

2022 - 2023  
BUSINESS INTELLIGENCE

## BRIKINT CASE STUDY



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# PRES

# SENTATION OF

# BUSINESS

Brikint, a multinational retail corporation, was founded in 1960 by Karol Brigham, a young entrepreneur who had a passion for delivering quality products to consumers. Starting with just one small retail store in Australia, the company quickly expanded its reach and product offerings to become a household name synonymous with reliability, affordability and quality.

As the company grew, the executive team, comprised of the commercial director, sales director, and logistics director, worked tirelessly to ensure the smooth operations of the company's retail locations across the globe. They recognized the importance of maintaining consistency in product quality, price, and customer service strategies across all stores.

To achieve this, Brikint employed a team of proprietors, sales managers, and sales assistants who shared the company's values and commitment to excellence. The team worked together to ensure that the company's sales objectives were met and exceeded, listening to customers' needs and delivering products that met those needs.

Brikint's product offerings are diverse, catering to a broad range of consumer needs. The company's product categories include items that fall under the "Rural", "Urban" or even "Youth" categories. From clothing to electronics, home goods to sporting equipment and garden products, Brikint has something for everyone.

Today, Brikint is a B2C retail corporation with a global presence. Its network of retail points includes six locations in Australia, four in Canada, three in Germany and Japan, two in Mexico and Nigeria, and ten in the United States. Despite its size and reach, the company remains committed to its core values of quality, affordability, and customer satisfaction, making it a preferred choice for consumers worldwide.



# BUSINESS NEEDS

In order to maintain a competitive edge in the contemporary global market, Brikint must remain at the forefront of data-driven decision-making that aligns with its overarching objectives and goals. In order to achieve this imperative, the corporation necessitates a robust and dynamic Business Intelligence (BI) system, which can provide insightful and in-depth analysis of the performance of its various products throughout their retail locations. Such a system will enable Brikint to identify opportunities for growth and optimization, streamline the decision-making process and enhance the overall operational and strategic capabilities of the organization. Below are the main business needs in detail:

- **Improve decision-making:** a BI system will enable Brikint's executive team to make informed decisions based on data analysis and insights. This will help the company identify trends and opportunities, as well as areas for improvement.
- **Increase sales and revenue:** by analysing sales data and customer behavior, Brikint can tailor its product offerings to meet consumer demand and increase sales. This will ultimately lead to higher revenue and profits for the company.
- **Optimize operational efficiency:** by streamlining operations and reducing costs, Brikint can improve its overall efficiency and profitability. A Business Intelligence system can provide insight into operational inefficiencies, allowing the company to make data-driven decisions that optimize resource allocation.
- **Monitor and improve supplier performance:** by tracking supplier performance, Brikint can identify areas for improvement and optimize its supply chain. This will help the company reduce costs and improve product quality.
- **Enhance data security:** ensuring the security of sensitive business information is critical. A Business Intelligence system can provide robust security features that protect against potential data breaches or unauthorized access.
- **Stay ahead of competition:** by analyzing market trends and competitor performance, Brikint can stay ahead of the curve and maintain its competitive edge. This will help the company identify opportunities for growth and expansion.

# BUSINESS PROBLEMS

To fulfill its objective of obtaining a comprehensive daily summary of product sales across all its locations, Brikint must consistently collect and analyse sales data from each of its locations. This data will provide invaluable insights to the company's decision-makers, allowing them to develop strategies that promote greater efficiency in market operations. In addition, it must meet all the requirements identified during the meeting with business partners:

- Lack of visibility and insight into daily sales data across all countries, hindering decision-making and reducing market operation efficiency;
- Difficulty in understanding sales evolution and performance across time and geographic locations, resulting in ineffective decision-making and reduced efficiency;
- Inability to track and monitor the performance of each manufacturer, leading to limited insight into sales by manufacturer and hindering the comparison of total sales with the targets for each store and role;
- Inadequate tracking and monitoring of sales by product, leading to difficulties in comparing sales with target values;
- Lack of accurate sales predictions for the next months, resulting in ineffective planning and decision-making;
- Limited understanding of YTD performance and comparisons with the previous selected period, leading to ineffective decision-making;
- Limited insight into market trends and competitor analysis, resulting in inadequate understanding of market share and growth;
- Inadequate tracking and monitoring of growth across different dimensions such as product, country, manufacturer, and store, resulting in limited insight into overall performance;
- Inadequate data security measures leading to potential information security breaches and unauthorized access by users;
- Limited visibility on the impact of discounts on sales information, leading to difficulties in decision-making and planning;
- Inability to provide sales information in Euros for European partners, resulting in difficulties in communicating sales information effectively.

# BUSINESS QUESTIONS

With the business needs and problems above, we defined the following business questions that the project aims to answer:

- How have sales evolved in value and volume over time, such as year, month and day? And across locations? How did the discounts impact the sales over time?
- What are the revenue predictions for the next months?
- For a Year to Date period, what are the sales in both value and volume? What are the daily sales? What are top categories and products sold? What are the regions with the most sales? How does it compare with a different period in time?
- What are the biggest companies competing with us in each country? What is our market share for each country?

