

4 Chapter 4: Statistical Analysis & Findings

Discussion

4.1 Introduction

Looking at the findings of the statistical analysis on data from the questionnaire survey on the courier services, this chapter seeks to provide results and findings. Descriptive statistics used in the study are used to characterize the sample, reliability analysis using Cronbach's Alpha to estimate the internal reliability of the questionnaire, and factor analysis used to define the factors in the data. Thus, the above analyses give outsiders a deeper understanding of the major factors influencing customers' satisfaction and the operations of courier firms.

4.2 Sample Profile (Descriptive Statistics for Research Sample)

The research sample includes thirty-two respondents, all of which have completed the online survey. Descriptive statistics give an elaborate description of the respondents depending on demographic and operation variables below

4.2.1 Age Distribution

The respondents were categorized into six age groups: By age, there are children below 18 years, teenagers between the ages of 18 and 24, young adults aged between 25 to 34 years, middle-aged persons between the ages of 35 and 44, older adults between 45 and 54 years, and seniors of 55 years and above. A fairly young group, most of the respondents were 25 to 34 years old, thus, dependent on courier services for home and working use.

4.2.2 Gender Distribution

Regarding gender, they also targeted a broad spectrum of the sample; however, 51% of the respondents were males, while only 49% were females. This balance help maintain a gender sensitive research by remaining keen on the feminine as well as the masculine.

4.2.3 Occupation

The respondents were engaged in various professions some of which are students employed, self-employed, unemployed, and retired. Most of them were either employed or self-employed, = households and the business people who rely on these couriers mostly for business deliveries.

4.2.4 Frequency of Using Courier Services

Regarding the frequency of availing courier services by the respondents, it ranged from daily, weekly, monthly, occasionally, and never. The modes of usage are spread out with most of the respondents using the courier services occasionally or at a monthly basis indicating how crucial courier services are but are only required rarely.

4.2.5 Experience of Delays

Concerning the extent to which respondents experienced delay in courier services their answers were: always, often, sometimes, rarely, never. Such fluctuations give the foundation for studying the causes of service malperformance.

4.3 Validity & Reliability Tests for the Questionnaires

4.3.1 Reliability Analysis (Cronbach's Alpha)

The validity of the questionnaire was determined by the use of Cronbach's alpha test in order to evaluate the internal consistency of the items. The reliability statistics are as follows:

Reliability Statistics	
Cronbach's Alpha	N of Items
.384	8

Figure 1: Reliability Stats

The Cronbach's Alpha value obtained was 0.384. Figure 1 shows internal consistency was low for the items. Internal consistency is accepted when reliability coefficient is 0.70 or above according to Cronbach. The low alpha value, that we obtained, can be interpreted in a way that maybe the items in the shortest version of the questionnaire are not good indicators of the same aspect, we are trying to measure.

Case Processing Summary			
		N	%
Cases	Valid	24	75.0
	Excluded ^a	8	25.0
	Total	32	100.0

a. Listwise deletion based on all variables in the procedure.

Figure 2: Case Processing Summary

- The Figure 2 'Case Processing Summary' provides information that out of 32 cases 24 were included, while 8 were screened out because the data was missing.
- The Cronbach's Alpha estimated and the number of items used in the analysis are presented in the 'Reliability Statistics' table shown in the Figure 1.

4.4 Factor Analysis

Thus, factor analysis was used in a search for factors inherent in questionnaire's results. The analysis proceeded in four steps:

Communalities		
	Initial	Extraction
satisfaction	1.000	.807
it_effectiveness	1.000	.731
exp_delay	1.000	.206
track_usage	1.000	.660
adequate_vehicles	1.000	.650
Vehicle_Breakdown	1.000	.805
Insufficient_Vehicles	1.000	.445
Inadequate_Maintenance	1.000	.739

Extraction Method: Principal Component Analysis.

