



CJMR

COLOMBO JOURNAL OF
MULTI-DISCIPLINARY RESEARCH

COLOMBO JOURNAL OF
MULTI-DISCIPLINARY RESEARCH

Volume 10 - No. 01 & 02 - March & November 2025

Faculty of Graduate Studies - University of Colombo

Reassessing Public Service Performance through an Integrated Analysis of Quality, Efficiency and Satisfaction

I. U. Yakandawala ✉

LIRNEasia, Borella, Western Province, Sri Lanka

Abstract

This study provides a comprehensive quantitative evaluation of the interrelationships among service delivery efficiency, perceived service quality, and customer satisfaction within public service contexts, using the SERVQUAL and TCV models. While previous research has typically examined these dimensions in isolation, this study integrates them into a unified analytical framework to assess their dynamic interplay. Drawing on primary survey data from a major divisional secretariat and applying correlation and regression techniques, the study tests eight hypotheses derived from a theory-driven conceptual model. The findings reveal a strong and statistically significant association between perceived service quality and customer satisfaction, demonstrating that improvements in communication, empathy, reliability, and related SERVQUAL dimensions substantially enhance satisfaction levels. In contrast, TCV-based service efficiency measured through time, cost, and visits shows no meaningful correlation with either service quality or satisfaction, indicating its relative independence from customer perceptions. These results challenge conventional assumptions that efficiency directly shapes user experience and highlight the need for multidimensional assessment frameworks in public administration. The study contributes novel empirical evidence on how key performance indicators interact, offering important insights for policymakers seeking to improve transparency, accountability, and citizen-centred service delivery.

Keywords: Public Service, Service Efficiency, Service Quality, Customer Satisfaction, SERVQUAL, TCV Model.

Received:
15 June 2025

Accepted revised version:
14 November 2025

Published:
24 December 2025

Suggested citation: Yakandawala, I. U. (2025). Reassessing public service performance through an integrated analysis of quality, efficiency and satisfaction. *Colombo Journal of Multi-Disciplinary Research*, 10 (01 & 02), 21-42.

✉ Corresponding Author: 22isuru22@gmail.com

DOI: <https://doi.org/10.4038/cjmr.v10i1-2.85>

ISSN: 2362-0633

© Copyright 2025 Faculty of Graduate Studies, University of Colombo. All rights reserved.

Introduction

Governments in various countries, are implementing various policies and strategies for encouraging and improving the public service performance (Lewis et al., 2015). The central governments in developing countries have taken several actions to measure the performance or efficiency in public service (Lewis et al., 2015). The measures play a valuable role in establishing transparency, accountability of public service delivery by evaluating the real-world scenario of the service (Wane & Chuma, n.d.). This study offers a novel empirical evaluation of the interplay between service efficiency, quality, and customer satisfaction using a dual-model approach by Service quality (SERVQUAL) Time, Cost and Visit (TCV) in the context of public service delivery. This contributed to enhancing the knowledge on the contemporary quantitative measures in public service delivery, meanwhile, explaining the three concepts as public service delivery, quality, and satisfaction in one context. The study enforces the exploration of the relationships of these three basic measures of service delivery.

Objective

There are studies on service delivery measures that used a single measure and scales. Ahsan et al. (2020) studied user Satisfaction through the Time, Cost and Visit (TCV) model. In Bangladesh, the United Nations Development Programme partnered programmes evaluated user satisfaction by the TCV model as a direct customer perspective instrument (UNOSSC, 2019). Parasuraman et al. (1988) used the SERVQUAL model for the service quality in the service process. Under all the literature, these models or measuring instruments (TCV model and SERVQUAL model) are used as a single measurement of service delivery. Conceptually and statistically, they have focused on one parameter to reveal the service delivery. The studies have been limited to a single approach in once and failed to address the relationship and interplay of the TCV efficiency, satisfaction and SERVQUAL service quality. The present study specifically tried to focus on exploring the inter-relationships of the key service delivery concepts using the measured that have already has been deployed among the previous studies. Unlike traditional assessments that consider these dimensions in isolation, this research provides a comprehensive framework to understand their dynamic interrelations. This new knowledge would contribute to identifying the quantitative relationships among these three key concepts of service delivery and measures of service delivery provide the objective measurement and are important to develop social welfare and economic progress by service delivery (UNOSSC, 2019). To improve the service delivery, constant measures are required (Owen, 1991). The present study verified the robust empirical relationships that can be used as constant measures with the knowledge of their interplaying nature.

A conceptual framework has been designed for obtaining the objective of the present study. Using the selected three scales as TCV efficiency, TCV Satisfaction and SERVQUAL Service Quality scales, below have been designed to statistically quantify their relationships and the impacts.

To address the research objective, basic assumptions were made to investigate the main relationships among the three scales and their sub-components.

H₁ :- There is a positive relationship and influence between service quality and its five factors of service quality.

H₂ :- There is a positive relationship and influence between TCV Satisfaction and its three factors of service quality.

H₃ :- There is a positive relationship among the TCV Model values (Time, Cost, Visits).

H₄ :- There is a positive relationship and influence between service quality and TCV Satisfaction.

H₅ :- There is a negative relationship between service quality and TCV values.

H₆ :- There is a negative relationship between TCV Model values and TCV Satisfaction.