For all of the questions below, the analysis should also be made over time:

- What are the top manufacturers when it comes to the number of products ordered and total sales? What are the sales both in value and volume by manufacturer? What are the main categories each manufacturer produces? What are the top products each manufacturer sells in quantity? What are the top regions in terms of sales value and volume for each manufacturer?
- What are the most sold products in value and volume? How do the sales in value and volume vary by product? What is the location and country where a product has the highest revenue generated? Is it meeting the revenue target?
- What is the country with the most sales in value and volume? What are the sales in value and volume for each country? How many retail locations in each country? What are top products and categories for each country? What is the top retail location for each country in revenues?
- What is the store providing the most revenue? What are the top products and categories for each store? What are the sales in value and volume by store? Is it meeting the revenue target?
- What is the employee providing the most revenue? What are the sales in volume and value by employee? Where is the country, role and retail store where the employee works? What are the top products and categories for each? Is it meeting the revenue target?

The information needs to be available both in dollars and euros.

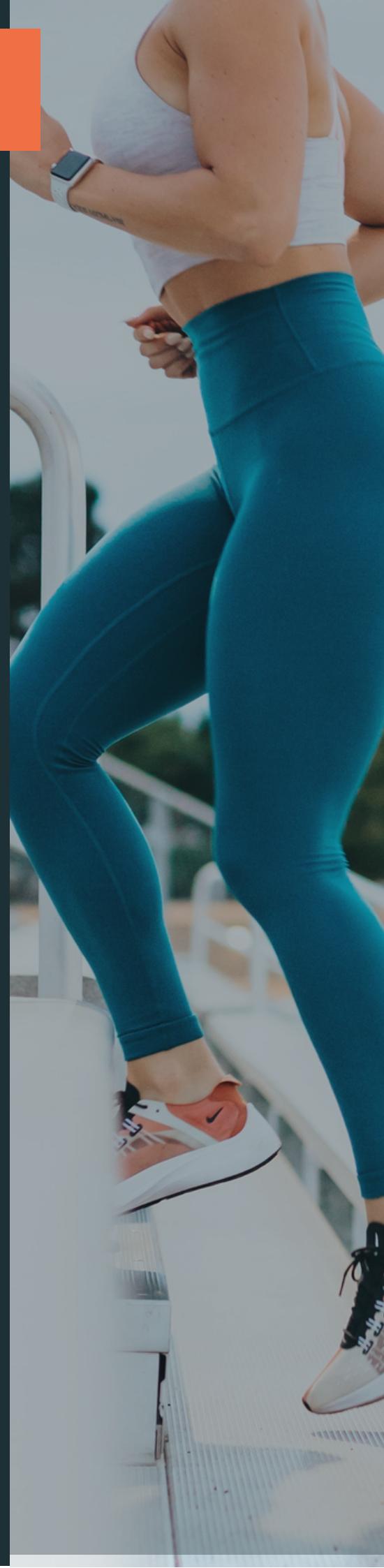
# SOURCE DATA

In regards to the initial database, we were provided with eight distinct files, each containing tables. The 'BI\_Dimensions' Excel file, supplied by the client, contained several tables and variables, including the following:

- **Product Table:** This table had a unique identifier for each product type (ProductID) and for the manufacturer that produced the product (ManufacturerID). Additionally, this table contained information on the product's name (Product), category (Category), and sale price in US dollars (Price).
- **Manufacturer Table:** This table had a unique identifier for each manufacturer (ManufacturerID), as well as the manufacturer's name (Manufacturer) and a PNG code of their logo (Logo), which was provided in a separate file.
- **Geo Table:** This table included variables such as ZIP code (Zip), city (City), state (State), region (Region), district (District), and country (Country).
- **Stores Table:** This table contained a unique identifier for each store (StoreID), the name of the store (Store), and the country in which it is located (Country).

We were also provided with seven CSV files with information regarding the sales in each country that Brikint operates. These files had the names Australia, Canada, Japan, USA, Mexico, Nigeria, and Germany. Each of these files contained a table with the following variables:

- **ProductID:** Unique identifier of the product that was sold.
- **Date:** Day of the sale, in the format dd-mm-yyyy.
- **Zip:** Zip code of the location where the purchase was made.
- **Units:** Number of items sold.
- **Revenue:** Amount, in US dollars, that was generated by the sale.
- **StoreID:** Unique identifier of the store in which the purchase was made.
- **StaffID:** Unique identifier of the staff member that completed the sale.





We also obtained some additional information that will be useful regarding macroeconomic indicators for all countries in which Brikint operates. We used the Federal Reserve Economic Data and other financial websites as sources for this information. We created an Excel file called 'Macroeconomic Indicators', which includes the following variables for each country between 2015 and 2021:

- **GDP per capita:** This variable measures the economic output per person in a country. It is calculated by dividing the country's gross domestic product (GDP) by its total population. It is often used as an indicator of a country's standard of living. In the excel file, it was transformed to a growth rate.
- **Inflation rate:** This variable measures the rate at which prices for goods and services are increasing in an economy. It is typically measured as the percentage change in a price index, such as the consumer price index (CPI), over a period of time.
- **Unemployment rate:** This variable measures the percentage of the labor force that is currently unemployed and actively seeking employment. It is often used as a measure of the health of an economy and can influence consumer spending. In the excel file, it was transformed to a growth rate.
- **Retail Market size:** This variable represents the scale and magnitude of the retail market, typically expressed in monetary terms. It helps assess the overall size and potential growth of the retail sector.

