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Demographic Analysis, Patron Satisfaction, And Suggestions Within the Light Rail Transit (LRT) Line 2 Service: A Scholarly-Based Service Enhancement Matrix

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Abstract

Transportation is essential in order for society to function properly and to sustain economic activity, trade, travel, and other aspects of modern life. The efficiency and accessibility of transport networks are critical to the development and well-being of nations and communities. Customer satisfaction plays a crucial role in the advancement of future public transportation. The researchers want to examine the relationship between the existing condition and potential solutions. This study provides possible solutions and improvement proposals for the Line 2 System Commuter of the Light Rail Transit Authority. A total of 138 passengers were given survey questionnaires as the respondents of the study. Frequency, Percentage, Ranking, Weighted Mean, Standard Deviation, and Chi-Square Test were used as statistical tools to analyze the results using the IBM Statistical Package for Social Sciences (SPSS). The finding reveals that there is a significant relationship between the respondents' demographic profile and customer satisfaction in the LRT Line 2 system as computed P values are lesser than 0.05. Furthermore, the researchers proposed service enhancement for the service quality in terms of timeliness, safety and security, accessibility and comfort of train facilities, ticketing system, and information and customer service.

Keywords: Demographics, Enhancement, Patron Satisfaction, Prisma Diagram, Service, Suggestions

1. Introduction

1.1 Background of the Study

The movement of people, products, or animals from one place to another is referred to as transportation. It entails moving people or things from a starting place (origin) to a destination using a variety of conveyance techniques, including automobiles, watercraft, aircraft, or even foot. In order for society to function properly and to support economic activity, trade, travel, and other aspects of contemporary life, transportation is essential. It includes a wide range of infrastructure and services, such as roads, trains, ports, airports, public transit, and more, and can take place across land, water, or the air. The growth and welfare of communities and countries depend heavily on the effectiveness and accessibility of transport systems. One of the most important aspects of modern society is transportation. According to, effective public transportation networks are a critical component of cost-effective, safe, and clean transportation for growth [1]. From a societal standpoint, the impoverished frequently rely only on public transportation. Public transit increases their opportunities for employment since without it, they would only be able to choose jobs that were close to where they lived. Additionally, it improves their access to recreation, health care, and education. Public transportation also serves as the primary mode of transportation for children, seniors, and individuals with impairments.

The railway has long been recognized as one of the most effective ways of land transportation for ages. The outstanding feature of this vehicle is its capacity to transport a large number of passengers in a single trip. It is among the most ancient forms of transportation. Currently, trains are regarded as the most convenient and efficient means of transportation. The railway is highly favored as a public transit option in certain developed countries due to its reliability, efficiency, comfort, and affordability.

The 13.8 km long Megatren, also known as Line 2 and operated by the Light Rail Transit Authority (LRTA), connects five cities in Metro Manila: Pasig, Marikina, Quezon City, San Juan, and Manila. It does so along the main thoroughfares of Marcos Highway, Aurora Boulevard, Ramon Magsaysay Boulevard, Legarda Avenue, and Recto Avenue. The Japan Bank for International Cooperation (JBIC) provided the majority of the soft loans used to build the Megatren system, which cost P31 billion. With a 2 percent interest rate for three packages and a 30-year repayment term with a 10-year grace period, this loan is extremely advantageous. 18 new four-car trains have been delivered by the Asia Europe MRT Consortium, which is headed by the Marubeni Corporation. There are 92.6 trains every day.

Nevertheless, railways continue to grasp with a multitude of issues pertaining to train punctuality, quality of service rendered by personnel, provision of safety information to passengers, preparedness of staff to assist travelers, cleanliness standards, station convenience, onboard security, accessibility of channels for feedback and complaints, as well as the adequacy of train availability. The cited difficulties pertain to the criteria for evaluating the level of satisfaction with a railway service.

In light of the ongoing issues experienced by railway passengers, the researchers aim to undertake a study on customer satisfaction. Customer satisfaction plays a crucial role in the advancement of future public transportation, namely in the realm of railways, both in theory and in practice. It has the capacity to elucidate the relationship between the services offered by the railway firm and the subsequent reactions of the passengers. The researchers want to examine the relationship between the existing condition and potential solutions. This study provides possible solutions and improvement proposals for the Line 2 System Commuter of the Light Rail Transit Authority.

1.2 Review of Related Literature

The researchers administer a comprehensive analysis of the customers satisfaction of the Light Rail Transit Line 2 Service and its demographic analysis and service enhance matrix by searching for various research and studies using Google Scholar, ResearchGate, academia.edu, sciencedirect.com, scribd.com, semanticscholar.org and other sources to search for references. The researchers reviewed the literature to acknowledge the status quo of this issue. A total of 24 most relevant search results were reviewed and selected as fit for our analysis and, hence, taken into consideration. Keywords used in the search were, Demographics, enhancement, patron satisfaction, service, suggestions.

The researcher used Preferred Reporting Items for Systematic Reviews and Meta- Analyses (PRISMA) in conducting the research.

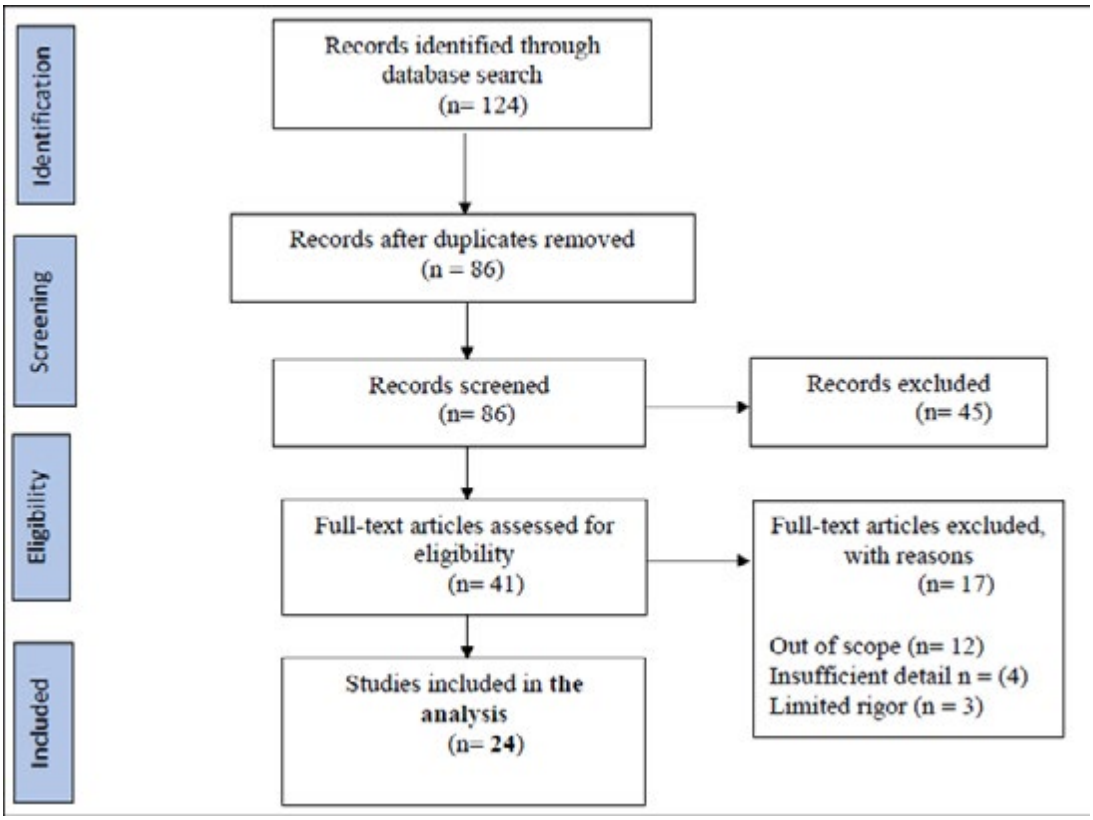

Figure 1: PRISMA 2020 Flow Diagram

Demographic Profile

According to Adam Hayes of Investopedia (September 30, 2023), Demographics are the statistics that describe populations and their characteristics. It is the study of a population- based on factors such as age, sex, occupation, education, income, employment.

