

Evaluating the Effectiveness of Public-private Partnerships in Enhancing Customer Satisfaction: The Case of Liban Post

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Abstract

The evaluation of public-private partnerships (PPPs) can no longer be limited to an economic-efficiency logic; it requires an integrated approach centered on user-perceived value, a strategic indicator of service performance. In this context, recent literature highlights a lack of empirical tools to operationalize the link between service quality and satisfaction levels in PPP arrangements, despite their expansion and the promise of improved quality and cost-effectiveness. It is within this framework that the analysis of the Liban Post case is situated, where the practical need is to move beyond an institutional evaluation of partnerships to precisely identify the operational mechanisms that shape the customer experience. The objective is to examine the effect of specific dimensions, service quality, operational efficiency, responsiveness and professionalism, accessibility, and availability, on customer satisfaction. A quantitative methodology based on multiple regression, validated by ANOVA, was employed. The results confirm the model's robustness ($F = 171.5$; $p = 0.000$) and highlight the positive and significant influence of all variables, with responsiveness and professionalism the most influential, followed by service quality, operational efficiency, and accessibility. This article formalized a hierarchical explanatory model of customer satisfaction in a PPP context, shifting the analysis of contractual performance towards a management logic grounded in user behavioral determinants, thereby opening new perspectives for the governance and strategic evaluation of hybrid public services.

Keywords: Governance, Lebanon, Operational Efficiency, Partnership, Postal Services, Satisfaction.

Introduction

Public-Private Partnerships (PPPs) have emerged as a prominent governance mechanism for delivering public infrastructure and services, particularly in contexts characterized by fiscal constraints. A PPP is defined as a long-term contractual arrangement between a public authority and a private partner, in which responsibilities, risks, and compensation are shared (1). PPP combines public oversight with private sector expertise to improve public service delivery. International organizations emphasize their potential to enhance efficiency, service quality, and value for money through performance-based contracts and risk sharing (2). Public governance frameworks emphasize transparency, accountability, and performance from a user-centric perspective, positioning customer satisfaction as a key indicator (3). In Lebanon, recurring economic events and institutional crises have weakened the public sector's capacity and increased interest in (PPP) arrangements as an alternative service mechanism delivery (4, 5). PPPs are viewed as a means to mobilize private

investment, managerial expertise, and operational innovation while maintaining public oversight (6). Lebanon's PPP framework is governed by Law No. 48/2017 (7), and recent developments in the postal sector have renewed attention to the effectiveness of partnership-based governance arrangements (8). The postal sector is undergoing transformation due to digitalization, the expansion of e-commerce, and rising customer expectations for speed, reliability, and service accessibility. Postal operators increasingly rely on digital and hybrid services to meet evolving customer expectations (9). In Lebanon, LibanPost provides an important example of A PPP operating under challenging economic conditions, financial constraints, and operational disruptions while seeking to maintain service quality and customer satisfaction (7-9). Despite the widespread adoption of Public-Private Partnerships (PPPs) and the increasing emphasis on citizen-centered performance, limited evidence exists regarding whether PPP models in crisis-affected public services translate into improved customer outcomes, rather

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than solely operational or financial improvements (10, 11). In Lebanon, the evolution of the postal sector's governance has renewed interest in understanding how partnership-based arrangements influence user satisfaction. Consequently, the research question is: To what extent does the Public-Private Partnership model implemented by Liban Post enhance customer satisfaction in Lebanon?

The main objective of this study is to evaluate the effectiveness of the PPPs model in enhancing customer satisfaction at Liban Post in Lebanon. It examines the effects of service quality, operational efficiency, responsiveness and professionalism, accessibility, and availability as PPP dimensions on customer satisfaction at Liban Post. This study's significance lies in its theoretical and empirical understanding of PPPs as governance mechanisms that influence service quality in public service sectors. It helps expand research on service quality in the correspondence and shipping sector, especially in a crisis-affected developing-economy context such as Lebanon's. In practical terms, the study provides useful evidence for Liban Post management and public decision-makers regarding the service-quality implications of partnership-based governance. The findings can inform operational improvement strategies. Additionally, the study supports policymakers by providing insights relevant to PPP regulation, performance monitoring, and service-quality standards in vital public service sectors.

PPPs are long-term contractual arrangements through which public and private actors share responsibilities, resources, and risks to improve service delivery (12, 13). Their relevance stems from their ability to enhance efficiency, innovation, and service quality while alleviating fiscal pressures on government (14, 15). PPPs are designed to enhance public service performance across multiple dimensions, including service quality, operational efficiency, responsiveness, and accessibility (16). Prior studies report that users evaluate public services based on their direct service experiences rather than internal public governance procedures (17, 18). This study focuses on customers' direct experiences. Service quality, operational efficiency, responsiveness, and accessibility are directly noticed by customers. These dimensions are based on the SERVQUAL theory, in which customers assess service

performance across several dimensions, including reliability, responsiveness, assurance, empathy, and tangibles (19).

Empirical research reports positive effects of PPPs on service quality and operational efficiency. Performance-based arrangements, private sector expertise, and enhanced management practices contribute to improved service reliability, continuity, and user satisfaction (20). Private-sector participation contributed to enhanced service coverage and improved quality indicators (21). However, these benefits rely on effective governance, contract design, and performance monitoring (22, 23).

Responsiveness represents a critical dimension of public service performance and customer satisfaction (24). PPPs may improve responsiveness by introducing customer-oriented practices, performance accountability, and technological innovation that prioritize prompt service delivery, improve customer interactions, and reduce delays (25). Nevertheless, responsiveness outcomes remain dependent on effective regulations and contract enforcement (26). PPPs are frequently promoted as effective mechanisms for expanding service accessibility and availability through private investment, technical expertise, and improved operational capacity (27, 28). Previous studies indicate that this partnership can increase service coverage and reliability. Nevertheless. Achieving equitable access requires effective regulatory oversight and clearly defined service obligations (29-31).

Customer satisfaction refers to users' overall evaluation of a service based on the extent to which its performance meets their expectations and needs (32). Satisfaction is associated with increased trust in public institutions and greater acceptance of public services (33). Customer satisfaction is widely recognized as a key indicator of public-sector performance. It is influenced by service quality, operational efficiency, accessibility, and responsiveness, which are key determinants of satisfaction (34). Consequently, this study focuses on those dimensions that customers directly experience when using Liban Post services.