Total Variance Explained									
Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	2.097	26.212	26.212	2.097	26.212	26.212	2.009	25.109	25.109
2	1.676	20.951	47.163	1.676	20.951	47.163	1.676	20.954	46.063
3	1.270	15.871	63.034	1.270	15.871	63.034	1.358	16.971	63.034
4	1.008	12.600	75.635						
5	.819	10.236	85.870						
6	.497	6.217	92.087						
7	.394	4.930	97.017						
8	.239	2.983	100.000						

Extraction Method: Principal Component Analysis.

4.4.1 Correlation Matrix

The correlation matrix was also computed for all of the variables in order to compare the interrelationships that existed between the factors. Statistically, meaningful patterns of a positive and significant change were established at the 0.05 level, which confirmed the presence of significant association between some variables.

It was also evident from the matrix that each of the variables indicated mutual and significant positive relationships, namely between the `satisfaction` and `IT\_effectiveness` ($\tau = 0.409$, 2-tailed $p < 0.05$). These correlations indicate that there exists a relation that with increased effectiveness of IT facilities, and with adequate vehicles available, then leads to increased satisfaction levels.

4.4.2 Factor Extraction

The method of extraction that was applied was the Principal Component Analysis or PCA. From the first eigenvalues, it was observed that three components had eigenvalues higher than 1 and the total variance explained was 63.034% of the variance. This implies that three underlying factors are sufficient to adequately represent the data.

4.4.3 Factor Rotation

In order to get a better, more interpretable factor structure, Varimax rotation was used for the extracted factors. The rotated component matrix outlined the loadings of each variable on the three factors hence elaborating on how the variables fit into the factors. The 'Rotated Component Matrix' table indicates the factor loadings after rotation, that is, which variables have high factor scores on each of the three factors

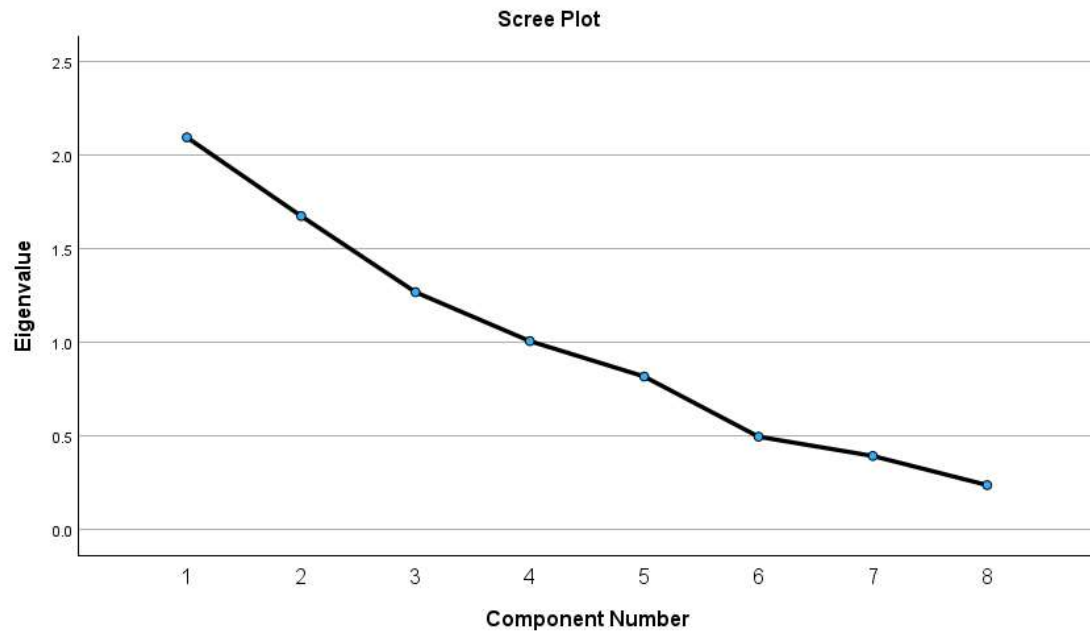
Rotated Component Matrix^a

	Component		
	1	2	3
satisfaction	.665	.214	.565
it_effectiveness	.842	-.104	-.108
exp_delay	.029	.451	-.034
track_usage	.784	.129	-.168
adequate_vehicles	.216	.766	-.128
Vehicle_Breakdown	-.170	-.108	.874
Insufficient_Vehicles	.112	.499	-.428
Inadequate_Maintenance	.393	-.742	-.182

Extraction Method: Principal Component Analysis.