• **Age** – It gives information about a person's age at a specific period of time. It is described as the measurement of the amount of time that has passed between the date of the live birth to a particular point in time, typically the date the data was collected. Age among distinctions in color, gender, creed, ethnicity, background, education, function, and personality has been taken into account in diversity studies (Thomas, 1990; Williams & O'Reilly, 1998). At the same time, while a vast number of organizational studies have covered almost every angle of the leadership theme (Baradicco; 1991, Åhman, 2003), the concept of age has largely been ignored. Additionally, Smart Survey states the age can be a sensitive question for many, if handled in the correct way, the insights you stand to gain from asking respondents the age question after you've analyzed each age groups' feedback for correlations or common themes can be hugely valuable in informing future decision making and bringing your organization even greater success [2].

• **Gender** – can be loudly defined as a multidimensional construct that encompasses gender identity and expression, as well as social and cultural expectations about status and behavior as they are associated with certain sex traits. A person's gender identification (such as woman, man, trans man, gender diverse, or nonbinary) is something they choose for themselves, can vary over the course of their life, and may or may not line up with societal norms based on cultural expectations. on their biological sex traits.

• **Occupation** – refers to the profession, sector of the economy, or line of work you are drawn to. It could also be referring to your position within the organization. Occupation is used to mean all things people want, need, or have to do, whether of a physical, mental, social, sexual, political, or spiritual nature, and is inclusive of sleep and rest. It refers to all aspects of an actual human being, including becoming and belonging. It is the activist element of human existence whether occupations are contemplative, reflective, meditative, or action-based" (Wilcock & Townsend, 2014, p. 542). In this study, it was observed that most commuters were students who use light rail transit (LRT) for its budget-friendly commutation price and fast travel time to school. Aside from that, traffic and hassles usually occur on service road vehicles, which could cause being late to class.

• **Frequency of Use** – refers to the rate of use by an individual as documented by the number of times per day, week or month, or something that occurs often or happens repeatedly.

• **Purpose of Trip** – refers to its purpose or motives. It could be business, leisure, visiting friends or relatives, or a combination of these reasons. In comparison to other modes of transportation, The Economic Times claims that trains are quick and least impacted by typical weather turbulence, such as rain or fog. The organization of rail transportation is superior to that of other modes of transportation. It follows predetermined routes and schedules.

• **Timeliness** – the fast travel time and early arrivals for business, school, and work were the most highlighted reasons for commuters on the light rail transit (LRT) line 2. While Michnik & Lo (2009) define timeliness as showing up early or at the appropriate time, Kahn et al. (2002) define timeliness as the degree to which the information is sufficiently current for the task at hand.

• **Safety and Security** – assess the probability of passengers being in an accident, whether vehicular or otherwise safety), or becoming a victim of crime (security). They can also evaluate various aspects of the workplace. According to Dr. Jean-Paul Rodrigue and Dr. Brian Slack, safety and security issues concern both transportation modes and terminals that can be either a target of terrorism, a vector to conduct illegal activities, or even a form of warfare. According to the article by Ali Gardezi, enacting safety and security measures has been shown to significantly impact public opinion. It is in the interests of operators and policymakers to constantly improve, keeping pace with the latest innovations, to maintain numbers and passengers' satisfaction.

• **Accessibility and Comfort of Facilities and Trains** – a comfortable train environment is a social resource during transport. To encourage people to use public transport instead of driving, the government is pushing for hassle-free and convenient options. They are urging public transport operators to provide travelers with up-to-date information, comfortable vehicles, and a variety of facilities at stations.

• **Ticketing System** – the technology called the Automated Fare Collection System (AFCS) has completely changed how people pay for transportation. Transport transactions are now quicker, more effective, and more convenient for both passengers and transit operators thanks to AFCS, which does away with the need for manual ticketing and payment systems. The LRT Line 1 and LRT Line 2 systems now use an Automated Fare Collection System (AFCS) that utilizes a new contactless smart card as the fare medium. This new system replaced the old magnetic ticket fare collection system starting on December 16, 2015. The Department of Transportation's PPP for the Automatic Fare Collection System Project for LRT Lines 1 and 2 and MRT 3 made this possible. The Common Ticketing Project for LRTA Lines 1 and 2 and MRT3 is a joint venture between the government and private organizations led by Ayala and Metro Pacific under the Public-Private Partnership (PPP) program. The old magnetic-based ticketing system installed in the early 2000s was replaced with contactless- based smart card technology on LRTA Lines 1 and 2 and MRT 3.

• **Information & Customer Service** – answering train-related questions, such as train times, delays, and ticket information;

assisting passengers with mobility issues; managing the station information point; being available at the reception; and conducting security reviews and patrols.

• **Comments and Suggestions Given by the Respondents** - Comments and suggestions are both ways of providing feedback, but they have different implications. Opinions express thoughts, while suggestions offer solutions.

In this study, researchers gather comments and suggestions from passengers on LRTA Line 2. Some of these are:

1. Far from ideal LRT.
2. Having ventilation, stanchion for designated areas that are similar to MRT stations, a monitor or timer for the ETA of trains, and vending machines for beverages
3. Provide security or assistance to those who will ride the LRT and implement crowd control for passengers' safety.
4. The information provided by the security guard should be uniform.
5. Just add more trains.
6. Very good. Keep it up.
7. Please make it more PWD-friendly.
8. Have a proper schedule of trains.
9. Good service because it provides good alternatives for motorists and passengers.
10. Comfort rooms should be clean all the time.

• **Significant relationship between demographics and customer satisfaction** - An important set of factors that should not be overlooked in attempting to understand and respond to consumers is demographics. Consumer behavior can be significantly influenced by variables such as age, sex, income, education, marital status, and mobility. When segmenting consumer groups, demographics are the most widely documented referential variables (Huang 1997). According to Chiou (2009), demographic variables such as age, education, and income have an impact on motivation to consume, satisfaction, and loyalty towards vegetarian restaurants. Among these demographic factors, the group with income between 20,001- 40,000 showed the highest level of consumption motivation, satisfaction, and loyalty towards vegetarian restaurants. Additionally, factors such as gender and marriage also played a role in these variables.

Cardozo (1965) proposed the earliest concept of satisfaction, arguing that customer satisfaction refers to the perception of customer purchases about product reciprocation. Engel, Blackwell, and Miniard (1995) stated that after consuming the product, consumers would assess and evaluate the value between product performance and the expected belief before purchasing; when the values of the two sides are equivalent, consumers receive a satisfactory feeling; otherwise, they are unsatisfied. The Service Enhancement Matrix for the improvement of services provided by the LRTA Service Enhancement Matrix is used to evaluate and improve the quality of services provided by an organization. Improving a service typically involves identifying its key dimensions and analyzing how enhancements in these dimensions can positively impact the overall quality of the service. There are different ways in which a service enhancement matrix can be structured. The following are some examples.

■ Service Dimension: Response Time Enhancement Measures: Implementing automated response systems, optimizing internal communication processes, and providing training for quicker issue resolution.

■ Service Dimension: Customer Satisfaction Enhancement Measures: Conducting regular customer surveys, analyzing feedback to identify pain points, training staff in effective customer communication and conflict resolution, and prioritizing responding quickly in some incidents.

■ Service Dimension: Service Flexibility Enhancement Measures: This measure measures how well we deal with the unexpected. Employees can set their own working hours, shifts, and break times and opt for a compressed workweek during a pandemic (i.e., working full-time for four days instead of five). Flexible hours. When necessary, employees can reduce hours or switch to a part-time schedule.

