between the attributes concerned. Multiple linear regression analysis provides a predictive equation:

$$Y = \alpha + \beta_1x_1 + \beta_2x_2 + \dots + \beta_nx_n$$

Where  $\alpha$  = constant

$\beta_1, \beta_2, \dots, \beta_n$  = beta coefficient or standardised partial regression coefficients (Tabachnick & Fidell 2001: 112) (reflecting the relative impact on the criterion attribute)

$x_1, x_2, \dots, x_n$  = scores on different predictors

where Y is the predicted value on the dependent attribute, a is the Y-intercept (the value of Y when all the X values are 0), X represents the various independent attributes, and b is the coefficient assigned to each of the independent attributes during regression (Tabachnick & Fidell 2001). The following subheading discusses in detail the procedure used in the MLRA.

**a) Measurement of attributes**

Multiple linear regression analysis assists only quantitative explanatory attributes, measured on an interval or continuous scale. As this research mainly focused on interval data, the study facilitated multiple linear regression analysis (MLRA).

**b) Pre-conditions in MLRA**

Although “it has been demonstrated that regression analysis is generally robust in the face of departures from assumptions” (Pedhazur 1997: 34), the underlying assumption of MLRA is that the relationship between independent attributes and dependent attributes is linear. In addition, it assumes that attributes have normal distributions. Non-normally distributed attributes, which are indicated through highly skewed attributes, or attributes with a substantial outlier, can distort relationships and significance tests. In this study, the normality of the attributes was therefore examined through a skewed test. Thus, there are three issues that could arise during the regression analysis that may affect the model fitting, which became a great concern of the researcher. These were outliers, normality and multicollinearity.

**\* Outlier**

For the multiple regression analysis, the preliminary descriptive analysis was utilised to perform an evaluation of potential outliers and observations with excessive influence. Hair *et al.* (1998: 197) described outliers as observations that are substantially different from the remainder of the dataset, that is, as extreme values. Thus, the dataset was cleaned to remove outliers identified by descriptive statistics.

\* **Normality**

The skewness test in descriptive statistics was used to identify the normality of the database. As it is a rigid requirement of linear regression to use only the attributes that are normally distributed, only the attributes that approximated to normality were utilised for the model fitting.

\* **Multicollinearity**

When employing a large number of possibly highly correlated independent attributes in a model, the possibility of multicollinearity may exist. Thus, to ascertain that there is a possible multicollinearity problem, initially, a correlation matrix among the independent attributes was utilised to detect the presence of high correlations among the attributes. Hair *et al.* (1998: 251) suggest that, whilst no limit has been set to define high correlations, values exceeding 0.9 need to be considered, and correlations exceeding 0.8 can often be indicative of problems. Thus, the value exceeding 0.9 was used as the cutoff point to determine multicollinearity. Furthermore, statistics of tolerance and the Variance-Inflation Factor (VIF) were computed to identify multicollinearity, as this would be a severe problem for this research study because its purpose is causal modelling. As a rule of thumb, if the tolerance was less than 0.40 and VIF was greater than 2.5, it was concluded that a problem exists with multicollinearity, which refers to excessive correlation of the independent attributes in the fitted model (Alison 1999, cited in Robinson, Scheltema & Cherry 2005). If multicollinearity was found, composite attributes, which were made by amalgamating highly collinear attributes, were utilised again for the conclusive model fitting.

c) **Model selection**

In this step, the procedure for the independent attributes to be included in the model was selected. Hutcheson and Sofroniou (1999:178) have pointed out that there are common attribute selection procedures that can be used to determine the “best” regression model, such as forward selection, backward elimination and stepwise selection. Thus, stepwise selection procedures were used to identify the best regression model to predict customer satisfaction. Stepwise selection is the most relevant technique of MLRA when a large

number of independent attributes are involved (Brace, Kemp & Snelgar 2006: 233-234). It ends up with the smallest set of predictor attributes in the final model that produces the most parsimonious model. An alpha value of 0.1 was used as the entry cutoff value for attribute selections.

#### **d) Predictive power of the models**

To measure the predictive power of the regression models, the coefficient of determination ( $R^2$ ) was used as an estimate. The  $R^2$  estimate describes the percentage of the total variance of the dependent attribute about its mean, which is “explained” or “accounted for” by the independent attribute (Lewis-Beck 1993: 53). The value of this coefficient can vary between 0 and 1. Thus, a value closer to 1 demonstrates the better fit of the model because if  $R^2$  is 1, then the regression model accounts for all the variations in the dependent attribute. Hair *et al.* (1998: 261) point out that if the regression model is properly applied and estimated, it can be assumed that the higher the value of  $R^2$ , the greater the explanatory power of the regression equation, and the better the prediction of the dependent attribute. However, there is no perfect statistical argument for deciding what level of  $R^2$  is appropriate (Uncles & Page 1998: 2708). Thus, the model with the highest  $R^2$  value can be used as the best model with predictive power. However, since  $R^2$  tends to overestimate the success of the model when applied to the real world, an adjusted  $R^2$  value was calculated. Adjusted  $R^2$  values generally take into account the number of attributes and the size of the sample, too. Thus, it is a less biased measure, compared to  $R^2$ , for the variance explained by the model; therefore, adjusted  $R^2$  was used in this study for the interpretation of the explanatory predictability of the models.

#### **(ii) Binomial logistic regression (BLRA)**

Binomial logistic regression was also used in the analysis to assess the non-linear relationship between customer satisfaction and service quality constructs in university libraries in Sri Lanka. More particularly, logistic regression modelling was employed to assess the independent role of the service quality attributes on customer satisfaction, that is, satisfaction or dissatisfaction. BLRA does not assume linearity of relationship between the independent and dependent attributes, and it does not require the normality of the

attributes. Thus, it has less stringent requirements compared to the linear regressions. Due to these merits and the combination of categorical and continuous independent attributes in the study, logistic regression was also one of the best techniques for the analysis.

The general form of the multivariate logistic regression is

$$\ln \left( \frac{\Pi}{1-\Pi} \right) = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \dots + \beta_k X_k$$

where  $\Pi$  is the probability of satisfaction for the logistic model, with regression coefficient  $\beta_1$  to  $\beta_k$ . The intercept is  $\beta_0$  when the values of predictor attributes, such as responsiveness, promptness, helpfulness and so on, are  $X_1$  to  $X_k$ . The logistic regression model indirectly models the response attributes based on probabilities associated with the dependent attribute (Y).

**a) Measurement of attributes**

To facilitate the dichotomous nature of the dependent attribute, the dependent attribute, which is satisfaction, was converted into a binary dependent, as satisfied and dissatisfied. The decoding procedure was carried out as follows. Overall customer satisfaction and domains were measured by some values, and thus, their values are as depicted in Table 4.6.

**TABLE 4.6: THE VALUES OF CONTINUOUS SATISFACTION ATTRIBUTES AND DOMAINS**

Value	Label in the continuous attributes
1	Very unsatisfied
2	Unsatisfied
3	Slightly satisfied
4	Satisfied
5	Very satisfied
0	Don't know

The values in the above Table 4.6 were recorded into binary codes, satisfied or unsatisfied, as maintained by the conditions given below.

Satisfied = if [value]  $\geq 3$

[if the value of continuous attribute is equal or greater than 3, it was labelled as “satisfied”]

Unsatisfied = if [Value]  $< 3$  and [value]  $\neq 0$

[if the value of continuous attribute is lower than 3 and the value is unequal to 0, it was labelled as “dissatisfied”]

## **b) Pre-conditions in MLRA**

Some pre-conditional requirements should be satisfied before completing a logistic regression analysis, as explained below:

### **\* Large sample size**

Unlike the linear regression analysis, logistic regression uses Maximum Likelihood Estimation (MLE) to form variates. Thus, MLE requires a large sample size to estimate the variates. If the sample is too small, it may be difficult to converge on a solution. Thus, the study used 1840 subjects for the study—that is, 28% of the total population.

### **\* Outliers**

In BLRA, outliers can also affect results of the logistic regression procedures significantly. Thus, the dataset was cleaned to remove the outliers identified in the descriptive statistics.

### **\* Multicollinearity**

Even in BLRA, multicollinearity is a problem for estimating the models, as in MLRA. Thus, a correlation matrix among the independent attributes was used to detect the presence of high correlations, and the value exceeding 0.9 was used as the cutoff point to determine the multicollinearity of this study. As there is no direct equivalent measurement to  $R^2$  in the BLRA, tolerance and VIF methods cannot be employed. Thus, this analysis also adopted the correlation matrix used in MLRA to examine the multicollinearity.

**c) Model selection**

The backward stepwise logistic regression technique utilised in this study was to determine the best predictive models. Backward selection starts with all attributes in the model and deletes one at a time. Thus, the final model derived by the stepwise selection procedure was the last step model, where adding or deleting another attribute would not improve the model significantly. Thus, it was used as the best model because it works by fitting the optimal model to the available dataset.

**d) Predictive power of the models**

Cox and Snell's  $R^2$  was employed to measure the predictive power of the model, which can vary from 0 to 1. A value closer to 1 denotes higher predictability. Total correctness was also used to measure the predictive power of the models. In this case, it measures the correctness of classification, based on predictive and observed values. In a perfect model, the correctness should be 100%.

**4.6.2.4.3 Model comparison and selection**

Since there is no corresponding Cox and Snell  $R^2$  or correctness measurement in linear regression analysis, these measures were not used for the final model comparisons obtained through MLRA and BLRA techniques. Even though Cox and Snell  $R^2$  is an attempt to imitate the interpretation of adjusted  $R^2$ , it tends to run lower than the corresponding  $R^2$  in linear regression because there is no analogous coefficient of  $R^2$  in logistic regression. Thus, when selecting the final model derived from different methodologies, MLRA and BLRA, a common predictability measurement cannot be utilised, as there is no precisely analogous coefficient in BLRA that corresponds to the adjusted  $R^2$  in linear regression. Thus, a new methodology called Mean Residual Analysis (MRA) was developed to compare the predictability of the models that were used to ensure the validity of the comparison. Based upon the higher scores of MRA, the final model to predict customer satisfaction in relation to service quality in university libraries in Sri Lanka was chosen as the concluding model.



### **Mean residual analysis**

The calculation of the mean residuals of the models from observations was based on the equation below.

$$\text{Mean deviation} = \frac{\sum(\text{predicted\_Value} - \text{observed\_value})^2}{N}$$

Where, N = Number of observations

If the mean residual is smaller, the accurate predictability of the model is higher. This was useful to detect predictions, which were distant from the observations, and to differentiate which model resulted in superior predictions that were closer to the observed values.

### **4.7 SUMMARY**

This chapter outlined the basic plan of the research study. This plan incorporates both qualitative and quantitative approaches. It provided insights into the methodology utilised to explore customer satisfaction in relation to service quality. In doing so, the chapter contributed by adopting a gradual and evolutionary methodology to the process of theory testing/building in the field of customer behaviour of university libraries. It attempted to justify the positivist paradigm and quantitative approach adopted for the research, in spite of it consisting of some qualitative characteristics belonging to phenomenological inquiry. A two-stage approach and details of both the exploratory and main studies that comprise the primary research components of this thesis were then outlined. The emphasis was placed on rigour across the research design in response to a call by service quality practitioners and researchers in library and information service sector to apply rigorous techniques to increase the reliability and validity of research in the discipline. The next chapter presents the results of the exploratory study.

## **CHAPTER FIVE: EXPLORATORY STUDY - DATA ANALYSIS AND FINDINGS**

### **5.1 INTRODUCTION**

Chapter Four discussed the methodological approach that was adopted as a means to fulfil the aims and objectives of the research study. Chapter Five details the results of the data analysis undertaken in the first stage of the research, serving as the exploratory part of the study and presented in logical sequenced sections providing coherence flow of information. The overall purpose of this exploratory study was to identify and aggregate the service quality attributes into quality domains, using the factor analysis technique. This stage covers four steps of the research design discussed in Chapter Four. Step One of the study specifies the constructs of service quality and customer satisfaction. Step Two generates a pool of service quality attributes, which were utilised to predict customer satisfaction and to validate and/or refine the revised fuzzy conceptual model. Step Three develops a questionnaire to identify the importance of the quality attributes, as perceived by library customers. Step Four refines the attributes and identifies the pertinent quality domains. At the end, the chapter discusses the issues, implications and post-exploratory considerations as a prelude to Chapter Five.

### **5.2 LITERATURE SURVEY**

The literature survey analysed the existing theories, frameworks and research findings thoroughly to identify the pertinent quality attributes used in past research studies in the field of service marketing and library and information sciences. As many as 113 quality attributes were identified, which seemed likely to be related to user satisfaction. They are listed in *Appendix I* in Chapter Three. These attributes were then discussed in focus groups to identify those that are specific to university libraries in Sri Lanka.

### **5.3 FOCUS GROUP DISCUSSIONS**

The identification of quality attributes and the fuzzy model validation during the first stage of the research study were performed through focus groups. The following sections elucidate the type of data and procedures utilised in the second step of the exploratory

study, required for accumulating a pool of quality attributes for the refinement and domain identification processes.

### **5.3.1 Introductory setting**

Four focus groups were established from the four selected universities, that is, one focus group per university. On the question of selecting participants for a group, the researcher chose seven customers using the numbers recommended by Morgan (1996) and Asquith (1997: 2), which were six to ten and less than eight, respectively, as bases of reference. The seven customers chosen consisted of three undergraduate students, two postgraduate students and two academic staff members from the Faculties of Arts in each of the universities located in Colombo and the University of Ruhuna in outer Colombo. At the Rajarata University of Sri Lanka, which does not have postgraduate students, two additional undergraduate students were invited to the group to maintain consistency. Though the combination of numbers from each category of participants could be varied to three academic staff members and two postgraduate students, to suit the availability of different types of customers, it proved to be very difficult to find three academic staff members from any of the chosen universities due to their tight time schedules. The focus groups were initially selected in consultation with the front office library staff of the selected libraries, based upon the regularity of their library visits and their willingness to participate.

Approximately two-hour discussions were held for each focus group in September 2008. The main purpose of these discussions was to obtain a clear view of the most relevant quality perspectives, purposive and situational attributes that may have an impact on customer satisfaction in the context of Sri Lankan university libraries. It was also used as a complement and as an instrument of validation of the fuzzy conceptual model. The discussions that were held became very open and frank brainstorming sessions, wherein the interplay of intellectual, attitudinal and emotional expressions was discernible among the participants. All discussions were in-depth, with minimal inputs from the researcher. The outcomes of the discussions were analysed using the following questions:

1. Are customers familiar with the concepts of satisfaction and service quality?
2. Do customers derive satisfaction from service quality?
3. If satisfaction is derived from service quality, what quality attributes promote customer satisfaction?
4. Is satisfaction related to situational and/or purposive attributes, and if so, what are those situational and/or purposive attributes?

The analysis of the focus group discussions yielded a rich inventory of attitudes of library customers in the universities.

### 5.3.2 Guiding themes for focus groups

Guidelines were developed to produce a structure for discussions and to ensure that all relevant issues were covered, based on the propositions listed in Section 5.3.1. Table 5.1 given below describes the guiding themes, rationale and the method/s employed.

**TABLE 5.1: THE QUESTIONING ROUTE FOR FOCUS GROUP DISCUSSIONS**

No.	Guiding Themes	Rationale	Method
1.	Background information on the customer	To ascertain whether selected customers are suitable to assess customer satisfaction and service quality in the university libraries	An information sheet was used to gather data from participants in relation to customer category, age, sex, level of education, regularity of library visits and experience as a library customer.
2.	Exploration of the meaning of customer satisfaction and service quality	To ascertain whether the customers are adequately knowledgeable in relation to the constructs of customer satisfaction and service quality	Two questions—"What do you know about customer satisfaction?" and "What do you know about service quality?"—were brought into play.
3.	Exploration of the relationship between customer satisfaction and service quality	To ascertain whether customers are familiar with the relationship between the constructs of customer satisfaction and service quality	The question "Do you think that there is a relationship between customer satisfaction and service quality?" was used.

No.	Guiding Themes	Rationale	Method
4.	Quality attributes that relate to customer satisfaction in libraries	To identify quality attributes in relation to satisfaction in libraries	The question, “Think of a specific service you received from your library recently and explain the qualities of this particular service you encountered from the beginning to the last stage of the service,” was asked.
5.	Discussion of all quality attributes found in literature	To ascertain whether the quality attributes found in the literature are relevant to customer satisfaction in Sri Lankan university libraries	Provided the attributes identified by the literature survey to be screened and to be determined whether or not each quality attribute is important to form customer satisfaction in the context of the university libraries in Sri Lanka.
6.	Situational attributes that may impact customer satisfaction in university libraries	To identify the situational attributes in relation to the construct of customer satisfaction	The question–“What do you think of the other attributes which may relate to service quality or customer satisfaction in university libraries?”–was asked.
7.	Confirmation of the conceptual model derived from literature	To ascertain whether the conceptual model derived from the literature and depicted in Chapter Three is confirmed, or whether further modifications are needed	Presented and explained the revised conceptual model identified in Chapter Three, and participants were requested to check whether it is applicable to their respective university library.

Source: Compilation by author

### 5.3.3 Profile of focus groups

The composition of the focus groups is shown in *Appendix III*. It summarises the socio-demographic characteristics of the participants of different groups. The majority of the customers had substantial years of experience with the university library service, ranging from 2 to 18 years. The selection of these customers was based on their experiences with the library service in the university (Wilson & Sasse 2004; Zeithaml & Bitner 2000: 75). The majority of respondents were males and were regular library customers in their universities. These qualities of the focus groups helped to enrich and validate the attributes identified through the literature survey, and to generate additional attributes that were more specific to the university library sector in Sri Lanka. The information noted by

the researcher during the discussions were subsequently analysed to identify the content elements (Berg 1998), thus determining the customers' quality requirements.

#### **5.3.4 Thematic focus group discussions**

The focus groups enjoyed participating in the discussions, which yielded a wealth of data. The questioning route required participants to describe how they defined customer satisfaction and the quality of library services.

*1. Are customers familiar with the concepts of satisfaction and service quality?*

Most commonly, customers emphasised the need for customer satisfaction with service quality, and one group described the importance of quality services as follows:

The library is like my second home. And I believe that the people here (library staff) always support me. I've gotten used to coming here so far. Whatever information need I encounter, I can come here and ask either from the people here (library staff) or just select the materials from the shelves. But basically, my satisfaction is merely based on the quality of information resources and the service rendered by the staff. In fact, I know the meaning of these two phrases, I mean customer satisfaction and service quality. (Focus group, University of Ruhuna)

Strong feelings regarding satisfaction and service quality among participants contextualised the discussion of these two constructs: service quality and customer satisfaction. According to one participant, "service quality just leads to my satisfaction" (Focus group, University of Colombo). All customers attending the focus group discussions were adequately familiar with the constructs.

*2. Do customers derive satisfaction from service quality?*

The focus groups in all selected universities opined that customer satisfaction and service quality were very important. One of the focus group members said that there is

a clear causal relationship with service quality and if service quality gets upgraded, our (customers) satisfaction will also rise to the top. (Focus group, University of Colombo)

Some of the members, (two from the University of Ruhuna, three from the University of Colombo and one from Rajarata University), stated that the main consideration at the time of receiving information from the library was the satisfaction of customers. However, they further articulated that service quality was important and that the information they received was adequate to achieve greater customer satisfaction. Therefore, it may be said that ascertaining quality and satisfaction in relation to information resources is imperative.

According to some participants, the quality of information was the primary reason for their satisfaction, even though they said that other service quality attributes may also have an impact on satisfaction. However, the majority of members pointed out that quality of both materials and services are very important and cannot be separated. One participant explained further:

From the time we enter the university library, we seek information. It is generally perceived as problem-oriented. We want to find out some information perhaps in consultation with a professional librarian. It is very much customer-led in terms of searching out information, with the satisfaction received from the service and products received. Quality and satisfaction have been combined into one concept irrespective of whether it is material or service; they cannot be separated (Focus group, University of Ruhuna).

Thus, it could be seen that customers perceive satisfaction as being derived from service quality.

*3. If satisfaction is derived from service quality, what quality attributes promote satisfaction?*

The objective of this question was to generate a pool of attributes specific to the construct of service quality being investigated. This pool should form a random subset of the construct to be measured (DeVellis 2003). All group participants agreed that satisfaction is driven by service quality, and it may also be derived by inclination, to a larger extent. A participant said,

Although I know personally that there is an interrelationship between these two concepts (constructs), I will actively search it out to find whether there is a theoretical implication. In practical circumstances, satisfaction occurs by means of quality not only of the services but also of the products available in our local libraries...but I don't understand that there is a theoretical relationship because my knowledge of contemporary management theories is very poor. I never know the answers to everything in management. (Focus group, University of Sri Jayewardenepura)

Accordingly, even though five participants admitted that they were not very familiar with service quality attributes at first, when the discussion proceeded, they understood the meaning of quality attributes. Subsequently, they were able to explain their quality requirements that they expected from their libraries.

Since this study dealt with the WTA method, which traces the experiences of customers with service quality in university libraries, the questions directed the discussions towards the best and worst experiences in the context of the service and quality attributes that an excellent service should provide. When the participants were requested to describe their experiences with the library service at their universities, the first theme that emerged was the importance of specific information resources on their subject disciplines for teaching and/or learning purposes. The participants had positive experiences when served with relevant materials. A number of members spoke of the difficulties they experienced in receiving information necessary for their teaching, learning and research activities. The participants were mainly concerned about not receiving enough information and exact information on what they needed. Thus, they emphasised the paramount importance of teaching materials and their quality, rather than other types of service quality. However, they all agreed on the possibility of measuring material quality on the basis of their perceptions of quality.

Some participants complimented the service environment of their libraries. The qualities of caring service and fellowship extended during information search were some of their best experiences. The participants mentioned common problems with the service instead of narrating individual incidents and/or personal experience, when asked about their past experiences with the library. They were concerned about limited materials, insufficient



service providers at the counters, non-availability of up-to-date and relevant information at the right time, and inflexibility in providing the necessities of requirement-based customer education programmes. The participants also presented their ideas on the quality attributes of an outstanding library service. Some of the participants spoke of the limited time available to find information, saying, “Oh! Alas! Time is overwhelmingly short” (Focus group, University of Colombo).

The common attitude of approximately half of the participants in all four focus groups was that searching for information was a time-consuming and frustrating activity. Their viewpoint was that they required help from the library staff to obtain the right information in the shortest possible time. Thus, the consensus among the members was that helpfulness, promptness and related qualities are essential for the library staff to contribute towards the achievement of greater customer satisfaction. Many participants complained about the limited accessibility of electronic information for teaching and learning purposes. While some had received the facilities subsequently, most employed in remote universities of Rajarata and Ruhuna had not yet received them.

The researcher analysed the discussions and highlighted the key words and concepts that were directly related to the quality of library services. The contents were thereafter used to explain the attributes relating to service quality. The focus groups also reviewed a comprehensive set of attributes of service quality in relation to customer satisfaction, as obtained from the literature survey. These attributes were converted into proper statements based on quality requirements. From these, statements relevant to the cultural and academic setting of the universities in Sri Lanka were selected. The requirements identified by the focus group discussions from the prevailing literature relevant to Sri Lankan university libraries are depicted in Table 5.3.

**TABLE 5.2: QUALITY REQUIREMENTS IDENTIFIED BY FOCUS GROUPS  
FROM THE LITERATURE**

No.	Service quality requirements	Confirmation received from			
		UC	USJP	RUSL	UR
1.	Library should be contemplative environment for study, learning and research	√	√	√	√
2.	The library should be a place for reflection and creativity	√	X	√	X
3.	Easy accessibility to the library building is important	√	√	√	X
4.	The library should produce clearly written instructions for us when needed	√	X	√	X
5.	The library should be a comfortable and inviting location	√	√	√	√
6.	Access to printed and electronic archives is important in a library	√	√	√	√
7.	The library should provide access to electronic databases/ digital collection to find information	√	√	√	√
8.	Audiovisual equipment in the library should be available in good working condition	√	√	√	√
9.	Approachability of library staff for finding information is very important to me	√	√	√	√
10.	Complaints made by us should be immediately addressed	√	√	√	√
11.	Staff should demonstrate cultural sensitivity	√	√	X	X
12.	Employees in the library should be courteous	√	√	√	√
13.	Giving customers personal attention by the staff would entertain me in the process of finding information for my work	√	√	√	√
14.	Library should keep customers informed about new library services	√	√	√	√
15.	It is essential to have knowledgeable staff/ subject specialists in the library for the provision of required information to the customers	√	√	√	√
16.	Library staff should give prompt service to us	√	√	√	√
17.	Library must assure the quality of information	√	√	√	√
18.	Library collection should be complete	√	X	√	√
19.	Library collection should be comprehensive	√	√	√	√
20.	Library should provide current information	√	√	√	√
21.	Ease of use/convenient access to library collection is required	√	√	√	√
22.	Clean, sufficient and visually appealing sanitary facilities are important	√	√	√	√

No.	Service quality requirements	Confirmation received from			
		UC	USJP	RUSL	UR
23.	Convenient opening hours is very important to customers, as there are different full-time and part-time customers	√	√	√	√
24.	Directional signs in clear, understandable, helpful way is important to access relevant resources and facilities	√	√	X	√
25.	Good ventilation should be in the library	√	√	√	√
26.	Functional furniture should be in the library	√	X	X	√
27.	Adequate lighting should be in the library	√	√	√	√
28.	Staff must re-shelve the library materials quickly	√	√	√	√
29.	Quietness of the place should be maintained for peaceful studies	√	√	√	√
30.	Library needs to be air-conditioned to keep the customers comfortable within the library premises	X	√	√	X
31.	Computers should be available in good working order to access different electronic collections, Internet and OPAC	√	√	√	√
32.	Error-free records of transaction are needed to maintain trust of library service	√	√	√	√
33.	Modern equipment in the library does motivate customers	√	√	√	√
34.	All kinds of transactions should be held in confidence	√	√	√	√
35.	Library customer education programmes are very important to become acquainted with the services	√	√	√	√
36.	Library guides/brochures are very important to become acquainted with the services	√	√	√	√
37.	Library Web page should contain correct and useful information about library services and resources	√	√	X	X
38.	OPAC should be an accurate source of information	√	√	X	√
39.	Remote access to electronic databases is important for accessing information from different places because customers are busy in the daytime	√	√	X	√
40.	Ease of use/arrangement of the online catalogue (OPAC) is a must	√	√	√	X

No.	Service quality requirements	Confirmation received from			
		UC	USJP	RUSL	UR
41.	Well-organised library Web page should be there for accessing information quickly	√	√	√	√

√ = confirmed by, X = unconfirmed by

Source: Compilation by author

Apart from the 41 quality requirements based upon the previous studies identified by focus groups, Table 5.3 indicates new quality requirements identified by the same groups as specific to universities in Sri Lanka. The identified requirements are unique and therefore cannot be found in any of the relevant existing literature. They are unique to the inherent dynamism of customer satisfaction and service quality in Sri Lankan university libraries.

**TABLE 5.3: QUALITY REQUIREMENTS IDENTIFIED BY FOCUS GROUPS  
FROM EXPERIENCE OF THE FOCUS GROUP MEMBERS**

No.	Quality requirements	Generated at			
		UC	USJP	RUSL	UR
01.	The resources should realistically reflect the customer needs	√	√	√	X
02.	Atmosphere during information searching and receiving should be supportive	√	X	√	X
03.	We expect some follow-up from the staff to ascertain whether we receive relevant information	√	√	X	√
04.	Length of waiting time at counters should be minimised	√	√	X	√
05.	Proper coordination of the staff between the different sections of the library is important to deliver required information to us.	√	√	X	√
06.	OPAC should provide up-to-date information.	√	√	X	X
07.	The Web site should provide help that addresses exactly what we need	√	X	X	√
08.	The library should not be a crowded place	√	√	√	√
09.	Effective resource sharing with other libraries should meet customer's information requirements that cannot be fulfilled by the local library	√	√		√
10.	As potential customers are unaware of some of the library's facilities, a wide-ranging marketing approach should be launched	√	√	√	√

No.	Quality requirements	Generated at			
		UC	USJP	RUSL	UR
11.	There should be a choice of ways to pay for charges	√	√	√	X
12.	A tariff for reasonable charges, for examples, overdue fines, lost books and so on, should be available	√	√	√	X
13.	Handicapped-friendly environment should be created	√	√	√	X
14.	Diversity of general readings is a must	√	X	X	√

√ = generated at, X = not generated in

Source: Compilation by author

A panel of experts consisting of three senior librarians from Sri Lankan universities screened all the quality requirements identified by focus groups for overlap and suitability. The panel found that some of the quality requirements identified in Table 5.2 overlapped with some items in Table 5.3. Thus, the fourth, eighth, tenth, and eleventh quality requirements in Table 5.3 were disregarded when finalising the list of quality attributes.

All finalised quality requirements were then transformed into quality attributes for inclusion in the provisional models that are to be tested in the second stage of the study. The researcher considered using the following decisive factors in the generation of attributes (as suggested by other researchers).

1. Attributes should address only a single issue and not be double-barrelled (DeVellis 2003);
2. Attributes that measure attitudes and behaviour should not be included in the same scale (Hinkin, Tracey & Enz 1997);
3. Attributes should be short, simple and easy for respondents to understand (DeVellis 2003); and
4. Negatively worded attributes should be avoided or used with considerable caution (DeVellis 2003).

Accordingly, from the quality statements (refer to Tables 5.2 and 5.3) gathered from focus group discussions, the researcher developed a list of 50 attributes, indicated below in Table 5.4.

**TABLE 5.4: SERVICE QUALITY ATTRIBUTES**

<b>No.</b>	<b>Attribute</b>
1.	Staff approachability
2.	Complaint responsiveness
3.	Cultural sensitivity
4.	Courtesy of the staff
5.	Personal attention to customers
6.	Being informed about new services
7.	Supportive atmosphere
8.	Follow-up service
9.	Proper coordination by the staff
10.	Staff knowledgeability
11.	Promptness of the staff
12.	Contemplative environment
13.	Physically challenged friendly facilities
14.	Reflective and creative place
15.	Accessibility to buildings
16.	Helpful directional signs
17.	Comfortable and inviting place
18.	High quality information resources
19.	Collection completeness
20.	Convenient access to collections
21.	Diversified general readings
22.	Collection comprehensiveness
23.	Current information
24.	Needs-oriented resources
25.	Good sanitary facilities
26.	Convenient opening hours
27.	Good ventilation
28.	Good functional furniture
29.	Good lighting
30.	Quick reshelving
31.	Quietness in the library
32.	Air-conditioning
33.	Access to computers
34.	Audiovisual equipment in good condition
35.	Modern equipment

No.	Attribute
36.	Error-free records in the systems
37.	Effective resource sharing
38.	Archival access
39.	E-journal access
40.	Remote access
41.	Reasonable fare structure
42.	Customer education programmes
43.	Transactional confidentiality
44.	Library guides
45.	Well-organised Web site
46.	Useful library Web site
47.	Needs well-oriented Web site
48.	Accurate OPAC
49.	Easy OPAC
50.	Up-to-date OPAC

Source: Compilation by author

4. *Does satisfaction relate to situational attributes, and if so, what situational attributes promote satisfaction?*

All the focus groups agreed that the experience of library customers with the services is very important. They collectively expressed the opinion that statements regarding experience are helpful to capture the quality of services required to improve customer satisfaction. Experiences, they said, can be used to compare the service with similar services in different competitive agencies. Thus, the results seem to suggest that an experienced customer can make better judgements on satisfaction judgments, rather than inexperienced customers. The focus groups also agreed that experience can be measured by either familiarity with or knowledge of the existing library services.

Some focus groups raised the issue of involvement with the service. Their contention was that a customer regularly using the library service may have the advantage of capturing the real service quality of the library and the satisfaction that could be derived from it. The vagueness of the assessment of service was highlighted by some members; if customers cannot determine the ease or difficulty of evaluating the constructs of service quality and customer satisfaction, this may affect better modelling of satisfaction with

service quality. Most interestingly, perhaps regarding this issue, the purposive attributes were rejected by all focus groups, stressing the fact that those should be considered as irrelevant to the judgment of satisfaction in university libraries.

### **5.3.5 Conformity to the conceptual model**

The focus groups recognised the linkage between customer satisfaction and service quality and recommended that libraries should identify specific quality attributes to promote customer satisfaction. All the focus groups, however, realised that the purposive attributes did not make any contributions towards customer satisfaction. The researcher therefore eliminated the purposive attributes from the conceptual model and continued to have further discussions with the groups. The majority of the participants authenticated the validity of the conceptual model in reflecting the customer satisfaction process. Thus, it possessed both the face value and conformity required to proceed with the study. Furthermore, the participants reported that customer satisfaction could also be identified empirically. As stated by the group, "...[T]hese quality attributes are observable and they directly impact satisfaction and also are useful to predict future behaviour of satisfaction" (Focus group, University of Colombo).

This implies that the underlying attributes of the model are helpful in predicting customer satisfaction, and assist library administrators to identify the strengths and weaknesses of the service quality of their libraries. The focus groups of the University of Colombo, University of Ruhuna and University of Sri Jayewardenepura endorsed the fact that the model reflected the dynamism of the customer satisfaction process. One participant from the University of Colombo stressed

Yes, the concepts and relationships between customer satisfaction and service quality are understandable and particularly it gives us an idea about what we already know in a different ... scientific way. (Focus group, University of Colombo)

Another participant from University of Ruhuna expressed

Yeap, we can simply understand the formation of customer satisfaction corresponding to service quality in this model. It is a pretty simple model



compared to the others [other models in the discipline of management] but something of an inclusive model to Sri Lankan university libraries. (Focus group, University of Ruhuna)

However, the majority of the participants of Rajarata University pointed out that even though the attributes and the process are correct, the underpinning theoretical paradigms of the formation of customer satisfaction process is difficult to understand because of their limited knowledge of the subject:

Well... the model seems to be all right, but the underpinning paradigms, particularly the disconfirmation concept in the model, are pretty much complicated and beyond our current understanding. So, conformity cannot be acknowledged, reluctantly though. (Focus group, Rajarata University of Sri Lanka)

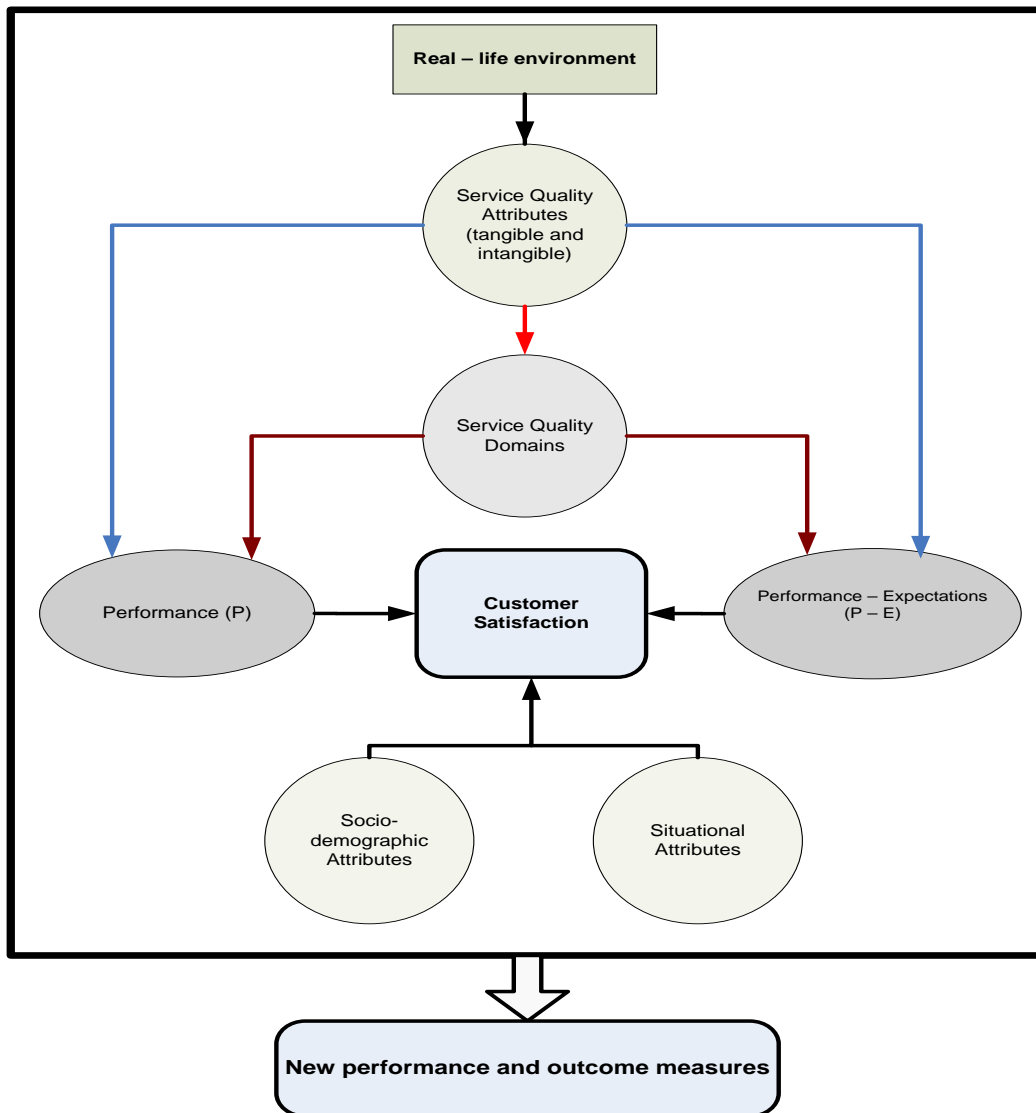
The participants were able to identify and apply the model derived from the conceptual model relevant to their perceptions of satisfaction. It became clear that customer satisfaction with service is a multi-faceted and complex construct. While library administrators could recognise and apply aspects of the satisfaction model to develop the service quality of their libraries, the customers' expectations were more complex. In general, these discussions confirmed that all the issues, except the purposive attributes identified in the fuzzy conceptual model, are critical and significant. In keeping with this, the final conceptual model outlines the customer perspectives of service quality and satisfaction based on what and how the customers understand and recognise their satisfaction with service. Thus, it conformed with the external validity of the conceptual model (Shadish, Cook & Campbell 2002: 83).

#### **5.4 FINAL CONCEPTUAL MODEL**

It became apparent that while the initial iteration of the customer satisfaction process was useful, there were areas of duplication and confusion. All focus group members concluded that service quality, situational and socio-demographic attributes may impact customer satisfaction, and the attributes of service quality should be generated by the real-library situation to represent the inherent dynamism of the contextual environment. Moreover, all four focus groups equally concurred that the service quality and situational attributes may be used to predict customer satisfaction significantly, but purposive

attributes do not have an impact on satisfaction. Furthermore, the focus groups argued that once a robust model for customer satisfaction is developed, new performance and outcome measures can be easily formulated. Figure 5.1 summarises revisions to the fuzzy conceptual model in Figure 2.3, depicted in Chapter Three.

**FIGURE 5.1: FINAL CONCEPTUAL MODEL**



Source: Compilation by author

## 5.5 EXPLORATORY SURVEY

The following procedure was adopted for the exploratory survey to refine quality attributes and to identify the quality domains in order to make use of them in the main study.

### 5.5.1 Questionnaire administration and data collection

With each requirement considered as a quality attribute, the focus groups identified fifty quality requirements for incorporation into a self-administered questionnaire. In this questionnaire, each requirement was stated as a quality attribute (*see Appendix II*). To minimise the respondents' non-responses, they were given a maximum of thirty minutes to answer the questionnaire. The questionnaire was designed in three blocks of questions, as outlined below:

- (i) Questions investigating the respondents' perceptions of quality attributes;
- (ii) Questions regarding the respondents' socio-demographic characteristics;  
and
- (iii) Questions investigating the respondents' perceptions of situational attributes.

The respondents were asked to indicate the importance of each attribute. The instrument was pre-tested by the panel of experts, who refined the identified quality attributes. The instrument was distributed to a sample of academic staff members, undergraduate and postgraduate students in the Faculties of Arts at all four universities. As per the rule of thumb described in section 4.5.4.1 in Chapter Four, the sample size was 250 customers because of the 50 attributes. However, to overcome the problem of non-responses, a 5% additional contingency rate was added to the total sample size. Thus, the number of customers in the sample was 263, as indicated below.

As per the rule of thumb, the theoretical sample size	= 250
5% contingency rate for the alleviation of non-response rate	= 13
Adjusted sample size (n)	= 263

According to the size of the population depicted in Table 4.3 in Chapter Four, the adjusted sample (n) was split into population strata. Thereafter, the subjects of the sample were allocated proportionately to each stratum, as indicated in Table 5.6 with an asterisk.

**TABLE 5.6: DISTRIBUTION OF THE SAMPLE**

University	Faculty	Customer segment	Subjects
University of Colombo	Arts	Undergraduates	1,907 (76)*
		Postgraduates	471 (19)*
		Academic staff	152 (6)*
University of Sri Jayewardenepura	Arts	Undergraduates	1,518 (60)*
		Postgraduates	135 (5)*
		Academic staff	152 (6)*
University of Ruhuna	Arts	Undergraduates	1,409 (56)*
		Postgraduates	3 (1)*
		Academic staff	99 (4) *
Rajarata University of Sri Lanka	Arts	Undergraduates	733 (29)*
		Postgraduates	0
		Academic staff	22 (1)*
<b>Total</b>			<b>6,601 (263)**</b>

\* Number of customers from this stratum for the sample of study

\*\* Size of the sample

Source: Compilation by author based on statistics available in each university

The researcher personally visited the libraries and selected the customers based upon the inclusion criteria discussed in Chapter Four. All selected customers were given the questionnaire enclosed in addressed, stamped envelopes, with requests to post the questionnaire to the researcher within the following ten days' period. Out of the 263 survey forms distributed to the sample population, 242 were duly completed and received with usable responses. This indicated a 92.01 % response rate, allowing the researcher to proceed with the analyses.

### 5.5.2 Socio-demographic characteristics

The socio-demographic data of the respondents are given in *Appendix IV*. The respondents represented the University of Colombo (40%), University of Sri Jayewardenepura (30%), University of Ruhuna (25%) and the Rajarata University of Sri Lanka (5%). Eighty-three percent of the respondents were undergraduates, 7% were academic staff members and 10% were postgraduate students. The respondents were asked how long they have been using the university library. More than 47% had over three years' experience using the university library service. The respondents were also asked to state the minimum number of library visits they usually make per week. More than 56% of the respondents reported visiting the library over four times per week. None had reported visits lower than two times per week, and therefore, it was not necessary to exclude any from the analysis, as it proved that the participants had enough experience with the university library system to participate in the survey adequately.

### 5.5.3 Descriptive analysis of quality attributes

A descriptive analysis of data was conducted to understand the pattern of data distribution and to specifically ascertain whether the data was normally distributed, thus determining the possibility of carrying out the statistical data analysis in the study. The data were first examined for normality and survey bias. Normal probability plots were generated and examined for all fifty attributes, and the data were considered normal for statistical analysis. The description of data is shown in Table 5.7.

**TABLE 5.7: DATA DESCRIPTION OF QUALITY ATTRIBUTES**

No.	Attribute	N	MN	MX	$\mu$	SD	Skewness
1.	Staff approachability	242	3	5	4.01	.36	.17
2.	Complaint responsiveness	242	2	5	4.05	.34	.25
3.	Cultural sensitivity	242	3	5	4.06	.33	1.19
4.	Courtesy of the staff	242	3	5	4.06	.29	1.95
5.	Personal attention to customers	242	2	5	4.02	.31	-.35
6.	Being informed about new services	235	3	5	4.05	.31	1.13

No.	Attribute	N	MN	MX	$\mu$	SD	Skewness
7.	Supportive atmosphere	242	2	5	3.96	.45	-.71
8.	Follow-up service	242	1	3	1.98	.59	.01
9.	Proper coordination by the staff	242	0	4	2.17	.67	.63
10.	Staff knowledgeability	242	2	5	3.83	.66	-1.17
11.	Promptness of the staff	242	1	5	3.87	.54	-1.87
12.	Contemplative environment	240	0	5	2.21	.93	-.21
13.	Physically challenged friendly facilities	233	0	5	2.73	1.05	.55
14.	Reflective and creative place	241	2	5	3.32	.81	.22
15.	Accessibility to buildings	242	1	5	2.61	.77	.29
16.	Helpful directional signs	241	0	5	4.12	.65	-1.49
17.	Comfortable and inviting place	242	0	5	4.17	.66	-1.17
18.	High quality information resources	242	4	5	4.33	.47	.71
19.	Collection completeness	242	4	5	4.23	.42	1.28
20.	Convenient access to collections	241	2	5	4.18	.43	.67
21.	Diversified general readings	234	1	5	2.31	.74	.69
22.	Collection comprehensiveness	242	0	5	4.00	.51	-1.87
23.	Current information	242	3	5	4.04	.40	.36
24.	Needs-oriented resources	242	3	5	4.17	.44	.81
25.	Good sanitary facilities	242	3	5	4.06	.30	1.95
26.	Convenient opening hours	242	3	5	4.01	.23	.32
27.	Good ventilation	242	2	5	3.92	.53	-1.24
28.	Good functional furniture	242	3	5	4.04	.29	1.11
29.	Good lighting	242	3	5	4.01	.36	.17
30.	Quick reshelving	242	2	5	4.05	.33	.32
31.	Quietness in the library	242	3	5	4.11	.36	1.38
32.	Air-conditioning	242	3	5	4.09	.35	1.30
33.	Access to computers	235	3	5	4.13	.43	.74
34.	Audiovisual equipment in good condition	242	3	5	4.07	.30	1.92
35.	Modern equipment	242	1	5	2.56	1.13	.63
36.	Error-free records in the systems	241	1	5	4.05	.60	-1.53
37.	Effective resource sharing	239	1	5	3.94	.58	-2.08
38.	Archival access	237	1	5	2.81	1.14	.14
39.	E-journal access	242	2	5	4.00	.51	-.75
40.	Remote access	242	2	5	4.02	.48	-.86

No.	Attribute	N	MN	MX	$\mu$	SD	Skewness
41.	Reasonable fare structure	242	1	5	4.09	.61	-1.40
42.	Transactional confidentiality	242	0	5	2.36	.77	-.15
43.	Library guides	242	2	5	3.90	.63	-.81
44.	Well-organised Web site	242	2	5	3.83	.59	-.29
45.	Useful library Web site	242	2	5	4.05	.47	-.83
46.	Needs well-oriented Web site	242	2	5	3.48	.74	.06
47.	Accurate OPAC	242	1	5	3.86	.63	-.92
48.	Easy OPAC	242	1	5	2.89	.91	-.21
49.	Up-to-date OPAC	242	1	5	3.98	.77	-1.13

N -Total, MN – Minimum Value, MX -Maximum Value,  $\mu$  - Mean, SD-Standard Deviation, S – Skewness

Source: Compilation by author

The construct of quality measures is slightly skewed to the right, and a few attributes are slightly skewed to the left, suggesting that generally, the measures are normal because skewness is  $\leq 2$  (West, Finch & Curran 1995). The values of the skewness in the dataset fulfilled the assumption of  $-2 < \text{skew} > +2$  for normality.