To conduct a competitive analysis in each country, we gathered data on the leading retail companies in all the countries where Brikint has operations. Specifically, we collected information on the yearly revenue between 2015 and 2021 for the following companies: Costco, Woolworths Group, Broccoli, Loblaw Companies, Adidas and Walmex. It is worth noting that Nigeria has a fragmented retail market largely dispersed through small businesses, for which reason we did not acquire data that we believed to be adequate.

Data regarding the exchange rate was also obtained, to allow the transformation from dollars to euros.

Finally, we also acquired data regarding the season for each day in each hemisphere, as well as information for each country's holidays.

## DISCOVERY PROCESS

As it is often the case, raw data is typically riddled with inconsistencies and requires preparation in order to be useful. Our data was no exception. We had to fix various data types, decode metadata, understand primary and foreign keys, and create surrogate keys. All of these tasks were time-consuming and required careful implementation. Furthermore, we had to make a decision between implementing a star-schema or a snow-flake model, as this would impact the approaches we took in further analysis.

# DIMENSIONAL MODEL

Dimensional modelling is, nowadays, the predominant approach for designing data warehouses in practice (Moody & Kortink, n.d.). Its main objectives are user understandability, query performance and resilience to change, with the main components being Fact Tables and Dimensional Tables (Kirmany, 2017). The dimension model developed for Brikint used a star schema with Sales as Fact Table, since Brinkint requires a solution centered on sales as the main business event. The dimension tables are: Product, Location, Staff, Store and Date. All dimensions have a one-to-many relationship with the fact table. The model is illustrated below:

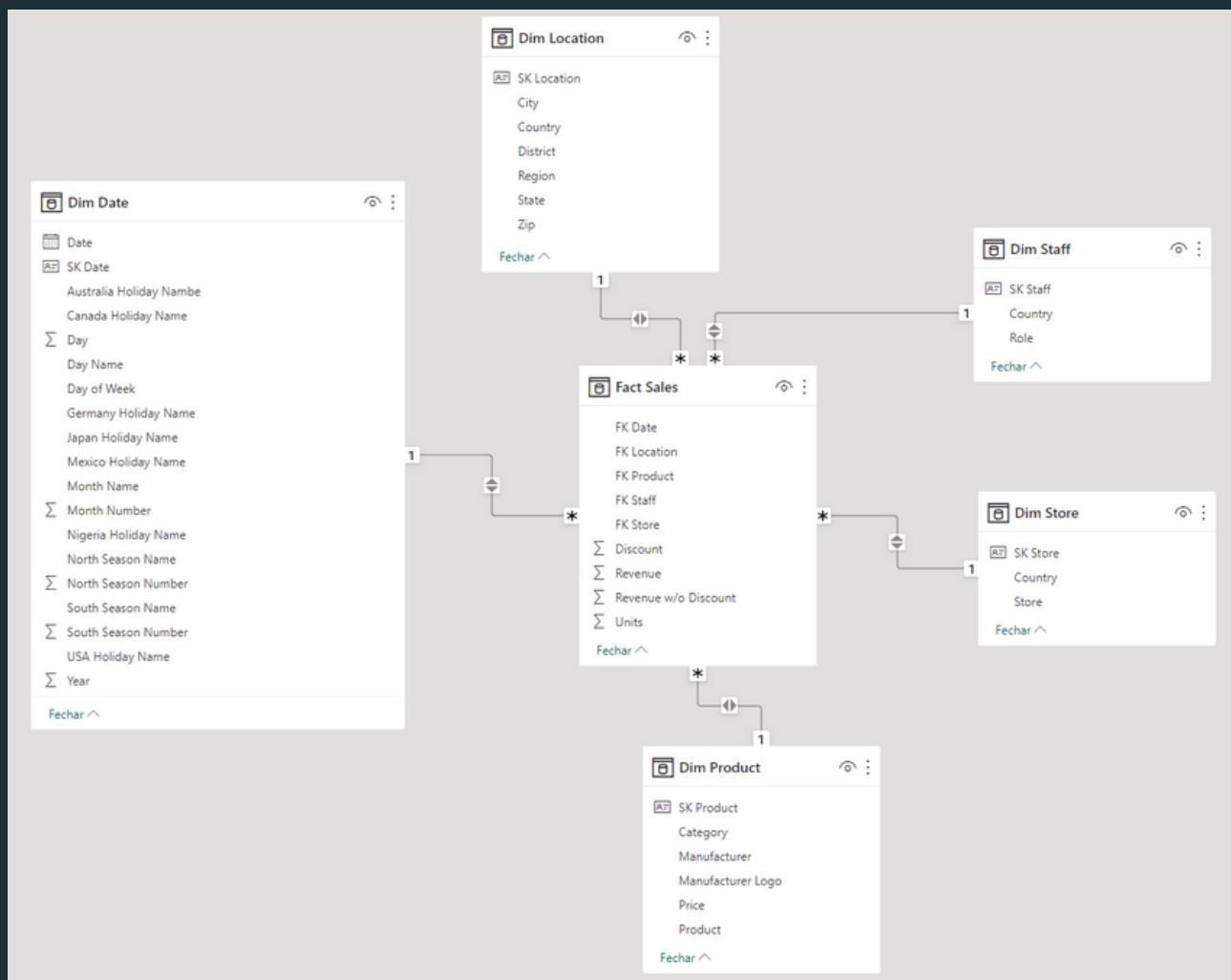
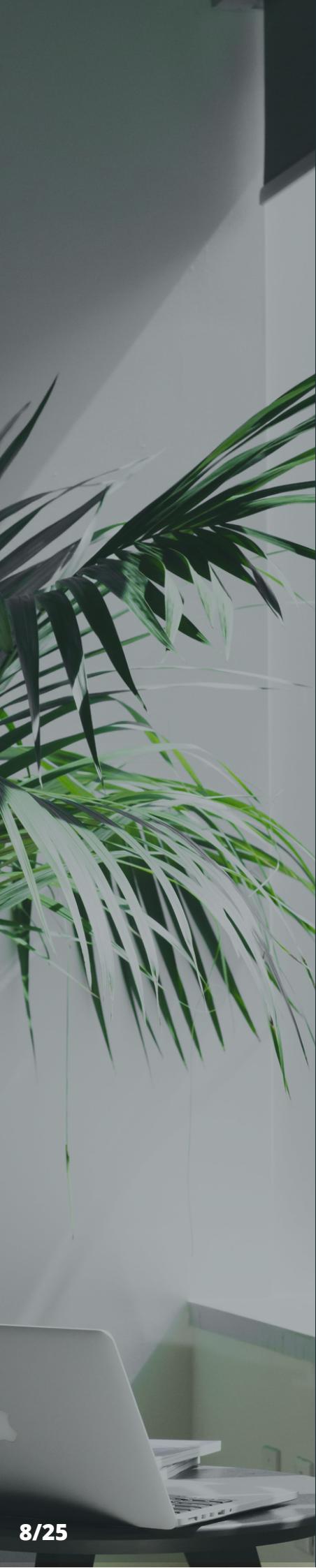