■ Service Dimension: Service Quality Enhancement Measures: Implementing quality control procedures, investing in staff training and development, and regularly updating service standards based on industry best practices (i.e., ISO Accreditation or International Organization for Standardization)

■ Service Dimension: Service Reliability Enhancement Measures: Improving maintenance and monitoring systems, investing in backup services, and implementing redundancy plans for critical services.

These examples illustrate how organizations can use the service enhancement matrix to identify key service dimensions and implement strategies to enhance their overall service quality.

• Synthesis

After discussing the topic, it has been widely accepted in customer satisfaction research that service quality is measured by how well the level of service provided matches the expectations of the customers. Providing quality service means meeting customer expectations on a consistent basis.

Similar to other literature and studies, customer satisfaction is crucial because it provides measures that can be used to manage and improve operations and services. In the case of transit agencies, like other service industries, an increase in customer satisfaction leads to retaining markets, higher usage of the system, attracting

new customers, and creating a more positive public image. To achieve these goals, public transit requires reliable and efficient methods to identify the factors that determine service quality from the perspective of the customers.

1.3 Conceptual Framework

Figure 2 presents the conceptual framework of the research designed to investigate whether there is a significant relationship in the assessment of customer satisfaction of the Line 2 System Commuter of Light Rail Transit Authority when respondents are grouped according to their demographic profiles.

• **Predictor Variable:** The predictor variable, in this context, refers to the demographic profile of the respondents. These demographic variables include age, gender, occupation, frequency of use and purpose of the trip. These are the attributes that researchers believe may impact how respondents evaluate the degree of customer satisfaction.

• **Outcome Variable:** The outcome variable represents the customers satisfaction of the Line 2 System of Light Rail Transit Authority with regards to various service aspects such as timeliness, safety and security, accessibility and comfort of facilities and trains, ticketing system and information and customer service.

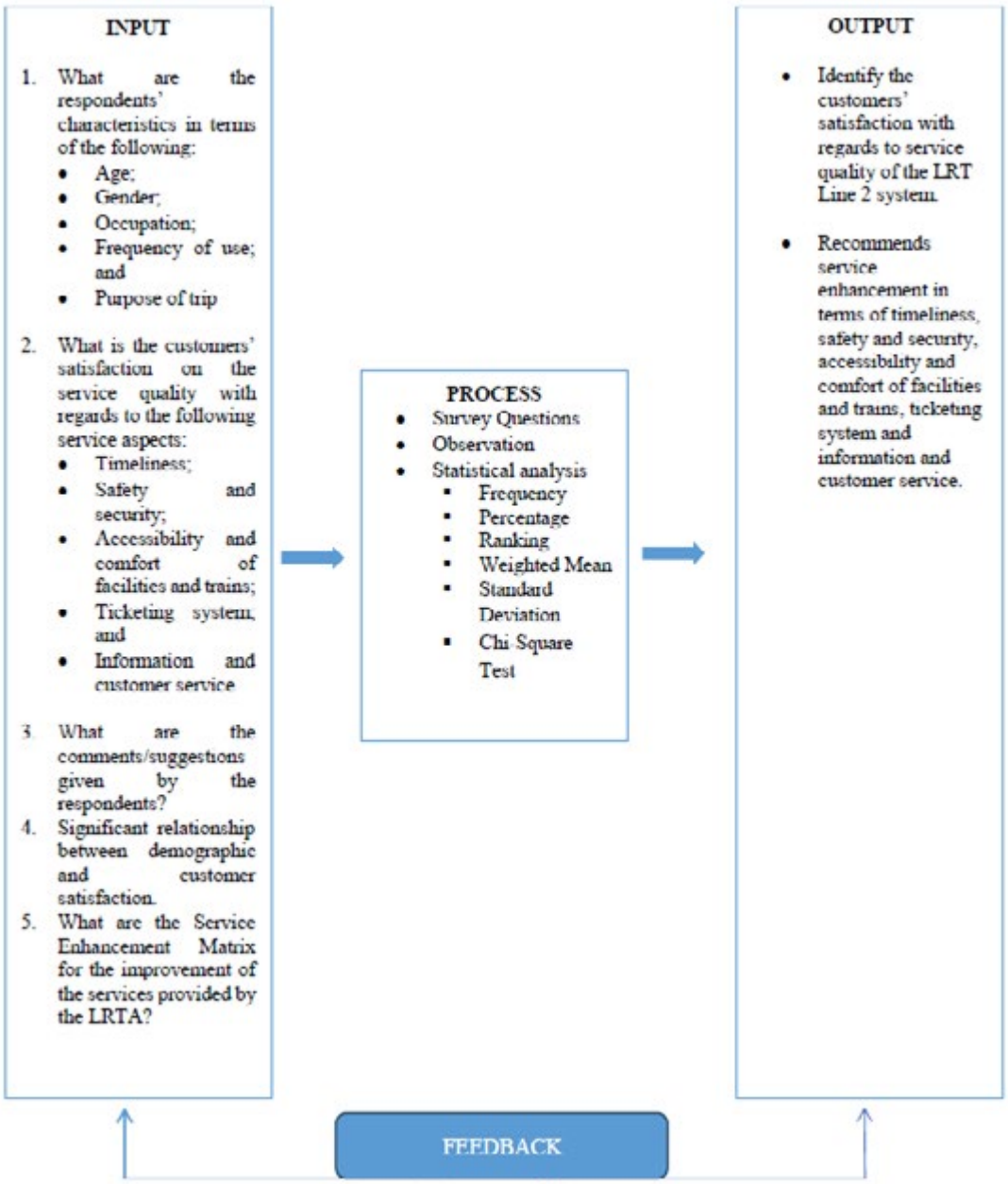

Figure 2: Conceptual Framework

1.4 Statement of the Problem

The main objective of this research study was to determine the customer satisfaction on the service quality of Light Rail Transit Authority specifically in the LRT Line 2 system

Particularly, the research study aimed to find answers to the following sub objectives:

What are the respondents' characteristics in terms of the following?

1. Age
2. Gender
3. Occupation
4. Frequency of Use
5. Purpose of Trip

What is the customer satisfaction on the service quality of Light Rail Transit Authority specifically in the LRT Line 2 system as viewed by the respondents with regards to the following service aspects?

1. Timeliness
2. Safety & Security
3. Accessibility & Comfort of Facilities and Trains
4. Ticketing system
5. Information & Customer Service

What are the comments/suggestions given by the respondents?

Significant relationship between demographic and customer satisfaction.

What are the Service Enhancement Matrix for the improvement of the services provided by the LRTA?

Null hypothesis: There is no significant relationship between the respondents' demographic profile and customer satisfaction.

1.5 Significance of the Study

The researcher intended that the findings and recommendations derived from this study would be highly beneficial to all relevant stakeholders.

Specifically, this study is expected to be beneficial for the following:

• **Light Rail Train Authority:** The conclusions of this research can be utilized as a guide to determine the initial steps the organization should take to improve its railway services. This research serves as the basis for its performance metrics.

• **LRTA Line 2 Passengers:** The findings of this study can contribute to assessing the performance and feedback of the Line 2 system commuter, prompting management to make improvements based on passenger needs.

• **National Government:** The Light Rail Train Authority is Government Owned and Controlled Corporation (GOCC), its offered services will illustrate the government's efficiency in

• addressing the transportation needs of its citizens. Disregarding the majority of passengers' complaints can lead to failure in government efforts and a decrease in support and effectiveness.

• **Future Researchers:** This study will serve as a valuable instrument and point of reference for future studies in the same field. This study can provide valuable raw data that will be beneficial for their research. Additionally, the information provided by this research can stimulate the generation of innovative ideas to enhance their study.

1.6 Scope and Delimitation

The coverage of this research is limited to the factors that affect the level of customers' satisfaction of the Light Rail Train Authority Line 2 System Commuter. Thus, it only includes the customers' perception regarding timeliness, safety and security, accessibility and comfort of facilities and trains, ticketing system and information and customer service. The respondents of the study were composed of 138 distributed within the 13 stations of LRT Line 2 system. The questionnaires were disseminated and administered on September 26 to November 14, 2023. The interpretation was done within the limits of the information provided by the respondent, the research instrument, and statistical tools used.