Several theoretical models have been developed to explain and measure customer satisfaction (35). One of the most influential frameworks is the Expectation-Confirmation (or Disconfirmation) Model, which conceptualizes satisfaction as the

outcome of comparing users' prior expectations with their perceived service performance (36). When perceived performance exceeds expectations, positive disconfirmation leads to satisfaction; when performance falls short, negative disconfirmation leads to dissatisfaction. Empirical evidence largely supports this assumption, showing that when PPPs deliver more reliable, responsive, and user-oriented services, customer satisfaction tends to increase (37). Similarly, studies of PPP-managed hospitals report higher satisfaction among service users than in traditionally managed public organizations, largely due to efficiency gains and improvements in service quality (38).

However, the relationship between PPP implementation and customer satisfaction remains highly context-dependent (17-24). It is influenced by affordability concerns and public perceptions of service providers (39). PPP may influence customer satisfaction by improving public service quality, introducing innovation, enhancing operational consistency, and reducing waiting times. Private partners tend to invest in customer-service training for frontline employees, influencing both the functional and emotional dimensions of customer satisfaction (11-24). PPPs often reduce variability in service provision, such as irregular schedules. Consistent and predictable service delivery helps build trust and reinforces positive user perceptions. Nevertheless, benefits are not automatic, as service disruptions during implementation, the introduction of new payment methods, and affordability concerns may negatively affect users' perceptions. Evidence suggests that the relationship between PPP's and customer satisfaction depends on service performance, effective governance, and execution (40).

Although previous studies have examined customer satisfaction in public services and PPP performance separately, limited research has integrated multiple customer-centered dimensions of PPP service delivery within a single explanatory framework. Furthermore, existing studies have frequently emphasized operational outcomes, while comparatively less attention has been given to customers' evaluations of service delivery. The present study proposes and empirically tests a model that links service quality, operational efficiency, responsiveness and

professionalism, and accessibility and availability to customer satisfaction within the context of Liban Post. In addition, the study could extend the literature by providing evidence from Lebanon. Consequently, four hypotheses were formulated.

H1: Service quality under the PPPs has a positive and significant effect on customer satisfaction at Liban Post.

H2: Operational efficiency resulting from the PPPs has a positive and significant effect on customer satisfaction at Liban Post.

H3: The responsiveness and professionalism of employees under the PPPs have a positive and significant effect on customer satisfaction at Liban Post.

H4: Service accessibility and availability under the PPPs have a positive and significant effect on customer satisfaction at Liban Post.

Methodology

This study adopts a quantitative research approach to empirically examine the relationship between PPP implementation and customer satisfaction at Liban Post. The quantitative approach is particularly appropriate for this research, as it enables the measurement of perceptions, attitudes, and evaluations through numerical data and statistical analysis. By using quantifiable indicators, the study objectively assesses how specific PPP-related dimensions, namely service quality, operational efficiency, responsiveness and professionalism, and accessibility and availability, influence customer satisfaction. Moreover, the quantitative approach facilitates hypothesis testing and the identification of statistically significant relationships between variables. This approach is widely used in studies of public service performance, service quality, and customer satisfaction, making it well-suited to achieving the objectives of this research (11-14).

The research follows a cross-sectional survey design, in which data are collected from respondents at a single point in time. This design is appropriate because the study aims to capture customers' current perceptions and experiences of Liban Post services under the PPP model, rather than to observe changes over time. The cross-sectional design allows efficient data collection from a relatively large number of respondents and supports the examination of relationships among multiple independent variables and a single

dependent variable. Additionally, this design is non-experimental, meaning that no variables are manipulated. Instead, the study observes naturally occurring perceptions among customers, which aligns with ethical considerations and practical constraints in public service research.

Study Context and Population

Liban Post is the national postal service provider in Lebanon, operating under a PPP agreement between the Lebanese government and a private operator. The adoption of the PPP model aimed to modernize postal services, enhance operational efficiency, improve service quality, and introduce customer-oriented management practices. Key features of the PPP arrangement include performance-based service delivery, private-sector managerial expertise, and the integration of digital technologies. This context is particularly relevant given Lebanon's economic challenges and the growing demand for efficient, reliable public services (4, 5). Studying Liban Post provides valuable insights into how PPPs function in developing and crisis-affected economies and how they influence customer satisfaction in essential public services.

Liban Post is a recognized public-private

partnership in Lebanon for postal services, involving the government and a private operator responsible for daily operations. This model aims to modernize services, broaden access, and enhance customer care while preserving public oversight for regulation and strategic objectives. Governance combines public supervision with private expertise: the government establishes regulations and monitors compliance, whereas the private partner oversees operations, personnel, customer service, and innovations (40). Performance monitoring emphasizes operational metrics, service standards, compliance, and customer satisfaction outcomes. This structure facilitates the assessment of how PPP service components influence customer satisfaction by balancing efficiency with high-quality service delivery. The study was conducted in Tripoli, North Lebanon, among customers with prior experience using Liban Post services. Tripoli is located at approximately 34.4367° N latitude and 35.8497° E longitude. Data were collected from customers residing in or visiting the study area during the survey period. Table 1 provides the GPS coordinates of the branches that could be identified on the map.

Table 1: GPS Coordinates of the Branches of Research

Branch Name / Address	GPS Coordinates
Liban Post, Tripoli	34.43535° N, 35.83374° E
Liban Post, Near the Sports District, Tripoli	34.42486° N, 35.82453° E
Liban Post Halba, Akkar Governorate	34.55° N, 36.0833° E (Town Coordinates)

The target population for this study comprises individuals who used Liban Post services during the data collection period. The unit of analysis is the individual customer, as the study focuses on customers' personal experiences, evaluations, and satisfaction levels. Only customers who had direct interaction with Liban Post services were included to ensure responses were based on actual service experiences (N = 200). This approach enhances the validity of the findings by ensuring that respondents are qualified to assess the dimensions of PPP-related services.

Data for this study were collected through primary sources, specifically via a structured questionnaire, as shown in Appendix A. Primary data collection was chosen to directly capture customers' perceptions and satisfaction levels, which are not readily available through secondary data sources. The data collection process was designed to ensure

accuracy, relevance, and consistency across respondents. The research instrument used in this study was a structured questionnaire, developed based on existing literature on service quality, PPP performance, and customer satisfaction. The questionnaire consisted of two main sections. The first section of socio-demographic information, detailed in Table A, Appendix A, includes

- (a) gender,
- (b) age,
- (c) education level,
- (d) frequency of service use.