FIGURE 1 - Dimensional Model



When it comes to sales, the fact table grain is daily sales by product, location, staff and store. We have the following measures:

- FK Date, with the data type of whole number
- FK Location, with the data type of whole number
- FK Product, with the date type of whole number
- FK Staff, with the date type of whole number
- FK Store, with the date type of whole number
- Discount, with the date type of percentage
- Revenue, with the date type of fixed decimal number
- Revenue w/o Discount, with the date type of fixed decimal number
- Units, with the date type of whole number

The product dimension gives us information regarding the product sold and its details, in this case price, category and manufacturer. It includes a surrogate key (SK Product) and a hierarchy with 3 levels: Manufacturer > Category > Product (since a manufacturer can produce more than one category of products). In terms of attributes, we have the following:

- SK Product, with the data type of whole number
- Category, with the data type of text
- Manufacturer, with the data type of text
- Manufacturer Logo, with the data type of text
- Price, with the data type of fixed decimal number
- Product, with the data type of text

The location dimension helps us understand how sales are geographically distributed. It includes a surrogate key (SK Location) and a hierarchy with 6 levels: Country > Region > District > State > City > Zip. In terms of attributes, we have the following:

- SK Location, with the data type of whole number
- City, with the data type of text
- Country, with the data type of text
- District, with the data type of text
- Region, with the data type of text
- State, with the data type of text
- Zip, with the data type of whole number

The staff dimension indicates the staff involved in a sale. It includes a surrogate key (SK Staff) and a hierarchy with 2 levels: Country > Role. In terms of attributes, we have the following:

- SK Staff, with the data type of whole number
- Country, with the data type of text
- Role, with the data type of text



The store dimension indicates the store where the sale happened. It includes a surrogate key (SK Store) and a hierarchy with 2 levels: Country > Store. In terms of attributes, we have the following:

- SK Store, with the data type of whole number
- Country, with the data type of text
- Store, with data type of text