1.7 Definition of Terms

We provide some definitions of terms according to their use in the study for clarification. The following terms are defined for the extent of information.

• **Accessibility.** It is assessed through the ease of accessing the station and its facilities, and the ease of riding on and off the train.

• **Cleanliness.** It is assessed through both the interior and exterior cleanliness of the train and the neatness of the stations and facilities.

• **Comfortability.** Passenger comfort is assessed through the shelter and seating at the station while waiting for the arrival of the train, the temperature of the train, and personal space inside the train.

• **Customer Satisfaction.** A measurement used to quantify the degree to which a customer is happy with a product, service, or experience. It was defined through the five service aspects (timeliness, safety and security, accessibility and comfort of facilities and trains, ticketing and information, and customer service) which was evaluated by the passengers.

• **Customer Service.** Customer Service is the support offered to customers both before and after they buy and use your products or services in this study, it is evaluated through the willingness to help, knowledge of the operation, and presentation of train and station personnel.

• **Facilities.** A place, amenity, or piece of equipment provided for a particular purpose. Something that is built, installed, or established, which includes trains and stations, to serve the riding

public of LRTA Line 2.

• **Fare.** The fee paid by the passenger allows him or her to ride the LRT Line 2. It varies depending on the distance traveled.

• **Light Rail Transit Authority (LRTA).** It is recognized as the premiere rail transit in the country providing reliable, efficient, dependable, and environment-friendly mass rail services to all residents of Metro Manila. LRTA is a wholly owned government corporation created on July 12, 1980 under Executive Order (EO) No. 603, as amended by EO No. 830 dated September 1982, and EO No. 210 dated July 7, 1987. The LRTA is primarily responsible for construction, operation, maintenance and/or lease of light rail transit systems in the Philippines.

• **Safety and Security.** It is assessed through safety during the trip and safety at stations. And security is assessed through the things done to make people or places safe and protected from harm.

• **Service Aspects.** Variables which affect the service of train to the passengers.

• **Service Quality.** An assessment of how well a delivered service conforms to the customer's expectations.

• **Ticketing.** An overall service that includes the current condition on purchasing train tickets, the current type of tickets being used, and the value of money of the fare.

• **Timeliness.** The quality or habit of arriving or being ready on time. This includes the punctuality, frequency and the travel of the train.

2. Methodology

This chapter discussed the design and procedures undertaken during the conduct of the research. The purposes of this chapter are to describe the research methodology of this study, explain the sample selection, describe the procedure used in designing the instrument and collecting the data, and provide an explanation of the statistical procedures used to analyze the data.

2.1 Research Design

This research made use of a descriptive research method which is designed for the researchers to gather information about present existing conditions needed in the chosen field of study. This method entitles the researchers to interpret the theoretical meaning of the findings and hypothesis development for further studies.

Descriptive method encompasses all the data gathered useful in adjusting or meeting the existing phenomenon. Survey study was employed to measure the existing event without inquiring into why it exists. In this research, creating and distribution of survey questionnaires and personal interviews are the procedures used to perform the descriptive research. As used in this research, gathered and treated, are data on the demographic profile of respondents such as age, gender, occupation, frequency of use, and purpose of the trip of Light Rail Transit Authority Line 2 system. Also, services aspects such as timeliness, safety and security, accessibility and comfort of facilities and trains, ticketing system and information and customer service are gathered and analyzed.

2.2 Population and Sampling of the Study

We, the researchers, acquire the ridership status for the year 2022 from the Light Rail Transit Authority through the Fare Revenue Operations Group, AFC System Administration Division, as follows:

Month	No. of Operating Days	Total Passengers
January	31	1,080,801
February	28	1,419,930
March	31	1,962,926
April	30	1,772,147
May	31	2,346,057
June	30	2,630,577
July	31	2,792,115
August	31	3,139,734
September	30	3,317,690
October	31	3,654,110
November	30	3,719,958
December	31	3,803,300

(Source: Light Rail Transit Authority - Fare Revenue Operations Group - AFC System Administration Division 2023)

Table 1: Passengers for the year 2022

Based on the statistics, the total number of passengers is 31,639,345 and the average monthly passenger count of the LRT Line 2 system is 2,636,612 for the year 2022.

The researchers applied Cochran's formula to determine the sample size. First, the researchers assume that there is a large population, but the variability in the proportion is unknown. Assuming the maximum variability is 0.5, the confidence level is 95% and 5% precision. therefore:

$$no = Z2pqe2 \text{ and } no = no1 + (no-1)N$$

Where:

n_0, n - sample size

z - critical value of desired confidence (1.96)

(note: value for z is found in statistical tables which contain the area under the normal curve)

p - estimated proportion of an attribute that is present in the population

q - 1 – p (estimated proportion of an attribute)

e - desired level of precision

N – no. of Population

Thus,

N = 2,636,612 (average monthly passengers)

z = 1.96

p = 10% or 0.10

q = 0.90

e = 0.5

$$no = 1.9620.1(0.9)0.052 = 138$$

$$n = 1381 + (138-1)2,636,612$$

n = 138 passengers

The computation resulted in a sample size of 138 passengers. The researchers decided to use a sample size of 138, which is more than the required sample size to be distributed on 13 stations of the LRTA Line 2 system according to the percentage of ridership at every station included. The researcher utilized random sampling to ensure each portion of the population undergoing study has a chance to be selected at random.

Stations	Total number of Passengers for the year 2022	Percentage of Ridership	Number of Respondents
Recto	635,908	24.12%	33
Legarda	126,443	4.80%	7
Pureza	120,333	4.56%	6
V. Mapa	132,968	5.04%	7
J. Ruiz	45,235	1.72%	2
Gilmore	93,910	3.56%	5
Betty-Go	35,121	1.34%	2
Araneta Cubao	411,700	15.61%	22
Anonas	135,284	5.13%	7
Katipunan	182,504	6.92%	10
Santolan	99,583	3.78%	5
Marikina-Pasig	248,791	9.44%	13
Antipolo	368,726	13.98%	19
Total	2,636,612	100.00%	138

(Source: Light Rail Transit Authority - Fare Revenue Operations Group - AFC System Administration Division 2023)

Table 2: Number of Respondents per Station

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2.3 Research Instrument

Survey Questionnaires were used by the researchers to collect the information needed to answer the problems in the research. The researchers construct the survey questionnaire in accordance to the objectives and definite problems written from the first chapter of the research. The prepared survey forms were distributed randomly to 400 passengers of the Light Rail Transit Authority Line 2 system Commuter, the number of questionnaire forms per station vary.

The Survey Questionnaire that has been inspired by the Quality Manual System 2018 of the Philippine National Railways is divided into two parts. The first part is for the demographic profile of the respondents which were their age, gender, occupation, frequency of using the Light Rail Transit Authority Line 2 system Commuter and their reason for using the said service. The second part consisted of the following service factors with corresponding sub questions in which were to be graded by the respondents.The five-point Likert Scale was used in the Survey forms to determine the levels of satisfaction for every service attribute and to also determine the overall satisfaction rating of the Light Rail Transit Authority Line 2 system Commuter. The following scales were used:

Numerical Rating	Range Interval	Percentage	Interpretation
5	4.51-5.00	Between 96-100%	Very Satisfied
4	3.51-4.50	Between 75-95%	Satisfied
3	2.51-3.50	Between 50-74%	Somewhat Satisfied
2	1.51-2.50	Between 25-49%	Dissatisfied
1	1.00-1.50	Below 25%	Very Dissatisfied

Table 3: Level of Satisfaction Likert Scale

2.4 Research Ethics Protocol

This study observes the ethical criteria established by general research ethics, as mandated by the Republic Act 10173 otherwise known as the Data Privacy Act of 2012. As a result, the respondents received thorough information regarding the various stages of the research process, and the data-gathering materials were stored and discarded after the study was finished.

