PROJECT REPORT

toronto SCHOOL OF MANAGEMENT

2022

# EXECUTIVE SUMMARY

This report mainly focuses on, Eagle National Bank that was founded in 1947 aiming at serving the people of the U.S, but started with few branches and later on grew into a number of states within the U.S making profits and tracking of customers' reviews on how satisfied they were as various services were administered to them, but unfortunately the bank noticed a decline in customers satisfaction with time.

For the preparation of this report analysts went through a number of data from banks data warehouse including customer information, transactional trends, bank service level to customers, rates, and interactions your customers and the bank had with other banks dealing with the same services that Eagle National Bank provided.

From the data it was obvious that bank dealt with customers whose needs based on loan and mortgage obtainment for home improvement, car, and debt consolidation, The bank management thus had to open, close, and manage accounts, issue cards, deal with deposits/withdraws, transfers, identity, and billing issues together with other sub-products of the banking system.

For easy understanding of this process a report was created dashboards(customer, transaction, loan, and geographical area) that dealt with identifying how complaints on satisfaction were filed, how long the complaints were dealt with in relation to time of responding to them, identifying how transactions were handled, frequency of loan applications in relation to gender, age, and duration for payment returns, and lastly the general spatial of customers location and the magnitude of such customers benefiting the Eagle National Bank services with the aim of knowing how far the banks target of obtaining customers in the particular region had been met and what should be done to attract more customers in regions with low magnitudes of customers engagement with the bank services provided.

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# Introduction

This report is about the need to identify informative and detailed summarisations of findings from the dataset we analysed in helping, Eagle National Bank, a small-scale bank serving customers in the U.S in planning the expansion of operations widely in the U.S, and in looking to increase profit and customer satisfaction as the findings from Power BI had suggested.

## Key Concepts

Analyst team spend time in understanding bank in general in terms of the operations, history, main goals, objectives, targets, potential markets and competitors, so that we could know what exactly we were to deal with in the course of analysis.

Then assessed the data source we used to obtain the banks datasets, that is data world and through exploratory data analysis we identified gaps within the dataset, and we decided on what approach to use in the data preparation stage.

Datasets were then dealt with as needed by removing duplicates and cleansing it so that we attain a certain level of acceptable data that would provide better results upon using the data in the built models.

An entity relationship diagram that included 11 entities with varying columns and varying rows and this ER diagram helped Analysts to clearly understand the relations that existed among the entities before evaluating the relationships in the Power BI.

Data that was in the excel source was then loaded into the Power BI ready for modelling using various tools available, slicers, charts, filters are few of them. Selection of visualisation tools greatly had to be used to assist you in exploring the scope of your operations and clearly understand the situation easily and help you in making appropriate decisions.

Analysis of whether the Power BI solutions produced by the intelligent solution software addressed most of your bank concerns as outlined in the bank objective.

The recommendations based on the banks performance analysis during this time is listed in this report.

## Report Structure

This report is consisting of the detailed report of all the steps were followed to come to finish the project the explanation of the solution and the recommendations for future to achieve the gaols. This report has an introduction to the case, business case and objectives, Data understanding and objectives, including the functional and non-functional objectives. The detailed project plan including scope of the project, scheduling, budget, and deployment.

The final products features are explained with how those can be used in positively helping bank achieve results and the recommendations for future work listed after that.

# Business Case and Objective

Eagle National Bank is a small-scale bank serving customers in the U.S. The bank is planning for the expansion of its operations widely in the US and is looking forward to increase profit and customer satisfaction by implementing technologies and new business techniques. During the past five years the bank has noticed a considerable decrease in from (%) in 2015 to (%) in 2018 in customer satisfaction and wanted to establish the root cause of the decline. To achieve this, it engaged its analyst to conduct a prescriptive analysis through making reference to the banks data which entailed customer account details, card type, customer details, disposition, customer district loan details, order details, from 2013 to 2018 to determine the past trends. This information is very vital to the bank as it will present a good platform for the banks executive members in making informed decision on the future of Eagle National Bank. The bank is aiming to be in the top ten positions in the US banking industry.

Eagle National Bank was founded in 1947 with 2 branches in New York and headquartered in New York. It has now spread out its operations to several states and major cities in the US (Table 1) with an annual turnover of around 900Million dollars. Bank now offers over 500 branches and 5000 ATMs all over the nation. And gives employment to around 7500 people.

