AdventureWorks

Yearly Report

CoverPage | Overview | Customers | Employees | Products | Promotions | Forecasts | Prospects

Data Source : SQL Server

Data Analyst: Adedotun Adeboye

GENERAL OVERVIEW

Year is 2021

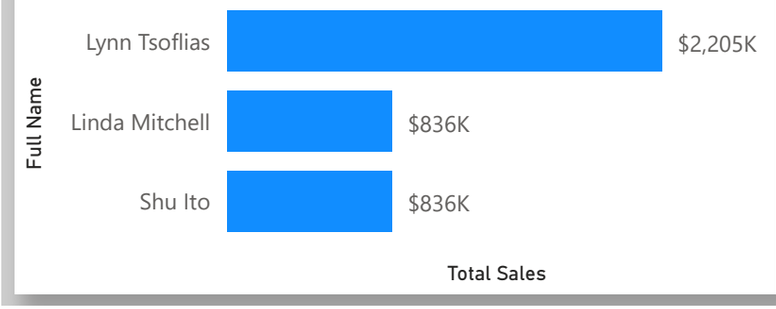
Year: 2021

Category: Accessories, Bikes

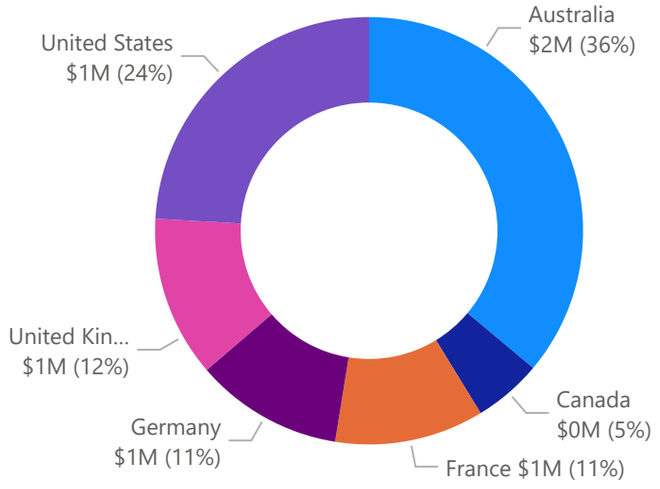
Summary Board

$6,109,407 Total Sales	**$12,600,375** SPLY Sales	**-51.51%** YoY% Growth
$2,538,214 Total Profit	**$5,016,434** SPLY Profit	**-49.40%** YoY% Growth
3953 Total Orders	**3760** SPLY Orders	**5.13%** YoY% Growth
3255 Customers	**2216** SPLY Customers	**46.89%** YoY% Growth
1 Avg Orders	**2** SPLY Avg_Ord...	**-28.43%** YoY% Growth
$1,877 Avg Spend	**$5,686** SPLY Avg_Spend	**-66.99%** YoY% Growth

