High Level Design (HLD)

Budget Sales Analysis

Revision Number: 1.5
Last date of revision: 29/01/2023

Pranit Patil

Document Version Control

Date Issued	Version	Description	Author
14/12/2022	1.0	Abstract, Introduction	Pranit Patil
27/12/2022	1.1	General Description	Pranit Patil
4/01/2023	1.2	Design Details	Pranit Patil
14/01/2023	1.3	Deployment	Pranit Patil
28/01/2023	1.4	KPI	Pranit Patil
29/01/2023	1.5	Final Revision	Pranit Patil

Contents

Document Version Control 2
Abstract 4
1 Introduction 5
1.1 Why this High-Level Design Document? 5
1.2 Scope 5
2 General Description 6
2.1 Product Perspective and Problem Statement 6
2.2 Tools used 6
3 Design Details 7
3.1 Functional Architecture 7
3.2 BI Reporting Architecture 8
3.3 Optimization 8
4 Deployment 10
5 KPIs (Key Performance Indicators) 14

Abstract

The growth of resell business in most populated cities are increasing and market competitions are also high. The dataset is one of the historical sales of a company named Adventure Works which has records for 3 years. Good data driven systemsfor analyzing sales can improve the performance of the company and generate more Return on Investment (ROI) to the stakeholders.

1 Introduction

1.1 Why this High-Level Design Document?

The purpose of this High-Level Design (HLD) Document is to add the necessary detail to the current project description to represent a suitable model for coding. This document is also intended to help detect contradictions before coding and can be used as a reference manual forhow the modules interact at a high level.

The HLD will be focusing on the below objectives:

- Present all the design aspects and define them in detail.
- Describe the user interface being implemented.
- Describe the hardware and software interfaces.
- Describe the performance and requirements.
- Include design features and the architecture of the project.
- List and describe the non-functional attributes like:

  - Security
  - Reliability
  - Maintainability
  - Portability
  - Reusability
  - Application compatibility
  - Resource utilization
  - Serviceability

1.2 Scope

The HLD documentation presents the structure of the system, such as the database architecture, application architecture (layers), application flow (Navigation), and technology architecture. The HLD uses non-technical to mildly-technical terms which should be understandable to theadministrators of the system.

2 General Description

2.1 Product Perspective and Problem Statement

The goal of this project is to analyze sales data and evaluate the performance of the sales team against its target. We should provide insights about the top performing and underperforming products/services, the problems faced to meet the target and market opportunities and sales activities that generate revenue.

2.2 Tools used

Business Intelligence tools and libraries works such as NumPy, Pandas, Seaborn, Matplotlib, MS-Excel, MS-Power BI, Jupyter Notebook and Python Programming Language are used to build the whole framework.

