

A Review of Public Service Delivery: Insights from Selected U.S. States

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Abstract

This project examines citizen satisfaction with public services across nine U.S. states using a comprehensive relational database. The analysis connects three datasets: citizen information, feedback on public services, and service details. The study explores critical metrics such as service funding, employee count, resolution timelines, and resolution outcomes to evaluate their impact on public satisfaction.

A mixed-method approach was employed, using SQL for data preparation and Excel for visualization. The project emphasizes trends in resolution efficiency, funding allocation, and demographic patterns affecting satisfaction levels. Findings include correlations between service funding and citizen satisfaction, resolution efficiency disparities among states, and key predictors of satisfaction ratings.

By uncovering actionable insights, such as areas needing resource reallocation or improved service workflows, this study provides a foundation for enhancing public service delivery. The findings also highlight the importance of citizen feedback in shaping responsive and effective governance.

Introduction

Knowing the quality and effectiveness of public services, government agencies are interested in addressing the needs of their citizens and providing better quality services. The Public Service Delivery Analysis project is thus carried out to measure the perceptions of citizens on various aspects of public services, to measure satisfaction levels, and to provide actionable insights into improving service delivery. It basically analyses some very important aspects of the public services: Time taken to address citizen complaints, funding, performance, and citizens' feedback. In a proposed project, the information of service budget and employees, as well as the citizen feedback, would be taken into account in order to get an overall picture of those factors which shape the satisfaction of the general public with services provided.

This analysis, through a data-driven approach, therefore highlights some useful insights that will be important to stakeholders like government decision-makers, policy analysts, and community leaders, enabling targeted improvements by the identification of gaps in service delivery and highlighting high-performing areas. It covers the methodology, tools, and processes used in the analysis; presents key findings; and gives recommendations for improvement in the delivery of public services.

The questions the analysis aims to answer are listed below:

1. How is the quality of each service rendered (e.g. wages, housing, electricity) perceived from the Citizens' view?
2. What is the corresponding satisfaction rating of each department responsible for these services?
3. Is there any relationship between the budget allocated to each department and its average rating?
4. Is there also any relationship between the number of employees and the public given rating, to suggest that maybe the number of employees available for delivering a service affects the quality of service they can deliver?
5. How does satisfaction vary across each state?
6. What' the average number of days needed by the public service provider to address citizens' complaints?

Citizen demographics to help understand how best to serve citizens, and if there is a difference in satisfaction perception.

1. How does rating differ between genders (to detect biases or unmet needs)?
2. How does different income level affect satisfaction level (To analyse if there are biases in the quality of service rendered to different income groups)?
3. Is there a disparity in the standard of the service rendered to different employment groups (e.g. Employed, Unemployed, Entrepreneur)?
4. Lastly, does the time taken to address a concern affect the satisfaction rating of Citizens?

Three datasets were used in the analysis, they include: the Citizens Table, which contains personal details about the individuals providing feedback, such as their names, cities, states, and other demographic information. It forms the basis for analysing how satisfaction levels vary among different groups of citizens. The second Table is the Feedback Table, which captures the actual feedback provided by citizens, including satisfaction scores, qualitative comments, and unique feedback IDs. It serves as the primary measure of how well services meet citizen expectations. Lastly, there's the Service Table, which includes detailed information about the services being evaluated, such as service names, budgets, employee counts, and their geographic context. It provides insights into resource allocation and service-specific performance metrics.

The datasets used in this analysis are fictional and were developed based on feedback gathered from citizens who lodged complaints with various public service providers, which are subsidiaries of different government departments across several states. These datasets record information such as citizen demographics, details of the services they interacted with, the time taken to resolve their complaints, and the resolution status (whether the issue was resolved or not).