2.5 Data Gathering Procedure

The researchers have requested for permission from the Light Rail Transit Authority to conduct a survey within a given period immediately after the proposed survey form is finally approved by the research professor, The researchers made a schedule on visiting all covered stations where the survey forms will be given to random qualified respondents. They were given instructions to write a check mark on the appropriate grade for the corresponding questions. The respondents had given sufficient amount of time to answer all the questions written on the survey forms for them to elude mistakes and inaccuracies in their assessments.

All the respondents' assessments in the survey forms have been tallied, tabulated, analyzed and interpreted by the researchers.

2.6 Statistical Treatment of Data

The researcher will use the computer software Statistical Package for Social Sciences Statistics version 26 for all computations. "Statistical Package for Social Sciences (SPSS) is a computer program that performs most of the statistical calculations" (Gravetter et al., 2021).

The following statistical treatment was used in this research:

Frequency counting and Percentage

It is an act of counting any proportion or share in relation to a whole. This formula will be utilized by the researcher in determining the demographic profile of the respondents.

Formula: $\%=f/n\cdot 100$

Where: % = Percentage

f = Frequency n = Sample population

Weighted Mean

It is a type of average in which, instead of each data point contributing equally to the final mean, some data points contribute more weight than others. This formula is utilized by the researchers to analyze and interpret the data gathered in the study. This will also be used to determine the weighted average score on customer satisfaction with the service quality of the Light Rail Transit Authority, specifically in the LRT Line 2 system, as viewed by the respondents with regards to the following service aspects:

Formula: $\bar{x} = \Sigma fx / n$

Where: $\bar{x}$ = Mean $\sum$ = Summation of

F = Frequency x = Weights n = Sample population

Standard Deviation

It is the traditional choice for measuring variability, summarizing the typical distance from the average to the data values. This will be used to determine the amount of dispersion of the data from selected respondents.

Formula:

$$s = \sqrt{\frac{\sum_{i=1}^{N}(x_i - \bar{x})^2}{N-1}}$$

s = sample standard deviation
N = the number of observations
x_i = the observed values of a sample item
$\bar{x}$ = the mean value of the observations

Chi-Square for independence tests

Chi-square for independence tests is a hypothesis test designed to test for a statistically significant relationship between nominal and ordinal variables organized in a bivariate table. This formula is utilized by the researchers for testing hypotheses if there is a significant relationship between demographics and customer satisfaction.

Formula:

Where:

X2 = Chi computed value ∑ = Summation of O = observed value E = Expected value

3. Results

This chapter presents the gathered, analyzed and interpreted data. Tables and figures are presented, and their weights are tabulated. This includes the analysis and interpretation of the statistical results computed by the researchers. All the data included in this chapter are based on the answers of the respondents to the questionnaire that the researchers provided. This chapter also presents the results of the data gathered from the survey questionnaires distributed among the respondents to determine customer satisfaction with the service quality of the Light Rail Transit Authority, specifically the LRT Line 2 system.

3.1 Profile of the respondents

3.1.1 In terms of age

Demographic Profile	Frequency	Percentage	Rank
Below 20 years old	10	7.25	*4*
21 - 30 years old	71	51.45	*1*
31 - 40 years old	29	21.01	*2*
41 - 50 years old	22	15.94	*3*
51 - 60 years old	5	3.62	*5*
Above 61 years old	1	0.72	*6*

Table 4: Frequency and Percent Distribution of the Respondents-Passengers in terms of Age

As shown on table 4, majority of the respondents are with ages 21 to 30 years old which comprises 51.45 percent of the sample population, whereas only a total of 21.01 percent of the sample size are of the age ranging 31 up to 40 years old, 15.94 percent are of ages ranging 41 up to 50 years old, 7.25 percent for ages below 20 years old, 3.62 percent are of ages ranging 51 to 60 years old and .72 percent of ages 61 above. This result will conclude that most of the respondents were considered as young adults.

3.1.2 In terms of Gender

Demographic Profile	Frequency	Percentage	Rank
Female	95	68.84	*1*
Male	35	25.36	*2*
LGBTQA+	8	5.80	*3*

Table 5: Frequency and Percent Distribution of the Respondents-Passengers in terms of Gender

Table 5 presents that the female respondents dominated the study conducted, with a share of 68.84 percent of the total sample size, compare to male respondents which had a share of 25.36 percent and LGBTQA+ which had a share of 5.80 percent.

3.1.3 In terms of Occupational Status

Demographic Profile	Frequency	Percentage	Rank
Employed	111	80.43	*1*
Student	18	13.04	*2*
Unemployed	9	6.52	*3*

Table 6: Frequency and Percent Distribution of the Respondents-Passengers in terms of Occupational Status

Table 6 presents that the employed respondents dominated the study conducted, with a share of 80.43 percent of the total sample size, compare to student respondents which had a share of 13.04 percent and unemployed which had a share of 6.52 percent.

3.1.4 In terms of Frequency of using LRT Line 2

Demographic Profile	Frequency	Percentage	Rank
Daily	66	47.83	*1*
Weekly	28	20.29	*2*
Monthly	21	15.22	*3*
A few times a year	16	*11.59*	*4*
Others	7	5.07	*5*

Table 7: Frequency and Percent Distribution of the Respondents-Passengers in terms of Frequency of using LRT Line 2

As shown on Table 7, respondents who used the train daily were 47.83 percent. While the others were 20.29 percent, 15.22 percent, 11.59 percent and 5.07 percent rode the LRT Line 2 weekly, monthly, a few times a year and other frequency of use, respectively. These numbers unveil that most of the respondents ride the LRT Line 2 to go to the places where they usually go especially daily. This can be related that majority of the respondents, which was going to school, work and others.

3.1.5 In terms of Purpose of using LRT Line 2

Demographic Profile	Frequency	Percentage	Rank
Business trip	6	4.35	*5*
School	12	8.70	*3.5*
Shopping	12	8.70	*3.5*
Work	55	*39.86*	*1*
Others	53	38.41	*2*

Table 8: Frequency and Percent Distribution of the Respondents-Passengers in terms of Purpose of using LRT Line 2

As shown on table 8, most of the respondents used the LRT Line 2 to go to work for about 39.86 percent, 38.41 were doing activities other than the given purposes, tied for 8.70 percent were for going to school and for shopping, lastly 4.35 percent for business trip. This will validate the reason why most of the respondents took LRT Line 2 daily. Most of the respondents used the train service to go to their work daily.

3.2 Customer Satisfaction on the Service Quality of Light Rail Transit Authority specifically in the LRT Line 2 system as viewed by the respondents

3.2.1 Customer Satisfaction in terms of Timeliness

Customer Satisfaction	Mean	SD	Interpretation	Rank
1. Frequency of train	3.88	0.88	*Satisfied*	*3*
2. Travel time	4.14	0.91	*Satisfied*	*1*
3. Punctuality	3.89	0.94	*Satisfied*	*2*
Composite Mean	***3.97***	**0.83**	**Satisfied**	

Table 9: Customer Satisfaction on the Service Quality of Light Rail Transit Authority specifically in the LRT Line 2 system as viewed by the respondents in terms of Timeliness

Legend: "HS – Highly Satisfied (4.5 - 5.00)/ Between 96 – 100%", "S – Satisfied (3.51 – 4.50/ Between 75 – 95%", "SS – Somewhat Satisfied (2.51 – 3.50)/ Between 50 -74%", "D –Dissatisfied (1.51 – 2.50)/ Between 25 – 49%", "HD – Highly Dissatisfied (1.00 -1.50)/ Below 25%", "WM – Weighted Mean" and "SD - Standard Deviation"

As shown on table 9, it gives that the satisfaction index in terms of timeliness was 3.97, or within the "Satisfied" range. Comparing the three components of timeliness, the "Travel time" sub-category has the highest satisfaction average with a score of 4.14. Next is the sub- category "Punctuality of train" having a score of 3.89 only 0.01 point ahead of the lowest score of the three sub-categories which is "Frequency of train" with a score of 3.88. Although their scores are different, they are all within the range of Satisfied Rating.