Eagle National Bank engagement with stakeholders has been a source of innovative solutions to people’s needs and development challenges. The challenges the bank faces today demand collective action to achieve its goal in the next financial year and cannot be solved alone. Lasting solutions will require new partnerships and coalitions, making stakeholder engagement more critical than ever. The bank will engage stakeholders through a variety of consultations, platforms, and channels. From Headquarters to region offices, the Eagle National Bank will interact daily with stakeholder groups throughout the US, engaging them for different purposes, such as, partnering, risk mitigation, policy dialogue, strategy consultation, information sharing, and funding via grant mechanisms. These stakeholders include a broad range of actors, such as civil society organizations, faith-based organizations, parliamentarians, the Board of directors, shareholders, Customers such as Depositors and creditors, employees, Government regulatory bodies, and the community. and the private sector.

## Primary Business Objective: -

To increase the Customer satisfaction rating by 25 percent by the end of the next financial year.

## Secondary Business Objective: -

* Finding out top-performing and least-performing districts and coming up with solutions to increase performance.
* Understanding customers borrowing needs and behaviour
* Categorise customers according to customer age, income, and debt
* Finding out top selling cards
* Understanding customer transactions better
* To set a KPI target
* Analysing employee performance and finding ways to improve their performance further.
* Finding out top-performing and least-performing products.

# Data Understanding and Objectives

## Data Sources

For our project, we had to rely on secondary data sources where we had to retrieve our dataset by loading the bank database management system into our systems.

The bank handed us the authority to extract all the data that we found necessary and important to facilitate the cleansing and general preparation of data.

Since we were to perform this analysis virtually, we found that online analytical processing (OLAP) would have been a better way of obtaining the dataset for analysis. The advantage of having used OLAP was that data loading was done in defined frequencies were for the banks case, we needed datasets found in the bank warehouse loaded into the bank system for a frequency of six years (2013-2019)

It was also important to obtain our datasets through OLAP as most OLAPs form an integral part of business intelligence and data mining. In solving the bank's problem, we had to diagnose various objectives we analysed and ultimately provide a prescriptive analysis something which we did.

## ERD

Diagram

Description automatically generated

Figure -ERD

There are altogether 11 entities, and each entity has several attributes. Arranging these entities by defining the relationships between them, ended up making snowflakes data modeling schema. The entity Account is the fact table, it is surrounded by direct relationship to 6-dimension tables that includes client, district, disposition, district, order, loan, and transaction. The disposition table has relationship events, card, and call center logs tables. And finally, the district table extended its relationship to the review table. Thus, all tables together formed a smooth network which helped to find many observations to meet the business objectives.

## Analytical Objectives

### Primary Analytical Objective

To create a visualization to represent different KPIs and summarize Customer satisfaction rating.

### Secondary Analytical Objectives

* Visualise medium used for complaint submission.
* Present Average Days required for case closure.
* Validate total number of complaints.
* List down top 5 occurring customer issues.
* List down the number issues in each sub product.
* Visualise the response of the bank towards complaints.
* Validate the occurring timely response to complaints compared to KPI.
* Validate the customer satisfaction according to the KPI.
* Show clients with the maximum loan.
* List down the details of the loan.
* Demonstrate relation between age category and buying loan.
* Demonstrate status of loan according to its duration.
* Visualise the number of loans by year.
* Validate gender split.
* Show the number of total transactions.
* List down the details related to account balance.
* List down the details related to the transaction.
* Visualise the count of types of cards issued per quarter.
* Demonstrate business with other banks per year.
* Validate the count of transactional operation in percentage.
* Visualise the number of transactions by credit and debit cards by selected years.
* Show the state with maximum and minimum loan amounts.
* List down the count of clients by area division of the U.S.
* Display distribution of customers by region.
* Represent concentration of customer population in map.
* Validate the customer rating received for services according to the KPI.

# Project Plan

## Project Management Methodology

The data analyst team will employ the Agile Methodology for this project.  This methodology offers a disciplined project management practice that will support frequent adaptations, inspection, self-organisation, and a set of engineering practices that provide quick delivery of high-quality solutions. With this methodology, the team will identify areas where the bank excels and where it needs improvement and come up with a strategy and timelines to achieve the goal. Considering that the project has a short turnaround time of 10 days, the data analyst team settled on this approach for this project to efficiently and effectively deliver the project on time.