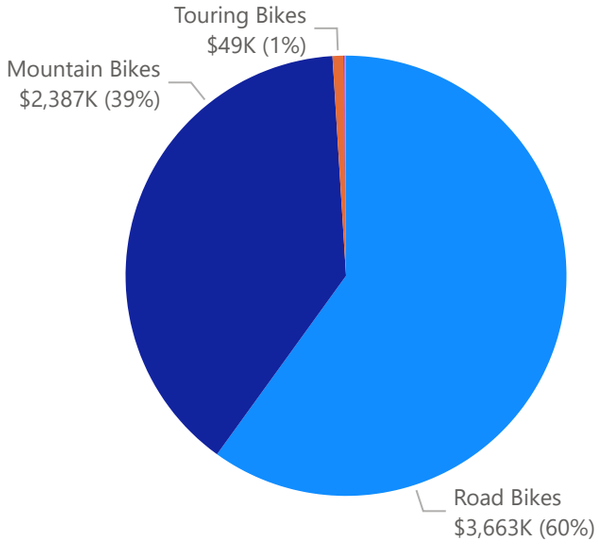
Top 3 Employees By Sales



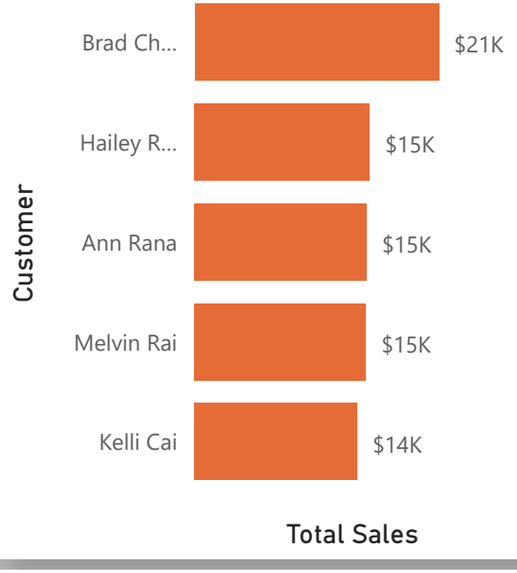
Revenue by Country



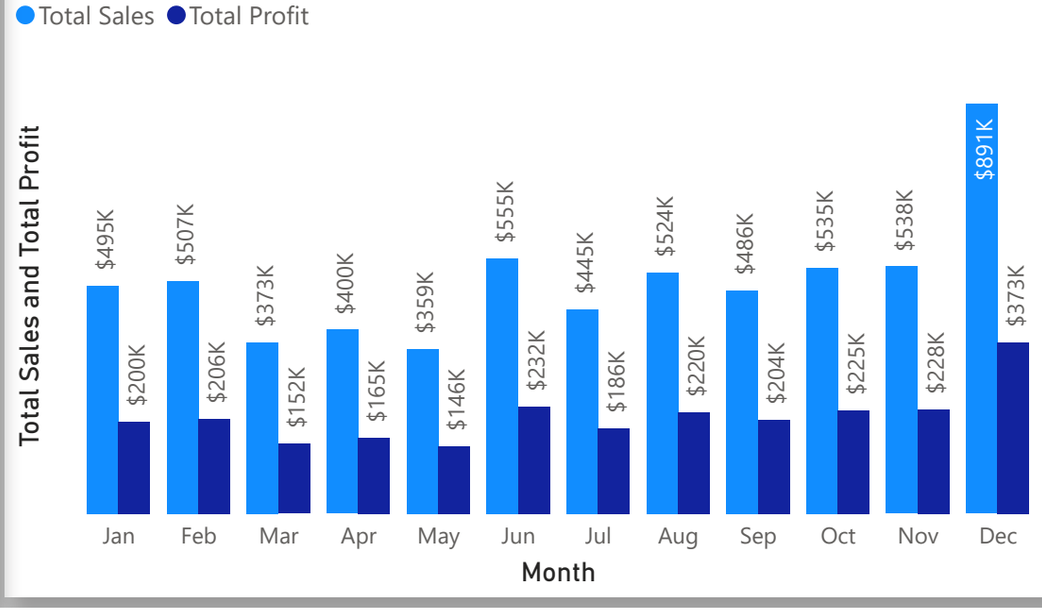
Revenue by Sub-Category



Total 5 Purchasing Customers



Total Sales and Total Profit by Month



CUSTOMERS

7819
No. of Customers

Year: All

Customer Number: All

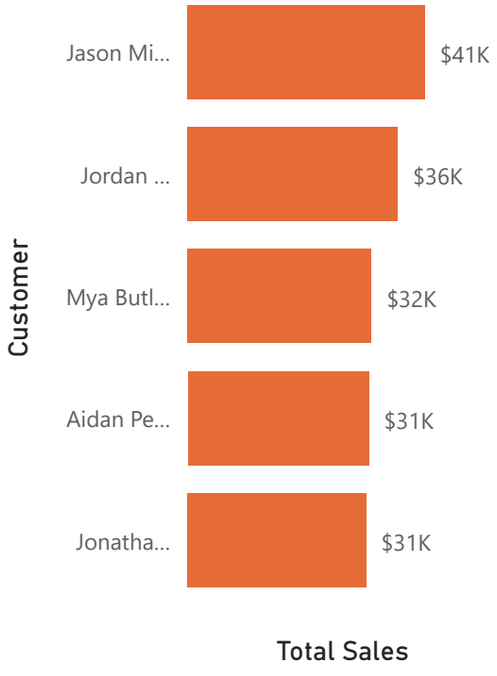
Customer Name: All

Gender: All

Countries

Australia	France	United Kingdom
Canada	Germany	United States

Total 5 Purchasing Customers



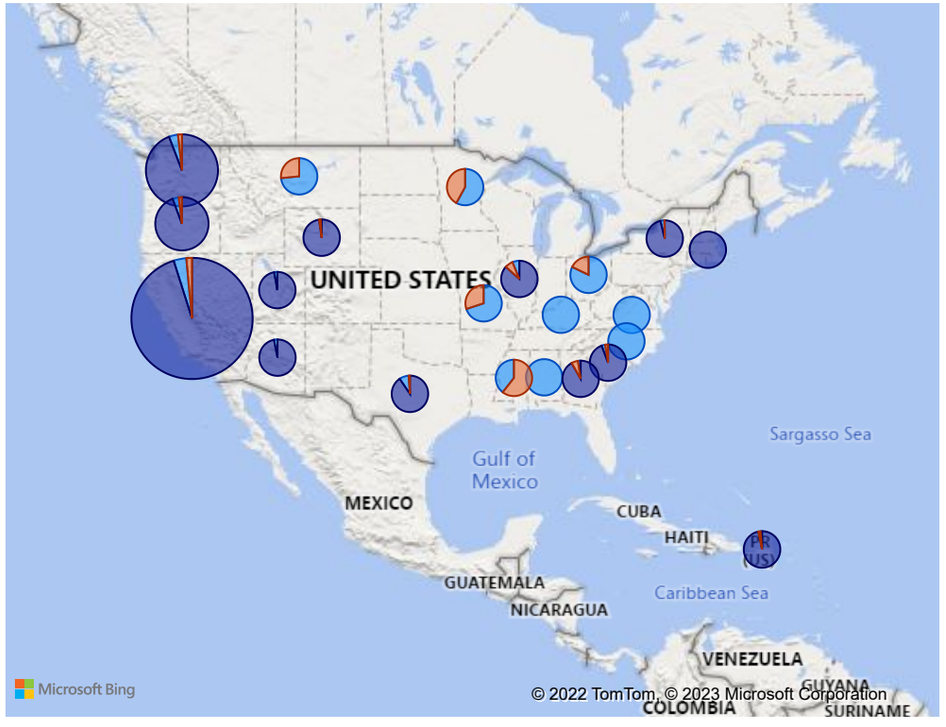
Key influencers | Top segments

What influences Total Sales to Increase ?

When...	....the average of Total Sales increases by
Num Of Children is 0 or less	$17.1K
Customer's Age is 78 or less	$16.69K
Yearly Income is 20000 - 90000	$10.63K
Cars Owned is 1 or less	$10.33K

