

"A Cutting-Edge Platform to Drive Economic Transformation"

OIC BUSINESS INTELLIGENCE CENTRE (OBIC)

Workshop on Fundamentals of Business Intelligence (BI) Jeddah, Saudi Arabia (20-22 March 2023)



Fundamentals of Business Intelligence - Objectives

What is Business Intelligence?



Answer what is BI and is it the same as Data Science?

Data Visualization Concepts

Learn terms used in visuals +17% and dashboards.

Common Data Concepts



Understand data types and data storage basics.



Learn the role that forms part of a BI Team.



Learn the purpose of telling



Learn how BI joins data efficiently.

| X |
|---|
| |
| |

Examples of the most popular BI tools.



Creative visuals with a clear purpose and message.



Explore the basics of metrics and functions.

Learn how BI serves the needs of a business.



Recognize well and badly designed visuals.



Explain what exactly is a data model.



Fundamentals of Business Intelligence

What is Business Intelligence?



What is Business Intelligence?

Business intelligence is the practice of turning data into actionable insights.



Actionable insights allow business leaders to change or maintain a course of action.



Is BI the same as Data Science?



Typical Questions

How many loans did we issue compared to last year?

Which category delivered the highest margin in Q4?

Key Skills

Basic Stats Data Transformation Data Visualization Business Knowledge

Typical Questions

Can we predict which customers are likely to default on loans?

Can we suggest relevant movies that a user will like, based on their previous choices?

Key Skills

Coding Data Mining Advanced Stats Domain Knowledge





What will happen or which outcome is most likely?



Categories of Business Intelligence Analysis

There are three major types of BI analysis, which cover many different needs and uses. These are predictive analytics, descriptive analytics, and prescriptive analytics.

Predictive Analytics

Takes historical and real-time data and models future outcomes for planning purposes

Descriptive Analytics

It is the process of identifying trends and relationships in data using historical and current data

Prescriptive Analytics

It takes all relevant data to answer the question, "what should my business do?"



Advantages and Disadvantages of Business Intelligence

Advantages

- Data Visibility and Clarity
- Accurate Reports
- Streamlined Processes
- Increased Efficiency
- Better Customer Experience
- Improved Employee
 Satisfaction

Disadvantages

- Initial Cost
- User Resistance
- Data Skills Gap



Fundamentals of Business Intelligence

Business Intelligence Platforms and Dashboards



Business Intelligence Platforms and Dashboards

| Business Intelligence Platforms | Business Intelligence Dashboards |
|---|--|
| Intuitive to use Variety of dashboard and visualization options Smart Insights Alerts for good and bad metrics Built-in artificial intelligence (AI) Deployment flexibility Integration with other platforms and applications Data connectivity Embedding in business application | Interactivity Real-time Data Customizable interface Standard templates Sharing ability |
| | |



Fundamentals of Business Intelligence





BI - Roles and Processes





Business Intelligence – Process and Roles



The Data Analyst



The Data Analyst



Data analysts are responsible for building data models and metrics, which facilitate analysis and visualization.



Extract, Transform & Load

- Import data from Excel files, CSV files and databases
- Transform data into desired format
- Load data into models



Create Models

- Combine tables to create **data models** that link related data
- Set up automated refreshes

Calculate Metrics

- X+Y= Write formulas to calculate business performance
 - Understand the data structure

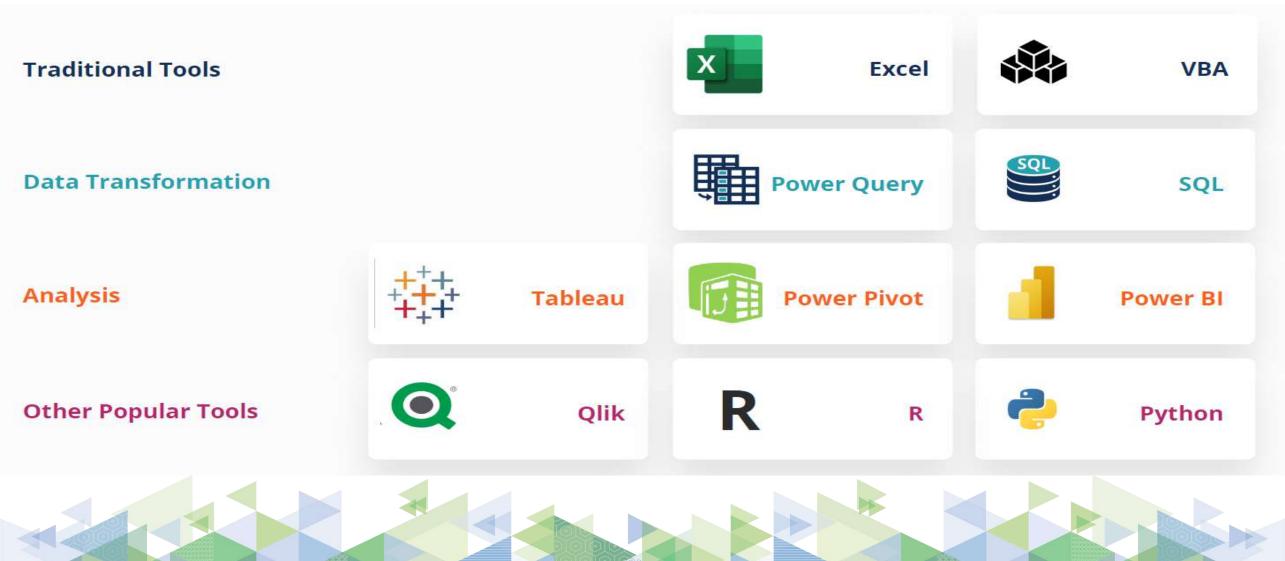


Documentation

- Document data models for other analysts.
- Document metric definitions using a data dictionary.



The Data Analyst - Common Tools





Business Intelligence – Process and Roles



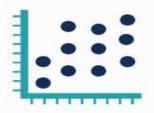
The Data Visualization Specialist



The Data Visualization Specialist



Data visualization specialists focus on turning clean data into visuals that help communicate a message or help answer a specific question.