Thereafter, the dataset was cleansed by:

1. eliminating the respondents where the variance across all responses was zero. It means the respondents did not apply their minds, if they rated the attributes identically. Respondents either do not read the questionnaire, or they do not think of the answer correctly.
2. suppressing the mean value of the attributes below 2.9 because the Likert scale consisted of 5 points: 1 = very important, 2 = unimportant, 3 = slightly important, 4 = important, and 5 = very unimportant. Values 3 and above symbolise “important” and below 3 symbolise the “unimportant”. Since this research entails only important attributes as perceived by customers, only those attributes with values of 3 and above were included.

No attribute was found from the first exercise of adjustment. However, the dataset had 242 completed questionnaires, that is, below the target of 250. Having completed the second exercise, ten attributes were suppressed, as shown in Table 5.8, because they were considered unimportant by of the customers. Thus, the total attributes used were 40, and

then, as per the rule prescribed by Hair *et al.* (1995) cited in Okoroafo (1997) that was discussed in Chapter Four, the minimum sample size should be 200 subjects. Hence, having 242 respondents exceeded the requirement of 200 for 40 attributes in order to conduct the factor analysis technique.

#### **5.5.4 Refinement of attributes and domain identification**

Following the data cleansing and normality testing, the dataset was analysed through descriptive, frequency, factor analysis and reliability tests, using the 13.0 version of SPSS package to identify the domain structure. This section discusses the techniques used in the study.

##### **5.3.4.1 Exploratory Factor Analysis**

As an outcome of the focus group discussions, fifty attributes were included in the survey, of which ten attributes were suppressed, leaving only forty attributes. In order to determine the appropriateness of factor analysis with the data, the following issues were considered.

Gorush (1983: 332) states that there is no perfect safe ratio of the number of customers to form a sample. One rule generally applied for factor analysis suggests a minimum of five times as many observations as there are attributes to be analysed. Thus, this study used 242 customers as the sample size, which was greater than the number of cases prescribed by Hair *et al.* (1995) cited in Okoroafo (1997). The Kaiser-Meyer-Olkin (KMO) test run on this sample resulted in a KMO of 0.7, which is described by Kaiser (1994: 35) as being “good.” Therefore, the result of the test for appropriateness indicated that the data satisfied the prerequisites for conducting factor analysis.

The cutoff point for factor loading is arbitrary, and its magnitude also varies from research to research. Thus, this study used 0.5 as the standard cutoff point.

By applying the PCA and Varimax rotation to the refined forty attributes described in section 5.5.3, the SPSS produced 11 factors with Eigenvalues greater than 1.0. Pett,



Lackey and Sullivan (2003: 209) stress the importance of considering the breadth and complexity of the factor, as well as its relationship for possible conceptualisation, even though it is important to use statistical procedures in naming a factor. The eleven-factor solution explained 67.20% of variance, which is deemed to be a satisfactory solution by social science standards (Hair *et al.* 1998: 377). However, the efficacy of the solution was highly questionable. Some factors loaded less than 0.5 and offered no explanatory value. More importantly, the entire factor solution that was produced was meaningless. Specifically, the generated factors consisted of a mixed array of attributes. For instance, factor one was composed of courtesy of staff, personal attention, information about new services, good sanitary facilities and audio visual equipment in good condition, which were absolutely meaningless to label as a certain domain. Thus, it was apparent that all factors caused attributes to be loaded together, which did not make sense conceptually as indicated in *Appendix II*, and some factors produced only one or two attributes, for example, Factors 9,10 and 11. Under these circumstances, the factor structure produced cannot be used as domains in the main study due to its illogical and irrational constitution.

The problem of meaningless factor loading is common in the factor analysis method (DeVellis 2003). As Baldwin (1972) (cited in Baldwin & Bottoms 1976: 20) says,

...the basic problem of meaningful interpretation of factors is crucial...investigators have very often been engaged in rather tortuous intellectual gymnastics in desperate efforts to derive some meaning from what are obviously very miscellaneous clusters of variables. Furthermore, greater confusion has been generated by the rather spurious claims for objectivity that many advocates of the method have put forward.

Even theorists using factor analysis often face problems of interpretation. As Blalock (1960: 384) describes,

... the main value of factor analysis is that it enables one to replace a large number of indices which may have very little theoretical meaning with a much smaller number of conceptual variables which may make very good sense theoretically. It is very possible, however, to end up with a set of factors which have very little theoretical meaning. We then have merely replaced a larger number of clear-cut operational indices by a smaller number of

theoretically meaningless factors. Factor analysis will therefore be of relatively little value unless the factors obtained can be identified.

To conquer the origination of meaningless factor solution, a method called the Delphi technique (Dalkey 1969) was used to group the attributes into conceptually logical factors. This process does not guarantee a content valid scale, but it serves as a basic exploratory tool to acquire and summarise the most conformed and conformable opinions of experts (Hsieh, Chin & Wu 2006: 216). These conceptual factors were then tested by the PCA in the EFA method to ensure that conceptually constructed factors represent the statistically developed factors. This approach has been recommended by Rosen and Surprenant (1998) as a means of identifying actual, rather than perceived, factor grouping. In addition, DeVellis (2003) recommends not combining cognitive and emotional attributes within an analysis. Thus, a separate analysis of conceptual groups will produce a better scale. This approach would help to identify a better remedy for the generation of meaningless factor solutions. The following section describes the Delphi solution adopted to overcome the problem.

#### **5.5.4.2 Delphi technique**

The Delphi technique was used for the study as it did not lend itself to precise analytical techniques but rather benefited from the subjective judgments of individuals on a collective basis (Adler & Ziglio, 1996). Delphi technique provided the study an iterative process, which was used to collect and distil the judgments of library customers as well as experts using a series of techniques interspersed with feedback. Thus, it ensured the conceptual unambiguousness and the simplicity of the conceptual domain identification process.

##### **(i) Factor grouping by experts**

The quality attributes identified through the focus groups were sent to the panel of experts for grouping and further evaluation. They categorised the attributes into relevant conceptual domains, based on their expertise. Table 5.9 indicates the attributes and conceptual domains identified by the experts. The process resulted in seven conceptual domains: affect of service personnel, building environment, collection and access,

furniture and facilities, technology, service delivery and Web services, as illustrated in Table 5.9. This was condensed into sub-constructs, primarily the conceptual domains that were most descriptive of the attributes they encompassed.

**(ii) Factor grouping by customers**

A separate technique was employed to categorise the quality attributes into conceptual domains on customers' perspectives. The customers were required to match attributes with quality domains defined by the panel of experts to determine whether the quality attributes and pertinent domains could be correctly understood by the customers. The aim of this technique was to theoretically identify the quality domains for further statistical analysis to finalise the domain structure of service quality. The purpose of the Delphi Technique was therefore to determine the conceptual unambiguousness and simplicity of the attributes generated by focus groups in order to include them in the new scale.

All the customers invited for the focus group discussions were requested to complete an exercise shown in *Appendix VII* to assess the adequacy of content. Quality attributes were listed on the right, and the domains on the left side of a sheet of paper, and the customers were asked to match the attributes with pertinent quality domains. This method provided support for initial construct validity because it allowed the customers to remove the attributes that are conceptually inconsistent, irrelevant and particularly low on face validity. As a starting point in analysing the responses, attributes were screened based on the agreement index of  $p=0.66$ , which explicates the 66% of respondents—that is, the minimum of two-thirds of the subjects—who can match the attributes correctly with pertinent domains. The conceptual domain identification of the exploratory study ( $n=32$ ) is indicated in Table 5.5.

**TABLE 5.5: DOMAINS IDENTIFIED BY DELPHI TECHNIQUE**

<b>Quality attribute</b>	<b>f</b>	<b>p</b>	<b>Domains matched by respondents</b>	<b>Domains identified by experts</b>
Staff approachability	32	1.0	Affect of service personal	Affect of service personal
Complaint responsiveness	30	0.94	Affect of service personal	Affect of service personal
Cultural sensitivity	28	0.88	Affect of service personal	Affect of service personal
Courtesy of the staff	32	1.00	Affect of service personal	Affect of service personal
Personal attention to customers	31	0.99	Affect of service personal	Affect of service personal
Being informed about new services	24	0.75	Affect of service personal	Affect of service personal
Supportive moods	28	0.88	Affect of service personal	Affect of service personal
Follow-up service	21	0.66	Affect of service personal	Affect of service personal
Proper coordination by the staff	31	0.99	Affect of service personal	Affect of service personal
Staff knowledgeable	32	1.00	Affect of service personal	Affect of service personal
Promptness of the staff	32	1.00	Affect of service personal	Affect of service personal
Contemplative environment	28	0.88	Building environment	Building environment
Physically challenged friendly facilities	29	0.91	Building environment	Building environment
Reflective and creative place	29	0.91	Building environment	Building environment
Accessibility to buildings	32	1.00	Building environment	Building environment
Helpful directional signs	20	0.63	Building environment	Collection & Access
Comfortable and inviting place	29	0.91	Building environment	Building environment
High quality information resources	32	1.00	Collection & access	Collection & access
Collection completeness	32	1.00	Collection & access	Collection & access
Convenient access to collections	32	1.00	Collection & access	Collection & access
Diversified general readings	32	1.00	Collection & access	Collection & access

Quality attribute	f	p	Domains matched by respondents	Domains identified by experts
Collection comprehensiveness	32	1.00	Collection & access	Collection & access
Current information	32	1.00	Collection & access	Collection & access
Needs-oriented resources	31	0.97	Collection & access	Collection & access
Good sanitary facilities	32	1.00	Furniture & facilities	Furniture & facilities
Convenient opening hours	26	0.81	Furniture & facilities	Furniture & facilities
Good ventilation	26	0.81	Furniture & facilities	Furniture & facilities
Good functional furniture	32	1.00	Furniture & facilities	Furniture & facilities
Good lighting	28	0.88	Furniture & facilities	Furniture & facilities
Quick reshelving	22	0.69	Furniture & facilities	Furniture & facilities
Quietness in the library	21	0.66	Furniture & facilities	Furniture & facilities
Air-conditioning	31	0.97	<b>Technology</b>	<b>Furniture &amp; facilities</b>
Access to computers	30	0.94	Technology	Technology
Audiovisual equipment in good condition	31	0.97	Technology	Technology
Modern equipment	32	1.00	Technology	Technology
Error-free records in the systems	30	0.94	Technology	Technology
Effective resource sharing	30	0.94	Service delivery	Service delivery
Archival access	21	0.66	Service delivery	Service delivery
E-journal access	29	0.91	Service delivery	Service delivery
Remote access	26	0.81	Service delivery	Service delivery
Reasonable fare structure	29	0.91	Service delivery	Service delivery
Customer education programmes	32	1.00	Service delivery	Service delivery
Transactional confidentiality	27	0.84	Service delivery	Service delivery
Library guides	21	0.66	Service delivery	Service delivery
Well-organised Web site	32	1.00	Web services	Web services
Useful library Web site	32	1.00	Web services	Web services
Needs-oriented Web site	32	1.00	Web services	Web services
Accurate OPAC	26	0.81	Web services	Web services
Easy OPAC	27	0.84	Web services	Web services
Up-to-date OPAC	26	0.81	Web services	Web services
<b>AVERAGE</b>	<b>29</b>	<b>0.90</b>		

f – Frequency, p- Probability

Source: Compilation by author

This presents the overall attributes with an agreement index of 0.90 (90%), and all individual attributes with more than 0.66 (66%) agreement. According to Johnson &

Gustafsson (2000: 59), the prescribed agreement index is 80%, which is the most effective cut-off level to determine whether content analysis is reliable. The current study has shown a 90% overall agreement index, which is more than the prescribed cut-off point. However, the DT does not guarantee the content valid scale, but it facilitates an exploratory study to provide evidence that the attributes represent a reasonable measure of the construct under examination. Even if the panel of experts categorised the attribute “Air-conditioning” under “Furniture and Facilities”, 97% of the respondents identified it as an attribute that belongs to the Technology domain. Hence, the respondents’ categorisation of the attribute was accepted to finalise the domain due to its higher agreement index and, on the other hand, because the service quality assessment is principally done by customers, rather than by experts.

These conceptually identified domains were further tested by the factor analysis technique to determine whether or not these conceptual domains were statistically correct. Accordingly, seven domains—effect of service personnel, building environment, collection and access, furniture and facilities, technology, service delivery and Web services—were statistically tested to be confirmed as potential domains of service quality.

#### **5.5.4.4 Exploratory factor analysis for discrete domains**

The exploratory study was expected to validate the scale attributes and domains to be used in the main survey. As the objective of this exploratory study is to establish a quality scale that refers to the existence of a construct explaining a set of attributes, exploratory factor analysis with Varimax-rotated PCA was performed for each conceptually identified domain.

To determine the appropriateness of factor analysis, the KMO measure of sampling adequacy and Bartlett’s Measure of Sphericity (BMS) were examined. A value of 0.60 or above from the KMO measure was utilised as the cutoff point to recommend that the data are adequate for EFA (Tabachnick & Fidel 2001). The significance of BMS was also established. Although the critical assumptions underpinning the factorial analysis were more conceptual than statistical (Hair *et al.* 1998: 137-138), there was a need to verify the

existence of an underlying structure of the data matrix. Therefore, the visual inspection of correlation matrices of data was performed to ensure that a substantial number of correlations were greater than 0.30 (Hair *et al.* 1998: 138). In addition, these correlation matrixes were examined to detect whether any attribute failed to correlate higher than 0.40 with at least another attribute (SPSS 1999). If the correlations of attributes failed to comply with this requirement, the pertinent attributes were suppressed. Attributes that had factor loadings of less than 0.50 were excluded from the analysis. The attributes loading on more than one factor with a loading score equal to or greater than 0.50 on each factor were also excluded from the analysis (Hattie 1985). Table 5.8 indicates the EFA results in relation to all domains.

**TABLE 5.8: EXPLORATORY FACTOR ANALYSIS FOR QUALITY DOMAINS**

Domain	Attribute	Factor 1	Factor 2	Eigenvalue	Variance explained	Cronbach's alpha	KMO	BMS (p)
Affect of service personal	Staff approachability	<b>.667</b>	-.235	Factor 1 : 3.75	Factor 1 40.80%	0.77	0.80	740.58 (0.00)
	Complaint responsiveness	<b>.777</b>	-.251					
	Cultural sensitivity	<b>.642</b>	-.378	Factor 2: 1.52	Factor 2 18.26%			
	Courtesy of the staff	<b>.809</b>	-.067					
	Personal attention to customers	<b>.705</b>	-.139					
	Being informed about new services	<b>.720</b>	-.116					
	Supportive moods	.411	<b>.582</b>					
	Staff knowledgeability	.494	<b>.641</b>					
	Promptness of the staff	.356	<b>.771</b>					
Building environment	Reflective and creative place	<b>.650</b>		1.96	65.34%	0.71	0.60	199.46 (0.00)
	Helpful directional signs	<b>.860</b>						
	Comfortable and inviting place	<b>.894</b>						
Collection and access	High quality information resources	<b>.692</b>		2.67	44.45%	0.74	0.76	306.28 (0.00)
	Collection completeness	<b>.784</b>						
	Convenient access to collections	<b>.553</b>						
	Collection comprehensiveness	<b>.565</b>						
	Current information	<b>.634</b>						
	Needs-oriented resources	<b>.739</b>						



Domain	Attribute	Factor 1	Factor 2	Eigenvalue	Variance explained	Cronbach's alpha	KMO	BMS (p)
Furniture and facilities	Good sanitary facilities	<b>.855</b>		3.13	44.76%	0.77	0.83	430.65 (0.00)
	Convenient opening hours	<b>.529</b>						
	Good ventilation	<b>.611</b>						
	Good functional furniture	<b>.593</b>						
	Good lighting	<b>.688</b>						
	Quick reshelving	<b>.737</b>						
	Quietness in the library	<b>.618</b>						
Technology	Air-conditioning	<b>.697</b>		2.01	50.33%	0.63	0.66	150.02 (0.00)
	Access to computers	<b>.850</b>						
	Audiovisual equipment in good condition	<b>.634</b>						
	Error-free records in the systems	<b>.635</b>						
Service delivery	E-journal access	<b>.897</b>		2.13	52.57%	0.68	0.60	237.72 (0.00)
	Remote access	<b>.779</b>						
	Customer education programmes	<b>.599</b>						
	Library guides	<b>.603</b>						
Web services	Well-organised Web site	<b>.788</b>		1.83	60.82%	0.66	0.63	119.04 (0.00)
	Useful library Web site	<b>.835</b>						
	Accurate OPAC	<b>.712</b>						

KMO-Kaiser-Meyer-Olkin measure of sampling adequacy, BMS-Bartlett's Measure of Sphericity: Chi square, p-Significance of Chi square statistics

- Only factor loading  $\geq 0.5$  are highlighted
- Only those attributes that loaded on only factors with Eigenvalues greater than one are shown

Source: Compilation by author based on SPSS outputs

**(i) Affect of service personnel**

The factor analysis of the Affect of service personnel included 11 quality attributes identified through DT. Two attributes were excluded from the analysis because the average important scores of these attributes were below 3.0, which indicated that these attributes were not important (refer to Table 5.6). This justified the elimination of such attributes for factor analysis, and nine attributes were used for the test. The correlation matrix as depicted in *Appendix V* shows that no attribute failed to correlate higher than 4.0 with at least another attribute, and a substantial number of correlations were greater than 0.30, as indicated in *Appendix V*. The Kaiser-Meyer-Olkin measure of sampling adequacy and Bartlett's Measure of Sphericity (BMS) were also examined. The KMO test showed 0.776, which was above the requirement of 0.60, and the BMS was also found to be significant at  $p=0.000$ , as indicated in Table 5.8. Therefore, the data were appropriate for factor analysis.

The PCA generated a two-factor solution as the outcome of the analysis. The first factor represented 40.90% of the explained variance of the scale, and the second factor explained 18.26% of the variance with a cumulative variance of 59.26%. The first factor was comprised of six attributes: staff approachability, complaint responsiveness, cultural sensitivity, courtesy of the staff, personal attention to customers and being informed about new services. The second factor consisted of three attributes: supportive moods, staff knowledgeability and promptness of the staff. Cronbach's reliability score was 0.77, which was acceptable.

According to the results reported here, the conceptual domain of the "affect of service personnel" had two separate sections. In proportion to the attributes contained in Factor 01, this domain was labelled "responsiveness" and the second domain in factor 02 "supportiveness".

**(ii) Building environment**

The "building environment" domain consisted of six attributes. Of these, three attributes—contemplative environment, physically challenged friendly facilities and accessibility to

buildings—were excluded because they were unimportant in the viewpoint of respondents (refer to Table 5.6). Thus, only three attributes were used for the factor analysis, and Kaiser-Meyer-Olkin measure of sampling adequacy and Bartlett’s Measure of Sphericity (BMS) were also examined. The statistics of both tests (KMO=0.6, BMS=199.46, (p=0.000)) and the correlation matrix depicted in *Appendix V* indicated that it was appropriate to perform a factor analysis.

Three attributes were loaded into one factor, as indicated in Table 5.8. The PCA indicated this one factor solution with 62.48% explained variance. Cronbach’s Alpha Reliability test indicated that the scale was reliable, with an alpha value of 0.71. This implies that the domain of building environment can be measured in terms of three attributes: reflective and creative place, helpful and directional signs, and comfortable and inviting place.

### **(iii) Collection and Access**

The domain of collection and access consisted of seven quality attributes, one of which was named diversified general readings. It was excluded from the factor analysis due to its unimportance, as shown in Table 5.6. To determine the appropriateness of factor analysis, KMO and BMS tests were used, and their results indicated an acceptable level, shown in Table 5.8. The correlation matrix depicted in *Appendix V* indicated substantial correlations being greater than 0.30 and allowing the study to proceed with EFA.

The PCA indicated only one factor solution representing 44.23% of the explained variance of the scale. The factor comprised six attributes with a factor loading greater than 0.5. These attributes were high quality information resources, collection completeness, convenient access to collections, collection comprehensiveness, current information, and needs-oriented resources. The reliability test yielded a Cronbach’s Alpha score of 0.74, which exceeds the 0.70 guideline set in Section 5.5.4.4. Thus, it was concluded that the scale to assess collection and access was reliable and that this domain could be measured in terms of the six attributes mentioned above.

**(iv) Furniture and facilities**

The factor analysis of the furniture and facilities domain included seven potential attributes derived from DT. The appropriateness of the factor analysis was determined by Kaiser Meyer Olkin's measure of sampling adequacy and Bartlett's measure of sphericity. Both tests indicated that the data was appropriate for factor analysis, as indicated in Table 5.8. The correlation matrix illustrated in *Appendix V* designated that the requirement of inter-attribute correlations were adequate to carry out the exploratory factor analysis.

The reliability of the scale was determined to be 0.77 by Cronbach's Alpha score, which exceeded the recommended reliability score of 0.70. Therefore, it was concluded that the furniture and facilities domain can be measured in terms of these seven attributes: food sanitary facilities, convenient opening hours, good ventilation, good functional furniture, good lighting, quick reshelving and quietness in the library.

**(v) Technology**

Five attributes were proposed to measure the technology domain, as shown in section 5.5.4.3. However, the attribute called modern equipment was excluded due to its unimportance in the viewpoint of the respondents, as shown in Table 5.6. Thus, four quality attributes were utilised for the factor analysis. The Kaiser-Meyer-Olkin measure of sampling adequacy (0.63) and Bartlett's test of sphericity ( $p=0.00$ ) indicated in Table 5.10 and the correlation matrix shown in *Appendix V* showed that the data was acceptable for factor analysis.

The PCA indicated that there was a one-factor solution representing 50.33% of the explained variance of the scale. The factor comprised four attributes with factor loadings greater than 0.5. These attributes were air-conditioning, access to computers, audiovisual equipment in good condition and error-free records in the systems. The reliability of the four attributes measuring technology was determined to be 0.63, using Cronbach's Alpha reliability test, which was less than the recommended reliability score of 0.70. However, it was determined to be close enough, considering the fact that reliability scores represent

the lower limit of acceptability (0.60) (Hair *et al.* 1998: 138). Thus, it can be concluded that this domain could be measured in terms of the four attributes.

**(vi) Service delivery**

Eight attributes were proposed to measure the domain of service delivery. Two attributes called archival access and transactional confidentiality were excluded from the factor analysis due to their unimportance in the opinion of the focus groups (refer to Table 5.6). Two attributes—effective resource sharing and reasonable fare structure—were eliminated due to low inter-attribute correlations, as indicated in *Appendix V*. A value of 0.60 KMO and BTS significance at  $p=0.000$ , shown in Table 5.10, indicate that the data were adequate for an exploratory factor analysis.

Only one factor was indicated by the PCA with 52.57% of explained variance of the scale. Cronbach's reliability test yielded a score of 0.68, which was close enough to the acceptable score of 0.70. Therefore, it was concluded that the service delivery domain could be measured in terms of four attributes: E-journal access, remote access, customer education programmes and library guides.

**(vii) Web services**

Six attributes for measuring the Web services domain and the attribute of easy OPAC were excluded from the factor analysis due to their unimportance (refer to Table 5.6). The inter-attribute correlation matrix revealed that the attribute called “need-oriented Web site” and “up-to date OPAC” were not able to meet the requirement related to the correlation of attributes due to low inter-attribute correlations, as indicated in *Appendix V*. Thus, these were excluded from the analysis, and three attributes were utilised for the factor analysis, as depicted in Table 5.8. The KMO measure of sampling adequacy and the BMS were employed to examine the appropriateness of the data for factor analysis. KMO was 0.63, which was acceptable. BMS was significant at  $p=0.00$ . These results indicated that it was appropriate for a factor analysis.

Cronbach's reliability test yielded a score of 0.66, which was close enough to 0.60, the lower limit of acceptability (Hair *et al.* 1998: 138). The results indicated a one-factor solution representing 60.82% of the explained variance in the scale. Thus, it was concluded that the Web service domain could be measured in terms of three attributes.

## **5.6 ISSUES, IMPLICATIONS AND POST-EXPLORATORY CONSIDERATIONS**

A number of new issues and implications emerged from the exploratory study, discussed in more detail below, and the original research design was therefore amended accordingly.

Gummesson (2001) suggests that researchers may opt for inappropriate methodologies for research problems due to the lack of theoretical development in the discipline of marketing. Schembri and Sandberg (2002) further articulated that dominant service quality models have failed to capture the real customer perspectives of service quality. These show a need to shift away from the objective measurement of service quality and to pose it in a different light. The phenomenological approach used in this exploratory part of the research, however, enabled the researcher to investigate variations of service quality and customer satisfaction, as experienced by different library customers. The end results of this stage of the research design translated into a frame of alternative library service quality specific to Sri Lankan universities, and thus, it permitted the study to capture effectively the dynamic nature of service quality and customer satisfaction in university libraries.

Since the literature indicated that purposive attributes may have an impact on customer satisfaction, the focus groups rejected the link between purposive attributes and customer satisfaction. This was on account of the phenomenological constitution of the methodological design of the study.

The exploratory factor analysis used for the identification of quality domains failed to produce a meaningful factor structure for the study. A new methodology was therefore

adopted to reveal an appropriate domain structure for the construct through the Delphi technique (DT). The results of DT indicated the emergence of seven domains: affect of service personal, building environment, collection and access, furniture and facilities, technology, service delivery and Web services. These domains were then individually tested by EFA to determine whether or not these conceptual domains are comparable with the domains identified by EFA. However, the domain named “affect of service personal” identified by the respondents was transformed into two new-fangled domains. The results suggested that the customers are likely to see higher responsiveness from the library personnel, while they receive support at their end. Accordingly, two factors—responsiveness and supportiveness—emerged from EFA. Thus, it is evident that the adjusted domains for the construct of service quality are responsiveness, supportiveness, building environment, collection and access, furniture and facilities, technology, service delivery and Web services.

The exploratory study did not attempt to determine the fact that there was significant evidence to show that the differences in situational and socio-demographic indicators will impact customer satisfaction. However, in this study, there was adequate reliability evident in the responses to indicate that most of the library customers had very high expectations from the quality of service of their libraries. Given the higher level of expectations, this exploratory study should be beneficial to library administrators to understand the expectations of their customers on the services rendered by their libraries. Though there are very few empirical studies on quality in the field of university libraries, the available data proved to be significant and interesting from the standpoint of academic libraries.

Larger samples and responses used in this study have led to rigorous analysis to confirm statistical rigour. In the second stage of the analysis, a larger sample was also used to maintain the statistical rigour and accuracy of the results.

## **5.7 SUMMARY**

This chapter discussed the first stage, that of the exploratory part of the study. The results of the focus group discussions indicated that 50 quality attributes were important for university libraries in Sri Lanka, whereas the sample of the exploratory study indicated 40 attributes. Eight domains were identified by means of DT and EFA: responsiveness, supportiveness, building environment, collection and access, furniture and facilities, technology, service delivery and Web services. This domain structure demonstrated acceptable construct validity, as the factors extracted accounted for a substantial proportion of variances. Reliability was also reasonable, and thus, this exploratory study suggested that these domain and attribute identifications are suitable for use in the second stage. It further provides a substantive and rigorous set of results with which to proceed to the main study.



## **CHAPTER SIX: MAIN STUDY - DATA ANALYSIS AND FINDINGS**

### **6.1 INTRODUCTION**

The exploratory part of the study consisting of stage one of the research was presented in Chapter Five. It produced eight quality domains and four situational attributes, which may have affected customer satisfaction. This chapter—as the main study—discusses the development of provisional models and the final selection of the best model to predict customer satisfaction in relation to service quality by analysing data with standard statistical techniques, such as multiple linear regression analyses (MLRA) and binomial logistic regression analyses (BLRA). During the development and selection process, the models were compared using two statistical methods. The adjusted  $R^2$  was used for the models analysed by MLRA, and Cox and Snell  $R^2$  and Correctness for the models analysed by BLRA. The best models thus derived were thereafter compared using Mean Residual Analysis (MRA) to select the best parsimonious model that could effectively predict customer satisfaction in relation to service quality. Finally, the influential strength of the relationship between customer satisfaction and socio-demographic and between customer satisfaction and situational attributes were analysed to ascertain whether or not these attributes influence overall customer satisfaction.

### **6.2 MAIN STUDY**

This section discusses the results of the main study. The main purpose of the main study was to build provisional models based on the results of the exploratory study, and thereafter to test the models with standard statistical techniques, in order to locate the best parsimony model. This final model identified was found to be useful to predict customer satisfaction in relation to service quality in Sri Lankan university libraries.

The preliminary stage of the main study was conducted using key steps, as described in Chapter Four and given below.

Step One:      Developing provisional models based on the identified attributes and domains.

Step Two: Conducting a survey to gather data on user satisfaction, service quality, socio-demographic and situational attributes.

Step Three: Testing the provisional models with standard statistical techniques.

Step Four: Identification of the best parsimony model to predict user satisfaction from a service quality perspective, in the context of university libraries in Sri Lanka.

### 6.2.1 Profile of the responses

A total of 1,840 questionnaires were distributed among the respondents of four universities, and out of these, 1,298 responses were received. Out of these responses, 1,181 were usable for the analysis, and 117 were unusable. Therefore, the overall gross response rate to the survey was 71%, but with the elimination of the unusable questionnaires, the usable response rate dropped to 64%. A summary of responses is presented below in Table 6.1.

**TABLE 6.1: SUMMARY OF RESPONSES TO THE QUESTIONNAIRE**

Questionnaires	Numbers	Percentage (%)
Total number of questionnaires distributed	1840	100
Total number of questionnaires returned	1298	71
Total number of returns useful for analysis	1181	64
Total number of returns unsuitable for analysis	117	7

The sample size of the present study compared to the sample sizes of prior studies discussed in Chapter Three seemed highly satisfactory, as its usable response rate is 64% (Sahu 2007; Filiz 2007; Sinyenyeko-Sayo 2007; Woo 2005). A 64% response rate was considered satisfactory, indicating the active participation of about two-thirds of the customers in the sample, who returned completed questionnaires.

### 6.2.2 Profile of the respondents

At the initial phase of the survey, to form an idea about the constitution of the respondent sample, profiles of the respondents involved in the study were developed. These profiles were formed using information available regarding the socio-demographic attributes of

the sample that was relevant to the service quality perceptions of the selected person, as opposed to perceptions on satisfaction.

Of the total number of respondents, 50.8% were male, while 49.1% were female, and 0.1% contained missing values. In terms of user category, 66% of them were undergraduate students, 10.1% were postgraduate students, and 23.9% were academic staff members. The majority of the respondents were from the University of Sri Jayewardenepura (33%), even though the University of Colombo had the largest population size. On the basis of regularity of library visits, 57% of them use the library every day, while 35.5% use the library 1-3 days a week. There were no non-library customers among the respondents in the study.

On the basis of the outcome mentioned above, one could infer that the characteristic of relatively high use of the library was indicative of the customers' familiarity and/or knowledgeability with the services, and this characteristic was therefore considered in this study as indicative of sufficient capability among those respondents to evaluate the service quality of the library. The majority of the respondents use the library for the purpose of obtaining information (71%). The demographic characteristics of the sample appear highly consistent with the population of universities in Sri Lanka and comparatively close to the overall characteristics depicted in university statistics (University Grants Commission of Sri Lanka Statistics 2007).

### **6.3 PROCEDURE USED FOR MODEL BUILDING AND ANALYSIS**

The following procedure was used to develop the provisional model and the analysis.

#### **6.3.1 Development of provisional models**

As discussed in the conceptual and contextual reviews, researchers have debated the merits and demerits of the disconfirmation and performance-only paradigms. In the specific context of library services, however, the researcher applying the quality attributes and domains identified in the exploratory part of the research proposed four provisional models in line with the final conceptual model. These provisional models

were based on the expectancy disconfirmation (gap) paradigm and performance-only paradigm, as illustrated in Models I, II III and IV in Figures 6.1, 6.4, 6.7 and 6.10, respectively. The purpose for developing the provisional model was to inquire and ascertain which of the models chosen presented the highest correlation with customer satisfaction assessments of library services in the university sector in Sri Lanka. Following a rigorous testing procedure, a highly acceptable model is presented as the final model.

Provisional Models I and II—as proposed by Grönroos (1992) and Parasuraman, Zeithaml and Berry (1985)—illustrate the disconfirmation (gap) theory that supports the notion that customers perceive service quality as a comparison between their perception on what a service should offer and their perception on the actual performance of the service. These two models interpret the definition of a perceived service quality of the library as the difference between customers' expectations of library services and their perceptions of the actual performance of the library service quality. Mathematically, the equation is expressed as  $SQ = (P_i - E_i)$ , where  $i$  is a service quality attribute and the sum is over  $k$  library service quality attributes for each quality domain.  $SQ$  is service quality,  $P_i$  is performance of a given attribute, and  $E_i$  is the customers' expectation of the same attribute. Provisional Models III and IV illustrate the performance-only theory as proposed by Cronin and Taylor (1992), which states that customer satisfaction is a function of performance of service quality attributes. Mathematically, it is  $SQ = f(P)$ , where  $SQ$  is service quality, and  $P$  is the performance of given quality attributes.

### **6.3.1.1 Construct measures**

According to the provisional models depicted in Figures 6.1, 6.4, 6.7 and 6.10, there were two basic constructs to be measured—service quality and customer satisfaction. The socio-demographic attributes and situational attributes were also measured to ascertain whether or not these attributes have any influence on customer satisfaction. To select appropriate measures, the expectation of customer satisfaction, the construct of customer satisfaction and situational attributes, wherever possible, were measured with single-item scales to

ensure measurement reliability (Churchill 1979). The manner in which the constructs used in the provisional models were operationalised is described below.

### **Operationalisation of the provisional models**

To identify the best parsimonious model, the constructs in the provisional models were operationalised in the following manner.

#### **1. Customer satisfaction**

Any construct can be measured either by a single item scale or by a multi-item scale. Most of the research studies in the field of customer satisfaction have utilised the multi-item scales more often, instead of the single items scales, to better represent customer satisfaction, which is a complex phenomenon (Kerlinger 1973: 536; Churchill 1979: 67; Gerbing & Anderson 1988: 186). Although some studies have adopted the single item measures and criticised the multi-item scales (Berkqvist & Rossiter 2007: 183; Drolet & Morrison 2001: 201; Tse & Wilton 1988), this study employed the multi-item scale to measure the construct, following the successful use of the multi-item scale by a large number of studies to devise a composite attribute to indicate overall customer satisfaction (Chin, Marcolin & Newsted 2003: 194). For this purpose, two questions were used, as described below.

##### **(i) Primary question**

*Overall, how would you rate your satisfaction with the library service of your university?*

In addition to this primary measure, the researcher directed a subsidiary question to the respondents to capture another aspect of customer satisfaction in relation to the impact of teaching and learning, on the premise that this aspect may be relatively absent from the primary question. This question attempts to identify the real value of a university library service in the context of customer satisfaction, interpreted in relation to the teaching and learning process of the university.

##### **(ii) The subsidiary question**

*How would you rate your satisfaction with the library service of your university in terms of its impact on your teaching and/or learning?*

The composite attribute that resulted from the amalgamation of these two questions was named “overall customer satisfaction”, which more correctly represented the construct of customer satisfaction in university libraries. These two questions were not weighed separately based on the importance of the concepts because both the primary and subsidiary questions were considered equally important to the study in the context of the teaching and learning environments of universities.

## **2. Service quality**

The exploratory study carried out in the first stage of the study identified 36 quality attributes that may impact customer satisfaction. These attributes were then narrowed down to quality categories, by clustering them into eight quality domains, as indicated in Chapter Five. Thus, the research used both quality attributes and/or domains for the analysis to determine the best model for predicting overall customer satisfaction. To enable this, the study utilised separate questions in the questionnaire for each quality attribute and quality domain identified in the analysis.

## **3. Situational attributes**

The situational attributes used in the provisional models are described below. The study employed customer experience, involvement and vagueness as situational attributes that may have significantly impacted the formation of customer satisfaction in university libraries.

### **(i) Customer experience**

Previous research measured experience in two different ways—either as knowledge of customers, or as familiarity of customers of a service or product (Patterson 2000). Experience is measured at the overall level using objective and subjective measures. Therefore, it is reasonable to hypothesise that the longer a customer has used library services, the more experienced he or she will be about library services. While the

knowledge regarding library service is referred to as the customers' perceptions of how much they know about this particular service (Scribner & Weun 2002), familiarity is considered to refer to the service-related experience of the customer (Alba & Hutchinson 1987). Thus, it can be argued that knowledge or familiarity basically denotes experience. However, the researcher used knowledge of customers in this study based on the premise that customers cannot be familiar with a service if they do not know about it. To measure the knowledge of customers, the statement given below was used to rate the statements made by the respondents. The rate was based on a Likert scale ranging from 1-5, where 1 = strongly agree and 5 = strongly disagree. The statement used was:

*I feel very knowledgeable about library services.*

(ii) Involvement

Involvement refers to the essentiality of the service. Thus, it was measured by a statement in which respondents could select an option ranging from 1 = strongly disagree to 5 = strongly agree. The statement used was:

*Library service is an essential service in my daily academic life.*

(iii) Vagueness

Vagueness of the assessment may be interpreted to refer to the ease or difficulty of evaluating the service. Thus, the researcher used ease as the positive concept for determining the vagueness of the service. The question used for this was a statement to which the respondents had the choice of selecting an option ranging from 1 = strongly disagree to 5 = strongly agree on the Likert scale. The statement was:

*It is very easy for me to evaluate service quality of my university library.*

#### **4. Socio-demographic attributes**

Member category, university, age and gender were used as socio-demographic attributes.

### 6.3.1.2 Overview of the attributes used for the provisional models

Identification and measurement of the factors affecting customer satisfaction are not straightforward, as there are many factors that are related to and may affect customer satisfaction. Therefore, these factors were arranged in a hierarchy.

1. There are measurable factors, which are related to customer satisfaction. These are called attributes. Each attribute corresponds to a question in the questionnaire, and these factors have been categorised into domains.
2. These domains have been aggregated into latent attributes, which reflect a relatively complex dimension of customer satisfaction that cannot be measured directly.
3. These latent attributes can be categorised into two groups according to their nature and explanatory power.
  - a. Explanatory attributes: These directly influence the customer satisfaction construct, that is, input factors.
  - b. Resultant attributes: They are the measures of customer satisfaction that represent the outcome.

Table 6.2 lists the latent attributes, domains and attributes of the provisional models. Each domain and attribute corresponds to a question in the questionnaire.

**TABLE 6.2: ATTRIBUTES IN THE PROVISIONAL MODELS**

Types	Latent attributes	Domains	Attributes
Explanatory attributes	Service quality	Responsiveness	<ul style="list-style-type: none"> <li>• Staff approachability</li> <li>• Complaint responsiveness</li> <li>• Cultural sensitivity</li> <li>• Courtesy of the staff</li> <li>• Personal attention to customers</li> <li>• Being informed about new services</li> </ul>
		Supportiveness	<ul style="list-style-type: none"> <li>• Supportive atmosphere</li> <li>• Staff knowledgeable</li> <li>• Promptness of the staff</li> </ul>



Types	Latent attributes	Domains	Attributes
		Building environment	<ul style="list-style-type: none"> <li>• Reflective and creative place</li> <li>• Helpful directional signs</li> <li>• Comfortable and inviting place</li> </ul>
		Collection and access	<ul style="list-style-type: none"> <li>• High quality information resources</li> <li>• Collection completeness</li> <li>• Convenient access to collections</li> <li>• Collection comprehensiveness</li> <li>• Current information</li> <li>• Needs-oriented resources</li> </ul>
		Furniture and facilities	<ul style="list-style-type: none"> <li>• Good sanitary facilities</li> <li>• Convenient opening hours</li> <li>• Good ventilation</li> <li>• Good functional furniture</li> <li>• Good lighting</li> <li>• Quick reshelving</li> <li>• Quietness in the library</li> </ul>
		Technology	<ul style="list-style-type: none"> <li>• Air-conditioning</li> <li>• Access to computers</li> <li>• Audiovisual equipment in good condition</li> <li>• Error-free records in the systems</li> </ul>
		Service delivery	<ul style="list-style-type: none"> <li>• E-journal access</li> <li>• Remote access</li> <li>• Customer education programmes</li> <li>• Library guides</li> </ul>
		Web services	<ul style="list-style-type: none"> <li>• Well-organised Web site</li> <li>• Useful library Web site</li> <li>• Accurate OPAC</li> </ul>
	Socio-demographic	Socio-demographic	<ul style="list-style-type: none"> <li>• Gender</li> <li>• Age</li> <li>• University</li> <li>• Customer category</li> </ul>
	Situational	Situational	<ul style="list-style-type: none"> <li>• Knowledge</li> <li>• Involvement</li> <li>• Vagueness</li> </ul>

Types	Latent attributes	Domains	Attributes
Resultant attributes	Overall customer satisfaction	Customer satisfaction	<ul style="list-style-type: none"> <li>• Satisfaction with overall service</li> <li>• Impact on Teaching and Learning</li> </ul>

Source: Compilation by author

#### 6.4 PROVISIONAL MODEL ANALYSIS

The primary interest of the provisional model analysis was to test whether the provisional models have acceptable statistical fitness. In other words, this provisional analysis was designed to determine how well the model describes the sampled data. Since Provisional Models I and III were particularly based on the attributes and domains, two research questions were used to analyse the models.

1. Do individual quality attributes predict their respective quality domains?
2. If individual quality attributes predict their respective quality domains, do these quality domains predict overall customer satisfaction?

Provisional Models II and IV however, were developed on the premise that individual quality attributes directly influence customer satisfaction. As a result, these models did not have any domains, as in the other provisional models. Instead, these models particularly addressed a specific research question only:

*Do individual quality attributes predict overall customer satisfaction?*

A model analysis was conducted with two multivariate statistical analyses to build regression models to represent the provisional models—that is, multiple linear regression and binomial logistic regression techniques. These techniques were used to determine the strength of the relationships between the independent and dependent attributes.

1. Multiple linear regression analysis (MLRA)

The relationship between independent attributes and the dependent attributes examined here was taken to be linear. A number of multiple regression analyses were run to

determine the strength of the predictor attributes and their respective domains, and finally, the domains and overall customer satisfaction. For all regression analyses, an automated stepwise regression selection procedure was applied to identify the best model.

## 2. Binomial logistic regression analysis (BLRA)

BLRA models were fitted into a backward stepwise method, and the results of each analysis were examined separately to ascertain the best model for predicting customer satisfaction, assuming non-linear functionality between the constructs of customer satisfaction and service quality. Binomial logistic regression was used to examine the binary dependent attribute (satisfied and unsatisfied) and the set of independent attributes. This study therefore used a binary dependent attribute for the use of BLRA in decoding the satisfaction attribute used for the MLRA, as depicted in Table 6.3.

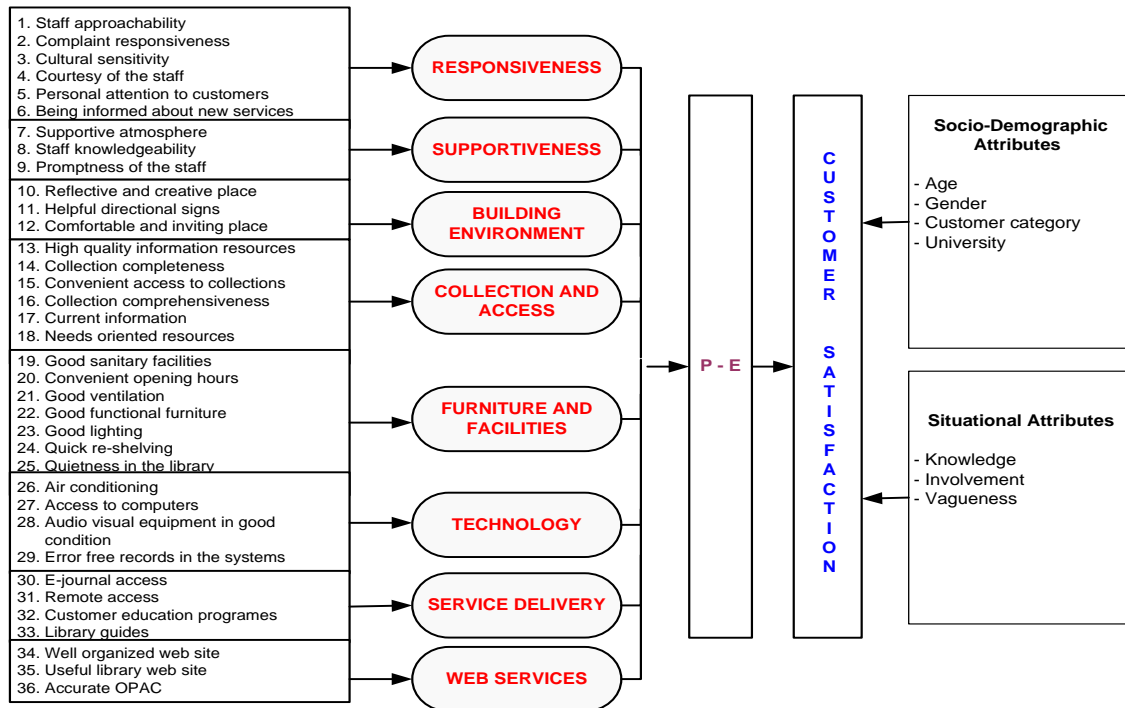
## **6.5 MODEL BUILDING AND ANALYSIS – PROVISIONAL MODEL I**

This section principally consists of two subsections. In subsection 6.5.1, Provisional Model I was developed based on the conceptual model and the attribute hierarchy described in Table 6.5.2. The next subsection discusses the data analysis aimed to assess model fitness. This assessment was primarily employed to examine the extent to which the provisional model was adequately represented by the observed attributes and/or domains, particularly when tested to ascertain the extent to which Provisional Model I describes the data in the sample.

### **6.5.1 Provisional Model I**

This model depicted below in Figure 6.1 indicates that customer satisfaction within each domain of service quality is a function of the gaps between the expectation and performance in the quality attributes within that domain. Moreover, the model explicates further by elucidating that these domains are significant predictors of customer satisfaction.

**FIGURE 6.1: PROVISIONAL MODEL I**



P-E = Performance – Expectation

Source: Compilation by author

### 6.5.2 Model Analysis – Provisional Model I

As described in section 6.5, Provisional Model I was analysed based on the research questions and standard statistical techniques, as given in Section 6.3 above.

**QUESTION:** Do gap scores of quality attributes predict their respective quality domains?

This question was addressed through two different standard statistical techniques: MLRA and BLRA.

#### 6.5.2.1 MLRA for quality domains

In this analysis, MLRA was used to determine the strength of the 36 quality attributes in their respective domains. Eight regression tests were carried out, one for each of the eight domains. The results are:

## 1. Responsiveness

Six attributes—staff approachability, complaint responsiveness, cultural sensitivity, courtesy of the staff, personal attention to customers and informing customers about new services—were entered into the regression. The best regression model that emerged from the analysis contained only four attributes: staff approachability, cultural sensitivity, personal attention to customers, and being informed about new services, as indicated in Table 6.3. The remaining two attributes were insignificant. The explanatory power of the model as reported by the adjusted  $R^2$  value was 0.061, which suggests that only 6.1% of the variability in the responsiveness domain was predicted by these four independent attributes in the linear regression mode. The analysis showed that the final model, with responsiveness as the dependent attribute, was statistically significant ( $F = 17.778$ ) at  $p < 0.001$ .