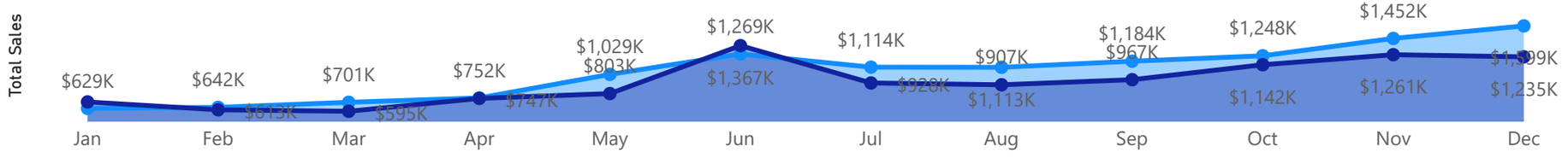
Customer Distribution by State

Category: Accessories, Bikes, Clothing



Purchasing Trend According to Marital Status

Marital Status: Married, Single



EMPLOYEES BOARD

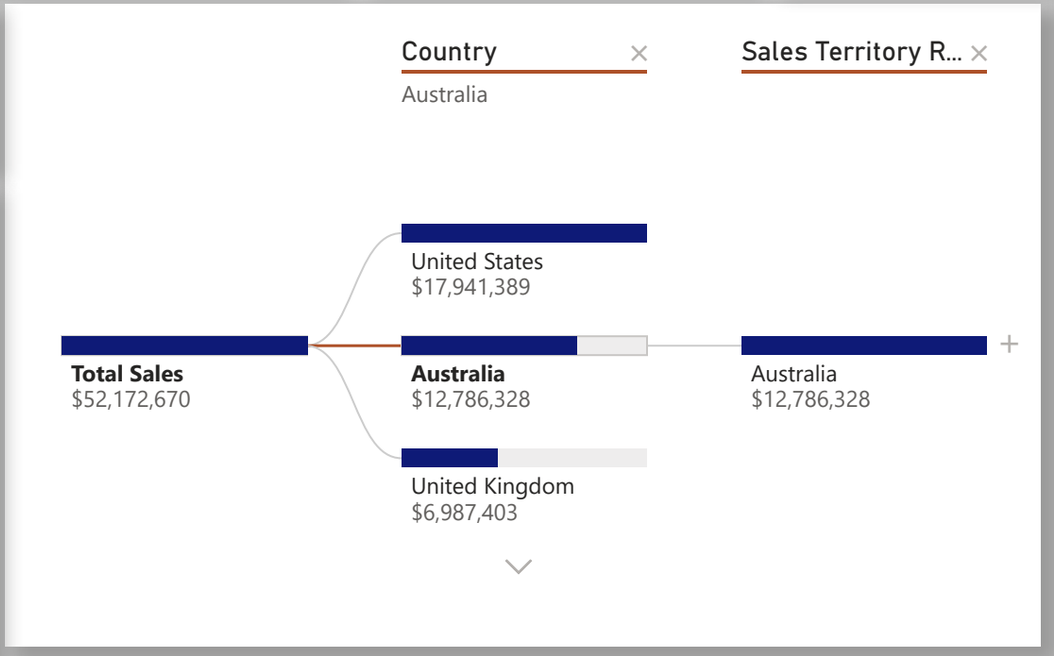
Year is 2022

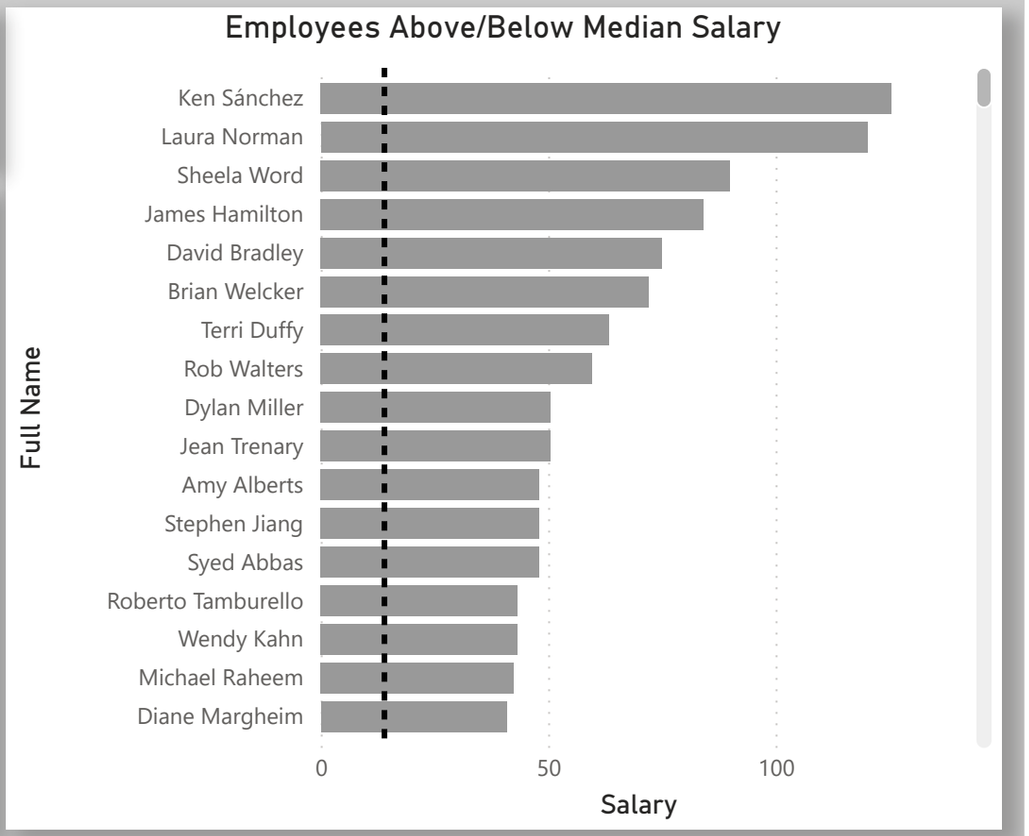
Year
2022

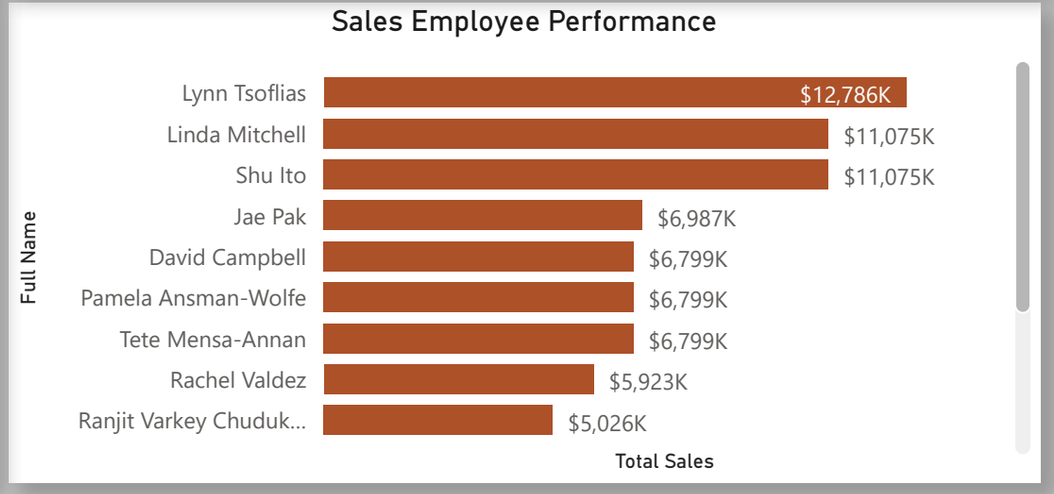
296
Employee Count

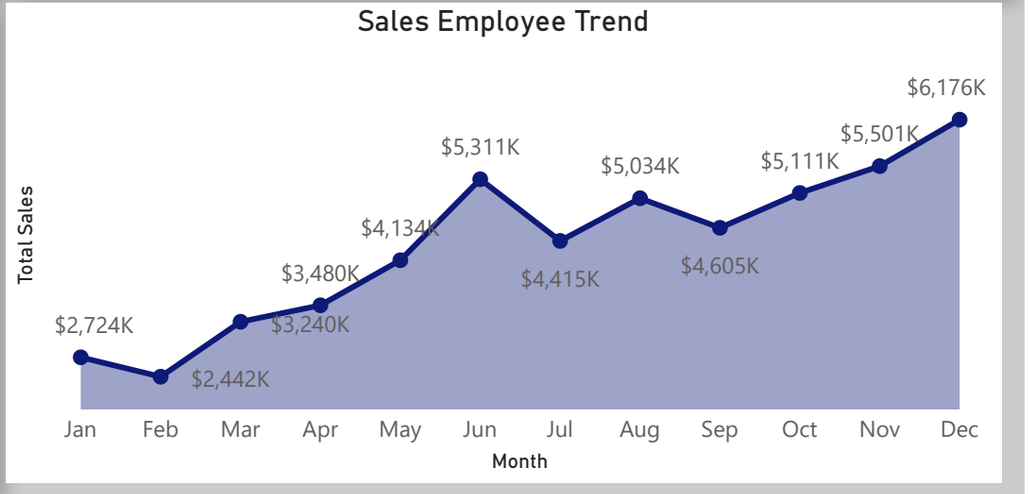
Gender
All

Department
- [ ] Document Cont...
- [ ] Engineering
- [ ] Executive
- [ ] Facilities and M...
- [ ] Finance
- [ ] Human Resourc...
- [ ] Information Ser...
- [ ] Marketing
- [ ] Production
- [ ] Production Con...
- [ ] Purchasing
- [ ] Quality Assuran...
- [ ] Research and D...
- [ ] Sales
- [ ] Shipping and R...
- [ ] Tool Design