3.2.2 Customer Satisfaction in terms of Safety and Security

Customer Satisfaction	Mean	SD	Interpretation	Rank
1. Security while waiting at station	4.10	0.91	*Satisfied*	*1*
2. Security inside the train	3.91	0.88	*Satisfied*	*3*
3. Presence of Security Personnel	3.96	0.85	*Satisfied*	*2*
Composite Mean	***3.99***	**0.80**	**Satisfied**	

Table 10: Customer Satisfaction on the Service Quality of Light Rail Transit Authority specifically in the LRT Line 2 system as viewed by the respondents in terms of Safety and Security

Legend: "HS – Highly Satisfied (4.5 - 5.00)/ Between 96 – 100%", "S – Satisfied (3.51 – 4.50/ Between 75 – 95%", "SS – Somewhat Satisfied (2.51 – 3.50)/ Between 50 -74%", "D – Dissatisfied (1.51 – 2.50)/ Between 25 – 49%", "HD – Highly Dissatisfied (1.00 -1.50)/ Below 25%", "WM – Weighted Mean" and "SD - Standard Deviation"

As shown on table 10, it gives that the satisfaction index in terms of safety and security was 3.99, or within the "Satisfied" range. Comparing the three components of timeliness, the "Security while waiting at station" sub-category has the highest satisfaction average with a score of 4.10. Next is the sub-category "Presence of security personnel" having a score of 3.96 only 0.05 point ahead of the lowest score of the three sub-categories which is "Security inside the train" with a score of 3.91. Although their scores are different, they are all within the range of Satisfied Rating.

3.2.3 Customer Satisfaction in terms of Accessibility and Comfort of Train Facilities

Customer Satisfaction	Mean	SD	Interpretation	Rank
1. Cleanliness of the stations and train	4.11	0.83	*Satisfied*	*1*
2. Refreshment facilities	3.73	0.96	*Satisfied*	*6*
3. Availability of toilet facilities	3.72	1.01	*Satisfied*	*7*
4. Comfortability inside the waiting area	3.86	0.94	*Satisfied*	*3*
5. Accessibility of train station	3.94	0.93	*Satisfied*	*2*

6. PWD- friendly facilities	3.79	1.06	*Satisfied*	*5*
7. Comfort inside the train	3.83	0.94	*Satisfied*	*4*
Composite Mean	***3.85***	***0.82***	***Satisfied***	

Table 11: Customer Satisfaction on the Service Quality of Light Rail Transit Authority specifically in the LRT Line 2 system as viewed by the respondents in terms of Accessibility and Comfort of Train Facilities

Legend: "HS – Highly Satisfied (4.5 - 5.00)/ Between 96 – 100%", "S – Satisfied (3.51 – 4.50/ Between 75 – 95%", "SS – Somewhat Satisfied (2.51 – 3.50)/ Between 50 -74%", "D – Dissatisfied (1.51 – 2.50)/ Between 25 – 49%", "HD – Highly Dissatisfied (1.00 -1.50)/ Below 25%", "WM – Weighted Mean" and "SD - Standard Deviation"

As shown on table 11, it gives that the satisfaction index in terms of accessibility and comfort of train facilities was 3.85, or within the "Satisfied" range. The category "Accessibility and Comfort of train facilities" has the greatest number of subcategories because this are the tangible parts of railway system which are facilities and trains. The sub-category "Cleanliness of stations and trains" got the highest rating with a score of 4.11. Second is "Accessibility of train station" with a score of 3.94. Third highest is "Comfortability inside the waiting area" with a score of 3.86. Fourth is "Comfort inside the train" with a score of 3.83. Fifth is "PWD- friendly facilities" with a score of 3.79. Sixth is "Refreshment facilities" with a score of 3.73. The sub-category that got the lowest score is the "Availability of toilet facilities" with a score of 3.72. All the sub-categories' scores are within the "Satisfied" range.

3.2.4 Customer Satisfaction in terms of Ticketing System

Customer Satisfaction	Mean	SD	Interpretation	Rank
Attitude of ticketing staff	4.01	0.88	*Satisfied*	*2*
Efficiency of ticketing staff	4.03	0.86	*Satisfied*	*1*
Ticket price	3.83	0.92	*Satisfied*	*3*
Composite Mean	***3.96***	***0.81***	***Satisfied***	

Table 12: Customer Satisfaction on the Service Quality of Light Rail Transit Authority specifically in the LRT Line 2 system as viewed by the respondents in terms of Ticketing System

Legend: "HS – Highly Satisfied (4.5 - 5.00)/ Between 96 – 100%", "S – Satisfied (3.51 – 4.50/ Between 75 – 95%", "SS – Somewhat Satisfied (2.51 – 3.50)/ Between 50 -74%", "D – Dissatisfied (1.51 – 2.50)/ Between 25 – 49%", "HD – Highly Dissatisfied (1.00 -1.50)/ Below 25%", "WM – Weighted Mean" and "SD - Standard Deviation"

As shown on table 12, it gives that the satisfaction index in terms of ticketing system was 3.96, or within the "Satisfied" range. Comparing the three components of ticketing system, the "Efficiency of ticketing staff" sub-category has the highest satisfaction average with a score of 4.03. Next is the sub-category "Attitude of ticketing staff" having a score of 4.01 only 0.02 point below of the highest score of the three sub-categories. Third is "Ticket price" with a score of 3.83. Although their scores are different, they are all within the range of Satisfied Rating.

3.2.5 Customer Satisfaction in terms of Information and Customer Service

Customer Satisfaction	Mean	SD	Interpretation	Rank
1. Train arrival information	4.00	0.92	*Satisfied*	*3*
2. Readable signage a and t stations inside train	4.15	0.89	*Satisfied*	*2*
3. Station names are readable and identifiable	4.20	0.90	*Satisfied*	*1*
4. Willingness of Train and Station Composite Mean Personnel to help	3.99	0.90	*Satisfied*	*4*
Composite Mean	***4.09***	***0.81***	***Satisfied***	

Table 13: Customer Satisfaction on the Service Quality of Light Rail Transit Authority specifically in the LRT Line 2 system as viewed by the respondents in terms of Information and Customer Service

Legend: "HS – Highly Satisfied (4.5 - 5.00)/ Between 96 – 100%", "S – Satisfied (3.51 – 4.50/ Between 75 – 95%", "SS – Somewhat Satisfied (2.51 – 3.50)/ Between 50 -74%", "D – Dissatisfied (1.51 – 2.50)/ Between 25 – 49%", "HD – Highly Dissatisfied (1.00 -1.50)/ Below 25%", "WM – Weighted Mean" and "SD - Standard Deviation"

Table 13 above shows that the Information and Customer Service has the highest rating out of the five service aspects with a score of 4.09. The biggest contributor of this score is the sub-category "Station names are readable and identifiable" with a score of 4.20. Sub-categories "Readable signage at stations and inside train", "Train arrival information" and "Willingness of train and station personnel to help" has scores of 4.15, 4.00 and 3.99, respectively.