Create Visuals

- Focus on one or a few metrics
- Highlight key data points or trends



Dashboarding

- Combine multiple visuals
- Tell a story using data & visuals
- See detail, identify root causes



Communicating Results

- Present to audiences
- Ensure consistency
- Manage audience permissions



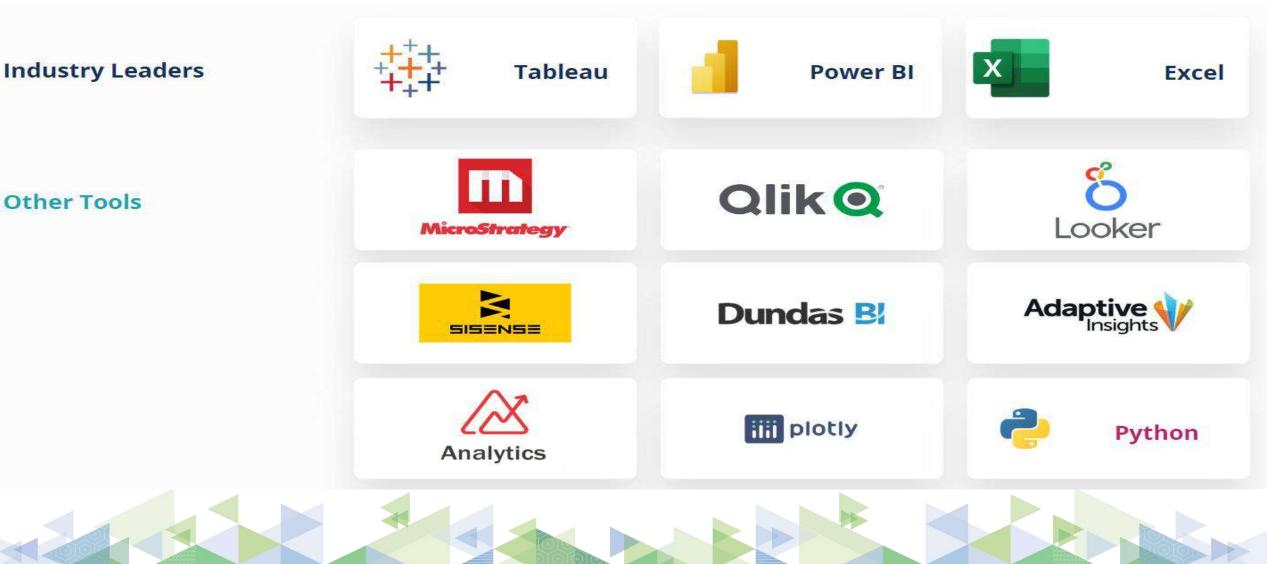
Audience Feedback

- Improve definitions
- Avoid uncertainty
- Make reports clearer



Data Visualization - Common Tools

Other Tools





Business Intelligence – Process and Roles



The Business Leader



The Business Leader



Business leaders are the main audience of business intelligence reports and dashboards. They are also key to guiding our data and analysis strategy.



Decision Making

- Maintain course of action
- Change course of action

Bad Example

"Could you run the sales and inventory report for me for September?"

Communicate

- Ask questions that highlight priorities
- Questions should engage thought
- Avoid transactional questions

Good Example

"Our warehousing costs are too high. I need to understand which products have the lowest turnover rate."



Business Intelligence – Process and Roles



The Data Engineer



The Data Engineer



Data engineers source, organize and move data between systems. They can also be involved in decisions about data storage and infrastructure.



Extract, Transform & Load

- Move data between systems
- Automate data feeds



Create Data Warehouses

- Store all business data
- Optimized for analysis
- Everything accessible in one place



Data Systems Knowledge

- Understand data structures
- Help analysts avoid issues



Data Governance

- Ensure the security of data
- Ensure data integrity



Types of Data Systems

Optimized for computers

Optimized for human analysis



OLTP

Optimized to Enter, Modify, Delete and Read data.



Data Warehouse

- Combines data from multiple sources.
- Optimized for analysis and human interaction.



Data Mart

Small data warehouses used for a specific project or team.



- Stores raw data in original format.
- Can store both structured data like tables and lists
- as well as **unstructured** data like emails and phone conversations.



SQL in a Nutshell

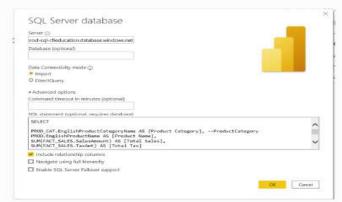
 SQL is a query language used to fetch data from a database.



- SQL stands for Structured Query Language.
- SQL is designed to be easy to read and write.
- An understanding of SQL will set you apart from dashboard focused BI analysts.

SQL can be used in many different environments

| connections | 🚅 Websere | 🗯 iGiGuery, 7 - prod-s. Ullerd | • = 9000 | lawry_4 - provident_liter | 14 | A | В | C | D | E |
|--|---|---|-----------------|--|-------|--------------------|--------------------------------------|-------------|-----------|---|
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Data Warehouse

| Transactio | DB | | |
|------------|------------|-------------|---------|
| Order ID | Product ID | Category ID | Revenue |
| 7 | 1 | А | 25,995 |
| 8 | 2 | В | 42,495 |
| 9 | 3 | А | 26,500 |

| Product Table DB2 | | | | | |
|-------------------|---------|--|--|--|--|
| Product ID | Product | | | | |
| 1 | Megane | | | | |
| 2 | F-150 | | | | |
| 3 | Focus | | | | |