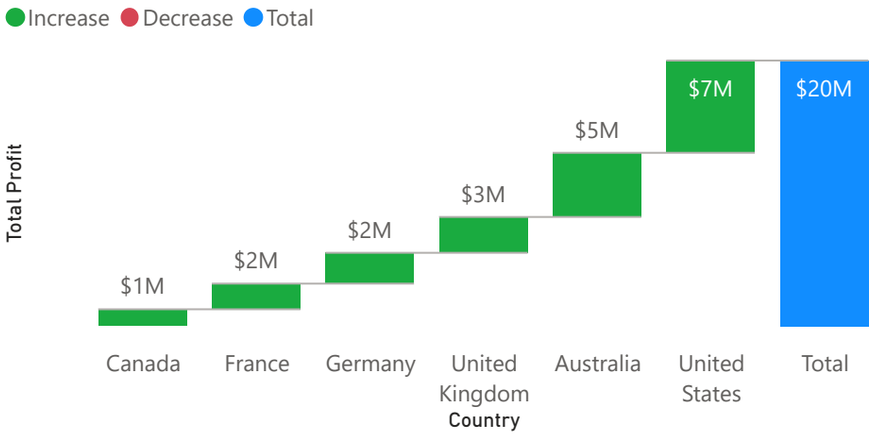


PRODUCTS OVERVIEW

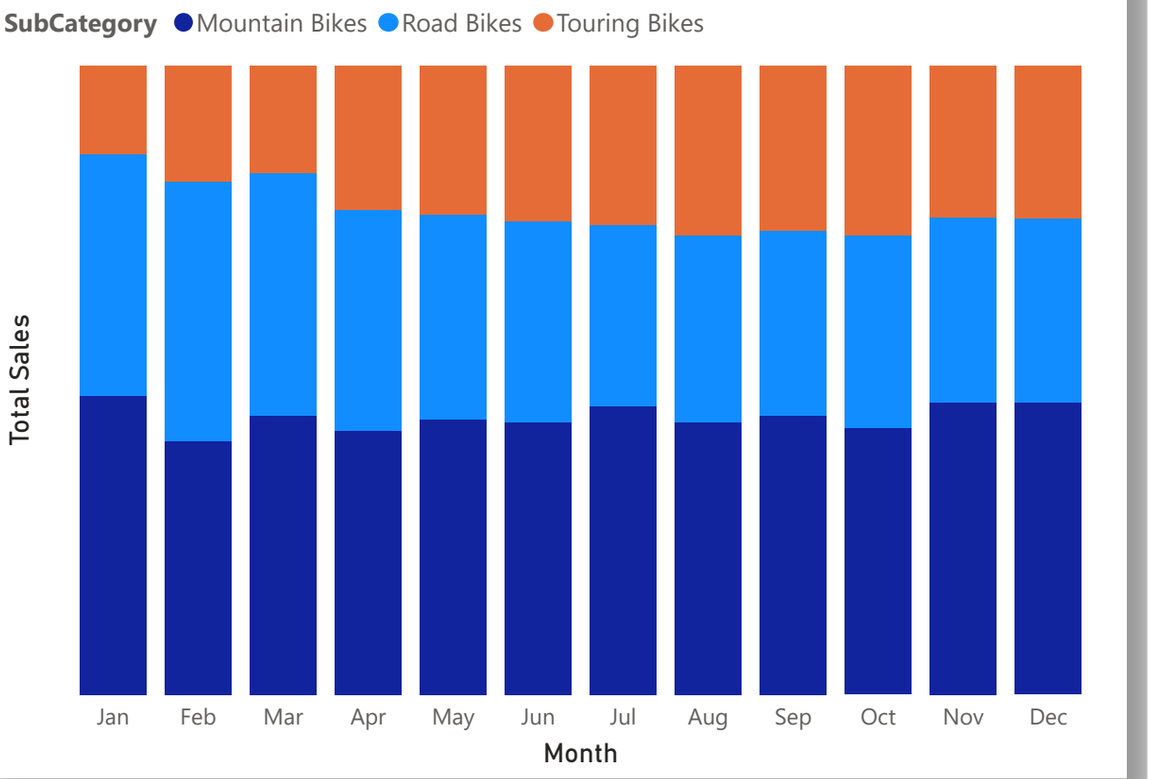
Year
2022

Category
Accessories
Bikes
Clothing

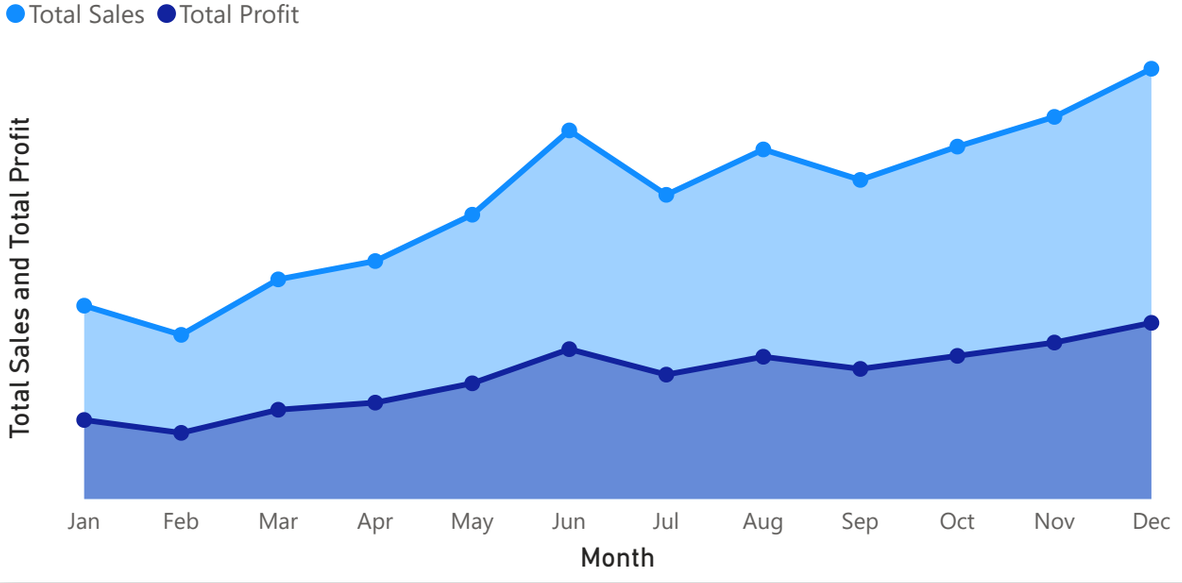
Profit by Country



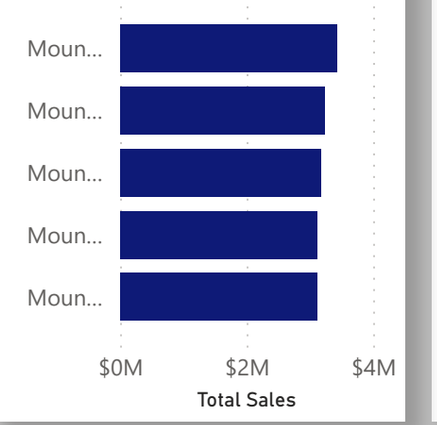
Monthly Revenue by SubCategory



Revenue and Profit Trend by Month



Total 5 Selling Products



SubCategory	Total Sales	Total Prc
Touring Bikes	**$11,582,307**	**$4,382,**
Road Bikes	**$15,642,014**	**$5,687,**
Mountain Bikes	**$21,701,208**	**$9,862,**
Mountain-500 Silver, 52	$111,303	$50,
Mountain-500 Silver, 48	$110,738	$50,
Mountain-500 Silver, 44	$83,619	$38,
Mountain-500 Silver, 42	$92,093	$41,
Mountain-500 Silver, 40	$115,823	$52,
Mountain-500 Black, 52	$97,198	$44,
Total	**$48,925,529**	**$19,932,**

PROMOTIONS

Year: All | Country: All | Promotion Category: All | Promotion Type: All | Promotion Name: All

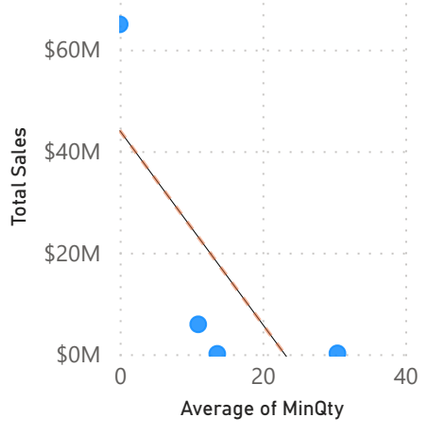
Key influencers | Top segments

What influences Total Sales to Increase ?

When... ....the average of Total Sales increases by

- **Average of MinQty goes down 10.92** → $24.82M
- Average of MaxQty goes down 8.76 → $19.41M
- PercentDiscount goes up 8.47 → $2.73M
- Average of PromotionPeriodInMonths goes down 12.00 → $2.14M

On average when Average of MinQty decreases, Total Sales increases.



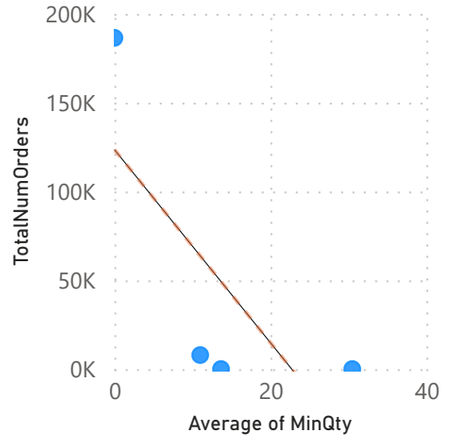
Key influencers | Top segments

What influences TotalNumOrders to Increase ?

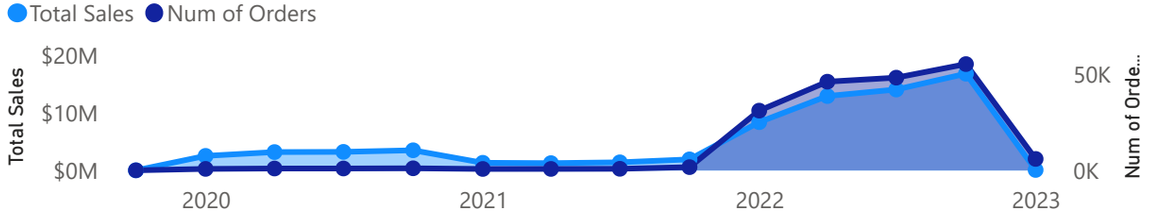
When... ....the average of TotalNumOrders increases by

- **Average of MinQty goes down 10.92** → 76.33K
- Average of MaxQty goes down 8.76 → 59.02K
- PercentDiscount goes up 8.47 → 10.98K
- Average of PromotionPeriodInMonths goes down 12.00 → 9.68K

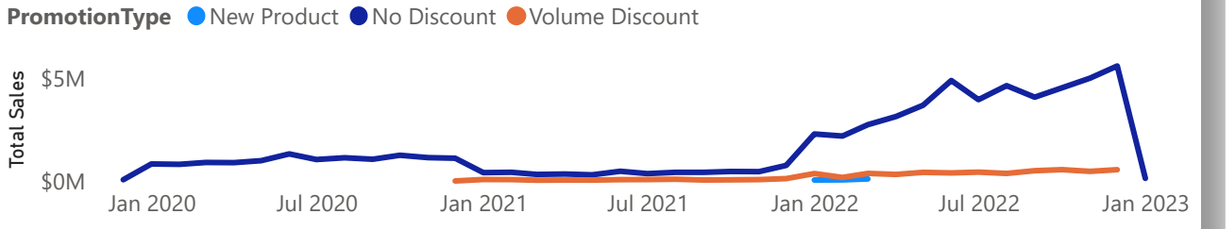
On average when Average of MinQty decreases, TotalNumOrders increases.