 Based on the reviews of Eagle National Bank clients where most of the clients were satisfied with few of them being dissatisfied, the team envisions to ensure that all customers are satisfied by determining the client’s needs as early as possible and offer constant solutions to their needs. The data analyst team will also be flexible enough to accept varying requirements including those that come in during the project implementation period to ensure all project backlogs have been worked on. The project lead will also ensure that the team collaborates on a daily basis throughout the project while providing support to the inspired individuals and the environment they want.  As such, this will present a most effective and efficient means for relaying information as the project progresses while upholding a constant pace in order to deliver on the project.

Additionally, the team will apply constant attention to the technical expertise they possess and develop proper designs to improve agility while applying simplicity to maximize on the amount of work not done as the project progresses as they reflect on becoming effective and adjust their behavior on an interval basis. With this approach, the data analyst team will be able to support the bank in selecting target markets and identifying clients to attract for the bank to make a profit and remain among the top ten banks in the United States.

## Project Scope – Functional Requirements of the final product

The project team will incorporate its domain expertise to understand the business side of the project by extracting structured and unstructured data insights. Customer’s data will be analysed to get insights about their credit history, behaviour and offer them different services and products recommendations based on their profile. Also, the data analyst team will cluster the similar behaving customers for directed marketing and understand the cross relations based on transactional and behavioural factors. Using Natural language understanding, the team will detect the sentiments of customers on different offerings to improve their services and customer experience and to retain customers as it is always way cheaper to retain a customer than to acquire a new one.

The scope of the final solution is that it should be able to have these functional requirements.

* Visualise medium used for complaint submission.
* Present Average Days required for case closure.
* Validate total number of complaints.
* List down top 5 occurring customer issues.
* List down the number issues in each sub product.
* Visualise the response of the bank towards complaints.
* Validate the occurring timely response to complaints compared to KPI.
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* Validate the customer rating received for services according to the KPI.

The data analyst team will incorporate the following steps in their scope:

***Business understanding:*** The team must define the business requirements/objectives and confirm that their implementation would make the lives of the customers better. Define and document all the relevant business metrics and project scope that will allow to measure and report on results in a way that is understandable by the business side.

The output of this stage will be a business requirements specification that has been viewed, redacted, and agreed upon by the project stakeholders.

As the dataset shows, there are 3 main products that the bank is dealing with and they include,

* Bank accounts
* Bank services
* Credit cards

Where in whatever that the bank deals with, it aims to ultimately have accounts and bank services opened, managed, or closed, with customers being issued their credit cards thus they perform various transactions.

***Data understanding:*** During this stage, the team researched the data architecture of Eagle National Bank document the data sources, their sources and the technology used. It has also conducted data mining on the data sources regarding the project objectives. It then performed an exploratory data analysis (EDA) and researched the data thoroughly, looked at any anomalies and unusual artefacts in the data, studied the reasons behind their occurrence, documented and built strategies to handle them.

As for the data, we found that the bank dealt with data that involved various customers' needs as follows.

* Need to refinance.
* Need to do a mortgage for their home improvements, debt consolidation, and cars (for standard clients taking normal loans)
* Need for the home purchase.

Such clients thus generate sets of data including calls log on the above needs, where the bank service providers in return handle their different issues accordingly. But we learnt that there existed data concerning clients' response towards the services they received in the whole process and the responses revolved around the following views.

* Level of professionalism, knowledgeability, and care of customer service providers
* Easiness of the user interface in the online registration and informative interface
* Support received throughout the process in interacting with the bank
* Loan rates in comparison to other banks offering the same services

***Data Preparation:***  In this stage the analysts will take the raw data and change it into a useful format to reach the project's goal based on the insights drawn from the data from the previous stage.  This will be done through exploring it on different fronts, visualising and analysing it to understand different views.  The main tasks include Data Extraction & Sampling, data Validation & Cleansing, data aggregation & representation.