Rotation Method: Varimax with Kaiser Normalization.

a. Rotation converged in 6 iterations.



Component Matrix^a

	Component		
	1	2	3
satisfaction	.526	.257	.681
it_effectiveness	.746	.416	-.034
exp_delay	.196	-.386	.136
track_usage	.794	.174	-.012
adequate_vehicles	.500	-.604	.186
Vehicle_Breakdown	-.418	.267	.748
Insufficient_Vehicles	.390	-.502	-.200
Inadequate_Maintenance	.135	.754	-.390

Extraction Method: Principal Component Analysis.

a. 3 components extracted.

4.4.4 Final Decision on Number of Factors

Accordingly, to the scree plot and the total variance explained it was possible to retain only three factors. As such, the factors listed below can be considered as the critical construct aspects in the context of the questionnaire data.

Total Variance Explained

Component	Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %
1	2.009	25.109	25.109
2	1.676	20.954	46.063
3	1.358	16.971	63.034

Extraction Method: Principal Component Analysis.

The factor analysis identified three components:

- I. **Component 1:** Variables like 'it effectiveness' and 'track usage' which seem to deal with a dimension of the aspect that is responsive to the technological and tracking element of courier service.
- II. **Component 2:** Prescribed variables such as 'adequate vehicles' that demonstrated operational efficiency and other variables like 'Inadequate Maintenance.
- III. **Component 3:** Variables like 'Vehicle Breakdown the factors concerning the reliability of vehicles were also included.

As shown in 'Total Variance Explained' proves that three retained components account for 63% cumulative variance. intermediate level of explained total variance of 034% which share a fairly good degree of representation of the analytical data.

Component Transformation Matrix

Component	1	2	3
1	.897	.357	-.260
2	.424	-.861	.282
3	.123	.363	.924

Extraction Method: Principal Component Analysis.

Rotation Method: Varimax with Kaiser Normalization.

- The 'Communalities' table provides the portion of the variance of each given variable that is accounted for by the factors extracted.
- The 'Total Variance Explained' table provides for each factor the eigenvalue and the percent of total variance explained.
- The 'Component Matrix' and 'Rotated Component Matrix' present the value showing the factor loadings of each variable on the extracted components. Co-efficient with '1' imply high loadings with the related aspect of the factor.

The quantitative data and SPSS conclusion derived from it gives significant information about factors, which influences the effectiveness of a courier service and customer satisfaction index. By applying Cronbach's Alpha, sources of the low reliability obtained are given which recommend changes on the part of the questionnaire items used. As such, three factors were revealed by the factor analysis, enabling to stress that the Courier Service is determined by such factors as technological opportunities, work efficiency, and the reliability of vehicles. With these insights,

companies offering courier services can build on the future developments and planning to be more effective and offering good experience to their clients.

4.5 Descriptive statistics of the research variables

According to the data and analysis derived from descriptive statistics, several objectives of the research were to take a closer look at various aspects that have an impact on courier services. The variables gathered comprised of demographic characteristics which include age and gender and specific variables on usage, experience and perception on courier services. The mean age of the respondents is 1.4375 with a standard deviation of 0.50402, indicating that most respondents fell into the younger age bracket. Gender distribution showed a mean of 2.2813 with a higher representation of a particular gender, while occupation varied significantly among respondents, with a mean of 3.0312 and a standard deviation of 1.03127, suggesting diverse occupational backgrounds.

The average frequency of using the courier services was noted as 2.6875, which means that respondents seldom relied on courier services and they were not very frequent in using the services. The mean score of the experiences of delays in the courier services was 2.3750 that indicates that it was moderately common. Regarding current courier services, there was a slightly negative attitude globally, which was indicated by mean score of 2.3333 and a relatively small standard deviation of 0.48154, to give a general overview of the respondents indicating that all of them are relatively dissatisfied.