Revenue and Number of Orders by Year and Quarter



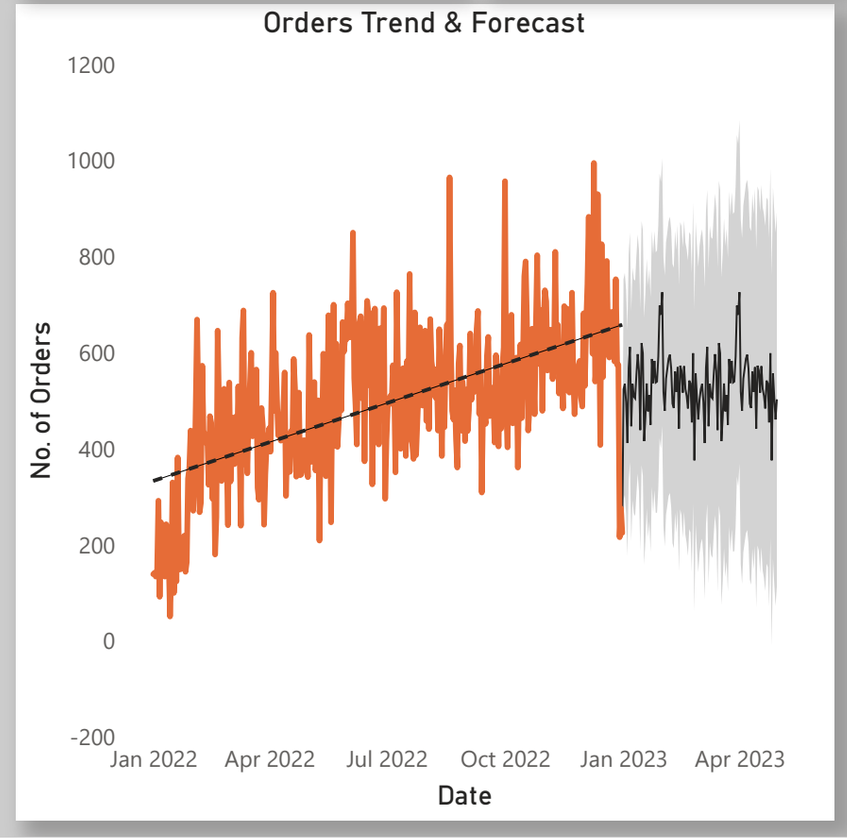
Revenue by Promotion Type

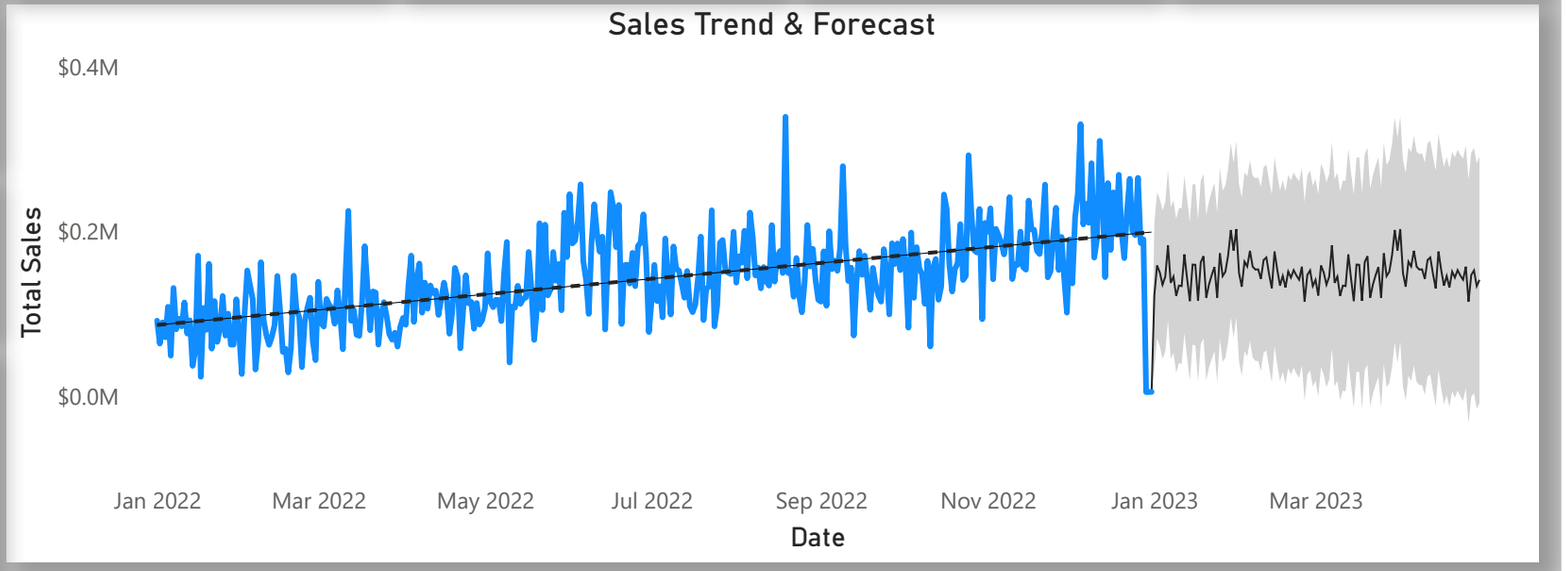


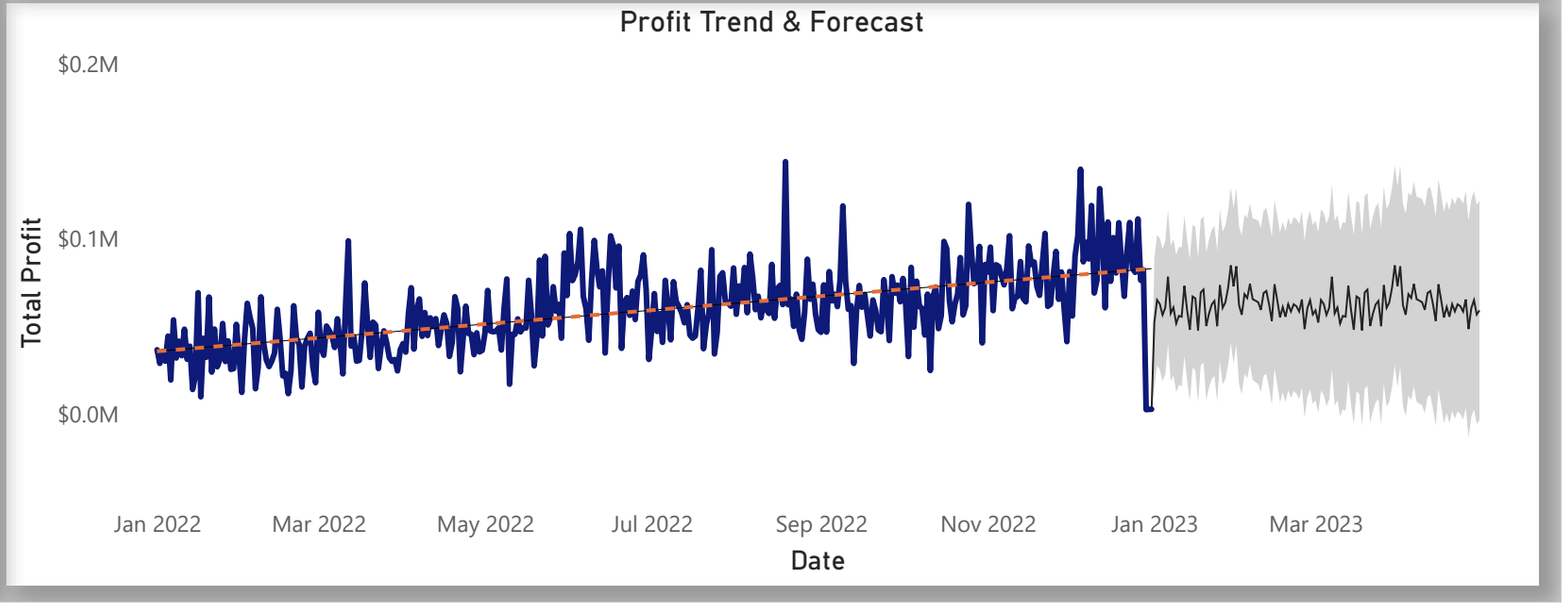
TRENDS & FORECAST

Year is 2022
Country is Australia
State is Alabama
City is Ballard
Category is Accessories
Sub-Category is Bib-Shorts