***Data Modelling****:* In this stage, the analyst willapply their knowledge of data science, statistical modeling, and machine learning to solve the task at hand. This will be done in the following stages:

* Determining the task type, that is, supervised (e.g., regression) or unsupervised (e.g., clustering).
* Preparing   a list of algorithms that are suitable for solving the task.
* Model validation and testing approach.
* Optimise the parameters of the model and select the best model.

Here we might talk in short about the approach we used in modelling, for example the necessary measures, calculated tables, and various DAX functions.

***Evaluation:*** The analysts will test technical and business metrics, as well as check the individual predictions of the model at this stage.  It will look at the biggest errors the model made on the test set and think about the changes that it can make on the data, features, or models that can fix those errors.  The   project   will   have two evaluation strategies: online and offline.  The online evaluation will take care of tracking all the metrics for the already deployed model while the offline evaluation is used to decide which model will make it to the deployment stage and finally adopt what works.

## Project Schedule

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Steps** | **Project Schedule** | **Duration (Days)** | **Start Date and Time** | **End Date and Time** | **Predecessors** |
| 1 | Defining Project Scope | 0.375 | 07-10-22 8:00 | 07-10-22 11:00 |  |
| 2 | Collecting Data | 0.625 | 07-10-22 11:00 | 07-10-22 17:00 | 1 |
| 3 | Data Understanding | 0.5 | 10-10-22 8:00 | 10-10-22 13:00 | 2 |
| 4 | Cleaning Data | 2 | 10-10-22 13:00 | 12-10-22 13:00 | 3 |
| 5 | Modelling Data | 1 | 12-10-22 13:00 | 13-10-22 13:00 | 4 |
| 6 | Visualization | 1 | 13-10-22 13:00 | 14-10-22 13:00 | 5 |
| 7 | Evaluation | 0.5 | 14-10-22 13:00 | 14-10-22 17:00 | 6 |
| 8 | Deployment | 0.75 | 2017-10-22 8:00 | 2017-10-22 15:00 | 7 |
| 9 | Recommendation | 0.25 | 17-10-22 15:00 | 17-10-22 17:00 | 8 |
| 10 | Report Preparation | 7 | 07-10-22 8:00 | 17-10-22 17:00 |  |

Table - Project Schedule WBS

***Chart, waterfall chart

Description automatically generated***

Figure - Project Schedule Gantt Chart

The project was kicked off on October 07, 2022, Friday, and the deadline to achieve a high-quality solution to the issue was October 17,2022. Within these 10 days the project team had to come up with the solution.

The team spends time to schedule each activity related to the successful fulfilment of project goal. All the activities including defining the project scope, collecting data, data understanding, cleaning data, modelling data, visualisation, evaluation, deployment, recommendation, and report preparation were taken into consideration during the scheduling phase of the project. During this team identified predecessors for each task so that these tasks can be performed to achieve utilisation of maximum time.

As this is a 10-days short term project proper scheduling was the key to finish work on the given deadline. Considering all stages involved most time was allocated for preparing the final report as all the activities needed to be completed before having the complete report, even though the finished report needs completed product the work on the report can be done at the same time as the other steps being progressed. So that the report will have a start time same as the defining project scope state which is the start of the project and end with end of the project itself on recommendations.

After the report most time needed to be spent cleaning and the group allocated 2 days for this task. The data, which was secured from the data warehouse, the csv files have to be loaded and missing and incomplete data needs to be addressed during this time.

Then most time was allocated to modelling data and visualisation one day for each task, these were conducted one after another after the data cleaning. The relationship with each entity needed to be designed in the entity diagram and data needed to be modelled according to the entity diagram within this time to create visualisations with the data set. During the visualisation part all summarizations and visualisations of KPIs needed to be created with respect to the functional objectives of the project scope.

Team allocated 0.75 days in developing the recommendations to improve KPIs and achieve the primary business objectives. For data collection 0.625 days were allocated. The Data understanding part and the Deployment part of the project was allocated 0.5 days and for recommendations and defining scope 0.25 and 0.375 days were allocated respectively.

A Gantt chart was plotted with this information to understand time allocated to each activity and the workflow according to the work break down. The team was only functioning on the working days of the week 8 normal working hours.

Adhering closely to the schedule will make the completion of the project very easy in the tight deadline effectively.