The data represents responses from a total of 1,000 citizens across nine U.S. states: Texas, Michigan, Iowa, Florida, California, Massachusetts, Washington, New Jersey, and Arkansas. This structured dataset enables a detailed examination of public service efficiency and citizen satisfaction. Then, based on the level of satisfaction they got from this personal interaction with

each public service provider, they gave a satisfaction rating, which is the main focus of this analysis.

The Citizen Table contains the following columns:

Citizen_ID (A primary key): A unique number given to each respondent for the analysis

Name: The name of each respondent

Date_of_Birth: This column contains the date of birth of each respondent, which can be used to evaluate their age.

Gender: The gender the respondent identifies as.

State: The state the citizen resides in, and which they are commenting on

City: The city of residence of the citizen.

Employment_Status: This contains the employment status of the citizen.

Income_Level: This contains the amount earned by the citizen annually.

The Feedback Table contains the following column:

Feedback_ID: A unique identifier for each feedback given

Citizen_ID (A foreign key): The unique identifier of the citizen that gave the feedback

Service_ID (A foreign Key): This is the identifier that links to the service table, to specify the specific service being commented on.

Feedback_Date: The date the feedback was provided

Rating: The satisfaction rating assigned to the feedback provided.

Resolution_Status: Explains the status of the complaint lodged by the citizen.

Days_to_resolution: The number of days it took for the citizen's complaint to be handled.

The columns contained in the service Table include

Service_ID (A primary key): The unique identifier for the service rendered in each state.

Service_Name: The name corresponding to that service ID.

Department: The Governmental department that renders that service.

State: The state corresponding to that service Id.

City: The city considered in each state.

Budget: The allocated spending budget for that service.

Employee_count: The number of employee available to render that service in each state and city.

Methodology

In carrying out the data cleaning and preparation aspect of the data analysis, Structure Query Language (SQL) was used. The link to the Google link drive where the query file is uploaded is provided below.

The following steps were followed in preparing the data:

1. The age column of the citizens' table was created and was populated by subtracting the date_of_birth from the date the analysis was done.
2. The datatype used in storing the income level fields was changed to the decimal datatype, to allow for mathematical analysis to be performed in it.
3. The dollar sign in front of income-level fields was removed and replaced with an empty string. The same operation was carried out for the budget column in the service table.
4. The income level was segmented into different classifications. People who earned below and up to 20000 Dollars annually were classified as "Very Low Earner", and those that earned a maximum of 60000 were classified as "Low Earner". People who earned a maximum of 100000 were classified as "Average earners", then finally, those that earned more than a 100000 U.S. Dollars were grouped as "Big pay-day earners".
5. The null values of the service_name column in the service table were populated by using the department. Department of Labor automatically implied wages, since that was what was common from the populated cells.
6. A new column "Budget_Classification" was created, and populated by classifying budgets less than 20,000,000 as Poorly funded and those between 20,000,000 and 40,000,000 as "Modestly Funded" and those above 40,000,000 as "Heavily Funded".
7. In a likewise manner to what was done in 8 above was done to satisfaction rating. Ratings below 2 are classified as Bad ratings, while those below between 2 and 3.8 are classified as Neutral, and those above 3.8 as Good.
8. Also, the day taken to resolve a complaint was considered and classified. Number of days less than 7 days were classified as 'Timely', and those between 7 and 15 as "Normal", and those more than 15 days as "Late".

9. A view “Service_Satisfaction_Summary” was created from the joining of the the service table and feedback table using a left join. A total of 50 non-empty results were generated and this was imported into an Excel workbook. The following columns were selected: Service_ID, Service_Name, Department, State, City, Avg_Rating, Total_Feedback_Count, Resolved_Count, Avg_Resolution_Days, Budget, Budget_Classification, Employee_Count.

10. Another view, the Citizen_Feedback_Analysis view was created, which contained details like: Citizen_ID, Name, Gender, AGE, Income_Level_Demography, State, Employment_Status, [Service-ID], Service_Name, Rating, Feedback_Date, Resolution_Status, Rating_Classification, Response_Time_Classification.