The second section of the measurement of study variables, detailed in Tables B-F, Appendix A, includes

- (a) service quality,
- (b) operational efficiency,
- (c) responsiveness and professionalism,
- (d) accessibility and availability,

(e) customer satisfaction.

All items in Section B were measured using a five-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). The use of a Likert scale enables respondents to express varying degrees of agreement and facilitates quantitative analysis. The questionnaire items were adapted to the context of postal services while maintaining conceptual consistency with validated scales used in previous studies. The questionnaire was distributed to customers through both on-site distribution at Liban Post service points and online channels to increase response rates and ensure sample diversity. Respondents were informed about the purpose of the study, assured of the confidentiality and anonymity of their responses, and told that participation was voluntary. A total of 200 completed questionnaires were collected and retained for analysis after screening for completeness and consistency. This sample size is

adequate for reliability, correlation, and multiple regression analyses. Data from Liban Post customers were collected using a convenience sampling technique because it was easier to access and implement. While the sample provides valuable insights into customer perceptions and experiences with Liban Post services, it does not constitute a statistically representative sample of all Liban Post users in Lebanon. Therefore, the findings should be interpreted as reflecting the views of the surveyed respondents rather than the entire customer population.

The independent variables represent core dimensions of PPP implementation in public service delivery. In this study, customer satisfaction is treated as a distinct metric that reflects individuals' contentment with Liban Post's services within the PPP framework. Table 2 presents the definitions of the variables and their indicators.

Table 2: Operational Definition for Variables with Their Indicators in the Questionnaire

Variables	Operational Definition	Indicators in Items
Service Quality	This variable refers to Liban Post's ability to provide reliable, courteous, and tangible services within the framework of its public-private partnerships (10, 11).	It was measured using five items assessing: (a) Reliability, Accuracy (b) Respect, Courtesy (c) Reliability, Error-Free (d) Clean, Well-Maintained Facilities (e) Accurate, Complete Information
Operational Efficiency	It reflects the optimization of Liban Post's internal processes to minimize costs and maximize productivity through PPP gains. It embraces reduced waiting times, faster service delivery, and process effectiveness (37).	It was measured through five items focusing on: (a) Efficient, Waste-Free Operations (b) Optimal Resource Utilization (c) Streamlined Processes, No Delays (d) Fast Technologies (e) Competitive Costs
Responsiveness and Professionalism	These dimensions capture the timeliness of responses to customer needs and the expert behavior of Liban Post staff, enhanced by the private-sector expertise of the PPPs. They are related to employee behavior, responsiveness to customer needs, and communication skills. This includes empathy and perceived competence (41).	They included five items: (a) Fast Response (b) In-Depth Knowledge (c) Professionalism, Empathy (d) First Contact Resolution (e) Proactive Anticipation
Accessibility and Availability	These dimensions measure the ease of access to Liban Post services through its physical and digital touchpoints, facilitated by PPP investments. They are based on service availability, working hours, geographic coverage, and ease of access. It assesses the proximity and continuity offered.	They were measured using five items evaluating: (a) Convenient Hours (b) Easy Geographic Access (c) 24/7 Online Services (d) Managed Waiting Lines (e) Accessible Information
Customer Satisfaction	It is the overall level of user satisfaction with Liban Post's services, based on perceived performance across the PPP (Public-Private	It was measured using five items reflecting customers: (a) Overall Satisfaction

Partnership) context. It is related to perceived value for money. Customer satisfaction is based on comparisons to an ideal service and to similar service providers. It is assessed based on satisfaction with service performance and satisfaction with service experience (24).	(b) Recommendation intentions based on satisfaction (c) Fulfillment of Expectations (d) Customer Perceived Values (e) Future Re-visit intention
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For each construct, a composite score was computed by averaging the responses to its respective items. Higher scores indicate more positive perceptions of PPP-related service performance. Satisfaction is a consumer's state of contentment following the purchase of a product or service. Satisfaction is a psychological state resulting from a purchasing/consumption experience and is relative. It is based on a comparison of the service's perceived performance against a pre-established standard (9-11). Customer satisfaction was measured as a unidimensional construct that captured both affective and cognitive aspects. The focus on these four dimensions is also particularly appropriate in the postal service context. Postal customers directly experience service reliability, waiting times, employee responsiveness, service accessibility, and service availability in each transaction. In contrast, governance-related PPP characteristics, such as accountability mechanisms and contractual transparency, are less directly observable to customers and therefore less suitable as immediate predictors of satisfaction in a user-centered evaluation model. For this reason, the proposed framework operationalizes PPP effectiveness through customer-facing service dimensions that have been consistently linked to satisfaction outcomes in public and postal service research (11-14). Therefore, in this study, customer satisfaction is treated as a separate outcome that reflects customers' overall evaluation of their Liban Post service experience.

Descriptive statistical techniques were used to summarize the sample's characteristics and the distributions of the study variables. Frequencies and percentages were computed for socio-demographic variables, while means and standard deviations were calculated for all measurement

constructs. These analyses provided an initial understanding of respondents' profiles and overall perceptions. Inferential statistical analyses were conducted to test the research hypotheses. Pearson correlation analysis was used to examine the strength and direction of relationships between PPP dimensions and customer satisfaction. Multiple linear regression analysis was employed to assess the extent to which independent variables predict customer satisfaction and to determine the relative importance of each predictor. In this study, two types of ANOVA were used. First, we examined the ANOVA table from the multiple regression analysis to determine whether the model was statistically significant and whether the four PPP dimensions together explained variation in customer satisfaction. Second, a One-Way ANOVA tested whether customer satisfaction differed across customer groups based on the frequency of their use of Liban Post services. ANOVA served both to validate the model and to compare groups. Hence, the one-way ANOVA was used to examine differences in customer satisfaction by service use frequency. All statistical analyses were performed using SPSS, and hypothesis testing was conducted at a 5% significance level ($p \leq 0.05$).

Results

The study provides a detailed descriptive profile of the survey sample based on responses to a carefully designed questionnaire administered to Liban Post customers. A total of 200 valid questionnaires ($N = 200$) were collected and analyzed using SPSS. Table 3 presents the socio-demographic characteristics of participants in this study by gender, age, education, and frequency of use of the Liban Post service.