Product Table



| Category ID | Category |
|-------------|----------|
| A | Car |
| В | Truck |

Transaction Table

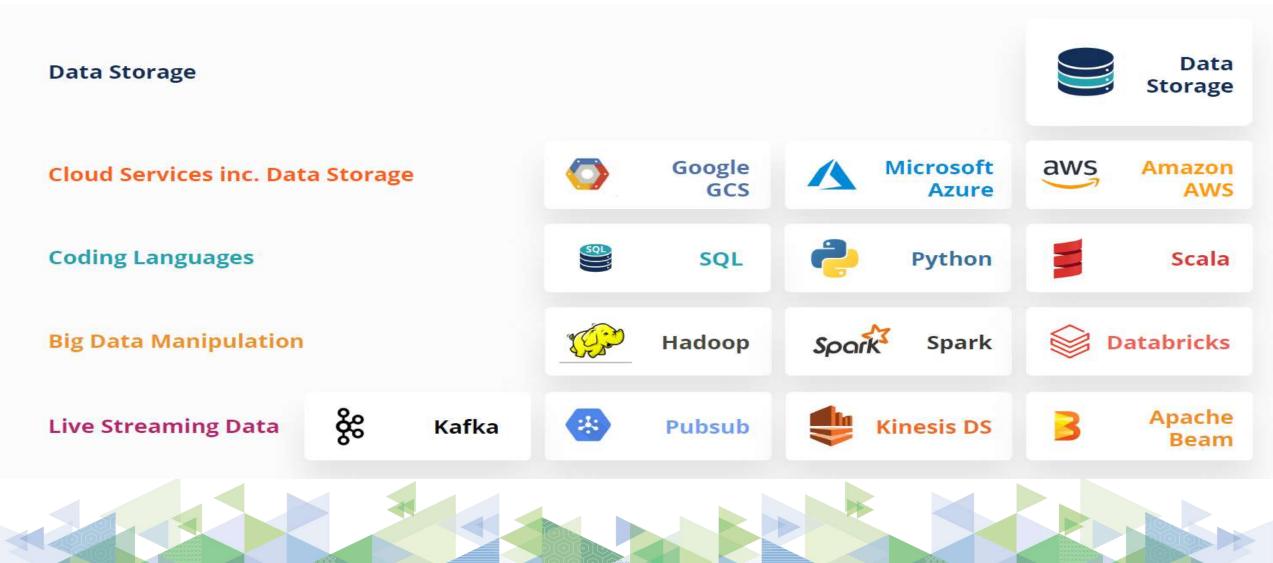
| Order ID | Product ID | Category ID | Revenue | \geq | Product ID | Product | Category |
|----------|------------|-------------|---------|--------|------------|---------|----------|
| 7 | 1 | А | 25,995 | | 1 | Megane | Car |
| 8 | 2 | В | 42,495 | | 2 | F-150 | Truck |
| 9 | 3 | А | 26,500 | | 3 | Focus | Car |

Benefits

- Combines and links data from different sources in one accessible database. •
- Organized by **semantic** groups, that bring together related data into simple tables. •



Data Engineer – Common Tools



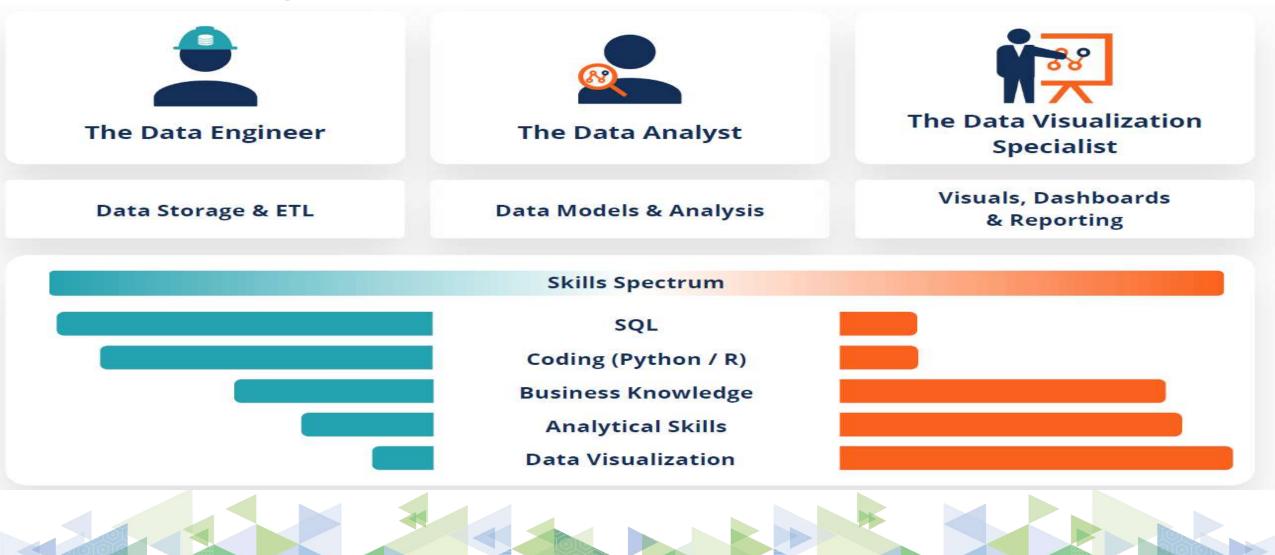


Business Intelligence Roles Recap





Business Intelligence Team Skills





Business Intelligence Team Skills





Responsibilities, skills and tools are likely to be shared across roles.





Fundamentals of Business Intelligence

Communicating with Data



Visuals vs. Dashboards

A visual represents a single table, chart or diagram.

A dashboard brings together several related charts to tell or story about the selected data.