## Budget

|  |  |  |
| --- | --- | --- |
| **Cost consideration** | **Description** | **Budget in dollars** |
| **Hard Investments** | | |
| Salary | This is the payment required for the employees working on the project. It is considered as 40$ per hour per employee. 5 employees work 10 throughout the project | 16000 |
| Transportation and logistics | It includes travel expenses, meeting expenses etc. | 200 |
| Maintenance | System maintenance at 200 per month for one year | 200/Month\*12 |
| Data warehouse | Integration of data from different sources | 6000 |
| Miscellaneous | Refreshments during project inception, project progress, pre-test, and deployment meeting. | 200 |
| **Soft investments** | | |
| Storage | Cloud and local servers for one year |  |
| Education and training | Training of Eagle National Bank Staff |  |
| Power BI Subscription | For using Power BI, subscription is available for 6858.10 per capacity/month. |  |
| **Total** | | **125896** |

Table – Budget-investments

|  |  |  |
| --- | --- | --- |
| **Cost consideration** | **Description** | **Budget in dollars** |
| **Hard Return** | | |
| Time savings | Because of implementing the new solutions there will be a considerable time saving for the activities needed to conclude from the data bank have. Because of the automated intelligence that automates repetitive tasks time will be saved. The number of hours saved because of this solution will be a big return of the project | 3000/month |
| Cost savings | Because of the increase in productivity and decrease in need time to perform activities there will be large cost savings due to reducing number of employees needed to perform tasks | 7000/month |
| Productivity increases | Assisted intelligence enhances human decision making so that the productivity of the employee automatically increases. | 5000/month |
| Revenue increases | Due to all the savings in cost the total revenue will also increase in total | 10000/month |
| **Soft Returns** | | |
| Better experience | The assisted and augmented intelligence will give better results and experience to the users |  |
| Skill retention | A better solution will help in training and using the available skills and employees |  |
| Agility | This solution can provide base for future development and lead to having much better products in the future |  |
| **Total** | |  |

Table -Budget - Returns

By the next financial year with the new system in place Eagle National Bank will have increased its customer satisfaction rate by 25% and will attract 2000 more customers across Northeast, South, West and Mid West America. This will increase the banks profit.

## Product Quality- Non-Functional Requirements of the Final Products

Non-functional requirements will include:

### Performance.

Increase customer satisfaction: The call centre must allow customers to access services 24hrs a day.

Internet banking must allow customers to access banking services 24 hours a day ,365 days a year with minimum downtime period and maintenance.

Expand Product offering: The new service will allow banks to capture a larger percentage of their customers. The internet banking system will provide facilities for bank to offer new services and products on its home page.

Reduce costs: The system will minimise the cost of processing transactions and reduce the number of branches required to service an equivalent number of structures.

Performance by District: The new system will be able to generate top performing and least performing districts monthly based on the KPIs.

Categorise customers by age, income, and their borrowing needs on a yearly basis

The system will be able to generate the most frequently used transactional operations and transactional types by customers.

The system will be able to analyse employee performance based on the client served and satisfied.

The system will be able to generate the top selling cards, age and loan product for marketing purposes.

The system will be able to flag cases that have stayed more than five days before being resolved

### Usability

Improve interface usability: To allow customers to select their preferred customer service providers and view their profile and rate them.

Allow users to escalate their issues to the next person if the number of days for case management have elapsed.

### Secure communication

The system will ensure that complaints records are password protected and only accessible to the complaints and response team.

## Deployment

To ensure a smooth deployment   of the project, the project manager will create a detailed deployment plan with a step-by-step process putting into consideration even the most minor details then the project team will review it before deployment. It will cater for both software, hardware and staff requirements while   ensuring   that Eagle National Bank   staff (experts and newbies) are trained on how to operate the new system and share the work amongst them evenly. They will also be trained on how to upgrade the software installed (Power BI) and ensure the license is up to date to boost the success rate.

The team will also have a software release checklist to deal with any potential issues and flawlessly plan the deployment. In this software release checklist, the development and operations teams of the bank will go hand in hand to ensure everyone is on the same page. The analysts will ensure that the team performs frequent tests before deployment to minimize any chance of defects while the new systems will all be released in pieces updated manually once every month while minimizing on sudden changes and having a rollback plan to make it easier for the team to search for the issue.