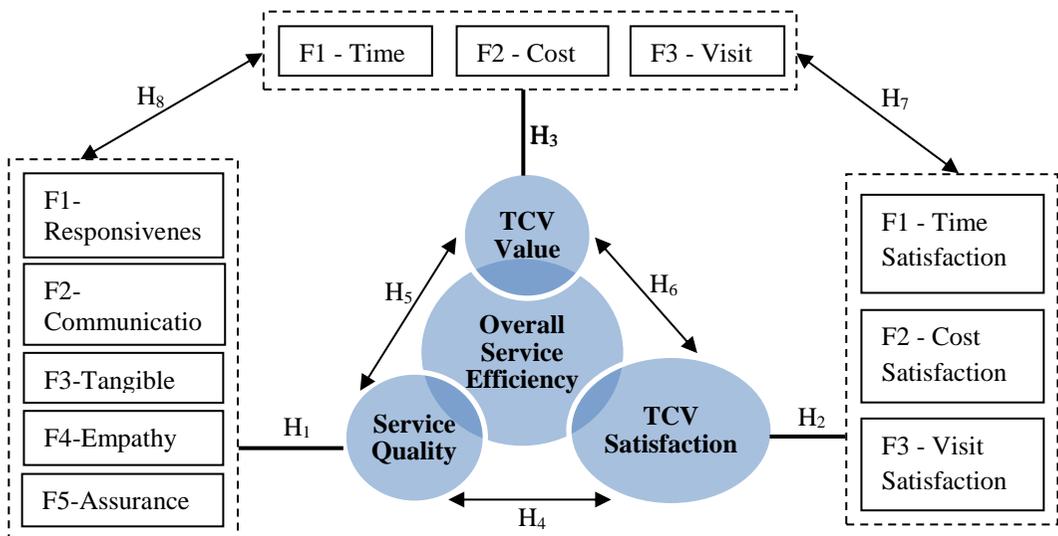
H₇ :- There is a negative relationship between factors of TCV Model values and factors of TCV Satisfaction.

H₈ :- There is a negative relationship between factors of TCV Model values and factors of service quality.

There are eight hypotheses constructed for quantifying and analysing the relationship and the influence of the service delivery scales. To depict, the hypotheses with assumed relationships and impact have been figured out by the chart below. It represents all scales with their sub-components (dimensions). The three main scales in centre of the diagram and their dimensions are connected with straight lines. The assumed relationships with other scales and sub-components were represented by arrows. Dotted lined rectangles grouped into dimensions which included the same scales.

Figure 1

The Conceptual Framework of the Study



Literature Review

The literature review has been focused mainly for providing the background of the key concepts and identifications of the scales for each key concepts. End of the process of defining and the identifying the scales, underscoring the key scales, the conceptual framework with the hypotheses for the quantitative study has been demonstrated.

TCV Model

Time, Cost and Visit shortened as TCV, measurement is a somewhat complex concept used in many industries to assess performance, resource allocation, and efficiency. This literature review seeks to clarify the definition and importance of TCV measurement in various scenarios. The key measuring instrument of the study for measuring and quantifying the efficiency is the TCV Model.

First, for people to think about innovation and build services from a citizen's perspective in terms of reduction in time, cost, and visit, the United Nations Development Programme (UNDP) a2i (Access to information) project presented a basic TCV framework as follows: (UNDP, 2015)

1. lowering the turnaround time for a service.
2. lowering expenses, penalties, travel expenses, missed income, and other opportunity costs.
3. minimising the number of trips required to accomplish a service transaction at government offices.

The TCV is applied in service process simplification, innovation-related workshops, the Service Innovation Fund application, and impact monitoring and evaluation conducted by a2i (United Nations Development Programme [UNDP], 2015).

Definition of TCV Measurement:

The TCV measurement is the systematic evaluation of time, cost and visit data to determine the efficiency, effectiveness, and use of resources within a certain system or process. As Smith and Johnson define, TCV measurement is the quantification and analysis of time spent, expenses incurred, and visits made in relation to certain activities, projects or services (Smith & Johnson, 2018).

Time Measurement:

The quantification of the duration or elapsed time connected with particular tasks, processes, or activities can be identified as Time measurement in TCV. This covers the time required to finish a project or provide a service or respond to a customer request. In 2019, Jones and others highlighted the importance of precise time measurement in TCV analysis for detecting inefficiencies, streamlining workflow and increasing productivity (Jones et al., 2019).

Cost Measurement:

Cost measurement of TCV refers to the examination of financial resources spent or invested in carrying out specified tasks, projects, or activities. This includes calculating the direct costs like labor cost, materials, and overhead, as well as indirect costs like delays, rework and opportunity costs. In 2020, Lee and Patel emphasise the importance of cost assessment in TCV analysis for identifying cost drivers, cutting down the expenses, and increasing returns on investment (Lee & Patel, 2020).

Visit Measurement:

The Visit measurement in TCV means the quantification and analysis of interactions, transactions, or encounters within a certain system, process or service environment. This involves trips to physical sites, virtual platforms and customer service channels, as well as contacts with clients, stakeholders and end users. In Wang and Brown (2021) showed the importance of visit measurement in TCV analysis for understanding customer behaviour, optimising service delivery and boosting the customer experiences (Wang & Brown, 2021).

TCV Satisfaction

This satisfaction measure was developed using the UNDP TCV model. "TCV satisfaction" is a phrase used to measure customer happiness with a product, service, or experience in terms of visits, cost, and time (Ahsan et al., 2021). It's a statistic that's frequently used in a variety of industries to assess how well a certain solution satisfies the requirements and expectations of users or consumers. The total contentment of the three aspects or dimensions of a service listed below is known as TCV satisfaction.

Time Satisfaction is used to describe the time required to finish an activity, get a service, or receive a product. Consumers usually favor time-efficient and effective solutions. Cost Satisfaction refers to the sum of money needed to purchase a good or service. Cost satisfaction measures how satisfied consumers are with the value they get for the money they spend. Visit satisfaction refers satisfaction to the quantity of contacts or visits necessary to meet a requirement or accomplish an objective. This could entail going to a place in person, using an app or website online, or engaging in any other way that is required to use the product.

Efficiency has a significant association with this TCV satisfaction approach. According to Thotam and Buhse (2019), longer visit times have been linked to higher levels of satisfaction, whereas shorter visits may result in lower levels of satisfaction. Given that this satisfaction closely corresponds with the efficiency scale used in this study, it is an important scale for examining how the public views the actual efficiency as determined by the TCV Model.

Depending on the situation, TCV satisfaction can differ greatly (Ahsan et al., 2021). In the healthcare industry, for instance, patients' satisfaction may be measured by factors such as the time it takes for them to see a doctor, the cost of their treatment, and the number of visits

they must make to the facility for follow-ups or additional care (Glogovac et al., 2019; Shirley & Sanders, 2013; Teunis et al., 2015).