| | StoreID | | State | | Top Product Groups By Sa | les \$ USD | | | |
|----------------------|-------------------|-------|----------------|---------------------------------|--|----------------------------------|---------------|--|--|
| Clothing | 36 | ~ | All | \sim | Group & Dept | Sales | Sales Share % | Sales YoY Growth % | Sales YoY Growth \$ |
| Electronics | | | 1.11 | | Books: Other | 2.012.737 | 22.3% | -12.479 | -286.715.00 |
| Garage | StoreType | e | | 2 | Assorted Food: Other | 1.191.618 | 13.2% | -37.849 | -725.399.52 |
| Kitchen | 227 | ~ | | 5 | Appliances: Kitchen | 1.078.008 | 12.0% | -11.75% | -143,506.88 |
| Other | All | × | | - | Kitchens: Kitchen | 961,183 | 10.7% | 4.70% | 43.145.52 |
| Top Performing Produ | of Groups Dups T | Ima | | | Womens: Clothing | 659,638 | 7.3% | | |
| top reitonning Prou | ter broups over 1 | une | | | Bicycle Storage: Garage | \$10,904 | 6.8% | | |
| | | | | Department | Garden Appliances: Other | 538,991 | 6.0% | | |
| | | | | Clothing | Girls: Clothing | 483,228 | 5.4% | | |
| | | | | Electronics | Car Tires: Other | 459.822 | 5,1% | | |
| | | | | Garage | Blankets: Other | 321.009 | 3.6% | -18.349 | |
| | | | | | Total | 8,317,138 | 92.3% | -16.63% | -1,659,343.88 |
| | | | | Kitchen | | | | | |
| 1.28M | 1.23M | 1.12M | | | Worst Performing Produc Group & Dept | Contraction of the second second | | es YoY Growth % Sa | ales YoY Growth \$ |
| | | 1.12M | 1.01M | | 88Q: Other | | | -100.00% | -667.00 |
| | | | | | DOCE OTHER | | 0.001 | -102.23% | |
| | | | | | Infante: Clothing | | | | |
| | | | | | Infants: Clothing Gadgets: Kitchen | -11 | -0.0% | | -498.54 |
| | | | | | Gadgets: Kitchen | -11 | -0.0% | -100.00% | -118.84 |
| 0.57M | | | | | | -11 | -0.0% | -100.00% -100.00% | -118.84 -116.00 |
| 0.57M | 0.52M | 0.49M | 0.48M | | Gadgets: Kitchen Dishware: Kitchen Seasonal Gifts: Other | | | -100.00% -100.00% -132,39% | -118.84 -116.00 -113.11 |
| 0.57M | 0.52M | 0.49M | 0.48M | | Gadgets: Kitchen Dishware: Kitchen | -28 | | -100.00% -100.00% | -118.84 -116.00 |
| | | 0.49M | | | Gadgets: Kitchen Dishware: Kitchen Seasonal Gifts: Other Desktops: Electronics | -28 | | -100.00% -100.00% -132.39% -100.00% | -118.84 -116.00 -113.11 -82.00 |
| 0.57M 0.42M | 0.52M | 0.49M | 0.48M 0,36M | | Gadgets: Kitchen Dishware: Kitchen Seasonal Gifts: Other Desktops: Electronics Cleaning Products: Kitchen | -28 | | -100.00% -100.00% -132.39% -100.00% -100.00% | -118.84 -116.00 -113.11 -82.00 -7.00 |
| 0.42M | 0.37M | 0.36M | 0,36M | | Gadgets: Kitchen Dishware: Kitchen Seasonal Gifts: Other Desktops: Electronics Cleaning Products: Kitchen Misc: Electronics | -28 | | -100.00% -100.00% -132.39% -100.00% -100.00% -100.00% | -118.84 -116.00 -113.11 -82.00 -7.00 |
| | | | | | Gadgets: Kitchen Dishware: Kitchen Seasonal Gifts: Other Desktops: Electronics Cleaning Products: Kitchen Misc: Electronics Bicycles: Garage | -28 | | -100.00% -100.00% -132.39% -100.00% -100.00% -100.00% -100.00% | -118.84 -116.00 -113.11 -82.00 -7.00 |

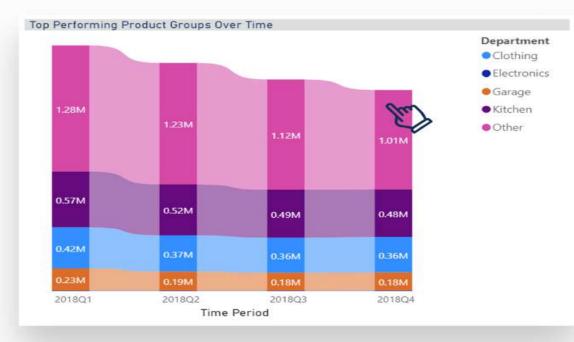


What is a Data Story?

Provides more detail on the current data, over time, across categories or locations.

Helps identify the actual or forecasted consequences of the current data.

Helps identify the root causes of an issue or success.



| Group & Dept | Sales | Sales Share % | Sales YoY Growth % | Sales YoY Growth \$ |
|--------------------------|-----------|---------------|--------------------|---------------------|
| Assorted Food: Other | 1,191,618 | 25.7% | -37.84% | -725,399.52 |
| Books: Other | 2,012,737 | 43.3% | -12.47% | -286,715.00 |
| Car Tires: Other | 459,822 | 9.9% | -21.26% | -124,142.50 |
| Blankets: Other | 321,009 | 6.9% | -18.34% | -72,117.06 |
| Photo Services: Other | 114,817 | 2.5% | -22.75% | -33,808.15 |
| Garden Appliances: Other | 538,991 | 11.6% | -4.94% | -28,008.94 |
| BBQ: Other | | | -100.00% | -667.00 |
| Seasonal Gifts: Other | -28 | -0.0% | -132.39% | -113.11 |
| Misc: Other | | | -100.00% | |
| Car Wash: Other | | | -100.00% | 0.00 |
| Total | 4,638,967 | 99.9% | -21.51% | -1,270,971.28 |



Chart Types



The **best chart is often the simple one** that communicates a message with absolute clarity.



Focusing Attention



Charts are used to answer questions, so make sure the answers are clear.



Good vs. Bad Visuals



You are the FP&A manager for a large department store.



Each week, you have a meeting to focus on the performance of one departments.

Key Questions

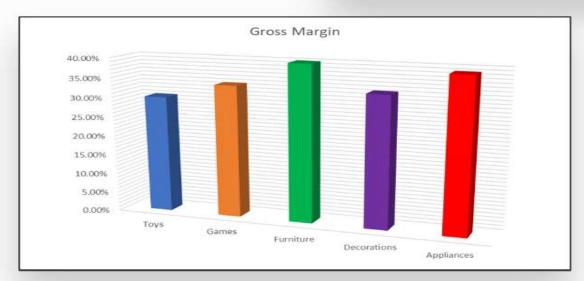
- What margin are we achieving in Decorations?
- How does that compare to other departments?
- What rank is this department in our business?



Good vs. Bad Visuals

Key Questions

- What margin are we achieving in Decorations?
- How does that compare to other departments?
- What rank is this department in our business?



 \times 3D bars are distracting?

- Which bar should I be focusing on?
- \times What period is the data from?
- \times Difficult to compare Decorations to Games.

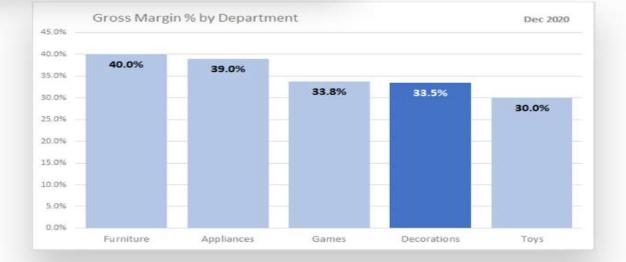




Good vs. Bad Visuals

Key Questions

- What margin are we achieving in Decorations?
- How does that compare to other departments?
- What rank is this department in our business?