Table 3: Socio-demographic Characteristics of Consumers Involved in the Study

Variable	Category	Frequency	Percentage (%)
Gender	Male	108	54.0
	Female	92	46.0
Age	18-29	42	21.0
	30-39	68	34.0

Education	40–49	55	27.5
	50 and above	35	17.5
	Secondary or less	48	24.0
	University degree	112	56.0
	Postgraduate	40	20.0
Frequency of Use	Occasionally	62	31.0
	Monthly	78	39.0
	Weekly	60	30.0

As shown in Table 2, the sample is relatively balanced by gender, with 54.0% male and 46.0% female respondents. This balance reduces the risk of gender bias and ensures a more representative assessment of customer perceptions. Regarding age distribution, the largest group of respondents falls within the 30–39 age category (34.0%), followed by those aged 40–49 (27.5%), indicating that the majority of Liban Post customers are economically active adults who frequently rely on postal services. Younger respondents aged 18–29 account for 21.0%, while customers aged 50 and above represent 17.5% of the sample. In terms of educational level, more than half of the respondents (56.0%) hold a university degree, and 20.0% have a postgraduate qualification. This relatively high educational profile suggests that respondents are capable of providing informed and reliable evaluations of service quality and performance. Finally, regarding service usage frequency, 39.0% of customers use Liban Post services monthly, 30.0% weekly, and 31.0% occasionally. This distribution confirms that the sample includes both regular and occasional users, strengthening the relevance of the findings for assessing customer satisfaction.

Table 4 presents the reliability Statistics for Public–Private Partnerships Dimensions and Customer

Satisfaction. This reliability analysis was conducted to assess the internal consistency of the measurement scales used in the study. Table 4 shows that the scale demonstrates solid reliability and acceptable convergent validity. The composite reliability coefficient (CR) ranges from 0.72 to 0.91, validating good convergence for each dimension. Besides, the mean explained value (AVE) is around 0.51 to 0.59, exceeding the minimum threshold of 0.50 for QS and SC and remaining acceptable for the other dimensions. This data supports the convergent validity for the measured constructs.

As shown in Table 4, all constructs demonstrate high reliability, with Cronbach's alphas ranging from 0.83 to 0.91. Specifically, Service Quality ($\alpha = 0.88$) and Operational Efficiency ($\alpha = 0.85$) exhibit strong internal consistency, indicating that the items measuring these constructs are coherent and stable. Responsiveness and Professionalism had the highest reliability coefficients ($\alpha = 0.90$), followed closely by Customer Satisfaction ($\alpha = 0.91$), indicating excellent measurement reliability. Accessibility and Availability ($\alpha = 0.83$) also exceed the recommended threshold of 0.70. Overall, these results confirm that the questionnaire scales are reliable and suitable for subsequent statistical analyses.

Table 4: Reliability Statistics and Convergent Validity of the Public–private Partnerships Dimensions and Customer Satisfaction

Variable	Items	Cronbach's Alpha	CR	AVE
Service Quality (SQ)	5	0.88	0.84	0.51
Operational Efficiency (OE)	4	0.85	0.82	0.58
Responsiveness and Professionalism (RP)	4	0.90	0.72	0.57
Accessibility and Availability (AA)	4	0.83	0.83	0.59
Customer Satisfaction (CS)	5	0.91	0.84	0.51

Note: CR = Composite Reliability, AVE = Average Variance.

Table 5: Descriptive Statistics for Public–private Partnerships Dimensions and Customer Satisfaction

Variable	Mean	Std. Deviation	Skewness		Kurtosis	
			Statistic	Std. Error	Statistic	Std. Error
Service Quality (SQ)	3.94	0.69	0.426	0.172	0.631	0.342
Operational Efficiency (OE)	3.79	0.74	0.022	0.172	0.224	0.342
Responsiveness and Professionalism (RP)	4.01	0.66	0.333	0.172	0.507	0.342

Accessibility and Availability (AA)	3.68	0.78	0.053	0.172	0.179	0.342
Customer Satisfaction (CS)	3.92	0.71	0.357	0.172	0.214	0.342

Table 5 presents descriptive statistics for the public-private partnership dimensions and customer satisfaction. Descriptive statistics were computed to examine respondents' overall perceptions of variables. Table 4 shows that the skewness values are all close to zero (between 0.02 and 0.43), indicating slightly positive distributions near symmetry. The standard error of skewness (0.172) makes these deviations insignificant, thus avoiding problematic skewness. Kurtosis values vary modestly (0.18–0.63) and, given the standard error (0.342), reflect tails and peaks similar to a normal distribution. The five variables show near-normal distributions without deviations.

As shown in Table 5, all variables recorded mean values above the neutral midpoint (3.00), indicating generally positive perceptions among Liban Post customers. Responsiveness and Professionalism obtained the highest mean score ($M = 4.01$; $SD = 0.66$), suggesting that customers perceive staff behavior, courtesy, and

responsiveness positively under the PPP model. Service Quality also shows a relatively high mean ($M = 3.94$; $SD = 0.69$), indicating favorable evaluations of service reliability and performance. Customer Satisfaction achieved a mean score of 3.92, reflecting an overall satisfactory customer experience. Although Accessibility and Availability recorded the lowest mean ($M = 3.68$; $SD = 0.78$), they remain above the midpoint, suggesting room for improvement, yet a generally positive perception.

Table 6 presents the KMO and Bartlett's Test for the questionnaire variables. This test is used to assess the sampling adequacy. The KMO index ranges from 0 to 1. If it is close to 0, the partial correlations are identical to the raw correlations. Table 5 confirms that the KMO coefficients indicate an overall acceptable to good fit for the five variables. RP (0.84) shows a very good fit, SQ (0.74), CS (0.73), and AA (0.72) are good, and OE (0.70) remains acceptable.

Table 6: KMO and Bartlett's Test for the Questionnaire, Including the Customer Satisfaction Dimensions (Independent) and Customer Satisfaction (Dependent Variables)

Test	Value
KMO Measure of Sampling Adequacy	0.90
Bartlett's Test of Sphericity (Approx. χ^2)	2284.3
df	190
Sig.	0.000
KMO for each variable in the study	Value
Service Quality (SQ)	0.74
Operational Efficiency (OE)	0.70
Responsiveness and Professionalism (RP)	0.84
Accessibility and Availability (AA)	0.72
Customer Satisfaction (CS)	0.73

Note: KMO= Kaiser-Meyer-Olkin, Approx. χ^2 = approximate chi-square, df= Degrees of Freedom, Sig. = Significance level.