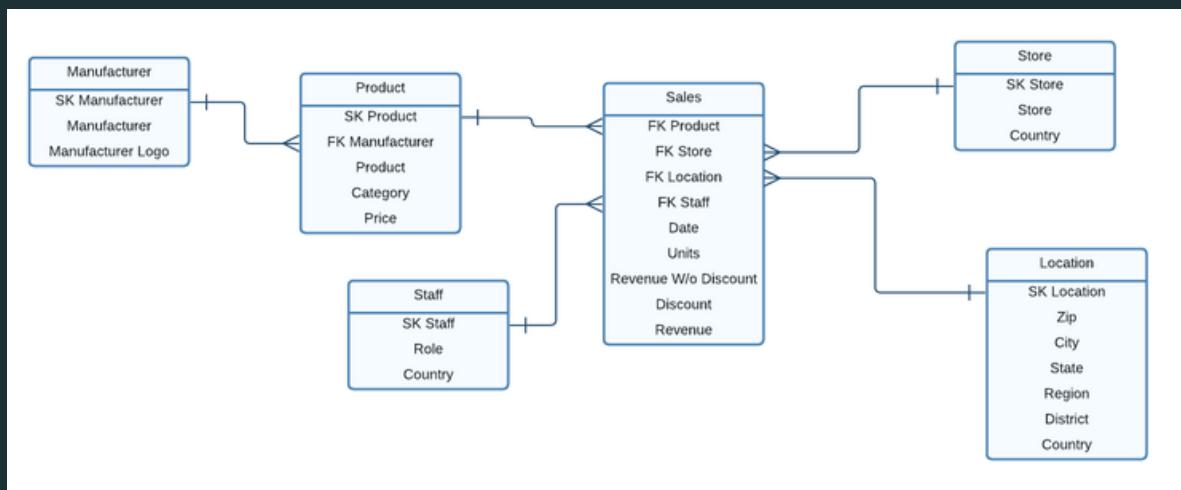
With the date dimension, we have information on when the sale happened, including the day, month, year, season and if it is a holiday. Both the name and number of day of week, month, season and holiday are included to allow for faster querying and effective reporting of the results. In this case, we also had to create multiple holiday attributes because of there being many countries with different holiday timelines. The same was done for the seasons, considering both the north and south hemispheres. The finest level of detail we opted for was a day because that was the highest level of detail the data offered and that Brinkint could extract value from. It includes a surrogate key (SK Date) and a hierarchy with 4 levels: Year > Month Name > Day Name > Day. In terms of attributes, we have the following:

- SK Date, with the data type of whole number
- Date, with the data type of date
- Day, with the data type of whole number
- Day Name, with the data type of text
- Day of Week, with the data type of whole number
- Month Name, with the data type of text
- Month Number, with the data type of whole number
- Year, with the data type of whole number
- North Season Name, with the data type of text
- North Season Number, with the data type of whole number
- South Season Name, with the data type of text
- South Season Number, with the data type of whole number
- Australia Holiday, with the data type of text
- Canada Holiday, with the data type of text
- Germany Holiday, with the data type of text
- Japan Holiday, with the data type of text
- Mexico Holiday, with the data type of text
- Nigeria Holiday, with the data type of text
- USA Holiday, with the data type of text

In our final version, we ended up not using the holiday and season attributes.

# DATA MODELLING METHODOLOGY

Aiming to design a suitable Data Warehouse which can be easily analysed and efficiently queried to generate relevant insights for the business, a Dimensional Modelling using the Moody and Kortink methodology was developed.



**FIGURE 2 – Entity Relationship Model**

This approach consists of four main steps, based on the Entity Relationship (ER) Model, represented in figure 2. Firstly, **classify the ER Model entities into three distinct categories**: Transaction Entities, Component Entities, and Classification Entities. The former stores information about events that occur in the business (e.g., sales or orders) in a specific occasion, and it incorporates measures or quantities. Additionally, Component Entities are connected with a Transaction Entity through a one-to-many relationship type. They answer relevant questions such as who, what, when, where, how, and why of a business event, and serve as the basis for composing dimensional tables in star schemas. Finally, through a chain of one-to-many relationships, Classification entities are functionally dependent on the Component Entities. They not only define embedded hierarchies in the data model but are also used to classify component entities.

In many cases, entities cannot be neatly categorized into a single category. Instead, they may fit into multiple categories, therefore a precedence hierarchy is used, meaning that transaction entities have the highest precedent, while component entities have the lowest precedent.

Concerning the business case, the ER model entities were classified as follows:

- Transaction Entities: Sales
- Component Entities: Product, Location, Stores, and Staff
- Classification Entities: Manufacturer

The second stage involves **identifying hierarchies**, which represent “any sequence of entities joined together by one-to-many relationships, all aligned in the same direction” (Moody et al., n.d.).

The following hierarchies were identified in this case:

- Manufacturer > Product > Sales
- Location > Sales
- Stores > Sales
- Staff > Sales

Lastly, **produce dimensional models using two operators**: the Collapse Hierarchy, which collapses higher level entities into lower levels, thus working as a form of denormalization; and the Aggregation, which can be applied to a transaction entity to create a new entity containing summarised data. It is important to highlight that the aggregation attributes must be numerical quantities. In the project, the manufacturer entity was collapsed into the product entity.

Regarding the Dimensional Design Option, the Star Schema was selected due to its easy-to-understand structure. Moreover, its design allows for fast query response times, making it a highly scalable and flexible option. Notwithstanding the mentioned advantages, it is a denormalized schema, which might have some issues regarding maintenance and redundancy. On the other hand, Snowflake Schemas have lower storage overhead, as they adhere to the normalizing principles, however, query processing demands more computational power.

The final schema encompasses a central table, named Fact Table, which corresponds to a particular type of business event and it has measures that can be aggregated, and Dimensions, which provide the context surrounding a business process event.



# DATA ENGINEERING

The data engineering process in Power BI involved several steps to ensure data accuracy, structure, and relevance for each table.

For the "**Dim Location**" table, the data was sourced from the Excel workbook using Power Query. Specifically, the "geo" sheet was selected. The headers were promoted, and certain column types were transformed. To remove unnecessary information, two initial rows were skipped. An index column was added to uniquely identify each location, which was then renamed to "SK Location" for clarity. The column order was adjusted, placing the most relevant columns like "Zip," "City," "State," "District," and "Country" at the forefront. The "Region" column was removed as it contained mostly missing values. There were two missing values in the "Country" column that were also filled considering the other columns.