This was produced from the joining of Citizens table and Feedback Table.

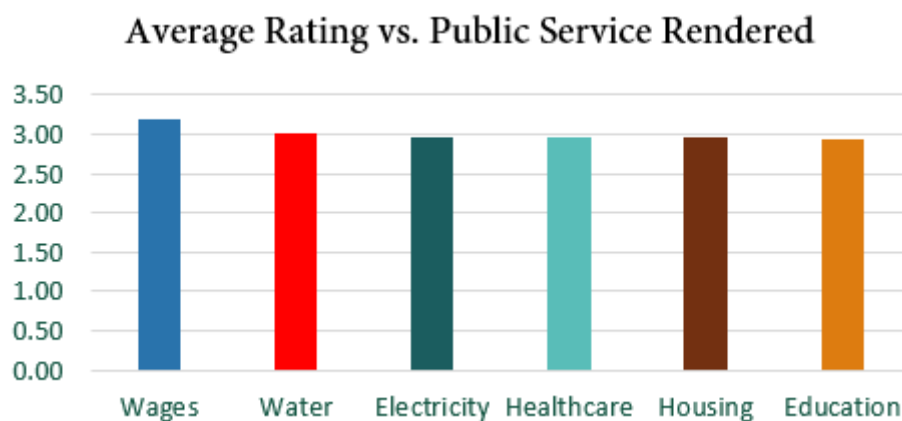
11. A data model was created in Excel, by joining these views together by the linking key

Analysis and Results

From the analysis process, it was determined that the average satisfaction rating across all the services is **2.99**, and the average number of days spent in resolving a citizen's complaint is **15.436 days**. The total budget allocated for the period of consideration is **\$1,547,606,165.60**, and the best-performing state is New Jersey with an average rating of **3.295**.

1. How is the quality of each service rendered (e.g. wages, housing, electricity) perceived from the Citizens' view?

This question seeks to provide an answer to which service(s) is being provided poorly to the populace. From this analysis, it was determined that the average satisfaction rating across each service provided is **2.99**. The satisfaction rating for each service did not differ much. Wages were classified as the most satisfying service rendered with an average rating of 3.19 across all states, followed by water with an average rating of 3.02, electricity with an average of 2.961, Healthcare followed closely with an average of 2.960, Housing with 2.957, and Education with 2.948.

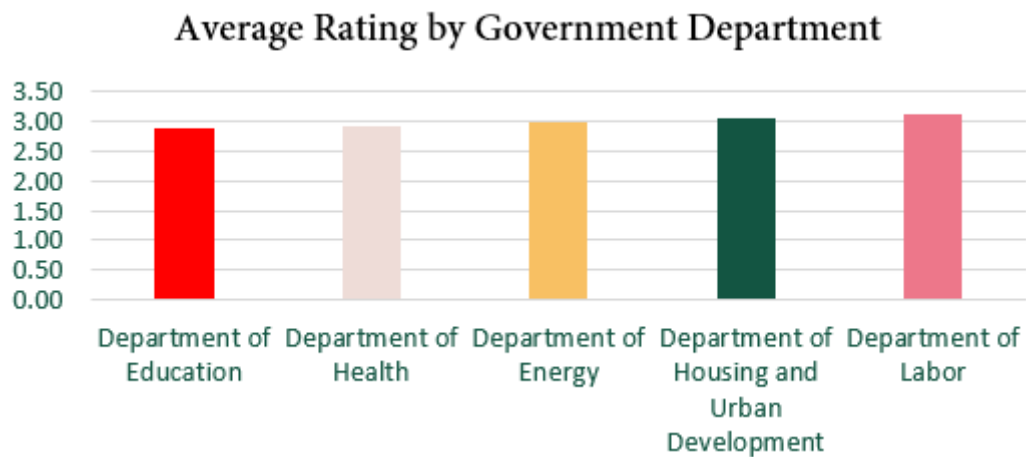


2. What is the corresponding satisfaction rating of each department responsible for these services?

Analysis of the department offering the best service was done, and the Department of Labor seems to be doing a good job of satisfying citizens, with a satisfaction rating of 3.11, followed closely by Department of Housing and Urban Development with an average rating of 3.07,