Year: 2022
Country: All
State: All
City: All
Category: All
SubCategory: All







ANALYSIS OF PROSPECTS

2059
Num of Prospects

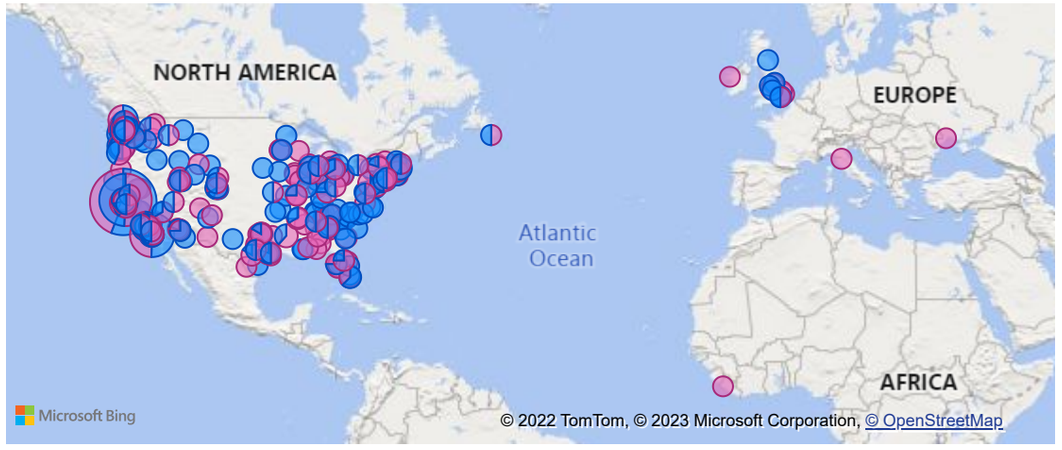
City: All

Age: 33 – 95

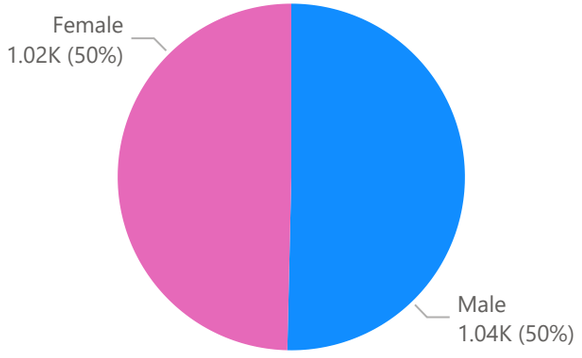
Yearly Income: 10000 – 170000

Prospects by City & Gender

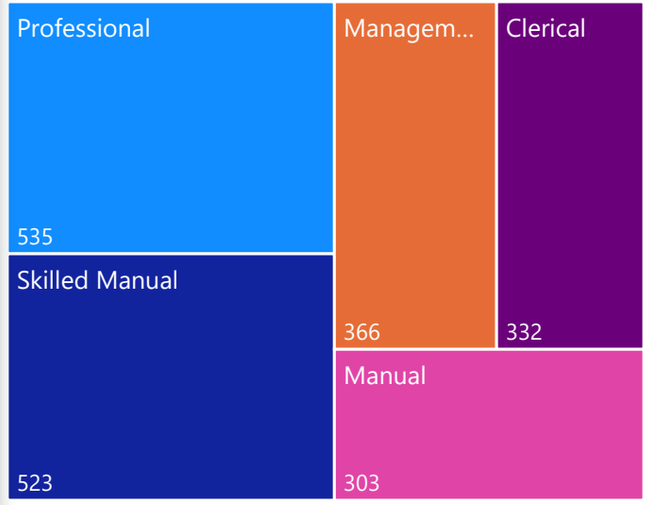
Gender: Female, Male



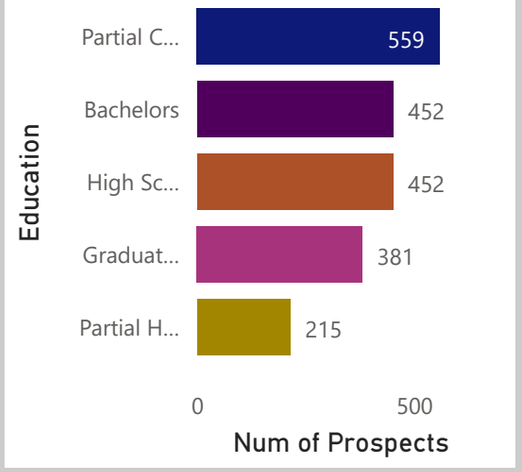
Prospects by Gender



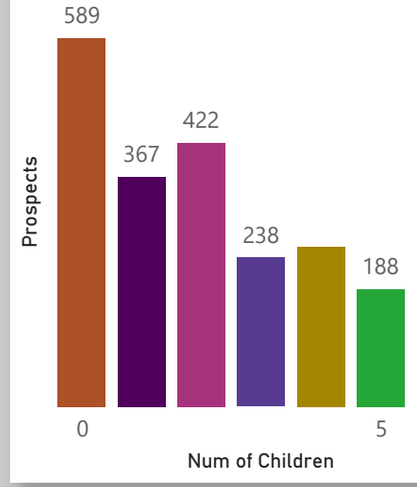
Prospects by Occupation



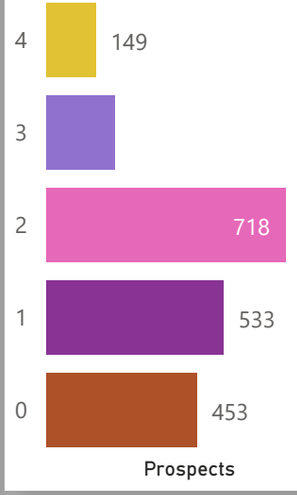
Prospects by Level of Education



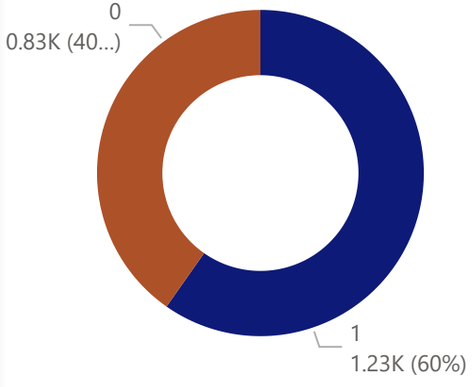
Prospects by Num of Children



Prospects by Cars



Prospects by Num of Houses

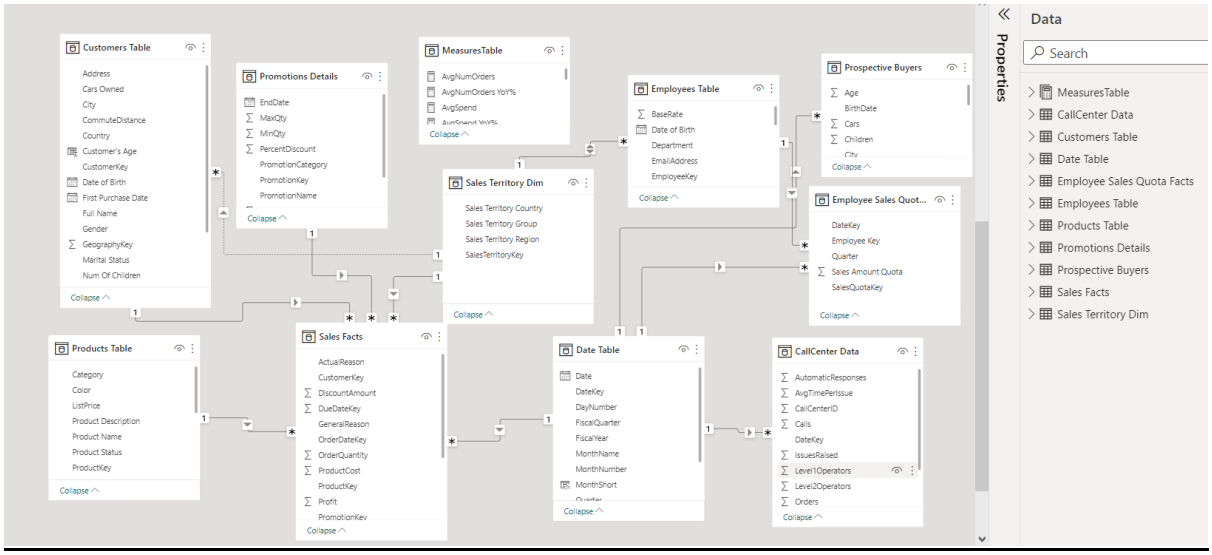


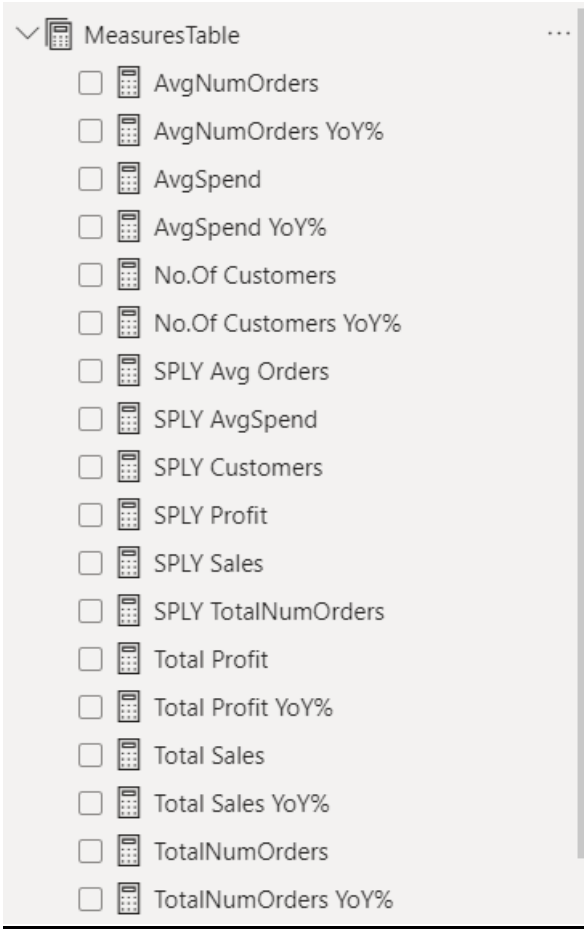
FirstName	LastName	City
Abby	Malhotra	Sedro Woo
Abby	Prasad	Concord
Abby	Rodriguez	Las Vegas
Abby	Srini	Berkeley
Abigail	Brown	Port Orcha
Abigail	Bryant	Edmonds
Abigail	Davis	Saint Ann
Abigail	Flores	Colma
Abigail	Gray	Merritt Isla
Abigail	Hall	Gold Bar
Abigail	Watson	Seattle
Adam	Alexander	Cedar City

BUSINESS DEMANDS

S/N	Role	Demands	Purpose	Criteria
1	Directors & Managers	Report overview of revenue, profit, growth over the years & staff performance.	Performance review, planning, staff re-appraisal and reward purposes	Sensitivity enabled PBI dashboard
2	Sales team	Dashboard Overview of Sales. General sales performance, Customer, products, prospects and promotions analysis. Factors influencing sales as well. Granularity also required.	For targeting, customer acquisition and retention purposes.	PBI Dashboard enabled with daily refresh; alerts and subscriptions
3	Business Development Team	Overview of prospects, trends & Forecasts	Decision Making for innovative purposes	Weekly refresh of Sales PBI dashboard