Customers may evaluate TCV satisfaction in e-commerce based on things like product prices, shipping times, and website usability (Thapa, 2020). TCV satisfaction is a critical performance metric that businesses use to pinpoint areas for development and make sure their products live up to client expectations. Through addressing issues with time, money, and visits, companies may improve customer satisfaction, customer loyalty, and eventually their bottom line.

SERVQUAL Model

The SERVQUAL model, a multidimensional research tool, is based on the idea of the customer views of five key dimensions which are, tangibles, reliability, responsiveness, assurance, and empathy. The structure consists of a questionnaire with paired statements for each category to figure out how good the service is (Parasuraman et al., 1988). It was developed by three scholars namely, A. Parasuraman, Valarie Zeithaml and Berry in 1985 (Parasuraman et al., 1985). Over time, it has become a standard for assessing service quality across a wide range of businesses. This model provides a complete framework for understanding and measuring service quality that customers view through five key dimensions as aforesaid. Since its introduction, the SERVQUAL model has been extensively empirically tested and theoretically refined.

In 1990, J. M. Carman conducted research to investigate the SERVQUAL model's applicability in the healthcare sector and was able to discover, the model was also an effective instrument for assessing patient perceptions of service quality (Carman, 1990). In parallel, the three scholars aforesaid Zeithaml, Parasuraman and Berry decided to do a meta-analysis of 26 studies in 1990 from various service industries to confirm the SERVQUAL instrument's reliability and validity. Their findings proved the multidimensional character of service quality and emphasized the significance of controlling customer expectations to improve perceived service quality (Zeithaml et al., 1990).

In addition to that, studies in hospitality management have been conducted to investigate the SERVQUAL model's usefulness in assessing hotel service quality also. In 2001, T.Y. Choi and R. Chu examined the relationship between service quality aspects and customer satisfaction in the hotel business, highlighting the importance of responsiveness and assurance in molding visitor impressions (Choi & Chu, 2001). Furthermore, in 2003, to get things into a more Chinese profile, T. Lam and H. Q. Zhang also investigated the impact of service quality on customer loyalty in the Chinese hotel industry, emphasising the importance of empathy and dependability in developing long-term connections with visitors (Lam & Zhang, 2003).

Although its highly usage, several scholars have pointed out, more likely criticised the SERVQUAL model's conceptual limits and methodological constraints. In 1984, a Finnish academic C. Gronroos questioned for a more comprehensive approach to service quality

assessment, highlighting the significance of interactions and relationships between both service providers and customers (Gronroos, 1984). Cause since the introduction era of SERVQUAL model, the structure has focused more on the customer's point of view. Also, in 1995 R. Johnston presented a redesigned paradigm that included characteristics of process quality and customer co-production both, questioning the static nature of the original SERVQUAL dimensions (Johnston, 1995).

So, in response to these criticisms, scholars and researchers created alternative models and approaches for assessing service quality. Such as SERVPERF scale which was introduced by Cronin and Taylor (1992), and the disconfirmation paradigm by R. L. Oliver (Oliver, 1980). These approaches provide varied perspectives on customer satisfaction while emphasising the dynamic nature of service interactions.

SERVQUAL Model in Sri Lankan context has been used for research purposes. Directly, there are eight dimensions. But Wijesekera et al. (2016) have modified the scale according to the DS office in a previous study. The new scale measuring the five dimensions of responsiveness, communication, tangibleness, empathy, and assurance was developed from 41 items, which were reduced to 19 items. The new scale to assess Divisional Secretariats' service excellence consists of just 19 elements divided into five categories.

1. **Responsiveness:** This component speaks to the preparedness and willingness of service providers to assist clients as soon as possible. It includes things like providing fast service, answering questions from customers quickly, and being able to respond to their demands quickly. A high level of responsiveness suggests that the service provider is willing and able to help clients effectively.
2. **Communication:** In the SERVQUAL paradigm, communication refers to how well information is exchanged between customers and service providers. It covers things like giving clients correct information, paying attention to their comments, and making sure they are aware of the services being offered. Establishing and maintaining trust and satisfying consumer expectations need effective communication.
3. **Tangibles:** The term "tangibles" describes the actual building tools, and staff appearance used in the provision of services. This dimension evaluates the outward features of the service environment, like attractiveness, cleanliness and the presence of contemporary equipment. The way that clients perceive the quality and credibility of a service is greatly influenced by tangibles.
4. **Empathy:** Understanding and addressing each customer's unique requirements and concerns is a necessary component of empathy. Empathic service providers genuinely care about their clients' welfare and make an effort to customise their interactions with them. By building rapport and trust, empathic interactions can increase consumer happiness and loyalty.

5. Assurance: The expertise, skill, and reliability of service providers are related to assurance. It includes things like staff knowledge, consistent service delivery, and the capacity to inspire trust in clients. Assurance gives clients peace of mind that they are working with capable experts who can successfully address their demands.

The SERVQUAL model can be identified as a useful tool for analysing and improving service quality across a variety of businesses. While it has changed throughout time to incorporate feedback from empirical research and theoretical advances, continual dialogue and innovation are essential to address its limitations and improve its usefulness in practice.

Methodology

Methodology of research is the systematic way of processing the study in a given period of time. The present study has used several methods, techniques, and tools for obtaining an effective result from the study and developing the research contribution to world. To validate the research the overall research methodology gives significant support for composing a value and universal acknowledgement to the study.

Research Approach

There are two types of research approaches in the field of research as qualitative and quantitative approaches. The present study used a quantitative approach to solve the research questions. The study's main focus was a quantitative study on the interrelationship between service quality, delivery efficiency, and customer satisfaction by application of SERVQUAL and TCV models. Deductive reasoning is used to collect the quantitative data for testing hypotheses with existing scales. Thus, the whole research reasoning has depended on the deductive reasoning method for generating the insightful result.

Study Area and Institution

To study the efficiency of the public service, divisional secretariats in Sri Lanka have been selected as the significant ground level public administration entity. Gampaha district has been selected under the population factor as rural, urban and estate sector population in the district. The Kelaniya Divisional secretariat has been selected among the district offices as a significant office in accessibility factors. The main role of the Kelaniya Divisional Secretariat can be categorized in the following manner (Divisional Secretariat – Kelaniya, n.d.).