**TABLE 6.3: PROVISIONAL MODEL I - RESULTS OF MLRA ANALYSIS FOR RESPONSIVENESS DOMAIN**

Attribute	B	S.E	Beta	t	Tolerance	VIF
C	3.028	.056		54.502		
Staff approachability	-.163	.033	-.158*	-4.920	.873	1.145
Being informed about new services	.105	.028	.114*	3.758	.985	1.015
Cultural sensitivity	-.107	.037	-.093*	-2.918	.892	1.121
Personal attention to customers	.066	.028	.073*	2.374	.958	1.044

C-Constant value of the regression equation, B-Unstandardised Beta coefficient, S.E.-Unstandardised Standard Error, Beta-Standardised Beta coefficient, t-t value

\* $p < 0.05$

Staff approachability and cultural sensitivity have negatively correlated with responsiveness. If it is easy to approach the library and staff cultural sensitivity is good, customers' satisfaction in regard to the responsiveness of the library staff declines. This implies that approachability and cultural sensitivity may inversely cause higher responsiveness of library staff.

To test the influence of multicollinearity, two diagnostic tests, tolerance and Variance of Inflation Factor (VIF), were performed. According to Table 6.4, the relatively high values of tolerance—which were almost close to 1 (Tolerance = 1)—and relatively low value of VIF—which is below <2.0—suggested a low level of colinearity. It indicates that there is no effect of multicollenearity in relation to the independent attributes produced by the regression model.

## 2. Supportiveness

The result of the regression analysis, with supportiveness as the dependent attribute, is summarised in Table 6.4. The final regression model was significant at  $p < 0.001$  ( $F = 11.994$ ), with all attributes entered into the analysis. The explanatory power of the model as reported by adjusted  $R^2$  was 0.027, which indicates that only 2.7% of the variability in the supportiveness could be explained by the three attributes produced in the final model.

**TABLE 6.4: PROVISIONAL MODEL I - RESULTS OF MLRA ANALYSIS FOR SUPPORTIVENESS DOMAIN**

Attribute	B	S.E	Beta	t	Tolerance	VIF
C	3.647	.042		87.472		
Supportive atmosphere	.120	.024	.148*	5.051	.983	1.018
Staff knowledgeability	.069	.022	.095*	3.104	.901	1.110
Promptness of the staff	-.062	.026	-.074*	-2.393	.888	1.127

C-Constant value of the regression equation, B-Unstandardised Beta coefficient, S.E.-Unstandardised Standard Error, Beta-Standardised Beta coefficient, t-t value

\* $p < 0.05$

Positive beta coefficients regarding supportive atmosphere and staff knowledgeability ( $\beta = 0.148$ ,  $t = 5.051$ ,  $p > 0.001$ ;  $\beta = 0.095$ ,  $t = 3.104$ ,  $p > 0.05$ ) suggest that the support customers receive from the library is more likely to depend on the supportive atmosphere and knowledgeable staff of the library, who are more likely to help customers than those who are less knowledgeable and supportive. Tolerance and VIF values are in the acceptable region, which implies that there are no issues regarding multicollinearity of independent attributes.

### 3. Building Environment

Table 6.5 shows the results of the linear regression analysis of attributes, with building environment as the independent attribute. The F-test of the regression model was found to be significant ( $F = 98.580$ ) at the level of  $p < 0.001$ . Three attributes were entered into the test, and only one attribute—reflective and creative place—was excluded from the final regression model due to its non-significance. Only 14.5% of the variance in building environment was accounted for by the predictor attributes, as reported by the adjusted  $R^2$  (0.145).

**TABLE 6.5: PROVISIONAL MODEL I - RESULTS OF MLRA ANALYSIS FOR BUILDING ENVIRONMENT DOMAIN**

Attribute	B	S.E	Beta	t	Tolerance	VIF
C	3.465	.024		144.376		
Comfortable and inviting place	.220	.019	.443*	11.318	.487	2.054
Helpful directional signs	-.040	.017	-.090*	-2.310	.487	2.054

C-Constant value of the regression equation, B-Unstandardised Beta coefficient, S.E.-Unstandardised Standard Error, Beta-Standardised Beta coefficient, t-t value

\* $p < 0.05$

The positive beta coefficient on comfortable and inviting place indicates that if the library is a comfortable and inviting place, customers are satisfied with its building environment. No multicollinearity of the model was found, as reported by tolerance and VIF values.

### 4. Collection and Access

High quality information resources, collection completeness, convenient access to collections, collection comprehensiveness, current information and needs-oriented resources were features incorporated into the analysis. Excepting high quality information resources, the other features were significant in the regression model for collection and access, as indicated in Table 6.6. The overall F of the model was also significant at  $p < 0.001$  ( $F = 64.285$ ). The explanatory power of the regression model as reported by the adjusted  $R^2$  was 0.220, which indicates that 22% of the variability in the

collection and access could be explained by the five independent attributes depicted in Table 6.6.

**TABLE 6.6: PROVISIONAL MODEL I - RESULTS OF MLRA ANALYSIS FOR COLLECTION AND ACCESS DOMAIN**

Attribute	B	S.E	Beta	t	Tolerance	VIF
C	3.636	.020		178.159		
Current information	.134	.018	.232*	7.429	.716	1.397
Convenient access to collections	.095	.013	.206*	7.274	.866	1.155
Needs-oriented resources	.113	.014	.247*	7.850	.701	1.427
Collection comprehensiveness	.064	.013	.140*	4.778	.815	1.227
Collection completeness	.036	.014	.070*	2.556	.937	1.068

C-Constant value of the regression equation, B-Unstandardised Beta coefficient, S.E.-Unstandardised Standard Error, Beta-Standardised Beta coefficient, t-t value

\*p <0.05

The positive beta coefficients of the attributes disclosed that current information, convenient access to collection, needs-oriented resources, collection comprehensiveness and completeness are more likely to lead to customers' satisfaction with the collection and access of a library.

## 5. Furniture and Facilities

Seven predictors in the domain of furniture and facilities were entered into a regression equation, with furniture and facilities as the dependent attribute. As Table 6.7 indicates, the final regression model was found to be statistically significant ( $F=107.001$ ) at  $p<0.001$ . According to the adjusted  $R^2$  of the regression model, the explanatory power of the model was 0.371, which indicates that 37% of the variability in the furniture and facilities domain could be explained by convenient opening hours, good ventilation, good functional furniture, good lighting, quick reshelving and quietness in the library.



**TABLE 6.7: PROVISIONAL MODEL I - RESULTS OF MLRA ANALYSIS FOR FURNITURE AND FACILITIES DOMAIN**

Attribute	B	S.E	Beta	t	Tolerance	VIF
C	3.410	.026		131.985		
Good ventilation	.138	.012	.327*	11.715	.750	1.334
Good functional furniture	.125	.012	.254*	10.125	.928	1.077
Quietness in the library	.087	.013	.176*	6.904	.898	1.114
Good lighting	.100	.013	.205*	7.978	.887	1.128
Quick reshelving	.088	.013	.181*	6.772	.819	1.221
Convenient opening hours	.020	.010	.051*	2.050	.926	1.080

C-Constant value of the regression equation, B-Unstandardised Beta coefficient, S.E.-Unstandardised Standard Error, Beta-Standardised Beta coefficient, t-t value

\*p <0.05

Positive beta coefficients indicate that the customers’ satisfaction with furniture and facilities in a library were based on good conditions of ventilation, good functional furniture, quietness, good lighting, quick reshelving and convenient opening hours. No issues pertaining to multicollinearity were found due to the acceptable levels of the tolerance and VIF values.

## 6. Technology

Table 6.8 reports the results of the regression analysis of attributes in the technology domain. Four attributes were entered: air-conditioning, access to computers, audiovisual equipment in good condition, and error-free records in the systems. Except for audiovisual equipment in good condition, the other three attributes were significant in the final regression model. The overall F-test of the model was highly significant, at  $p < 0.001$  ( $F = 95.268$ ). The proportion of shared variance was calculated by the adjusted  $R^2$ , and its value was 0.197. This indicates that 19.7% of the variance in the technology domain was accounted for by three predictor attributes, illustrated in Table 6.9.

**TABLE 6.8: PROVISIONAL MODEL I - RESULTS OF MLRA ANALYSIS FOR TECHNOLOGY DOMAIN**

Attribute	B	S.E	Beta	t	Tolerance	VIF
C	3.996	.015		259.172		
Air-conditioning	.129	.011	.328*	11.971	.927	1.079
Access to computers	.100	.009	.306*	11.075	.912	1.096
Error-free records in the systems	.050	.011	.136*	4.776	.864	1.157

C-Constant value of the regression equation, B-Unstandardised Beta coefficient, S.E.-Unstandardised Standard Error, Beta-Standardised Beta coefficient, t-t value

\*p < 0.05

As reported in the above table, relatively high scores of tolerance and low scores of VIF indicate that no multicollinearity problem arises among the independent attributes.

## 7. Service delivery

E-journal access, remote access, customer education programmes and library guides were entered into the regression equation, and all four attributes were significant, as indicated in Table 6.9. The overall F statistics value of the model (86.969) proved that the model is significant at  $p < 0.001$ , indicating a strong relationship between independent and dependent attributes. The explanatory power as reported by the adjusted  $R^2$  was 0.234, which specified that predictor attributes could explain 23.4% of the variability in the domain of service delivery.

**TABLE 6.9: PROVISIONAL MODEL I - RESULTS OF MLRA ANALYSIS FOR SERVICE DELIVERY DOMAIN**

Attribute	B	S.E	Beta	t	Tolerance	VIF
(Constant)	3.474	.023		148.708		
E-journal access	.168	.013	.336*	12.487	.941	1.062
Library guides	.123	.013	.257*	9.285	.887	1.128
Remote access	.077	.011	.189*	7.081	.955	1.047
Customer education programmes	.041	.013	.086*	3.097	.875	1.143

C-Constant value of the regression equation, B-Unstandardised Beta coefficient, S.E.-Unstandardised Standard Error, Beta-Standardised Beta coefficient, t-t value

\*p < 0.05

The strongest predictor was e-journal access ( $\beta=0.336$ ,  $t=12.478$ ,  $p>0.001$ ), which indicates that the provision of e-journal access mainly influenced customer satisfaction, with service delivery in libraries. A multicollinearity problem was not found in the model due to acceptable tolerance and VIF values.

## 8. Web Services

A well-organised Web site, useful library Web site and accurate OPAC were entered into the regression equation, but only useful library Web site was included in the final regression model. Table 6.10 summarises the results of the multiple regression analysis of the Web services domain. The F statistics of the final model indicates that the model is significant ( $F=189.006$ ) at  $p<0.001$ . The adjusted  $R^2$  value was 0.143, suggesting that the predictor attribute was able to explain 14.3% of the variation in the dependent attributes of Web services.

**TABLE 6.10: PROVISIONAL MODEL I - RESULTS OF MLRA ANALYSIS FOR WEB SERVICES DOMAIN**

Attribute	B	S.E	Beta	t	Tolerance	VIF
(Constant)	3.412	.020		174.374		
Useful library Web site	.182	.013	.379*	13.748	1.000	1.000

C-Constant value of the regression equation, B-Unstandardised Beta coefficient, S.E.-Unstandardised Standard Error, Beta-Standardised Beta coefficient, t-t value

\* $p<0.05$

The positive beta coefficient of the useful library Web site is  $\beta=0.379$  (and  $t=13.748$ ,  $p>0.001$ ), which indicates that if a useful library Web site is available in the library, customers are more likely to be satisfied with libraries with Web services, rather than those without library Web sites. Tolerance and VIF attributes were also at the level of acceptance.

### 6.5.2.2 BLRA for quality domains

BLRA analysis was also used to determine the strength of quality attributes in the respective quality domains, with the assumption of non-linearity among the attributes. A

total of eight BLRA tests for each quality domain were carried out, and the reported results are presented in Table 6.12.

### 1. Responsiveness

The relationships between six individual predictor attributes and responsiveness as the dependent attribute were examined by BLRA. The results indicate that four of the six attributes were significant predictors of responsiveness satisfaction, while only two failed to predict. Table 6.11 summarises the results.

**TABLE 6.11: PROVISIONAL MODEL I - RESULTS OF BLRA ANALYSIS FOR RESPONSIVENESS DOMAIN**

Attribute	B	S.E	Wald	Exp(B)	95% CI	
Staff approachability	-.398	.073	30.009	.672*	.582	.774
Complaint responsiveness	.264	.101	6.896	1.303*	1.069	1.587
Cultural sensitivity	-.326	.084	15.052	.722*	.612	.851
Being informed about new services	.278	.064	18.785	1.321*	1.165	1.497

B-Beta coefficient, S.E.-Standard Error of B, Wald-Wald statistics, Exp(B)-Odd ratio, CI-Confidence interval

\*p <0.05

The overall model for responsiveness was not significant, as reported by the Hosmer and Lemeshow Test Value  $X^2= 14.355$ , manifesting a p-value of 0.073. The -2 Log likelihood statistics were 1154.628, and Cox and correctness were 78%.

### 2. Supportiveness

No attribute was selected for the final regression model analysed by BLRA.

### 3. Building Environment

Of the three attributes tested, two attributes were found to be significant, as depicted in Table 6.12. Only one attribute failed to predict satisfaction for building environment—comfortable and inviting place. The overall model was significant, as reported by the Hosmer and Lemeshow Test Value  $X^2= 16.776$  and exhibiting the p-value of 0.033. The -

2 Log likelihood statistic was 1255.823, the Cox & Snell R<sup>2</sup> value was .083, and correctness was 73.2%.

**TABLE 6.12: PROVISIONAL MODEL I - RESULTS OF BLRA ANALYSIS FOR BUILDING ENVIRONMENT DOMAIN**

Attribute	B	S.E	Wald	Exp(B)	95% CI	
Reflective and creative place	.464	.066	49.914	1.590*	1.398	1.808
Helpful directional signs	.233	.050	21.309	1.262*	1.143	1.393

B-Beta coefficient, S.E.-Standard Error of B, Wald-Wald statistics, Exp(B)-Odd ratio, CI-Confidence interval

\*p <0.05

Reflective and creative place emerged as the strongest significant predictor, resulting in it being 1.6 times more likely to provide satisfaction with building environment in libraries, compared to those not featuring reflective and creative places.

#### 4. Collection and Access

As per Table 6.13, of the six attributes tested in the collection and access domain, five attributes remained significant, and only one was not significant. The overall regression model for the domain of collection and access was significant, as conveyed by the Hosmer and Lemeshow Test value  $X^2 = 23.977$ , exhibiting the p-value 0.002. The -2 Log likelihood statistics were 1280.536, the Cox & Snell R<sup>2</sup> value was .205, and the correctness of the regression model was 71.7%.

**TABLE 6.13: PROVISIONAL MODEL I - RESULTS OF BLRA ANALYSIS FOR COLLECTION AND ACCESS DOMAIN**

Attribute	B	S.E	Wald	Exp(B)	95% CI	
Collection completeness	.207	.059	12.270	1.230*	1.095	1.380
Convenient access to collections	.474	.059	63.828	1.606*	1.430	1.804
Collection comprehensiveness	.280	.058	23.388	1.323*	1.181	1.483
Current information	.439	.075	34.251	1.551*	1.339	1.797
Needs-oriented resources	.371	.062	35.599	1.449*	1.283	1.637

B-Beta coefficient, S.E.-Standard Error of B, Wald-Wald statistics, Exp(B)-Odd ratio, CI-Confidence interval

\*p <0.05

The convenient access to collection manifested an odds ratio of 1.6, which means that if the library provides convenient access to the collection, it is 1.6 times more likely to satisfy customers in terms of access and collection.

## 5. Furniture and Facilities

Of the seven attributes tested in the furniture and facilities domain for customer satisfaction, six attributes remained significant, as indicated in Table 6.14. Convenient opening hours was the only non-significant attribute. The overall regression model for the domain was significant, as the Hosmer and Lemeshow Test Value was  $X^2 = 15.814$  at  $p < 0.05$ . The -2 Log likelihood statistics were 1149.979, the Cox & Snell  $R^2$  value was .273, and the correctness was 72.7%.

**TABLE 6.14: PROVISIONAL MODEL I - RESULTS OF BLRA ANALYSIS FOR FURNITURE AND FACILITIES DOMAIN**

Attribute	B	S.E	Wald	Exp(B)	95% CI	
Good sanitary facilities	.151	.072	4.442	1.164	1.011	1.340
Good ventilation	.416	.058	51.064	1.516	1.352	1.699
Good functional furniture	.337	.062	29.736	1.401	1.241	1.582
Good lighting	.341	.062	30.513	1.406	1.246	1.586
Quick reshelving	.474	.066	51.472	1.606	1.411	1.828
Quietness in the library	.448	.063	50.550	1.565	1.383	1.770

B-Beta coefficient, S.E.-Standard Error of B, Wald-Wald statistics, Exp(B)-Odd ratio, CI-Confidence interval

\* $p < 0.05$

Quick reshelving was the strongest and most significant predictor of furniture and facilities satisfaction in libraries. Quick reshelving was more than 1.6 times likely than delayed reshelving to contribute to furniture and facilities satisfaction in libraries.

## 6. Technology

Of the four attributes tested for the technology domain, two attributes failed to predict satisfaction with technology. The attributes that were discarded from the regression model include good air-conditioning and access to computers. The model produced a Hosmer and Lemeshow test  $X^2$  value of 4.095, manifesting an insignificant p-value of

0.664, thus providing evidence that the final regression model does not fit the data. The -2 Log likelihood statistics were 1393.469, the Cox & Snell R<sup>2</sup> value was .026, and the correctness was 69.1%.

**TABLE 6.15: PROVISIONAL MODEL I - RESULTS OF BLRA ANALYSIS FOR TECHNOLOGY DOMAIN**

Attribute	B	S.E	Wald	Exp(B)	95% CI	
Audiovisual equipment in good condition	.146	.048	9.372	1.157*	1.054	1.270
Error-free records in the systems	-.246	.054	20.486	.782*	.703	.870

B-Beta coefficient, S.E.- Standard Error of B, Wald-Wald statistics, Exp(B)-Odd ratio, CI-Confidence interval

\*p <0.05

## 7. Service Delivery

Of the four attributes tested for service delivery, only three remained significant at the domain level, as exhibited in Table 6.16. The attribute excluded from the final model was customer education programmes.

**TABLE 6.16: PROVISIONAL MODEL I - RESULTS OF BLRA ANALYSIS FOR FURNITURE AND FACILITIES DOMAIN**

Attribute	B	S.E	Wald	Exp(B)	95% CI	
E-journal access	.431	.060	50.974	1.539*	1.367	1.733
Remote access	.117	.048	6.047	1.125*	1.024	1.235
Library guides	.363	.059	37.679	1.438*	1.281	1.615

B-Beta coefficient, S.E.-Standard Error of B, Wald-Wald statistics, Exp(B)-Odd ratio, CI-Confidence interval

\*p <0.05

However, the overall model for the domain of service delivery was not significant, as reported by the Hosmer and Lemeshow test. The X<sup>2</sup> value was 14.312 at p=0.074. The -2 Log likelihood statistics were 1231.325, the Cox & Snell R<sup>2</sup> value was .085, and the correctness was 72.5%. The availability of e-journals is over 1.5 times more likely than non-availability to satisfy customers with the technology domain of the library.

## 8. Web Services

Of the three Web Services attributes tested, two were found to be significant, as indicated in Table 6.17, and only one failed to predict satisfaction towards Web Services—a well-organised Web site. However, the overall regression model fit was poor because the Hosmer and Lemeshow test  $X^2$  value was 7.418, manifesting a non-significant p-value of 0.492. The -2 Log likelihood statistics were 414.757, the Cox & Snell  $R^2$  value was .037, and the correctness was 94%.

**TABLE 6.17: PROVISIONAL MODEL I - RESULTS OF BLRA ANALYSIS FOR WEB SERVICES DOMAIN**

Attribute	B	S.E	Wald	Exp(B)	95% CI	
Useful library Web site	.504	.095	28.116	1.656*	1.374	1.996
Accurate OPAC	.348	.125	7.711	1.417*	1.108	1.812

B-Beta coefficient, S.E.-Standard Error of B, Wald-Wald statistics, Exp(B)-Odd ratio, CI-Confidence interval

\*p <0.05

**QUESTION:** If gap scores of individual quality attributes predict their respective quality domains, do these quality domains predict overall customer satisfaction?

### 6.5.2.3 MLRA for quality domains with overall customer satisfaction

As the gap scores of individual quality attributes were able to predict their corresponding quality domains in the MLRA, the analysis was continued to uncover the quality domains, which can be significant predictors of overall customer satisfaction using the same statistical technique.

Table 6.18 summarises the results of MLRA. The overall F-test for the final regression model was found to be statistically significant ( $F= 94.669$ ) at  $p<0.001$ . The adjusted  $R^2$  value was 0.295, which indicates that the predictor attributes—collection, furniture, supportiveness, service delivery and building environment—explained only 30% of the variation in overall customer satisfaction.



**TABLE 6.18: PROVISIONAL MODEL I - RESULTS OF MLRA ANALYSIS ON  
CUSTOMER SATISFACTION AT DOMAIN LEVEL**

<b>Attribute</b>	<b>B</b>	<b>S.E</b>	<b>Beta</b>	<b>t</b>	<b>Tolerance</b>	<b>VIF</b>
C	3.607	.016		226.895		
Furniture and facilities	.132	.011	.330*	12.123	.850	1.176
Supportiveness	.078	.008	.259*	10.256	.987	1.014
Collection and access	.095	.011	.228*	8.865	.951	1.051
Service delivery	.068	.010	.174*	6.786	.957	1.045
Building environment	-.016	.008	-.056*	-2.074	.875	1.143

C-constant value of the regression equation, B-Unstandardised Beta coefficient, S.E.-Unstandardised Standard Error, Beta-Standardised Beta coefficient, t-t value

\*p < 0.05

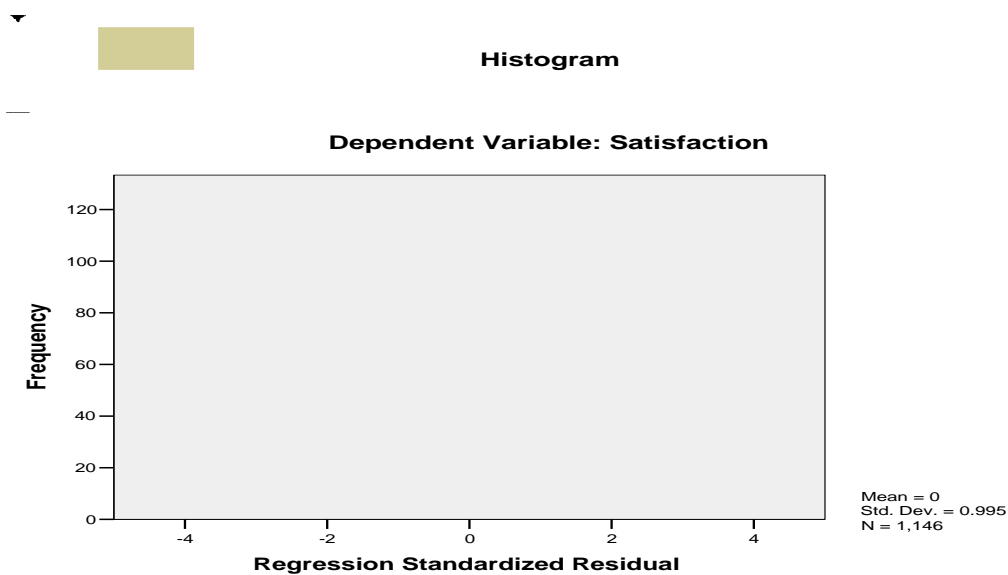
The regression equation suggests that overall customer satisfaction was significantly related to collection and access ( $\beta=0.228$ ,  $t=8.886$ ,  $p>0.001$ ), furniture and facilities ( $\beta=0.330$ ,  $t=12.123$ ,  $p>0.001$ ), supportiveness ( $\beta=0.259$ ,  $t=10.256$ ,  $p>0.001$ ), service delivery ( $\beta=0.174$ ,  $t=6.786$ ,  $p>0.001$ ), and building environment ( $\beta=-0.056$ ,  $t=-2.074$ ,  $p>0.05$ ). The positive signs of beta coefficients of attributes indicate that furniture and facilities, supportiveness, collection and access, and service delivery—as measured by customers—tend to attract higher customer satisfaction than other attributes. The negative coefficient of building and environment indicates that the customers are not significantly concerned about this domain, and if the building and environment is at the level of higher customer satisfaction, customers tend to demonstrate less overall satisfaction.

The relative importances of the attributes were indicated by their standardised beta coefficients. According to the final regression model indicated in Table 6.18, the absolute value of the beta coefficient for furniture and facilities is the highest (0.330), which indicates that Furniture and Facilities is the strongest predictor of customer satisfaction, though the general belief of the customers is that collection and access would be the strongest predictor. The attribute of collection and access was in third place, next to supportiveness.

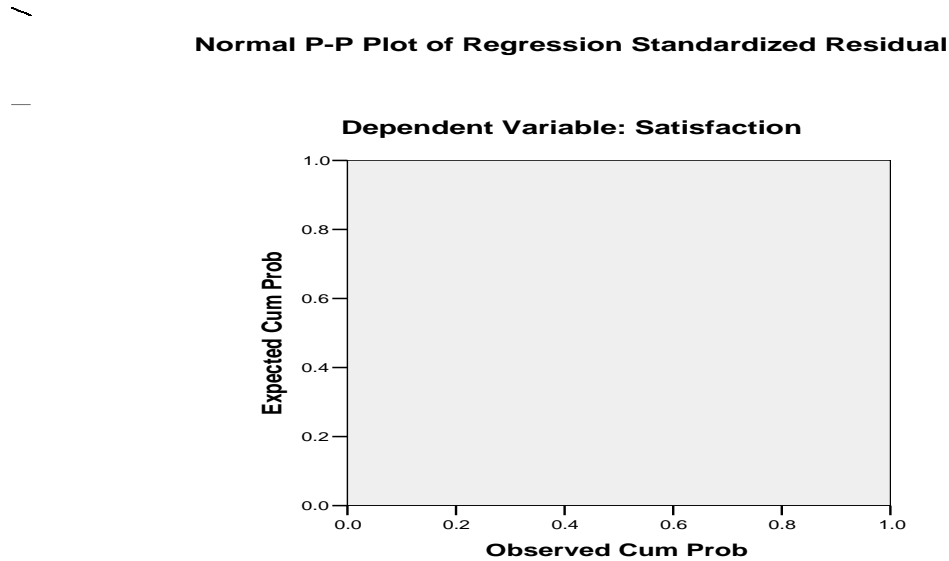
### Residual analysis

A residual analysis was conducted to establish the validity of the regression model (Field 2005). The histogram for the standardised residuals depicted in Figure 6.2 suggests normality of the data. Figure 6.3 also suggests that the normal probability plot also lies close to a straight line, indicating that residuals are approximately normally distributed. Thus, the results explicate that the regression model is valid and robust.

**FIGURE 6.2: HISTOGRAM OF STANDARDISED RESIDUALS OF QUALITY ATTRIBUTES ON CUSTOMER SATISFACTION IN MODEL I**



**FIGURE 6.3: NORMAL PROBABILITY PLOT OF STANDARDISED RESIDUALS OF QUALITY ATTRIBUTES ON CUSTOMER SATISFACTION IN MODEL I**



**6.5.2.4 BLRA for quality domains with overall customer satisfaction**

BLRA was used to determine the strength of quality attributes and their respective domains. Some quality domains were not significant in terms of the statistics on their goodness of fit. The supportiveness domain did not produce any significant attribute. In summary, the quality domains versus the statistical significance of the regression models are indicated as follows:

<b>Domain</b>		<b>Statistical significance</b>
Responsiveness	—————→	not significant
Supportiveness	—————→	no attributes selected
Building environment	—————→	significant
Collection and access	—————→	significant
Furniture and facilities	—————→	significant
Technology	—————→	not significant
Service delivery	—————→	not significant
Web services	—————→	not significant

Taking into consideration the overall circumstances, five domains out of eight were not significant, indicating their poor fit. Thus, the analysis used only the significant domains as predictor attributes with overall customer satisfaction as the dependent attribute to determine the best model. It produced only the building environment domain and the furniture and facilities domain as significant predictors of overall customer satisfaction, as indicated in Table 6.19.

**TABLE 6.19: PROVISIONAL MODEL I - RESULTS OF BLRA ANALYSIS ON CUSTOMER SATISFACTION AT DOMAIN LEVEL**

Attribute	B	S.E	Wald	Exp(B)	95% CI	
Building environment	.735	.075	95.623	2.086*	1.800	2.417
Furniture and facilities	.810	.114	50.236	2.248*	1.797	2.812

B-Beta coefficient, S.E.-Standard Error of B, Wald-Wald statistics, Exp(B)-Odd ratio, CI-Confidence interval

\*p <0.05

The overall fitness of the regression model was not significant, as reported by the Hosmer and Lemeshow test  $X^2$  value of 8.013 at  $p=0.331$ . The -2 Log likelihood statistics were 1080.236, the Cox and Snell  $R^2$  value was .197, and the correctness was 75.8%. Furniture and facilities was the strongest predictor, and the collection and Access domain was excluded from the model due to its non-statistical significance.

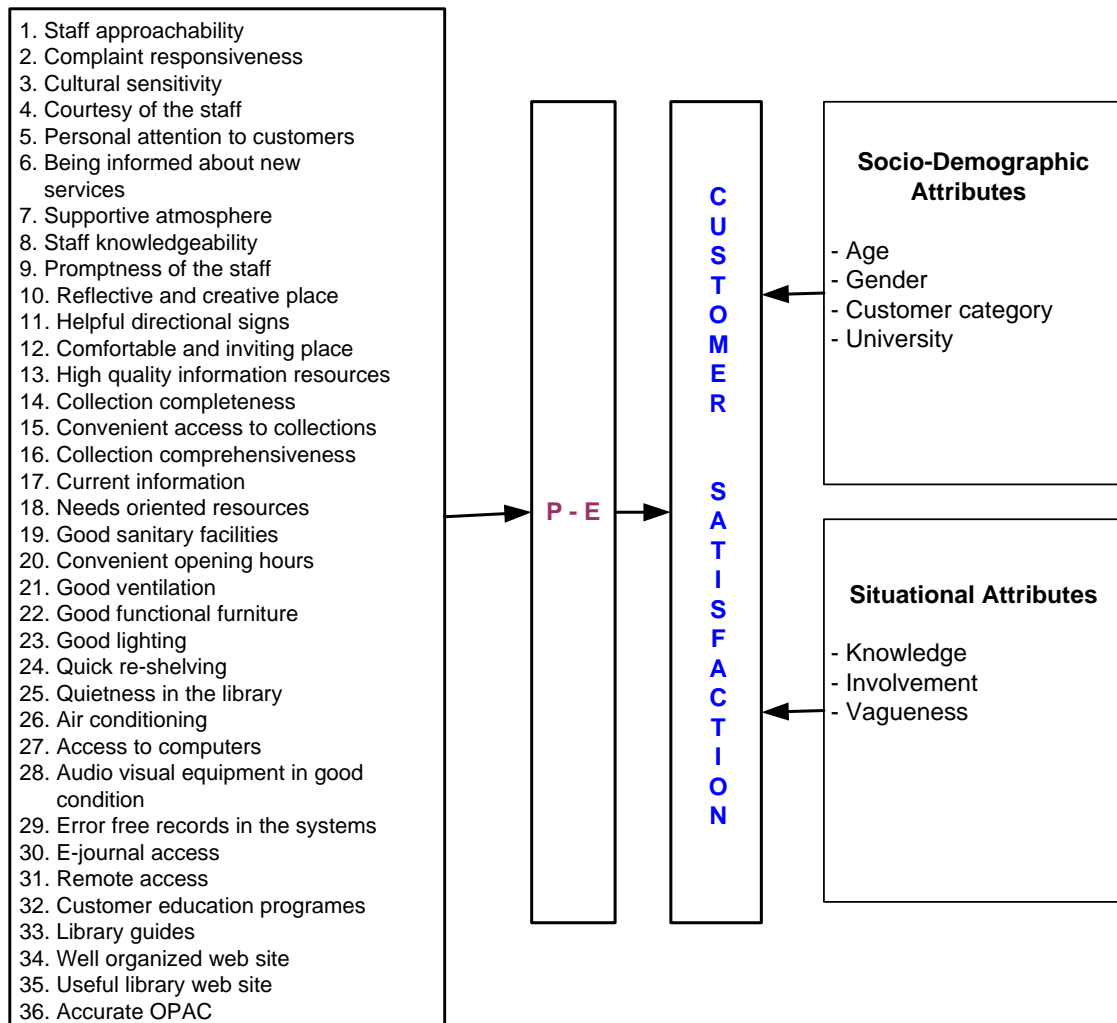
## **6.6 MODEL BUILDING AND ANALYSIS – PROVISIONAL MODEL II**

Provisional Model II is presented in Section 6.6.1, and the analysis of the model using MLRA and BLRA is depicted in Section 6.6.2.

### **6.6.1 Provisional Model II**

Figure 6.4 indicates that customer satisfaction is related to the gap scores between expectation and performance for the individual quality attributes. It does not point to any intermediate domains, for example, Model I, illustrated in Figure 6.1.

**FIGURE 6.4: PROVISIONAL MODEL II**



Source: Compilation by author

P-E = Performance – Expectation

### 6.6.2 Model analysis – Provisional Model II

Model analysis was carried out as per the research questions and statistical techniques given below.

**QUESTION:** Do gap scores of quality attributes predict overall customer satisfaction?

This question was also subjected to two different standard analytical techniques: multiple linear regression analysis (MLRA) and binomial logistic regression analysis (BLRA).

### 6.6.2.1 MLRA for overall customer satisfaction

Multiple regression tests were performed for the gap scores of all 36 quality attributes to measure the influence of these attributes on overall customer satisfaction.

**TABLE 6.20: PROVISIONAL MODEL II - RESULTS OF MLRA ANALYSIS ON CUSTOMER SATISFACTIONS AT ATTRIBUTE LEVEL**

Attribute	B	S.E	Beta	t	Tolerance	VIF
C	3.511	.018		198.979		
Need oriented resources	.048	.008	.209*	5.772	.709	1.411
Comfortable and inviting place	.044	.008	.181*	5.873	.983	1.018
Current information	.047	.011	.156*	4.424	.744	1.344
Good functional furniture	.035	.008	.138*	4.372	.932	1.073
High quality information	.030	.008	.117*	3.714	.943	1.061
Customer education programmes	.025	.009	.099*	2.686	.685	1.459
Quick reshelving	.028	.008	.116	3.603	.893	1.120
E-journal access	.024	.008	.094*	2.969	.919	1.088
Audiovisual equipment in good condition	.017	.009	.078*	2.044	.631	1.585

C-constant value of the regression equation, B-Unstandardised Beta coefficient, S.E.-Unstandardised Standard Error, Beta-Standardised Beta coefficient, t-t value

\*p <0.05

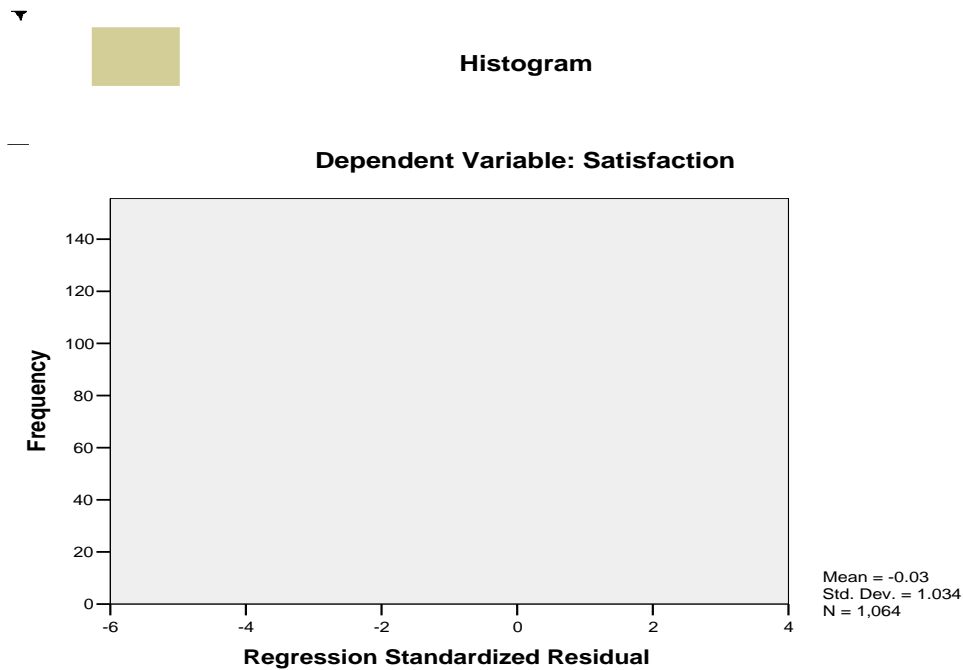
Table 6.21 summarises the results of the multiple regression analysis indicated by the final regression model, which was found to be statistically significant ( $F=30.865$ ) at  $p<0.001$ . As reported by the adjusted  $R^2$ , the explanatory power of the model indicates  $R^2 = 0.250$ , which demonstrates that 25% of the variability in the satisfaction model is explained by nine gap attributes. As shown in Table 6.20, customer satisfaction was most significantly related to needs-oriented resources ( $\beta=0.209$ ,  $t=5.772$ ,  $p>0.001$ ). The next most important attribute is comfortable and inviting place ( $\beta=0.181$ ,  $t=5.873$ ,  $p>0.001$ ), implying that a comfortable and inviting place has a high impact on customer satisfaction.

### Residual analysis

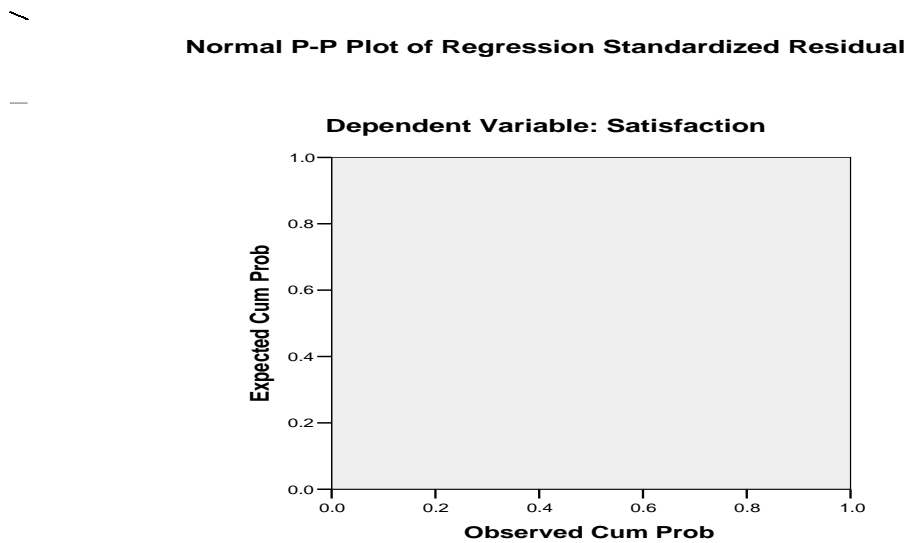
The normality of the residuals was checked by the normal probability plot of standardised residuals as depicted in Figures 6.5 and 6.6. A visual inspection of the normal probability

plot revealed that the residual plots were almost close to the normal straight diagonal line, suggesting that the residuals approximated normal distribution. Thus, the results confirmed the assumption that residuals were normally distributed. It particularly confirms the higher validity of the regression model.

**FIGURE 6.5: HISTOGRAM OF STANDARDISED RESIDUALS OF QUALITY ATTRIBUTES ON CUSTOMER SATISFACTION IN MODEL II**



**FIGURE 6.6: NORMAL PROBABILITY PLOT OF STANDARDISED RESIDUALS OF QUALITY ATTRIBUTES ON CUSTOMER SATISFACTION IN MODEL II**



#### **6.6.2.2. BLRA for overall customer satisfaction**

Of the 36 attributes tested for overall customer satisfaction, 23 attributes failed to predict overall customer satisfaction. The attributes that were discarded from the regression model include high quality resources, good sanitary facilities, convenient opening hours and so on. The significant attributes are indicated in Table 6.21. However, overall fitness of the model was poor, as shown by the Hosmer and Lemeshow test ( $X^2 = 4.425$ ,  $p=0.817$ ).



**TABLE 6.21: PROVISIONAL MODEL II - RESULTS OF BLRA ANALYSIS ON CUSTOMER SATISFACTIONS AT ATTRIBUTE LEVEL**

Attribute	B	S.E	Wald	Exp(B)	95% CI	
Staff approachability	-.222	.090	6.067	.801*	.672	.956
Personal attention to customers	.172	.078	4.814	1.187*	1.018	1.384
Helpful directional signs	.290	.064	20.559	1.337	1.179	1.516
Current information	.397	.109	13.289	1.488*	1.202	1.842
Needs-oriented resources	.186	.079	5.483	1.204*	1.031	1.407
Convenient opening hours	.243	.063	14.751	1.275	1.126	1.443
Good functional furniture	.201	.074	7.301	1.222*	1.057	1.414
Quick reshelving	.145	.075	3.762	1.157*	.998	1.340
Error-free records in the systems	-.288	.082	12.266	.749*	.638	.881
E-journal access	.343	.079	18.848	1.409*	1.207	1.644
Library guides	.269	.077	12.229	1.309*	1.126	1.522
Well-organised Web site	.149	.064	5.438	1.161*	1.024	1.316
Useful library Web site	.241	.071	11.528	1.272*	1.107	1.462

B-Beta coefficient, S.E.-Standard Error of B, Wald-Wald statistics, Exp(B)-Odd ratio, CI-Confidence interval

\*p <0.05

The -2 Log likelihood statistics were 777.900, the Cox & Snell R<sup>2</sup> value was 0.201, and the correctness was 74.1.

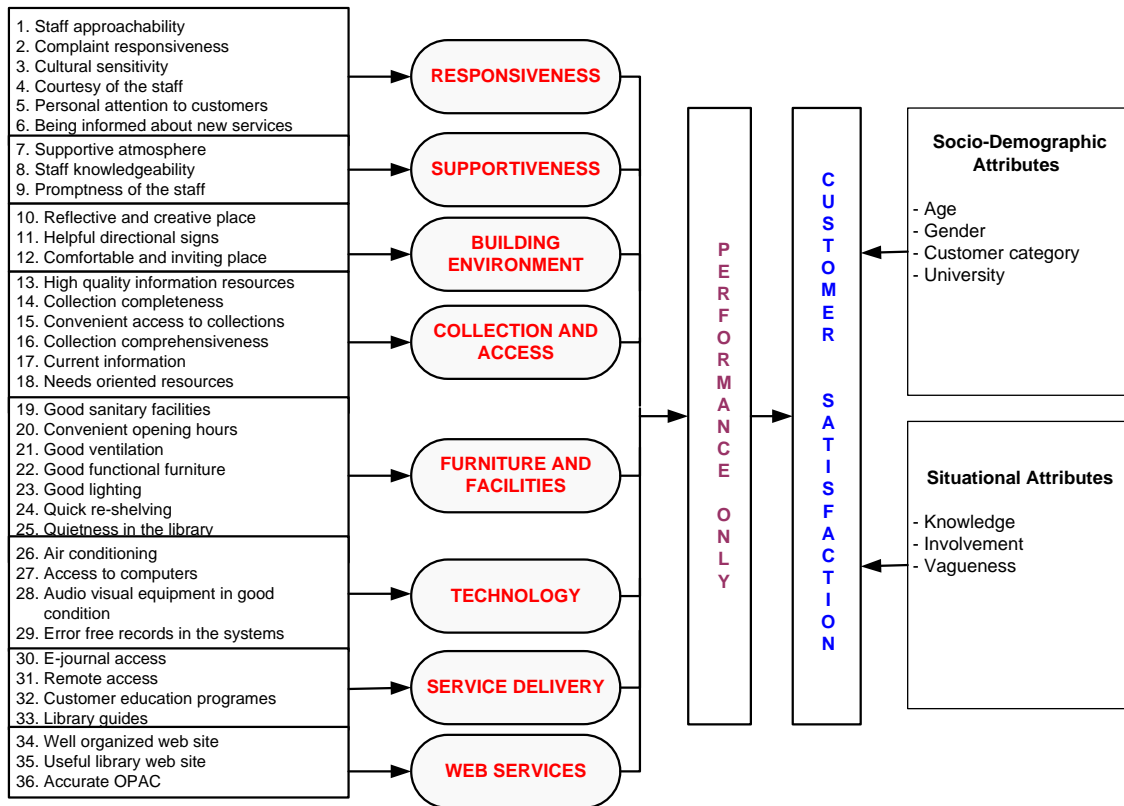
### 6.7 MODEL BUILDING AND ANALYSIS – PROVISIONAL MODEL III

Initially, this section covers Provisional Model III, which was based on the disconfirmation paradigm and domain structure. Then, it analyses the provisional model empirically by employing standard statistical techniques.

#### 6.7.1 Provisional Model III

This model depicted in Figure 6.7 indicates that customer satisfaction within each domain of service quality is a function of the performance-only scores for quality attributes within that domain. The model further explicates that these domains will be significant predictors of customer satisfaction.

**FIGURE 6.7: PROVISIONAL MODEL III**



Source: Compilation by author

### 6.7.2 Model Analysis – Provisional Model III

A model analysis was carried out by using the research questions given below and the statistical techniques described as follows:

**QUESTION:** Do performance-only scores of quality attributes predict their respective quality domains?

This question was subjected to two different standard analytical techniques: multiple linear regression analysis (MLRA) and binomial logistic regression analysis (BLRA).

#### 6.7.2.1 MLRA for quality domains

This analysis was used to determine the strength of the performance-only scores of the 36 quality attributes in their respective domains. A total of eight regression tests were conducted, one for each of the eight quality domains.

## 1. Responsiveness

A summary of stepwise regression results is provided in Table 6.22. The attributes were entered into the regression equation one at a time. The overall F-test for the final regression model was highly significant ( $F=38.556$ ,  $p<0.001$ ), with three attributes in the resulting equation. Complaint responsiveness, courtesy of the staff and personal attention to customers were excluded in the final equation due to statistical insignificance. The explanatory power, as reported by the adjusted  $R^2$  value, was 0.087, suggesting that the three predictors explained 9% of the variation in the responsiveness domain.

