

# Bike Metrics: unveiling sales trends

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Databases and Data Visualization project

# Presentation Overview

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- SalesDeveloper.db dataset
- Balanced Scorecard
- Datawarehouse
- Dashboard Application (Tableau visualizations)

# Salesdeveloper.db dataset

employee		product		salesorderheader		address	
EmployeeBusinessEntityID	int	ProductID	int	SalesOrderID	int	AddressID	int
ParentEmployeeBusinessEntityID	int	Name	varchar(50)	RevisionNumber	tinyint unsigned	AddressLine1	varchar(60)
FirstName	varchar(50)	ProductNumber	varchar(25)	OrderDate	datetime	AddressLine2	varchar(60)
LastName	varchar(50)	MakeFlag	tinyint(1)	Status	tinyint unsigned	City	varchar(30)
MiddleName	varchar(50)	FinishedGoodsFlag	tinyint(1)	OnlineOrderFlag	tinyint(1)	PostalCode	varchar(15)
Title	varchar(50)	Color	varchar(15)	SalesOrderNumber	varchar(25)	StateProvinceCode	varchar(3)
SalesTerritoryKey	int	SafetyStockLevel	int	PurchaseOrderNumber	varchar(25)	CountryRegionCode	varchar(3)
HireDate	datetime	ReorderPoint	int	AccountNumber	varchar(15)	IsOnlyStateProvinceFlag	tinyint(1)
BirthDate	datetime	StandardCost	decimal(19,4)	CustomerID	int	StateProvinceName	varchar(50)
EmailAddress	varchar(50)	ListPrice	decimal(19,4)	TerritoryID	int	TerritoryID	int
Phone	varchar(25)	Size	varchar(5)	BillToAddressID	int	CountryRegionName	varchar(50)
MaritalStatus	varchar(1)	SizeUnitMeasureCode	varchar(3)	ShipToAddressID	int		
EmergencyContactName	varchar(50)	WeightUnitMeasureCode	varchar(3)	ShipMethodID	int		
EmergencyContactPhone	varchar(25)	Weight	decimal(8,2)	TaxAmt	decimal(19,4)		
SalariedFlag	tinyint(1)	DaysToManufacture	int	Freight	decimal(19,4)		
Gender	varchar(1)	ProductLine	varchar(2)	LocalCurrency	varchar(3)		
PayFrequency	tinyint unsigned	Class	varchar(2)				
BaseRate	decimal(19,4)	Style	varchar(2)				
VacationHours	int	ProductSubcategoryID	int				
SickLeaveHours	int	ProductModelID	int				
CurrentFlag	tinyint(1)	SellStartDate	datetime				
SalesPersonFlag	tinyint(1)	SellEndDate	datetime				
DepartmentName	varchar(50)	DiscontinuedDate	datetime				
StartDate	datetime						
EndDate	datetime						
Status	varchar(50)						

■ salesorderdetail	
□ SalesOrderID	double
□ SalesOrderDetailID	double
□ ProductID	double
□ SpecialOfferID	double
□ UnitPrice	double
□ OrderQty	double
□ UnitPriceDiscount	double
□ CarrierTrackingNumber	varchar(255)
□ DueDate	datetime
□ ShipDate	datetime

■ productvendor	
□ ProductID	int
□ BusinessEntityID	int
□ AverageLeadTime	int
□ StandardPrice	decimal(19,4)
□ LastReceiptCost	decimal(19,4)
□ LastReceiptDate	datetime
□ MinOrderQty	int
□ MaxOrderQty	int
□ OnOrderQty	int
□ UnitMeasureCode	varchar(3)

■ person	
□ BusinessEntityID	double
□ PersonType	varchar(255)
□ NameStyle	double
□ Title	varchar(255)
□ FirstName	varchar(255)
□ MiddleName	varchar(255)
□ LastName	varchar(255)
□ Suffix	varchar(255)
□ EmailPromotion	double

■ vendor	
□ BusinessEntityID	int
□ AccountNumber	varchar(15)
□ Name	varchar(50)
□ CreditRating	tinyint unsigned
□ PreferredVendorStatus	tinyint(1)
□ ActiveFlag	tinyint(1)