In the case of the "**Dim Manufacturer**" table, the data was sourced from the "manufacturer" sheet in an Excel workbook using Power Query. Similar to the previous table, the headers were promoted for proper column naming. The column types underwent transformation, with "Column1" set as text and other columns set as any type. The table was transposed to organize the columns and rows more effectively for analysis. The promoted headers were reapplied to the transposed table. Furthermore, the column types were transformed again, with "ManufacturerID" set as an integer and "Manufacturer" and "Logo" set as text. The final table had two columns, "Column4" and "List of Suppliers and Manufacturers," removed.

Moving on to the "**Dim Product**" table, the data was sourced from the "Product\_Table" table within an Excel workbook using Power Query. The column types were transformed, with "ProductID" and "ManufacturerID" set as integers, while "Product," "Category," and "Price" were set as text. To ensure consistency, the "Category" values were filled down. Additionally, the "USD" text in the "Price" column was replaced with an empty string, and the decimal separator was changed from "." to ",". The "Price" column was then transformed to the currency type with the "pt-PT" locale. To enrich the table, the "ManufacturerID" column was joined with the "Dim Manufacturer" table based on a nested join using the "ManufacturerID" column as the key. This resulted in the addition of the "Manufacturer" and "Logo" columns from the joined table. The column names were renamed accordingly, and the column order was adjusted to prioritize "SK Product," "Product," "Category," "Price," "Manufacturer," and "Manufacturer Logo." Finally, the "ManufacturerID" column was removed, resulting in a structured "Dim Product" table ready for analysis and visualization in Power BI.

In the "**Dim Staff**" table, the data was sourced from the "staff" sheet in the Excel workbook using Power Query. The headers were promoted to ensure proper column naming. The column types were transformed, with "StaffID" set as an integer and "Role" and "Country" set as text. To enhance clarity, the column name "StaffID" was renamed to "SK Staff." To ensure uniqueness, duplicate values in the "SK Staff" column were removed using the Distinct function. Similarly, for the "Dim Store" table, the data was sourced from the "Table2" table in the Excel workbook using Power Query. The column types were transformed, with "StoreID" set as an integer and "Store" and "Country" set as text. To improve clarity, the column name "StoreID" was modified to "SK Store." Additionally, to standardize the country names, instances of "U.S.A." were replaced with "USA" using the ReplaceValue function.

The "**Fact Sales**" table underwent more complex data engineering processes. Aggregations, joins, and calculated columns were performed to derive the desired information. The data was expanded by joining with the "Dim Product," "Dim Store," and "Dim Staff" tables based on their respective keys. The expanded columns were renamed to reflect the source table. For example, "Dim Product" columns were prefixed with "Product," "Dim Store" columns with "Store," and "Dim Staff" columns with "Staff." The "Fact Sales" table also involved the application of currency conversions by joining with the "Exchange Rate by Month" table. Unnecessary columns were removed, resulting in a structured "Fact Sales" table ready for analysis and reporting.

The "**Dim Date**" table was created by generating a list of dates from 2014-03-01 to 2022-01-01. The dates were generated using the GenerateSeries function, specifying the start date and end date. The generated list of dates was converted into a table by invoking the Table.FromList function. Additional columns were added to enhance analysis, such as the day, day of the week, month, and year. The columns were concatenated and transformed to create a unique date key for each row. Finally, the column order was adjusted, with the "Date" column placed at the beginning of the table and the it was specified as a date table.





For the "**Competition**" table, financial data files were extracted, and relevant columns were selected. The column names were standardized, ensuring consistency and clarity. Appropriate data types were assigned to each column, such as "Year" as integer, "Revenue" as percentage, and both "Company" and "Country" as text. The revenue figures were converted to the appropriate currency format, removing any unwanted characters or symbols.

For the "**Country Indicators**", relevant data was extracted, and column names were standardized for consistency. Appropriate data types were assigned to each column, such as "Year" as integer and the other columns as currency and percentage. To provide a more granular view, data was expanded for each country and year combination. Irrelevant columns were removed, and **currency conversion** was performed using exchange rates obtained from the "Exchange Rate by Month" table. Both the "**Exchange Rate by Month**" and "**Exchange Rate by Year**" tables were loaded from an Excel file. The column types were transformed, with "Date" set as date/time and "Exchange Rate" as numeric. The tables were sorted by date to ensure proper sequencing. For the "Exchange Rate by Month" table, the month and year information was extracted from the "Date" column using the *Date.Month* and *Date.Year* functions. The data was then grouped by month and year, calculating the **average exchange rate for each period**. Similarly, the "Exchange Rate by Year" table further grouped the data by the year column, obtaining the annual average exchange rate.

Finally, both the "**Season**" and **the holidays from each country** were loaded from excel files and left outer joins were performed to add this information to the Dim Date table (duplicates were removed afterwards).

A table corresponding to the color mode was also created to allow for the creation of two separate color modes that the user can choose from.

The load to the model was disabled for the queries corresponding to the manufacturer and the ones related to exchange rate, season and holidays because these were only auxiliary tables used to enrich the existing tables.