3 Design Details

3.1 Functional Architecture

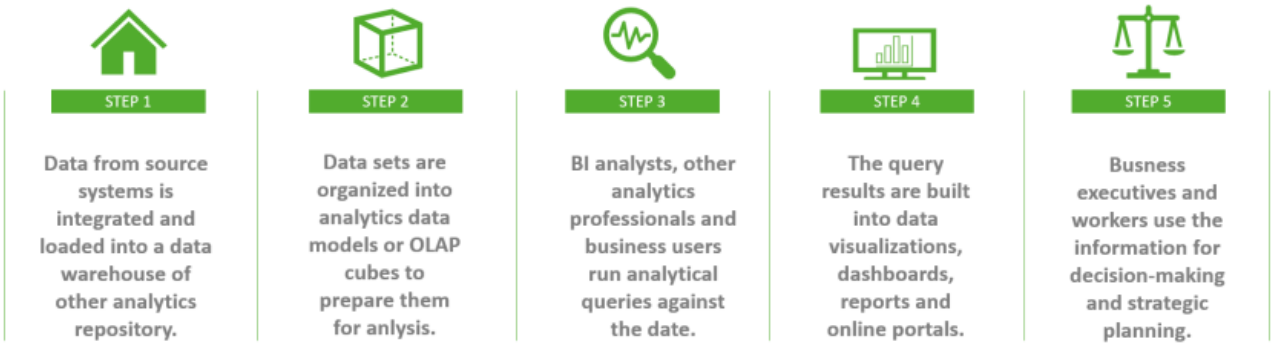


Figure 1: Functional Architecture of Business Intelligence

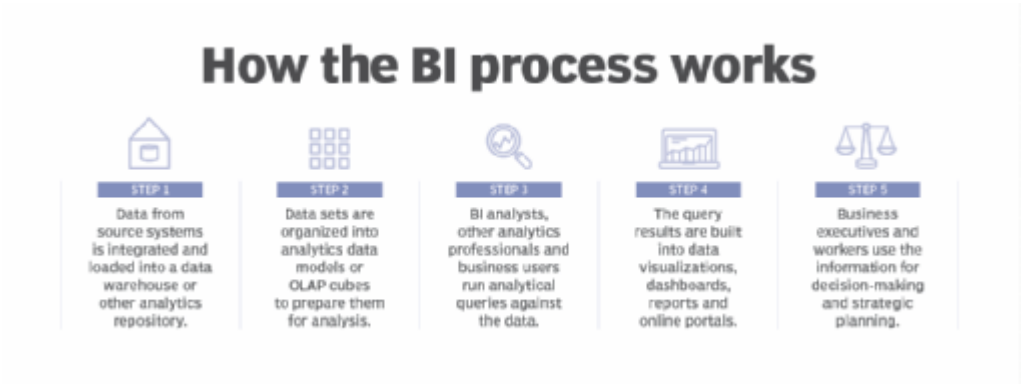


Figure 2: Working of BI Process

3.2 BI Reporting Architecture

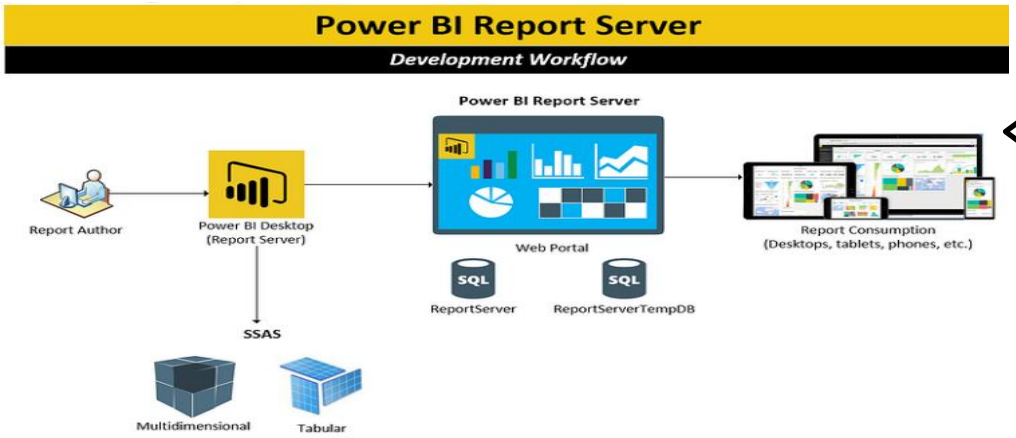


Figure 3: Power BI Architecture

3.3 Optimization

1. **Your data strategy drives performance**

   - Minimize the number of fields.
   - Minimize the number of records.
   - Optimize extracts to speed up future queries by materializing calculations,removing columns and the use of accelerated views.

2. **Reduce the marks (data points) in your view**

   - Practice guided analytics. There's no need to fit everything you plan to show in a single view. Compile related views and connect them with action filters to travel from overview to highly-granular views at the speed of thought.
   - Remove unneeded dimensions from the detail shelf.
   - Explore. Try displaying your data in different types of views.

3. **Limit your filters by number and type**

   - Reduce the number of filters in use. Excessive filters on a view will create a more complex query, which takes longer to return results. Double-check your filters and remove any that aren't necessary.

   - Use an include filter. Exclude filters load the entire domain of a dimension while including filters do not. An include filter runs much faster than an exclude filter, especially for dimensions with many members.

   - Use a continuous date filter. Continuous date filters (relative and range-of-date filters)can take advantage of the indexing properties in your database and are faster than discrete data filters.

   - Use Boolean or numeric filters. Computers process integers and Booleans (t/f) much faster than strings.