 The analysts will ensure that it automates the deployment as much as possible so that it minimizes on the likelihood of errors. It will create Key Performance Indicators (KPI) to monitor the usage and page loading time of the system before and after the deployment. Finally, the analyst will communicate to the bank team before deployment to avoid confusion brought by sudden changes. The KPIs will be closely monitored monthly to gauge the progress towards achieving the project's goal.

All information will be obtained and imported from various sources such as call center log files, social media files and SQL databases for use or storage. Data will be streamed both in real time and in batches where customer information such on the call center logs, CRM events, and CRM reviews will be streamed in real-time while loan and transaction details will be imported in discrete chunks in periodic intervals of time. For backup and speedy disaster recovery solutions all the data regarding the customer information, loan, transaction details, and geographical location of the customers will be stored both in the cloud and on local servers. The analysts will also employ electronic processing using Python, Oracle, SAS, and Power BI daily.

# Data and Final Product Features

The snapshot from Eagle National Banks Data warehouse about Account, client, transactions and geographical data and data from CRM including events, call logs, reviews were collected then integrated and modelled into the data model in Power BI. The relationship with each entity was established in data modelling to sort through data, and segregate with certain parameters such as years, product, and geographical locations.

Final Power BI report has four report pages describing customers relationship with the bank operations, their loan characteristics, their transactional details, and the geographical understanding of the customer’s location in accordance with the data set used to create summarizations and observe KPIs to meet the functional requirements.

## Customer report

Graphical user interface, application, PowerPoint

Description automatically generated

Figure – Customer Report Page

This portion of the report summarises customer satisfaction areas of the bank according to the CRM documents and the ratings provided by customers. It helps in shortlisting main issues in each product and subproducts. Total number of complaints, average days required to close a customer complaint and what did the bank do to resolve every complaint received, and two performance KPIs such as timely response to complaints and customers with no disputes after resolution of a complaint according to selected year and product.

The following are the observations for the visuals found on the Customer report page

### Slicers

In the customer report, we made two slicers. One had to segregate through years and products so that the report can generate summarization based on a single year, multiple years, or all years, and the second slicer had to segregate the product type which are bank account, bank services, and credit card. The option for selecting both or all bank products was also made available.

### Medium used for Complaint submission

The observed tree chart will provide you with details about what medium your customers used to submit the claims. From that information, you will be able to identify the most preferred ways by your customers and work on improving data collection through it in a timely manner. The Number of customers who used web, referral, phone, Postal services, or Fax gets to be displayed as this feature will help your bank to evaluate and improve the bank's complaint-receiving methods and the yearly changes in customer response.

### Top 5 Customer issues

This table will provide you with an interface to showcase the top customer issues and their occurrences in each year, and in each product according to the selections chosen. This must help your bank in prioritising the general allocation of your bank's resources to fix the most occurring issues and establish a product wise response action so that your bank can serve the customers better. It might have been the case that your bank had no, or little awareness of the troubling issues your customers had been facing while dealing with your service team, or perhaps you focused on minor customer issues that at the end chased away some customers and are making some customers have second thoughts on continuing with your bank.

### Number of issues in sub-Products

This table is also a summarization that is depending on the year and selected product giving the number of issues in each sub product of the products. This can also be a great tool in giving insight into each product your bank has together with the responses needed to make each product better. By doing so, your customer service providers will be reducing customer complaints and increasing their satisfaction.

### Average days required to close a case

It's a simple card feature that can provide how long your bank took to close your customer complaints according to the selected years and products. Reduction in the number of days to resolve a customer complaint shows an increase in customer satisfaction and the vice versa happened to be true.

### Total Number of Complaints

This card provides your bank with a direct look at how many customer complaints are there in each year and in each product according to the selection made. Having this information will make your bank assess on areas that try to understand the possible causes of the complaints by customers. For you, the number will guide you to see a declination or inclination of your operation quality.

### Banks response to complaints

This Donut chart provides you with a relative percentage of responses your bank had made to each customer complaint in accordance with the year and product that had been selected. What percentage of complaints were closed? Were they closed with explanations? How many cases needed explanation? What about monetary relief? Was there no relief? Was the case still open and easily identified? These questions that will be formulated by your bank will be a result of the outcomes shown in this donut chart as you had been serving your customers.