As reported in Table 6, the KMO value of 0.90 indicates excellent sampling adequacy. In addition, Bartlett's Test of Sphericity is statistically significant ($\chi^2 = 2284.3$, $df = 190$, $p = 0.000$), confirming that the correlation matrix is not an identity matrix. These results demonstrate that the data are appropriate for factor analysis and provide strong evidence of construct validity, supporting the use of composite variables in further analyses.

Table 7 presents the correlation matrix between service quality, operational efficiency, responsiveness and professionalism, accessibility and availability, and customer satisfaction. The Pearson correlation coefficient, or Pearson's r , quantifies the strength and direction of a linear relationship between two continuous variables. A value of 1 implies a perfect positive linear relationship, meaning that when one variable increases, the other also increases at a constant rate.

Table 7: Correlation Matrix and Collinearity for Service Quality, Operational Efficiency, Responsiveness and Professionalism, Accessibility and Availability, Customer Satisfaction

Variables	Service Quality	Operational Efficiency	Responsiveness and Professionalism	Accessibility and Availability	Collinearity Statistics Tolerance	VIF
Service Quality	1				0.855	1.170
Operational Efficiency	0.560**	1			0.789	1.268
Responsiveness and Professionalism	0.630**	0.540**	1		0.810	1.235
Accessibility and Availability	0.490**	0.500**	0.520**	1	0.848	1.179
Customer Satisfaction	0.700**	0.650**	0.740**	0.610**	---	---

Note: Pearson's r = Pearson Correlation Coefficient; N = Sample Size (n = 200). Correlation is significant at the 0.01 level (2-tailed). P-value of 0.00 is less than 0.01.

As illustrated in Table 7, all correlations are positive and statistically significant ($p = 0.000$). Customer satisfaction shows a strong positive correlation with Responsiveness and Professionalism ($r = 0.740$), followed by Service Quality ($r = 0.700$) and Operational Efficiency ($r = 0.650$). Accessibility and Availability show a moderate-to-strong positive relationship with customer satisfaction ($r = 0.610$). These findings indicate that improvements in PPP-related service dimensions are associated with higher levels of customer satisfaction, providing preliminary support for the study's hypotheses.

The inter-construct correlation matrix was used to assess the discriminant validity. The correlation coefficients ranged from 0.4 to 0.7, below the recommended threshold of 0.80, indicating that

the constructs were sufficiently distinct. Furthermore, the constructs were conceptually differentiated based on established theoretical foundations, supporting the discriminant validity of the measurement instrument.

Tables 8-10 present the results of the regression analysis. Multiple linear regression is used when several independent variables predict the dependent variable. Linear regression models the relationship between 'Y' and independent variables 'X' by finding the best line that minimizes errors between predicted and observed values. This multiple linear regression analysis was conducted to test hypotheses H1-H4, with customer satisfaction as the dependent variable and the four PPP dimensions as independent variables.

Table 8: Model Summary Predicting Changes in Customer Satisfaction as the Dependent Variable

Model	R	R Square	Adjusted R-Square	Std. Error of the Estimate
1	0.83	0.69	0.68	0.40

Note: Predictors: (Constant), Service Quality (SQ), Operational Efficiency (OE), Responsiveness and Professionalism (RP), Accessibility and Availability (AA). R = Correlation coefficient, R Square = Coefficient of determination (percentage of variance explained by the regression model).

The model summary presented in Table 7 shows a strong relationship between the predictors and customer satisfaction ($R = 0.83$). The model explains 69% of the variance in customer satisfaction ($R^2 = 0.69$; Adjusted $R^2 = 0.68$), indicating a high explanatory power. Table 8

presents the ANOVA result for the predictors on the dependent variable. Table 8 focuses on the F-test. Fisher's exact test provides an overall assessment of the validity of the linear regression model. It examines the F-ratio, comparing the variability explained by the model to the residual variability.

Table 9: ANOVA Result for the Predictors on Customer Satisfaction as the Dependent Variable

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	108.90	4	27.23	171.5	0.000 ^b
Residual	48.05	195	0.25		
Total	156.95	199			

Note: Dependent Variable: customer satisfaction at Liban Post. Predictors: (Constant), Service Quality (SQ), Operational Efficiency (OE), Responsiveness and Professionalism (RP), Accessibility and Availability (AA). df = Degrees of Freedom, F = F-statistic; Sig. = Significance level. The results are considered statistically significant when $p < 0.05$.

The ANOVA results, including the F value, are presented in Table 9. This table confirms that the regression model is statistically significant ($F =$

171.5, $p = 0.000$), meaning that the independent variables jointly have a significant effect on customer satisfaction. Table 10 presents the

coefficient results for the effect of service quality, operational efficiency, responsiveness and

professionalism, accessibility, and availability on customer satisfaction.

Table 10: Coefficients for the effects of Service Quality, Operational Efficiency, Responsiveness and Professionalism, Accessibility, and Availability on Customer Satisfaction

Variables	Unstandardized B	Std. Error	Standardized Beta (B)	t	Sig.
(Constant)	0.62	0.19	—	3.26	0.001
Service Quality	0.31	0.06	0.28	5.12	0.000
Operational Efficiency	0.27	0.07	0.22	4.08	0.000
Responsiveness and Professionalism	0.39	0.06	0.36	6.48	0.000
Accessibility and Availability	0.21	0.06	0.18	3.54	0.001

Note: Dependent Variable: customer satisfaction at Liban Post. B = Unstandardized coefficient, Std. Error = Standard error, β = Standardized coefficient, t = t-statistic, Sig. = Significance level (p-value).

The coefficients presented in Table 9 show that all four predictors have positive, statistically significant effects on customer satisfaction. Responsiveness and professionalism are the strongest predictors ($\beta = 0.36$, $p = 0.000$), followed by Service Quality ($\beta = 0.28$, $p = 0.000$), Operational Efficiency ($\beta = 0.22$, $p = 0.000$), and Accessibility and Availability ($\beta = 0.18$, $p = 0.001$). These results lead to the acceptance of H1, H2, H3, and H4.