4	Data Science Team	Overview of trends & forecast Information	Predictions and further analysis	Weekly refresh of PBI dashboard

SNAPSHOT OF 'ADW PROJECT REAL' POWER BI MODEL & TABLES





SNAPSHOT OF SQL CODES

```sql
/***Query for Sales Facts Table***/
SELECT FIS.[SalesOrderNumber]
      ,[ProductKey]
      ,[OrderDateKey]
      ,[DueDateKey]
      ,[ShipDateKey]
      ,[CustomerKey]
      ,[PromotionKey]
      ,[SalesTerritoryKey]
      ,[OrderQuantity]
      ,[UnitPrice]
      ,[UnitPriceDiscountPct] AS 'DiscountPerUnit'
      ,[DiscountAmount]
      ,[ProductStandardCost] AS ProductCost
      ,[TotalProductCost]
      ,[SalesAmount]
      ,([SalesAmount] - [TotalProductCost]) AS 'Profit' /***Added a new column to display the profit for each sale***/
      ,FIR.[SalesReasonKey]
      ,DSR.[SalesReasonName] AS ActualReason
      ,DSR.[SalesReasonReasonType] AS GeneralReason
  FROM [AdventureWorksDW2019].[dbo].[FactInternetSales] AS FIS
  LEFT JOIN [FactInternetSalesReason] AS FIR JOIN [DimSalesReason] AS DSR
  ON SalesOrderNumber = FIR.SalesOrderNumber
  ON FIR.SalesReasonKey = DSR.SalesReasonKey
  ORDER BY FIS.SalesOrderNumber
  /***Merged columns from 2 other Fact tables to make a big fact table so we can have a star schema in our model***/
```

```sql
/***Query For Prospective Buyers Table***/
SELECT [ProspectiveBuyerKey]
      ,[FirstName]
      ,[LastName]
      ,[BirthDate]
      ,DATEDIFF(year, BirthDate, GETDATE())AS Age
      ,CASE MaritalStatus WHEN 'M' THEN 'Married' WHEN 'S' THEN 'Single' END AS 'MaritalStatus'
      ,CASE Gender WHEN 'M' THEN 'Male' WHEN 'F' THEN 'Female' END AS 'Gender'
      ,[YearlyIncome]
      ,[TotalChildren] AS Children
      ,[Education]
      ,[Occupation]
      ,[HouseOwnerFlag] AS Houses
      ,[NumberCarsOwned] AS Cars
      ,[City]
      ,[StateProvinceCode]
      ,[PostalCode]
  FROM [AdventureWorksDW2019].[dbo].[ProspectiveBuyer]
```