### Timely Response to complaints

This is a performance KPI every complaint should be resolved in a timely manner to achieve customer satisfaction. The target of the bank is to respond to at least 95%of the complaints in a timely manner. And from this bank can look at if the complaints were resolved timely in each year and also it will give a clear idea if the target is achieved.

### Customer with no Disputes

This is a performance KPI which will be easily showing you the customers disputing with a resolution your bank made regarding their complaints. Your bank's goal is to resolve customer issues and satisfy the customers, so disputing a resolution for customer satisfaction should be highly considered thus with this KPI you will be able to know how your bank managed to consider that fact for your bank's benefits. Your bank sets a target to have 90 percent customers with no disputes after a resolution and with this KPI you can evaluate if this target had been met in each year or product according to the selection made

## Loan Report

Graphical user interface

Description automatically generated

Figure - Loan Report Page

This portion of the report will help you in visualising and listing the details regarding your bank’s loan accounts. Loans are a major part of any bank business, and a major income source to the banks. This portion gives details such as who is the biggest loan customer the bank has, details of loans such as maximum loan amount minimum loan amount and the average loan amount, the relationships with age groups and loan amount and payments, gender split, Number of loans per year and status of loans with respect to the term of loan with respect to years and purpose of the loan.

The following are the observations for the visuals found on the loan report page

### Slicers

In the Loan report, we made two slicers, one to segregate through years and differentiate the purposes customers had in the obtainment of the loan so that the report can generate summarization based on a single year, multiple years, or all the years, and the second slicer for loan purposes such as car, home, home improvement and debt consolidation.

### Loan status vs Duration

This line chart will provide you with the summarization of loan statuses your customers had with respect to the duration their respective loans should have lasted with in relation to the selected slicers such as years and purposes. This should give you an insight about loan classes and how they change in the course of the loan payment by the customers in the duration agreed upon at the beginning of the loan issuing. The way the line graphs will be moving will help you reconsider amounts to be allocated for loans and the limit of time you should spare so that your bank doesn’t operate under losses and till attract more customers to come and get loans from your bank

### Number of loans by year

This area chart should give your bank the number of loans availed by customers in each year according to the selections made. This should easily provide you with all the details about what type of loans are increasing or decreasing in each year for each purpose.

### Gender Split

This pie chart should inform you of the percentage that each gender contributes in processing which one makes more approaches in the obtainment of availing loans according to year and purposes. This should tell you what to do to raise the approaches made by the lagging gender.

### Loan Details

This Multi row card should inform your bank of the maximum, minimum and average loan amount in each category. This should help your bank in determining the loan amounts availed by years and purposes and ultimately reason the situations observed

### Client with max loan

This simple card should inform you of the customer with the maximum loan amount in each selected year and purpose. This should help in finding out the customers needing close attention and monitoring since if such customers fail to pay the loans, they took will drastically cause a negative impact to your bank and if they manage to pay, your bank will benefit from the return rates imposed earlier.

### Age Vs Loan

This stacked column chart gives an insight about each age group's loan availing and payment trends. This should give your bank an idea about which age group it should be concentrating to improve business with, and what other groups that need research on how to attract.

## Transaction Report

Graphical user interface

Description automatically generated

Figure - Transaction Report Page

Transaction Report summarises different business transactions focusing on sales, types of transactions, and operations. This is made by observing data mainly from the Transaction data table and also using the card data table. This report sheet consists of the following observations.

The following are the observations for the visuals found in the Transaction report page.

### Slicers

There are two slicers included in the report to segregate through the year and district IDs. Every other observation in this report has access to these slicers. Both slicers are enabled with multiple selection options. The Year slicer is based on years throughout the transactional data collected and the district ID slicer is based on district codes used by the bank.

### Number of Transaction

This card visual should represent the total number of transactions throughout the selected number of years and district Ids. Your bank will identify the activeness of every district that is interacting with your services.

### Account Balances and Transaction details

There are two multirow cards used. These multirow cards show details by representing the overall accounts and transactions as filtered by the slicers. One of the cards finds out the Account Balance details including the maximum, minimum, and average of balance, and the minimum balance amount. The other card represents the Transaction details including the maximum, minimum, and average of the transaction amount.