■ customer	
□ CustomerID	int
□ PersonID	int
□ StoreID	int
□ TerritoryID	int
□ AccountNumber	varchar(10)

■ salesterritory	
□ TerritoryID	int
□ Name	varchar(50)
□ CountryRegionCode	varchar(3)
□ Group	varchar(50)

■ salesterritoryhistory	
□ BusinessEntityID	int
□ TerritoryID	int
□ StartDate	datetime
□ EndDate	datetime

■ productsubcategory	
□ ProductSubcategoryID	int
□ ProductCategoryID	int
□ Name	varchar(50)

■ store	
□ StoreID	double
□ StoreName	varchar(255)
□ SalesPersonID	double

■ productcategory	
□ ProductCategoryID	int
□ Name	varchar(50)

■ productmodel	
□ ProductModelID	int
□ Name	varchar(255)

# Balanced Scorecard

Financial Perspective	Customer Perspective	Learning and Growth Perspective	Internal Business Processes Perspective
<p><b>1- Gross Profit Margin</b> by Product Category and by Region</p> <ul style="list-style-type: none"><li>Assess the profitability of different product categories, providing insights into which categories contribute the most to the gross profit margin.</li><li>Measure the profitability of each region by evaluating the percentage of sales retained as gross profit</li><li><b>Formula:</b> <math>(\text{Total Sales} - \text{Total Cost of Goods Sold}) / \text{Total Sales}</math></li></ul> <p><b>2- Average Transaction Value</b></p> <ul style="list-style-type: none"><li>Measure the average value of a transaction. Provide insights into the purchasing behavior of customers and can help identify opportunities to increase the average transaction value</li><li><b>Formula:</b> <math>(\text{Total Sales} / \text{Number of Transactions})</math></li></ul>	<p><b>1- Customer Retention Rate</b></p> <ul style="list-style-type: none"><li>Measure the percentage of customers who continue to make purchases, indicating the effectiveness of customer retention efforts.</li><li><b>Formula:</b> <math>((\text{Number of Repeat Customers} / \text{Total Number of Customers}) * 100)</math></li></ul> <p><b>2- Region Order Frequency</b></p> <ul style="list-style-type: none"><li>Calculate how frequently, on average, an order is placed in each region. This KPI helps in understanding region engagement and loyalty.</li><li><b>Formula:</b> Average number of orders per day per country</li></ul>	<p><b>1- Gender Pay Equity Index</b> by Department</p> <ul style="list-style-type: none"><li>Assess gender pay equity by comparing the average pay for female employees to the average pay for male employees by department. A value close to 100 indicates greater pay equity, while deviations may indicate potential salary gaps.</li><li><b>Formula:</b> <math>(\text{Average Pay for Females} / \text{Average Pay for Males}) * 100</math></li></ul> <p><b>2- Employee Well-being Index</b> by Department</p> <ul style="list-style-type: none"><li>Measure the percentage of total work hours that employees spend on sick leave or vacation. A lower index indicates a healthier work-life balance and potentially higher employee satisfaction.</li><li><b>Formula:</b> <math>((\text{Total Sick Leave Hours} + \text{Total Vacation Hours}) / \text{Total Work Hours}) * 100</math></li></ul>	<p><b>1- Order Fulfillment Cycle Time</b> ↘</p> <ul style="list-style-type: none"><li>Measure the average time it takes for the vendor to fulfill orders, helping assess the efficiency of internal order processing.</li><li><b>Formula:</b> <math>(\text{Average Ship Date} - \text{Order Date})</math></li></ul> <p><b>2- Vendor Credit Rating Index</b></p> <ul style="list-style-type: none"><li>Measure the average credit rating across all vendors. A higher index indicates, on average, better credit ratings among vendors.</li><li><b>Formula:</b> <math>(\text{Average Credit Rating})</math></li></ul>

# Financial Perspective

## 1- Gross Profit Margin by Product Category and by Region

- Assess the profitability of different product categories, providing insights into which categories contribute the most to the gross profit margin.
- Measure the profitability of each region by evaluating the percentage of sales retained as gross profit
- Formula:  $(\text{Total Sales} - \text{Total Cost of Goods Sold}) / \text{Total Sales}$