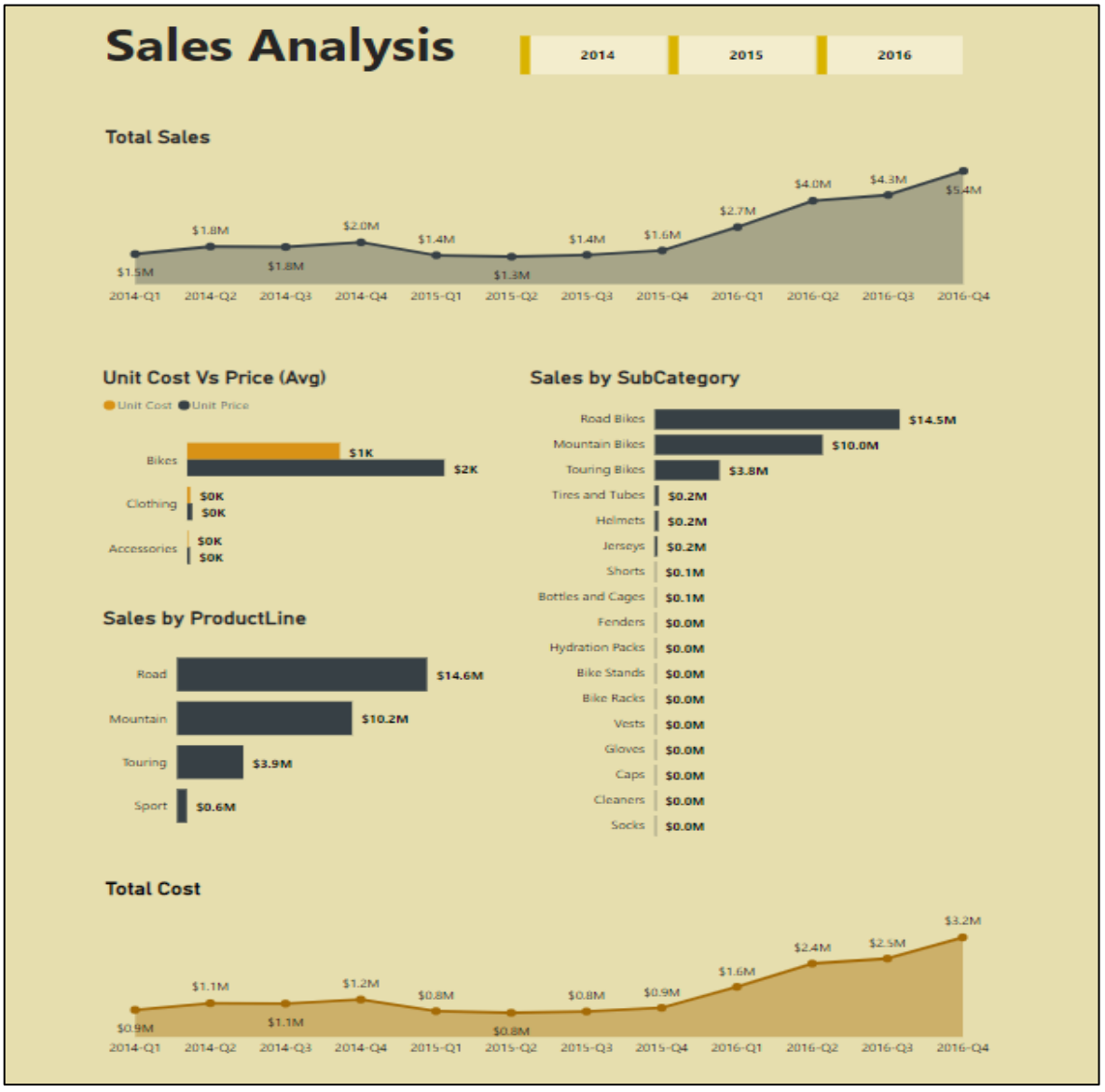
   - Use parameters and action filters. These reduce the query load (and work across data sources).