By following these detailed data engineering steps for each table, the data was accurately structured and prepared for analysis and reporting in Power BI.

# MODEL OPTIMIZATION



In order to optimize the dashboard for enhanced performance and usability, several key steps were taken, including the creation of hierarchies, hiding of columns, adjustment of data types and summarization. These steps were implemented aiming to facilitate efficient data analysis and exploration.

Hierarchies were established in the model to provide a structured organization of data, enabling users to navigate and drill down into different levels of granularity.

By creating hierarchies such as the Date Hierarchy (Year, Quarter, Month Name, Day) in the Dim Date table and the Location Hierarchy (Country, District, State, City) in the Dim Location table, users can easily explore data from different perspectives and gain deeper insights.

Hidden columns play a crucial role in establishing relationships between tables and ensuring accurate calculations. By hiding certain columns, such as the FK Date in the Competition and Country Indicators tables, SK Date, the columns corresponding to the season and holidays in the Dim Date table, SK Location, and Zip in the Dim Location table, Price and SK Product in the Dim Product table, SK Staff and Team in the Dim Staff table, and SK Store in the Dim Store table, the model's structure remains clean and uncluttered. These hidden columns serve as foreign keys and primary keys, supporting efficient data relationships and enabling accurate calculations, or correspond to columns that will not be used on the dashboard. FK Staff was not hidden because there were missing values when it comes to staff in a certain sale. Therefore, it was used to filter on the dashboard to make sure these transactions did not appear to the user when analyzing information containing both staff and sales.

Summarization on specific columns was carefully applied to enhance the representation and interpretation of data. All summarizations were done with either the sum or average and these include the following columns in the respective tables. For instance, we used a sum for Revenue(\$) and Revenue(€) on the Fact Sales table and the average on GDP per Capita Growth on the Country Indicators table. There was also attention paid in sorting the variables, for instance by sorting the Month Name column by the Month Number column.

Afterward, the attention was directed towards the development of measures designed to aid in the provision of the designated information to users. Specifically, a Target Revenue was computed, entailing a revenue increase of 15% compared to the preceding year. Additionally, the Difference to Target, % Sales Growth, YOY Sales Growth %, and Forecasted Revenue were determined. An important measure to take into consideration is the difference to Target with and without discount. As our goal is to analyze the impact of the discount policy, we compare the target in both cases to the discounted previous year.

# DASHBOARD DESCRIPTION



In the following section we will proceed to explain in detail all elements and pages of the final dashboard. The dashboard starts with an overview of the most important information (Home Page) and then moves on to analyse how various dimensions impact sales

The filters were selected with careful consideration given to predictability and consistency. For example, on the Geography Page, a Country filter is made available to ensure a seamless user experience. Row-level security has also been implemented in accordance with the roles defined in the provided materials.

Additionally, the dashboard provides interactive functionalities aimed at improving usability and customization. Users have the option to choose between viewing the data in euros (€) or US dollars (\$), accommodating the preferences of a multinational company operating in different currency zones. Furthermore, users can opt to include or exclude discounts from the revenue calculations, allowing for analysis based on different pricing scenarios. Finally, users can also choose between a dark and light mode according to their color preferences. This is applied on the Home Page and then the colors change throughout the whole dashboard.

To facilitate navigation within the dashboard, strategically placed bookmark buttons enable users to easily access specific sections or data points of interest. This feature enhances efficiency and enables users to swiftly navigate between relevant sections without the need to browse through multiple pages.

Many of the cards were manually altered to be used as KPI's but in a distinct visual style. Putting data labels was decided for each graph in specific to guarantee that the information was easy to visualize and uncluttered.

The **Home Page** of the dashboard aims to provide the users with a quick and factual overview of the company's KPIs in a visually appealing and easily accessible format. The following KPIs and formats were chosen to provide a comprehensive snapshot of Brikint's overall performance:

**Total Revenue in Billions Card:** This figure represents the total revenue generated by Brikint, measured in billions. It serves as a primary indicator of the company's financial health and overall success.

**Total Units Sold Card:** This metric showcases the total number of units sold by Brikint, providing insights into the scale of customer demand for the company's products.

**Revenue Growth Card:** This KPI reflects the percentage increase in revenue compared to the previous year, offering a valuable measure of Brikint's year-on-year performance and growth trajectory.

**Best-Selling Product Category and Revenue Card:** This data point highlights the category of products that generated the highest revenue for the company. It enables the user to identify its most successful product line.

**Revenue Target Difference Bar Chart:** This KPI reveals the variance between Brikint's actual revenue, and the target revenue set for each date. The date hierarchy was used to allow the users to drill down to quarter, month and day. It aids management gauge the company's performance against predefined goals and evaluates the effectiveness of sales and marketing efforts.

**Revenue Continent Map:** This element provides a breakdown of Brikint's revenue by continent, offering insights into the performance of its different markets. It allows for comparative analysis, helping identify regions with the highest revenue contribution and areas that may require additional focus.

This page provides an overall view of several fundamental business inquiries concerning the performance of the company over time and the extent of its presence in international markets. This comprehensive understanding is further enhanced by the incorporation of dynamic filtering mechanisms found on subsequent pages of the dashboard.