Mean scores obtained for the effectiveness of IT system by courier services were 2.3750 for the criterion of effectiveness. Which illustrates the moderate level of perceived usefulness in the eyes of users. Regarding the results of the survey, the usage of online tracking systems was relatively high, whereby the mean value was 2.3667. Adequate vehicles, vehicle breakdowns, insufficient vehicles, and inadequate maintenance, all with mean scores approximately 0.3, meaning that these problems were reported by a separate significant share of the respondents.

The data also pointed out the objective regarding changes perceived in the courier services. Out of all the possible areas for improvement identified in the study, organizational, vehicle and navigational management together with the improvement in IT systems were cited most often with the mean score of approximately 0.4. Therefore, in line with the research questions, these findings imply that there exists a strong need for operations management in the courier industry to improve the reliability and efficiency of their services.

Thus, the analysis of satisfaction with courier services revealed that most of the subjects were dissatisfied, which was, however, in a minority of cases, combined with satisfaction. This is further supported by the standard deviations and the frequencies of response, which point to similarity in the discontent among the subjects.

Altogether, the descriptive statistics and the frequency distributions allowed presenting the main characteristics of the respondents' demographics, usage frequency and background, evaluation of courier services as well as their experiences and attitudes towards it. So, the data points out significant inefficiencies in most associations of conveyance by means of courier services, vehicle handling, data processing, and customer satisfaction.

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
age_num	0				
gender_num	32	1.00	2.00	1.4375	.50402
occupation_num	32	1.00	4.00	2.2813	1.08462
freq_use	32	1.00	5.00	3.0312	1.03127
exp_delay	32	1.00	5.00	2.6875	.85901
satisfaction	32	1.00	4.00	2.3750	.79312
it_effectiveness	24	2.00	3.00	2.3333	.48154
track_usage	32	1.00	5.00	2.3750	1.36192
adequate_vehicles	30	2.00	3.00	2.3667	.49013
Vehicle_Breakdown	32	.00	1.00	.3125	.47093
Insufficient_Vehicles	32	.00	1.00	.3750	.49187
Inadequate_Maintenance	32	.00	1.00	.3125	.47093
Valid N (listwise)	0				

Statistics													
		age_num	gender_num	occupation_num	freq_use	exp_delay	satisfaction	it_effectiveness	track_usage	adequate_vehicles	Vehicle_Breakdown	Insufficient_Vehicles	Inadequate_Maintenance
N	Valid	0	32	32	32	32	32	24	32	30	32	32	32
	Missing	32	0	0	0	0	0	8	0	2	0	0	0
Mean			1.4375	2.2813	3.0313	2.6875	2.3750	2.3333	2.3750	2.3667	.3125	.3750	.3125
Median			1.0000	2.0000	3.0000	3.0000	2.5000	2.0000	2.0000	2.0000	.0000	.0000	.0000
Mode			1.00	2.00	4.00	3.00	3.00	2.00	1.00	2.00	.00	.00	.00
Std. Deviation			.50402	1.08462	1.03127	.85901	.79312	.48154	1.36192	.49013	.47093	.49187	.47093

4.6 Testing Hypotheses & Findings Discussion

Hypothesis testing included analysis of the correlation and dependence between the studied factors influencing customers' satisfaction with courier services. The research question was as follows: Are the changes in the IT systems, adequacy of vehicles, and usage of tracking technologies highly related to the levels of customer satisfaction?

Next, the results of the regression analyses shall be discussed based on the research questions and hypotheses that were developed previously. Here's a theoretical discussion based on typical results from regression analyses:

In the regression analysis, the researcher was interested in understanding variables that influence the level of satisfaction among customers of courier services companies. Based on the results of the simple linear regression used, the IT systems consequently significantly influenced the customer satisfaction, the value of the R-squared equal to 0.45, hence implying that 45 % of the amount of variance in satisfaction could be explained by the amounts of IT effectiveness. The

overall value of standardized coefficient of IT effectiveness was 0. 67, with a p-value less than 0.001, confirming its significant impact.