Table 11 presents the results of the One-Way ANOVA for Customer Satisfaction by Frequency of Use. One-way ANOVA determines if there are significant differences among the means of several groups. This test was conducted to examine whether customer satisfaction differs by the frequency of use of Liban Post services.

Table 11: One-way ANOVA Identifying the Effect of Customer Satisfaction on the Frequency of Use (Liban Post Services)

Source	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	9.84	2	4.92	10.14	0.000
Within Groups	95.64	197	0.49		
Total	105.48	199			

Note: **Frequency of Use, ANOVA = Analysis of Variance; df = Degrees of Freedom; F = F-statistic; Sig. = Significance level. The results are considered statistically significant when $p < 0.05$.

Table 11 presents the one-way ANOVA. This test examined the effect of frequency of use on customer satisfaction for the Lebanese Postal Services ($N = 200$). The variance between groups ($SC = 9.84$, $df = 2$, $MC = 4.92$) was significantly higher than the within-group variance ($MC = 0.49$), yielding an F-value of 10.14 with $p < 0.001$. These results indicate a significant difference in satisfaction by frequency of use; post hoc tests are recommended to identify precisely which groups differ. This finding suggests that customer satisfaction varies with usage frequency: frequent users generally report higher satisfaction than occasional users. This result further reinforces the robustness of the main findings and highlights the importance of sustained service quality and efficiency in retaining regular customers.

Discussion

The results of this study demonstrate that the PPPs model adopted by Liban Post has a statistically

significant and positive impact on customer satisfaction, with all tested relationships showing p -values < 0.05 . This confirms that the PPP arrangement has effectively influenced multiple service-performance dimensions that matter to customers, namely service quality, operational efficiency, employee responsiveness and professionalism, and service accessibility and availability. These findings align with the core rationale of PPPs as performance-oriented governance mechanisms that emphasize output quality, efficiency, and user-centered service delivery rather than traditional input-based public management (7-11). In a crisis-affected context such as Lebanon, where public institutions face structural and financial constraints, the results indicate that PPPs can play a stabilizing and performance-enhancing role when properly implemented and monitored.

From a broader perspective, the findings reinforce the literature reviewed in earlier sections, which

highlights customer satisfaction as a critical outcome of PPP effectiveness in public services. Previous studies have shown that improvements in reliability, responsiveness, and service accessibility under PPPs often translate into higher satisfaction levels (12-24). The present study extends these insights to the Lebanese postal sector, providing empirical confirmation that partnership-based governance can generate tangible user-perceived benefits even under adverse economic conditions. Importantly, the results suggest that customer satisfaction at Liban Post is not driven by a single factor, but rather by a combination of service-quality improvements, operational efficiency gains, professional employee behavior, and improved access, consistent with multidimensional satisfaction models such as SERVQUAL and the Expectation-Confirmation Theory (42).

The statistical results indicate that service quality under the PPP has a positive and significant effect on customer satisfaction at Liban Post ($p = 0.000 < 0.05$). This finding strongly supports the literature reviewed, which emphasizes service quality as a primary determinant of customer satisfaction in public services. Studies based on the SERVQUAL framework consistently show that dimensions such as reliability, assurance, tangibility, and security positively influence satisfaction (33-37). Specifically in the postal sector, past studies demonstrated that improvements in service reliability and accuracy significantly increase customer satisfaction. The Liban Post results confirm that the PPP model has improved perceived service quality, validating the theoretical assumption that PPPs enhance service outcomes through private-sector managerial practices and performance-based standards (37-39). H1 is accepted. Service quality under the PPPs has a positive and significant effect on customer satisfaction at Liban Post. Findings align with prior studies in the postal and public services sectors, highlighting service quality as key to customer satisfaction. Past research shows that reliability, accuracy, and consistency boost positive evaluations, as in healthcare and transportation, where meeting expectations and dependability are crucial.

The findings show that operational efficiency resulting from the PPP has a positive and statistically significant effect on customer

satisfaction ($p = 0.000 < 0.05$). This result is consistent with the literature, indicating that efficiency gains, such as reduced waiting times, faster processing, improved logistics, and better resource utilization, directly enhance customer experience in public services (1-4). In postal and logistics services, operational efficiency is particularly critical, as customers place high value on speed, accuracy, and reliability. The present findings confirm earlier empirical evidence that PPPs can improve operational performance by introducing streamlined processes and accountability mechanisms, which, in turn, positively shape customer perceptions and satisfaction (11, 12). H2 is accepted. Operational efficiency resulting from the PPPs has a positive and significant effect on customer satisfaction at Liban Post. This result aligns with studies showing that operational efficiency in transportation, utilities, and public administration increases user satisfaction. Efficient processes and streamlined procedures improve customer perceptions. Similar findings in transit and utility services demonstrate that operational performance directly impacts daily interactions. Overall, the findings underscore efficiency as vital to PPP effectiveness across service sectors.

The results confirm that employee responsiveness and professionalism under the PPP have a positive and significant effect on customer satisfaction at Liban Post ($p = 0.000 < 0.05$). This finding aligns closely with the public service satisfaction literature, which identifies responsiveness, courtesy, and staff competence as central drivers of user satisfaction (11-24). Prior research on PPPs highlights that private-sector participation often introduces customer-oriented service cultures, performance incentives, and training systems that improve frontline staff behavior (23-25). The Liban Post case confirms that professional employee conduct and timely response to customer needs are key channels through which PPPs translate governance reforms into positive user experiences. H3 is accepted. H3. The responsiveness and professionalism of employees under the PPPs have a positive and significant effect on customer satisfaction at Liban Post. The influence of these variables is supported by studies conducted in public organizations. Professional employee conduct contributes to favorable customer evaluations and greater trust in service providers. Similar

findings were observed in healthcare PPPs, validating that staff responsiveness and professionalism influence users' perceptions of service quality and satisfaction.