**TABLE 6.22: PROVISIONAL MODEL III - RESULTS OF MLRA ANALYSIS FOR RESPONSIVENESS DOMAIN**

Attribute	B	S.E	Beta	t	Tolerance	VIF
C	4.073	.186		21.859	.822	1.216
Staff approachability	-.287	.037	-.235*	-7.675	.996	1.004
Being informed about new services	.108	.028	.107*	3.856	.823	1.215
Cultural sensitivity	-.119	.043	-.085*	-2.757	.822	1.216

C-constant value of the regression equation, B-Unstandardised Beta coefficient, S.E.-Unstandardised Standard Error, Beta-Standardised Beta coefficient, t-t value

\* $p < 0.05$

The regression equation suggests that responsiveness was significantly related to staff approachability ( $\beta=0.235$ ,  $t=21.859$ ,  $p>0.001$ ), being informed about new services ( $\beta=0.107$ ,  $t=3.856$ ,  $p>0.001$ ) and cultural sensitivity ( $\beta=0.085$ ,  $t=2.757$ ,  $p>0.005$ ). A significant positive relationship with being informed about new services implies that respondents who are informed about new services tend to exhibit greater customer satisfaction than those who are not informed. Staff approachability and cultural sensitivity were found to be negatively related to responsiveness, suggesting that when responsiveness is high, staff approachability and cultural sensitivity are low. In order to test the potential influence of multicollinearity, two diagnostic tests, namely the tolerance and VIF tests, were conducted. According to Table 6.23, relatively high values of tolerance ( $\Omega \geq 1$ ) and relatively low value of VIF ( $<2.0$ ) suggested a low level of

collinearity. In this respect, it could be confirmed that there were no issues of multicollinearity in relation to independent attributes.

## 2. Supportiveness

Table 6.23 summarises the results of the multiple linear regression analysis conducted with supportiveness as the independent attribute. The F-test of the final regression model indicates a strong significant relationship between the independent and dependent attributes (F=19.322, p<0.001).

**TABLE 6.23: PROVISIONAL MODEL III - RESULTS OF MLRA ANALYSIS FOR SUPPORTIVENESS DOMAIN**

Attribute	B	S.E	Beta	t	Tolerance	VIF
C	3.046	.136		22.371	1.000	1.000
Supportive atmosphere	.153	.025	.173*	6.089	.855	1.170
Staff knowledgeability	.106	.024	.134*	4.344	.855	1.170
Promptness of the staff	-.095	.029	-.100*	-3.238	1.000	1.000

C-constant value of the regression equation, B-Unstandardised Beta coefficient, S.E.-Unstandardised Standard Error, Beta-Standardised Beta coefficient, t-t value

\*p < 0.05

The three predictor attributes were entered into the regression, and the test resulted in all three attributes with an adjusted R<sup>2</sup> value of 0.045, which is the explanatory power of the regression model. It suggests all three predictor attributes were able to explain 4.5% of the variance in the supportiveness orientation. The tolerance and VIF levels of the model were in the accepted range, suggesting that multicollinearity does not have an effect on the final model fitting.

As shown in the final regression model in Table 6.23, supportiveness was significantly related to supportive atmosphere ( $\beta=0.0.173$ ,  $t=6.089$ ,  $p>0.001$ ), staff knowledgeability ( $\beta=0.134$ ,  $t=4.344$ ,  $p>0.001$ ) and promptness of the staff ( $\beta=0.100$ ,  $t=3.238$ ,  $p>0.001$ ). The positive sign of the beta coefficient for supportiveness implies that the supportiveness of the service providers tends to elicit greater satisfaction of the respondents, compared to an unsupportive atmosphere. Staff knowledgeability was also

positively related to supportiveness, thus indicating that the availability of knowledgeable staff will affect customer satisfaction in relation to the supportiveness of the library. Promptness of the staff negatively correlated with supportiveness. If the promptness of the staff is high, customer satisfaction toward supportiveness is low, which implies that unnecessary promptness may negatively impact support of the library. The attribute having the strongest effect on supportiveness was the supportive atmosphere of the staff (0.173).

### 3. Building Environment

Table 6.24 presents the results of the regression analysis between building environment and its attributes. The overall F-test for the final model was found to be statistically significant ( $F=357.088$ ,  $p<0.001$ ). The adjusted  $R^2$  value was 0.475, suggesting that predictor attributes explained 48% of variance in the building environment domain.

**TABLE 6.24: PROVISIONAL MODEL III - RESULTS OF MLRA ANALYSIS FOR BUILDING AND ENVIRONMENT DOMAIN**

Attribute	B	S.E	Beta	t	Tolerance	VIF
C	.554	.097		5.710		
Helpful directional signs	.261	.012	.447*	21.177	.999	1.001
Comfortable and inviting place	.258	.013	.424*	20.081	.998	1.002
Reflective and creative place	.298	.020	.314*	14.874	.997	1.003

C-constant value of the regression equation, B-Unstandardised Beta coefficient, S.E.-Unstandardised Standard Error, Beta-Standardised Beta coefficient, t-t value

\* $p < 0.05$

The three attributes were entered into the stepwise regression test, and the best model that emerged contains all three predictor attributes. As shown in Table 6.24, building environment was significantly related to comfortable and inviting place ( $\beta=0.424$ ,  $t=20.081$ ,  $p>0.001$ ), helpful directional signs ( $\beta=0.447$ ,  $t=21.177$ ,  $p>0.001$ ) and reflective and creative place ( $\beta=0.314$ ,  $t=14.871$ ,  $p>0.001$ ).

The most salient attribute in explaining building environment orientation (44.7 %) was helpful directional signs. The positive sign of the beta coefficient for building

environment implied that helpful directional signs, comfortable and inviting place, and reflective and creative place tend to induce more satisfaction with regard to the building environment.

#### 4. Collection and Access

Table 6.25 reports the summarised results of the regression analysis for the collection and access domain. The overall F-test of the final regression model was highly significant ( $F = 88.090$ ,  $p < 0.001$ ), with six attributes produced in the resultant equation. The predictive power of the model was 0.307 (adjusted  $R^2 = 0.307$ ), suggesting that predictor attributes explained 31% of the variation in the dependent attribute.

**TABLE 6.25: PROVISIONAL MODEL III - RESULTS OF MLRA ANALYSIS FOR COLLECTION AND ACCESS DOMAIN**

Attribute	B	S.E	Beta	t	Tolerance	VIF
C	.651	.153		4.261		
Convenient access to collections	.163	.020	.240*	8.267	.697	1.435
Current information	.148	.018	.240*	8.199	.683	1.464
High quality information resources	.108	.018	.153*	6.130	.940	1.064
Collection comprehensiveness	.158	.022	.204*	7.077	.704	1.420
Needs-oriented resources	.133	.018	.237*	7.316	.559	1.788
Collection completeness	.119	.020	.174*	5.918	.680	1.470

C-constant value of the regression equation, B-Unstandardised Beta coefficient, S.E.-Unstandardised Standard Error, Beta-Standardised Beta coefficient, t-t value

\* $p < 0.05$

The regression equation in Table 6.26 suggests that the attributes called convenient access to collection ( $\beta = 0.240$ ,  $t = 8.267$ ,  $p > 0.001$ ) and current information ( $\beta = 0.240$ ,  $t = 8.199$ ,  $p > 0.001$ ) were the most important attributes, in terms of their standard beta coefficients. This shows that convenient access to collection and current information are the strongest predictors of the collection and access domain. The positive signs of all beta coefficients of all attributes implied that convenient access to collection, current information, high quality information resources, collection comprehensiveness, needs-oriented resources

and collection completeness of the library significantly affected customer satisfaction with respect to library collection and access.

### 5. Furniture and Facilities

Statistics on the attributes entered into the regression equation, and collectively explained portions of the variance in the dependent attribute are presented in Table 6.26. The F-test of the regression model was highly significant ( $F=893.769$ ) at  $p<0.001$ , indicating a strong relationship between the independent attributes and the dependent attribute. The explanatory power of the regression model is demonstrated in the adjusted  $R^2$ . It was 0.752, which means that the predictor attributes explained 75% of the variability in the furniture and facilities domain.

**TABLE 6.26: PROVISIONAL MODEL III - RESULTS OF MLRA ANALYSIS FOR FURNITURE AND FACILITIES DOMAIN**

Attribute	B	S.E	Beta	t	Tolerance	VIF
C	.376	.063		6.004		
Good ventilation	.321	.010	.523*	30.891	.734	1.362
Good functional furniture	.251	.010	.397*	24.646	.810	1.235
Convenient opening hours	.159	.010	.279*	16.296	.719	1.391
Good lighting	.176	.013	.215*	13.457	.824	1.214

C-constant value of the regression equation, B-Unstandardised Beta coefficient, S.E.-Unstandardised Standard Error, Beta-Standardised Beta coefficient, t-t value

\* $p < 0.05$

The attributes of good sanitary facilities, quick reshelving and quietness in the library were excluded from the final regression model due to their insignificance. All the attributes defined in Table 6.26 show acceptable values of tolerance and VIF, which indicate that these attributes do not have multicollinearity problems. The regression model of Table 6.27 suggests that good ventilation ( $\beta=0.523$ ,  $t=30.891$ ,  $p>0.001$ ), good functional furniture ( $\beta=0.397$ ,  $t=24.646$ ,  $p>0.001$ ), convenient opening hours ( $\beta=0.279$ ,  $t=16.296$ ,  $p>0.001$ ) and good lighting ( $\beta=0.215$ ,  $t=13.475$ ,  $p>0.001$ ) are significantly related to the furniture and facilities domain. All four attributes indicated a positive

relationship with the positive beta coefficient on the furniture and facilities domain, thus demonstrating that good ventilation, functional furniture, convenient opening hours and good lighting are more sensitive features of the quality of furniture and facilities in their respective libraries.

## 6. Technology

Table 6.27 summarises the results of the multiple linear regression analysis of attributes in the technology domain. The overall F-test for the final regression model was highly significant ( $F=127.946$ ) at  $p<0.001$ , exhibiting a strong relationship between the independent and dependent attributes. The proportion of shared variance as reported by adjusted  $R^2$  value equalled 0.304, which indicates that 31% of the variance in the technology domain was accounted for by the predictor attributes included in the model. The values for tolerance and VIF were in the accepted region, as indicated in Table 6.27.

**TABLE 6.27: PROVISIONAL MODEL III - RESULTS OF MLRA ANALYSIS FOR TECHNOLOGY DOMAIN**

Attribute	B	S.E	Beta	t	Tolerance	VIF
C	2.208	.087		25.241		
Access to computers	.146	.015	.301*	9.734	.628	1.591
Air-conditioning	.127	.012	.287*	10.964	.877	1.140
Error-free records in the systems	.107	.015	.183*	7.297	.950	1.052
Audiovisual equipment in good condition	.081	.017	.143*	4.823	.680	1.470

C-constant value of the regression equation, B-Unstandardised Beta coefficient, S.E.-Unstandardised Standard Error, Beta-Standardised Beta coefficient, t-t value

\* $p<0.05$

As shown in the regression equation in Table 6.27 above, access to computers ( $\beta=0.301$ ,  $t=9.734$ ,  $p>0.001$ ), air-conditioning ( $\beta=0.287$ ,  $t=10.964$ ,  $p>0.001$ ), error-free records in the system ( $\beta=0.183$ ,  $t=7.297$ ,  $p>0.001$ ) and audio visual equipment in good condition ( $\beta=0.143$ ,  $t=4.823$ ,  $p>0.001$ ) were significantly related to technology. All attributes were positively related, and the relative importance of the attributes was indicated by their standardised beta coefficients. Accordingly, the best coefficient for technology was



access to computers (0.301), suggesting that access to computers is the strongest predictor of technology, relative to the other three attributes.

## 7. Service delivery

Table 6.28 summarises the results of the multiple regression analysis with service delivery as the dependent attribute. As Table 6.28 illustrates, the regression model with four attributes was found to be statistically significant ( $F=200.783$ ,  $p<0.001$ ). The explanatory power of the model as illustrated by the adjusted  $R^2$  value was 0.413, which indicates that the 41% of the variability in the service delivery domain could be explained by all four independent attributes.

**TABLE 6.28: PROVISIONAL MODEL III - RESULTS OF MLRA ANALYSIS FOR SERVICE DELIVERY DOMAIN**

Attribute	B	S.E	Beta	t	Tolerance	VIF
C	.969	.087		11.132		
E-journal access	.188	.012	.350*	15.231	.979	1.021
Library guides	.170	.016	.259*	10.716	.886	1.128
Remote access	.171	.014	.280*	12.200	.981	1.020
Customer education programmes	.176	.019	.220*	9.124	.891	1.123

C-constant value of the regression equation, B-Unstandardised Beta coefficient, S.E.-Unstandardised Standard Error, Beta-Standardised Beta coefficient, t-t value

\* $p < 0.05$

As shown in Table 6.28, service delivery was significantly related to e-journal access ( $\beta=0.350$ ,  $t=15.232$ ,  $p>0.001$ ), library guides ( $\beta=0.259$ ,  $t=10.716$ ,  $p>0.001$ ), remote access ( $\beta=0.280$ ,  $t=12.200$ ,  $p>0.001$ ) and customer education programmes ( $\beta=0.220$ ,  $t=9.124$ ,  $p>0.001$ ). All attributes were positively correlated to service delivery, implying that e-journal access, library guides, remote access and customer education programmes have a significant effect on customer satisfaction, with respect to service delivery of libraries. The relatively most important predictor in the model is e-journal access (0.350), compared to the other three attributes in the final model.

## 8. Web Services

The results of the MLRA regarding Web Services as the dependent attribute are summarised in Table 6.29. As revealed below, the regression model was found to be statistically significant ( $F=360.770$ ) at  $p<0.001$ . Three attributes were included in the final regression model, with the proportion of shared variance as reported by the adjusted  $R^2$  value of 0.481. This means that 48.1% of the variance in the Web services domain was accounted for by usefulness of the Library Web site, accurate OPAC and a well-organised Web site. The most powerful predictor of the model is a useful library Web site (0.608) to explain satisfaction with library Web services.

**TABLE 6.29: PROVISIONAL MODEL III - RESULTS OF MLRA ANALYSIS FOR WEB SERVICES DOMAIN**

Attribute	B	S.E	Beta	t	Tolerance	VIF
C	1.015	.095		10.666		
Useful library Web site	.380	.016	.608*	24.258	.708	1.412
Accurate OPAC	.364	.024	.328*	15.281	.967	1.034
Well-organised Web site	-.048	.015	-.079*	-3.133	.704	1.421

C-constant value of the regression equation, B-Unstandardised Beta coefficient, S.E.-Unstandardised Standard Error, Beta-Standardised Beta coefficient, t-t value

\* $p < 0.05$

### 6.7.2.2 BLRA for quality domains

All domains and attributes in Model III were tested by means of BLRA. Eight BLRA tests were conducted to identify the statistical associations of independent and dependent attributes.

#### 1. Responsiveness

All six attributes were entered into the BLRA, which produced only two attributes as predictor attributes in the final regression model (see Table 6.30). The overall fitness of the model, which was reported by the Hosmer and Lemeshow Test, indicates the value of chi square 11.143 at the level of  $p=0.083$ . This demonstrates that the model does not fit

the data. The -2 Log likelihood statistics were 1410.009, the Cox & Snell R<sup>2</sup> value was 0.058, and the correctness was 56.4%.

**TABLE 6.30: PROVISIONAL MODEL III - RESULTS OF BLRA ANALYSIS FOR RESPONSIVENESS DOMAIN**

Attribute	B	S.E	Wald	Exp(B)	95% CI	
Staff approachability	-.612	.086	50.390	.542*	.458	.642
Being informed about new services	.147	.059	6.159	1.159*	1.031	1.302

B- Beta coefficient, S.E.- Standard Error of B, Wald-Wald statistics, Exp(B)-Odd ratio, CI-Confidence interval

\*p <0.05

## 2. Supportiveness

Of the three attributes tested for supportiveness, all were able to predict customer satisfaction with regard to supportiveness in libraries, as indicated in Table 6.31. The overall model for the domain of supportiveness was not significant ( $X^2 = 6.065$ ,  $p = 0.532$ ). The -2 Log likelihood statistics were 1008.735, the Cox & Snell R<sup>2</sup> value was .031, and the correctness was 53.5%.

**TABLE 6.31: PROVISIONAL MODEL III - RESULTS OF BLRA ANALYSIS FOR SUPPORTIVENESS DOMAIN**

Attribute	B	S.E	Wald	Exp(B)	95% CI	
Supportive atmosphere	.307	.080	14.860	1.360*	1.163	1.590
Staff knowledgeability	.347	.075	21.232	1.415*	1.221	1.641
Promptness of the staff	-.258	.096	7.149	.773*	.640	.934

B- Beta coefficient, S.E.-Standard Error of B, Wald-Wald statistics, Exp(B)-Odd ratio, CI-Confidence interval

\*p <0.05

The regression model reveals that if library staff are more knowledgeable about library services, customer satisfaction with supportiveness will increase by a multiple of two, as compared to less knowledgeable staff.

### 3. Building Environment

Of the three attributes entered into the regression model, the model produced all three attributes with a significant level of  $p < 0.05$ . The regression model's Hosmer and Lemeshow chi-square value represents the level of the relationship between the attributes that remain unexplained by the model. It produced a chi-square value of 183.408, manifested in a significant p-value at the 0.001 level, providing evidence that the model suits the data. The 2 Log likelihood statistics were 324.043, the Cox & Snell  $R^2$  value was 0.236, and the correctness was 97.8%.

**TABLE 6.32: PROVISIONAL MODEL III - RESULTS OF BLRA ANALYSIS  
FOR BUILDING ENVIRONMENT DOMAIN**

Attribute	B	S.E	Wald	Exp(B)	95% CI	
Reflective and creative place	2.178	.241	81.868	8.833*	5.510	14.159
Helpful directional signs	1.997	.216	85.773	7.369*	4.829	11.245
Comfortable and inviting place	1.970	.232	71.931	7.169*	4.548	11.302

B-Beta coefficient, S.E.-Standard Error of B, Wald-Wald statistics, Exp(B)-Odd ratio, CI-Confidence interval

\* $p < 0.05$

By far, the predictor with the largest effect size was reflective and creative place. The odds of the library being a reflective and creative place was over nine times greater (odds=8.833) as a cause of satisfaction towards the building environment than those libraries that do not provide a reflective and creative environment. Helpful and directional signs and comfortable and inviting place also displayed higher odd ratios.

### 4. Collection and Access

Of the six attributes tested for Collection and Access, three attributes failed to predict: high quality information resources, convenient access to collections and needs-oriented resources. The overall multivariate regression model for collection and access was significant (Hosmer and Lemeshow Test =  $X^2 = 19.927$ ;  $p < 0.05$ ). The 2 Log likelihood statistics were 181.673, the Cox & Snell  $R^2$  value was .017, and the correctness was 98.3%.

**TABLE 6.33: PROVISIONAL MODEL III - RESULTS OF BLRA ANALYSIS  
FOR COLLECTION AND ACCESS DOMAIN**

Attribute	B	S.E	Wald	Exp(B)	95% CI	
Collection completeness	.652	.229	8.137	1.919*	1.226	3.003
Collection comprehensiveness	.567	.180	9.871	1.763*	1.238	2.511
Current information	.663	.234	8.048	1.941*	1.228	3.069

B-Beta coefficient, S.E.-Standard Error of B, Wald-Wald statistics, Exp(B)-Odd ratio, CI-Confidence interval

\*p <0.05

As indicated in Table 6.33, the predictor with the largest effect size was current information. This indicated that if the collection consists of current information, the customers' satisfaction with the library collection will increase two-fold compared to outdated collections.

### 5. Furniture and Facilities

Of the seven attributes entered into the analysis, four were found to be significant—as depicted in Table 6.34—and three failed to predict. The failed predictors were good sanitary facilities, quick reshelving and quietness in the library. The overall model for the domain of furniture and facilities was not significant, as reported by the Hosmer and Lemeshow Test ( $X^2 = 3.997$ ,  $p = 0.857$ ). The 2 Log likelihood statistics were 156.324, the Cox & Snell R value was .300, and the correctness was 97.6%.

**TABLE 6.34: PROVISIONAL MODEL III - RESULTS OF BLRA ANALYSIS  
FOR FURNITURE AND FACILITIES DOMAIN**

Attribute	B	S.E	Wald	Exp(B)	95% CI	
Convenient opening hours	2.629	.373	49.720	13.863*	6.675	28.792
Good ventilation	2.158	.340	40.276	8.652*	4.443	16.847
Good functional furniture	2.653	.311	72.744	14.196*	7.716	26.117
Good lighting	1.369	.318	18.562	3.933*	2.109	7.333

B-Beta coefficient, S.E.-Standard Error of B, Wald-Wald statistics, Exp(B)-Odd ratio, CI-Confidence interval

\*p <0.05

The table indicates that if the library has convenient opening hours and good functional furniture, the customers' satisfaction with the furniture and facilities will increase almost fourteen times, compared to inconvenient opening hours and bad functional furniture.

## 6. Technology

The regression model produced three attributes with a significance level of  $p < 0.001$ , as indicated in Table 6.35. The attribute that was discarded from the model was error-free records in the system. The model produced a Hosmer and Lemeshow Test Value of  $X^2 = 0.042$ , manifested in an insignificant p-value ( $p = 1.00$ ); this is evidence that the model does not fit the data. The -2 Log likelihood statistics were 24.039, the Cox & Snell  $R^2$  value was .025, and the correctness was 99.5%.

**TABLE 6.35: PROVISIONAL MODEL III - RESULTS OF BLRA ANALYSIS FOR TECHNOLOGY DOMAIN**

Attribute	B	S.E	Wald	Exp(B)	95% CI	
Air-conditioning	2.016	.734	7.538	7.509*	1.781	31.667
Access to computers	2.218	1.060	4.383	9.192*	1.152	73.350
Audiovisual equipment in good condition	1.736	.812	4.575	5.675*	1.156	27.849

B-Beta coefficient, S.E.-Standard Error of B, Wald-Wald statistics, Exp(B)-Odd ratio, CI-Confidence interval

\* $p < 0.05$

## 7. Service Delivery

All four attributes tested for the domain of service delivery were found to be significant predictors, according to the final regression model, which is shown in Table 6.36. The overall multivariate model was significant, resulting in a Hosmer and Lemeshow Test Value of  $X^2 = 44.850$  and manifested in a significant p-value at the level of  $p < 0.001$ . These findings indicate that the model matches the data. The -2 Log likelihood statistics were 474.986, the Cox & Snell  $R^2$  value was .134, and the correctness was 92.9%.

**TABLE 6.36: PROVISIONAL MODEL III - RESULTS OF BLRA ANALYSIS  
FOR SERVICE DELIVERY DOMAIN**

Attribute	B	S.E	Wald	Exp(B)	95% CI	
E-journal access	.749	.132	32.417	2.115*	1.634	2.737
Remote access	.570	.131	18.892	1.768*	1.367	2.286
Customer education programmes	.774	.130	35.285	2.169*	1.680	2.800
Library guides	.750	.119	39.847	2.117*	1.677	2.672

B-Beta coefficient, S.E.-Standard Error of B, Wald-Wald statistics, Exp(B)-Odd ratio, CI-Confidence interval

\*p <0.05

By far, the most effective predictor in terms of size was customer education programmes. Maintaining customer education programmes is two times more likely to generate satisfaction with service delivery than libraries that do not feature such orientation programmes.

### 8. Web Services

All three attributes tested in the domain of Web services remained significant. These attributes included a well-organised Web site, a useful library Web site, and accurate OPAC, as indicated in Table 6.37. The overall regression model was significant, as reported by the Hosmer and Lemeshow Test Value of 47.892, producing a significant p-value at the level of p<0.001. The -2 Log likelihood statistics were 380.065, the Cox & Snell R<sup>2</sup> value was .120, and the correctness was 94.9%.

**TABLE 6.37: PROVISIONAL MODEL III - RESULTS OF BLRA ANALYSIS  
FOR WEB SERVICES DOMAIN**

Attribute	B	S.E	Wald	Exp(B)	95% CI	
Well-organised Web site	-.344	.156	4.877	.709*	.522	.962
Useful library Web site	.992	.161	37.967	2.696*	1.967	3.696
Accurate OPAC	1.577	.173	82.670	4.839*	3.445	6.798

B-Beta coefficient, S.E.-Standard Error of B, Wald-Wald statistics, Exp(B)-Odd ratio, CI-Confidence interval

\*p <0.05

A well-organised Web site was found to have a significant negative relationship with satisfaction with Web services, but accurate OPAC in libraries was four times more likely to be a strong factor affecting customer satisfaction with Web services.

**QUESTION:** If performance-only scores of individual quality attributes predict their respective quality domains, do these quality domains predict overall customer satisfaction?

### 6.7.2.3. MLRA for quality domains with overall satisfaction

As the performance-only scores of individual quality attributes predict their corresponding quality domains, the analysis was continued to determine whether these quality domains would be significant predictors of overall satisfaction.

**TABLE 6.38: PROVISIONAL MODEL III - RESULTS OF MLRA ANALYSIS ON CUSTOMER SATISFACTIONS AT DOMAIN LEVEL**

Attribute	B	S.E	Beta	t	Tolerance	VIF
C	.333	.089		3.745		
Collection and access	.181	.010	.357*	18.054	.943	1.060
Furniture and facilities	.184	.010	.359*	17.725	.899	1.113
Supportiveness	.130	.007	.353*	17.612	.918	1.089
Service delivery	.142	.011	.257*	13.110	.960	1.041
Building environment	.105	.010	.204*	10.370	.951	1.051
Technology	.114	.014	.161*	8.284	.978	1.023
Responsiveness	.017	.006	.054*	2.652	.894	1.119

B-Beta coefficient, S.E.-Standard Error of B, Wald-Wald statistics, Exp(B)-Odd ratio, CI-Confidence interval

\*p <0.05

Table 6.38 summarises the results of the regression analysis. The regression model presents only seven attributes, and the attribute “Web services” was excluded due to its poor level of significance. The adjusted  $R^2$  indicates how much of the variance in the satisfaction is accounted for in the population from which the sample was derived.  $R^2 = 0.564$  indicates that the model, which accounted for seven attributes out of the eight tested, is the most parsimonious model accounting for over 56% of the variance in the satisfaction outcome. The p-value ( $p < 0.001$ ) also indicates that the regression model is



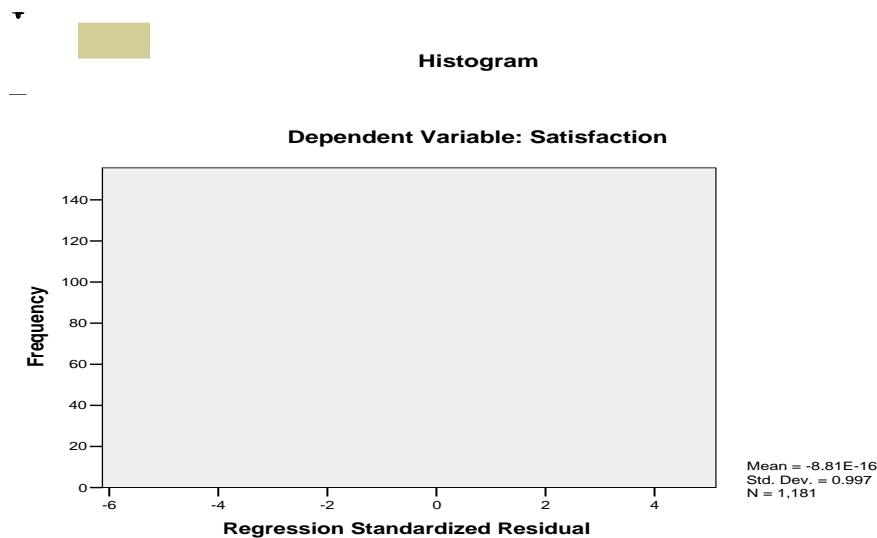
significant. In view of this, overall customer satisfaction with the quality of library services can be explained in terms of seven attributes: collection and access, furniture and facilities, supportiveness, service delivery, building environment, technology and responsiveness. All beta values, except responsiveness, indicate a strong influence on overall customer satisfaction.

In order to check multicollinearity, two diagnostic tests, the tolerance and VIF tests, were conducted and reported in Table 6.39. All measures of these two tests were in the accepted region.

### Residual analysis

A residual analysis can be utilised to establish the validity of the model. In the analysis, the histogram for the regression standardised residual is reproduced in Figure 6.8.

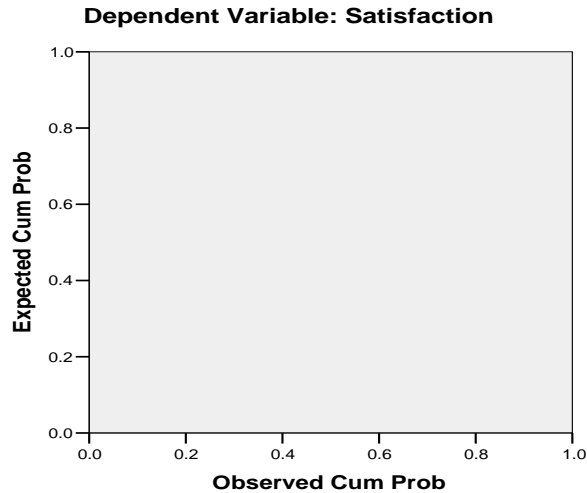
**FIGURE 6.8: HISTOGRAM OF STANDARDISED RESIDUALS OF QUALITY ATTRIBUTES ON CUSTOMER SATISFACTION IN MODEL III**



The distribution of the histogram suggests normality in the data. An examination of the normal probability plot depicted in Figure 6.9 indicates that the residual plots were almost close to the normal straight diagonal line, suggesting that the residuals were almost normally distributed, and that the model is robust.

**FIGURE 6.9: NORMAL PROBABILITY PLOT OF STANDARDISED RESIDUALS OF QUALITY ATTRIBUTES ON CUSTOMER SATISFACTION IN MODEL III**

**Normal P-P Plot of Regression Standardized Residual**



These results provide reasonably compelling evidence that the substantive model developed is valid and robust. Thus, it was concluded that the assumptions of linearity in multiple regression have not been violated.

**6.7.2.4. BLRA for quality domains with overall customer satisfaction**

The statistical significance of the BLRA regarding some quality domains was inadequate. The domains versus the goodness of fit of the models are summarised as follows:

<b>Domain</b>		<b>Statistical significance</b>
Responsiveness	—————→	not significant
Supportiveness	—————→	not significant
Building Environment	—————→	significant
Collection and Access	—————→	significant
Furniture and Facilities	—————→	not significant

Technology	→	not significant
Service Delivery	→	significant
Web Services	→	significant

Taking into consideration the overall situation, four domains out of eight were not significant, indicating their poor goodness of fit. Thus, the analysis used only the significant domains as predictor attributes of overall customer satisfaction to determine the best parsimonious final regression model. It produced only three domains as significant predictors of overall customer satisfaction, and they, indicated in Table 6.39, included collection and access, service delivery and Web services. The domain that was omitted from the final regression model was building environment. However, the model produced a Hosmer and Lemeshow Test Value of  $X^2 = 3.868$ , revealing an insignificant p-value ( $p=0.795$ ), evidencing that the overall fitness of the model is poor because the model does not fit the data correctly. The 2 Log likelihood statistics were 1132.333, the Cox & Snell  $R^2$  value was .164, and the correctness was 74.1%.

**TABLE 6.39: PROVISIONAL MODEL II - RESULTS OF BLRA ANALYSIS OF CUSTOMER SATISFACTION AT ATTRIBUTE LEVEL**

Attribute	B	S.E	Wald	Exp(B)	95% CI	
Collection and Access	.667	.128	27.069	1.949*	1.516	2.506
Service Delivery	.803	.129	38.466	2.232*	1.732	2.877
Web Services	1.234	.116	113.544	3.434*	2.737	4.309

B-Beta coefficient, S.E.-Standard Error of B, Wald-Wald statistics, Exp(B)-Odd ratio, CI-Confidence interval  
 \* $p < 0.05$

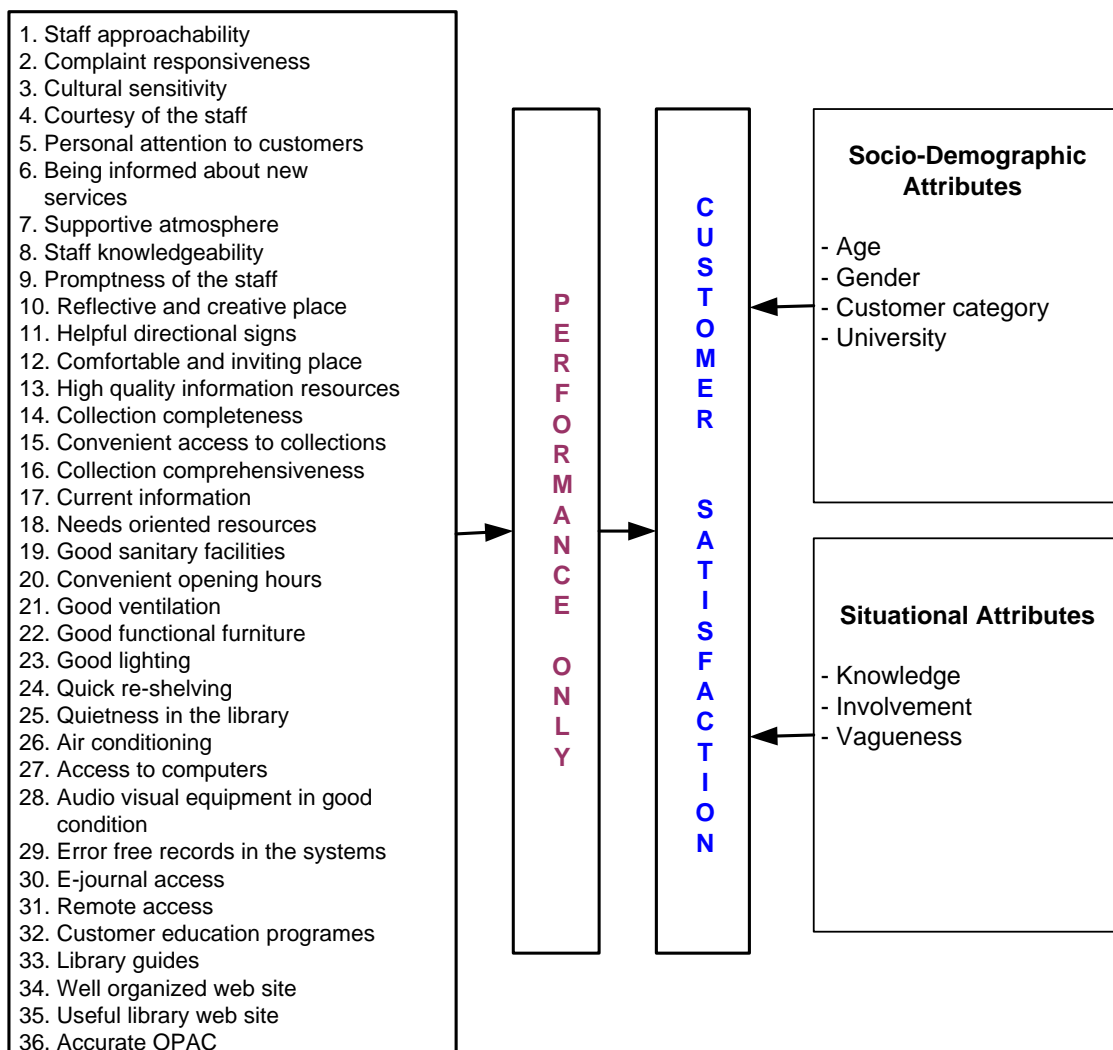
## 6.8 MODEL BUILDING AND ANALYSIS – PROVISIONAL MODEL IV

Provisional Model IV and the analysis of the model are depicted in Sections 6.8.1 and 6.8.2, respectively.

### 6.8.1 The Provisional Model IV

Model IV—illustrated in Figure 6.10—depicts that customer satisfaction is related to the performance-only scores for the identified 36 quality attributes.

**FIGURE 6.10: PROVISIONAL MODEL IV**



Source: Compilation by author

### 6.8.2 Model analysis – Provisional Model IV

A model analysis was completed as follows to determine whether Provisional Model IV fits the sample data.

**QUESTION:** Do performance-only scores of individual quality attributes predict overall customer satisfaction?

This question was subjected to two different standard analytical techniques, MLRA and BLRA.

#### 6.7.2.1 MLRA for overall customer satisfaction

This analysis was used to determine the strength of the 36 quality attributes in overall customer satisfaction. One multiple linear regression model was used to determine the strength of the relationship between the individual quality attributes and overall satisfaction. In total, 15 quality attributes out of the 36 were found to be significant predictors of overall customer satisfaction, as indicated in Table 6.40.

**TABLE 6.40: PROVISIONAL MODEL IV - RESULTS OF MLRA ANALYSIS OF CUSTOMER SATISFACTION AT ATTRIBUTE LEVEL**

Attribute	B	S.E	Beta	t	Tolerance	VIF
C	1.662	.117		14.181		
Current information	.046	.012	.148*	3.957	.526	1.901
Helpful directional signs	.057	.009	.195*	6.602	.848	1.180
Good functional furniture	.043	.011	.133*	4.027	.683	1.465
Customer education programmes	.040	.014	.093*	2.789	.668	1.498
E-journal access	.028	.008	.097*	3.416	.920	1.087
Needs-oriented resources	.057	.011	.204*	5.107	.465	2.153
Convenient opening hours	.045	.009	.159*	5.017	.737	1.357
Comfortable and inviting place	.037	.009	.118*	4.010	.851	1.175
Good lighting	.044	.013	.110*	3.349	.692	1.445

Attribute	B	S.E	Beta	t	Tolerance	VIF
Remote access	.025	.009	.077*	2.802	.974	1.026
Collection comprehensiveness	.035	.011	.093*	3.046	.793	1.261
Library guides	.025	.010	.074*	2.510	.849	1.178
Being informed about new services	-.021	.008	-.068*	-2.432	.945	1.058
Audiovisual equipment in good condition	.032	.014	.080*	2.388	.658	1.519
Staff knowledgeability	.020	.009	.069*	2.143	.716	1.397

C-constant value of the regression equation, B-Unstandardised Beta coefficient, S.E.-Unstandardised Standard Error, Beta-Standardised Beta coefficient, t-t value

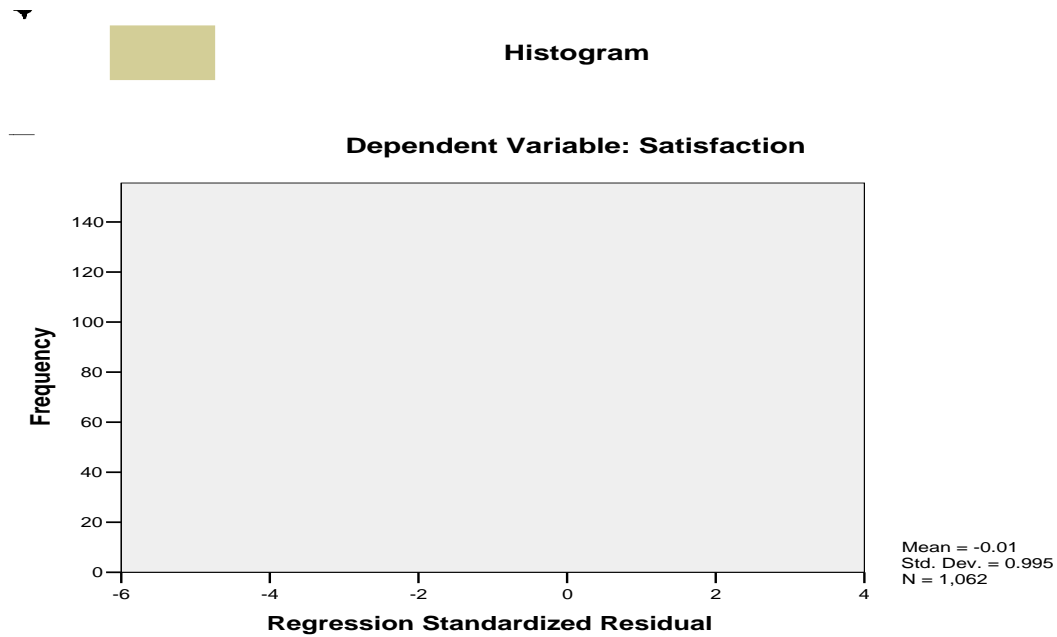
\*p < 0.05

The strongest predictor was needs-oriented resources (0.226), followed by helpful directional signs (0.181) and current information (0.167). All predictor attributes in this model explained 30% ( $R^2=0.296$ ) of the variance in satisfaction. The overall model was significant ( $F=27.598$ ) at the level of  $p<0.001$ . All relationships between predictor attribute and resultant attribute are positive, except the attribute regarding being informed about new services (-0.56).

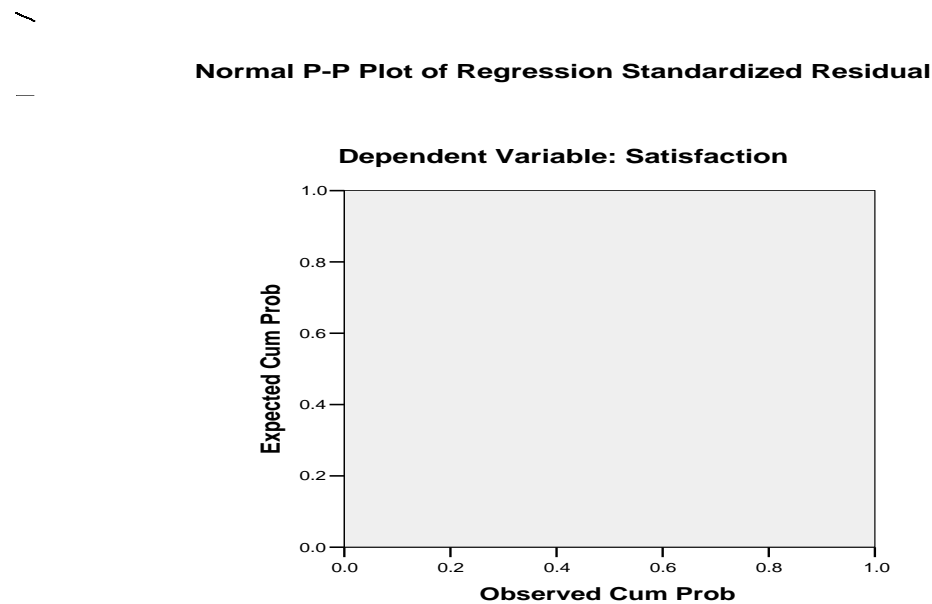
### Residual Analysis

To confirm that the model has not violated the assumption of normality that underlies MLRA, a histogram—shown in Figure 6.11—and a normal probability plot of the standardised residuals—depicted in Figure 6.12—were constructed to examine whether the assumptions of regression analysis were met. These figures confirm that the residuals were normally distributed, that the residuals were linear and that the assumption of normality underlying the regression analysis had not been violated.

**FIGURE 6.11: HISTOGRAM OF STANDARDISED RESIDUALS OF QUALITY ATTRIBUTES ON CUSTOMER SATISFACTION IN MODEL IV**



**FIGURE 6.12: NORMAL PROBABILITY PLOT OF STANDARDISED RESIDUALS OF QUALITY ATTRIBUTES ON CUSTOMER SATISFACTION IN MODEL IV**



### 6.8.2.2 BLRA for overall customer satisfaction

The results of the BLRA are shown in Table 6.41. Of the 36 attributes tested for overall customer satisfaction, only five attributes predicted the construct. The results of the logistic regression analysis are shown in Table 6.42. The regression model produced a Hosmer and Lemeshow Test Value  $X^2=3.272$ , revealing the p-value to be insignificant ( $p=0.916$ ) and providing evidence that the model does not fit the data. The -2 Log likelihood statistics were 80.445, the Cox & Snell  $R^2$  value was .267, and the correctness was 77.9%.

**TABLE 6.41: PROVISIONAL MODEL IV – RESULTS OF BLRA ANALYSIS ON CUSTOMER SATISFACTIONS AT ATTRIBUTE LEVEL**

Attribute	B	S.E	Wald	Exp(B)	95% CI	
Cultural sensitivity	-.322	.114	8.040	.724*	.580	.905
Current information	.554	.110	25.517	1.740*	1.403	2.157
Convenient opening hours	.671	.092	53.141	1.957*	1.634	2.344
Good functional furniture	.600	.108	31.024	1.821*	1.475	2.249
Quietness in the library	-.321	.101	10.149	.725*	.595	.884
Access to computers	.395	.114	11.958	1.485*	1.187	1.857
Error-free records in the systems	-.350	.117	9.018	.704*	.560	.885
E-journal access	.412	.086	23.113	1.510*	1.276	1.786
Well-organised Web site	.264	.100	6.910	1.302*	1.069	1.585
Useful library Web site	.646	.107	36.616	1.909*	1.548	2.353
Accurate OPAC	.639	.165	15.069	1.894*	1.372	2.615

B-Beta coefficient, S.E.-Standard Error of B, Wald-Wald statistics, Exp(B)-Odd ratio, CI-Confidence interval

\*p <0.05

## 6.9 META ANALYSIS FOR PROVISIONAL MODEL COMPARISONS

This section deals with the comparison of regression models to identify the best parsimony model. At the outset, a model comparison was conducted, using two different methods.

1. Comparison of provisional models analysed by MLRA; and
2. Comparison of provisional models analysed by BLRA.



In this stage, it was intended to identify the best parsimonious models derived from each statistical technique—that is, MLRA and BLRA. The selected models from each technique were then evaluated to select the best parsimonious final model.

### 6.9.1 MLRA model comparison

Section 6.9.1.1 compares Provisional Models I and III, analysed by MLRA, and section 6.9.1.2 compares Provisional Models II and IV, analysed by MLRA.

#### 6.9.1.1 MLRA model comparison: Models I and III

Initially, two models were compared to determine the best model based on either gap scores or performance-only scores at the domain level. Then, the comparison was further continued to determine the best provisional model with quality domains at overall customer satisfaction level. Thus, the analysis consisted of two steps, outlined below.

#### 1. Comparison of the measure of customer satisfaction within eight quality domains

Table 6.42 presents the MLRA model comparisons related to Provisional Model I and III.