1. Acting as a close commercial city to Colombo city.
2. Accommodating people working in Colombo and suburban areas.
3. Acting as a spiritual and historical city.
4. Acting as a center of education.

Thus, considering the rational factors and under the significant, the Kelaniya Divisional secretariat has been used for the study as the study area.

Data

When considering deriving the efficiency scale and designing a conceptual framework in the literature review process, methodology design and analysing, creating recommendations, secondary data sources have been employed for making an insightful study. Depending on the study area, to test hypotheses through quantifying the service efficiency, quality and satisfaction the study has been built through the collected primary data. The survey method has been used as the basis for quantitative data collection.

Determining the Sample-Size

This study focuses on Sri Lanka Public service delivery, and the target population can be derived as the population who receive public service delivery from the DS offices in Sri Lanka. Lack of public service delivery formal data in Sri Lanka, the population of public service received cannot be defined through works of literature.

Placzek and Friede (2017) discuss the importance of using estimates from previous studies to determine the sample size needed to achieve the desired statistical power. Elashoff and Lemeshow (n.d.) discuss sample size determination in epidemiologic studies, emphasizing the importance of confidence intervals and material samples. Similarly, Lwanga and Lemeshow (1991) provide practical insights into sample size determination in studies, focusing on statistical aspects and the importance of sample size in research.

Khan (2022), states that there are no set of standards for determining sample size, sample design, required level of accuracy, non-responses, variables and sampling procedures. However, statistical power increases with the number of participants (Hair et al., 2010). According to Hair et al. (2010), a sample size of at least 100 is preferred for factor analysis. In the context of survey research, Adam (2020) provides a minimum sample size determination table for researchers to use as guidance when aiming for a sample size wider than 100. Since, as a convenience sampling study, the sample size has been selected as 109.

Data Analysis

There is three main analytical techniques used under quantitative data analysis as correlation, regression, and descriptive analysis. The present study uses statistical methods for the analysis of quantitative analysis using the Statistical Package for the Social Sciences - SPSS software package.

When evaluating and hypothesis testing, mainly correlation and regression are used as the statistical methods for checking the availability of the hypothesis. Furthermore, these methods have been used for measuring the powerfulness of the relationship and influence of each variable. In SPSS computation, Pearson product-moment correlation and Multiple Linear Regression have been used for the hypothesis testing.

The r -value in the Pearson product movement correlation matrix represents the degree of association (correlation) between two variables, while the p -value denotes the correlation's

statistical significance. A general guideline for interpreting the correlation coefficients was proposed by Guildford (1977). He states that the correlation coefficients' absolute values (+/-), range from 0 to 0.2 for negligible relationships, 0.2 to 0.4 for low relationships, 0.4 to 0.7 for moderate relationships, 0.7 to 0.9 for high relationships, and 0.9 to 1 for extremely high relationships (Guildford, 1977). Spearman's rho is used for the non-parametric correlations. It also used as the same criteria as Guildford.

The influence of one dependent variable and one or more independent variables can be ascertained by multiple regression analysis. The Coefficients table, which is displayed in the "Sig." column of the SPSS computation, gives the information needed to forecast the dependent variable and assess if the independent variable statistically substantially influences the model. In addition, the values in the "B" column under the "Unstandardised Coefficients" column can be utilised (SPSS Statistics - Procedure, Assumptions and Reporting the Output - Linear Regression Analysis, n.d.). Effect sizes for a coefficient β fall into three categories: only small, medium and large with values. For a coefficient β , effect sizes between 0.10–0.29 can be depicted as a small effect. Effect sizes between 0.30–0.49 are medium, and effect sizes of 0.50 or greater are a large type of effect (Cohen, 2013; Fey et al., 2023).

Results and Discussions

Hypothesis - H₁

H₁ :- There is a positive relationship and influence between service quality and its five factors of service quality.

This focuses on the main aspect of the service quality. There are five aspects or factors of the service quality. Responsiveness, communication, tangibility, empathy and assurance are the factors. This hypothesis assumes that the service quality and these five factors have a positive bond under the present study data set. In addition to that, this hypothesis testing aligns with the most influential and related factor to the service quality in DS office.

First, the relationship between service quality and the factors of service quality has been measured by the Pearson Correlation. As depicted in the table below, the strongest linear relationship was found to exist between Service Quality and Communication ($r = 0.954$, $p = 0.01$). The positive correlation coefficient of 0.954 indicates that as the score for Service Quality increases so does the rating for Communication. The second highest was found between Service Quality and Empathy ($r = 0.942$, $p = 0.01$) and the correlation coefficient indicates that there was a strong positive linear relationship between these two. The next highest was between Service Quality and Tangibility ($r = 0.922$, $p = 0.01$) and the value indicates a high positive linear relationship. Service Quality and Responsiveness ($r = 0.906$, $p = 0.01$) indicate a high positive linear relationship as well. Finally, Service Quality showed a positive correlation with Assurance ($r = 0.854$, $p = 0.01$).

Overall correlation between service quality and responsiveness, communication, tangibility and empathy has been an extremely high positive relationship. Only assurance

shows a highly positive relationship. **As a result, H₁ hypothesis can be accepted with a high correlation between service quality and its factors.**

Table 2

Correlation between service quality and its five factors of service quality

	Correlations					
	Y	X1	X2	X3	X4	X5
F1 Responsiveness	0.906**	1				
F2 Communication	0.954**	0.874**	1			
F3 Tangibility	0.922**	0.774**	0.845**	1		
F4 Empathy	0.942**	0.813**	0.890**	0.857**	1	
F5 Assurance	0.854**	0.684**	0.793**	0.805**	0.784**	1

** . Correlation is significant at the 0.01 level (1-tailed). Y = Service Quality

As depicted in the table below, the largest beta coefficient was 0. 245 for Responsiveness. This means that this variable makes the strongest unique contribution to explaining the dependent variable (Service Quality), when the variance explained by all other predictor variables in the model was controlled for. The Beta value of Empathy was the second highest (0.240). The above findings indicate that both Responsiveness and Empathy were equally important in explaining the variation of Service Quality. The next highest beta values were Tangibility and Communication respectively. The smallest Beta value with the least influence has been the Assurance with Service Quality. These findings indicate that both variables made a smaller contribution to the explanation of the variation of Service Quality. Based on the collinearity diagnostic table obtained, none has a tolerance value smaller than 0.10 and VIF statistics are less than 10.0. This indicates that there is no serious multicollinearity problem among the predictor variables of the model.