- Title and period are clear
- Data point of interest is highlighted
- Bar ordering helps identify ranking

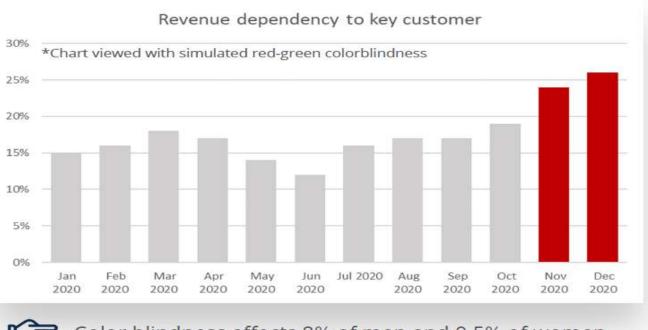


Design Principles

Industry Norms

| Month | Amount |
|---------------|----------|
| January 2020 | 10,300 |
| February 2020 | (20,200) |
| March 2020 | 13,250 |
| April 2020 | 19,200 |
| May 2020 | (2,302) |

Accessibility



Col

Color blindness affects 8% of men and 0.5% of women.



Fundamentals of Business Intelligence

Key Concepts of Data



%

Data Types 3 1.7 Decimal Integers Percentages **Date Time** Date Time

ABC \times **True or False** Text Location (Boolean)

Defining data types help optimize the amount of memory used to store our data.

Data types also help software understand how it can manipulate values.



Functions

Functions are like formulas. They allow us to perform a calculation on or manipulate an input value.

```
ROUND(NUMBER, DECIMAL_PLACES) ROUND(25.3348, 2) = 25.33
```

Each input is called an **argument**.

SUM(NUMBER[1] , NUMBER[2] , ...)

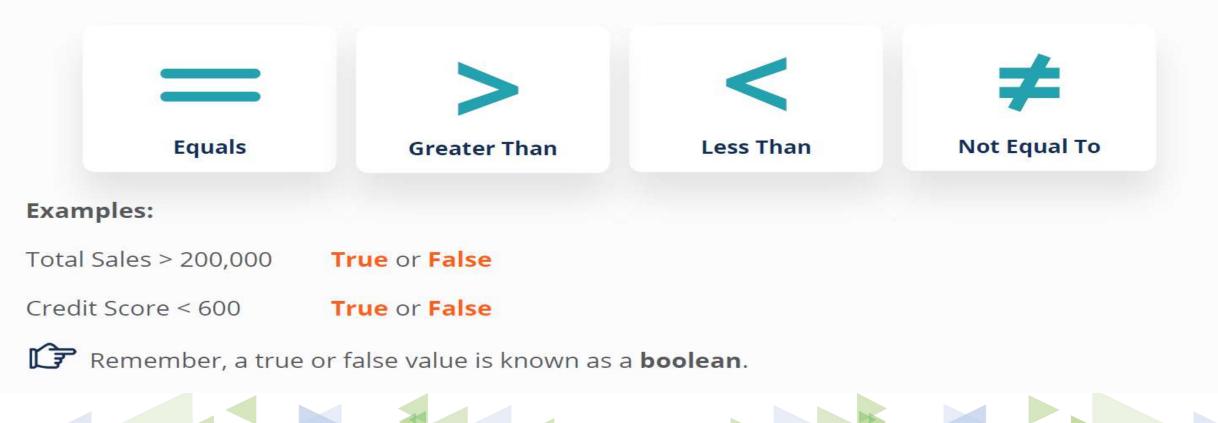
| Number Functions | Text Functions | Date Functions | Boolean Functions |
|------------------|----------------|----------------|-------------------|
| Sum() | Left() | DateAdd() | IF() |
| Average() | Right() | Today() | AND() |
| Abs() | Trim() | DateDiff() | OR() |
| Max() | Contains() | Month() | NOT() |
| Round() | Find() | lsDate() | |
| Floor() | Mid() | | |



Boolean Values

Boolean values describe whether a certain condition is **true** or **false**.

Comparison operators help us define boolean values.





Boolean Values

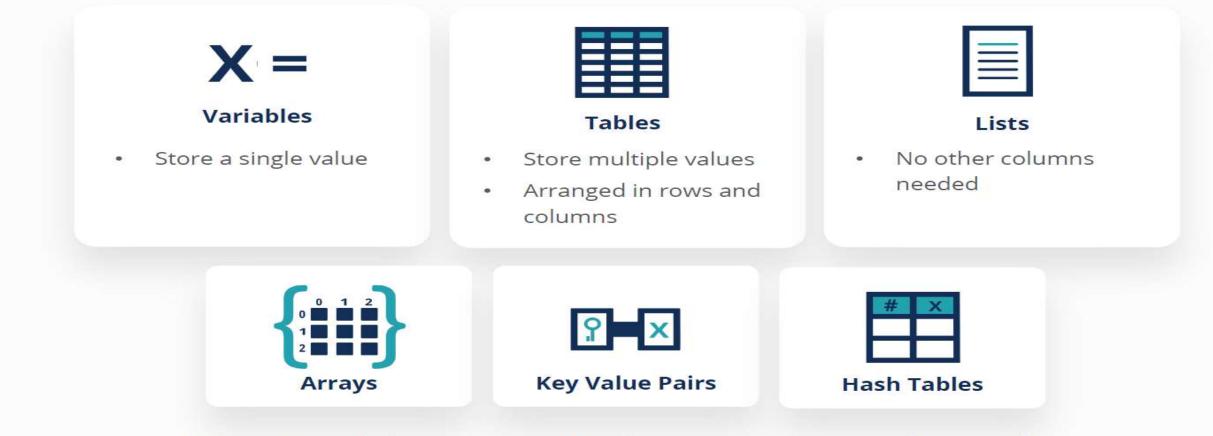
- Logical functions allow us to use **Boolean Variables (TRUE / FALSE)** in formulas.
- Logical functions also known as **Boolean operators.**



The application of Logical Functions is often referred to as **Boolean Logic**.



Data Structures



Data structures help store one or more values in an appropriate way for our analysis.



Appending Tables

Appending tables allows us to combine multiple files or source tables into one.

Sales Table 1

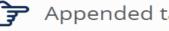
| OrderID | Revenue | CustomerID |
|---------|---------|------------|
| 152156 | 261.24 | PM-12520 |
| 138688 | 14.62 | DV-13045 |
| 108966 | 957.57 | PM-12520 |
| 115812 | 1706.18 | BH-11710 |

Sales Table 2

| OrderID | Revenue | CustomerID |
|---------|---------|------------|
| 127372 | 222.01 | DV-13045 |
| 129293 | 111.01 | DV-13045 |
| 129443 | 293.12 | BH-11710 |
| 122345 | 248.93 | PM-12520 |

Appended Table

| OrderID | Revenue | CustomerID |
|---------|---------|------------|
| 152156 | 261.24 | PM-12520 |
| 138688 | 14.62 | DV-13045 |
| 108966 | 957.57 | PM-12520 |
| 115812 | 1706.18 | BH-11710 |
| 127372 | 222.01 | DV-13045 |
| 129293 | 111.01 | DV-13045 |
| 129443 | 293.12 | BH-11710 |
| 122345 | 248.93 | PM-12520 |



Appended tables are known as a **union**.