3.2.6 Overall Customer Satisfaction of the respondents in the service quality of LRT Line 2 system

Customer Satisfaction	Mean	SD	Interpretation	Rank
Timeliness	3.97	0.83	*Satisfied*	*3*
Safety and Security	3.99	0.80	*Satisfied*	*2*
Accessibility and Comfort	3.85	0.82	*Satisfied*	*5*
Ticketing system	3.96	0.81	*Satisfied*	*4*
Information and Customer Service	4.09	0.81	*Satisfied*	*1*
Grand Mean	***3.97***	***0.81***	***Satisfied***	

Table 14: Overall Customer Satisfaction on the Service Quality of Light Rail Transit Authority specifically in the LRT Line 2 system as viewed by the respondents

Legend: "HS – Highly Satisfied (4.5 - 5.00)/ Between 96 – 100%", "S – Satisfied (3.51 – 4.50/ Between 75 – 95%", "SS – Somewhat Satisfied (2.51 – 3.50)/ Between 50 -74%", "D – Dissatisfied (1.51 – 2.50)/ Between 25 – 49%", "HD – Highly Dissatisfied (1.00 -1.50)/ Below 25%", "WM – Weighted Mean" and "SD - Standard Deviation"

As shown in the table 14, the overall satisfaction of the respondents in terms of the various service quality of the LRT Line 2 system is 3.97 or within the "Satisfied" range. The highest contributor is the "Information and Customer Service" with score of 4.09. Second is the "Safety and Security" with score of 3.99. Third is "Timeliness" with score of 3.97. Fourth is "Ticketing System" with a score of 3.96 and lastly the "Accessibility and comfort" with a score of 3.85.

3.3 Comments/suggestions given by the respondents

The comments and suggestions given by the respondents for further improvement of the service quality of the Light Rail Transit Authority, specifically in the LRT Line 2 system, where uniformity and security guard visibility, facility cleanliness, comfortability, and accessibility of the waiting area and train station, plus additional friendly facilities, are available for people with disabilities. In addition is having a vendo machine for refreshment beverages and extended operating hours and more trains in operation for faster services.

3.4 Significant relationship between demographic and customer satisfaction

3.4.1 Significant relationship between age bracket and customer satisfaction

Demographic	Customer Satisfaction	Chi value	P value	Remarks
Age Bracket	Timeliness	35.026[a]	0.020	*Significant*
	Safety and Security	59.964[a]	0.000	*Significant*
	Accessibility and Comfort	251.306[a]	0.000	*Significant*
	Ticketing system	132.723[a]	0.000	*Significant*
	Information and Customer Service	141.111[a]	0.000	*Significant*

Table 15: Significant relationship between age bracket and customer satisfaction in the LRT Line 2 system

The table 15 shows the relationship between demographic profile in terms of age and the service quality factors determining the customers satisfaction of LRT Line 2 system. The figures on the above table were derived through the use of Chi-Square for independence tests for which the level of significance at 0.05 (p). The computed 0.020 for timeliness, and 0.000 for safety and security, accessibility and comfort, ticketing system and information and customer service are lesser than the p value of 0.05 so the null hypothesis that there is no significant relationship between the respondents' demographic profile in terms of age and customer satisfaction is rejected.

3.4.2 Significant relationship between gender profile and customer satisfaction

Demographic	Customer Satisfaction	Chi value	P value	Remarks
Gender Profile	Timeliness	22.167[a]	0.005	*Significant*
	Safety and Security	19.059[a]	0.015	*Significant*
	Accessibility and Comfort	69.271[a]	0.000	*Significant*
	Ticketing system	21.952[a]	0.005	*Significant*
	Information and Customer Service	23.932[a]	0.002	*Significant*

Table 16: Significant relationship between gender profile and customer satisfaction in the LRT Line 2 system

The table 16 shows the relationship between demographic profile in terms of gender and the service quality factors determining the customers satisfaction of LRT Line 2 system. The figures on the above table were derived through the use of Chi-Square for independence tests for which the level of significance at 0.05 (p). The computed 0.005 for timeliness and ticketing system, 0.015 for safety and security, 0.002 for information and customer service and for accessibility and comfort are lesser than the p value of 0.05 so the null hypothesis that there is no significant relationship between the respondents' demographic profile in terms of gender and customer satisfaction is rejected.

3.4.3 Significant relationship between occupational status and customer satisfaction

Demographic	Customer Satisfaction	Chi value	P value	Remarks
Gender Profile	Timeliness	42.556[a]	0.000	*Significant*
	Safety and Security	46.542[a]	0.000	*Significant*
	Accessibility and Comfort	25.587[a]	0.001	*Significant*
	Ticketing system	15.518[a]	0.050	*Significant*
	Information and Customer Service	25.535[a]	0.001	*Significant*

Table 17: Significant relationship between occupational status and customer satisfaction in the LRT Line 2 system

The table 17 shows the relationship between demographic profile in terms of occupational status and the service quality factors determining the customers satisfaction of LRT Line 2 system. The figures on the above table were derived through the use of Chi-Square for independence tests for which the level of significance at 0.05 (p). The computed 0.050 for ticketing system, 0.001 for accessibility and comfort and information and customer service, and 0.000 for safety and security are lesser than the p value of 0.05 so the null hypothesis that there is no significant relationship between the respondents' demographic profile in terms of occupational status and customer satisfaction is rejected.

3.4.4 Significant relationship between frequency of use and customer satisfaction

Demographic	Customer Satisfaction	Chi value	P value	Remarks
Frequency of using LRT Line 2	Timeliness	55.430[a]	0.000	*Significant*
	Safety and Security	72.144[a]	0.000	*Significant*
	Accessibility and Comfort	208.940[a]	0.000	*Significant*
	Ticketing system	104.980[a]	0.000	*Significant*
	Information and Customer Service	135.101[a]	0.000	*Significant*

Table 18: Significant relationship between frequency of use and customer satisfaction in the LRT Line 2 system

The table 18 shows the relationship between demographic profile in terms of occupational status and the service quality factors determining the customers satisfaction of LRT Line 2 system. The figures on the above table were derived through the use of Chi-Square for independence tests for which the level of significance at 0.05 (p). The computed 0.000 for timeliness, safety and security, accessibility and comfort, ticketing system, and information and customer service are lesser than the p value of 0.05 so the null hypothesis that there is no significant relationship between the respondents' demographic profile in terms of frequency of use and customer satisfaction is rejected.

3.4.5 Significant relationship between purpose of the trip and customer satisfaction

Demographic	Customer Satisfaction	Chi value	P value	Remarks
Purpose of using LRT Line 2	Timeliness	39.302[a]	0.001	*Significant*
	Safety and Security	33.711[a]	0.006	*Significant*
	Accessibility and Comfort	116.863[a]	0.000	*Significant*
	Ticketing system	54.823[a]	0.000	*Significant*
	Information and Customer Service	75.802[a]	0.000	*Significant*

Table 19: Significant relationship between purpose of the trip and customer satisfaction in the LRT Line 2 system

The table 19 shows the relationship between demographic profile in terms of purpose of the trip and the service quality factors determining the customers satisfaction of LRT Line 2 system. The figures on the above table were derived through the use of Chi-Square for independence tests for which the level of significance at 0.05 (p). The computed 0.006 for safety and security, 0.001 for timeliness, and 0.000 for accessibility and comfort, ticketing system, and information and customer service are lesser than the p value of 0.05 so the null hypothesis that there is no significant relationship between the respondents' demographic profile in terms of purpose of the trip and customer satisfaction is rejected.

Thus, it is proven in this study that there is significant relationship between the respondents' demographic profile and customer satisfaction in the LRT Line 2 system.

4. Discussion

Findings

Based on the results of the data gathered that were analyzed and interpreted, the following were the findings:

4.1 Profile of the respondents

Majority of the respondents were aged 21 to 30 years old with 51.45% and the above 61 years old with .72%. In terms of gender, female respondents were more than male respondents and LGBTQA+ with 68.84%. In terms of occupation, employed respondents were 111 or 80.43% of total respondents. 47.83% of the respondents rode the train service daily. Lastly, majority of the respondents were going to work with 39.86% and the least was going on a business trip with 4.35%.