## 2- Average Transaction Value

- Measure the average value of a transaction. Provide insights into the purchasing behavior of customers and can help identify opportunities to increase the average transaction value
- Formula:  $(\text{Total Sales} / \text{Number of Transactions})$

# Customer Perspective

## 1- Customer Retention Rate

- Measure the percentage of customers who continue to make purchases, indicating the effectiveness of customer retention efforts.
- Formula:  $((\text{Number of Repeat Customers} / \text{Total Number of Customers}) * 100)$

## 2- Region Order Frequency

- Calculate how frequently, on average, an order is placed in each region. This KPI helps in understanding region engagement and loyalty.
- Formula: Average number of orders per day per country

# Learning and Growth Perspective

## 1- Gender Pay Equity Index

- Assess gender pay equity by comparing the average pay for female employees to the average pay for male employees. A value close to 100 indicates greater pay equity, while deviations may indicate potential salary gaps.
- Formula:  $(\text{Average Pay for Females}/\text{Average Pay for Males}) \times 100$

## 2- Employee Well-being Index

- Measure the percentage of total work hours that employees spend on sick leave or vacation. A lower index indicates a healthier work-life balance and potentially higher employee satisfaction.
- Formula:  $((\text{Total Sick Leave Hours} + \text{Total Vacation Hours})/\text{Total Work Hours}) \times 100$

# Internal Business Processes Perspective

## 1- Order Fulfillment Cycle Time



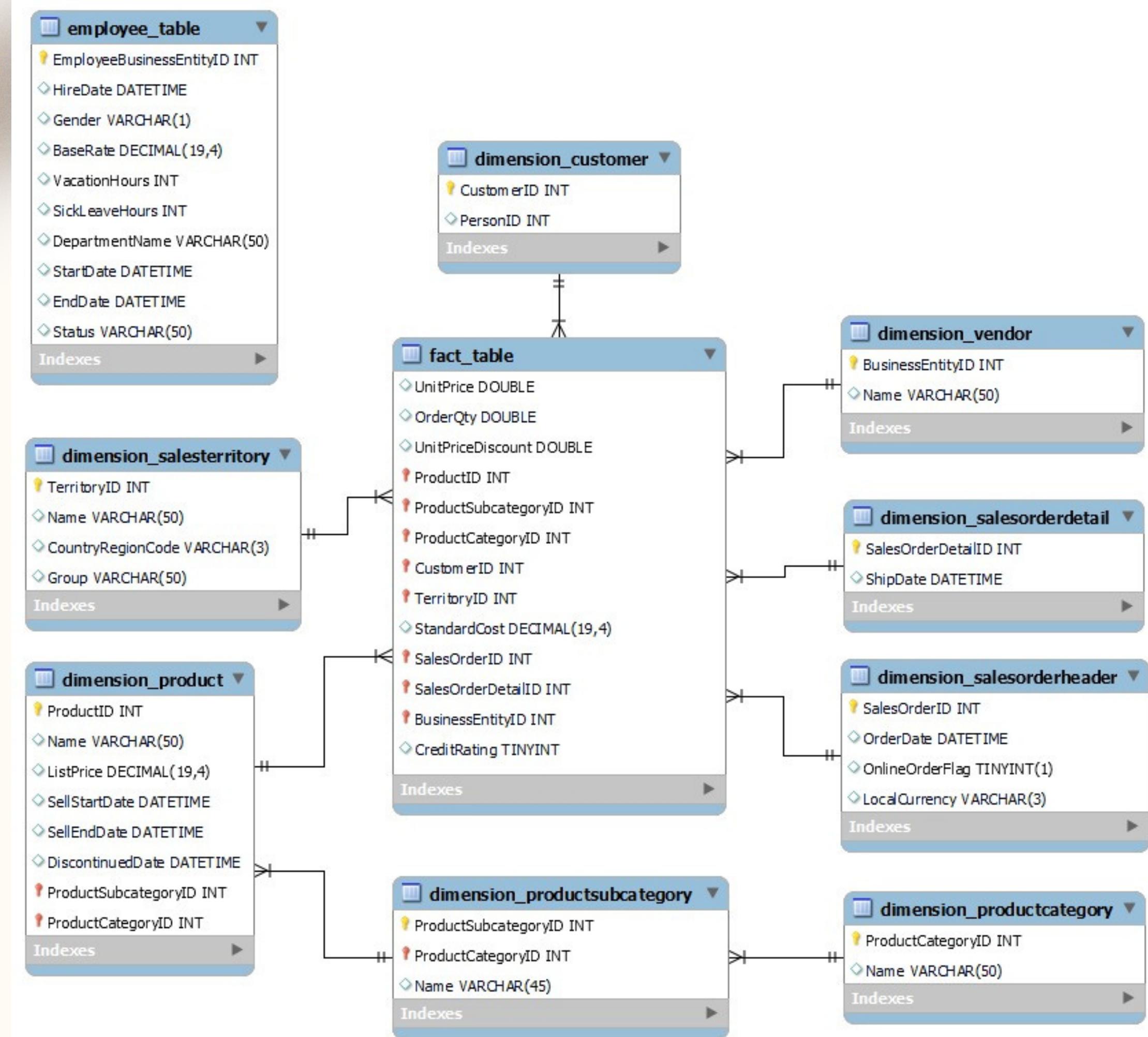
- Measure the average time it takes for the vendor to fulfill orders, helping assess the efficiency of internal order processing.
- Formula:  $(\text{Average Ship Date} - \text{Order Date})$