Tables must have the **same columns**.



Joining Tables

Joins allow us to physically combine two different tables into one, by matching column values.

| OrderID | Revenue | CustomerID |
|---------|---------|------------|
| 152156 | 261.24 | PM-12520 |
| 138688 | 14.62 | DV-13045 |
| 108966 | 957.57 | PM-12520 |
| 115812 | 1706.18 | BH-11710 |

Fo

| reign | Key (| (FK) | |
|-------|-------|------|--|
| | | | |

| CustomerID | Customer Name |
|------------|-----------------|
| PM-12520 | Prita Meier |
| DV-13045 | Darrin Van Huff |
| BH-11710 | Brosina Hoffman |

ey (FK) Primary Key (PK)

| OrderID | Revenue | CustomerID | Customer Name |
|---------|---------|------------|-----------------|
| 152156 | 261.24 | PM-12520 | Prita Meier |
| 138688 | 14.62 | DV-13045 | Darrin Van Huff |
| 108966 | 957.57 | PM-12520 | Prita Meier |
| 115812 | 1706.18 | BH-11710 | Brosina Hoffman |



- A Foreign Key (FK) identifies a row in another table.
- A **Primary Key (PK)** identifies a row in the current table.





Relationships

Relationships create a connection between two tables, but keep them physically separate.

| OrderID | Revenue | CustomerlD (FK) |
|---------|----------------|--------------------|
| 152156 | 261.24 | PM-12520 |
| 138688 | 14.62 DV-13045 | |
| 108966 | 957.57 | PM-12520 |
| 115812 | 1706.18 | BH-11710 |
| | - | |

| CustomerID (PK) | Customer Name |
|--------------------|-----------------|
| PM-12520 | Prita Meier |
| DV-13045 | Darrin Van Huff |
| BH-11710 | Brosina Hoffman |
| | |

Example: What is the total revenue for Prita Meier?

Example formula: CALCULATE(SUM([Revenue]) , [Customer Name] = 'Prita Meier')

Columns are only used when they are needed.

Helps reduce storage space.



File Types

Excel File

| | AutoSave (| | 9 · CI- | ð. | | 2 | RetailFixed | Costs • | |
|----|------------|--------------|------------|----------|-----------------|----------|-------------|-----------------|---------|
| F | le Ho | me Inser | t Page Lay | out Fo | rmulas Dat | a Review | View | Develop | er Add |
| ſ | n Xa | | Calibri | - 11 | - A* A* | === | 87- | ab Wrap Text | |
| Pa | iste | opy Y | BIU | el maste | a.A. | | | 📴 Merge & C | anter a |
| | ~ 🞺 Fo | rmat Painter | P . g . | 1.111 | e . | 등 등 등 | | En Ivierge oc c | enter |
| | Clipboa | and F2 | | Font | G | | Alignm | ent | rg. |
| F | 10 | | | + 1 D | < | | | | |
| A | А | В | с | D | E | F | G | н | ī |
| 1 | StoreID | Date | Wages | Rent | TargetSales | | | | |
| 2 | 1 | 06/01/2017 | 142,382 | 167653 | 709,103.6 | 7 | | | |
| 3 | 1 | 13/01/2017 | 140,412 | 165333.2 | 699,291.8 | 6 | | | |
| 4 | 1 | 20/01/2017 | 140,860 | 165861.2 | 701,525.0 | 9 | | | |
| 5 | 1 | 27/01/2017 | 120,485 | 141870.6 | 600,054.6 | 5 | | | |
| 6 | | 03/02/2017 | 132,298 | 158425.8 | 670,076.3 | 8 | | | |
| 7 | 3 | 10/02/2017 | 123,718 | 148151.6 | 626,620.7 | 2 | | | |
| 8 | 3 | 17/02/2017 | 124,875 | 149536.2 | 632,477.0 | 1 | | | |
| 9 | 1 | 24/02/2017 | 123,211 | 147543.4 | 624,048.2 | 8 | i. | | |
| 10 | 1 | 03/03/2017 | 141,725 | 170830.2 | 722,541.9 | 2 | 1 | | |
| 11 | 1 | 10/03/2017 | 134,410 | 162013 | 685,248.7 | 7 | T | | |
| 12 | 3 | 17/03/2017 | 122,583 | 147756.6 | 624,950.0 | 3 | | | |
| 13 | 1 | 24/03/2017 | 119,981 | 144620 | 611,683.4 | 9 | | | |
| 14 | 1 | 31/03/2017 | 127,246 | 153377.4 | 648,723.7 | 1 | | | |
| 15 | 1 | 07/04/2017 | 140,588 | 165092.6 | 698,274.2 | 2 | | | |
| 16 | 1 | 14/04/2017 | 127,867 | 150154.6 | 635,092.5 | 9 | | | |
| 17 | 3 | 21/04/2017 | 123,175 | 144644.6 | 611,787.5 | 4 | | | |
| 18 | 1 | 28/04/2017 | 130,506 | 153254 | 648,201.7 | 8 | | | |
| 19 | 1 | 05/05/2017 | 151,690 | 172331.4 | 728,891.3 | 9 | | | |
| 20 | 3 | 12/05/2017 | 136,379 | 154937.2 | 655,321.0 | 3 | | | |
| 21 | 1 | 19/05/2017 | 132,780 | 150848.2 | 638,026.2 | 3 | | | |
| 22 | 1 | 26/05/2017 | 129,403 | 147011.6 | 621,798.9 | 8 | | | |

- Store values, formulas & formatting
- Good for analysis, bad for storage

CSV (Comma Separated Values)