Table 3

Regression between service quality and its five factors of service quality.

Model	Unstandardised		Standardised			Collinearity	
	B	Std. Error	Beta	t	Sig	Tolerance	VIF
1 (Constant)	0.905	0.844		1.072	0.286		
F1 Responsiveness	0.928	0.082	0.245	11.264	0.000	0.226	4.425
F2 Communication	1.260	0.162	0.228	7.755	0.000	0.124	8.086
F3 Tangibility	0.744	0.077	0.222	9.686	0.000	0.204	4.901
F4 Empathy	1.468	0.156	0.240	9.393	0.000	0.164	6.115
F5 Assurance	0.696	0.094	0.139	7.381	0.000	0.299	3.342

a. Dependent Variable: SERVQUAL
R = 0.994; R² = 0.989; Adj. R² = 0.988.

Hypothesis – H₂

H₂ :- There is a positive relationship and influence between TCV Satisfaction and its three factors of service quality.

TCV satisfaction consists of three variables, such as Time Satisfaction, Visit Satisfaction and Cost satisfaction. This hypothesis predicts that the TCV Satisfaction, and its independent factor variables relationship and influence should be positive. According to correlation statistics, all three variables are expected a significant level ($p = 0.01$). Therefore, all the variables have signification and statistical accepted correlation with TCV Satisfaction. The highest level of correlation can be seen from TCV Satisfaction and the Time factor. ($r = 0.958$) It has been an extremely high relationship between the variables in the present study data set. Visit ($r = 0.948$) and cost ($r = 0.890$) have a strong relationship prior to the Time factor. Time and visit denote the extremely high positive relationship between TCV satisfaction. Cost has been high of the ratings. However, all three variables have a strong relationship with the TCV satisfaction.

Table 4

Correlation between TCV Satisfaction and its three factors of service quality

	Y	X1	X2	X3
TCV Satisfaction	1			
Visits Satisfaction	0.948**	1		
Time Satisfaction	0.958**	0.934**	1	
Cost Satisfaction	0.890**	0.725**	0.753**	1

** . Correlation is significant at the 0.01 level (1-tailed).

In regression analysis, for the final model with dependent variable TCV Satisfaction, influence statistics cannot be computed because the fit is perfect. In other words, the degree of correlation between variables is high and it causes problems while fitting the model and interpreting the results in regression. Below table shows the t and sig. values have been empty. Therefore, the influence of time, cost and visits for TCV satisfaction has been unaccepted in testing.

Table 5

Regression between TCV Satisfaction and its three factors of service quality.

Model		Unstandardised Coefficients		Standardised Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	-3.997E-15	0.000		.	.		
	Visit Satisfaction	1.000	0.000	0.352	.	.	0.127	7.895
	Time Satisfaction	1.000	0.000	0.350	.	.	0.116	8.636
	Cost Satisfaction	1.000	0.000	0.372	.	.	0.430	2.328

a. Dependent Variable: TCV
R = 1.000; R2 = 1.000; Adj. R2 = 1.000.

Hypothesis – H₃

H₃:- There is a positive relationship among the TCV values.

This hypothesis aligns with non-parametric tests. The reason for that is the visits, time and cost have not fulfilled the Parametric Assumptions. In addition to that, this is a calculation of an independent variable correlation test for interpreting its relationship to each other. Then, the main TCV factors for each correlation have been tested by the table below.

Table 6

Correlation among the TCV values

		Visits	Time	Cost
Spearman's rho	Visits	1.000		
	Time	0.722**	1.000	
	Cost	0.044	-0.092	1.000

** . Correlation is significant at the 0.01 level (1-tailed).

There is a notable situation that can be demonstrated. There is only one relation that can be proven by the statistical Spearman rho correlation. The positive relationship between the Time and Visits in TCV model can be depicted by the table below. R= 0.722 of high correlation is in between Time and Visits. The rest of the relationships, such as Time and Cost, Cost and Visits. Those have been in a low significance level ($p > 0.05$). Hence, this H₃ hypothesis is rejected by relationship with Time and Cost, Cost and Visits. In context of Time and Visit in TCV model, hypothesis is accepted with positive relationship.

Hypothesis – H₄

H₄ :- There is a positive relationship and influence between service quality and TCV Satisfaction.

This hypothesis has been limited to measuring the relation between the major dependent variables of the conceptual framework. This focuses on the relationship and the influence of Service quality and TCV Satisfaction. Positive relationships have been expected by the hypothesis. Accepting this positive relationship, the relationship between the Service quality and the TCV Satisfaction is a positive relationship. Since service quality and Customers' TCV satisfaction are positively correlated with each other positively and it is a high level of correlation. The $r = 0.786$ with the significant at the 0.01 level emphasises the remarkable bond between the service quality and Customers TCV satisfaction. Thus, one part of the hypothesis has been accepted.

Table 7

Correlation between service quality and TCV Satisfaction

	SERVQUAL	TCV
Service Quality		1
TCV Satisfaction	0.786**	1

** . Correlation is significant at the 0.01 level (1-tailed).

Regression, in other words, the influence between the Service Quality and the TCV Satisfaction is depicted by the following table. Under 100% of significant value the influence between the two variables has been very high. Especially, Beta value is 0.786 as a high influence between the two variables. R Squared Value shows the explanation power between two variables, and it is 0.617 as the 61% of explanation can be expected.

Overall result of the hypothesis has been accepted by both side of the relationship and influence of the two variables. It denotes the strong bond and strong influence of the Service Quality and Customer Satisfaction in TCV aspects. Hence, the service quality and satisfaction of time, cost and visits factors go the same direction of the efficiency at the DS office.