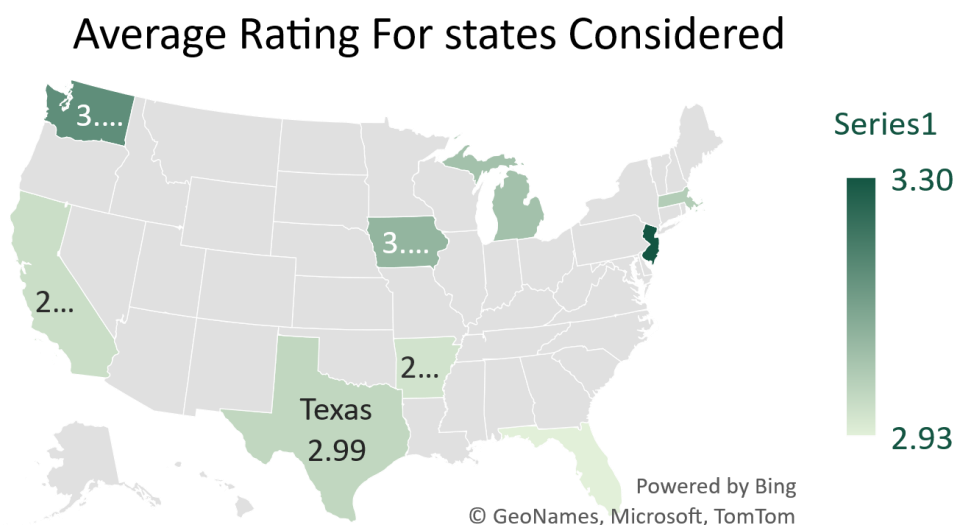
then the Department of energy 2.979, followed by the department of health with a rating of 2.9375, then the Department of Education.

This analysis would enable stakeholders to carry out a deeper search into why some critical sectors had a low satisfaction rating.



3. How does satisfaction vary across each state?

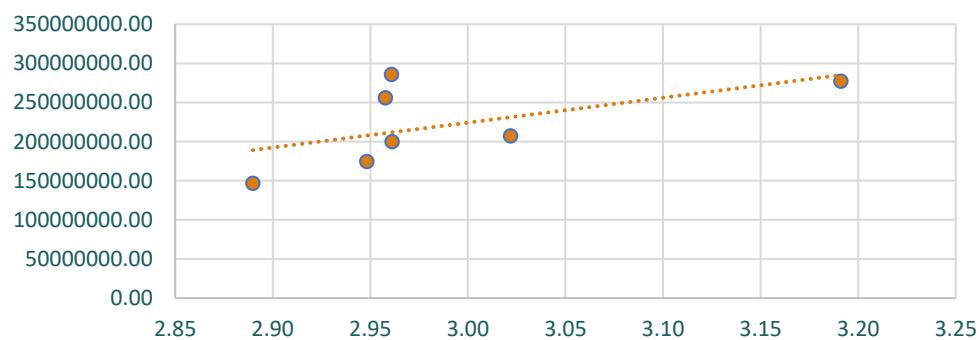
Analysis was carried out on different states, to determine the states that need urgent looking into and those that are doing well. The analysis found out that New Jersey ranked 1st, followed by Washington, Iowa, Michigan, Massachusetts, Texas, California, Arkansas, Florida. The state of Florida needs urgent looking into to determine what the real cause of the poor rating could be.