RectOrdersCSVExample - Notepad

File Edit Format View Help RowID, OrderID, OrderDate, ShipDate, CustomerID, ProductID, PostalCodeID, ShipModeID, Sales, Quantity, Discour 1,CA-2016-152156,88/11/2016,11/11/2016,CG-12528,FUR-80-10001798-1-1,218,3,261.96,2,0,41.9136 2,CA-2016-152156,08/11/2016,11/11/2016,CG-12520,FUR-CH-10000454-1-1,218,3,731.94,3,0,219.582 3,CA-2016-13868B,12/06/2016,16/06/2016,DV-13045,OFF-LA-10000240-2-1,518,3,14.62,2,0,6.8714 4,U5-2015-108966,11/10/2015,18/10/2015,SO-20335,FUR-TA-10000577-1-1,171,4,957.5775,5,0.45,-303.031 5, U5-2015-108966, 11/10/2015, 18/10/2015, S0-20335, OFF-ST-10000760-1-1, 171, 4, 22, 368, 2, 0, 2, 2, 5164 6,CA-2014-115812,09/06/2014,14/06/2014,BH-11710,FUR-FU-10001487-1-1,517,4,48.86,7,0,14.1694 7,CA-2014-115812,09/06/2014,14/06/2014,8H-11710,0FF-AR-10002833-1-1,517,4,7.28,4,0,1.9656 8,CA-2014-115812,09/06/2014,14/06/2014,8H-11710,TEC-PH-10002275-1-1,517,4,907.152,6,0.2,90.7152 9,CA-2014-115812,09/06/2014,14/06/2014,8H-11710,OFF-8I-10003910-1-1,517,4,18.504,3,0.2,5.7825 10,CA-2014-115812,09/06/2014,14/06/2014,BH-11710,OFF-AP-10002892-1-1,517,4,114.9,5,0,34.47 11,CA-2014-115812,09/06/2014,14/06/2014,BH-11710,FUR-TA-10001539-1-1,517,4,1706.184,9,0.2,85.3092 $\begin{array}{l} 12, (A-2014-115812, 09) - 06/2014, 14/06/2014, 0H-11710, TEC-PH-1002033-1-1, 517, 4, 911, 424, 4, 8, 2, 661, 3588\\ 13, (A-2017-11442, 15/64/2017, 20/64/2017, 20, 114206, 0FF-PA-1002035-1-1, 1120, 4, 15, 552, 3, 8, 2, 5, 4327\\ 14, (A-2016-161309, 05/12/2016, 10/12/2016, TH-15070, 0FF-PL-1002035-6-1-1, 120, 4, 15, 552, 3, 8, 2, 5, 4327\\ 15, (J5-2015-118083, 22/11/2015, 26/11/2015, PH-14815, 0FF-PL-10020356-6-1-1, 520, 4, 657, 85, 8, 6, 2, 312, 5922\\ 15, (J5-2015-118083, 22/11/2015, 26/11/2015, PH-14815, 0FF-PL-10000756-3-1, 418, 4, 2, 544, 3, 9, 8, -3, 816\\ 17, (A-2014-163509, 11/11/2015, 146/11/2015, PH-14815, 0FF-PL-10000756-3-1, 418, 4, 2, 544, 3, 9, 8, -3, 816\\ 17, (A-2014-163509, 11/11/2015, 146/11/2015, PH-14815, 0FF-FL-100000756-3-1, 418, 4, 2, 544, 3, 9, 8, -3, 816\\ 17, (A-2014-163509, 11/11/2015, 146/1204, 10/2017, 10/2017, 0FF-51-100000756-3-1, 418, 4, 2, 544, 3, 9, 8, -3, 816\\ 17, (A-2014-163509, 11/11/2014, 18/11/2014, PK-10027, 0FF-51-100000756-3-1, 418, 4, 2, 544, 3, 9, 8, -3, 816\\ 17, (A-2014-163509, 11/11/2014, 18/11/2014, PK-10027, 0FF-51-100000756-3-1, 418, 4, 2, 544, 3, 0, 8, -3, 816\\ 17, (A-2014-163356, 27/08/2014, 01/08/2014, 2D-21925, DFF-81-100000756-3-1, 418, 4, 2, 544, 3, 8, 8, 2, 0, 2, 92\\ 19, (A-2014-143356, 27/08/2014, 01/08/2014, 2D-21925, DFF-8H-100000756-3-1, 577, 3, 213, 48, 3, 0, 2, 16, 611\\ 21, (A-2014-143356, 27/08/2014, 01/08/2014, 2D-21925, DFF-8H-10000215-1, 577, 3, 213, 4, 29, 4, 21, 6, 101\\ 21, (A-2014-143356, 27/08/2014, 01/08/2014, 2D-21925, DFF-8H-10002215-1, 577, 3, 213, 4, 29, 4, 2, 7, 38\\ 22, (A-2016-137330, 09/11/2016, 13/11/2016, (BH-15685, 0FF-AP-10001492-2-1, 273, 4, 10, 4, 7, 8, 56896\\ 23, (A-2016-137330, 09/11/2016, 13/11/2016, (BH-15685, 0FF-AP-10001492-2-1, 273, 4, 10, 4, 7, 8, 56896\\ 24, (L-3-2014-143356, 27/08/2017, 18/07/2017, 75, 20655, DFF-AP-10001492-2-1, 273, 4, 10, 4, 7, 8, 56896\\ 24, (L-3-2014-13330, 49/11/2016, 13/11/2016, (BH-15685, 0FF-AP-10001492-2-1, 273, 4, 10, 4, 7, 8, 56896\\ 24, (L-3-2014-13330, 49/11/2016, 13/11/2016, (BH-15685, 0FF-A$ 12,CA-2014-115812,09/06/2014,14/06/2014,8H-11710,TEC-PH-10002033-1-1,517,4,911.424,4,0.2,68.3568 24, US-2017-156909,16/07/2017,18/07/2017,5F-20065,FUR-CH-10002774-1-1,82,3,71.372,2,0.3,-1.0196 25,CA-2015-106320,25/09/2015,30/09/2015,EB-13870,FUR-TA-10000577-1-1,483,4,1044.63,3,0,240.2649 26,CA-2016-121755,16/01/2016,20/01/2016,EH-13945,OFF-8I-10001634-1-1,520,3,11.648,2,0.2,4.2224 27, CA-2016-121755, 16/01/2016, 20/01/2016, EH-13945, TEC-AC-10003027-1-1, 520, 3, 90, 57, 3, 0, 11, 7741 28, US-2015-150630, 17/09/2015, 21/09/2015, T8-21520, FUR-00-10004834-1-1, 82, 4, 3083, 43, 7, 0, 5, -1665, 0522 29.U5-2015-150630.17/09/2015.21/09/2015.T8-21520.0FF-BI-10000474-1-1.82.4.9.618.2.0.7.-7.0532 30,US-2015-150630,17/09/2015,21/09/2015,TB-21520,FUR-FU-10004848-1-1,82,4,124.2,3,0.2,15.525 31, US-2015-150630, 17/09/2015, 21/09/2015, TB-21520, OFF-EN-10001509-1-1, 82, 4, 3. 264, 2, 0. 2, 1. 1016 32, US-2015-150630, 17/09/2015, 21/09/2015, TB-21520, OFF-AR-10004042-1-1, 82, 4, 86. 304, 6, 0.2, 9. 7092 33,US-2015-150630,17/09/2015,21/09/2015,TB-21520,0FF-8I-10001525-1-1,82,4,6.858,6,0.7,-5.715 34,US-2015-150630,17/09/2015,21/09/2015,TB-21520,0FF-AR-10001683-1-1,82,4,15.76,2,0.2,3.546 35,CA-2017-107727,19/10/2017,23/10/2017,MA-17560,OFF-PA-10000249-3-1,426,3,29.472,3,0.2,9.9468 36,CA-2016-117590,08/12/2016,10/12/2016,GH-14485,TEC-PH-10004977-2-1,407,1,1097-544,7,0.2,123.4737 37, CA-2016-117590,08/12/2016,10/12/2016,GH-14485,FUR-FU-10003664-2-1,407,1,190.92,5,0.6,-147.963 38,CA-2015-117415,27/12/2015,31/12/2015,SN-20710,OFF-EN-10802986-3-1,424,4,113.328,9,0.2,35.415 39,CA-2015-117415,27/12/2015,31/12/2015,SN-20710,FUR-80-10002545-3-1,424,4,532.3992,3,0.32,-46.9764 40,CA-2015-117415,27/12/2015,31/12/2015,5N-20710,FUR-CH-10004218-3-1,424,4,212.058,3,0.3,-15.147 41,CA-2015-117415,27/12/2015,31/12/2015,5N-20710,TEC-PH-10000486-3-1,424,4,371.168,4,0.2,41.7564 42,CA-2017-120999,10/09/2017,15/09/2017,LC-16930,TEC-PH-10004093-2-1,345,4,147.168,4,0.2,16.5564