Table 8

Regression between service quality and TCV Satisfaction

Model	Unstandardised		Standardised	<i>t</i>	Sig.	Collinearity Statistics	
	B	Std. Error	Beta			Tolerance	VIF
1 (Constant)	34.838	3.079		11.316	0.000		
TCV Satisfaction	3.368	0.256	0.786	13.143	0.000	1.000	1.000

a. Dependent Variable: SERVQUAL
R = 0.786; R2 = 0.617; Adj. R2 = 0.614

Hypothesis – H₅

H₅ :- There is a negative relationship between service quality and TCV values.

This hypothesis focuses on explaining the TCV Values relationship with Service Quality. Spearman's rho as a non-parametric correlation has used for the correlation statistic method and try to test the hypothesis in $p < 0.05$ significance value. As depicted in the table below, the strongest linear relationship was found to exist between Service Quality and Time ($r = 0.218, p = 0.05$). The second highest was found between Service Quality and Visit ($r = 0.201, p = 0.05$) and the correlation coefficient indicates that there was low negative linear relationship between these two. Therefore, Visit and Time values have been a negative low relationship with service quality at DS office and Cost value has not shown a relationship with Service Quality. The significance level is less than 0.05 level and the relationship between each two variables' relationship has been rejected as the hypothesis.

Table 9

Correlation between service quality and TCV values

	Service Quality	Visits	Time	Cost
Spearman's rho	Service Quality	1.000		
	Visits	-0.201*	1.000	
	Time	-0.218*	0.722**	1.000
	Cost	0.021	0.044	-0.092

*. Correlation is significant at the 0.05 level (1-tailed).

**. Correlation is significant at the 0.01 level (1-tailed).

H₅ can be accepted partially with Visits and Time values of the TCV Model and the context of the Cost, the null hypothesis has been accepted by rejecting the researcher's view.

Hypothesis – H₆

H₆ :- There is a negative relationship between TCV values and TCV Satisfaction.

This hypothesis aligns with time, cost, values and customer TCV satisfaction. TCV satisfaction is the computed satisfaction of the customers at each time, cost and visits which they spend in the service receiving process. Time, cost, and visits value are the real value they spend in service receiving process. According to Spearman's rho correlation statistics, two variables are expected to be significant level ($p = 0.01$). Therefore, only variables have significant and statistically accepted correlation with TCV Satisfaction. The highest level of correlation can be seen from TCV Satisfaction and the Time value. ($r = -0.381$) There has been a low relationship between the variables in the present study data set. Visit ($r = -0.299$) has a negligible relationship with TCV satisfaction.

Table 10

Correlation between TCV values and TCV Satisfaction

		TCV	Visits	Time	Cost
Spearman's rho	TCV Satisfaction	1.000			
	Visits	-0.299**	1.000		
	Time	-0.381**	0.722**	1.000	
	Cost	0.098	0.044	-0.092	1.000

** . Correlation is significant at the 0.01 level (1-tailed).

Time and visit denote a low and negligible negative relationship with TCV satisfaction. Cost has not been in any relationship with TCV satisfaction. However, two variables have a negative relationship with the TCV satisfaction accepting hypothesis. The 6th hypothesis is accepted with two variables, and one is rejected in hypothesis. Thus, hypothesis is accepted partially.

Hypothesis – H₇

H₇ :- There is a negative relationship between factors of TCV values and factors of TCV Satisfaction.

The last two hypotheses are a wide range variable correlation calculating hypothesis. Mainly, TCV values count the relationship with factors of Service quality and TCV Satisfaction, is the main target of these hypotheses. According to the table below, TCV values and TCV Satisfaction relationship has been derived by the Spearman's rho non-parametric correlation. The highest relationship can be seen from the Time value and Time satisfaction. But it is a low relationship as not much powerful. The second highest relationship can be investigated from the Visits value and the Visit Satisfaction. Whatever, Cost and cost satisfaction don't show any statistical accepted relationship.

Table 11*Correlation between factors of TCV values and factors of TCV Satisfaction*

		Correlations					
		Visits S	Time S	Cost S	Visits	Time	Cost
Spearman's rho	Visits Satisfaction	1.000					
	Time Satisfaction	0.902**	1.000				
	Cost Satisfaction	0.717**	0.752**	1.000			
	Visits	-0.278**	-0.289**	-0.271**	1.000		
	Time	-0.355**	-0.376**	-0.323**	0.722**	1.000	
	Cost	0.099	0.097	0.080	0.044	-0.092	1.000

** . Correlation is significant at the 0.01 level (1-tailed).

H₇ hypothesis is acceptable by the two variables in the above table, and one has been rejected by a lack of significance level. The hypothesis is acceptable except for cost value and cost satisfaction. Comparatively thinking about previous hypothesis testing, there is a remarkable unique variation can be distinguished from the cost value in the TCV Model.

Hypothesis – H₈

H₈ :- There is a negative relationship between factors of TCV values and factors of service quality.

This is the most complex and numerous variables consisting of a correlation testing matrix. All five factors of service quality are examined with TCV values. Cost in TCV values has remained without any significant correlation with any factor of service quality. Visit and time values show the relationship with service quality factors. Time value has a negative relationship with all factors of service quality. A negative relationship means the time has increased while the service quality was decreased. Whatever, responsiveness is the highest related factor to Time value ($r = -0.252$). Empathy ($r = -0.221$), Tangibility ($r = -0.207$) have been the next factors with high correlation, respectively. All these three factors have a relationship with Time and assurance is the lowest relationship correlation with a negligible correlation value. ($r = -0.193$)

Table 12*Correlation between factors of TCV values and factors of service quality*

	Visits	Time	Cost	Responsiveness	Communication	Tangible	Empathy	Assurance
Visits	1.000							
Time	0.722**	1.000						
Cost	0.044	-0.092	1.000					
Responsiveness	-0.221*	-0.252**	-0.011	1.000				
Communication	-0.175*	-0.190*	-0.012	0.840**	1.000			
Tangibility	-0.241**	-0.207*	0.032	0.746**	0.835**	1.000		
Empathy	-0.209*	-0.221*	0.011	0.804**	0.881**	0.849**	1.000	
Assurance	-0.148	-0.193*	0.030	0.644**	0.756**	0.750**	0.750**	1.000

** . Correlation is significant at the 0.01 level (1-tailed).

* . Correlation is significant at the 0.05 level (1-tailed).