4. Is there any relationship between the budget allocated to each department and their average rating?

Analysis was carried out to determine if the budget allocated for a particular service was a determining factor in the quality of service rendered. The analysis was carried out in Microsoft Excel using Pivot Table. The pivot table was used to build a scatter plot chart, which revealed that there is a 0.579 relationship strength between the budget allocated for the service and the citizen satisfaction. This is an indication that in more than half of the cases, the more the money available to be spent, the better the quality of service rendered to the public.

Relationship Between Department Allocated Budget and Citizen Satisfaction



5. Is there also any relationship between the number of employees and the public given rating, to suggest that maybe the number of employees available for delivering a service affects the quality of service they can deliver?

Similar to the mode of analysis for Question 4, A scatter plot chart was created from a pivot table, which listed the services rendered, the employee available for rendering that service and the average citizen satisfaction. The analysis revealed that there is no relationship (0.064) between the employee count and the satisfaction rating. What this implies is that the number of employees available to carry out a job does not affect the quality of service rendered.

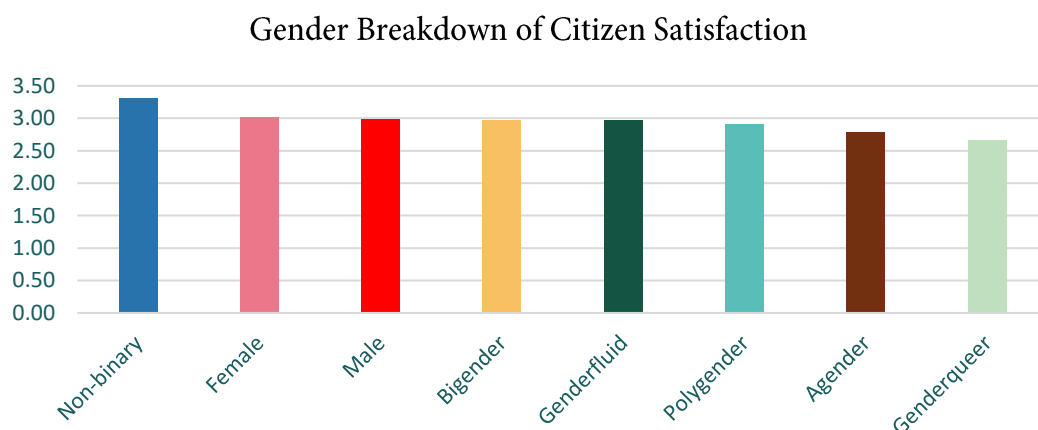
Citizen demographics to help understand how best to serve citizens

This section hopes to answer the question of whether there is disparity in the quality of service rendered to different classes of people, and to find a solution in the case of a bias. In this section

of analysis, we considered the level of satisfaction given to different gender groups, employment status, income level amongst others.

1. How does rating differ between gender (to detect biases or unmet needs)?

This analysis was done to carry out to determine the quality of service rendered to different gender groups. Different scenarios have suggested that there might be a bias towards people of colour, and maybe suggest if there is a perception of service satisfaction among this diverse groups. To properly analyse this, analysis was carried out in SQL using Queries and Microsoft Excel using Pivot Table. The non-binary group had the highest amount of satisfaction, rating an average of 3.3, followed by those that identify as Females, then Male gender group, followed by other groups. The Chart below gives a proper clarification to the analysis.



2. How does different income level affect satisfaction level (To analyse if there are biases in the quality of service rendered to different income groups)?

This analysis was carried out to determine if there is a bias in the quality of service rendered to people based on their income level (e.g. do people that earn more, and therefore stay in highbrow areas get better quality service, while people with lower pay get a lesser quality of service).

3. Does the resolution status have anything to do with the satisfaction derived from the quality of service rendered?

There are three different classifications available in the resolution status, Resolved, Closed and Pending. Resolved means that the issue raised by the citizen has been fully addressed, and the citizen's complaint or feedback has been satisfactorily dealt with. Pending means that the complaint or feedback is still under review or processing and has not yet been addressed. Closed means the complaint has been concluded, but it may not have been resolved to the citizen's satisfaction.