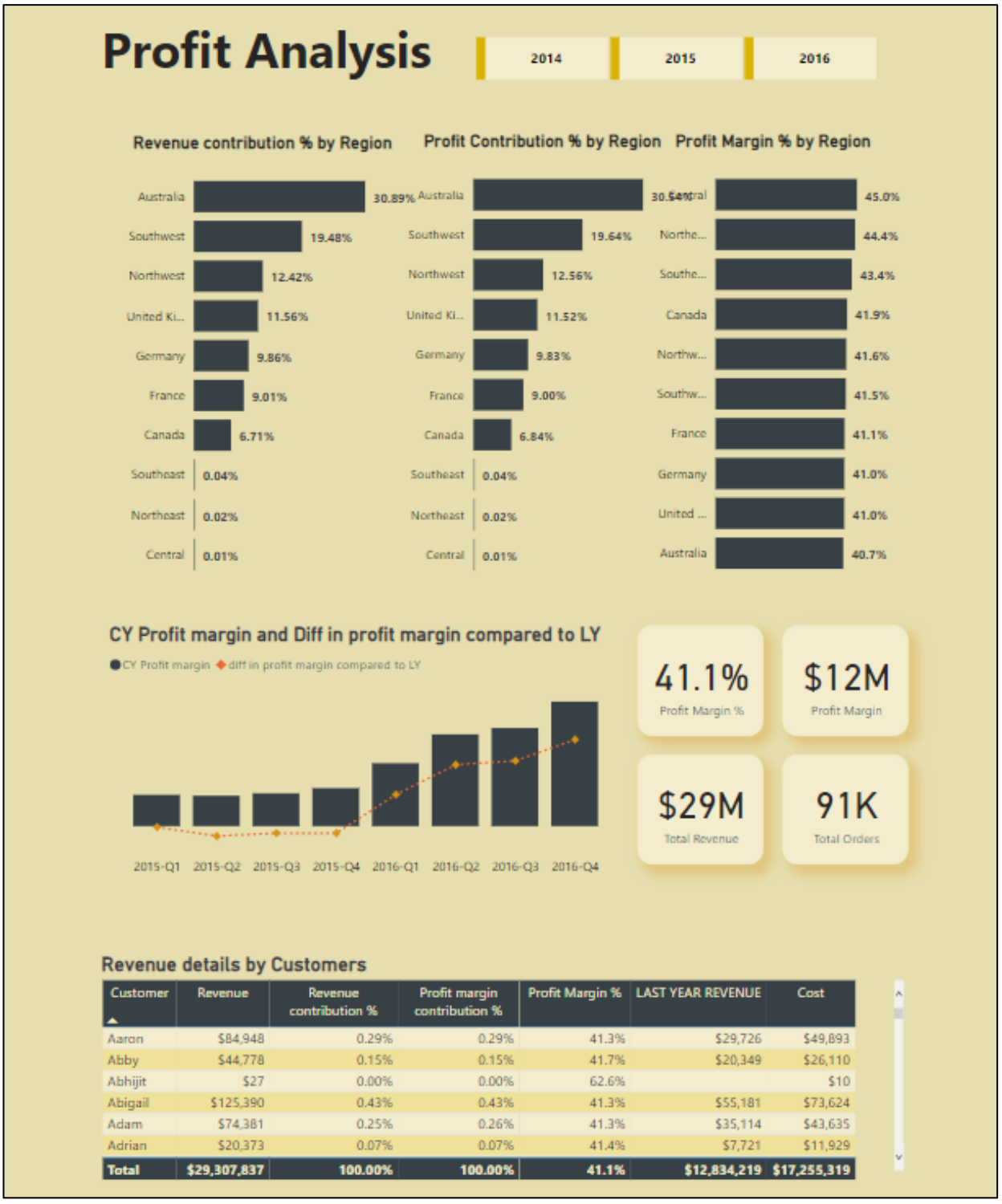
4. **Optimize and materialize your calculations**

- Perform calculations in the database
- Reduce the number of nested calculations
- Reduce the granularity of LOD (level of detail)or table calculations in the view. The more granular the calculation, the longer it takes.
- LODs - Look at the number of unique dimension members in the calculation.
- Table Calculations - the more marks in the view, the longer it will take to calculate.
- Where possible, use MIN or MAX instead of AVG. AVG requires more processing than MIN or MAX. Often rows will be duplicated and display the same result with MIN, MAX, or AVG.
- Make groups with calculations. Like include filters, calculated groups load only named members of the domain, whereas Tableau's group function loads the entire domain.
- Use Booleans or numeric calculations instead of string calculations. Computers can process integers and Booleans (t/f) much faster than strings. Boolean>Int>Float>Date>DateTime>String.