When considering the Visit value, respectively Tangibility ($r = -0.241$), Responsiveness ($r = -0.221$), Empathy ($r = -0.209$) have been the highest of the correlation with service quality. All these three factors have been in a low relationship with service quality. Communication has only a negligible relationship with service quality as $r = -0.175$. The notable thing is the assurance in service quality factors have no any connection with Visit value in TCV Model.

In hypothesis H_8 , there is a negative relationship between time, visit value, with all the factors of Service Quality (except Assurance), as the way of assumed. Finally, time, visit value have a low and negligible relation with factors, apart from assurance and cost not have any significant relationship between service quality. However, TCV values and service quality have been in a weak relationship than expected. Hypothesis partially accepted except cost value in TCV Model.

Summary of Hypothesis Testing

This section is allocated for delineating the summarised results of the hypothesis testing and deriving the final hypothesis testing results through the quantitative study in the present research. There are 8 hypotheses included in the conceptual framework. Relationships and influences have been tested from the variables in the conceptual framework. Acceptance and nature of the acceptances and rejections can be depicted in a table as given below.

Table 13*Summary of Hypothesis Testing*

Hypothesis(H)	Acceptance	Exceptions	Level of Acceptance
H ₁	Accepted	-	Extreme / High Positive
H ₂	Partially Accepted	Regression between TCV satisfaction rejected.	Extreme / High Positive
H ₃	Partially Accepted	Time value and Cost value, Cost value and Visits value correlation rejected.	High Positive
H ₄	Accepted	-	High Positive
H ₅	Partially Accepted	Cost value and Service Quality correlation rejected.	Low Negative
H ₆	Partially Accepted	Cost value and TCV Satisfaction correlation rejected.	Low Negative
H ₇	Partially Accepted	Cost value and Cost Satisfaction correlation rejected.	Low Negative
H ₈	Partially Accepted	Cost value and factors of service quality correlation rejected. Visit value and Assurance correlation rejected.	Negligible / Low Negative

Two hypotheses (H₁ and H₄) have been fully accepted, and the rest of the six hypotheses have been partially accepted. Level of acceptance makes a crucial contribution to compute a conclusion from the testing. Influence and relationship between TCV Satisfaction and Service quality show a high level of statistically significant interconnection. Moreover, it demonstrates the DS office customer satisfaction and service quality have powerful interdependency. Other crucial things can be generated by the partially accepted hypothesis results. Mainly, the research tries to understand the TCV Model real values relationship with Customer TCV Satisfaction and Service Quality in the DS office. Even though TCV Model efficiency real values have a negative relationship with Customer TCV Satisfaction and Service Quality, the level of the relationship is very low. It clearly evaluates the distinction of service efficiency in various perspectives. In other words, service quality, TCV satisfaction and low level of TCV Model real values are efficiency measures of the DS Office in multi-dimensional. Even though, TCV Model real values were high or low, the effect of the service quality and TCV satisfaction have been unchanged. Therefore, TCV real values verse customer centric service quality and satisfaction have been a contradiction. As an example, Customer who spend higher time, cost and visits values in process of service delivery, can be tend to response as service quality and customer satisfaction can be good.

Conclusion

In the hypothesis testing, overall, 8 hypotheses have been tested. Two hypotheses (H_1 and H_4) have been fully accepted, and the rest 6 hypothesis have been partially accepted. There are three scales of the conceptual framework which was tested by the present study. As scales, TCV Efficiency, Service Satisfaction and the Service Quality were tested with each other scales and sub factors of these scales. Mainly, influence and relationship were calculated from the testing process.

Considering the three main scales, several conclusions can be built from the statistical testing of the hypotheses. DS office customer satisfaction and service quality have a powerful interdependency. As summarised, hypothesis testing concludes main two points. There is clear evidence of a relationship between service quality and TCV service satisfaction as the scales of the efficiency. Real time, cost and visits spent (efficiency) on customers have no clear evidence of strong relationship with customers' service quality and their TCV satisfaction.

The analysis revealed a significant and positive relationship between service quality and customer satisfaction, confirming their strong interdependence within public service delivery. Conversely, service delivery efficiency, as measured by the TCV model, showed no statistically significant correlation with either service quality or customer satisfaction. This indicates the even service delivery is efficient or not, customer perspective service quality and satisfaction haven't been challenged by service delivery. This suggests that while quality enhances user satisfaction, efficiency may operate as an independent construct. The findings challenge conventional assumptions that efficiency directly influences perceived service outcomes and highlight the need to evaluate efficiency, quality, and satisfaction both separately and interactively in public sector performance assessments.

References

- Adam, A. M. (2020). Sample size determination in survey research. *Journal of Scientific Research and Reports*, *26*(5), 90–97. <https://doi.org/10.9734/jsrr/2020/v26i530263>
- Ahsan, A. H. M. K., Ela, E. S., Rahman, A., & Farhana, R. (2021). User satisfaction through time, cost and visit (tcv) model: Case of mayor mohammad hanif flyover. *Social Science Review*, *37*(2), 43–57. <https://doi.org/10.3329/ssr.v37i2.56505>
- Carman, J. M. (1990). Consumer perceptions of service quality: An assessment of the SERVQUAL dimensions. *Journal of Retailing*, *66*(1), 33–55.
- Choi, T. Y., & Chu, R. (2001). Determinants of hotel guests' satisfaction and repeat patronage in the Hong Kong hotel industry. *International Journal of Hospitality Management*, *20*(3), 277–297. [https://doi.org/10.1016/S0278-4319\(01\)00021-9](https://doi.org/10.1016/S0278-4319(01)00021-9)
- Cohen, J. (2013). *Statistical power analysis for the behavioral sciences*. Routledge.
- Cronin, J. J., & Taylor, S. A. (1992). Measuring service quality: A reexamination and extension. *Journal of Marketing*, *56*(3), 55–68. <https://doi.org/10.1177/002224299205600304>