**TABLE 6.42: MLRA MODEL COMPARISON AT DOMAIN LEVEL – PROVISIONAL MODEL I AND III**

Domain	Quality Attribute	Provisional Model I based on Disconfirmation (Gap) paradigm (Beta)	Provisional Model III based on Performance-only paradigm (Beta)
Responsiveness	Staff approachability	-.158*	-.235*
Responsiveness	Complaint responsiveness	n.s.	n.s.
Responsiveness	Cultural sensitivity	-.093*	-.085*
Responsiveness	Courtesy of the staff	n.s.	n.s.
Responsiveness	Personal attention to customers	.073*	n.s.
Responsiveness	Being informed about new services	.114*	.107*
		F= 17.778, $p < 0.001$ Adjusted $R^2 = 0.061$	F=38.556, $p < 0.001$ Adjusted $R^2 = 0.087$

Domain	Quality Attribute	Provisional Model I based on Disconfirmation (Gap) paradigm (Beta)	Provisional Model III based on Performance-only paradigm (Beta)
Supportiveness	Supportive atmosphere	.148*	.173*
Supportiveness	Staff knowledgeability	.095*	.134*
Supportiveness	Promptness of the staff	-.074*	-.100*
		F= 11.994, p<0.001 Adjusted R <sup>2</sup> =0.027	F=19.322, p<0.001 Adjusted R <sup>2</sup> =0.045
Building environment	Reflective and creative place	n.s.	.314*
Building environment	Helpful directional signs	-.090*	.447*
Building environment	Comfortable and inviting place	.443*	.424*
		98.580, p<0.001 Adjusted R <sup>2</sup> =0.145	F=357.088, p<0.001 Adjusted R <sup>2</sup> =0.475
Collection and access	High quality information resources	n.s.	.153*
Collection and access	Collection completeness	.070*	.174*
Collection and access	Convenient access to collections	.206*	.240*
Collection and access	Collection comprehensiveness	.140*	.204*
Collection and access	Current information	.232*	.240*
Collection and access	Needs-oriented resources	.247*	.237*
		F = 64.285, p<0.001 Adjusted R <sup>2</sup> = 0.220	F = 88.090, p<0.001 Adjusted R <sup>2</sup> = 0.307
Furniture and facilities	Good sanitary facilities	n.s.	n.s.
Furniture and facilities	Convenient opening hours	.051*	.279*
Furniture and facilities	Good ventilation	.327*	.523*
Furniture and facilities	Good functional furniture	.254*	.397*
Furniture and facilities	Good lighting	.205*	.215*
Furniture and facilities	Quick reshelving	.181*	n.s
Furniture and facilities	Quietness in the library	.176*	n.s
		F=107.001, p<0.001 Adjusted R <sup>2</sup> = 0.371	F=893.769, p<0.001 Adjusted R <sup>2</sup> = 0.752

Domain	Quality Attribute	(Model I) Gap (Disconfirmation) (Beta)	(Model III) Performance-only (Beta)
Technology	Air-conditioning	.328*	.287*
Technology	Access to computers	.306*	.301*
Technology	Audiovisual equipment in good condition	n.s	.143*
Technology	Error-free records in the systems	.136*	.183*
		F=95.268, p<0.001 Adjusted R <sup>2</sup> = 0.197	F=127.946, p<0.001 Adjusted R <sup>2</sup> = 0.304
Service delivery	E-journal access	.336*	.350*
Service delivery	Remote access	.189*	.280*
Service delivery	Customer education programmes	.086*	.220*
Service delivery	Library guides	.257*	.259*
		F=86.969; p<0.001 Adjusted R <sup>2</sup> =0.234	F=200.783, p<0.001 Adjusted R <sup>2</sup> =0.413
Web services	Well-organised Web site	n.s	-.079*
Web services	Useful library Web site	.379*	.608*
Web services	Accurate OPAC	n.s	.328*
		F=189.006, p<0.001 Adjusted R <sup>2</sup> = 0.143	F=360.770, p<0.001 Adjusted R <sup>2</sup> = 0.481

\* p< 0.05

n.s. = Not significant

Gap scores indicated in Provisional Model I found four quality attributes in the responsiveness domain to be significant predictors of satisfaction with responsiveness in the library. However, the regression model based on performance-only scores (Model III) found only three attributes to be significant with responsiveness. Clearly, the strongest predictor of both regression models was being informed about new services (gap: beta=0.114, performance-only: beta=0.107). When the predictability of both models as reported by the adjusted R<sup>2</sup> was compared, the regression model based on performance-only scores in Model III and depicted in Figure 6.7 was found to be the best (R<sup>2</sup>=0.087) in the domain of responsiveness.

The second quality domain is supportiveness. All three attributes were selected by both regression models as significant predictors. Both regression models produced supportive atmosphere as the strongest predictor (gap: beta=0.148, performance-only: beta=0.173).

When both models were compared, it was found that the regression model-based on performance-only scores-accounted for 4.5% of the variance associated with supportiveness satisfaction, as reported by the adjusted  $R^2$  of 0.045, which was higher than the variance produced by the regression model based on gap scores  $R^2=0.027$ . Thus, the performance-only regression model in Model III and depicted in Figure 6.7 was found to be superior when compared to Model I, which illustrates the disconfirmation (gap) theory.

Two of the three building environment attributes were significant in the regression model, based on gap scores, and all three were significant predictors of the performance-only model. This regression model depicted in Model III in Figure 6.7 accounted for over 47% of the variance ( $R^2=0.475$ ) associated with the building environment domain, which was prominent in both models.

All predictor attributes were significant in the regression model based on performance-only scores associated with the collection and access domain, and the corresponding gap model indicated only five predictors in the final regression model, as demonstrated in Table 6.43. When both models were compared, it became apparent that the predictability of the regression model based on performance-only scores was superior ( $R^2=0.307$ ) to the gap model ( $R^2=0.220$ ) scores.

The next quality domain of furniture and facilities revealed that four of the seven attributes were significant in the regression model based on performance-only scores within the domain. However, the performance-only model was not able to outperform the gap model in relation to the number of attributes selected by the model. Three quality attributes were omitted from the final regression model. However, both models indicate that good ventilation is the most powerful predictor in relation to customer satisfaction towards furniture and facilities in libraries. Nevertheless, the regression model on performance-only scores based on Model III accounted for over 75% of the variance associated with the satisfaction of this domain, which is almost two times higher than the gap model variance (37 %).

Satisfaction with technology revealed that all attributes in the performance-only regression model were significant predictors, but only three items were significant in the gap model. When considering the predictability of both models, it was found, as reported by adjusted  $R^2$  statistics, that the regression model based on performance-only scores was the best, as it accounted for over 30% of variance the associated with technology, compared to the model on gap scores (20%).

Satisfaction with service delivery in both regression models showed that all attributes were significant predictors. However, in considering the predictability of both models, it was apparent that the performance-only model was the best because it accounted for over 41% of the variance associated with the satisfaction with the service delivery domain ( $R^2=0.413$ ) over the gap model (23%).

These regression models also analysed the strength of the quality attributes pertaining to satisfaction with Web services in libraries. One of the three quality attributes was significant in the gap model, while all three were significant in the performance-only model. The strongest predictor of both models was useful library Web sites (gap: beta=0.379, performance-only: beta=0.608). The regression model on performance-only scores was superior compared to the gap model, as it accounted for over 48% of the variance associated with the satisfaction with Web services in libraries ( $R^2=0.481$ ).

In conclusion, performance-only models were always much stronger than the gap models, as depicted in Table 6.43. Thus, it can be concluded that the performance-only paradigm is the strongest paradigm for predicting customer satisfaction at the domain level.

## 2. Comparison of the measures at overall customer satisfaction with quality domains

The regression model derived by MLRA to model customer satisfaction with quality domains is depicted in Table 6.43.

**TABLE 6.43: MLRA MODEL COMPARISON AT OVERALL SATISFACTION LEVEL – PROVISIONAL MODELS I AND III**

Quality Attribute	Provisional Model I based on Disconfirmation (Gap) paradigm (Beta)	Provisional Model III based on Performance-only paradigm (Beta)
Responsiveness	n.s.	.054*
Supportiveness	.259*	.353*
Building environment	-.056*	.204*
Collection and access	.228*	.357*
Furniture and facilities	.330*	.359*
Technology	n.s.	.161*
Service delivery	.174*	.257*
Web services	n.s.	n.s.
	F= 94.669, p<0.001 Adjusted R <sup>2</sup> = 0.295	F=219.169 ;p<0.001 Adjusted R <sup>2</sup> = 0.564

\*p<0.05

n.s. = Not significant

Comparison of the two provisional models, depicted in Table 6.44, indicated that predicting overall customer satisfaction with library services can be correctly measured by the performance-only paradigm because this model accounts for higher predictability, as reported by the adjusted R<sup>2</sup> value of 0.564. This model explained over 56% of the variance associated with overall customer satisfaction, which is significantly higher than the gap model, which accounted for only 30% of the variance.

From a close study of the MLRA and BLRA analyses, it was concluded that the performance-only paradigm, depicted in Provisional Model III, was the best model for predicting overall customer satisfaction through quality attributes and quality domains, based on multiple linear regression analysis.

### 6.9.1.2 MLRA model comparison: Models II and IV

Comparison of Models II and IV was carried out as analysed by MLRA. The following Table 6.44 indicates the results of the analysis.

**TABLE 6.44: MLRA MODEL COMPARISON AT ATTRIBUTE LEVEL –  
PROVISIONAL MODELS II AND IV**

<b>Quality attribute</b>	<b>Provisional Model II based on Disconfirmation (Gap) paradigm (Beta)</b>	<b>Provisional Model IV based on Performance- only paradigm (Beta)</b>
Staff approachability	n.s	n.s
Complaint responsiveness	n.s	n.s
Cultural sensitivity	n.s	n.s
Courtesy of the staff	n.s	n.s
Personal attention to customers	n.s	n.s
Being informed about new services	n.s	-.068*
Supportive atmosphere	n.s	n.s
Staff knowledgeability	n.s	.069*
Promptness of the staff	n.s	n.s
Reflective and creative place	n.s	n.s
Helpful directional signs	n.s	.195*
Comfortable and inviting place	.181*	.118*
High quality information resources	.117	n.s
Collection completeness	n.s	n.s
Convenient access to collections	n.s	n.s
Collection comprehensiveness	n.s	.093*
Current information	.156*	.148*
Needs-oriented resources	.209*	.204*
Good sanitary facilities	n.s	n.s
Convenient opening hours	n.s	.159*
Good ventilation	n.s	n.s
Good functional furniture	.138*	.133*
Good lighting	n.s	.110
Quick reshelving	.116*	n.s
Quietness in the library	n.s	n.s
Air-conditioning	n.s	n.s
Access to computers	n.s	n.s
Audiovisual equipment in good condition	.078*	.080*
Error-free records in the systems	n.s	n.s
E-journal access	.094*	.097*
Remote access	n.s	.077*
Customer education programmes	.099*	.093*

Quality attribute	Provisional Model II based on Disconfirmation (Gap) paradigm (Beta)	Provisional Model IV based on Performance- only paradigm (Beta)
Library guides	n.s	.074*
Well-organised Web site	n.s	n.s
Useful library Web site	n.s	n.s
Accurate OPAC	n.s	n.s
	F = 30.865, p<0.001 Adjusted R <sup>2</sup> = 0.250	F= 27.598, p<0.001 Adjusted R <sup>2</sup> = 0.296

n.s = Not significant

\*p<0.05

The multiple regression tests performed for performance-only scores and gap scores of all 36 quality attributes, and the measuring effect of these individual attributes on overall customer satisfaction are indicated in Table 6.44. Thirteen attributes out of 36 were significant predictors in the performance-only model (Model IV), while only nine attributes were significant in the gap model (Model II). The overall fitness of both models was statistically significant (gap: F = 30.865, p<0.001; performance-only: F = 27.598, p<0.001). The independent attributes of the performance-only model explained approximately 30% of the variance in overall satisfaction, as reported by the adjusted R<sup>2</sup> (R<sup>2</sup>=0.296). Compared to the gap model (25%), it is apparent that Model IV on performance-only scores is superior in predicting customer satisfaction using service quality.

## 6.9.2 BLRA model comparison

Section 6.9.2.1 compares Provisional Models I and III, analysed by BLRA, and section 6.9.1.2 compares Provisional Models II and IV, analysed by BLRA.

### 6.9.2.1 BLRA model comparison: Provisional Models I and III

At the outset, Provisional Models I and III derived through BLRA were compared to determine the best model based on the gap scores or performance-only scores at the



domain level. Then, the models were compared based on the same gap or performance-only paradigms to determine the best model at the overall customer satisfaction level.

### 1. Comparison of the measure of customer satisfaction within eight quality domains

A comparison of Models I and III was conducted through BLRA analysis. The following table shows the results of the comparison.

**TABLE 6.45: BLRA MODEL COMPARISON AT DOMAIN LEVEL – PROVISIONAL MODELS I AND III**

Domain	Quality Attribute	Provisional Model I based on Disconfirmation (Gap) paradigm Exp(B)	Provisional Model III based on Performance-only paradigm Exp(B)
Responsiveness	Staff approachability	.672*	.542*
Responsiveness	Complaint responsiveness	1.303*	n.s.
Responsiveness	Cultural sensitivity	.722*	n.s.
Responsiveness	Courtesy of the staff	n.s.	n.s.
Responsiveness	Personal attention to customers	n.s.	n.s.
Responsiveness	Being informed about new services	1.321*	1.159**
		Hosmer and Lemeshow test : X <sup>2</sup> =14.355, P=0.073 Cox and Snell R <sup>2</sup> =0.073 Correctness: 78%	Hosmer and Lemeshow test: X <sup>2</sup> =11.143, P=0.083 Cox and Snell R <sup>2</sup> =0.058 Correctness: 56.4%

Domain	Quality Attribute	Provisional Model I based on Disconfirmation (Gap) paradigm Exp(B)	Provisional Model III based on Performance-only paradigm Exp(B)
Supportiveness	Supportive atmosphere	n.s.	1.360*
Supportiveness	Staff knowledgeable	n.s.	1.415*
Supportiveness	Promptness of the staff	n.s.	.773**
		N/A	H&L Test: $X^2=6.065$ , P=0.532 Cox and Snell $R^2=.031$ Correctness:83.5%
Building environment	Reflective and creative place	1.590*	8.833*
Building environment	Helpful directional signs	1.262*	7.369*
Building environment	Comfortable and inviting place	n.s.	7.169*
		Hosmer and Lemeshow test: $v=16.776$ , P=0.033 Cox and Snell $R^2=.083$ Correctness: 73.2%	Hosmer and Lemeshow test: $X^2=183.408$ , P=0.000 Cox and Snell $R^2=.236$ Correctness: 97.8%
Collection and access	High quality information resources	n.s.	n.s.
Collection and access	Collection completeness	1.230*	1.919*
Collection and access	Convenient access to collections	1.606*	n.s.
Collection and access	Collection comprehensiveness	1.323*	1.763*
Collection and access	Current information	1.551*	1.941*
Collection and access	Needs-oriented resources	1.449*	n.s.
		Hosmer and Lemeshow test: $X^2=23.977$ , P=0.002 Cox and Snell $R^2=.205$ ; Correctness: 71.7%	Hosmer and Lemeshow test: $X^2=19.927$ , P=0.05 Cox and Snell $R^2=.017$ Correctness: 98.3%

Domain	Quality Attribute	Provisional Model I based on Disconfirmation (Gap) paradigm Exp(B)	Provisional Model III based on Performance-only paradigm Exp(B)
Furniture facilities and	Good sanitary facilities	1.164*	n.s.
Furniture facilities and	Convenient opening hours	n.s.	13.863*
Furniture facilities and	Good ventilation	1.516*	8.652*
Furniture facilities and	Good functional furniture	1.401*	14.196*
Furniture facilities and	Good lighting	1.406*	3.933*
Furniture facilities and	Quick reshelving	1.606*	n.s.
Furniture facilities and	Quietness in the library	1.565*	n.s.
		Hosmer and Lemeshow test: $X^2=15.814$ , $P=0.005$ Cox and Snell $R^2=.273$ Correctness: 72.7%	Hosmer and Lemeshow test: $X^2=3.997$ , $P=0.857$ Cox and Snell $R^2=.300$ Correctness:97.6%
Technology	Air-conditioning	n.s.	7.509*
Technology	Access to computers	n.s.	9.192*
Technology	Audiovisual equipment in good condition	1.157*	5.675*
Technology	Error-free records in the systems	.782*	n.s.
		Hosmer and Lemeshow test: $X^2=4.095$ , $P=0.664$ Cox and Snell $R^2=.026$ Correctness: 69.1%	Hosmer and Lemeshow test: $X^2= 0.042$ , $P=1.000$ Cox and Snell $R^2=.025$ Correctness: 99.5%
Service delivery	E-journal access	1.539*	2.115*
Service delivery	Remote access	1.125*	1.768*
Service delivery	Customer education programmes	n.s.	2.169*
Service delivery	Library guides	1.438*	2.117*
		Hosmer and Lemeshow test: $X^2=14.312$ ; $p=0.074$ Cox and Snell $R^2=.085$ Correctness: 72.5%	Hosmer and Lemeshow test: $X^2=44.850$ ; $p=0.000$ Cox and Snell $R^2=.134$ Correctness: 92.9%

Domain	Quality Attribute	Provisional Model I based on Disconfirmation (Gap) paradigm Exp(B)	Provisional Model III based on Performance-only paradigm Exp(B)
Web services	Well-organised Web site	n.s.	.709*
Web services	Useful library Web site	1.656*	2.696*
Web services	Accurate OPAC	1.417*	4.839*
		Hosmer and Lemeshow test: $X^2=7.418$ ; $p=0.492$ Cox and Snell $R^2=.037$ Correctness: 94%	Hosmer and Lemeshow test: $X^2=47.892$ ; $p=0.000$ Cox and Snell $R^2=.120$ Correctness: 94.9%

n.s. = Not significant

\* $p < 0.05$

Four of the six attributes in the responsiveness domain were significant predictors in the regression model based on gap scores, while only two attributes were significant in the regression model based on performance-only scores. The strongest predictor of both models was being informed about new services. However, in comparing the Hosmer and Lemeshow test  $X^2$  statistics, both models were not significant (gap:  $p=0.073$ ; performance-only:  $p=0.083$ ).

The regression model pertaining to gap scores in relation to the supportiveness domain did not produce any single significant predictor, and the regression performance-only model produced all predictors as significant factors. However, the overall fitness of the performance-only model was also poor, as reported by the Hosmer and Lemeshow test  $X^2$  ( $p=0.532$ ). Thus, both models did not predict satisfaction with supportiveness in libraries.

The next quality domain was building and environment, all attributes of which were significant in the regression model on performance-only scores. In the gap model, however, the comfortable and inviting place attribute was dropped, indicating that it was not significant. Both regression models showed the required model fitness, but the performance-only model produced higher correctness of the predictability (98%) and Cox and Snell  $R^2$  statistics (0.24).

The collection and access domain revealed that all attributes were significant, except high quality information resources, in the regression model based on gap scores. However, three attributes were excluded from the performance-only model due to its insignificance: high quality information resources, convenient access to collection, and needs-oriented resources. The overall fitness of both regression models was good, as reported by the Hosmer and Lemeshow test ( $X^2=23.977$ ,  $P=0.002$ ;  $X^2=19.927$ ,  $p=0.05$ ), except total correctness. The Cox and Snell  $R^2$  and the number of significant attributes in the gap model were higher than the performance-only model. Thus, it can be concluded that the gap model is the best compared to the performance-only regression model in the domain of collection and access.

In furniture and facilities, the regression model on gap scores showed a significant overall goodness of fit ( $X^2=15.814$ ,  $p=0.005$ ), while the performance-only model did not explain a significant model fitness ( $X^2=3.997$ ,  $p=0.857$ ). It also presented all predictor attributes, except convenient opening hours, as significant. Thus, it can be concluded that the gap model is best for predicting the domain of furniture and facilities.

In the technology domain, both regression models were unable to demonstrate the required overall model fitness (gap: Hosmer and Lemeshow Test:  $X^2=4.095$ ,  $p=0.664$ ; performance-only: Hosmer and Lemeshow Test:  $X^2=0.042$ ,  $p=1.000$ ).

Regarding satisfaction with service delivery, the performance-only regression model revealed that the final model was significant ( $X^2=44.850$ ;  $p=0.000$ ), with a higher total percentage of correctness (92.9%). However, the model on gap scores was unable to produce a significant overall model fitness ( $X^2=14.312$ ;  $p=0.074$ ). Thus, the performance-only model was the most optimal for this domain.

The Web services domain was also the same as the service delivery domain. The performance-only regression model was the sole model that produced higher overall model fitness ( $X^2=47.892$ ) at  $p<0.001$ , and it also engendered higher correctness at

94.9%. It can therefore be concluded that the performance-only model is the best for the predictability of satisfaction with Web services in libraries.

In summary, the attributes pertaining to the following domains were able to predict their respective domains well, and the best corresponding paradigm used to predict the domain is also indicated below by arrow signs.

Responsiveness	—————>	Performance-only
Supportiveness	—————>	None
Building environment	—————>	Performance-only
Collection and access	—————>	Gap
Furniture and facilities	—————>	Gap
Technology	—————>	Performance-only
Service delivery	—————>	Performance-only
Web services	—————>	Performance-only

Since five domains out of the eight can be correctly predicted by their individual quality attributes in the performance-only paradigm, it can be concluded that BLRA has also revealed that the performance-only paradigm is the best for higher predictability of customer satisfaction and service quality. However, this does not imply that all quality domains can be predicted by the performance-only paradigm because the attributes of collection and access, furniture and facilities, and supportiveness did not correctly predict the respective quality domains by this paradigm.

## **2. Comparison of the measure of customer satisfaction with quality domains**

Since the individual attributes were not reasonably able to predict their respective quality domains, only the significant domains were used to model overall customer satisfaction, as indicated in the following table. The summary of statistics is indicated in Table 6.46.

**TABLE 6.46: BLRA MODEL COMPARISON AT OVERALL CUSTOMER SATISFACTION LEVEL – PROVISIONAL MODELS I AND III**

<b>Quality Domain</b>	<b>Provisional Model I based on Disconfirmation (Gap) paradigm Exp(B)</b>	<b>Provisional Model III based on Performance-only paradigm Exp(B)</b>
Responsiveness	Not used	Not used
Supportiveness	Not used	Not used
Building environment	2.086*	n.s.
Collection and access	n.s.	1.949*
Furniture and facilities	2.248*	Not used
Technology	Not used	Not used.
Service delivery	Not used	2.232*
Web services	Not used	3.434*
	Hosmer and Lemeshow test: $X^2= 8.013$ , $p=0.331$ Cox and Snell $R^2=.197$ Correctness: 75.8%	Hosmer and Lemeshow test: $X^2= 3.868$ , $p=0.795$ Cox and Snell $R^2=.164$ Correctness: 73%

\* $p<0.05$

This comparison gives measurements of the relationship between overall customer satisfaction and satisfaction with significant quality domains. In the regression model based on performance-only scores, collection and access, service delivery, and Web services were significant predictors, while in the gap models, only furniture and facilities and building environment were significant. Overall correctness was better in the regression model based on gap scores at 76%. However, both regression models were not significant, as reported by Hosmer and Lemeshow test statistics (gap: H&L Test:  $X^2= 8.013$ ,  $p=0.331$ ; performance-only: Hosmer and Lemeshow Test:  $X^2= 3.868$ ,  $p=0.795$ ).

**6.9.2.2 BLRA model comparison: Models II and IV**

Provisional Models I and IV were compared to select the model that indicates higher predictability.

**TABLE 6.47: BLRA MODEL COMPARISON AT ATTRIBUTE LEVEL –  
PROVISIONAL MODEL II AND IV**

<b>Quality attribute</b>	<b>Provisional Model II based on Disconfirmation (Gap) paradigm Exp(B)</b>	<b>Provisional Model IV based on Performance-only paradigm Exp(B)</b>
Staff approachability	.801*	n.s
Complaint responsiveness	n.s	n.s
Cultural sensitivity	n.s	.724*
Courtesy of the staff	n.s	n.s
Personal attention to customers	1.187*	n.s
Being informed about new services	n.s	n.s
Supportive atmosphere	n.s	n.s
Staff knowledgeability	n.s	n.s
Promptness of the staff	n.s	n.s
Reflective and creative place	n.s	n.s
Helpful directional signs	1.337*	n.s
Comfortable and inviting place	n.s	n.s
High quality information resources	n.s	n.s
Collection completeness	n.s	n.s
Convenient access to collections	n.s	n.s
Collection comprehensiveness	n.s	n.s
Current information	1.488*	1.740*
Needs-oriented resources	1.204*	n.s
Good sanitary facilities	n.s	n.s
Convenient opening hours	1.275*	1.957*
Good ventilation	n.s	n.s
Good functional furniture	1.222*	1.821*
Good lighting	n.s	n.s
Quick reshelving	1.157*	n.s
Quietness in the library	n.s	.725*
Air-conditioning	n.s	n.s
Access to computers	n.s	1.485*
Audiovisual equipment in good condition	n.s	n.s
Error-free records in the systems	.749*	.704*
E-journal access	1.409*	1.510*
Remote access	n.s	n.s
Customer education programmes	n.s	n.s
Library guides	1.309*	n.s
Well-organised Web site	1.161*	1.302*
Useful library Web site	1.272*	1.909*



Quality attribute	Provisional Model II based on Disconfirmation (Gap) paradigm Exp(B)	Provisional Model IV based on Performance-only paradigm Exp(B)
Accurate OPAC	n.s	1.894*
	Hosmer and Lemeshow test: $X^2 = 4.425$ , $p=0.817$ Cox and Snell $R^2=.201$ Correctness: 74.1%	Hosmer and Lemeshow test: $X^2= 3.272$ , $p=0.916$ Cox and Snell $R^2=.267$ Correctness: 77.9%

\* $p<0.05$

Both regression models derived from BLRA were unable to demonstrate an acceptable level of overall model fitness, as reported by Hosmer and Lemeshow test statistics (gap:  $X^2 = 4.425$ ,  $p=0.817$ , performance-only:  $X^2= 3.272$ ,  $p=0.916$ ). However, the Cox and Snell  $R^2$  statistics and correctness of the prediction of performance-only model were better than those derived from the gap model.

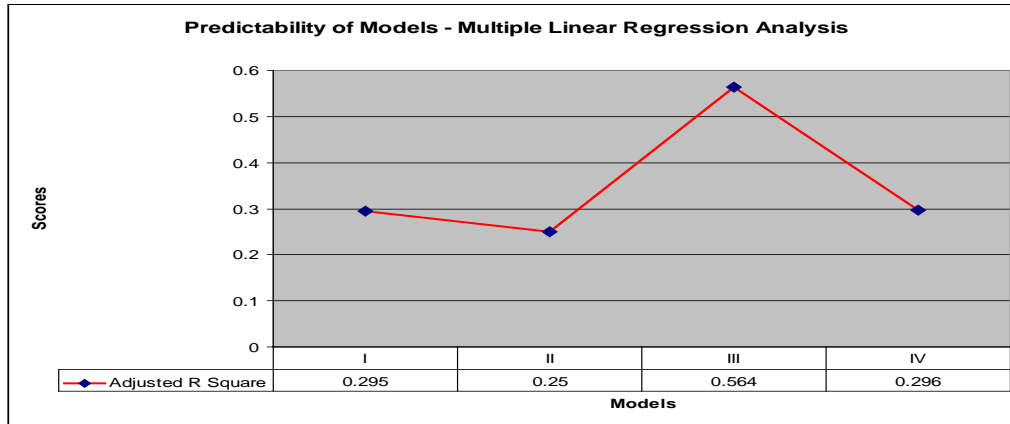
### 6.10 SELECTION OF THE BEST PROVISIONAL MODEL IN THE MLRA

According to the preceding analyses, all the provisional models were analysed by MLRA. A summary of the MLRA statistics of all provisional models is given below in terms of the F-statistics, significance level (p) and adjusted  $R^2$ .

Provisional Model I	F= 94.669, $p<0.001$ ;	Adjusted $R^2 = 0.295$
Provisional Model II	F= 30.865, $p<0.001$ ;	Adjusted $R^2= 0.250$
Provisional Model III	F= 219.169, $p<0.001$ ;	Adjusted $R^2 = 0.564$
Provisional Model IV	F= 27.598, $p<0.001$ ;	Adjusted $R^2= 0.296$

All these statistics were graphed into a line chart with the objective of determining the best provisional model with highest predictability, as reported by the adjusted  $R^2$  in the MLRA technique. Based upon the adjusted  $R^2$  as the predictability of each model, the model comparison was performed as depicted in Figure 6.13.

**FIGURE 6.13: PREDICTABILITY OF PROVISIONAL MODELS ANALYSED THROUGH MLRA**



The graph clearly demonstrates the highest scores of adjusted  $R^2$ , indicating that the best model in relation to the predictability of customer satisfaction is Provisional Model III, based on the performance-only paradigm.

### 6.10.1 Selection of the best model in the BLRA

Consistent with the model analysis conducted in the previous sections, all provisional models were also analysed by BLRA. The summary of regression model statistics of all provisional models is given below in terms of the Hosmer and Lemeshow test, significance level ( $p$ ), Cox and Snell  $R^2$  and Correctness.

Model I      Hosmer and Lemeshow test:  $X^2 = 8.013$ ,  $p=0.331$ ; Cox and Snell  $R^2 = .197$ ; Correctness: 75.8%

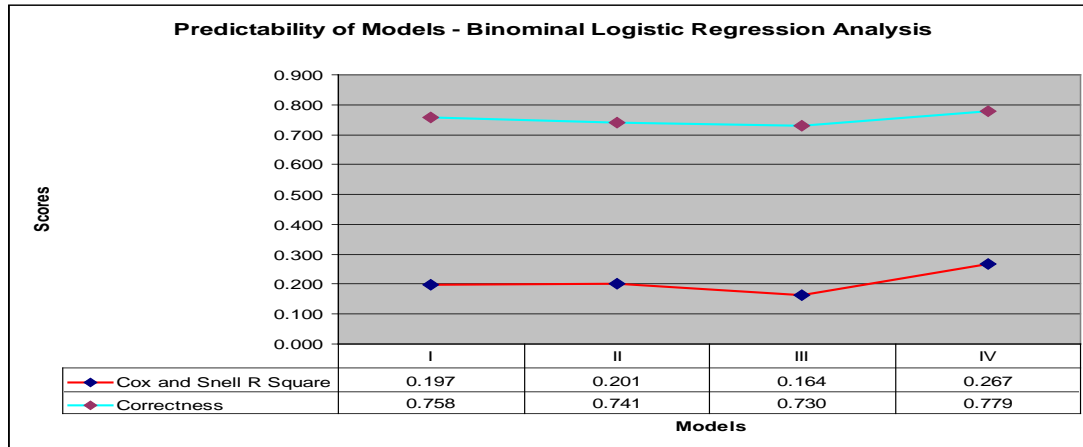
Model II      Hosmer and Lemeshow test:  $X^2 = 4.425$ ,  $p=0.795$ ; Cox and Snell  $R^2 = .201$ ; Correctness: 74.1%

Model III      Hosmer and Lemeshow test:  $X^2 = 3.868$ ,  $p=0.316$ , Cox and Snell  $R^2 = .164$ , Correctness: 73%

Model IV      Hosmer and Lemeshow test:  $X^2 = 3.272$ ,  $p=0.916$ , Cox and Snell  $R^2 = .267$ , Correctness: 77.9%

Based upon the Cox and Snell  $R^2$  and correctness, the BLRA model comparison was done as depicted in Figure 6.14.

**FIGURE 6.14: PREDICTABILITY OF PROVISIONAL MODELS ANALYSED THROUGH BLRA**



All models based on binomial logistic regression were unable to demonstrate significant strengths of fits. However, in considering the Cox and Snell  $R^2$  statistics and the prediction correctness, it is apparent that Model IV, which is based on the performance-only paradigm, is best compared to the other models (see Figure 6.14).

### 6.10.2 Final model comparison

Since there is no similar measure to evaluate predictability in both multiple linear regression and binomial logistic regression, a new measure was formulated. Even if the adjusted  $R^2$  was the most optimal for evaluating the predictability of models in linear regression, there is no analogous measurement in logistic regression to evaluate the same predictability. Even though there are some other R-square measures—such as Cox and Snell, Nagelkerke’s and McFadden  $R^2$ —used in logistic regression analysis, they tend to run lower than the corresponding adjusted  $R^2$  in linear regression because there is no analogous coefficient of  $R^2$  in logistic regression. Thus, a new method was developed for the model comparison, that is, the Mean Residual Analysis (MRA).

$$\begin{aligned} \text{Mean Residual Analysis} &= \left( \sum \frac{\text{Observed\_probabilities} - \text{Predicted\_probabilities}}{N} \right) \times 100 \\ &= \sum \frac{\text{Residuals}}{N} \times 100 \end{aligned}$$

If the mean residuals are smaller, the predictable accuracy of the model is higher. This was useful to detect predictions that were distant from the observations and to differentiate which model resulted in superior predictions that were closer to the observed values.

Mean Residual Analysis for regression Model III, based on multiple linear regression analysis:

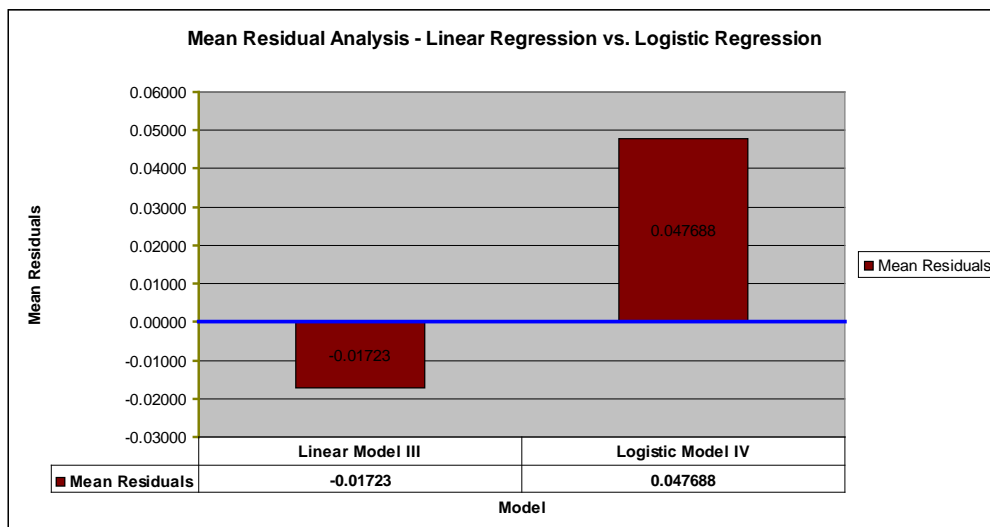
Mean Residuals = -0.01723

Mean Residual Analysis for regression Model IV, based on binomial logistic regression analysis:

Mean Residuals = 0.047688

These figures were graphed into a bar chart to determine the relative efficacy of the BLRA and MLRA models.

**FIGURE 6.15: MEAN RESIDUAL ANALYSIS FOR FINAL MODEL SELECTION**



According to Figure 6.15, it is apparent that the absolute lowest mean residuals belong to the model derived from multiple linear regression analysis–Provisional Model III, based upon the performance-only paradigm. Thus, it indicates that the relative efficacy of Model III founded on a linear relationship between the constructs was 36% higher than the models based on logistic regression analysis, as illustrated in Figure 6.15.

### 6.11 Socio-demographic attributes in overall customer satisfaction

A series of one-way ANOVA tests were run to determine whether the perceptions of overall customer satisfaction differed with respect to the respondents’ ages, genders, member categories and universities. Tables 6.48-6.50 summarise the results.

#### Age

The ANOVA table for age is depicted below in Table 6.48.

**TABLE 6.48: ANOVA FOR AGE**

Attribute Category	N	Mean	Standard Deviation	Standard Error	95% Confidence Interval for Mean	
					Lower bound	Upper bound
18-23	688	3.35	.324	.012	3.33	3.37
24-29	195	3.37	.353	.025	3.32	3.42
30-35	253	3.43	.301	.019	3.39	3.46
36-41	10	3.45	.369	.117	3.19	3.71
42-47	3	3.33	.289	.167	2.62	4.05
Total	1149	3.37	.326	.010	3.35	3.39
Attribute	Sum of Squares	Df	Mean Square	F	Sig.	
Age category (Combined)	1.153	4	.288	2.735	.028	

N-Observations, df-Degree of freedom, F-F statistics, Sig.-Significance at

### Member category

The ANOVA table for member category is depicted in Table 6.49.

**TABLE 6.49: ANOVA FOR MEMBER CATEGORY**

Attribute Category	N	Mean	Standard Deviation	Standard Error	95% Confidence Interval for Mean	
					Lower bound	Upper bound
Undergraduate	780	3.35	.330	.012	3.32	3.37
Postgraduate	119	3.39	.363	.033	3.32	3.46
Academic Staff	282	3.41	.302	.018	3.38	3.45
Total	1181	3.37	.328	.010	3.35	3.39
Attribute	Sum of Squares		df	Mean Square	F	Sig.
Member category (Combined)	.945		2	.473	4.421	.012

N-Observations, df-Degree of freedom, F-F statistics, Sig.-Significance at

### University

The ANOVA table for university is depicted in Table 6.50.

**TABLE 6.50: ANOVA FOR UNIVERSITY CATEGORY**

Attribute Category	N	Mean	Standard Deviation	Standard Error	95% Confidence Interval for Mean	
					Lower bound	Upper bound
University of Colombo	375	3.47	.335	.017	3.44	3.51
University of Sri Jayawardenepura	390	3.37	.299	.015	3.34	3.40
Rajarata University	244	3.33	.277	.018	3.30	3.37
University of Ruhuna	172	3.18	.349	.027	3.12	3.23
Total	1181	3.37	.328	.010	3.35	3.39
Attribute	Sum of Squares		df	Mean Square	F	Sig.
University (Combined)	10.642		3	3.547	35.915	.000

N-Observations, df-Degree of freedom, F-F statistics, Sig.-Significance at

## Gender

The ANOVA table for gender is depicted in Table 6.51.

**TABLE 6.51: ANOVA FOR GENDER CATEGORY**

Attribute Category	N	Mean	Standard Deviation	Standard Error	95% Confidence Interval for Mean	
					Lower bound	Upper bound
Male	600	3.35	.330	.013	3.32	3.37
Female	580	3.39	.324	.013	3.36	3.42
Total	1180	3.37	.328	.010	3.35	3.39
Attribute	Sum of Squares		df	Mean Square	F	Sig.
Gender (Combined)	.545		1	.545	5.082	.024

N-Observations, df-Degree of freedom, F-F statistics, Sig.-Significance at

As illustrated in Table 4.48, age has demonstrated an influence on satisfaction. The members belonging to the age group 36-41 are more satisfied, compared with other age groups. According to Table 6.50, it is apparent that member category affects overall customer satisfaction ( $F=4.421$ ,  $p<0.05$ ). It also suggests that the academic staff are more satisfied with overall service quality compared to the other groups. As illustrated in Table 6.50, the university also has the ability to elicit overall customer satisfaction, as reported by F-statistics ( $F=35.915$ ,  $p<0.001$ ). Furthermore, at the University of Colombo, people are more satisfied with the overall service of the library than in the other universities surveyed. As revealed in Table 6.51, females were found to be more satisfied with the service compared to males. This information given in Table 6.51 also implies that gender has an impact on overall customer satisfaction with the library service.

### 6.12 Situational attributes

Since the situational attributes are ratios, the MLRA technique was used to determine the relationship with overall customer satisfaction as the dependent attribute. Of the four attributes entered into the equation, stepwise methods produced only two attributes as significant: involvement and knowledge, as illustrated in Table 6.52. Vagueness was excluded from the final regression model, as it was not significant.

**TABLE 6.52: MLRA FOR SITUATIONAL ATTRIBUTES ON CUSTOMER SATISFACTION**

<b>Attribute</b>	<b>B</b>	<b>S.E</b>	<b>Beta</b>	<b>t</b>	<b>Tolerance</b>	<b>VIF</b>
C	3.518	.130		25.241		
Involvement	-.238	.054	-.199*	9.734	.408	2.451
Knowledge	.159	.048	.148*	10.964	.413	2.423

C=constant value of the regression equation, B=Unstandardised Beta coefficient, S.E=Unstandardised Standard Error, Beta=Standardised Beta coefficient, t=t value

\*p < 0.05

The overall F-test for the final regression model was highly significant (F=7.022, p<0.001, exhibiting a significant relationship between the independent and dependent attributes. The proportion of shared variance as reported by adjusted R<sup>2</sup> value equalled 0.015, which indicates that only 1.5% of the variance in overall customer satisfaction was accounted for by these three predictor attributes included in the model. The values for tolerance and VIF were in the accepted region, as indicated in Table 6.53.

### **6.13 SUMMARY**

The purpose of this study was to examine the nature and predictability of customer satisfaction in relation to service quality in Sri Lankan university libraries. Four provisional models were developed based on the conceptual model and the analysis performed in the exploratory part of the study (Chapter Five). These models were based on the disconfirmation (gap) paradigm and/or the performance-only paradigm. The analysis was carried out by means of two standard statistical techniques, called MLRA and BLRA. The provisional models tested by linear regression technique demonstrated that Provisional Model III was the best for predicting customer satisfaction of which quality attributes, as well as the domains under which the attributes were nested. This model was based on the performance-only paradigm, found to be stronger than the models measuring the gaps between perceptions and expectations (disconfirmation). However, when comparing the relative efficacy of both techniques, it was found that Model III, based on linear regression analysis, was the best parsimonious model providing evidence on the relationship between customer satisfaction and service quality, which was linear. It is contended that the parsimonious model developed has the potential



for subsequent developments and use by researchers and library administrators, in order to evaluate customer satisfaction and service quality in university libraries. The next chapter discusses the best model in detail, highlighting its managerial, theoretical and practical implications.

## **CHAPTER SEVEN: SUMMARY, DISCUSSION, IMPLICATIONS AND CONCLUSIONS**

### **7.1 INTRODUCTION**

The previous chapter provided a detailed account of the development and selection of a model to predict customer satisfaction from a service quality perspective. This chapter brings together the findings of the research and the contributions it has made to both service marketing theory and library and information sciences, in the context of service delivery in university libraries.

The initial focus is on the discussion of the selected provisional model for the prediction of customer satisfaction, followed by a discussion of the final model purified by the findings of the research. This chapter also discusses the results of the ten research questions put forth by the study. A summary of the contributions these findings have made to the relevant body of knowledge and the extent to which this knowledge would stimulate development of the subject matter for use in future research in the discipline are also presented. Following a brief discussion of the theoretical and methodological implications identified for practice and managerial insight, recommendations of the study and for future research are also provided, while cautioning the readers on the limitations that emerged in the study, before concluding the thesis with end remarks.

### **7.2 SUMMARY OF THE THESIS**

This research study was initiated with the intention of making a modest contribution to the relevant body of knowledge and stimulates further research in the discipline of library and information sciences. Before discussing the findings of this thesis, underscoring the contribution it has made to the relevant body of knowledge and service practices in university libraries, it seems pertinent and appropriate to present a brief chapter-by-chapter overview of the seven chapters of the thesis. Finally, a discussion of the recommendations and conclusions is presented.

**Chapter One:** The first chapter set the scene of the study, presenting the major objectives, problem area, scope and significance of the study. This research study was motivated by the major concern expressed by administrators in Sri Lankan university libraries to provide quality service that best suits the perceptions of the customers. This situation in university libraries motivated the researcher to focus on the need to develop a suitable model to predict customer satisfaction relevant to service quality in university libraries.

In the development of a model to predict customer satisfaction relating to service quality, this chapter emphasised the importance of a systematic examination of different indicators of service quality. As a preliminary measure, the current state of knowledge on the topic of research was conducted by undertaking a survey of relevant literature and findings from past empirical studies. This provided the conceptual background for the study. It also rationalised the necessity for a contextual setting by presenting the contextual background of university libraries in Sri Lanka.

**Chapter Two:** In Chapter Two, a review of the relevant conceptual literature was presented. This treatise delved into the conceptual base related to customer satisfaction and service quality. A critique of the existing conceptual literature was also put forth, discussing the definitions, concepts and theories related to customer satisfaction. The chapter elaborated upon the relationship between customer satisfaction and service quality, indicating that in the context of the research, service quality is a pre-requisite for customer satisfaction. This chapter critiqued the conceptual foundations of existing research studies and collectively concluded that the disconfirmation paradigm and performance-only paradigm may be utilised as a reliable and valid theoretical base to explain the customer satisfaction construct in relation to service quality. On this basis, a conceptual framework was developed by integrating the concepts applicable to the problem area, taking into account the key conceptual issues, theoretical criticisms of the concepts, and the issues of integration uncovered in the course of the conceptual review. The chapter finally presented a fuzzy conceptual model, which was currently

parsimonious rather than comprehensive, reflecting a scientific and theoretical conceptualisation of customer satisfaction in relation to service quality.

**Chapter Three:** This chapter provided the contextual research background to the study. It was logical to review the contextual setting, as it provides the notional and procedural foundations required to provide a theoretical framework to understand customer satisfaction in relation to service quality.

Two comprehensive models of customer satisfaction—that is, SERVQUAL, SERVPREF and a contextualised SERVQUAL model in libraries, LibQUAL—that integrate the theoretical paradigms identified in the conceptual review were comprehensively discussed and reviewed to examine their applicability to libraries and, in particular, university libraries. The conclusion derived from the review of the models was that these generic models were not appropriate to capture the real dynamism of the milieu of libraries in Sri Lanka, but that the underpinning paradigms of these models, particularly disconfirmation and performance-only, would be able to provide a solid foundation for modelling customer satisfaction in relation to service quality in libraries.

It also identified service quality and situational and socio-demographic attributes, which have proven their influence on customer satisfaction in the prevailing literature. The intention was to refine them to suit real-life environments in order to develop provisional models for further investigation relevant to the main study. The study uncovered the fact that while it was complete in aggregate, in isolation, some of the components of the fuzzy conceptual model identified in Chapter Two do not reflect accurately the picture of the contingency pattern of customer satisfaction. A revised fuzzy model based on contextual research findings was therefore presented in the chapter, with 14 research issues and 17 implications, the management of which was presented in the methodological part of the research.

**Chapter Four:** This chapter moved on to explaining the research design and methodology adopted in the study. The details of the research methodology include a

discussion on the philosophical paradigm, methods of the study, data collection procedures, the survey instrument used, and the sampling process adopted. The survey method—based on the stratified random sampling technique—was chosen as the most appropriate data collection technique due to the largeness of the sample.

Following the discussions in Chapter Three, this chapter initially examined the management of the research issues and their implications. The research design was presented thereafter in two stages: the exploratory study and the main study. The exploratory study identified quality attributes and domains. The main study developed provisional models based on the conceptual model revised in Chapter Three and on the findings of the exploratory study. Subsequently, the chapter discussed the methodological procedures adopted to test the models to identify the best/most suitable parsimony model to predict satisfaction.

As the philosophy of this research study was the combination of a phenomenological and a positivistic paradigm, the exploratory part of the research embraced the inductive approach, as it specifically focused on the experiential aspects of human behaviour and the process that underlines it. The research approach of the main study was deductive reasoning, as it necessitated testing the models empirically to find causal relationships between the constructs. The study was mainly cross-sectional. In the exploratory part of the research, there were four steps: specifying the domain of service quality and customer satisfaction, generating a list of service quality attributes that may impact customer satisfaction, and validating or confirming the revised fuzzy conceptual model identified in Chapter Three. Developing a questionnaire to identify the degree of importance of the attributes on customers' perspectives, and finally, refining the attributes and identifying quality domains were accomplished by utilising exploratory factor analysis, Cronbach's alpha, correlation matrices, KMO measure of sampling adequacy, and Bartlett's Measure of Sphericity. The main study had three steps: developing provisional models based on the identified attributes and domains in the exploratory study, conducting a survey to gather data on customer satisfaction and service quality, and testing the models with the data gathered from a larger sample. Finally, the chapter concluded that the confinement

of the best parsimonious model for predicting customer satisfaction will be achieved by employing MLRA, BLRA and ANOVA techniques.