4.2 Customer satisfaction of the service quality Light Rail Transit Authority specifically in the LRT Line 2 system as perceived by the respondents

After all the scores per service attributes were obtained, the overall satisfaction level was computed. It showed that the overall average of the five service attributes was 3.97 or equivalent to “Satisfied”. Specifically, in terms of Timeliness, the weighted mean was 3.97 of satisfied. In Safety and Security, it achieved a satisfied level with a weighted mean of 3.99. The security while waiting at station had the highest score under this service with a weighted mean of 4.10. The Accessibility and Comfort of Train Facilities got a weighted mean of 3.85 and was equivalent to satisfied. It clearly showed that the respondents were satisfied on cleanliness of the stations and train with a weighted mean of 4.11. But still lacked with the availability of toilet facilities which only scored 3.72 or equivalent to satisfied level. The Ticketing System got a weighted mean of 3.96 and was equivalent to satisfied. In terms of Information & Customer service, it received the highest weighted mean on all five service attributes. It had a score of 4.09 but still within satisfied level. It is because of the station names are readable and identifiable which achieved the highest score of 4.20.

5. Conclusions

Profile of the respondents

To summarize, the majority of commuters were in younger age groups, where they were most aware of the light rail transit (LRT) line 2 quality of service. It was observed that most commuters were students and young teenagers using light rail transit (LRT) for its cheap commutation price and fast travel time reasons compared to using service road vehicles for commuters where traffic usually occurs.

The researchers gathered male and female respondents to the survey. However, it is also considered that those respondents who are part of the LGBTQA+ community have a third- world gender concerning their gender preferences. It was revealed that the majority of commuters were female groups, and they were the most aware of the quality of service on light rail transit (LRT) line 2.

It was observed that most commuters were employed who use light rail transit (LRT) daily for its budget-friendly commutation price and fast travel time to work. Aside from that, traffic and hassles usually occur on service road vehicles, which could cause being late to work.

The majority of commuters' purposes for using the light rail transit (LRT) line 2 were for work and schooling. Commutation price and fast travel time were the highlighted reasons why commuters use the light rail transit (LRT) line 2 compared to service road vehicles.

Customer satisfaction of the service quality Light Rail Transit Authority specifically in the LRT Line 2 system as perceived by the respondents

- **Timeliness**

The fast travel time and early arrivals for business, school, and work were the most highlighted reasons for commuters on the light

rail transit (LRT) line 2.

Kahn et al. (2002) define timeliness as the extent to which the information is sufficiently up-to-date for the task at hand, while Michnik & Lo (2009) define timeliness as arriving early or at the right time.

• Safety & Security

Security while waiting at the station through the visibility or presence of security personnel is one of the most important tools to assess the probability of passengers being in an accident.

According to Dr. Jean-Paul Rodrigue and Dr. Brian Slack, safety and security issues concern both transportation modes and terminals that can be either a target of terrorism, a vector to conduct illegal activities, or even a form of warfare. Moreover, according to the article by Ali Gardezi, enacting safety and security measures has been shown to significantly impact public opinion. It is in the interests of operators and policymakers to constantly improve, keeping pace with the latest innovations, to maintain numbers and passengers' satisfaction.

• Accessibility & Comfort of Trains Facilities

Cleanliness, comfortability of the stations, and accessibility of the train station environment are social resources during transport.

To encourage people to use public transport instead of driving, the government is pushing for hassle-free and convenient options. They are urging public transport operators to provide travelers with up-to-date information, comfortable vehicles, and a variety of facilities at stations.

• Ticketing System

The attitude and efficiency of ticketing staff as well as ticket price were great reasons why commuters regularly use the light rail transit (LRT) line 2.

The Automated Fare Collection System (AFCS) is a technology that has revolutionized the way people pay for transportation. AFCS eliminates the need for manual ticketing and payment systems, making transportation transactions faster, more efficient, and more convenient for both passengers and transit operators. Additionally, an Automated Fare Collection System (AFCS) using a new contactless smart card as a fare medium is being utilized in both the LRT Line 1 and LRT Line 2 systems. The old magnetic ticket fare collection system of LRT Lines 1 and 2 was totally replaced with the new contactless smartcard-based AFCS starting December 16, 2015, through the Department of Transportation's PPP for the Automatic Fare Collection System Project for LRT Lines 1 and 2 and MRT 3. The Common Ticketing Project for LRTA Lines 1 and 2 and MRT3 under the Public-Private Partnership (PPP) programme is a joint venture between the government and private organization led by Ayala and Metro Pacific. This new AFCS project replaces the old magnetic-based ticketing system installed in early 2000 and replaces the old system with contactless-based smart card technology on LRTA Lines 1 and 2 and MRT 3.

• Information & Customer Service

Train arrival information and readable signage at stations and inside trains play an important role in the information and customer service of the light rail transit (LRT) line 2.

Additionally, answering train-related questions, such as train times, delays, and ticket information, assisting passengers with mobility issues, managing the station information point, being available at the reception, and conducting security reviews and patrols.

Recommendations

The information that has been conducted from the study brought a precise conclusion, through this the following recommendations were introduced favorably based on the service enhancement matrix that is used by organizations to assess and improve the quality and performance of their services.

• Timelines

Enhancing train timeliness plays a vital role in improving the overall quality of the LRT Line 2 system. Management should invest in infrastructure improvements such as upgrading the tracks, signals, and stations to minimize the impact of adverse weather conditions, track obstructions, or other external factors on train schedules. Implementing alternative routes or services for passengers in case there are disruptions or any fortuitous events would also be recommended. Moreover, in order to keep passengers informed about the train schedules, it is advised to install clear and visible passenger information systems at stations. Lastly, invest in new technologies, such as automation and predictive maintenance, to improve the efficiency and reliability of the train system.

• Safety & Security

Enhancing safety and security on trains is essential to provide passengers with a comfortable and worry-free travel experience. Management should install adequate light in the stations and train cars to enhance visibility and discourage criminal activity. In addition, install platform screen doors on station platforms to prevent passengers from falling onto the tracks and develop a mobile app that allows passengers to receive real-time safety and security alerts and report incidents. Furthermore, management should consider the Crime Prevention through Environmental Design (CPTED) principles to make stations and trains less vulnerable to security threats.

• Accessibility & Comfort of Trains Facilities

Enhancing accessibility and comfort for train facilities is essential to provide an accommodating and making journey more enjoyable travel experience for passengers. Management should establish Wi-Fi and charging stations to cater the digital needs of the passenger as well as introduce on-board cafeterias or refreshment service for longer journeys. Create a space that is designated for luggage and stroller storage to keep aisles and entrance clear. Last suggestion would be the implementation of a seat reservation system for passengers to ensure they have guaranteed seats especially during peak hours.

• Ticketing System

Enhancing the ticketing system can streamline the ticketing process to make it more user-friendly, convenient, and efficient for passengers. Management should consider digitization by introducing online booking and managing tickets through mobile apps and websites that display real-time ticket availability information, likewise accepting a variety of contactless payment methods such as credit cards, mobile wallets, and smart cards. Use of barcodes or QR codes on tickets for easy validation and access control. Moreover, launch dynamic pricing models that offer discounts during off-peak hours and special promotions to attract more passengers and create loyalty programs that reward frequent passengers with discounts, upgrades, or exclusive offers.

• Information & Customer Service

Though it is the highest scoring attribute, enhancing information and customer service on trains can significantly improve information dissemination and can ultimately enhance the passenger experience and increase customer satisfaction. Management should introduce information in multiple languages to cater diversity to its passengers and assign onboard customer service representatives to assist passengers with inquiries and provide information about the journey. Developing a passenger app that offers real-time information, journey planning, and assistance services would be recommended. Lastly, initiating information dissemination for all the passengers with visual or hearing impairments through braille, audio announcements, and sign language interpreters.

In general, it is essential to improve the public transport system of the Line 2 system commuter of the Light Rail Train Authority to increase customer satisfaction. These improvements will be beneficial to make the public transport system more sustainable and reduce the use of private cars in the future. It can also attract new passengers and maintain its existing users and further resolve problems such as traffic congestion, accidents, traffic noise, air pollution and fuel consumption [3-24].

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