## 2- Vendor Credit Rating Index

- Measure the average credit rating across all vendors. A higher index indicates, on average, better credit ratings among vendors.
- Formula:  $(\text{Average Credit Rating})$

# Data Warehouse

# Snowflake Schema



# **Tableau Dashboard & Business Recommendations**

# Financial Perspective

## Gross Profit Margin per Region

- Explore strategies for improvement in **North America**:
  - Evaluate and Optimize cost structures
  - Implement targeted pricing strategies to enhance profitability
  - Explore operational efficiencies to reduce expenses
- Maintain and Capitalize on the highest gross profit margins in **Australia**.

## Gross Profit Margin per Product Category

- Leverage the success in **Accessories** to inform pricing and marketing strategies.
- Evaluate pricing and cost structures for potential Optimizations in **Bikes and Components**.

## Average Transaction Value

- **US Market:** Maximize high values by introducing premium offerings and/or implementing targeted upselling.
- **AU Market:** Optimize transaction size by evaluating pricing strategies and/or implementing promotions for larger transactions.

# Customer Perspective

## Customer Retention Rate

- **AU Market (High)**: Strengthen loyalty programs and personalized marketing. Replicate successful strategies from the highest repeat customer base.
- **US Market (Strong)**: Enhance customer engagement initiatives and consider additional loyalty incentives for repeat customers.
- **FR and DE Market (Low)**: Investigate causes for lower repeat customer rates. Customer surveys and feedback sessions could help understand customer expectations and preferences.

## Region Order Frequency

- **US Market (High)**: Optimize inventory and explore fast delivery options to capitalize on high order frequency.
- **AU Market (Moderate)**: Implement targeted marketing and promotions to encourage increased order frequency.
- **FR and DE Market (Low)**: Tailor marketing strategies to address customer needs and preferences.

# Learning and Growth Perspective

## Gender Pay Equity Index

- **Production Control and Quality Assurance:** Investigate and rectify gender pay disparities, and ensure inclusion and equity in these departments.
- Improvement focus: Correct gender pay disparities in **Department Control, Facilities and Maintenance, and Shipping and Receiving.**

## Employee Well-being Index

- Identify and address factors contributing to the lowest well-being index in the **Production department.**
- Continue efforts to maintain and improve well-being in **Engineering and Executive** departments.

# Internal Business Processes Perspective

## Order Fulfillment Cycle Time

- Analyze the order fulfillment process in **Germany** to identify best practices. Share and implement their practices globally.
- Identify and address bottlenecks to streamline order fulfillment in **North America**.

## Vendor Credit Rating Index

- Strengthen partnerships with high-rated vendors such as **Victory Bikes** and **Merit Bikes**. Explore opportunities for collaboration, bulk purchasing, or exclusive arrangements.

# Q&A Session

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Thank you for listening!