The analysis carried out revealed that Resolved complaints had an average rating of 3.03, followed by Pending complaints with an average rating of 3.01, then Closed complaints with the lowest rating of 2.94. This analysis implies that addressing the complaint to the requirement of the citizen sits well with them than just closing it out-front.

4. Lastly, does the time taken to address a concern affect the satisfaction rating of Citizens?

This analysis hopes to determine if the time it took to address complaints affected the satisfaction rating and therefore encourage reduced time in address complaints from citizens. The analysis was carried out by building a slicer in Excel using the Response Time column, also it was confirmed using SQL query. Late response had an average rating of 3.017, followed by the normal response time with 2.97, then the Timely response time with 2.969. This can suggest that maybe the quality of work done when the compliant was hurriedly addressed was bad.

Recommendations

Recommendations Based on Government Service Satisfaction Analysis

1. Budget Allocation Strategy

We've found that increased budget somewhat improves service quality, with a 0.579 relationship strength. This means departments should focus on strategic spending, not just throwing money at problems. Prioritize funding for departments like Labor and Housing and Urban Development, which are already performing well, and invest in understanding why additional money hasn't significantly improved service in other areas.

2. Employee Workforce Approach

The analysis shows no correlation between employee count and service quality. This suggests we need to focus on training, efficiency, and employee skills rather than simply hiring more people. Departments can invest in:

- Quality training programs
- Improving work processes
- Developing employee skills
- Creating more efficient service delivery methods

3. State-Specific Interventions

Florida needs immediate attention, ranking lowest in-service satisfaction. Stakeholders might need to conduct a detailed investigation to understand:

- Local administrative challenges
- Specific service delivery issues
- Potential systemic problems affecting service quality

4. Service Improvement Focus

Since service ratings are clustered around 3 out of 5, there's room for significant improvement.

Prioritize:

- Wages service (highest rating at 3.19)
- Developing targeted improvement strategies for each service type

5. Departmental Performance Enhancement

The Department of Labor is performing best in majority of the state considered. Study their:

- Management practices
- Employee training methods
- Service delivery approaches

Use these insights to help other departments improve their performance.

6. Citizen Feedback Mechanism

Implement a robust, ongoing feedback system that:

- Captures detailed citizen experiences
- Allows for real-time service improvement
- Provides transparent reporting of service quality

8. Resolution Time Improvement

With an average resolution time of 15.4 days, work on:

- Streamlining complaint resolution processes
- Setting clear timelines for service requests
- Creating more efficient communication channels
- This should also be balanced with quality work, and not just resolving complaints hurriedly.

Appendix

The SQL Queries used in the analysis process are divided into two: Data cleaning and Preparation Queries. These queries were used to prepare the dataset for dashboard building and further exploration in Excel. The second set of queries were used to carry out aggregated analyses of the dataset, to further confirm what was generated in Excel using Pivot Tables.