- Efficient storage in text format
- Values are separated by commas

JSON File



- Flexible and efficient file format
- Used to move data between systems

Databases



- Robust centralized data storage
- The one version of the truth





A Data Model

Two or more tables connected with relationships are referred to as a **Data Model**.

| ate Table (| Dimension Tab | le) | | Custome | r Table ([| Dimension Table) |
|-------------|---------------|-------------|-----------------|-----------------|---|---------------------------|
| Date (PK) | Day of Weel | < | | CustomerID (PK) | | Customer Name |
| 01/12/2020 | Tuesday | |) | - PM-1 | 2520 | Prita Meier |
| 02/12/2020 | Wednesday | | | DV-1 | 3045 | Darrin Van Huff |
| 03/12/2020 | Thursday | | | BH-1 | 1710 | Brosina Hoffman |
| | | / | | , <u> </u> | | |
| Order ID | Date (FK) | Revenue | CustomerID (FK) | I ∫₹ | | bles contain measu |
| 152156 | 01/12/2020 | 261.24 | PM-12520 | 2 | about events or transactions. Dimension Tables contain attri help describe the events in more | |
| 138688 | 02/12/2020 | 14.62 | DV-13045 | ſ, | | |
| 108966 | 02/12/2020 | 957.57 | PM-12520 | | | |
| 115812 | 03/12/2020 | 1706.18 | BH-11710 | | | |

Customer Table (Dimension Table)

Sales Transaction Table (Fact Table)



Types of Relationships



Many to One

Each key can only appear once in one table, but may appear many times in the other.



One to Many

The same as the above, expressed the other way around.



One to One

A single occurrence of the key in each table.



Many to Many (Avoid where possible)

Potentially many occurrences of each key in each table.

Relationship types help us understand and manage duplicate values in our data.



Fundamentals of Business Intelligence

Samples of Data, Process and Service Models



Samples - Data Models



Banking (Data, Process and Services Models)

- Profitability, Relationship Marketing
- Risk Management
- Asset and Liability Mgmt
- Compliance
- Business Process re-engineering



- Customer centricity
- Claims, Policy, Underwriting
- Intermediary Performance
- Compliance
- Risk Management
- Business Process Re-engineering





- Risk Management
- Asset and Liability Mgmt
- > Compliance
- KYC and Account Opening
- Middle/Back Office Transformation



Health Plan (Health Plan Data Warehouse)

- Claims
- Medical Management
- Provider and Network
- Sales, Marketing and Membership
- Financials



Retail (Retail Data Warehouse)

- Customer centricity
- Merchandising Management
- Store Operations & Product Mgmt
- Supply Chain Management
- Compliance



Telco (Telecommunications Data Warehouse)

- Churn Management
- Relationship Mgmt and Segmentation
- Sales and Marketing
- Service Quality and Product Lifecycle
- ➤ Usage Profile





Samples - Process and Service Models



Banking (IFW Process Models)

- KYC / Account Opening
- Lending, Syndicated Lending
- Mortgages
- Savings, Investments & Deposits
- Wealth Management
- Sales & Relationship Management
- Product & Marketing Management
- Payments
- Regulatory and Compliance
- Human Resource Administration



Financial Markets (Financial Markets Process Models)

- KYC / Account Opening
- Lending, Syndicated Lending
- Mortgages
- Savings, Investments & Deposits
- Wealth Management
- Sales & Relationship Management
- Product & Marketing Management
- Payments
- Regulatory and Compliance
- Human Resource Administration
- Trade Processing
- Best Execution / MiFID



- Enterprise Resource Management
- Channel Management and CRM
- Communications Management
- Marketing & Customer Acquisition
- Product Portfolio management
- Claim management
- Policy Administration
- Underwriting
- Financial transaction
- Reinsurance Management
- Investment Management
- Provider Management



Fundamentals of Business Intelligence

Developing Business Intelligence Strategy



Developing Business Intelligence Strategy

Major success factors in building the Business Intelligence Strategy

- Know your business strategy and goals
- Identify key stakeholders
- Choose a sponsor from your key stakeholders
- Choose your BI platform and tools
- Create BI Team
- Define your scope
- Prepare your data infrastructure
- Define your goals and roadmap



Fundamentals of Business Intelligence

OBIC will contain data, processes, and services models related to Driving the Economic Transformation



OBIC PARTNERS



Thank you