**Chapter Five:** This was devoted to the analyses and findings of the exploratory study. In the exploratory study, quality attributes related to customer satisfaction in university libraries were generated by an in-depth search of the literature and focus group discussions. The literature survey allowed the researcher to identify 113 quality attributes, from which 41 significant attributes were identified by the focus groups, indicating their relevance within the Sri Lankan context. An additional nine attributes, which are very specific to university libraries in Sri Lanka, were also generated by these discussions. All four focus groups collectively agreed with the notion that service quality and situational attributes can be effectively used to predict customer satisfaction, but that purposive attributes do not have a significant impact on customer satisfaction.

Thereafter, the study used 242 subjects for the sample to identify the importance of quality attributes and to generate quality domains for the main study. Identification of domains was completed by DT and EFA, based on PCA Varimax rotation. Following the PCA, eight quality domains were discovered: responsiveness, supportiveness, building environment, collection and access, furniture and facilities, technology, service delivery and Web services. The chapter presented the domain structure identified by the exploratory study and demonstrated the acceptable construct validity and reliability in the conclusion. It validated the results as substantive and rigorous, and argued that they can be used to proceed to the second stage of the study.

**Chapter Six:** The main study, the core of the thesis, was developed in Chapter Six. Four provisional models were developed based upon the final conceptual model, domains and attributes identified in the exploratory study. The provisional models were founded on the disconfirmation (gap) paradigm and performance-only paradigm, as illustrated in Figures 6.1, 6.4, 6.7 and 6.10 in Chapter Six. Provisional Model I indicated the disconfirmation paradigm based on the gap scores of the quality attributes and domains. Provisional Model II indicated the disconfirmation paradigm based on the gap scores of the quality

attributes. Provisional Model III indicated the performance-only paradigm based on the performance-only scores of the quality attributes and domains. Provisional Model IV indicated the performance-only paradigm based on the performance-only scores of the quality attributes. The model analysis was carried out by means of two multivariate statistical analyses: the multiple linear regression technique with the assumption of linearity, and the binomial logistic regression technique with the assumption of non-linearity. These techniques were employed to determine the strength of the relationships between the independent and dependent attributes. All models analysed by MLRA were compared on the premise of the adjusted  $R^2$  as the measure of predictability of each provisional model, while Cox and Snell  $R^2$  and correctness were used for the BLRA.

Accordingly, Provisional Model III analysed by MLRA was selected as the best model for predicting customer satisfaction in relation to service quality in university libraries. In examining the power of situational attributes, it was found that customers' involvement in and knowledge of the service provisions influence the formation of overall customer satisfaction. In the socio-demographic aspect, age, member category, university and gender have also demonstrated a significant effect on customer satisfaction. Chapter Six concluded that Model III, based on a linear relationship between the construct of satisfaction and service quality, was the best parsimonious model to predict customer satisfaction from the service quality perspective in university libraries in Sri Lanka.

**Chapter Seven:** The seventh and final chapter describes the findings of the study in relation to the objectives, research questions and the development of the final model. Academic contributions of the study to the current literature and its managerial implications are also stated. Finally, this chapter draws attention to the limitations of the study and suggests research problems for potential further study and consideration.

## **1.3 DISCUSSION**

The discussion in this section reviews the key findings of this study and compares its outcome with those of previous studies referred to in the literature survey. The chapter initially discusses the final model, depicting many outcomes of the study. Section 7.3.1.1 depicts the overview of the selected provisional model, and section 7.3.1.2 expands upon the final model, which was the primary finding of the study.

### **7.3.1 The model for predicting customer satisfaction**

This section presents and discusses the selected provisional model, the revised provisional model, wherein the revisions were based on the findings of the study and the provisional model transformed into the final model. The discussion proceeds to the final model in detail.

#### **7.3.1.1 The selected provisional model**

According to the comparison of provisional models presented and discussed in Chapter Six, the provisional models analysed by MLRA were superior to the models derived by BLRA. In general, the models analysed by MLRA demonstrated the best predictability of customer satisfaction with service quality and high precision in comparison to the models derived by BLRA. For further comparisons, the provisional models analysed by MLRA based on the performance-only paradigms were selected as the better parsimonious models, in relation to the higher predictability of customer satisfaction, as also reported in other studies (Wolfenbarger & Gilly 2003). Finally, following a comparison of the models based upon the performance-only paradigm, Provisional Model III, comprised of quality domains and attributes, was established as the best parsimony model, owing to the facility it provides for enhanced predictability of customer satisfaction. This was noted in Chapter Six. The models constituted of domains have also been proven as the best models in some other studies in service marketing (Gounaris 2005).

##### **7.3.1.1.1 Construct of service quality**

Taking into consideration the construct of service quality, Provisional Model III consisted of 36 quality attributes and eight quality domains. The dependent attribute of the model



was overall customer satisfaction, and independent attributes consisted of eight quality domains: responsiveness, supportiveness, building environment, collection and access, furniture and facilities, technology, service delivery and Web services. Each independent attribute was also used as a dependent attribute to examine whether there is a relationship between the dependent attribute and quality attributes of given domains as independent attributes.

Since Provisional Model III consists of domains and attributes, the analysis was conducted in two steps. Step One determined whether satisfaction in each quality domain is a function of the measurement of performance, in terms of the attributes within that domain. When the quality attributes predicted satisfaction on their respective quality domains, the second step was undertaken. Step Two determined whether these quality domains predict overall customer satisfaction. The results of the analysis of Provisional Model III are explained below.

1. Satisfaction within each domain of customer satisfaction will be a function of the measurement of performance for the attributes within that domain.

This proposition tested the relationship between 36 quality attributes and the domains under which the attributes were nested. Eight multiple linear regression tests were used to measure the strength of these relationships, as discussed in section 6.7.2.1 of Chapter Three. For the domain of responsiveness, only three attributes—staff approachability, being informed about new services and cultural sensitivity—were significant predictors of satisfaction with responsiveness. The model accounted for 9% of the variance in satisfaction with the domain. The second domain addressed satisfaction with supportiveness. It was revealed that all attributes—supportive atmosphere, staff knowledgeability and promptness of the staff—were significant predictors of satisfaction with supportiveness. This model accounted for 4.5% of the variance in satisfaction with supportiveness. The third set of regression models under the domain of building environment examined the relationship between quality attributes with the building environment domain. All three attributes, namely, helpful directional signs, comfortable

and inviting place, and reflective and creative place, were significant predictors, and they explained 48% of the variability in the domain.

The next domain was collection and access. All six quality attributes were significant predictors of satisfaction with collection and access of the library. The six attributes were convenient access to collections, current information, high quality information resources, collection comprehensiveness, needs-oriented resources and collection completeness. This model explained almost 31% of the variance in the domain. The fifth domain of the model was furniture and facilities. Four of the seven quality attributes were significant predictors of satisfaction with furniture and facilities. Good ventilation, good functional furniture, convenient opening hours and good lighting attributes explained 75% of the variability in the domain. The model for the technology domain revealed that all four attributes—access to computers, air-conditioning, error-free records in the systems and audiovisual equipment in good condition—were significant predictors of satisfaction with the technology domain. Thirty percent of the variance in the technology domain was accounted for by these predictor attributes. The next regression model associated with MLRA examined the relationship of the quality attributes and service delivery.

All quality attributes, namely, e-journal access, library guides, remote access and customer education programmes were found to be statistically significant, and 41% of the variability in the service delivery domain could be explained by said attributes. The final domain was associated with Web services, and all three attributes named—useful library Web site, accurate OPAC and well-organised Web site—were significant predictors of the Web services domain; these explained almost 48% of the variance in the domain. Overall, thirty attributes out of 36 were found to be significant predictors of their respective domains. Only two domains—responsiveness, and furniture and facilities—did not qualify to establish that all quality attributes of their respective quality domains were significant. However, the remaining six domains—supportiveness, building environment, collection and access, technology, service delivery and Web services—were significant predictors of their respective domains. In the usual course of events, all models displayed significant levels of F-statistics at  $p < 0.001$ , which indicates that the goodness of fit of all

the regressed models are highly acceptable. Thus, it was concluded that the performance scores of individual quality attributes predict their respective quality domains well. On this premise, the second step was completed to determine whether the quality domains are significant predictors of overall customer satisfaction.

2. All quality domains will be significant predictors of overall customer satisfaction.

This proposition was focused at ascertaining whether all quality domains in Provisional Model III were significant predictors of overall customer satisfaction. Only seven domains—responsiveness, supportiveness, building environment, furniture and facilities, collection and Access, technology and service delivery—were significant predictors of overall customer satisfaction, and the model accounted for 56% of the variance associated with satisfaction, as discussed in section 6.7.2.3 of Chapter Six. The final model excluded the domain of Web Services as a consequence of its non-significance, and on the whole, the final model was statistically significant at  $p < 0.001$ .

#### **7.3.1.1.2 Socio-demographic attributes**

University, age, member category and gender were tested in order to determine whether these attributes influenced overall customer satisfaction, as depicted in section 6.11 of Chapter Six. The results of each of these analyses, based on ANOVA tests, revealed that age, member category, university and gender had an influence on overall customer satisfaction.

#### **7.3.1.1.3 Situational attributes**

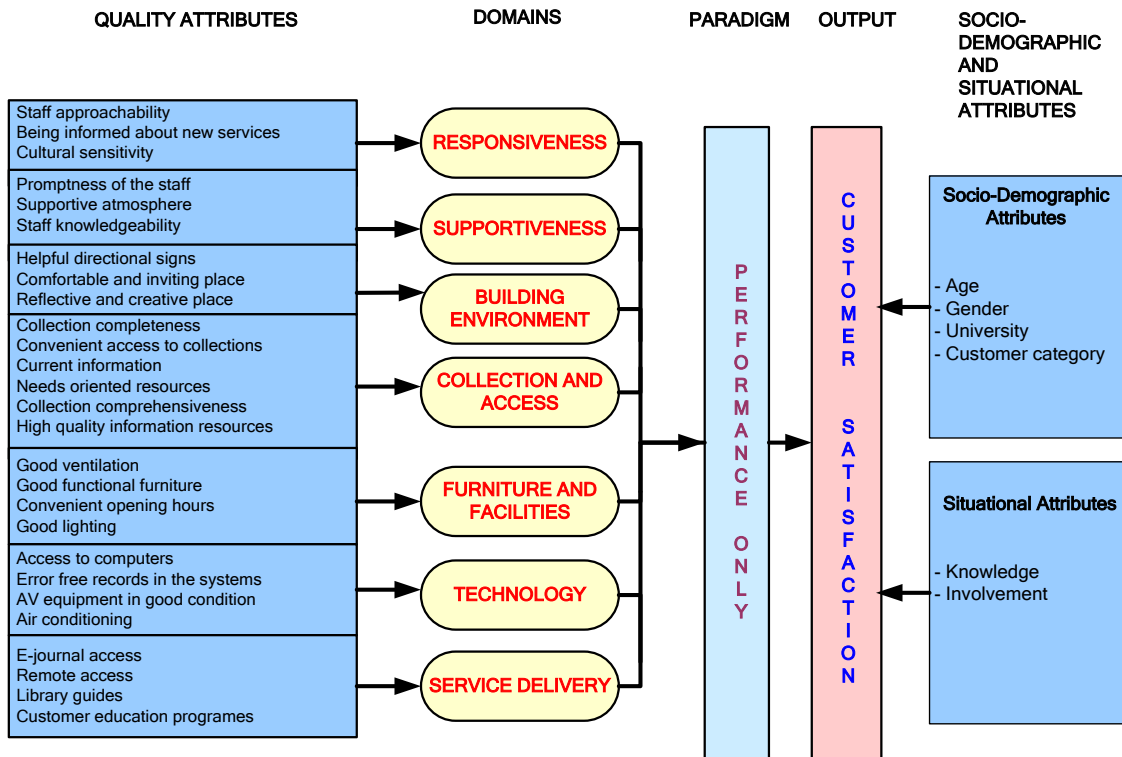
The purpose of examining situational attributes was to determine whether there is any relation between situational attributes and overall customer satisfaction. In the MLRA discussed in section 6.12 in Chapter Six, a significant relationship was found for the attributes of involvement and knowledge. Vagueness had been excluded from the final model on the basis of its statistical non-significance. The F-statistics for the overall F model was significant at the level of  $p < 0.001$ , evidencing that the overall model is statistically significant.

According to the findings that emerged from the analysis, the selected provisional model, that is, Model III based on the performance-only paradigm, was revised as described in the following section.

### **7.3.2 Final model revised**

This section presents the revised final model based on the findings of the study. Throughout the analysis, all the quality domains, with the exception of Web services, were found to be significantly associated with overall customer satisfaction. In individual quality domains, except the two domains of responsiveness and furniture and facilities, all attributes were significantly allied with respective quality domains. Even in the domains of responsiveness and furniture and facilities, a minimum of three attributes correlated with each particular domain. On the whole, Provisional Model III was substantially supported by the findings of the study, but some modifications were necessary, as indicated in the results of the analysis, to contextualise the model for Sri Lankan universities. This study therefore recommends on the basis of its findings that the selected Provisional Model III be improved by incorporating the significance of the findings, and that the attributes not significant to customer satisfaction be reconsidered. The model was consequently reduced to incorporate only the service quality domains of responsiveness, supportiveness, building environment, collection and access, technology, service delivery, and furniture and facilities. Age, gender, member category and university—as socio-demographic attributes—and involvement and knowledge—as situational attributes—were also incorporated into the model. Based upon these results, the revised version of Provisional Model III, that is, the final model of the study, is shown in Figure 7.1.

**FIGURE 7.1 THE FINAL MODEL TO PREDICT CUSTOMER SATISFACTION**



Source: Compilation by author

The uniqueness of this model is evident in the following features:

1. The model presents a holistic structure of the inherent dynamism of the customer satisfaction concept in relation to service quality in university libraries in Sri Lanka.
2. It integrates prevailing literature in the area of library and information sciences and service marketing, and includes aspects of linearity and complexity of the constructs and customer heterogeneity by socio-demographic attributes, together with the magnitude of the performance-only paradigm.
3. The model includes situational attributes that have not been considered in other customer satisfaction models developed in relation to libraries.
4. The socio-demographic and situational attributes were also used for the model to simplify the relationships among them that cannot be found from other similar models.

5. It generated seven quality domains that are exclusive and cannot be seen in other similar models in the service marketing and LIS disciplines.

### 7.3.3 Summary of model in equations

Several important outcomes were observed from the analysis, which provides further clarification of service quality on customer satisfaction. The regression results of the equation in the final model has been summarised below.

#### 7.3.3.1 The models derived at the domain level

The following equation was used as the generic formula to represent the final regressed models. The relation between the predicted outcome, Y, and the predictor variables, X<sub>1</sub>, X<sub>2</sub>.....X<sub>k</sub>, is defined as follows.

According to Tabachnick and Fidell (2001: 111), the generic formular of the multiple linear regression regression model:

$$Y = \alpha + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \dots \dots \dots \beta_n X_n + e$$

Where “e” represents the error term.

The consequent seven MLRA equations represent each quality domain of the final model.

1. Responsiveness satisfaction (Y) = 4.073- 0.235 Staff approachability (X<sub>1</sub>)+ 0.107 Being informed about new services (X<sub>2</sub>) -0.085 Cultural sensitivity (X<sub>3</sub>) +e
2. Supportiveness satisfaction (Y) = 3.046+ Supportive atmosphere (X<sub>1</sub>)+ 0.173+0.134 Staff knowledgeable (X<sub>2</sub>) -0.100 Promptness of the staff (X<sub>3</sub>) +e
3. Building environment satisfaction (Y) = 0.054+ 0.447 Helpful directional sign (X<sub>1</sub>)+0.424 Comfortable and inviting place (X<sub>2</sub>)+ 0.314 Reflective and creative place (X<sub>3</sub>) +e
4. Collection and access satisfaction (Y) = 0.654+ 0.240 Convenient access to collection (X<sub>1</sub>)+ 0.240 Current information (X<sub>2</sub>) + 0.153 High quality information resources (X<sub>3</sub>)+ 0.204 Collection comprehensiveness (X<sub>4</sub>)+ 0.237 Needs-oriented resources (X<sub>5</sub>)+ 0.174 Collection completeness (X<sub>6</sub>) +e

5. Furniture and Facilities satisfaction (Y) = 0.376+0.523 Good ventilation (X<sub>1</sub>)+ 0.397 Functional furniture (X<sub>2</sub>)+0.279 Convenient opening hours (X<sub>3</sub>)+ 0.215 Good lighting (X<sub>4</sub>) +e
6. Technology satisfaction (Y) = 2.208+0.301 Access to computers (X<sub>1</sub>)+ 0.287 Air-conditioning (X<sub>2</sub>)+0.183 Error-free records in the system (X<sub>3</sub>)+0.143 AV equipment in good condition (X<sub>4</sub>)+e
7. Service delivery satisfaction = 0.969+0.350 E-journal access (X<sub>1</sub>)+0.259 Library guides (X<sub>2</sub>)+0.280 Remote access (X<sub>3</sub>)+0.220 Customer education programmes (X<sub>4</sub>)+e

### **7.3.3.2 The model derived at overall customer satisfaction level**

The relationship between seven domains and overall customer satisfaction was delineated by the following equation:

$$\text{Overall customer satisfaction (Y)} = 0.333 + 0.357 \text{ Collection and access (X}_1\text{)} + 0.359 \text{ Furniture and facilities (X}_2\text{)} + 0.353 \text{ Responsiveness (X}_3\text{)} + 0.257 \text{ Service delivery (X}_4\text{)} + 0.204 \text{ Building environment (X}_5\text{)} + 0.161 \text{ Technology (X}_6\text{)} + 0.054 \text{ Supportiveness (X}_7\text{)} + e$$

The regression coefficient of the final model is 0.333, which indicates the average amount the dependent attribute increases, when the independent attribute increases by one unit and other independent attributes are held constant. In other words, the  $\beta$  coefficient is the slope of the regression line; the lower the  $\beta$ , the more moderate the slope, indicating that when the independent attributes—collection and access, furniture and facilities, responsiveness, service delivery, building environment, technology, and supportiveness—increase, then overall customer satisfaction increases by a relatively low unit. Thus, even if the relationship is positive, the dependent attribute does not increase at the same level of increment as with the independent attributes. This insinuates that even though the satisfaction of library customers towards the domains is high in the library environment, the overall customer satisfaction is not as high as the level of domain satisfaction.

### **7.3.4 Research objectives**

This section discusses the objectives pertaining to research questions presented in Chapter One in detail. The aim of this section is to explore the extent to which the objectives were achieved in the study and to comprehend the specific implications of each research question (RQ).

#### **Objective 1: To examine what constitutes customer satisfaction in relation to service quality in university libraries in Sri Lanka.**

This objective consisted of the following two research questions.

**RQ. 1:** *Why is it necessary to contemplate customer satisfaction in relation to service quality?*

This research question was investigated by conducting a literature survey, the results of which are discussed comprehensively in Chapter Three. The discussion presented below is a summary and conclusion of the results of the literature survey.

Most of the literature on customer satisfaction has endorsed the growing popularity of service quality as a contrivance for developing customer satisfaction. The first step in the study therefore involved identifying the domain of the construct to explain what is included in the problem area. Customer satisfaction and service quality are said to be interrelated concepts, and satisfaction to be a function of service quality (Hernon & Altman 1998: 36; Iacobucci, Ostrom, & Grayson 1995: 277). Thus, the important aspect of this relationship is the causality between the two constructs: Which one is antecedent to the other? Does satisfaction cause quality judgment, or does quality judgment cause satisfaction? Since most researchers have agreed that quality judgments cause satisfaction, it may be concluded that service quality is the antecedent of satisfaction (Dabholkar, Shepherd & Thorpe 2000: 116; Heskett, Sasser & Schlesinger 1997; Spreng & Mackoy 1996: 209).



Satisfying customers is a core business challenge in every organisation, which university libraries cannot escape. A quality library service basically indicates satisfying the requests of customers accurately, exhaustively and expeditiously (Sharma 2001). Providing excellent service quality is also recognised as a critical business requirement (Vilares & Coehlo 2003; Voss *et al.* 2004). As Rosen, Karwan & Scribner (2003) state, customer satisfaction and service quality are not a corporate offering; they are unconditionally a competitive weapon. This is truly an essential component of corporate profitability and survival (Bolton, Lemon & Verhoef 2004: 278; Luo & Homburg 2007: 113; Monk & Ryding 2007: 627; Newman & Cowling 1996, cited in Maddern *et al.* 2007: 999). Traditionally, the Association of Research Libraries (ARL) suggested some assessment criteria based on the objective description of collection sizes and other expenditure-driven matrices in order to measure service quality in libraries, but these do not take into consideration the satisfaction of customers.

Recently, there has been increasing pressure on libraries to assess the degree to which their services demonstrate quality, rather than relying on traditional statistics, based on tangible products of the library. Several individual libraries have conducted independent measures of customer satisfaction and service quality in libraries. Even so, there is no universal and systematic reporting mechanism for the results (Cook & Thompson 2000: 248) in libraries. As library service assessment processes develop and progress, both researchers and library administrators have begun to examine current practices and to seek to experiment with better assessments. While a number of researchers have evaluated the constructs of customer satisfaction and service quality to model satisfaction in other areas, there is a dearth of research studies in the field of university libraries to model customer satisfaction with service quality, in order to encourage stakeholders to develop appropriate measures for assessment.

### **Implications of RQ. 1**

The university library should ensure that the university community makes use of the resources for the right purpose, and that the library provides high quality services to this wider customer community (Poll & Boekhorst 1996). By identifying service quality and

customer satisfaction from the customers' perspectives, library service can strengthen its quality of services, as expected by customers. To collate the opinions of customers on current library services, the libraries can reorient and regulate the services to serve the customers better. Assessment techniques are the most significant instruments to monitor a university library regarding the fulfilment of its objectives. Thus, the requirement to contemplate customer satisfaction means the prediction of levels of satisfaction from the service quality perspective, thus identifying the strengths and weaknesses of the services to enhance the service provision of the university library. This is the basic motivation of the current research agenda.

**RQ. 2:** *What are the available theories that can be used to predict customer satisfaction in relation to service quality?*

This research question was also examined in the comprehensive literature survey, the results of which are described in Chapter Two. The discussion below is the summary of its findings.

One of the leading paradigms that has dominated the service quality and customer satisfaction literature is the disconfirmation paradigm, based on consumer behaviour, which suggests that customers' post purchase perceptions of a product/service are a function of their pre-purchase expectations (Grönroos 1993: 51). This paradigm met with much criticism from other researchers (Buttle 1996). The major criticism was that the expectations did not add any new knowledge, other than that which comes from performance measures (Cronin & Taylor 1992: 65; Cronin & Taylor 1994). Therefore, Cronin and Taylor (1992: 60) suggested a new paradigm called the performance-only paradigm, in order to prove its intrinsic worth empirically. They explain that the performance-only measure of a service or good is the most important aspect for capturing the customers' perceptions of the quality of service offered by a service provider (Cronin & Taylor 1992: 60). Babakus and Boller (1992) agreed with the criticism put forth by Cronin and Taylor (1992; 1994), confirming that the difference in scores between

expected and actual performance, according to the disconfirmation paradigm, was mainly attributable to the general tendency to increase customer expectations.

Other than these paradigms, there are some other paradigms—the weighted performance-only paradigm, evaluated performance and normed quality paradigm—that can be found in the literature. However, the disconfirmation and performance-only paradigms are the most prominent and popular paradigms, which have been conscientiously researched in a vast array of studies, and their applicability has been proven in different contextual settings and cultures in both business and non-business philanthropic areas.

### **Implications of RQ. 2**

Service quality and customer satisfaction assessment in the literature reveal numerous conflicting results. While the disconfirmation paradigm has received widespread acceptance and support in the literature, some studies discovered that the performance-only paradigm is unbeatable. This mixed evidence suggests that the satisfaction formation processes in different cultures vary, and it may perhaps be more complex than established by the leading paradigms (Oliver 1980: 461; Oliver & DeSarbo 1988: 495-496). It is therefore apparent that there is no generally agreed-upon notion about the best paradigm in predicting customer satisfaction regarding service quality based on customers' perspectives. Thus, the investigation of these two paradigms was useful to identify the best means of predicting customer satisfaction in relation to service quality in university libraries.

### **Objective 2: To examine what constitutes customer satisfaction in relation to service quality in university libraries in Sri Lanka**

To identify a solution for the second objective of the study, an in-depth investigation was conducted with three research questions. The following research questions reflect the results found from the analysis.

**RQ.3:** *What are the service quality attributes that impact customer satisfaction in the context of university libraries in Sri Lanka?*

This investigation also involved an in-depth search of the literature to ascertain the attributes of service quality. The literature yielded 113 attributes pertaining to service quality, listed in Table 3.3 of Chapter Three, which were likely to be related to customer satisfaction. These attributes were subsequently directed to the focus groups for the identification of quality attributes that are very relevant to university libraries in Sri Lanka. The focus groups identified forty one attributes from the 113 attributes taken from the prevailing literature that are relevant to the existent dynamism of Sri Lankan university libraries, and an additional fourteen quality attributes were also identified as very specific attributes relevant to the Sri Lankan university environment. These attributes are unique to the inherent dynamism of customer satisfaction and service quality phenomena in university libraries in Sri Lanka. A panel of experts reviewed the selected fifty five quality attributes and finally identified fifty, after eliminating the duplicated, ambiguous and incorrectly worded attributes, as shown in Table 5.5 of Chapter Five. As an outcome of the focus group discussions, the fifty attributes were included in an exploratory survey to identify the domains of quality attributes from the customers' perspectives. Forty of the quality attributes were identified as important attributes by the respondents of the exploratory study. When aggregating the attributes into quality domains, the forty attributes were reduced to thirty six significant attributes. These are indicated in Table 7.1, which also reveals that after the model refinement process, the attributes relevant to university libraries in Sri Lanka were included in the final model.

**TABLE 7.1: QUALITY ATTRIBUTES IDENTIFIED BY THE STUDY**

Quality attributes identified by the exploratory study	Quality attributes presented in the final model
Staff approachability	X
Complaint responsiveness	-
Cultural sensitivity	X
Courtesy of the staff	-
Personnel attention to customers	-
Being informed about new services	X
Supportive atmosphere	X
Staff knowledgeability	X
Promptness of the staff	X
Reflective and creative place	X
Helpful directional signs	X
Comfortable and inviting place	X
High quality information resources	X
Collection completeness	X
Convenient access to collections	X
Collection comprehensiveness	X
Current information	X
Needs-oriented resources	X
Good sanitary facilities	X
Convenient opening hours	X
Good ventilation	X
Good functional furniture	X
Good lighting	X
Quick reshelving	-
Quietness in the library	-
Air-conditioning	X
Access to computers	X
Audiovisual equipment in good condition	X
Error-free records in the systems	X
E-journal access	X
Remote access	X
Customer education programmes	X
Library guides	X
Well-organised Web site	-
Useful library Web site	-
Accurate OPAC	-

X = quality attributes presented the final model. - = quality attributes not presented in the final model

### **Implications of RQ. 3**

In general, customers' expectations and perceptions, as well as performances of services, are formed by service quality attributes that are specific to each service organisation. These dimensions should have conceptual and empirical relevance to the construct of

customer satisfaction in university libraries. Deductive and inductive attribute generation methods were found to be useful in identifying the quality attributes that are connected to customer satisfaction. Of the thirty six quality attributes that were identified in the exploratory study as significant, twenty eight were conclusively identified in the final model, which could be used to predict customer satisfaction in the university library sector in Sri Lanka, as depicted in Figure 7.1.

**RQ. 4:** *What are the service quality domains that impact customer satisfaction in the context of university libraries in Sri Lanka?*

The methods used in this section of the study were the Delphi technique and factor analysis. These were employed to identify the dimensional structure of service quality within university libraries. In the focus group discussions, 50 attributes relating to all aspects of service quality were found to be important in the context of university libraries in Sri Lanka. These attributes were used for the exploratory study to identify the factor structure. However, in the process of customers' assessments of the importance of service quality in relation to their satisfaction, subjects in the exploratory study identified only forty attributes that are significant in the formation of satisfaction in university libraries. The Principal Component Analysis (PCA) based on Varimax Rotation was used to refine these 40 attributes, and it produced an 11-factor structure with Eigenvalues greater than 1.0. The eleven-factor solution explained 67.20% of variance, which is deemed to be satisfactory by social science standards (Hair *et al.* 1998: 377), but the efficacy of the solution was highly questionable because the entire factor structure produced was a meaningless factor solution. Thus, to overcome the meaningless factor structure, the Delphi technique (DT) was used to group the attributes into conceptually logical factors/domains. It produced eight quality domains, and then, the EFA with Varimax rotated PCA was performed for each conceptually identified domain. To determine the appropriateness of factor analysis, the KMO measure of sampling adequacy and BMS were examined, and a visual inspection of correlation matrices of data was also performed to ensure whether a substantial number of correlations was greater than 0.30 (Hair *et al.* 1998: 138).

The conceptually categorised domains, except affect of service personnel, were statistically significant and valid with quality attributes. However, PCA produced two factors for the domain of affect of service personnel, as responsiveness and supportiveness. Therefore, responsiveness, supportiveness, building environment, collection and access, furniture and facilities, technology, service delivery and Web services were determined through the factorial analysis technique as the domain structure for the construct of service quality in university libraries, as shown in Table 7.2. However, the model analysis excluded the Web services domain in the final model because of its statistical non-significance.

**TABLE 7.2: QUALITY DOMAINS IDENTIFIED BY THE STUDY**

<b>Domain identified by the exploratory study</b>	<b>Domains identified by the final model</b>
Responsiveness	X
Supportiveness	X
Building environment	X
Collection and access	X
Furniture and facilities	X
Technology	X
Service delivery	X
Web services	-

X = quality domains presented in the final model, - quality domains not presented in the final model

#### **Implications of RQ. 4**

The SERVQUAL domain structure has been questioned by some researchers. Nitecki (1996), cited in Nagata *et al.* (2004: 54), examined the applicability of SERVQUAL in the library sector and found only three significant domains. She therefore questioned the validity of SERVQUAL in establishing domains in the assessment of service quality in university libraries. Even though the underpinning attributes of each domain of this study are different from Satoh and Nagata's (2003) work, cited in Nagata *et al.* (2004: 55), only

one domain—collections and access—was similar to the collections and access domain of the present study. It was concluded in the conceptual review that at present, there is no universally established theoretical model to measure customer satisfaction in relation to service quality, as there are many criticisms of the existing SERVQUAL, SERVPREF and LibQUAL models. Customer satisfaction necessitates an identification of domains that are very specific to a given context. Thus, by applying an array of research methods, this study has identified seven quality domains that impact customer satisfaction in relation to service quality in Sri Lankan university libraries.

**RQ. 5:** *What provisional customer satisfaction models can be constructed, based on the disconfirmation and performance-only paradigms?*

Chapter Six demonstrated all the provisional models developed for analysis. Model I—as depicted in Figure 6.1 of Chapter Six—indicates customer satisfaction within each domain of service quality as a function of the gaps between the expectation and performance for quality attributes within that domain. Figure 6.4 in Chapter Six depicts Model II, which designates customer satisfaction related to the gap scores between expectation and performance for the individual quality attributes. Model III—as demonstrated in Figure 6.7 in Chapter Six—indicates that customer satisfaction within each domain of service quality is a function of the performance-only scores for quality attributes within that domain. The model thereafter demonstrates that these domains will be significant predictors of the overall customer satisfaction. Model IV, illustrated in Figure 6.10 of Chapter Six, demonstrates that customer satisfaction is related to the performance-only scores for the identified 36 quality attributes.

### **Implications of RQ. 5**

All possible models—that is, four provisional models—were constructed based on the disconfirmation and performance-only paradigms. Therefore, these models consisted of four propositions. However, the first two propositions were composed of two sub-propositions.



Proposition 1: *Sub-proposition i*: Satisfaction within each quality domain will be a function of the gap of the attributes within that domain.

Proposition 1: *Sub-proposition ii*: The gap of quality domains will be significant predictors of overall customer satisfaction.

Proposition 2: Overall customer satisfaction is a function of the gaps of individual quality attributes.

Proposition 3: *Sub-proposition i*: Satisfaction within each quality domain will be a function of the performance of attributes within that domain.

Proposition 3: *Sub-proposition ii*: Performance of quality domains will be significant predictors of overall customer satisfaction.

Proposition 4: Overall customer satisfaction is a function of the performance of individual quality attributes.

Provisional Models I, II, III and IV adopted these propositions, respectively. This type of provisional model development process has thus far not been employed in any research study in the field of library and information science. Thus, this is unique, from a methodological viewpoint, in the service marketing area in the context of libraries in general.

**Objective 3: To establish service quality attributes and particular service quality domains, which impact customer satisfaction with university libraries in Sri Lanka**

The investigation of research questions pertaining to this objective was conducted by means of two different statistical techniques. As there is no consensus regarding whether the relationship between customer satisfaction and service quality is linear or non-linear, this study used both linearity and non-linearity assumptions. The linearity assumption was investigated by MLRA, and the non-linearity assumption by BLRA. Thus, the following research questions nested in this research objective were analysed with both of these standard statistical techniques.

**RQ.6:** *Are individual service quality attributes strong predictors of their respective service quality domains in libraries?*

This research question was tested using 36 quality attributes identified by the exploratory part of the study, and the domains under which the attributes were nested. To ascertain the relationships between the gap of expectation and performance in each of the eight quality domains, MLRA and BLRA techniques were employed in the analysis.

***Analysis based on linearity assumption using MLRA***

Sixteen multiple linear regression tests were used to measure the strengths of the attributes and domains, based on the performance-only paradigm, and another set of eight multiple linear regression tests was used to measure the strengths of the attributes and respective domains, based on the disconfirmation paradigm (gap). For the responsiveness domain, only three domains were significant, and this model accounted for only 9% of the variance in satisfaction with responsiveness. The next examination was focused on gap scores, and it produced only four attributes as significant. However, the regression model based on gap scores was weaker than the model based on the performance-only paradigm because the attributes of this gap model accounted for only 6% of the variance.

All attributes in the supportiveness domain were significant in both paradigms, but the model on performance-only was superior because it accounted for 5% of the variance, whilst the gap model accounted for 3%. While all attributes in the building and environment domain were significant in the performance-only model, only two were significant in the gap model. The performance-only model accounted for 48% of the variance associated with satisfaction with the building and environment domain. The gap model, however, accounted for only 15% of this domain's variance. The next set of regression tests addressed satisfaction with collections and access. This analysis revealed that all attributes were significant predictors of the model on performance-only, accounting for 31% of the variance in satisfaction with collections and access. The corresponding gap analysis revealed that only five gaps were significant predictors, and only 22% of the variance was associated with satisfaction with collection and access. The

fifth set of regression models examined the relationship between quality attributes and furniture and facilities domain. Only four attributes were significant predictors in the model on performance, accounting for almost 75% of the variance, and six attributes were significant predictors of the gap model, accounting for 37% of the variance.

The technology domain indicated that all attributes based on performance-only were significant predictors, accounting for 30% of the variance, and 23% was explained by the gap model. Service delivery and Web services also revealed that all attributes pertaining to their disciplines were significant in the performance-only model, accounting for 41% and 48% of the variances associated with the particular domain, respectively. The corresponding gap regression analysis of the two domains showed that all attributes were significant in the gap model in the service delivery domain, while only one attribute was significant in the Web services domain. Both models in both domains showed 23% and 14% of the variance associated, respectively.

#### ***Analysis based on non-linearity assumption using BLRA***

BLRA was performed to measure the strengths of associations between quality attributes and the respective quality domains. Sixteen logistic regression models were developed to examine the differences between gap models and performance-only models. The responsiveness domain found four attributes in the gap model to be significant, and the performance-only model found only one attribute significant. However, both models were not statistically significant. The regression model derived for gap scores of the supportiveness domain did not contain any significant attribute, and the performance-only model consisted of all three attributes as significant. However, the model does not fit the data, indicating its non-statistical significance. Two of the four building environment attributes were significant in the gap model, and all three were significant in the performance-only mode. The overall fitness of both models was good, but the correctness of classification of the data of performance-only model was better (97.8) than that of the gap model (73.2). The regression model pertaining to collections and access for the gap scores revealed that five of the six attributes were significant predictors, while the performance-only model proclaimed only three attributes as significant. The Hosmer and

Lemeshow tests indicated that both models were significant overall, but the performance-only model showed a higher correctness.

The furniture and facilities gap score model showed that six of the seven independent attributes were significant predictors of the domain. The corresponding performance-only model indicated that only four attributes were significant. The overall goodness of fit of the gap model was revealed by the Hosmer and Lemeshow test, and the model was statistically significant. The performance-only model was not significant. The model derived for technology, the sixth attribute, was not significant in both gap and performance-only paradigms. The next models based on the gap and performance-only paradigms analysed the strength of satisfaction attributes in the service delivery domain. Three of the four attributes were significant predictors of satisfaction with service delivery in the gap model. All four attributes were significant in the performance-only model. However, the gap model did not show the overall significance, while the performance-only model showed a statistical significance with higher correctness (92.9%) than the gap model (72.5%). The last regression model based on gap scores also revealed that two of the three gaps were significant with the Web services domain. The performance-only model revealed all three attributes as significant, and the prediction as having higher correctness (94.9%). Overall, the gap model was not significant, and the performance-only model was statistically significant at  $p < 0.001$ .

### **Implications of RQ. 6**

The performance-only models—analysed by means of both multiple linear regression analysis and binomial logistic regression analysis—were always much stronger than the models based on gap scores. As a whole, the models derived from the performance-only paradigm predicted satisfaction of quality domains more correctly, which further indicates that the individual service quality attributes are strong predictors of their respective service quality domains in libraries. Moreover, the model based on the performance-only scores of these individual quality attributes and analysed by MLRA were explicitly found to be better predictors than the performance-only scores analysed by BLRA. This demonstrates that the relationship between the domains and quality

attributes are linear, and the results of these analyses showed that the individual service quality attributes are strong predictors of their respective service quality domains.

**RQ. 7:** *Are individual service quality attributes significant predictors of overall customer satisfaction in libraries?*

The relationships between the 36 quality attributes and overall customer satisfaction, using gap scores and performance-only scores, were estimated. The analysis was carried out through two different methods, employing MLRA when assuming a linear relationship, and employing BLRA when assuming a non-linear relationship between the constructs.

***Analysis based on linearity assumption using MLRA***

Only nine attributes based on gap scores were significant predictors of overall customer satisfaction. These quality attributes accounted for only 25% of the variance in overall satisfaction, as indicated in Table 6.49. In the performance-only model, fifteen of the thirty-six quality attributes were significant predictors of overall customer satisfaction (see Table 6.49). This model accounted for almost 30% of the variance associated with overall customer satisfaction.

***Analysis based on linearity assumption using BLRA***

Only thirteen quality attributes, as explained in section 6.6.2.2 of Chapter Six, were found to be statistically significant when predicting overall customer satisfaction in the model based on gap scores. This regression model, however, accounted for a poor overall fitness, manifesting a statistically insignificant p-value. The next model examined the relationship between performance-only scores of quality attributes and overall customer satisfaction. Only eleven attributes were significant predictors of overall satisfaction. The model also produced a Hosmer and Lemeshow test value, manifesting an insignificant p-value (0.916) and thus providing evidence that the model does not fit the data.

### **Implications of RQ. 7**

A comparison of the two statistical methods used for data analysis showed that MLRA is the best method because it produced statistically significant models. The difference between the predictive powers of the quality attributes, performance-only versus the gap scores, indicates that the performance-only scores presented better predictive power over the gap scores. Thus, it is evident that the individual service quality attributes, based on performance-only scores, are significant predictors of overall customer satisfaction in university libraries.

**RQ. 8:** *Are individual service quality domains significant predictors of overall customer satisfaction in libraries?*

This was focused on the predictability of the eight quality domains in predicting overall customer satisfaction in university libraries. Each of these domains was operationalised in the survey as an independent question about customers' perception of the overall quality of each of the eight domains. The relationship between the eight quality domains and overall satisfaction was examined using gap scores and performance-only scores, with multiple linear regression analysis and binomial logistic regression analysis.

### ***Analysis based on linearity assumption in using MLRA***

To measure the influence of the eight domains on overall customer satisfaction, two regression models were developed, based on gaps scores and performance-only scores. The first regression model focused on gap scores of eight domains. Five of the eight quality domains—responsiveness, building environment, technology, service delivery and Web services—were included in the final model as significant domains. The model accounted for almost 30% of the variance associated with overall customer satisfaction. The second model was based upon performance-only scores, revealing that seven quality domains out of eight were significant with overall customer satisfaction without Web services. This model explained over 56% of the variance associated with overall satisfaction.

### *Analysis based on linearity assumption using BLRA*

The binomial logistic regression analysis was performed to measure the strength of the relationship between domains and overall customer satisfaction in assuming a non-linear relationship between these constructs. Two BLRA models were run to examine the differences in the predictability of quality domains versus the gap scores and performance-only scores. The first model, based on the gap scores, found only two domains out of the eight—building environment and furniture and facilities—to be significant predictors of overall satisfaction. However, the regression model as reported by Hosmer and Lemeshow test was not significant. The second model based on the performance-only scores selected only three domains—collection and access, technology, and Web services—out of the eight. However, the model produced a Hosmer and Lemeshow Test Value of  $X^2 = 3.868$ , manifesting an insignificant p-value ( $p = 0.795$ ). This proved that the overall fitness of both models is poor because the models did not fit the survey data accurately. Thus, both models did not qualify for consideration.

### **Implications of RQ. 8**

Overall customer satisfaction is related to both satisfaction ratings in the form of gap scores and performance-only scores of quality domains, although the relationship between overall satisfaction and quality domains based on gap scores was weak, indicating statistical non-significance. The performance-only paradigm was found to be a statistically better paradigm, which produced significantly better predictors of overall customer satisfaction than the disconfirmation paradigm. Thus, all individual service quality domains, except Web services, were significant predictors of overall customer satisfaction in libraries. The MLRA produced the best model, and the linearity assumption of the relationship between the constructs was adequately proven by the study.

**Objective 4: To determine which socio-demographic and situational attributes predict customer satisfaction, which help library administrators and policymakers to better understand these influential determinants of different customer groups**

This objective was investigated through two research questions, given below. The purpose of this objective was to ensure whether there was any impact from these ancillary attributes on overall customer satisfaction in university libraries.

**RQ. 9:** *What socio-demographic attributes impact overall customer satisfaction regarding library services?*

In this study, it was necessary to find evidence to link the theory that differences in age, gender, member category and university have a significant impact on overall customer satisfaction. ANOVA tests were used to determine the differences in age, gender, member category and university in the process of developing overall customer satisfaction. It was found that there are significant differences resulting from age, member category, university and gender with regard to the prediction of customer satisfaction.

#### **Implications of RQ. 9**

Taking into consideration the prevailing literature, it was found that there is no clear signal in similar studies that socio-demographic attributes determine customer satisfaction. However, Nimsomboon and Nagata (2003) state that all desired expectations lagged behind the actual service perception, and there are different perspectives among three customer groups. Filiz (2007) discovered similarities and differences in customer groups. However, the survey results did not show statistical differences in perceptions of library service quality between Osmangazi University and Anadolu University students (Filiz 2007). Age, gender, university and member category have an influential power on the formation of overall customer satisfaction. Satisfaction with library services may consequently differ, according to such customer characteristics. Thus, it can be concluded that there is an impact from these socio-demographic attributes upon overall satisfaction with the services of the university libraries.



**RQ. 10:** *What situational attributes impact overall customer satisfaction regarding library services?*

Three situational attributes examined in this study were involvement, knowledge and vagueness. One MLRA model was employed to determine the strengths of the relationships between overall satisfaction and situational attributes. A total of two situational attributes out of the three were found to be significant predictors of overall customer satisfaction. Knowledge and involvement were significant, and vagueness was excluded from the final model due to its statistical non-significance. Thus, it is apparent that the involvement of the customers with library services and their knowledge about the services impact the level of customer satisfaction.

#### **Implication of RQ. 10**

No study demonstrated that situational attributes impact overall customer satisfaction towards library services. However, the analysis presented here demonstrated a statistically significant relationship between overall customer satisfaction and situational attributes. Specifically, knowledge and involvement are significant, due to the fact that the sample respondents were selected based on an inclusion criterion that they have experience with the university library service as customers. This is an untouched avenue that has not been previously identified by similar studies in the discipline.

### **7.4 OVERALL IMPLICATIONS OF THE RESEARCH**

The new source of empirical evidence from this analysis offers some significant implications. The study contributes to the body of knowledge in three main areas—methodological, theoretical and managerial aspects—as discussed below.

#### **7.4.1 Methodological implications**

To capture the holistic nature of customer satisfaction in relation to service quality in achieving reliability and validity, a combination of positivist and phenomenological inquiries (Cooper-Martin 1992; Hirschman & Holbrook 1986) was used in the study. In highlighting the static nature of generic service quality models identified in the service

marketing, Grönroos (1993) calls for a more adaptable model to incorporate the inherent dynamism of service quality in a specific service sector. Thus, the exploratory part of this research study was based upon the premise of capturing the real dynamism of satisfaction and quality constructs in the Sri Lankan university library sector. In this section, the legitimate dynamism of customer satisfaction, based on what customers seek to be satisfied with the library service in relation to service quality, was investigated through the phenomenological approach. This approach helped the study to identify the real picture of customer satisfaction in relation to service quality, thus determining the quality attributes that contribute to customer satisfaction. Using the phenomenological inquiry, the focus groups of this study examined service quality attributes and the satisfaction formation process in university libraries through their consumption experiences. Consequently, a sound conceptual model was developed for the study. The findings of this research therefore have implications for service marketing practitioners in libraries, including recognition of the holistic nature of library use and the dynamic nature of the attributes that define customers' satisfaction with library services.

Domain refinement and the model development procedure, which consist of a series of statistical tests, were conducted in the study and based upon the positivistic approach. This process included exploratory factor analysis, reliability analysis, and regression analysis. Thus, the study primarily utilised positivism for the main part of the study. Therefore, the findings of this study and its methodological contribution are unique to service quality research in libraries because this approach challenges the tradition that holds that phenomenology and positivism are two different and diametrically opposed approaches, and that a combination of these two cannot exist (Easterby-Smith, Thorpe & Lowe 1991: 27). The challenge confronted in this is to generate a sound theory through experiential customer behaviour. Thus, the methodology employed in this study is distinctly relevant to the service marketing sector; it facilitated both capturing the bona fide dynamism of the backdrop and purification of the final model, by employing a new paradigm of a combined phenomenological and positivistic approach, derived from two different philosophical doctrines.