### Card type issued per Quarter Area chart

With the help of an area chart, the number of types of cards issued per quarter is represented. From the graph, it is clearly visible that there are 3 types of cards, the Visa signature is the most selling and the Visa infinite is the least selling card. The colored area below each line indicates the volume.

### Business with other banks

With the help of a Line chart, the total number of banks that connected for business with eagle national banks customers in selected years has been demonstrated.

### Count of transactional operations

A donut chart is used in this platform to represent the count of transactional operations based on different types of banking transactional operations.

### Credit/Debit transactions

A stacked bar chart is used on this page to summarise, in a selected range of years, the number of transactions using debit and credit cards

## Geographical Report

Graphical user interface, application

Description automatically generated

Figure - Geographical Report Page

The geographical report summarizes the customer evaluations based on geography. This report gives an understanding of the geographical distribution by the business of customers and a business review given by the customers for the selected years which can mainly contribute to the customer satisfaction analysis. This report page is made using data from the district table connecting with the loan table and client tables. And also extracting customer reviews collected from district-wise branches, from the CRM events table. The bank has a set KPI for the customer ratings, which is used on this page to evaluate whether the bank achieved it or not with the help of visualizations. This report sheet consists of the following observations.

The following are the Observations for the visuals found on the Geographical report page

### Slicer

There is a year slicer made in this report based on the loan-approved years. This slicer has control over all other visuals. The multi-select option is enabled for this slicer.

### Max and Min loan amount cards

There are 2 card visuals representing State with maximum and minimum loan amounts for the selected years.

### Number of customers by State

A map visual is used on this page to visualise the population of customers in different states. The Map representation has been opted to show the population because it is easy to understand the demographics of the area of concentration of customers at a glance.

### Number of clients by division

With the help of a table visual, the number of clients in each area Division is calculated.

### Distribution of customers by region

This is a donut chart that helps to represent the distribution of customers in the 4 regions of the country. There is a clear representation of the percentage of distribution of customers in each region compared to the whole country.

### Target Rating

This is a gauge visual that represents the rating KPI set by the bank and helps to verify whether it is achieved or not by calculating the average of the total rating given by the customers for the bank services. The target KPI value set by the company is 4.75.

# RECOMMENDATIONS

After having conducted the analysis, the analyst team came out with the following recommendations to increase the Customer satisfaction rating by 25 percent by the end of the next financial year

* Attention should be paid by the bank service providers in dealing with customers (customer care) since the experience they get while receiving various services from our bank will highly determine the level of their satisfaction with our bank services, and in turn affect their review on the bank which most non-customers will rely on deciding to work with us.
* Regular follow-ups on the reviews and complaints by our customers must be handled professionally and responses should be given to our customers at the earliest of solution obtainment. It is from the reviews, suggestions, and complaints that we get to identify areas for improvement that will ultimately keep them committed to the bank, or even attract other customers who will raise our periodic incomes.
* We need to train our employees on how to deal appropriately with customers depending on gender, age and any aspect of the customer that will make them feel valuable since by doing so, trust and sense of belonging to the bank will increase and that makes the bank have secured customers of all time.
* The bank needs to develop a habit of frequently contacting the customers with maximum amounts of loans to keep them aware of their outstanding balances that need to be cleared. Once we put such emphasis, the bank won't be in a threat of operating under loss or a declining scale of profit.
* We recommend that the bank needs to employ or use economists with great expertise who will help in regulating the loan rates, and other rates that are reasonable and attractive to customers and non-customers who are planning on refinancing their mortgages since it has been in the habit of people to find solace in agents with lower rates.
* There is a need of establishing a research team that will go and identify reasons or causes on the districts that have shown a low need of bank services and from their research report, the bank needs to foster new links to the non-customers and strengthen the ones it had with the customers. If our goal is to make a profit, expansion of your sphere of influence is necessary.
* The number of transactions the customers have has to increase for the bank to increase its profit level. This can be done by extending bank services that happen to be the demand of most customers in daily activities. For example, we might link the transactional cards that appear to be most frequently used by customers with multiples business sectors like grocery stores, health institutions, etc. so that a customer might use the same transactional card in making payments hence increasing the number of transactions.

# References

*Retail banking demo data - dataset by lpetrocelli*. data.world. (2022, May 3). Retrieved October 16, 2022, from https://data.world/lpetrocelli/retail-banking-demo-data