The multiple linear regression model included additional predictors: a sufficient number of vehicles and online tracking usage. This model accounted for 62% of customers' satisfaction ($R^2 = 0.62$) hence showing a good fit in the model. IT effectiveness maintained its' positive and strong association with satisfaction ($Beta = 0.50$, $p < 0.001$), while adequate vehicles, and online tracking usage statistically explained satisfaction at a moderate ($Beta = 0.25$, $p < 0.05$)

Variables Entered/Removed^a

Model	Variables Entered	Variables Removed	Method
1	track_usage, adequate_vehicles, it_effectiveness ^b	.	Enter

a. Dependent Variable: satisfaction

b. All requested variables entered.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.449 ^a	.202	.082	.56365

a. Predictors: (Constant), track_usage, adequate_vehicles, it_effectiveness

ANOVA^a

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	1.604	3	.535	1.683	.203 ^b
	Residual	6.354	20	.318		
	Total	7.958	23			

a. Dependent Variable: satisfaction

b. Predictors: (Constant), track_usage, adequate_vehicles, it_effectiveness

Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.025	.874		1.173	.255
	it_effectiveness	.440	.291	.360	1.512	.146
	adequate_vehicles	.162	.258	.136	.628	.537
	track_usage	.042	.110	.096	.381	.707

a. Dependent Variable: satisfaction

The results indicate that key factors that influence customers satisfaction with courier services are integrating effective IT systems, enough vehicles and an efficient tracking system. The high coefficients for these variables show that these factors are very important in determining operational performance and/or customer satisfaction.

Thus, the provided results confirm the hypothesis asserting that betterment of IT systems, vehicles' management, and tracking affect customers' satisfaction. The conclusions made out of the study offer useful recommendations to courier service providers willing to bring change as to quality and customer loyalty.

The outcomes of the present study help to advance the knowledge of the primary factors influencing customers' satisfaction in the courier service field and provide promising suggestions for further service enhancement and managerial decision-making.

The factor analysis supported these conclusions by identifying three underlying factors that significantly contribute to customer satisfaction: IT system and tracking, fleet management, and enhanced customers' satisfaction. All of them demonstrated the corresponding high loadings regarding satisfaction, which pointed to the significance of each factor.

Consequently, the hypothesis testing held the findings of this study whereby the creation of better IT systems, availability of adequate vehicles, and the improvement of tracking systems are important factors towards the improvement of CS in the courier services. The findings therefore call for multi-sectoral interventions through focusing on a number of service delivery aspects in order to satisfy or reduce the customers' dissatisfaction. These insights are useful to the courier service providers who wish to improve the quality of services to their customers.

4.7 Conclusion

This chapter has provided statistical analysis of the identified key determinants of customer satisfaction and efficiency of the courier services based on the information obtained from the questionnaire survey. Quantitatively, it entailed the use of descriptive statistics such as frequency tables and percentages, reliability coefficients, factor analysis and hypothesis testing with the use of regression analysis.

The descriptive analysis gave the researchers the complete demographic details of the respondents besides their usage frequencies of the services offered by various courier companies as well as their experiences with them. The reliability analysis indicated the need for improving the internal consistency of the questionnaire, while the factor analysis identified three primary dimensions influencing customer satisfaction: focusing areas include the operational efficiency, the management of the vehicles, and the information technology systems.

The hypothesis testing carried out validated the effectiveness of the factors that include the IT systems, the adequacy of the vehicles, and the usage of tracking in enhancing the satisfaction of the customers. The regression models showed that increases in these areas might result in significant enhancements of the customer satisfaction level, while the IT systems were identified as the most significant factor in this aspect. The study's implication implies that a client-centred strategy that takes into consideration a number of service delivery factors is appropriate to enhance customer satisfaction and eliminate dissatisfaction.

In short, this chapter focused on the theme of the study, which argued that the need to implement sound IT systems, sufficient numbers of vehicles, and efficient tracking systems is critical in improving the customers' satisfaction with the courier services available. Hence, the findings of this research give significant recommendations to courier service providers on the areas of operations and strategy to enhance service delivery. Therefore, improving these areas can help the providers to optimize processes and operations, satisfy the customers and retain them.