In light of the core statistical techniques used in the analysis, it was found that the MLRA and BLRA did not produce similar results, when subjecting the same dataset to the two techniques. MLRA produced a higher predictability of the models in comparison to BLRA. In both models, MLRA produced more accurate estimates of the probability of belonging to the dependent category. Furthermore, MLRA estimates were aligned more closely with observed probabilities, compared to the BLRA estimates. Thus, it indicates a linear relationship between the constructs of customer satisfaction and service quality, as MLRA shares the assumption of the linearity of relationship between these two constructs. Ting (2004: 407) says “much research on satisfaction is still using the linear function to measure the determinants of satisfaction.” This statement is proven by the study at hand, indicating that the relationship between the constructs is linear, though some studies have argued that the relationship is non-linear (Ting 2004: 407).

The greater the number of independents, the more the researchers are expected to report the adjusted  $R^2$  coefficient as a measure of evaluating the predictability of the models, based on the linearity assumption. The adjusted  $R^2$  is important when comparing models with different numbers of independents. Gujarati (2006: 229) recommends that even when comparing two regression models, it is important to determine the  $R^2$  value, as it explicitly takes into account the number of attributes included in the model. Therefore, the adjusted  $R^2$  was helpful to learn more about the predictability of models because it provided an indication of the extent of the variance in the performance outcome. The model has accounted for the population from which the sample was drawn. Furthermore, a visual inspection of the normal probability plot revealed that the residual plots were almost close to the normal straight diagonal line, suggesting that the residuals were of approximate normal distribution in confirming the greater validity of the regression model.

This research is basically a multi-stage and multi-method study. The multi-methods and two-stage research design offered an incomparable methodological foundation for future research studies in the field of service quality and customer satisfaction in libraries. The two stages of the study were the exploratory study and the main study. The exploratory

section of the study used a four-step method, combining different research methods to ascertain the solutions for the first five research questions, while the main study consisted of four steps to test the provisional models to uncover the most optimal final model. The major contributions of this research consequently include the utilisation of a mixed methodological research design to discover the best optimal model.

From a methodological perspective, most researchers have used EFA with Varimax factor rotation to reduce the attributes and to identify the domains. However, in this study, EFA demonstrated a significant shortcoming, which is the distorted factor loading, as demonstrated in some other research studies (Segars & Grover 1993). In this present study, the factors were loaded onto a solution, of which the factor loading was illogical, meaningless and irrational. Thus, to stall and remove the materialisation process of meaningless factor solution, this analysis used a manual attribute clustering technique, the Delphi technique, which was performed by a panel of experts and a group of customers to cluster the attributes into conceptually logical factors/domains. The Exploratory Factor Analysis, with the Varimax rotated PCA, was then performed for each conceptually identified domain, in order to review whether it confirmed the factor structure statistically. This was helpful to identify statistically significant factors, when the PCA generated extraneous factor solutions. Hence, the distinctiveness of the factors can be affected by these meaningless factor solutions, and the researcher might lack any sound evidence or theoretical explanation on which to base an interpretation (Sureshchndar, Rajendran & Anantharaman 2002). Thus, such methodological mitigation is imperative for confronting such situations, which indicates the methodological novelty of this study.

A common statistical measure—such as the adjusted  $R^2$  and correctness to compare the BLRA and MLRA models that assess the relative efficacy of the models—could not be found in the standard statistical techniques. A coefficient of BLRA that corresponded to the adjusted  $R^2$  in the MLRA was needed for model comparison. However, there were no precisely analogous coefficients in the BLRA to the adjusted  $R^2$  of MLRA. Even though a number of logistic  $R^2$  measures have been introduced in the literature, all measures tend

to run lower than the adjusted  $R^2$  of MLRA. Even if Cox and Snell's  $R^2$  is an attempt to imitate the interpretation of the adjusted  $R^2$  in MLRA, it does not produce the actual percentage of variance explained, as reported by the adjusted  $R^2$ , and therefore, the model comparisons cannot be correctly performed (Garson 2008). Thus, a new measure called mean residual analysis was devised to contend with this predicament. In this measure, residuals of each model, based on MLRA and BLRA, were calculated separately. Then, the mean residuals were calculated for each model and compared. As the residuals are the difference between the observed values and predicted values by the regression, the lowest mean residuals indicate that the data is almost close to the diagonal curve of the regression, suggesting that the regression curve approximated the data. It further confirms that the validity of the regression model, which produced the lowest mean residuals, is higher than the other models. This is one of the major methodological contributions of the present study that expand the knowledge base of service marketing research, generally, and service marketing libraries in particular.

#### **7.4.2 Theoretical implications**

The most important theoretical contribution of this study is that the performance-only theory has been proven valid for determining customer satisfaction with service quality perspectives in the university library sector in Sri Lanka. It produces a better insight into the formation of customer satisfaction in relation to the university library sector by examining its attributes and domains. Thus, the overall contribution of this study to the service marketing philosophy is that it establishes the fact that performance scores of quality attributes follow some predictable pattern of customer satisfaction in university libraries.

Although a considerable number of formal research studies on customer satisfaction related to service quality in libraries have been carried out in the West, only a few such research studies have been conducted in the East. As reported and proven by other research studies in different service sectors in various cultures, the best method for predicting customer satisfaction is the performance-only paradigm (Cronin & Taylor 1992; McAlexander, Kaldenberg & Koenig 1994). The current study also provides

evidence of its robustness and usability for generalisations on the performance-only paradigm in a different culture, such as university libraries in the Eastern hemisphere. Even if LibQUAL for library assessment is widely applied to any kind of library in any culture, the underpinning theory of the model based on the disconfirmation paradigm is built only to identify the discrepancies between customers' perceptions and expectations of services. Thus, it is apparent that the current LibQUAL is not yet an adequately developed tool to measure and represent a dependable library service assessment. In conclusion, it may be contended that the performance-only paradigm has outperformed the disconfirmation paradigm in predicting overall customer satisfaction, as reported by several other studies (Brady, Cronin & Brand 2002: 17-18; Cronin & Taylor 1992; McAlexander, Kaldenberg & Koenig 1994). Thus, this study contributes to the body of knowledge by establishing a premise for the confirmation of theory, based on the evidence revealed that the performance-only paradigm provides the best method of predicting customer satisfaction in university libraries.

This study further confirms the compelling argument raised by Bolton and Oliver in 1989, cited in Bolton and Drew (1991: 376), that the customers' assessment of continuously provided public services may depend on performance-only assessments. In an overwhelming finding, this study confirms the fact that the performance-only theory was advanced to determine customers' assessments of satisfaction in relation to service quality, by taking into consideration the fact that the library service is also a continuously provided public service in universities. This revelation has been now confirmed by the empirical findings of this study, signifying that the performance-only paradigm is the best-suited paradigm for the Sri Lankan university library environment.

The identified final model in this study is different from the outcomes of previous empirical research on service quality and customer satisfaction in the library sector. Also supported by other research in the field of library and information sciences, this model proved that wherever the five SERVQUAL dimensions were not found, additional dimensions of quality were necessary. On the whole, service quality domains in this model prove to be useful as components for examining the predictive power of customer

satisfaction. These domains provide theoretical and empirical explanations regarding the application of the conceptual framework on “customer satisfaction in relation to service quality” of library services, specifically, university academic libraries. As Jabnoun and Khalifa (2005), Akbaba (2006: 185) and Caro and Garcia (2007: 60-61) pointed out, the applicability of generic models—such as SERVQUAL and SERVPREF—for measuring service quality is open to question. Moreover, it can be argued that a simple adaptation of generic models, such as LibQUAL and SERVQUAL, attributes and domains is insufficient to measure service quality across a diversity of service industries.

In consonance with previously identified models in the literature suggesting that all models are multi-dimensional, seven domains were found in this study, too. It is apparent that the number of domains varied according to the service sector, like libraries and the country in question. For example, the domain structure of the lodging industry in Australia (Wilkins, Merriless & Herington 2007) was different from North America (Getty & Getty 2003).

In recent times, the relationship between quality and satisfaction has been questioned in some contemporary studies (Shahin 2004; Riviere *et al.* 2006), while the majority of the research has taken the debate forward up to a point where the relationship is linear. However, the results of the multiple linear regression analysis used in this study showed that service quality attributes are significant factors in determining customer satisfaction, and the data of the study supported this predominantly accepted notion of linearity. The quality attributes and domains were regressed to determine whether a linear relationship exists with customer satisfaction in the sample. Residual plots against the predicted values of the dependent attribute of customer satisfaction did not exhibit any nonlinear pattern in the residuals, with regard to confirming the assumption of linearity in MLRA. However, BLRA was unable to offer better predictability and model fitness, compared to MLRA. Thus, the non-linearity assumption of the relationship lacked restraint, and it was concluded that the relationship between customer satisfaction and service quality in the university library environment is linear (Hair *et al.* 1998: 229). Most of the literature

supports this study, by attesting a linear relationship between service quality and customer satisfaction.

### **7.4.3 Managerial implications**

It is very important for library administrators to understand the attributes that play a role in the overall satisfaction judgments of library customers, and particularly in the domains as well. Thus, it is essential for library administrators to understand these drivers and how they influence satisfaction. In this study, the three most important quality domains were identified—collection and access, service delivery, and furniture and facilities—by which customers mainly evaluate their overall performance to form satisfaction. Therefore, library administrators are required to maintain or increase the level of customer satisfaction in these domains and to assign high priority to them. However, on the whole, the strong performance of all quality domains, as identified in the study, is the decisive factor that ensures overall customer satisfaction in relation to library services (Lagrosen & Lagrosen 2007: 49). Thus, it becomes necessary to arrange the resources and operations in each of the domains to optimise the functioning of the service patterns and policies in order to provide an upgraded service to the customers. In the long run, library administrators should periodically examine how they manage and how these quality domains perform in the context of the needs of library customers.

Generally, university libraries have a dominant role in the library sector because of their monopolistic position. There hardly exist competitors in the sector, as university libraries are specialised in scholarly information resources, which are not easily found in other libraries. The collections of the university libraries are built to meet specific research and informational needs of the institution's academic programmes. The general policy of university libraries is that the curricula provide the basis on which the library collection is built. Due to this monopoly in the sector, university libraries are likely to have fewer service-oriented provisions and more bureaucratic characteristics in their service provisions. As a result, the university library customer may be relatively less satisfied with service provisions of the library. In this study, however, it was found that customers have not been sensitised to these issues for the reason that they have not chosen



responsiveness and supportiveness domains as prioritised important areas. Even if customers have specified collection and access, service delivery, and furniture and facilities as the most important domains, this does not indicate that the customers are less satisfied with supportiveness and responsiveness. As a consequence, this disparity should also be taken into consideration when refurbishing the service corresponding to identified quality attributes and domains, in order to provide an excellent service to valued customers.

In general, it is established that the performance-only paradigm is dominant in predicting customer satisfaction, in comparison to the disconfirmation paradigm. It is also apparent that library administrators should pay more attention to the actual performance of their services, rather than on promotional services to market the commodities, because customers primarily rely on how the service provider performs the service.

The model identified in this study could be used to design a simple measurement or to monitor the process of a library's performance, solely by surveying customers. Using these results in a comparative context could also be a useful tool for diagnosing service quality in relation to customer satisfaction in university libraries, which could stimulate improving service quality by analysing and remedying the shortcomings. In other words, the tools could possibly be employed by every university library in Sri Lanka, and these tools themselves could help to develop service quality that would in turn improve customer satisfaction. The final model of the study can therefore be utilised to design a tool with its attributes, domains and the performance-only paradigm. Ultimately, the results could be generalised across university libraries in Sri Lanka for best practices, and also for cross-institutional assessments, to establish a model for local practices. Given the contextual considerations, the application of this instrument could be extended to other academic libraries outside the universities.

As can be seen from the outcome of the analysis, age, university, member category and gender have a moderating influence on overall satisfaction. Academic staff members and female customers tend to be more satisfied, compared to other member categories and

males. In addition, customers' knowledge of and involvement with library services also influence overall customer satisfaction. Overall satisfaction varies on the basis of knowledge and involvement of the customer, age, university, gender and member category. Therefore, service providers should be able to understand better the customers' knowledge and to which member category they belong, in order to provide a better customised service with the objective of increasing their overall satisfaction.

In addition, the quality attributes identified in the literature and by focus groups (Karatepe, Yavas & Babakus 2005) might not be exhaustive. Therefore, library administrators should also conduct interviews or opinion surveys with customers to ascertain what they perceive to be the key determinants in the formation of satisfaction. The present study showed that library administrators should recognise that each service context is unique, and that socio-demographic factors and situational attributes in particular should also be taken into consideration, when enhancing service quality to satisfy customers.

## **7.5 LIMITATIONS OF THE STUDY**

The review of conceptual and contextual literature revealed that the discussion regarding customer satisfaction focused primarily on theoretical and methodological proponents of satisfaction in relation to service quality. The present research found different shortcomings and limitations in these approaches. This included a lack of a generally accepted conceptual framework and sound instructional methodology to help libraries to examine, evaluate and assess customer satisfaction and service quality. It is apparently important, as Bartell (1996) has argued, that organisations do not apply the methods suggested by any of the quality management philosophers rigidly and in a formula-driven manner. Thus, it was also clear that it is necessary to examine the methods and paradigms very carefully and to judiciously match them to the very specific requirements of a specified library.

This study was restricted to four university libraries, excluding branch libraries instead of the entire number (15) of universities, seven postgraduate institutions and nine other

higher educational degree-awarding institutions in Sri Lanka. However, this limitation was mitigated by selecting two universities in Colombo and two outside the Colombo area, which was meant to be a reasonably representative sample of the universities.

The rigorous model-building procedure allowed the production of a general model to model customer satisfaction in relation to service quality. Nevertheless, this exercise has some limitations, which should be addressed in a future study. Even if a valid model were developed, a confirmatory analysis and cross-cultural validation should be conducted with a larger sample, for greater generalisation of the novel model. As Churchill (1979) says, while the exploratory factor analysis is valid for developing models in the early stages, subsequent use of factor analysis in a confirmation fashion seems necessary in the later stages. The advantage of applying confirmatory factor analysis, in reference to classical approaches—such as common factor analysis and multi-trait, multi-method analysis—to determine convergent and discriminant validity, are widely recognised (Anderson & Gerbing 1988).

Even though this study used the coefficient alpha to measure reliability including internal consistency, the test-retest reliability is much better for establishing the reliability of a model (Galletta & Leader 1989: 424). This is specifically important for examining the stability of an instrument over time.

A limitation can be seen in the measurement of attributes in the model, which were described in positively worded statements and may thus lead to positive replies. It is generally agreed that good researchers use both positive and negative statements (Churchill 1979). However, this approach may have some negative consequences for respondents who can make comprehension errors and take more time to read and answer the questionnaire in this study, which consisted of over sixty questions. Babakus and Boller (1992) believed that the combined positively and negatively worded statements in SERVQUAL tended to result in two separate “method factors,” and subsequently, Parasuraman, Berry and Zeithaml (1991a) have reworded all their negative statements positively. However, this would perhaps present a limitation of this study, as it is a

question of whether the positively worded statements may lead only to positive replies. Thus, this should be separately investigated by a methodical psychometric scrutiny.

This survey used a cross-sectional sample. As a result, while causal relationships can be inferred, they cannot be strictly proven. A longitudinal research design with requisite controls and before-after measures would be necessary to properly test causality of customer satisfaction and service quality in university libraries. Even if this is difficult to achieve with the subjects in the study, such investigations would advance the existing theory/theories and help researchers to capture bona fide states of customer satisfaction in university libraries over an extended period of time. Moreover, this perspective of university library customers could reveal new avenues of customer satisfaction in the long run.

The result of this study revealed significant relationships between customer satisfaction and service quality, customer satisfaction and socio-demographic attributes, and customer satisfaction and situational attributes. However, the model did not test for the existence of reciprocal effects between the constructs. The reciprocal effect of situational and socio-demographic attributes on each of the eight quality domains must be tested.

As all universities in Sri Lanka are public/state universities, the libraries have surreptitious customers, such as unauthorised outsiders, policymakers and well-wishers. Their needs, expectations and perceptions might be different from the general public of the university community. However, the influence of these customers may affect the overall quality of the library in different ways because they may simply approach the heads of parent organisations and administrators of the library. In consequence, the administrators may change the service in keeping with the suggestions of these customers, as they are more influential and more powerful in comparison to the general customer community of the library. These indirect customers may complicate and confront the validity of the simplistic notions of customer satisfaction and service quality models. Thus, the study should be expanded to capture the diversity of the customer

population in the appropriate context, in order to obtain more information regarding the dynamism of the context, by exercising the phenomenological approach.

## **7.6 FURTHER RESEARCH AND DEVELOPMENTS**

Further development of the final model is possible. More questions could be added to increase the level of customer satisfaction and gather more quality attributes, which could significantly contribute to the formation of satisfaction. Furthermore, the attributes and domains can be used to weigh the more important attributes that carry greater values. Further research is also needed to weigh the domains of responsiveness, supportiveness, building and environment, collection and access, furniture and facilities, technology, and service delivery, as they are evenly weighted at present. On this premise, the quality attributes and domains identified in the exploratory study can be used to weigh them. The higher scoring attributes and pertinent domains could carry greater weight, thus substantially influencing overall customer satisfaction.

In addition, further research can include a situational analysis to identify which attributes and domains are most prominent in which situations. The framework can also be applied to different settings.

This study was conducted in Sri Lanka. Further expansion and comparison involving university libraries not based in Sri Lanka, with differing work practices, methods, customer communities, and library resources, can be conducted. Culture will have a significant influence on service quality and customer satisfaction. This would open another line of comparative research that could help libraries understand global issues pertaining to customer satisfaction with service quality. Calvert (2001) stated that “academic library customers have very similar expectations of service,” based on a comparative analysis of the data in the United States, China, Singapore and New Zealand. Thus, it is clear that users value the same dimensions when forming customer satisfaction in relation to service quality of libraries. As a result, if a common structure of domains for libraries could be established based on the premise, the possibility of using them as benchmarks of the instrument can be explored. On the other hand, there is another

argument that the construct of service quality, which has been developed in one culture, may differ from other cultural settings (Karatepe, Yavas & Babakus 2006; Payne-Palacio & Theis 2005: 155-156; Raajpoot 2004: 189; Spears & Gregoire 2004: 61). Thus, the relative importance and efficacy of attributes and domains in different cultures might not be applicable (Donnelly & Shiu 1999: 498; Glaveli *et al.* 2006: 390; Karatepe, Yavas & Babakus 2006) to all libraries across the globe. This research study also compared the similarities among results of other studies conducted in different countries. These results are very specific to university libraries in Sri Lanka, but there is space for additional investigations.

The research design used in this study was based largely on self-administered questionnaires, data analysis for clustering attributes into domains, and finally, checking their significance. In this case, the environment factors were considered static. However, the enormous economical, logistical and political problems that could have placed restrictions on this investigation have not been taken into account in this study. There are numerous political and logistical circumstances in university libraries that doubtlessly impede the formation of customer satisfaction with service. Thus, further investigation is needed to address these impediments and to examine how they affect overall customer satisfaction and service quality.

The low explanatory power of some regression models—for example, responsiveness and supportiveness—in the present study might have arisen due to methodological considerations, such as the use of a 5-point scale rather than a 7-point or 10-point scale. Sometimes, the problem of less explanatory power may arise from the inclusion of inappropriate attributes in the model, in the context of university libraries. Both aspects must be investigated, and replications are required in future research so as to arrive at a psychometrically, methodologically as well as managerially more useful model for use in university libraries.

The methodology of this research to address the research problem is unique. Therefore, it is a significant contribution to the relevant body of knowledge. This methodology could

be employed for further research studies to examine the robustness of the methodology for making generalisations in different settings. Furthermore, the research questions derived from this study provide further research opportunities in the service marketing area.

## **7.7 CONCLUSIONS**

Library administrators have recognised that irregular service statistics alone are not sufficient for assessing library operations. Employing user assessment of library services is now a well-accepted concept. Pruett (2005: 5) asserts that customers' assessments of service quality are decisive, a conclusion derived from customer-centred academic libraries, rather than service-centred academic libraries. As suggested by Hiller and Self (2004: 2), the assessment of academic library services is important because of the increased pressure of accountability to all stakeholders, changing customer needs, and the identification of academic library services that are not up to standard.

### **7.7.1 Best paradigm**

The review of the literature revealed that the disconfirmation and performance-only paradigms were the two most widely advocated and applied paradigms, appropriate for determining customer satisfaction in relation to service quality. A number of research studies have been carried out in the field of library and information sciences, but it is not yet clear as to which paradigm is the best for modelling customer satisfaction. This study made a pioneering effort to establish conceptual and methodological soundness, along with the diagnostic power of the two paradigms, in the context of evaluating the service quality in the university library sector in Sri Lanka. The study reveals and concludes that **the performance-only measure has emerged as the best paradigm for use in the context of university libraries.** The study has extended the understanding of scholars and library administrators of the theory in this area and provided important information on the customer satisfaction process of university libraries in terms of service quality, which may contribute to more optimised customer care.

### **7.7.2 Customer satisfaction as a complex phenomenon**

Even though the disconfirmation paradigm was the best and most popular approach available in the 1990s, it is becoming apparent that it consists of a number of shortcomings. At best, it can be argued that the SERVQUAL model based on the disconfirmation paradigm is applicable to contexts close to its original settings—appliance repair and maintenance, and retail banking. It appears that developing separate models depending upon the purpose and context of the measurement is the most fruitful and meaningful way forward. It may be possible that the service quality and customer satisfaction constructs are quite distinct in different areas, and if so, it is impossible to obtain a global measurement approach. Thus, the results confirm the argument put forth by Berry, Zeithaml and Parasuraman (1985: 45) that the relative importance of service quality attributes would vary among distinct service industries.

The results of this study and the dynamics related to the assessment of library service reveal that **customer satisfaction from a service quality perspective in university libraries is considerably more complex than conceptualised by the current tools, such as LibQUAL, SERVPREF and SERVQUAL.** Thus, this research, by addressing both conceptual and empirical issues, has produced a final model that can be best used to identify and steer practical assessment activities efficiently in university libraries, allowing libraries to evaluate their services systematically and to identify areas for effective improvement. Furthermore, this model provides a frame of reference for university libraries to assess their performance. The research also found seven quality domains and 28 related attributes concerned with overall customer satisfaction. Even though some quality areas may not satisfy customers, management must still maintain quality levels that adhere to industry standards and remedy any failures of these attributes, in order to prevent their detrimental effects on satisfaction.

### **7.7.3 Attributes/domains on customer satisfaction**

This research focused on the quality drivers of the construct of customer satisfaction, based on a cross-sectional analysis at a single point in time. The results reinforce some of the findings in the existing literature that point to service quality in university libraries as



being the key drivers of customer satisfaction, which can be predicted by the performance-only paradigm. Furthermore, the findings were in conformity with the literature that points to the linear relationship between satisfaction and service quality. However, the domain structure of the final model is exclusive to this study, which cannot be observed in other relevant studies in the field. Seven of the eight quality domains—responsiveness, supportiveness, building environment, collection and access, furniture and facilities, technology, and service delivery proved to be significant predictors of customer satisfaction in the final model.

Involvement with and knowledge of the library customers of service provision have an significant impact on the formation of overall customer satisfaction. Age, member category, university and gender also affect overall customer satisfaction. Therefore, **these factors must also be considered by service providers and policymakers in university libraries in order to harness the process of enhancing ultimate customer satisfaction.** Whilst not detracting from preceding research studies conducted in the field, this study has demonstrated significant implications for researchers and library administrators in the country in understanding the importance of individual quality attributes/domains within the specific service spectrum of university libraries, in order to provide greater satisfaction for customers with a quality library service.

#### **7.7.4 Building blocks for future research in relationship marketing**

In this study, a broad conceptual model integrating well-established paradigms and concepts from the areas of service marketing and library and information sciences was initially developed. Thereafter, attributes and domains were generated through a variety of methodologies to develop provisional models, in order to identify the best model that particularly demonstrates higher predictability. Theoretically, this study extends significantly the body of knowledge of service quality and customer satisfaction in service marketing in the field of library and information sciences. Compared to previous studies, **the domains and their related attributes developed in this study, composed of a comprehensive pool of measures for assessing quality of services, can serve as building blocks for further research in relationship marketing.** It has also turned out

to be the most parsimonious model for customer satisfaction, capable of explaining a greater proportion of variance present in overall customer satisfaction through a multi-item scale. From a diagnostic perspective, performance-only scores used in the chosen model constitute a better choice. As it entails a direct assessment of performance of service quality, it provides a more pragmatic diagnosis of service quality in libraries. The model also has the ability to direct managerial attention to service areas, which are critically deficient from the customers' standpoint and require immediate attention.

#### **7.7.5 Philosophical paradigm shift**

It is concluded that the epistemological issues in relation to this research study have proven that—even though positivism and phenomenology are two distinct paradigms coming from two different doctrines of research that cannot be amalgamated into one paradigm—a combination of the two, which does not adhere to any philosophical doctrine, can also be formed. Thus, a combination of the philosophical approach and the positivistic approach used in this study facilitated the building of theory and a theoretical verification, rather than of testing hypotheses. It may therefore be concluded that **a research study can have a variety of philosophical doctrines interwoven successfully to pursue the research objectives of any study.** The final model derived from this approach allows service providers and researchers alike insight into the variation of customer satisfaction, in terms of service quality. Effectively, this combined philosophical approach to the study has derived an alternative framework that goes some way towards incorporating the dynamism of customer satisfaction in relation to service quality in university libraries.

#### **7.8 SUMMARY**

This final chapter summarised research findings that answer the research questions. It also explained the contribution of the research to the body of knowledge, with new perspectives on theoretical, practical and methodological implications. The conclusions and implications of the study were evaluated using the literature available on customer satisfaction and service quality, particularly in the library and information service sector. Research objectives and questions were linked to the findings, summarising the key

results of the study. The study produced a final model based on the performance-only paradigm, with a linear relationship between customer satisfaction and service quality constructs in university libraries in Sri Lanka, applying a combination of the phenomenological and positivistic approaches. The recommendations of the study, based on the empirical findings, highlighted potential avenues available for future research to expand the research beyond the boundaries of the current study.

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**APPENDIX I : SERVICE QUALITY ATTRIBUTES AND DOMAINS  
IDENTIFIED IN THE PAST RESEARCH**

<b>Attribute</b>	<b>Domain</b>	<b>Citation</b>	<b>Country</b>
Timeliness of services/providing services at a promised time	Waiting times	Calvert & Hernon (1997)	New Zealand
	Service delivery	Calvert (1998)	Singapore
	No domain identified (ND)	Harwood & Bydder (1998)	New Zealand
	ND	Calvert (2001)	China
	Reliable	Cook, Heath & Thompson (2001)	USA
	Reliability	Tuomi (2001)	Finland
	Affect of service-personal	Nimsomboon and Nagata (2003)	Thailand
	Reliability	Filiz (2007)	Turkey
Speed/ response time (Efficiency)	Guidance	Calvert & Hernon (1997)	New Zealand
	Service delivery	Calvert (1998)	Singapore
	ND	Harwood & Bydder (1998)	New Zealand
	ND	Calvert (2001)	China
	Reliable	Cook, Heath & Thompson (2001)	USA
Relevance	Material for courses	Calvert & Hernon (1997)	New Zealand
	Information content	Calvert (1998)	Singapore
	ND	Harwood & Bydder (1998)	New Zealand
	ND	Calvert (2001)	China
	ND	Woo (2005)	Hong Kong
	Information & Library Environment	Filiz (2007)	Turkey
	Services	Calvert (1998)	Singapore
Convenient opening hours	ND	Harwood & Bydder (1998)	New Zealand
	Empathy	Cook, Heath & Thompson (2001)	USA
	ND	Calvert (2001)	China
	Empathy	Tuomi (2001)	Finland
	Collection & Access	Nimsomboon & Nagata (2003)	Thailand
	ND	Woo (2005)	Hog Kong
	Guidance (H)	Calvert & Hernon (1997)	New Zealand

<b>Attribute</b>	<b>Domain</b>	<b>Citation</b>	<b>Country</b>
Library opening hours display in advance	Services	Calvert (1998)	Singapore
	ND	Calvert (2001)	China
Quick re-shelving of library materials	Library staff	Calvert & Hernon (1997)	New Zealand
	Services	Calvert (1998)	Singapore
	ND	Harwood & Bydder (1998)	New Zealand
	ND	Calvert (2001)	China
	ND	Woo (2005)	Hong Kong
	Library staff	Calvert & Hernon (1997)	New Zealand
Availability of library materials	Information content	Calvert (1998)	Singapore
	ND	Calvert (2001)	China
	Collection & Access	Nimsomboon & Nagata (2003)	Thailand
	ND	Woo (2005)	Hong Kong
	Material for courses	Calvert & Hernon (1997)	New Zealand
Assuring accuracy of information	Information content	Calvert(1998)	Singapore
	ND	Harwood & Bydder (1998)	New Zealand
	ND	Woo (2005)	Hong Kong
	Information & Library Environment	Filiz (2007)	Turkey
Error free records	Reliable	Cook, Heath & Thompson (2001)	America
	Reliability	Tuomi (2001)	Finland
	Information & Library Environment	Filiz (2007)	Turkey
Reliability of information received	Responsive	Cook, Heath & Thompson (2001)	USA
Keep customers informed about library services	ND	Calvert (2001)	China
	Responsiveness	Tuomi (2001)	Finland
	Affect of service-organizational	Nimsomboon & Nagata (2003)	Thailand
	Confidence	Filiz (2007)	Turkey
	Collection Access	Cook, Heath & Thompson (2001)	USA
Comprehensiveness of the collection	ND	Harwood & Bydder (1998)	New Zealand

<b>Attribute</b>	<b>Domain</b>	<b>Citation</b>	<b>Country</b>
Completeness of the collection	Collection Access	Cook, Heath & Thompson (2001)	USA
	Empathy	Tuomi (2001)	Finland
	Information control	Moon (2005)	South Africa
	Reliability	Filiz (2007)	Turkey
Ease of use/ convenient access to library collection	Library staff	Calvert & Hernon (1997)	New Zealand
	Physical surrounding	Calvert (1998)	Singapore
	ND	Harwood & Bydder (1998)	New Zealand
	Collection Access	Cook, Heath & Thompson (2001)	USA
	ND	Calvert (2001)	China
	Collection & Access	Nimsomboon & Nagata (2003)	Thailand
	Information control	Moon(2005)	South Africa
Full text delivered electronically	Collection Access	Cook, Heath & Thompson (2001)	USA
Access to archives	Collection Access	Cook, Heath & Thompson (2001)	USA
Directional signs for collection clear, understandable, helpful	Guidance	Calvert & Hernon (1997)	New Zealand
	Physical surrounding )	Calvert (1998)	Singapore
	ND	Harwood & Bydder (1998)	New Zealand
	ND	Calvert (2001)	China
Interdisciplinary needs addressed by the collection	Material for courses	Calvert & Hernon (1997)	New Zealand
	Services	Calvert (1998)	Singapore
	ND	Harwood & Bydder (1998)	New Zealand
	ND	Calvert (2001)	China
	Collection Access	Cook, Heath & Thompson (2001)	USA
Library materials in the stack	Collection Access	Cook, Heath & Thompson (2001)	USA
Resources added to collection	Material for courses	Calvert & Hernon (1997)	New Zealand
	Information content	Calvert (1998)	Singapore
	Collection Access	Cook, Heath & Thompson (2001)	
	ND	Calvert (2001)	China



<b>Attribute</b>	<b>Domain</b>	<b>Citation</b>	<b>Country</b>
Material arriving within a set time (from storage/ ILL)	Material (H)	Calvert & Hernon (1997)	New Zealand
Quietness of the place	ND	Calvert & Hernon (1997)	New Zealand
	Physical surrounding	Calvert (1998)	Singapore
	ND	Harwood & Bydder (1998)	New Zealand
	LibAsPlace	Cook, Heath & Thompson (2001)	USA
	Affect of service-organisational	Nimsomboon & Nagata (2003)	Thailand
	Tangibles	Nitecki (1996)	America
Modern equipment in the library	Tangibles	Cook, Heath & Thompson (2001)	USA
	Tangibles	Tuomi (2001)	Finland
	Tangibles	Nimsomboon & Nagata (2003)	Thailand
	Affect of service-organisational	Moon (2005)	South Africa
Visual appeal materials	Tangibles	Cook, Heath & Thompson (2001)	USA
	Tangibles	Tuomi (2001)	Finland
	Affect of service-organisational	Nimsomboon & Nagata (2003)	Thailand
Visually appealing facilities	Tangibles	Cook, Heath & Thompson (2001)	USA
	Tangibles	Tuomi (2001)	Finland
	Collection & Access	Nimsomboon & Nagata (2003)	Thailand
	Information & Library Environment	Filiz (2007)	Turkey
Seating: sufficiency	Furniture & facilities	Calvert & Hernon (1997)	New Zealand
	Physical surrounding	Calvert (1998)	Singapore
	ND	Harwood & Bydder (1998)	New Zealand
	Furniture & facilities	Calvert & Hernon (1997)	New Zealand
A contemplative environment	LibAsPlace	Cook, Heath & Thompson (2001)	USA
	LibAsPlace	Cook, Heath & Thompson (2001)	USA
A place for reflection and creativity	Affect of service-personal	Nimsomboon & Nagata (2003)	Thailand
A place that inspires study and learning	LibAsPlace	Moon (2005)	South Africa
A heaven for study, learning and research	Library as place	Moon (2005)	South Africa
A meditative place	LibAsPlace	Cook, Heath & Thompson (2001)	USA

<b>Attribute</b>	<b>Domain</b>	<b>Citation</b>	<b>Country</b>
Seating: variety/comfortable	Furniture & facilities	Calvert & Hernon (1997)	New Zealand
	Physical surrounding	Calvert (1998)	
	ND	Harwood & Bydder (1998)	New Zealand
Functional furniture	Furniture & facilities	Calvert & Hernon (1997)	New Zealand
	ND	Harwood & Bydder (1998)	New Zealand
Comfortable and inviting location	LibAsPlace	Cook, Heath & Thompson (2001)	USA
	Collection & Access	Nimsomboon & Nagata (2003)	Thailand
	Library as place	Moon (2005)	South Africa
Lighting	Building & environment	Calvert & Hernon (1997)	New Zealand
	Physical surrounding	Calvert (1998)	Singapore
	ND	Calvert (2001)	China
Temperature/air conditioning	Building & environment Physical surrounding	Calvert & Hernon (1997)	New Zealand
	ND	Calvert (1998)	Singapore
	Building & environment Physical surrounding	Calvert (2001)	China
Good ventilation	Building & environment	Calvert & Hernon (1997)	New Zealand
	ND	Calvert (2001)	China
Humidity in the building	Building & environment	Calvert & Hernon (1997)	New Zealand
	ND	Calvert (2001)	China
Study rooms with where discussions are permitted	Furniture & facilities	Calvert & Hernon (1997)	New Zealand
	Physical surrounding	Calvert (1998)	Singapore
	ND	Calvert (2001)	China
Group study rooms	Physical surrounding	Calvert (1998)	Singapore
	LibAsPlace	Cook, Heath & Thompson (2001)	USA
	Library as place	Moon (2005)	South Africa
Individual study rooms	LibAsPlace	Cook, Heath & Thompson (2001)	America
Center intellectual creativity	LibAsPlace	Cook, Heath & Thompson (2001)	USA
Attractiveness of the place	ND	Calvert & Hernon (1997)	New Zealand
	Physical surrounding	Calvert (1998)	<b>Singapore</b>
Sufficient toilets	Furniture & facilities	Calvert & Hernon (1997)	New Zealand
	ND	Calvert (1998)	Singapore
	ND	Calvert (2001)	China

<b>Attribute</b>	<b>Domain</b>	<b>Citation</b>	<b>Country</b>
Clean toilets	Furniture & facilities	Calvert & Hernon (1997)	New Zealand
	Physical surrounding	Calvert (1998)	Singapore
	ND	Calvert (2001)	China
Drinking fountains in the library	Furniture & facilities	Calvert & Hernon (1997)	New Zealand
	ND	Calvert (2001)	China
Personal belongings are safe in the library	Physical surrounding	Calvert (1998)	Singapore
Feel safe and secure in the library	Physical surrounding	Calvert (1998)	Singapore
	ND	Harwood & Bydder (1998)	New Zealand
	LibAsPlace	Cook, Heath & Thompson (2001)	USA
Transactions held confidential	Assurance	Nitecki (1996)	USA
	Assurance	Cook, Heath & Thompson (2001)	USA
	Assurance	Tuomi (2001)	Finland
	Affect of service-organisational	Nimsomboon & Nagata (2003)	Thailand
	Quality of service provided	Filiz (2007)	Turkey
Friendliness of staff	Library staff	Calvert & Hernon (1997)	New Zealand
	Service delivery	Calvert (1998)	Singapore
	ND	Harwood & Bydder (1998)	New Zealand
	Assurance	Tuomi (2001)	Finland
	ND	Woo (2005)	Hong Kong
Politeness of staff	Library staff	Calvert & Hernon (1997)	New Zealand
	Service delivery	Calvert (1998)	Singapore
	ND	Harwood & Bydder (1998)	New Zealand
	ND	Calvert (2001)	China
	ND	Woo (2005)	Hong Kong
Deal with customers in caring fashion	Empathy	Cook, Heath & Thompson (2001)	USA
	Affect of service-personal	Nimsomboon & Nagata (2003)	Thailand
	Affect of service	Moon (2005)	South Africa
	Quality of service provided	Filiz (2007)	Turkey

<b>Attribute</b>	<b>Domain</b>	<b>Citation</b>	<b>Country</b>
Readiness to respond to customer / no busy	Library staff	Calvert & Hernon (1997)	New Zealand
	Responsiveness	Cook, Heath & Thompson (2001)	USA
	ND	Calvert (2001)	China
	Responsiveness	Tuomi (2001)	Finland
	Affect of service-personal	Nimsomboon & Nagata (2003)	Thailand
	Affect of service	Moon (2005)	South Africa
	Quality of service provided	Filiz (2007)	Turkey
Knowledgeable staff/ Subject specialist/expertise staff	Library staff	Calvert & Hernon (1997)	New Zealand
	Services	Calvert (1998)	Singapore
	ND	Harwood & Bydder (1998)	New Zealand
	ND	Calvert (2001)	China
	Assurance	Cook, Heath & Thompson (2001)	USA
	Assurance	Tuomi (2001)	Finland
	Affect of service	Moon (2005)	South Africa
	Affect of service-personal	Nimsomboon & Nagata (2003)	Thailand
Quality of service provided	Filiz (2007)	Turkey	
Library staff give prompt service	Responsive	Cook, Heath & Thompson (2001)	USA
	Responsiveness	Tuomi (2001)	Finland
	Collection & Access	Nimsomboon & Nagata (2003)	Thailand
	Reliability	Filiz (2007)	Turkey
Providing services as promised	Reliable	Cook, Heath & Thompson (2001)	USA
	Reliability	Tuomi (2001)	Finland
	Affect of service-organisational	Nimsomboon & Nagata (2003)	Thailand
	Quality of service provided	Filiz (2007)	Turkey
Performing services right the first time	Reliable	Cook, Heath & Thompson (2001)	USA
	Reliability	Tuomi (2001)	Finland
	Affect of service-personal	Nimsomboon & Nagata (2003)	Thailand
	Reliability	Filiz (2007)	Turkey

<b>Attribute</b>	<b>Domain</b>	<b>Citation</b>	<b>Country</b>
Willingness to help customers	Library staff	Calvert & Hernon (1997)	New Zealand
	ND	Harwood & Bydder (1998)	New Zealand
	Service delivery	Calvert (1998)	Singapore
	ND	Calvert (2001)	China
	Responsiveness	Cook, Heath & Thompson (2001)	USA
	Responsiveness	Tuomi (2001)	Finland
	Affect of service-organisational	Nimsomboon & Nagata (2003)	Thailand
	Affect of service	Moon (2005)	South Africa
Employees who are courteous	Reliability	Filiz (2007)	Turkey
	Library staff	Calvert & Hernon (1997)	New Zealand
	ND	Harwood & Bydder (1998)	New Zealand
	Assurance	Cook, Heath & Thompson (2001)	America
	ND	Calvert (2001)	China
	Assurance	Tuomi (2001)	Finland
	Affect of service-organisational	Nimsomboon & Nagata (2003)	Thailand
	Affect of service	Moon (2005)	South Africa
Employees in still confidence	Quality of service provided	Filiz (2007)	Turkey
	Assurance	Cook, Heath & Thompson (2001)	USA
	Assurance	Tuomi (2001)	Finland
Understand customers needs	Affect of service-personal	Nimsomboon & Nagata (2003)	Thailand
	Empathy	Cook, Heath & Thompson (2001)	USA
	Affect of service-organisational	Nimsomboon & Nagata (2003)	Thailand
Giving customers individual attention	Affect of service	Moon (2005)	South Africa
	Quality of service provided	Filiz (2007)	Turkey
	Empathy	Cook, Heath & Thompson (2001)	USA
Giving customers personal attention	Affect of service-organisational	Nimsomboon & Nagata (2003)	Thailand
	Affect of service	Moon (2005)	South Africa
	Reliability	Filiz (2007)	Turkey
	Empathy	Tuomi (2001)	Finland

<b>Attribute</b>	<b>Domain</b>	<b>Citation</b>	<b>Country</b>
Availability of the staff when required	Library staff (H)	Calvert & Hernon (1997)	New Zealand
	Service delivery (C )	Calvert (1998)	Singapore
	ND	Harwood & Bydder (1998)	New Zealand
	ND	Cook, Heath & Thompson (2001)	USA
	ND	Calvert (2001)	China
Complaint responsiveness	ND	Calvert & Hernon (1997)	New Zealand
	Services	Calvert (1998)	Singapore
	ND	Harwood & Bydder (1998)	New Zealand
	ND	Calvert (2001)	China
Approachability to the library staff	Library staff	Calvert & Hernon (1997)	New Zealand
	Service delivery	Calvert (1998)	Singapore
	ND	Harwood & Bydder (1998)	New Zealand
	Reliable	Cook, Heath & Thompson (2001)	USA
	ND	Calvert (2001)	China
Handle customers' service problems	ND	Harwood & Bydder (1998)	New Zealand
	Reliability	Tuomi (2001)	Finland
	Affect of service-personal	Nimsomboon & Nagata (2003)	Thailand
	Affect of service	Moon (2005)	South Africa
	Reliability	Filiz (2007)	Turkey
Demonstrate cultural sensitivity	Electronic services	Calvert & Hernon (1997)	New Zealand
	ND	Harwood & Bydder (1998)	New Zealand
	ND	Calvert (2001)	China
Know customer's best interest	Empathy	Cook, Heath & Thompson (2001)	USA
	Empathy	Tuomi (2001)	Finland
	Collection & Access	Nimsomboon & Nagata (2003)	Thailand
	Quality of service provided	Filiz (2007)	Turkey
Library staff understand what information customer looking for	Electronic services	Calvert & Hernon (1997)	New Zealand
	Service delivery	Calvert (1998)	Singapore
	ND	Harwood & Bydder (1998)	New Zealand
	ND	Calvert (2001)	China
	Empathy	Tuomi (2001)	Finland

<b>Attribute</b>	<b>Domain</b>	<b>Citation</b>	<b>Country</b>
Most of the services are free for customers	Guidance	Calvert & Hernon (1997)	New Zealand
Library staff offer suggestions where to look for information (provide access to the information)	Service delivery	Calvert (1998)	Singapore
	ND	Harwood & Bydder (1998)	New Zealand
	Tangibles	Cook, Heath & Thompson (2001)	USA
Neat & professionally appearing staff	Information & Library Environment	Filiz (2007)	Turkey
Photocopy machines available and in good working order	Library staff	Calvert & Hernon (1997)	New Zealand
	Services	Calvert (1998)	Sinigapore
	ND	Harwood & Bydder (1998)	New Zealand
	ND	Calvert (2001)	China
	Equipment	Calvert & Hernon (1997)	New Zealand
Computers are available and in good working order	Services	Calvert (1998)	Singapore
	ND	Harwood & Bydder (1998)	New Zealand
	ND	Calvert (2001)	China
	Equipment	Calvert & Hernon (1997)	New Zealand
Audiovisual equipments available and in good work order	Services	Calvert (1998)	Singapore
	ND	Harwood & Bydder (1998)	New Zealand
	ND	Calvert (2001)	China
	Equipment	Calvert & Hernon (1997)	New Zealand
Computer printers are available and in good working order	Services	Calvert (1998)	Singapore
	ND	Harwood & Bydder (1998)	New Zealand
	ND	Calvert (2001)	China
Multi media/ Interactive computers are available and in good working order	Equipment	Calvert & Hernon (1997)	New Zealand
	ND	Harwood & Bydder (1998)	New Zealand
Quality of the collection	ND	Calvert & Hernon (1997)	New Zealand
	ND	Calvert (1998)	Singapore

<b>Attribute</b>	<b>Domain</b>	<b>Citation</b>	<b>Country</b>
Currency of information received	Information content	Calvert (1998)	Singapore
	Information & Library Environment	Filiz (2007)	Turkey
Precision of information received	Quality of service provided	Filiz (2007)	Turkey
Audio-visual material	Services	Calvert (1998)	Singapore
Access to electronic databases/ digital collection	Affect of service-organisational	Nimsomboon & Nagata (2003)	Thailand
	ND	Woo (2005)	Hong Kong
	Information control	Moon (2005)	South Africa
Remote access electronic databases	Information control	Moon (2005)	South Africa
Library staff mention about Inter Library loans	Guidance	Calvert & Hernon (1997)	New Zealand
	Service delivery	Calvert (1998)	Singapore
	ND	Harwood & Bydder (1998)	New Zealand
	ND	Calvert (2001)	China
	ND	Woo (2005)	Hong Kong
Ease of use/ arrangement of the online catalogue (OPAC)	Guidance	Calvert & Hernon (1997)	New Zealand
	Services	Calvert (1998)	Singapore
	ND	Calvert (2001)	China
	ND	Woo (2001)	Hong Kong
	Quality of service provided	Filiz (2007)	Turkey
Online catalogue is easy to learn	Quality of online catalogue	Filiz (2007)	Turkey
Easy to become skill full at using Online catalogue	Quality of online catalogue	Filiz (2007)	Turkey
OPAC computers in good working order	Guidance	Calvert & Hernon (1997)	New Zealand
	Services	Calvert (1998)	Singapore
	ND	Harwood & Bydder (1998)	New Zealand
	ND	Calvert (2001)	China
	ND	Woo (2005)	Hong Kong
	Guidance	Calvert & Hernon (1997)	New Zealand



<b>Attribute</b>	<b>Domain</b>	<b>Citation</b>	<b>Country</b>
OPAC computers conveniently distributed	Services	Calvert (1998)	Singapore
	ND	Harwood & Bydder (1998)	New Zealand
	ND	Calvert (2001)	China
	Guidance	Calvert & Hernon (1997)	New Zealand
Easy access to OPAC	Services	Calvert (1998)	Singapore
	ND	Harwood & Bydder (1998)	New Zealand
	ND	Calvert (2001)	China
	Quality of online catalogue	Filiz (2007)	Turkey
	Guidance	Calvert & Hernon (1997)	New Zealand
Remote access OPAC	Services	Calvert (1998)	Singapore
	ND	Calvert (2001)	China
OPAC has a help option	Guidance	Calvert & Hernon (1997)	New Zealand
	Services	Calvert (1998)	Singapore
	ND	Calvert (2001)	China
OPAC is a accurate source of information	Guidance	Calvert & Hernon (1997)	New Zealand
	Services	Calvert (1998)	Singapore
	ND	Harwood & Bydder (1998)	New Zealand
	Reliable	Tuomi (2001)	Finland
Well organised library web page	ND	Woo (2005)	Hong Kong
Library news on the web	Services	Calvert (1998)	Singapore
Library web page includes subject guides to other web sites	Services	Calvert (1998)	Singapore
Library web page contains correct and useful information about library services and resources	Equipment	Calvert & Hernon (1997)	New Zealand
	Services	Calvert (1998)	Singapore
	NA	Calvert (2001)	China
	Information control	Moon (2005)	South Africa
Web site offers a way to ask reference questions	Services	Calvert (1998)	Singapore
Library customer education programmes	Electronic services	Calvert & Hernon (1997)	New Zealand
	Services	Calvert (1998)	Singapore
	ND	Harwood & Bydder (1998)	New Zealand
	ND	Calvert (2001)	China
	Affect of service-organisational	Nimsomboon & Nagata (2003)	Thailand
	ND	Woo (2005)	Hong Kong
	Services	Calvert (1998)	Singapore

<b>Attribute</b>	<b>Domain</b>	<b>Citation</b>	<b>Country</b>
Clear written instructions for customers when needed	Collection access	Cook, Heath & Thompson (2001)	
	Electronic services	Calvert & Hernon (1997)	New Zealand
Library guide/ brochures	Services	Calvert (1998)	Singapore
	ND	Calvert (2001)	China
	Services	Calvert (1998)	Singapore
Library alert services	Services	Calvert (1998)	Singapore
Library orientation programmes	Services	Calvert (1998)	Singapore
Library staff help to select electronic resources	Electronic services	Calvert & Hernon (1997)	New Zealand
	Service delivery	Calvert (1998)	Singapore
	ND	Harwood & Bydder (1998)	New Zealand
	ND	Calvert (2001)	China
Library staff show how to use OPAC	Electronic services	Calvert & Hernon (1997)	New Zealand
	Service delivery	Calvert (1998)	Singapore
	ND	Harwood & Bydder (1998)	New Zealand
	ND	Calvert (2001)	China
Library staff teach the use of electronic sources to students	Electronic services	Calvert & Hernon (1997)	New Zealand
	ND	Harwood & Bydder (1998)	New Zealand
	ND	Calvert (2001)	China
Library staff encourage to get assistance when required	Electronic services	Calvert & Hernon (1997)	New Zealand
	Service delivery	Calvert (1998)	Singapore
	ND	Calvert (2001)	China
Library staff don't overwhelm customers with too much information	Electronic services	Calvert & Hernon (1997)	New Zealand
	Service delivery	Calvert (1998)	Singapore
	ND	Calvert (2001)	China
Provides services such as staplers, pencil sharpeners	ND	Calvert & Hernon (1997)	New Zealand
	ND	Calvert (2001)	China

ND – No domain

Source: Author compilation based on the literature

## **APPENDIX II : QUESTIONNAIRE FOR THE EXPLORATORY SURVEY**

Department of Information Science  
University of South Africa  
Pretoria, South Africa  
20<sup>th</sup> October, 2008

Dear Sir/Madam

### **An exploratory survey to develop a model to predict customer satisfaction in relation to service quality in university libraries in Sri Lanka**

For the partial fulfilment of my doctoral study in Information Science at the University of South Africa, I am conducting a research study to help understand the level of customer satisfaction of Sri Lankan university libraries in relation to service quality. As a part of my major study, now I am carrying out an exploratory survey to come up with important service quality items in libraries as perceived by the customers. The outcome of this exploratory study will particularly aid to develop the main study of my research endeavour.