Data Cleaning and Preparation Queries

```
-- Add age column to the Citizens Table
ALTER TABLE SQL_Capstone_Project.dbo.Citizens_Table
ADD AGE INT NULL;

--Calculating the age of each citizen that took the survey
UPDATE SQL_Capstone_Project.dbo.Citizens_Table
SET AGE = DATEDIFF(YEAR, Date_Of_Birth, GETDATE());

-- Changing the datatype of the income_level column
ALTER TABLE SQL_Capstone_Project.dbo.Citizens_Table
ALTER COLUMN Income_Level DECIMAL(18,2);

--Removing the dollar sign in front of every cell in income_Level column of citizens_Table
UPDATE SQL_Capstone_Project.dbo.Citizens_Table
SET Income_Level = CAST(REPLACE(Income_Level, '$', '') AS decimal(18, 2));

--Creating the income level demography column
ALTER TABLE SQL_Capstone_Project.dbo.Citizens_Table
ADD Income_Level_Demography NVARCHAR(255) NULL;

-- Populating the income_level_Demography column
UPDATE SQL_Capstone_Project.dbo.Citizens_Table
SET Income_Level_Demography = CASE
    WHEN Income_Level <= 20000 THEN 'Very Low Earner'
    WHEN Income_Level <=60000 THEN 'Low Earner'
    WHEN Income_Level <= 100000 THEN 'Average Earner'
    WHEN Income_Level >100000 THEN 'Big Pay-day Earner'
END;

-- Populating the null values in the service_Name Column of the Service_Table
UPDATE SQL_Capstone_Project.dbo.Service_Table
SET Service_Name = CASE
    WHEN Department = 'Department of Labor' THEN 'Wages'
    WHEN Department = 'Department of Energy' THEN 'Electricity'
    WHEN Department = 'Department of Housing and Urban Development' THEN 'Housing and Development'
    WHEN Department = 'Department of Health' THEN 'HealthCare'
    WHEN Department = 'Department of Education' THEN 'Education'
END
WHERE Service_Name IS NULL;
```

```

-- Populating the null values in the service_Name Column of the Service_Table
UPDATE SQL_Capstone_Project.dbo.Service_Table
SET Service_Name = CASE
    WHEN Department = 'Department of Labor' THEN 'Wages'
    WHEN Department = 'Department of Energy' THEN 'Electricity'
    WHEN Department = 'Department of Housing and Urban Development' THEN 'Housing and Development'
    WHEN Department = 'Department of Health' THEN 'HealthCare'
    WHEN Department = 'Department of Education' THEN 'Education'
END
WHERE Service_Name IS NULL;

--Removing the dollar sign in front of every cell in Budget column of Service Table, and casting it as a decimal
UPDATE SQL_Capstone_Project.dbo.Service_Table
SET Budget = CAST(REPLACE(Budget, '$', '') AS decimal(18, 2));

-- Changing the data type of the budget column of service_Table
ALTER TABLE SQL_Capstone_Project.dbo.Service_Table
ALTER COLUMN Budget DECIMAL(18,2);

--ADD a new budget classification column to the [Service Table]
ALTER TABLE SQL_Capstone_Project.dbo.Service_Table
ADD Budget_Classification NVARCHAR(255) NULL;

--Filling the cells of Budget Classification
UPDATE Service_Table
SET Budget_Classification = CASE
    WHEN Budget < 20000000 THEN 'Poorly Funded'
    WHEN Budget <= 40000000 THEN 'Modestly Funded'
    WHEN Budget > 40000000 THEN 'Heavily Funded'
END;

```

```

-- Adding a new column to classify the ratings given by each citizen for different services
ALTER TABLE SQL_Capstone_Project.dbo.Feedback_Table$
ADD Rating_Classification NVARCHAR(255) NULL;

--Filling the cells of Rating_Classification
UPDATE Feedback_Table$
SET Rating_Classification = CASE
    WHEN Rating < 2 THEN 'Bad'
    WHEN Rating <= 3.8 THEN 'Neutral'
    WHEN Rating >3.8 THEN 'Good'
END;

-- Adding a new column to classify the days taken to solve the complaints of each citizen
ALTER TABLE SQL_Capstone_Project.dbo.Feedback_Table$
ADD Response_Time_Classification NVARCHAR(255) NULL;

--Filling the cells of Response_Time_Classification
UPDATE Feedback_Table$
SET Response_Time_Classification = CASE
    WHEN days_to_resolution < 7 THEN 'Timely'
    WHEN days_to_resolution <= 15 THEN 'Normal'
    WHEN days_to_resolution >15 THEN 'Late'
END;