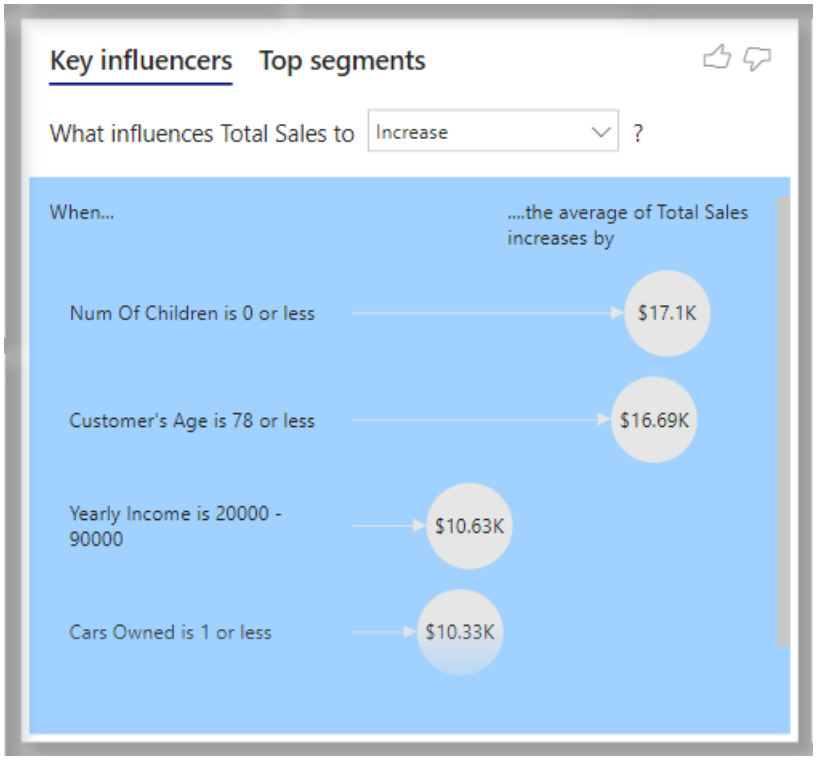
```sql
/***Query For Promotions Table***/
SELECT [PromotionKey]
      ,[EnglishPromotionName] AS PromotionName
      ,([DiscountPct] * 100) AS PercentDiscount
      ,[EnglishPromotionType] AS PromotionType
      ,[EnglishPromotionCategory] AS PromotionCategory
      ,[StartDate]
      ,[EndDate]
      ,DATEDIFF(MONTH,[StartDate], [EndDate]) AS PromotionPeriod
      ,[MinQty]
      ,[MaxQty]
  FROM [AdventureWorksDW2019].[dbo].[DimPromotion]
```

```sql
/***Query for Call Center Table***/
SELECT [FactCallCenterID] AS CallCenterID
      ,[DateKey]
      ,[WageType]
      ,CASE [Shift] WHEN 'AM' THEN 'Morning' WHEN 'PM1' THEN 'Afternoon'
       WHEN 'PM2' THEN 'Evening' WHEN 'midnight' THEN 'Midnight'  END AS 'Shift'
      ,[LevelOneOperators] AS Level1Operators
      ,[LevelTwoOperators] AS Level2Operators
      ,[TotalOperators]
      ,[Calls]
      ,[AutomaticResponses]
      ,[Orders]
      ,[IssuesRaised]
      ,[AverageTimePerIssue] AS AvgTimePerIssue
  FROM [AdventureWorksDW2019].[dbo].[FactCallCenter]
```

STATISTICS TEST

Purpose of this Statistics Test: The statistics test was introduced to either approve or disapprove of the result and prediction given by the key influencer chart in the 'Customer' page of the "ADW Project Real" Power BI report.

Fig1: Sample of the Key Influencers Chart and Analysis



The result stated that Sales tends to increase when:

i. Customers have 0 or no kids (decrease in the number of kids)
ii. Customers own a car or less
iii. Introducing a 3rd value that wasn't tested initially – "Number of houses owned by the customer"

TESTING METHOD

The statistical method used for testing is 'Multiple Linear Regression'

Fig 2: Regression Diagram

Regression

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	Cars, Houses, Children[b]	.	Enter

a. Dependent Variable: V10

b. All requested variables entered.

All the independent variables were approved for analysis

The dependent variable is **"V10" which is "Sales"**

SAMPLE SIZE

A sample representative of the population was extracted from the ADW database in CSV. Format and used for the analysis.

ANALYSIS & RESULTS

Fig 3: Diagram of Model Summary

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.058[a]	.003	.003	926.9240287

a. Predictors: (Constant), Cars, Houses, Children

b. Dependent Variable: V10

Model Summary: The 'R Square' and 'Adjusted R Square' value confirms that we are working with a multiple linear regression method

'R' here is the Multiple Correlation Coefficient and having a value of 58% literally means that the correlation between the dependent and independent variables is moderate.

'R-Squared' also known as 'Coefficient of Variance' represents the proportion of variance in the dependent variable that can be explained by the independent variable. Judging by the value of R Square below, only 3% of the variance in the dependent variable can be explained by the independent variable which happens to be very low or non-existent. Furthermore the remaining 97% variance cannot be explained by the examined independent variables.

However, we cannot conclude until we have seen the remainder of the analysis and the individual sig. values and coefficient analysis for the independent variables.

ANOVA (Analysis of Variance)

Fig 4: ANOVA

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	178050450.20	3	59350150.066	69.077	<.001[b]
	Residual	51889809432	60394	859188.155		
	Total	52067859882	60397			

a. Dependent Variable: V10

b. Predictors: (Constant), Cars, Houses, Children

ANOVA helps to determine if the equation in its entirety is significant or not. The 'Sig.' value seen in the table below shows that the equation and the variables are significant in predicting Sales.

COEFFICIENTS

Fig 5: Coefficient's Table

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients			95.0% Confidence Interval for B	
		B	Std. Error	Beta	t	Sig.	Lower Bound	Upper Bound
1	(Constant)	546.593	8.854		61.735	<.001	529.240	563.947
	Children	-28.929	2.466	-.051	-11.730	<.001	-33.763	-24.095
	Houses	24.460	8.366	.012	2.924	.003	8.061	40.858
	Cars	-15.806	3.416	-.020	-4.627	<.001	-22.501	-9.111

a. Dependent Variable: V10

While ANOVA talks about the whole equation, the coefficient shows us which of independent variables is significant in predicting increase in sales and this is depicted by the sig. value of each independent variable. ***The 'sig.' value for each of the independent variables must be less than 0.05 (<0.05) for it to be classed as significant***

From our 'Coefficients' table above:

- Children is less than 0.05 and hence is significant
- Houses is less than 0.05 and is significant as well
- Cars is less than 0.05 and is significant too
- The constant is less than 0.05 and is significant too

All our independent variables are significant and can help in predicting our dependent variable which is 'Sales'.

The Equation for prediction:

Predicted Sales = (546.593) + (Children*-28.929) + (Houses*24.460) + (Cars*-15.806)

Unstandardized Coefficients

From the results above, all the independent variables "Children, Houses & Cars" can statistically and significantly predict sales. Since all the independent variables are statistically significant and assuming all variables are constant, a corresponding increase in sales can be predicted with a 28.9% decrease in Children owned plus 24.4% increase in home ownership plus 15.8% decrease in car ownership.

Standardized Coefficients

A standard deviation increase in the number of children will result in a standard deviation decrease of 0.051 in sales. A standard deviation increase in the number of houses will result in a standard deviation decrease of 0.012 in sales. A standard deviation increase in the number of cars will result in a standard deviation decrease of 0.020 in sales. This also shows us that the number of children has twice or more impact in predicting sales.

Coefficient Correlations: Judging from the values, we can deduce that none of the independent variables are correlated to one another and this is significant in validating the results.

Coefficient Correlations[a]

Model			Cars	Houses	Children
1	Correlations	Cars	1.000	.129	-.282
		Houses	.129	1.000	-.209
		Children	-.282	-.209	1.000
	Covariances	Cars	11.668	3.697	-2.376
		Houses	3.697	69.997	-4.320
		Children	-2.376	-4.320	6.082

a. Dependent Variable: V10

CONCLUSION

We can safely conclude that the prediction made by the Key Influencers chart in Power BI is correct as it has also been proved by our statistical test. It is therefore safe for the business to go ahead to use this predictions for informed decision making however they deem fit.