If you are willing to take part would you please complete the enclosed questionnaire and return it to me in the reply paid envelope attached within the next ten days. We appreciate your help in advance. All information in this study will be kept confidential. Data will be stored securely. No reference will be made in oral or written reports, which could link participants to the study. Your participation in this study is voluntary. In the future, if you need any help regarding knowledge in customer satisfaction and service quality, I will be more than glad to do my best to help you and your university library.

If you have any question and suggestions, please feel free to contact me over **0714878800** or [chaminda@lib.cmb.ac.lk](mailto:chaminda@lib.cmb.ac.lk) at anytime.

Thank you.

Chaminda Jayasundara  
DLitt et Phil student

**An Exploratory survey on Customer Satisfaction in relation to Service Quality in University Libraries in Sri Lanka  
QUESTIONNAIRE**

**SECTION A: IMPORTANCE OF ATTRIBUTES**

Different library customers expect different quality of services from their libraries. As you are also a customer of your university library, please look at the following statements and mark it how **IMPORTANT** each item to you in relation to your library use. You may use the scale of 1 to 5 where 1 is very unimportant and 5 is very important. If it is irrelevant to you, you may mark “Not Applicable” column.

The term **customer** is at times used to denote all kind of library users in your university.

Question no.	Item	Scale					
		Very unimportant	Unimportant	Little important	Important	Very important	Not Applicable
1.	The library should have contemplative environment for studies and research <b>(CONTEMPLATIVE ENVIRONMENT)</b>	1	2	3	4	5	0
2.	The library should be a place for reflection and creativity <b>(REFLECTIVE AND CREATIVE PLACE)</b>	1	2	3	4	5	0
3.	The university should have easy accessible facilities to its library building <b>(ACCESSIBILITY TO BUILDINGS)</b>	1	2	3	4	5	0

Question no.	Item	Scale					
		Very unimportant	Unimportant	Little important	Important	Very important	Not Applicable
4.	The library should be a comfortable and inviting place <b>(COMFORTABLE AND INVITING PLACE)</b>	1	2	3	4	5	0
5.	The library should have facilities to access to printed and electronic archives of information sources <b>(ARCHIVAL ACCESS)</b>	1	2	3	4	5	0
6.	The library should provide access to electronic databases/digital collection for finding information <b>(E-JOURNAL ACCESS)</b>	1	2	3	4	5	0
7.	Audiovisual equipments of the library should be available in good working condition <b>(AUDIOVISUAL EQUIPMENT IN GOOD CONDITION)</b>	1	2	3	4	5	0
8.	Very easily approach to library staff <b>(STAFF APPROACHABILITY)</b>	1	2	3	4	5	0
9.	Complaints made by users/customer should be immediately inquired by the library <b>(COMPLAINT RESPONSIVENESS)</b>	1	2	3	4	5	0

Question no.	Item	Scale					
		Very unimportant	Unimportant	Little important	Important	Very important	Not Applicable
10.	The library staff should understand the cultural differences of the customers <b>(CULTURAL SENSITIVITY)</b>	1	2	3	4	5	0
11.	Staff in the library should be courteous <b>(COURTESY OF THE STAFF)</b>	1	2	3	4	5	0
12.	The library should provide personal attention to us <b>(PERSONAL ATTENTION TO CUSTOMERS)</b>	1	2	3	4	5	0
13.	Library should keep us informed about new library services <b>(BEING INFORMED ABOUT NEW SERVICES)</b>	1	2	3	4	5	0
14.	It is essential to have knowledgeable staff/ subject specialists in the library for the provision of required information to us <b>(STAFF KNOWLEDGEABILITY)</b>	1	2	3	4	5	0
15.	Library staff should give us prompt service <b>(PROMPTNESS OF THE STAFF)</b>	1	2	3	4	5	0
16.	Library must assure the quality of information resources <b>(HIGH QUALITY INFORMATION RESOURCES)</b>	1	2	3	4	5	0

Question no.	Item	Scale					
		Very unimportant	Unimportant	Little important	Important	Very important	Not Applicable
17.	The library collection should be complete <b>(COLLECTION COMPLETENESS)</b>	1	2	3	4	5	0
18.	The library collection should be comprehensive <b>(COLLECTION COMPREHENSIVENESS)</b>	1	2	3	4	5	0
19.	The library should provide current information <b>(CURRENT INFORMATION)</b>	1	2	3	4	5	0
20.	The library should provide convenient access to its collections <b>(CONVENIENT ACCESS TO COLLECTIONS)</b>	1	2	3	4	5	0
21.	The library should provide clean, sufficient and visually appealing sanitary facilities <b>(GOOD SANITARY FACILITIES)</b>	1	2	3	4	5	0
22.	The library should provide convenient opening hours since there are different full-time and part-time customers <b>(CONVENIENT OPENING HOURS)</b>	1	2	3	4	5	0

Question no.	Item	Scale					
		Very unimportant	Unimportant	Little important	Important	Very important	Not Applicable
23.	The Library should provide directional signs in clear, understandable and helpful way enabling customers to get access to relevant resources and facilities <b>(HELPFUL DIRECTIONAL SIGNS)</b>	1	2	3	4	5	0
24.	Good ventilation should be in the library <b>(GOOD VENTILATION)</b>	1	2	3	4	5	0
25.	Good functional furniture should be in the library <b>(GOOD FUNCTIONAL FURNITURE)</b>	1	2	3	4	5	0
26.	Adequate lighting should be in the library <b>(GOOD LIGHTING)</b>	1	2	3	4	5	0
27.	The library staff should re-shelve the library materials quickly <b>(QUICK RE-SHELVING)</b>	1	2	3	4	5	0
28.	Quietness of the premises should be maintained for peaceful studies <b>(QUIETNESS IN THE LIBRARY)</b>	1	2	3	4	5	0
29.	The library needs to be air conditioned to keep us comfortable within the premises <b>(AIR CONDITIONING)</b>	1	2	3	4	5	0



Question no.	Item	Scale					
		Very unimportant	Unimportant	Little important	Important	Very important	Not Applicable
30.	Computers should be available in good working order to access different electronic collections, Internet and OPAC <b>(ACCESS TO COMPUTERS)</b>	1	2	3	4	5	0
31.	Error free records of transactions are needed to maintain the trust on library customer-service <b>(ERROR FREE RECORDS IN THE SYSTEMS)</b>	1	2	3	4	5	0
32.	The library should provide modern equipment <b>(MODERN EQUIPMENT)</b>	1	2	3	4	5	0
33.	All kind of transactions should be confidential <b>(TRANSACTIONAL CONFIDENTIALITY)</b>	1	2	3	4	5	0
34.	The library should provide customer education programmes enabling customers to get acquainted with the services <b>(CUSTOMER EDUCATION PROGRAMMES)</b>	1	2	3	4	5	0
35.	The library should provide guides/ brochures in relation to its services <b>(LIBRARY GUIDES)</b>	1	2	3	4	5	0

Question no.	Item	Scale					
		Very unimportant	Unimportant	Little important	Important	Very important	Not Applicable
36.	Library web page should contain correct and useful information about the services and resources <b>(USEFUL LIBRARY WEB SITE)</b>	1	2	3	4	5	0
37.	OPAC should be an accurate source of information <b>(ACCURATE OPAC)</b>	1	2	3	4	5	0
38.	The library should provide remote access facilities to users since some customers are busy <b>(REMOTE ACCESS)</b>	1	2	3	4	5	0
39.	Ease of use/ arrangement of the online catalogue (OPAC) is a must <b>(EASY OPAC)</b>	1	2	3	4	5	0
40.	Well organised library web page should be there for allowing us to access information quickly <b>(WELL ORGANISED WEB SITE)</b>	1	2	3	4	5	0
41.	Information resources should match with our information needs. <b>(NEEDS ORIENTED RESOURCES)</b>	1	2	3	4	5	0

Question no.	Item	Scale					
		Very unimportant	Unimportant	Little important	Important	Very important	Not Applicable
42.	The atmosphere of the library staff during our information searching and receiving should be supportive <b>(SUPPORTIVE ATMOSPHERE)</b>	1	2	3	4	5	0
43.	We expect some follow ups from the staff to ascertain whether we receive relevant information <b>(FOLLOW UP SERVICE)</b>	1	2	3	4	5	0
44.	Proper coordination of the staff among different sections of the library is important to deliver required information to us. <b>(PROPER COORDINATION BY THE STAFF)</b>	1	2	3	4	5	0
45.	OPAC should provide up-to-date information. <b>(UP-TO-DATE OPAC)</b>	1	2	3	4	5	0
46.	The web site should provide help that seems to be just about exactly what we need <b>(NEEDS ORIENTED WEB SITE)</b>	1	2	3	4	5	0

Question no.	Item	Scale					
		Very unimportant	Unimportant	Little important	Important	Very important	Not Applicable
47.	Effective resource sharing with other libraries would entertain customer's informational requirements which can not be fulfilled by the local library <b>(EFFECTIVE RESOURCE SHARING)</b>	1	2	3	4	5	0
48.	Reasonable financial charging structure for all types of businesses in the library such as fines, and lost books should be available <b>(REASONABLE FARE STRUCTURE)</b>	1	2	3	4	5	0
49.	Handicapped-friendly environment should be there for disabled members <b>(PHYSICALLY CHALLENGED is better HANDICAPPED FRIENDLY FACILITIES)</b>	1	2	3	4	5	0
50.	The library should provide different types of general reading materials for us <b>(DIVERSIFIED GENERAL READINGS)</b>	1	2	3	4	5	0

## SECTION B: ABOUT YOU

Please tick (✓) in the appropriate box

1. Are you a registered customer (user) of the library?

Yes	
No	

2. What is the type of your membership?

Student membership	
Teachers membership	
Other	

3. If you are a member of the academic staff, please indicate whether you are on temporary, contract or permanent basis:

Temporary basis	
Contract basis	
Permanent basis	

4. If you are a student, what is the type of your studentship?

Undergraduate Student	
Postgraduate student	

5. What is your university?

University of Colombo	
University of Sri Jayawardenepura	
Rajarata University of Sri Lanka	
University of Ruhuna	

6. What is your age?

18-23	
24-29	
30-35	
36-41	
42-47	
48-52	
More than 53	

7. What is your gender?

Male	
Female	

8. What is your regularity of library visits?

Everyday	
1-3 days a week	
4-6 days a week	
Once in two weeks	
Once in a month	
Never	
Other	

9. How long have you used the university library?

Below One year	
One to two years	
Three to Four years	
Five to Ten years	
More than Ten years	

10. What is the purpose of your library visits?

To find information	
To ask for advice	
To read lecture notes	
To use computers	
To find quite/convenient place to study	
To meet friends	
Other	

**End**

**Thank you for your cooperation**

### APPENDIX III: GROUP DYNAMICS OF FOCUS GROUPS

Number of the Group	Participant	Age	Sex	Level of Education	Regularity in library visit (weekly)	Experience as a member of the library (years)
<b>Focus group 1</b> University of Colombo (UC)	Undergraduate 1	24	Male	4 <sup>th</sup> year Economics student	4 times	4
	Undergraduate 2	23	Female	3 <sup>rd</sup> year History student	5 times	4
	Undergraduate 3	22	Male	2 <sup>nd</sup> year Sociology Student	6 times	3
	Postgraduate 1	43	Female	Master of Development Studies student	3 times	4
	Postgraduate 2	33	Male	Master of International Relations Student	3 times	6
	Academic staff 1	35	Male	Master of Science - Geography	4 times	9
	Academic staff 2	55	Female	Doctor of Philosophy - Economics	3 times	22
<b>Focus Group 2</b> University of Sri Jayawardenepura (USJP)	Undergraduate 1	24	Male	4 <sup>th</sup> year Economics student	3 times	4
	Undergraduate 2	22	Male	3 <sup>rd</sup> year Geography student	4 times	3
	Undergraduate 3	23	Female	2 <sup>nd</sup> year Sinhala Student	4 times	2
	Postgraduate 1	29	Female	Master of Arts - Economics student	3 times	5
	Postgraduate 2	31	Male	Master of Arts – Geography student	3 times	5
	Academic staff 1	46	Male	Doctor of Philosophy - Sinhala	3 times	12
	Academic staff 2	39	Male	Doctor of Philosophy - Economics	4 times	11

Number of the Group	Participant	Age	Sex	Level of Education	Regularity in library visit (weekly)	Experience as a member of the library (years)
<b>Focus Group 3</b> Rajarata University of Sri Lanka (RUSL)	Undergraduate 1	21	Male	2 <sup>nd</sup> year Mass communication student	2 times	1
	Undergraduate 2	23	Female	3 <sup>rd</sup> year Geography student	3 times	3
	Undergraduate 3	22	Male	2 <sup>nd</sup> year Sinhala student	3 times	2
	Undergraduate 4	23	Female	3 <sup>rd</sup> year Sociology student	4 times	3
	Undergraduate 5	24	Male	4 <sup>th</sup> year Sinhala student	6 times	2
	Academic staff 1	35	Male	Master of Philosophy – Economics	3 times	6
	Academic staff 2	45	Male	Master of Arts - Geography	3 times	9
<b>Focus Group 4</b> University of Ruhuna (UR)	Undergraduate 1	23	Male	3 <sup>rd</sup> year Economics Student	2 times	3
	Undergraduate 2	23	Male	3 <sup>rd</sup> year Sociology Student	4 times	3
	Undergraduate 3	22	Female	2 <sup>nd</sup> year Social statistics Student	2 times	2
	Postgraduate 1	30	Male	Master of Arts - Economics Student	2 times	5
	Postgraduate 2	43	Male	Master of Arts - History Student	2 times	6
	Academic staff 1	45	Male	Master of Philosophy – Political science	3times	12
	Academic staff 2	40	Male	Doctor of Philosophy - Geography	4 times	18

Source: Compilation by author



**APPENDIX IV : PROFILE OF THE REpondENTS IN THE EXPLORATORY STUDY**

<b>CHARACTERISTICS</b>	<b>CATEGORY</b>	<b>FREQUENCY (f)</b>	<b>PERCENTAGE (%)</b>
Gender	Male	109	45
	Female	133	55
Age	18-23	157	64.9
	24-29	43	17.8
	30-35	23	9.5
	36-41	13	5.4
	42-47	3	1.2
	48-52	3	1.2
University	UC	97	40.1
	USJP	73	30.2
	RUSL	61	25.2
	UR	11	4.5
User category	Undergraduate	200	82.6
	Postgraduate	25	10.3
	Academic Staff	17	7.0
Regularity of Library visits	Everyday	71	29.3
	1-3 days a week	105	43.4
	4-6 days a week	66	27.3
Experience as a user of university library	Below One year	0	0
	One to two years	128	52.9
	Three to Four years	101	41.7
	Five to Ten years	9	3.7
	More than Ten years	4	1.7
Purpose of visit	To receive information	163	67.4
	To receive advice	1	0.4
	To read lecture notes	28	11.6
	To find quite/convenient place to study	20	8.3
		30	12.4

UC – University of Colombo, USJP – University of Sri Jayawardenepura, RUSL- Rajarata University of Sri Lanka,  
UR – University of Ruhuna

Source: Compilation by author

**APPENDIX V: CORRELATION MATRIXES OF QUALITY ATTRIBUTES USED IN THE EXPLORATORY STUDY**

**CORRELATION MATRIX OF THE AFFECT OF SERVICE PERSONAL DOMAIN**

ATTRIBUTES	STAFF APPROACHABILITY	COMPLAINT RESPONSIVENESS	CULTURAL SENSITIVITY	COURTESY OF THE STAFF	PERSONAL ATTENTION TO CUSTOMERS	BEING INFORMED ABOUT NEW SERVICES	SUPPORTIVE MOODS	STAFF KNOWLEDGABILITY	PROMPTNESS OF THE STAFF
STAFF APPROACHABILITY	1.000	.468	.416	.514	.373	.412	.156	.171	.073
CULTURAL SENSITIVITY	.468	1.000	.706	.553	.421	.452	.202	.227	.130
COURTESY OF THE STAFF	.416	.706	1.000	.396	.315	.343	.073	.125	.024
PERSONAL ATTENTION TO CUSTOMERS	.514	.553	.396	1.000	.592	.532	.211	.345	.215
BEING INFORMED ABOUT NEW SERVICES	.373	.421	.315	.592	1.000	.563	.214	.205	.092
SUPPORTIVE MOODS	.412	.452	.343	.532	.563	1.000	.194	.248	.139
STAFF KNOWLEDGABILITY	.156	.202	.073	.211	.214	.194	1.000	.363	.419
STAFF APPROACHABILITY	.171	.227	.125	.345	.205	.248	.363	1.000	.553
PROMPTNESS OF THE STAFF	.073	.130	.024	.215	.092	.139	.419	.553	1.000

Source: Compilation by author based on SPSS output

**CORRELATION MATRIX OF THE BUILDING ENVIRONMENT DOMAIN**

ATTRIBUTES	REFLECTIVE AND CREATIVE PLACE	HELPFUL DIRECTIONAL SIGNS	COMFORTABLE AND INVITING PLACE
REFLECTIVE AND CREATIVE PLACE	1.000	.311	.399
HELPFUL DIRECTIONAL SIGNS	.311	1.000	.697
COMFORTABLE AND INVITING PLACE	.399	.697	1.000

Source: Compilation by author based on SPSS output

### CORRELATION MATRIX OF THE AFFECT OF COLLECTION AND ACCESS DOMAIN

ATTRIBUTES	HIGH QUALITY INFORMATION RESOURCES	COLLECTION COMPLETENESS	CONVENIENT ACCESS TO COLLECTIONS	COLLECTION COMPREHENSIVENESS	CURRENT INFORMATION	NEEDS ORIENTED RESOURCES
<b>HIGH QUALITY INFORMATION RESOURCES</b>	1.000	.447	.400	.270	.328	.301
<b>COLLECTION COMPLETENESS</b>	.447	1.000	.271	.438	.315	.541
<b>CONVENIENT ACCESS TO COLLECTIONS</b>	.400	.271	1.000	.073	.275	.294
<b>COLLECTION COMPREHENSIVENESS</b>	.270	.438	.073	1.000	.225	.310
<b>CURRENT INFORMATION</b>	.328	.315	.275	.225	1.000	.412
<b>NEEDS ORIENTED RESOURCES</b>	.301	.541	.294	.310	.412	1.000

Source: Compilation by author based on SPSS output

### CORRELATION MATRIX OF THE AFFECT OF FURNITURE AND FACILITIES DOMAIN

ATTRIBUTES	GOOD SANITARY FACILITIES	CONVENIENT OPENING HOURS	GOOD VENTILATION	GOOD FUNCTIONAL FURNITURE	GOOD LIGHTING	QUICK RE-SHELVING	QUIETNESS IN THE LIBRARY
<b>GOOD SANITARY FACILITIES</b>	1.000	.415	.492	.464	.514	.574	.408
<b>CONVENIENT OPENING HOURS</b>	.415	1.000	.204	.204	.211	.317	.241
<b>GOOD VENTILATION</b>	.492	.204	1.000	.366	.245	.308	.262
<b>GOOD FUNCTIONAL FURNITURE</b>	.464	.204	.366	1.000	.272	.280	.233
<b>GOOD LIGHTING</b>	.514	.211	.245	.272	1.000	.485	.402
<b>QUICK RE-SHELVING</b>	.574	.317	.308	.280	.485	1.000	.364
<b>QUIETNESS IN THE LIBRARY</b>	.408	.241	.262	.233	.402	.364	1.000

Source: Compilation by author based on SPSS output

### CORRELATION MATRIX OF THE AFFECT OF TECHNOLOGY DOMAIN

ATTRIBUTES	AIR CONDITIONIN G	ACCESS TO COMPUTERS	AUDIOVISUAL EQUIPMENT IN GOOD CONDITION	ERROR FREE RECORDS IN THE SYSTEMS
AIR CONDITIONING	1.000	.477	.220	.255
ACCESS TO COMPUTERS	.477	1.000	.430	.403
AUDIOVISUAL EQUIPMENT IN GOOD CONDITION	.220	.430	1.000	.194
ERROR FREE RECORDS IN THE SYSTEMS	.255	.403	.194	1.000

Source: Compilation by author based on SPSS output

### CORRELATION MATRIX OF THE SERVICE DELIVERY DOMAIN

ATTRIBUTES	E-JOURNAL ACCESS	REMOTE ACCESS	CUSTOMER EDUCATION PROGRAMM ES	EFFECTIVE RESOURCE SHARING	REASONABL E FARE STRUCTURE	LIBRARY GUIDES
E-JOURNAL ACCESS	1.000	-.071	-.025	-.031	-.021	.040
REMOTE ACCESS	-.071	1.000	.686	.176	.404	.400
CUSTOMER EDUCATION PROGRAMMES	-.025	.686	1.000	.152	.218	.240
EFFECTIVE RESOURCE SHARING	-.031	.176	.152	1.000	.122	.186
REASONABLE FARE STRUCTURE	-.021	.044	.218	.122	1.000	.234
LIBRARY GUIDES	.040	.400	.240	.186	.234	1.000

Source: Compilation by author based on SPSS output

**CORRELATION MATRIX OF THE WEB SERVICES DOMAIN**

<b>ATTRIBUTES</b>	<b>WELL ORGANISED WEB SITE</b>	<b>USEFUL LIBRARY WEB SITE</b>	<b>NEEDS ORIENTED WEB SITE</b>	<b>ACCURATE OPAC</b>	<b>UP-TO-DATE OPAC</b>
<b>WELL ORGANISED WEB SITE</b>	1.000	.508	.316	.285	.159
<b>USEFUL LIBRARY WEB SITE</b>	.508	1.000	.405	.179	.064
<b>NEEDS ORIENTED WEBSITE</b>	.316	.405	1.000	.114	.226
<b>ACCURATE OPAC</b>	..285	.179	.114	1.000	-.135
<b>UP-TO-DATE OPAC</b>	.159	.064	.226	.135	1.000

Source: Compilation by author based on SPSS output

## APPENDIX VI : INITIAL EFA OUTPUT OF THE EXPLORATORY STUDY

### KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.751
Bartlett's Test of Sphericity	Approx. Chi-Square	5246.019
	df	780
	Sig.	.000

### Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	8.405	21.013	21.013	8.405	21.013	21.013	4.210	10.525	10.525
2	3.182	7.954	28.967	3.182	7.954	28.967	3.005	7.513	18.038
3	2.731	6.828	35.795	2.731	6.828	35.795	2.862	7.156	25.194
4	2.526	6.316	42.111	2.526	6.316	42.111	2.847	7.118	32.312
5	1.888	4.719	46.830	1.888	4.719	46.830	2.311	5.778	38.090
6	1.761	4.403	51.233	1.761	4.403	51.233	2.182	5.454	43.544
7	1.578	3.946	55.179	1.578	3.946	55.179	2.121	5.304	48.848
8	1.382	3.455	58.634	1.382	3.455	58.634	2.092	5.229	54.077
9	1.191	2.977	61.612	1.191	2.977	61.612	2.033	5.081	59.158
10	1.156	2.891	64.503	1.156	2.891	64.503	2.016	5.040	64.198
11	1.078	2.695	67.198	1.078	2.695	67.198	1.200	2.999	67.198
12	.997	2.492	69.689						
13	.968	2.420	72.110						
14	.889	2.223	74.332						
15	.807	2.016	76.349						
16	.768	1.920	78.268						
17	.766	1.915	80.183						
18	.700	1.749	81.932						
19	.663	1.658	83.590						
20	.612	1.529	85.119						
21	.565	1.412	86.531						
22	.553	1.382	87.913						
23	.510	1.274	89.187						
24	.487	1.218	90.406						
25	.452	1.129	91.534						
26	.445	1.112	92.646						
27	.400	1.000	93.646						
28	.372	.929	94.575						
29	.342	.855	95.430						
30	.323	.808	96.239						
31	.276	.690	96.928						
32	.263	.657	97.585						
33	.221	.553	98.138						
34	.203	.508	98.646						
35	.156	.391	99.037						
36	.155	.388	99.425						
37	.118	.295	99.720						
38	.062	.154	99.874						
39	.036	.090	99.964						
40	.015	.036	100.000						

Extraction Method: Principal Component Analysis.

Rotated Component Matrix <sup>a</sup>

	Component										
	1	2	3	4	5	6	7	8	9	10	11
STAFF APPROACHABILITY	.301	.077	.307	-.113	.036	-.035	.714	.066	.155	-.074	-.007
COMPLAINT RESPONSIVENESS	.376	.143	.785	.009	-.020	-.131	.103	.121	.106	-.098	-.064
CULTURAL SENSITIVITY	.174	-.009	.845	.034	.104	-.005	.132	-.018	.159	-.019	.128
COURTESY OF THE STAFF	.805	.215	.265	.100	-.051	.104	.228	.039	.046	-.025	-.092
PERSONAL ATTENTION TO CUSTOMERS	.730	.124	.167	-.008	.017	-.111	-.037	.082	.215	-.043	.020
KEEP INFORMED ABOUT NEW SERVICES	.601	.156	.192	-.014	.116	-.141	.066	.133	.462	.028	.016
SUPPORTIVE MOODS	.146	.683	-.024	.083	.035	-.282	-.008	.021	.036	-.130	.044
STAFF KNOWLEDGEABILITY	.152	.766	.134	.015	-.006	.180	-.029	-.002	.072	.062	-.039
PROMPTNESS OF THE STAFF	.029	.802	.032	-.040	.024	.050	.022	-.126	.041	.023	-.013
REFLECTIVE AND CREATIVE PLACE	-.110	.002	.129	-.103	.018	-.092	-.009	.258	-.532	.463	-.151
HELPFUL DIRECTIONAL SIGNS	-.137	-.005	-.115	-.023	.002	.061	-.107	.040	.000	.878	-.035
COMFORTABLE AND INVITING PLACE	-.075	-.011	-.027	-.144	-.018	-.034	-.021	-.058	-.111	.841	.223
HIGH QUALITY INFORMATION RESOURCES	.089	-.131	-.006	.668	.124	-.016	-.127	.305	-.084	-.013	.026
COLLECTION COMPLETENESS	.048	.126	.066	.773	.152	.080	-.046	-.197	-.118	-.106	-.049
CONVENIENT ACCESS TO COLLECTIONS	.038	.014	.071	.534	-.147	-.103	-.061	.173	-.034	-.170	.253
COLLECTION COMPREHENSIVENESS	-.131	-.043	.044	.589	.126	.068	-.094	-.153	.041	.189	-.425
CURRENT INFORMATION	-.026	.037	-.022	.634	-.080	.046	.218	.126	.211	-.025	.126
NEEDS ORIENTED RESOURCES	.203	.145	-.009	.697	-.055	.129	-.028	-.037	.117	-.046	-.072
GOOD SANITARY FACILITIES	.770	.178	.179	.210	-.027	.218	.345	.055	.010	-.064	-.098
CONVENIENT OPENING HOURS	.620	-.077	.134	-.065	-.002	.156	-.034	-.066	.038	-.193	.244
GOOD VENTILATION	.282	.644	.066	.125	.118	.377	.173	-.086	.032	.017	-.003
GOOD FUNCTIONAL FURNITURE	.415	.309	-.029	.084	-.136	.196	.266	.071	-.126	-.050	.165
GOOD LIGHTING	.272	.049	.226	-.078	.050	.039	.815	.145	.116	-.116	-.015
QUICK RE-SHELVING	.420	.160	.703	.083	.017	-.031	.198	.151	.125	-.123	-.109
QUIETNESS IN THE LIBRARY	.186	.010	.528	.045	.137	.210	.371	.006	-.042	.119	.230
AIR CONDITIONING	.005	.141	.391	-.027	-.019	.160	.029	.060	.620	-.107	.061
ACCESS TO COMPUTERS	.259	.051	.073	.068	.005	.213	.198	.146	.745	-.010	-.058
AUDIOVISUAL EQUIPMENT IN GOOD CONDITION	.743	.186	.173	.206	-.035	.243	.343	.061	.042	-.065	-.095
ERROR FREE RECORDS IN THE SYSTEMS	.099	.021	.139	.041	-.072	-.075	.007	.490	.475	.011	-.062
EFFECTIVE RESOURCE SHARING	.003	-.022	.071	.052	-.007	.018	-.009	.030	.035	.138	.720
E-JOURNAL ACCESS	.114	.479	.060	.086	.161	.651	.182	-.040	.091	-.017	-.051
REMOTE ACCESS	.109	.427	.161	.131	-.040	.563	.199	.011	.111	.016	-.066
REASONABLE FARE STRUCTURE	.165	-.128	-.057	-.028	-.029	.437	-.159	.420	.064	.088	-.197
CUSTOMER EDUCATION PROGRAMMES	.136	.233	.133	.047	.696	.258	.106	.110	.046	-.034	-.066
LIBRARY GUIDES	.079	-.033	-.124	.059	.226	.685	-.089	-.100	.126	-.029	.147
WELL ORGANISED WEB	-.026	.049	.087	.130	.830	.142	-.011	.166	.117	.024	-.132
USEFUL LIBRARY WEB	-.148	-.089	.090	-.096	.726	-.010	-.128	.131	-.217	-.110	.132
NEEDS ORIENTED WEBSITE	-.007	-.029	-.243	-.027	.563	-.104	.226	-.322	-.005	.176	.035
ACCURATE OPAC	.103	-.023	.093	-.021	.170	.056	.137	.706	.008	.129	.124
UP-TO-DATE OPAC	-.013	-.101	.009	.148	.085	-.116	.102	.759	.068	-.110	.033

Extraction Method: Principal Component Analysis.

Rotation Method: Varimax with Kaiser Normalization.

a. Rotation converged in 12 iterations.

**APPENDIX VII: CONTENT ASSESSMENT QUESTIONNAIRE USED IN THE EXPLORATORY SURVEY**

**IDENTIFICATION OF SERVICE QUALITY DOMAINS  
CONTENT ASSESSMENT QUESTIONNAIRE**

Instructions: Seven categories of library service quality are defined on the left-hand side of the page. On the right-hand side are attributes which explain each of the seven categories. First read through all of the categories, and then fill-in the blanks preceding each attribute at the right with the letter of the category (A-W) to which it most closely corresponds.

**A** - Affect of service personal

**B** - Building environment

**C** - Collection & Access

**F** - Furniture & facilities

**T** - Technology

**S** - Service delivery

**W** - Web services

\_\_\_\_\_ Staff approachability

\_\_\_\_\_ Complaint responsiveness

\_\_\_\_\_ Cultural sensitivity

\_\_\_\_\_ Courtesy of the staff

\_\_\_\_\_ Personal attention to customers

\_\_\_\_\_ Being informed about new services

\_\_\_\_\_ Supportive moods

\_\_\_\_\_ Follow up service

\_\_\_\_\_ Proper coordination by the staff

\_\_\_\_\_ Staff knowledgeability

\_\_\_\_\_ Promptness of the staff

\_\_\_\_\_ Contemplative environment

\_\_\_\_\_ Physically challenged friendly facilities

\_\_\_\_\_ Reflective and creative place

\_\_\_\_\_ Accessibility to buildings

\_\_\_\_\_ Helpful directional signs

\_\_\_\_\_ E-journal access

\_\_\_\_\_ Remote access

\_\_\_\_\_ Reasonable fare structure

\_\_\_\_\_ Customer education programmes



<b>A</b> - Affect of service personal	_____ Transactional confidentiality
<b>B</b> - Building environment	_____ Library guides
<b>C</b> - Collection & Access	_____ Well organised web site
<b>D</b> - Furniture & facilities	_____ Useful library web site
<b>E</b> - Technology	_____ Needs oriented website
<b>F</b> - Service delivery	_____ Accurate OPAC
<b>G</b> - Web services	_____ Easy OPAC
	_____ Up-to-date OPAC
	_____ Comfortable and inviting place
	_____ High quality information resources
	_____ Collection completeness
	_____ Convenient access to collections
	_____ Diversified general readings
	_____ Collection comprehensiveness
	_____ Current information
	_____ Needs oriented resources
	_____ Good sanitary facilities
	_____ Convenient opening hours
	_____ Good ventilation
	_____ Good functional furniture
	_____ Good lighting
	_____ Quick re-shelving
	_____ Quietness in the library
	_____ Air conditioning
	_____ Access to computers
	_____ Audiovisual equipment in good condition
	_____ Modern equipment
	_____ Error free records in the systems
	_____ Effective resource sharing
	_____ Archival access

**Thank you**

## **APPENDIX VIII: QUESTIONNAIRE FOR THE MAIN SURVEY**

Department of Information Science  
University of South Africa  
Pretoria, South Africa  
10<sup>th</sup> January, 2009

Dear Sir/Madam

### **A survey to develop a model to predict customer satisfaction in relation to service quality in university libraries in Sri Lanka**

For the partial fulfilment of my doctoral study in Information Science at the University of South Africa, I am conducting a research study to help understand the level of customer satisfaction of Sri Lankan university libraries in relation to service quality. As a part of my study, now I am carrying out a survey to come up with process and status of customer satisfaction in relation to service quality in university libraries as perceived by the library customers. The outcome of this survey will particularly aid to develop a model which represents the inherent dynamism of the customer satisfaction process in university libraries in Sri Lanka.

I request you to kindly take part completing the enclosed questionnaire and return it to me in the reply paid envelope attached within the next ten days. I appreciate your help in advance. All information in this study will be kept confidential. Data will be stored securely. No reference will be made in oral or written reports, which could link participants to the study. Your participation in this study is voluntary. In the future, if you need any help regarding knowledge in customer satisfaction and service quality, I will be more than glad to do my best to help you and your university library.

If you have any question and suggestions, please feel free to contact me over **0714878800** or **chaminda@lib.cmb.ac.lk** at anytime.

Thank you.

Chaminda Jayasundara  
DLitt et Phil student

**A survey on Customer Satisfaction in relation to Service Quality in University Libraries in Sri Lanka**

**QUESTIONNAIRE**

**SECTION A: ABOUT YOU**

**Please tick (√) in the appropriate box**

1. Are you a registered customer (user) of the library?

Yes	
No	

2. What is the type of your membership?

Student membership	
Teachers membership	
Other	

3. If you are a member of the academic staff, please indicate whether you are on temporary, contract or permanent basis:

Temporary basis	
Contract basis	
Permanent basis	

4. If you are a student, what is the type of your studentship?

Undergraduate Student	
Postgraduate student	

5. What is your university?

University of Colombo	
University of Sri Jayawardenepura	
Rajarata University of Sri Lanka	
University of Ruhuna	

6. What is your age?

18-23	
24-29	
30-35	
36-41	
42-47	
48-52	
More than 53	

7. What is your gender?

Male	
Female	

8. What is your regularity of library visits?

Everyday	
1-3 days a week	
4-6 days a week	
Once in two weeks	
Once in a month	
Never	
Other	

9. How long have you used the university library?

Below One year	
One to two years	
Three to Four years	
Five to Ten years	
More than Ten years	

10. What is the purpose of your library visits?

To find information	
To ask for advice	
To read lecture notes	
To use computers	
To find quiet/convenient place to study	
To meet friends	
Other	

**SECTION B: EXPECTATIONS AND SATISFACTION**

As you are a customer of your university library, please look at the following statements and mark how **IMPORTANT** each item to you and how **SATISFIED** you are with each item in relation to your library use.

**Labels**

Column: **IMPORTANT**

- 1. Very unimportant
- 2. Unimportant
- 3. Little important
- 4. Important
- 5. Very important
- 6. Don't know

Column: **SATISFACTION**

- 1. Not at all satisfied
- 2. Unsatisfied
- 3. Little satisfied
- 4. Satisfied
- 5. Very satisfied
- 6. Don't know

**1. RESPONSIVENESS**

Item	IMPORTANT to me of each item in relation to library use						SATISFACTION of each item in relation to my library use					
	1	2	3	4	5	0	1	2	3	4	5	0
Staff should anticipate customer needs and provide opportunity to talk with them freely												
Complaints made by library customers should be immediately attended												
The library staff should understand the cultural differences of the customers												
Staff in the library should be courteous												
The library should provide personal attention to customers												
Library should keep the customers informed about new library services												

How would you rate the overall quality of the above mentioned features of <b>RESPONSIVENESS</b> of your library?	Not at all satisfied	Unsatisfied	Little satisfied	Satisfied	Very Satisfied	Not Applicable
	1	2	3	4	5	0

## 2. SUPPORTIVENESS

Item	IMPORTANCE to me of each item in relation to library use						SATISFACTION of each item in relation to my library use					
	1	2	3	4	5	0	1	2	3	4	5	0
The atmosphere of library staff during customers' information searching, gathering and receiving should be supportive	1	2	3	4	5	0	1	2	3	4	5	0
It is essential to have knowledgeable staff/ subject specialists in the library for the provision of required information to customers	1	2	3	4	5	0	1	2	3	4	5	0
Library staff should offer a prompt service	1	2	3	4	5	0	1	2	3	4	5	0

How would you rate the overall quality of the above mentioned features of <b>SUPPORTIVENESS</b> of your library?	Not at all satisfied	Unsatisfied	Little satisfied	Satisfied	Very Satisfied	Not Applicable
	1	2	3	4	5	0

## 3. BUILDING ENVIRONMENT

Item	IMPORTANCE to me of each item in relation to library use						SATISFACTION of each item in relation to my library use					
	1	2	3	4	5	0	1	2	3	4	5	0
The library should be a place for reflection and creativity	1	2	3	4	5	0	1	2	3	4	5	0
The Library should provide directional signs in clear, understandable and helpful way enabling customers to access to relevant resources and facilities	1	2	3	4	5	0	1	2	3	4	5	0
The library should be a comfortable and inviting place	1	2	3	4	5	0	1	2	3	4	5	0

How would you rate the overall quality of the above mentioned features of <b>BUILDING ENVIRONMENT</b> of your library?	Not at all satisfied	Unsatisfied	Little satisfied	Satisfied	Very Satisfied	Not Applicable
	1	2	3	4	5	0

#### 4. COLLECTION AND ACCESS

Item	IMPORTANCE to me of each item in relation to library use						SATISFACTION of each item in relation to my library use					
	1	2	3	4	5	0	1	2	3	4	5	0
Library must assure high quality of contents of its information resources	1	2	3	4	5	0	1	2	3	4	5	0
The library collection should be complete	1	2	3	4	5	0	1	2	3	4	5	0
The library should provide convenient access to its all collections	1	2	3	4	5	0	1	2	3	4	5	0
The library collection should be comprehensive	1	2	3	4	5	0	1	2	3	4	5	0
The library should provide current information	1	2	3	4	5	0	1	2	3	4	5	0
Information resources should match with customers' information needs.	1	2	3	4	5	0	1	2	3	4	5	0

How would you rate the overall quality of the above mentioned features of <b>COLLECTION AND ACCESS</b> of your library?	Not at all satisfied	Unsatisfied	Little satisfied	Satisfied	Very Satisfied	Not Applicable
	1	2	3	4	5	0

#### 5. FURNITURE AND FACILITIES

Item	IMPORTANCE to me of each item in relation to library use						SATISFACTION of each item in relation to my library use					
	1	2	3	4	5	0	1	2	3	4	5	0
The library should provide clean, sufficient and visually appealing sanitary facilities	1	2	3	4	5	0	1	2	3	4	5	0
The library should provide convenient opening hours since there are different full-time and part-time customers	1	2	3	4	5	0	1	2	3	4	5	0
Good ventilation should be in the library	1	2	3	4	5	0	1	2	3	4	5	0
Good functional furniture should be in the library	1	2	3	4	5	0	1	2	3	4	5	0
Adequate lighting should be available in the library	1	2	3	4	5	0	1	2	3	4	5	0
The library staff should re-shelve the materials quickly	1	2	3	4	5	0	1	2	3	4	5	0
Quietness of the premises should be maintained for peaceful studies	1	2	3	4	5	0	1	2	3	4	5	0

How would you rate the overall quality of the above mentioned features of <b>FURNITURE AND FACILITIES</b> of your library?	Not at all satisfied	Unsatisfied	Little satisfied	Satisfied	Very Satisfied	Not Applicable
	1	2	3	4	5	0

## 6. TECHNOLOGY

Item	IMPORTANCE to me of each item in relation to library use						SATISFACTION of each item in relation to my library use					
	1	2	3	4	5	0	1	2	3	4	5	0
The library needs to be air conditioned to keep customers comfortable within the premises	1	2	3	4	5	0	1	2	3	4	5	0
Computers should be available in good working order to access different electronic collections, Internet and OPAC	1	2	3	4	5	0	1	2	3	4	5	0
Audiovisual equipments of the library should be available in good working condition	1	2	3	4	5	0	1	2	3	4	5	0
Error free records of transactions are needed to maintain the trust on library customer-service	1	2	3	4	5	0	1	2	3	4	5	0

How would you rate the overall quality of the above mentioned features of <b>TECHNOLOGY</b> of your library?	Not at all satisfied	Unsatisfied	Little satisfied	Satisfied	Very Satisfied	Not Applicable
	1	2	3	4	5	0

## 7. SERVICE DELIVERY

Item	IMPORTANCE to me of each item in relation to library use						SATISFACTION of each item in relation to my library use					
	1	2	3	4	5	0	1	2	3	4	5	0
The library should provide access to electronic databases/ digital collections for finding information	1	2	3	4	5	0	1	2	3	4	5	0
The library should provide remote access facilities	1	2	3	4	5	0	1	2	3	4	5	0
The library should provide customer education programmes enabling customers to get acquainted with the services	1	2	3	4	5	0	1	2	3	4	5	0
The library should provide guides/ brochures in relation to its services	1	2	3	4	5	0	1	2	3	4	5	0

How would you rate the overall quality of the above mentioned features of <b>SERVICE DELIVERY</b> of your library?	Not at all satisfied	Unsatisfied	Little satisfied	Satisfied	Very Satisfied	Not Applicable
	1	2	3	4	5	0



## 8. WEB SERVICES

Item	IMPORTANCE to me of each item in relation to library use						SATISFACTION of each item in relation to my library use					
	1	2	3	4	5	0	1	2	3	4	5	0
Well organised library web page should be there for allowing customers to access information quickly												
Library web page should contain correct and useful information about the services and resources												
OPAC should be an accurate source of information												

How would you rate the overall quality of the above mentioned features of <b>WEB SERVICES</b> of your library?	Not at all satisfied	Unsatisfied	Little satisfied	Satisfied	Very Satisfied	Not Applicable
	1	2	3	4	5	0

## 9. OVERALL SATISFACTION

<b>OVERALL</b> , how would you rate your satisfaction with the library service of your university?	Not at all satisfied	Unsatisfied	Little satisfied	Satisfied	Very Satisfied	Not Applicable
	1	2	3	4	5	0

<b>OVERALL</b> , how would you rate your satisfaction with the library service of your university in relation to its impact on your teaching and/or learning?	Not at all satisfied	Unsatisfied	Little satisfied	Satisfied	Very Satisfied	Not Applicable
	1	2	3	4	5	0

## SECTION C: SITUATIONAL ATTRIBUTES

In relation to your library use, please mark how **AGREE** or **DISAGREE** you are with each statement.

Item	Strongly disagree	Disagree	Little agree	Agree	Strongly agree	Not Applicable
Compared to my colleagues in the university, I am very knowledgeable about the library services (Knowledgeable)	1	2	3	4	5	0
It is very easy for me to evaluate service quality of my university library (Vagueness)	1	2	3	4	5	0
Library service is an essential service in my daily academic life (Involvement)	1	2	3	4	5	0

**Thank you**