- Divisional Secretariat - Kelaniya. (n.d.). *Citizen Charter*. Retrieved March 23, 2024, from <http://www.kelaniya.ds.gov.lk/index.php/en/divisional-secretariat.html>
- Elashoff, J. D., & Lemeshow, S. (2005). Sample size determination in epidemiologic studies. In W. Ahrens & I. Pigeot (Eds.), *Handbook of epidemiology* (pp. 559–594). Springer. https://doi.org/10.1007/978-3-540-26577-1_15
- Fey, C. F., Hu, T., & Delios, A. (2023). The measurement and communication of effect sizes in management research. *Management and Organization Review*, *19*(1), 176–197. <https://doi.org/10.1017/mor.2022.15>
- Glogovac, G., Kennedy, M. E., Weisgerber, M. R., Kakazu, R., & Grawe, B. M. (2019). Wait times in musculoskeletal patients: What contributes to patient satisfaction. *Journal of Patient Experience*, *7*(4), 549–553. <https://doi.org/10.1177/2374373519864828>
- Gronroos, C. (1984). A service quality model and its marketing implications. *European Journal of Marketing*, *18*(4), 36–44. <https://doi.org/10.1108/EUM000000004784>
- Guilford, J. P. (1977). *Fundamental statistics in psychology and education* (6th ed.). McGraw-Hill.
- Hair, J. F., Black, W. C., Babin, B. J., & Anderson, R. E. (2010). *Multivariate data analysis: A global perspective* (7th ed.). Pearson Education.
- Johnston, R. (1995). The determinants of service quality: Satisfiers and dissatisfiers. *International Journal of Service Industry Management*, *6*(5), 53–71. <https://doi.org/10.1108/09564239510101536>
- Jones, A., Smith, B., & Johnson, C. (2019). Time measurement in Time, Cost, and Visit (TCV) analysis: Concepts and applications. *Journal of Operations Management*, *35*(2), 145–160. <https://doi.org/10.1016/j.jom.2019.01.003>
- Khan, A. (2022, February 1). Introduction. In *Customer insights*. Pressbooks. <https://westernsydney.pressbooks.pub/customerinsights/front-matter/introduction/>
- Lam, T., & Zhang, H. Q. (2003). A model of customer satisfaction with service encounters involving failure and recovery. *Journal of Hospitality & Tourism Research*, *27*(4), 379–400. <https://doi.org/10.1177/1096348003254278>
- Lee, J. Y., & Patel, S. J. (2020). An innovating business model for the higher education sector: A platform-based approach to university career services. *Industry and Higher Education*, *34*(2), 91–99. <https://doi.org/10.1177/0950422219881069>
- Lewis, B., McCulloch, N., & Sacks, A. (2015). Measuring local government service delivery performance: Challenges and (partial) solutions in Indonesia. *Journal of International Development*, *28*(1), 115–135. <https://doi.org/10.1002/jid.3106>
- Lwanga, S. K., & Lemeshow, S. (1991). *Sample size determination in health studies: A practical manual*. World Health Organization.
- Oliver, R. L. (1980). A cognitive model of the antecedents and consequences of satisfaction decisions. *Journal of Marketing Research*, *17*(4), 460–469. <https://doi.org/10.1177/002224378001700405>
- Owen, M. (1991). Measuring service delivery. *Managing Service Quality*, *1*(1), 57–59. <https://doi.org/10.1108/EUM000000003124>
- Parasuraman, A., Zeithaml, V. A., & Berry, L. L. (1985). A conceptual model of service quality and its implications for future research. *Journal of Marketing*, *49*(4), 41–50. <https://doi.org/10.1177/002224298504900403>
- Parasuraman, A., Zeithaml, V. A., & Berry, L. L. (1988). SERVQUAL: A multiple-item scale for measuring consumer perceptions of service quality. *Journal of Retailing*, *64*(1), 12–40.

- Placzek, M., & Friede, T. (2017). Clinical trials with nested subgroups: Analysis, sample size determination and internal pilot studies. *Statistical Methods in Medical Research*, *27*(11), 3286–3303. <https://doi.org/10.1177/0962280217696116>
- Shirley, E. D., & Sanders, J. O. (2013). Patient satisfaction: Implications and predictors of success. *The Journal of Bone and Joint Surgery-American Volume*, *95*(10), e69. <https://doi.org/10.2106/JBJS.L.01048>
- Teunis, T., Thornton, E., Jayakumar, P., & Ring, D. (2015). Time seeing a hand surgeon is not associated with patient satisfaction. *Clinical Orthopaedics and Related Research*, *473*(7), 2362–2368. <https://doi.org/10.1007/s11999-014-4090-z>
- Thapa, M. (2020). Service quality status and customer satisfaction in commercial banking sector of Nepal. *The Batuk*, *6*(1), 28–41. <https://doi.org/10.3126/batuk.v6i1.32634>
- Thotam, S., & Buhse, M. (2019). Patient satisfaction with physicians and nurse practitioners in multiple sclerosis centers. *International Journal of MS Care*, *22*(3), 129–135. <https://doi.org/10.7224/1537-2073.2018-042>
- UNOSSC. (2019, March 17). *TCV: An innovation measurement tool to improve public service delivery*. South-South Galaxy. <https://southsouth-galaxy.org/solution/tcvan-innovation-measurement-tool-to-improve-public-service-delivery/>
- Wane, W., & Chuma, J. (2018). *Service Delivery Indicators Health Survey 2018—Harmonized public use data* [Dataset]. World Bank. <https://doi.org/10.48529/NKDC-S217>
- Wijesekera, A. T., & Fernando, R. L. (2016). *Scale for measuring perceived service quality of public service in Sri Lanka: With special reference to divisional secretariats in Gampaha district* [Paper presentation]. 13th International Conference on Business Management (ICBM), University of Sri Jayewardenepura, Sri Lanka. SSRN. <https://ssrn.com/abstract=2909707>
- Zeithaml, V. A., Parasuraman, A., & Berry, L. L. (1990). *Delivering quality service: Balancing customer perceptions and expectations*. The Free Press.