4 Deployment

Prioritizing data and analytics couldn't come at a better time. Your company, no matter what size, is already collecting data and most likely analyzing just a portion of it to solve business problems, gain competitive advantages, and drive enterprise transformation. With the explosive growth of enterprise data, database technologies, and the high demand for analytical skills, today's most effective IT organizations have shifted their focus to enabling self-service by deploying and operating Power BI at scale, as well as organizing, orchestrating, and unifying disparate sources of data for business users and experts alike to author and consume content. Power BI prioritizes choice in flexibility to fit, rather than dictate, your enterprise architecture. Power BI Desktop and Power BI Service leverage your existing technology investments and integrate them into your IT infrastructure to provide a self-service, modern analytics platform for your users. With on-premises, cloud, and hosted options, there is a version of Power BI to match your requirements.





Revenue details by Customers

Customer	Revenue	Revenue contribution %	Profit margin contribution %	Profit Margin %	LAST YEAR REVENUE	Cost
Aaron	$84,948	0.29%	0.29%	41.3%	$29,726	$49,893
Abby	$44,778	0.15%	0.15%	41.7%	$20,349	$26,110
Abhijit	$27	0.00%	0.00%	62.6%		$10
Abigail	$125,390	0.43%	0.43%	41.3%	$55,181	$73,624
Adam	$74,381	0.25%	0.26%	41.3%	$35,114	$43,635
Adrian	$20,373	0.07%	0.07%	41.4%	$7,721	$11,929
Total	**$29,307,837**	**100.00%**	**100.00%**	**41.1%**	**$12,834,219**	**$17,255,319**