```

```

CREATE VIEW Service_Satisfaction_Summary AS
SELECT
    s.Service_ID,
    s.Service_Name,
    s.Department,
    s.State,
    s.City,
    ROUND(AVG(f.Rating), 2) AS Avg_Rating,
    COUNT(f.Feedback_ID) AS Total_Feedback_Count,
    SUM(CASE WHEN f.Resolution_Status = 'Resolved' THEN 1 ELSE 0 END) AS Resolved_Count,
    ROUND(AVG(f.days_to_resolution), 2) AS Avg_Resolution_Days,
    s.Budget,
    s.Budget_Classification,
    s.Employee_Count
FROM SQL_Capstone_Project.dbo.Service_Table s
LEFT JOIN SQL_Capstone_Project.dbo.Feedback_Table$ f ON s.Service_ID = f.[Service-ID]
GROUP BY
    s.Service_ID,
    s.Service_Name,
    s.Department,
    s.State,
    s.City,
    s.Budget,
    s.[Budget_Classification],
    s.Employee_Count;

```

```

-- Creating the Citizen Feedback Analysis View
CREATE VIEW Citizen_Feedback_Analysis AS
SELECT
    c.Citizen_ID,
    c.Name,
    c.Gender,
    c.AGE,
    c.Income_Level_Demography,
    c.State AS Citizen_State,
    c.Employment_Status,
    f.[Service-ID],
    s.Service_Name,
    f.Rating,
    f.Feedback_Date,
    f.Resolution_Status,
    f.Rating_Classification,
    Response_Time_Classification
FROM Citizens_Table c
JOIN Feedback_Table$ f ON c.Citizen_ID = f.Citizen_ID
JOIN Service_Table s ON f.[Service-ID] = s.Service_ID;

```

The Analysis Queries are shown below in the order of which they were carried out.

```

--calculating the average rating
SELECT AVG(Rating) AS Average_rating
FROM SQL_Capstone_Project.dbo.Final_Table

--calculating the average resolution days
SELECT AVG(days_to_resolution) AS Average_resolution_day
FROM SQL_Capstone_Project.dbo.Final_Table

--calculating total budget allocated
SELECT SUM(Budget) AS Average_resolution_day
FROM SQL_Capstone_Project.dbo.Final_Table

--Sorting the states with the highest average satisfaction rating
SELECT State, AVG(Rating) AS Average_satisfaction_rating
FROM SQL_Capstone_Project.dbo.Final_Table
GROUP BY State
ORDER BY Average_satisfaction_rating DESC;

--- checking the services rendered and their average rating
SELECT Corresponding_Service_Name, AVG(Rating) AS Average_satisfaction_rating
FROM SQL_Capstone_Project.dbo.Final_Table
GROUP BY Corresponding_Service_Name
ORDER BY Average_satisfaction_rating DESC;

--- checking the services rendered and their average rating
SELECT Department, AVG(Rating) AS Average_satisfaction_rating
FROM SQL_Capstone_Project.dbo.Final_Table
GROUP BY Department
ORDER BY Average_satisfaction_rating DESC;

```

```

--- checking the average rating rating of Departments
SELECT Department, AVG(Rating) AS Average_satisfaction_rating
FROM SQL_Capstone_Project.dbo.Final_Table
GROUP BY Department
ORDER BY Average_satisfaction_rating DESC;

--- checking the quality of service rendered to different gender groups
SELECT Gender, AVG(Rating) AS Average_satisfaction_rating
FROM SQL_Capstone_Project.dbo.Final_Table
GROUP BY Gender
ORDER BY Average_satisfaction_rating DESC;

--- checking the average rating based on response time
SELECT Response_Time_Classification, AVG(Rating) AS Average_satisfaction_rating
FROM SQL_Capstone_Project.dbo.Final_Table
GROUP BY Response_Time_Classification
ORDER BY Average_satisfaction_rating DESC;

--- checking the average rating based on resolution status
SELECT resolution_status, AVG(Rating) AS Average_satisfaction_rating
FROM SQL_Capstone_Project.dbo.Final_Table
GROUP BY resolution_status
ORDER BY Average_satisfaction_rating DESC;

```