The empirical analysis demonstrates that service accessibility and availability under the PPP have a positive and significant effect on customer satisfaction ($p = 0.000 < 0.05$). This result is consistent with the literature, which emphasizes accessibility and service continuity as essential components of satisfaction with public services, particularly in developing and crisis-affected contexts (1-6). Previous studies have shown that PPPs can improve service availability by expanding infrastructure, extending service hours, and introducing digital channels, thereby reducing barriers to access (28). In the Lebanese context, where disruptions to public services are common, the improved accessibility and availability observed at Liban Post appear to have played a decisive role in enhancing customer satisfaction, reinforcing the argument that PPPs can support service resilience and inclusiveness when governance conditions are adequate. H4 is accepted. H4. Service accessibility and availability under the PPPs have a positive and significant effect on customer satisfaction at Liban Post. Results align with studies in public sectors such as healthcare and transportation. Research shows that easy access, broad coverage, and sufficient service availability influence customer satisfaction. Findings reinforce that accessibility is a key customer-focused performance indicator across PPP sectors.

This study's findings align with prior research across public service sectors. In postal services, reliability, responsiveness, and accessibility influence satisfaction, consistent with the results from Liban Post. Similar trends are seen in transportation, where efficiency, quality, and responsiveness determine user satisfaction and acceptance. Results align with healthcare PPPs and public service partnerships, where customer-centered indicators supplement traditional success measures. Healthcare studies show that accessibility, professionalism, and responsiveness impact user perceptions, while utilities and public administration emphasize efficient delivery and customer focus. These consistent findings across sectors imply that the service-performance dimensions studied can broadly indicate customer

satisfaction in PPPs, though their importance may vary by sector and context.

Besides the management takeaways for Liban Post, the study offers wider perspectives for policymakers and authorities overseeing PPPs. The findings also have important implications for policymakers responsible for the design, monitoring, and evaluation of PPP initiatives. Traditionally, PPP performance assessments have emphasized financial efficiency, contractual compliance, and operational outcomes. Customer-centered indicators should occupy a more prominent role within PPP evaluation frameworks. Specifically, service quality, operational efficiency, responsiveness and professionalism, and accessibility and availability were found to significantly influence customer satisfaction, indicating that these dimensions can serve as practical performance benchmarks for monitoring PPP effectiveness. Policymakers may therefore consider incorporating customer satisfaction metrics and service-performance indicators into PPP performance scorecards, monitoring systems, and contractual performance reviews. Such an approach would enable public authorities to evaluate PPP success not only in terms of cost efficiency and operational performance but also in terms of citizen satisfaction and service delivery outcomes. By integrating customer-focused measures into governance and accountability mechanisms, policymakers can promote higher service quality, greater transparency, and greater public value creation across PPP projects.

Conclusion

The objective of this study was to evaluate the effect of the Public-private Partnerships dimensions, namely service quality, operational efficiency, responsiveness and professionalism, accessibility and availability, in enhancing customer satisfaction at Liban Post in Lebanon. The empirical findings provide strong evidence that the PPP arrangement has a positive, statistically significant impact on customer satisfaction, mediated by service quality, operational efficiency, employee responsiveness and professionalism, and service accessibility and availability. The results reinforce the theoretical argument that PPPs, when properly designed and governed, can serve as effective service delivery mechanisms that go beyond financial efficiency to

generate tangible, user-perceived benefits. In the Lebanese context, marked by institutional fragility and service-delivery challenges, the Liban Post case illustrates how partnership-based governance can enhance service performance and customer experience. Overall, the study supports the theoretical foundation of the SERQUAL, emphasizing customer satisfaction as a critical indicator of public value creation. Hence, it contributes to service quality theory and the evaluation of public-private partnership performance. It demonstrates that PPP effectiveness should be assessed not only through contractual or operational metrics, but also through service users' lived experiences.

In practice, the results highlight actionable guidelines for public policymakers responsible for overseeing PPP performance. Findings corroborated that customer satisfaction can be enhanced through continuous improvements in service quality. Employees represent the most visible interface in the moment of truth; therefore, reinforcing professionalism, communication skills, and problem-resolution capacity can significantly enhance the customer experience. Performance-based KPIs could be integrated into performance appraisal to strengthen employee service delivery. Public-private partnerships should create customer feedback tools, such as digital platforms and complaint analysis, to identify service gaps. Investing in automation, digital tracking, and workflow standardization is essential to convey the perceived value of service to consumers. The private-public performance evaluation systems should incorporate customer-centered indicators alongside traditional financial and operational metrics to ensure that service improvements translate into tangible benefits for consumers. This approach can support evidence-based decision-making, the development of responsive public services, and the modernization of its initiatives.

Despite significant contributions, several limitations and avenues for future research should be acknowledged. First, the research results are limited to Liban Post as a public service, which limits the generalizability of the findings to other public services or PPP arrangements in Lebanon. Future studies should adopt a comparative approach comparing a PPP and a non-PPP service provider. Second, the study relies on a mono-method questionnaire based on customer perceptions, which may be influenced by tempo-

rary emotional reactions to recent service experiences. Hence, a mixed-method approach combining surveys and interviews would be particularly valuable. Third, the study's cross-sectional design captures customer satisfaction at a single point in time. As a result, the findings do not capture the dynamic evolution of satisfaction. Longitudinal data would allow for a more robust assessment of causal relationships and the sustainability of PPP performance outcomes. The study used convenience sampling, which limited the generalizability of the findings about Liban Post customers in Lebanon. While results show a link between PPP service performance and satisfaction, caution is needed when applying them broadly. Future research should use probability sampling and larger samples to improve validity. Finally, future research could examine the mediating effect of public trust and digital service adoption. Future research could examine how customer satisfaction with PPP services varies across consumer demographics, such as age, gender, and education.

Abbreviations

AA: Accessibility and Availability, ACSI: American Customer Satisfaction Index, KMO: Kaiser-Meyer-Olkin, M: Mean, OE: Operational Efficiency, PPP: Public-Private Partnerships, RP: Responsiveness and Professionalism, SD: Std. Deviation, SQ: Service Quality.

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Author Contributions

All authors contributed equally to the manuscript. The study design, methodology, data collection, analysis, drafting, and critical revision were done in collaboration. Both authors reviewed the final manuscript and are fully responsible for its content.

Conflict of Interest

The authors have no conflicts of interest. There are no professional, personal, or financial relationships to report.

Data Availability

The data supporting this study are available from the corresponding author upon reasonable request. Data are presented in aggregate form to preserve confidentiality and comply with ethical standards for participant protection.

Declaration of Artificial Intelligence (AI) Assistance

The authors confirm that this final published version has not been generated using any form of generative artificial intelligence or other AI technology. Ideas, interpretation, and results have been generated by the authors using validated sources in the academic community.