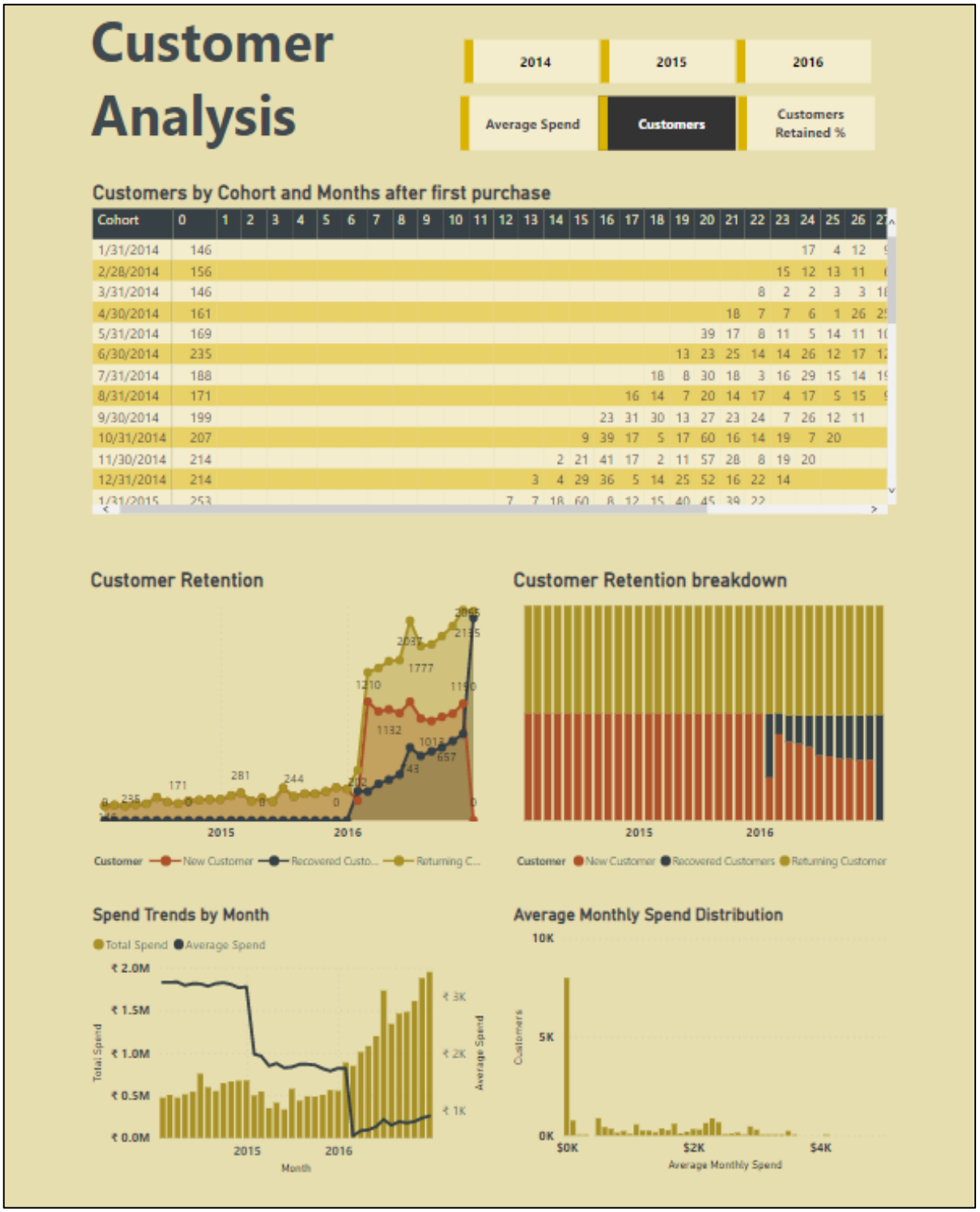
Variance Analysis

Sales by Category & Variance to Target

Sales by Product & Variance to Target

Category	Sales	Target sales	Variance	Variance %
Clothing	**$322,677**	**₹ 333,741**	**($11,064)**	**-3.3%**
Vests	$33,465	₹ 34,565	($1,101)	
Socks	$4,882	₹ 5,449	($567)	
Shorts	$67,050	₹ 68,453	($1,403)	
Jerseys	$165,066	₹ 170,938	($5,872)	
Gloves	$33,380	₹ 33,965	($585)	
Caps	$18,834	₹ 20,371	($1,537)	
Bikes	**$28,318,145**	**₹ 15,848,226**	**$12,469,919**	**78.7%**
Touring Bikes	$3,844,801	₹ 4,055,965	($211,164)	
Road Bikes	$14,520,584	₹ 5,257,897	$9,262,687	
Mountain Bikes	$9,952,760	₹ 6,534,364	$3,418,396	
Accessories	**$667,015**	**₹ 687,607**	**($20,592)**	**-3.0%**
Tires and Tubes	$231,300	₹ 242,777	($11,477)	
Hydration Packs	$38,823	₹ 39,803	($980)	
Helmets	$215,923	₹ 221,905	($5,982)	
Fenders	$44,268	₹ 43,670	$598	
Cleaners	$6,869	₹ 6,465	$404	
Bottles and Cages	$55,031	₹ 57,369	($2,338)	
Bike Stands	$37,842	₹ 38,757	($915)	
Bike Racks	$36,960	₹ 36,861	$99	
Total	**$29,307,837**	**₹ 16,869,574**	**$12,438,263**	**73.7%**

Variance by Months


Customer Analysis
2014
2015
2016
Average Spend
Customers
Customers Retained %
Customers by Cohort and Months after first purchase
Customer Retention
Customer Retention breakdown
Spend Trends by Month
Total Spend
Average Spend
Average Monthly Spend Distribution
Customers
Average Monthly Spend

5 KPIs (Key Performance Indicators)

Dashboards will be implemented to display and indicate certain KPIs and relevant indicators for the sales. When the system starts to capture the historical/periodic data for a user, the dashboards will be included to display charts over time with progress on various indicators or factors.

Key indicators displaying a summary of the sales and its relationship with different metrics.

1. Sales trend line
2. Cost trend line
3. Average unit cost and price
4. Revenue generated by Subcategory
5. Sales by Product Line
6. Revenue contribution by region
7. Profit contribution by region
8. Profit % by region
9. Current year profit margin vs difference in last year's profit margin
10. Total orders
11. Total revenue
12. Variance to target comparison by category
13. Variance by month line chart
14. Actual sales and target sales matrix
15. Cohort analysis table
16. Customer retention line chart
17. Monthly spending trend
18. Average monthly spend distribution