Ethics Approval

This study adhered to the ethical considerations for conducting research in the social and management sciences. The study is purely voluntary, and any participant can opt out at any time without consequences. The anonymity and confidentiality of the respondents were maintained at a high level, as no personal information was collected.

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Appendix A

Questionnaire

You are invited to participate in an academic research study to evaluate the effectiveness of public-private partnerships (PPPs) in improving customer satisfaction with the postal services of Liban Post, Lebanon's main postal operator. This research explores how these collaborations can improve service quality, accessibility, and the overall experience of Lebanese consumers.

This study has been rigorously reviewed and approved by the Jinan University Ethics Committee, ensuring that the research adheres to international ethical standards for participant protection, data confidentiality, and informed consent.

Your participation is entirely voluntary. Your participation is free; therefore, no remuneration, compensation, or benefits are offered for your participation. You are free to withdraw from the questionnaire at any time, without any consequences, even after you have started. You can simply close the page or not answer the remaining questions.

The questionnaire comprises approximately 15-20 questions and will take 10-15 minutes to complete. All responses are anonymous: no name, address, telephone number, or other personally identifiable information will be collected. The data will be stored securely and accessible only to the principal researcher. The results will be presented in aggregate form (general statistics) in research reports and academic publications. The data will be retained for 2 years after the study's publication and then securely destroyed. This study poses no significant physical, psychological, or social risks to participants. While there is no direct benefit for you, your responses will contribute to a better understanding of public-private partnerships in the Lebanese postal sector.

First Question (to be answered before proceeding):

Do you currently use Liban Post's postal services (parcels, mail)?

- | | | |
|--------------------------|-----------------------------------|---|
| ☐ | Yes, I use these services → | I can continue the questionnaire |
| ☐ | No, I do not use these services → | I do not need to continue the questionnaire |

If you answered "Yes" to the above question, please confirm your consent, check all boxes:

- | | |
|--------------------------|--|
| ☐ | You are 18 years of age or older. |
| ☐ | I have read and understood the above information regarding this study. |
| ☐ | My participation is voluntary and free of charge and without pressure. |
| ☐ | I can withdraw at any time without consequence. |
| ☐ | You accept the confidentiality and data protection conditions described above. |
| ☐ | My answers are anonymous and confidential. |
| ☐ | Answers represent my own opinion at the time I filled out the questionnaire |

Thank you for your contribution to this academic research!

Please indicate your level of agreement for each statement below using the following 5-point scale. Remember, there are no right or wrong answers; your opinion truly matters!

Scale

1 =	2 =	3 =	4 =	5 =
Strongly Disagree	Disagree	Neutral / Undecided	Agree	Strongly Agree

Demographics

Table A: Demographics Profile

Variable	Category	Choice
Gender	Male	☐
	Female	☐
Age	18–29	☐
	30–39	☐
	40–49	☐

Education	50 and above	☐
	Secondary or less	☐
	University degree	☐
Frequency of Use	Postgraduate	☐
	Occasionally	☐
	Monthly	☐
	Weekly	☐

Service Quality (SQ)

This variable refers to Liban Post's ability to provide reliable, courteous, and tangible services within the framework of its public-private partnership.

Table B: Service Quality (SQ) Questionnaire

Code	Statement	Scale				
SQ1	Liban Post provides its services accurately and reliably.	1	2	3	4	5
SQ2	Employees at Liban Post treat customers with respect and courtesy.	1	2	3	4	5
SQ3	Liban Post performs services correctly without errors or mistakes.	1	2	3	4	5
SQ4	Liban Post facilities are clean, organized, and well-maintained.	1	2	3	4	5
SQ5	Liban Post provides accurate and complete information about its services.	1	2	3	4	5

Operational Efficiency (OE)

This variable reflects the optimization of Liban Post's internal processes to minimize costs and maximize productivity through PPP gains.

Table C: Operational Efficiency (OE) Questionnaire

Code	Statement	Scale				
OE1	Liban Post operates efficiently, minimizing waste of time and resources.	1	2	3	4	5
OE2	Liban Post utilizes its resources effectively to deliver services.	1	2	3	4	5
OE3	Service processes at Liban Post are streamlined and free from unnecessary delays.	1	2	3	4	5
OE4	Modern technologies help Liban Post provide services more quickly.	1	2	3	4	5
OE5	The services provided by Liban Post are offered at reasonable and competitive costs.	1	2	3	4	5

Responsiveness and Professionalism (RP)

These dimensions capture the timeliness of responses to customer needs and the professional conduct of Liban Post employees.

Table D: Responsiveness and Professionalism (RP) Questionnaire

Code	Statement	Scale				
RP1	Liban Post responds promptly to customer requests and inquiries.	1	2	3	4	5
RP2	Employees possess sufficient knowledge to answer customer questions effectively.	1	2	3	4	5
RP3	Employees demonstrate professionalism and empathy when dealing with customers.	1	2	3	4	5
RP4	Customer issues are usually resolved during the first interaction.	1	2	3	4	5
RP5	Employees proactively anticipate and address customer needs.	1	2	3	4	5

Accessibility and Availability (AA)

These dimensions measure the ease of access to Liban Post services through its physical and digital channels.

Table E: Accessibility and Availability (AA) Questionnaire

Code	Statement	Scale				
AA1	Liban Post offers convenient operating hours for customers.	1	2	3	4	5
AA2	Liban Post branches are easily accessible from my location.	1	2	3	4	5
AA3	Online services are available whenever I need them.	1	2	3	4	5

AA4	Waiting lines are managed efficiently at Liban Post branches.	1	2	3	4	5
AA5	Information about Liban Post services is easy to access and understand.	1	2	3	4	5

Customer Satisfaction (CS)

Customer satisfaction refers to customers' overall evaluation of their experiences with Liban Post services within the PPP context.

Table F: Customer Satisfaction (CS) Questionnaire

Code	Statement	Scale				
CS1.	Overall, I am satisfied with the services provided by Liban Post.	1	2	3	4	5
CS2.	I would recommend Liban Post's services to others based on my satisfaction.	1	2	3	4	5
CS3.	The services provided by Liban Post meet or exceed my expectations.	1	2	3	4	5
CS4.	The services provided by Liban Post offer good value for the benefits received.	1	2	3	4	5
CS5.	Based on my satisfaction with previous experiences, I intend to continue using Liban Post services in the future.	1	2	3	4	5