The **Time Page** within the dashboard provides insights into the historic performance of the company throughout years, months and days, as well as a forecast for the following three years. These features enable users to assess historical trends and plan for future predicted growth. In our analysis, due regard was given to the visual alignment of the elements on the page, with the aim of establishing an intuitive demarcation between elements pertaining to sales value and those related to sales volume.

**Forecast Predictions Button:** This button displays forecast predictions for the next three years. It includes two time series line graphs: one showing the sum of revenue by year, and the other displaying a double line graph with the sum of revenue and forecasted revenue by year and month. These predictions help users anticipate future revenue trends, align business strategies accordingly and also assess how confident they feel given previous forecasts. We also created an exit button on the top right corner for a more accessible user experience. In this section we also included a button for a text box that provides the user with some potential marketing strategies.





**Temporal Slider:** This slider allows users to adjust the graphs based on a specified time frame. It offers flexibility in visualizing data for specific periods, whether by year or month. Users can easily customize the view to focus on specific time intervals of interest.

**Revenue Card:** This card provides the revenue generated for the selected period and presents the ratio of revenue achieved compared to the target. It allows users to monitor revenue performance and assess the company's progress in meeting its revenue goals.

**Actual to Target Ratio Card:** This card provides the proportion of the actual revenues compared to the target, with conditional color formatting differentiating if we have surpassed or not the target. It provides fast insight to verify how Brikint is doing compared to the target.

**Units Sold Card:** This card displays the number of units sold for the selected year, as well as the units sold in the previous year. It provides insights into the company's sales volume and highlights year-on-year growth or decline in unit sales.

**Double Bar Chart with Revenue Comparison by Time:** The double bar chart showcases the total revenue for each time dimension, comparing it to the revenue generated in the same period of the previous year. Additionally, it includes a series displaying the percentage sales growth. The date hierarchy was used to allow the users to drill down to quarter, month and day. This chart helps users identify seasonal patterns, track revenue performance on a yearly, quarterly, monthly and daily basis, and evaluate growth rates compared to the previous year.

**Double Line Area Graph with Units Sold by Date:** This graph illustrates the total units sold per date, comparing it to the units sold in the same date of the previous year. The date hierarchy was used to allow the users to drill down to quarter, month and day. It offers insights into the company's sales volume trends, seasonal fluctuations, and year-on-year growth in units sold.

The **Geography page** of the dashboard offers an in-depth analysis of sales, allowing users to explore and understand performance across different geographic locations. The following components have been integrated into this page to provide insights:

**Revenue YTD Ratio Card:** This card displays the total revenue generated in millions for each selected region, such as a country or a city. It includes a KPI that indicates the progress towards reaching the revenue target of if it has been surpassed. The numeric value of the ratio between the actual revenue and the target is also presented. This KPI allows management to assess the performance of each region in relation to revenue goals and identify regions that have met or exceeded their targets.

**Number of Stores Card:** This card showcases the total number of stores in each selected region, providing a quick overview of Brikint's retail presence. It helps identify regions with a high concentration of stores and those that may require expansion or additional investment.

**Revenue Growth Card:** This KPI card presents the percentage growth in revenue for the selected region compared to the previous period. It enables users to track the revenue growth trend and identify regions experiencing significant sales expansion or potential challenges.

**Actual to Target Ratio Card:** This card provides the proportion of the actual revenues for each country compared to the target, with conditional color formatting differentiating if we have surpassed or not the target. It provides a way to verify how each country is doing compared to the target in an easy manner.

**Sales Contribution Pie Chart:** This chart illustrates the percentage sales contribution of different product categories within the selected region. It provides a visual representation of the sales distribution and allows for quick identification of the most dominant and lucrative product categories.

**Sales Across Country World Map:** A world map is incorporated, visually representing sales across different countries. It enables users to gain a global perspective on sales performance, identify high-performing countries, and explore potential opportunities in untapped markets.

**Region Table:** This table provides detailed information on sales growth, the sum of revenue, and sales contribution for each country within the selected region. It allows for comparison and analysis of sales performance across different countries. Additionally, users can drill down into specific regions within countries using the location hierarchy to gain a more granular understanding of sales performance.

The functionality involved in filtering and selecting various geographic contexts enhances the flexibility and relevance of the information presented on the Geography page. This particular feature enables users to customize their analysis to specific regions of interest, thereby fostering a more comprehensive understanding of sales performance in alignment with the designated business objectives.

The **Product Page** of the dashboard provides a comprehensive view of product category dimensions, allowing users to analyze and evaluate the performance of different product categories. The following components have been integrated into this page to offer insights:



**Revenue Year-to-Date (YTD) Card:** This card displays the total revenue generated in millions for the selected product category. It contains a KPI that indicates the progress towards reaching the revenue target. Once more, the numeric value of the ratio between the actual revenue and the target is presented.

**Actual to Target Ratio Card:** This card provides the proportion of the actual revenues for each category/product compared to the target, with conditional color formatting differentiating if we have surpassed or not the target. It allows the user to easily verify how each category/product is doing compared to the target.

**Sales Contribution Card:** This card provides the percentage contribution of the filtered product category to the overall revenue. It helps users understand the significance of the selected product category and its impact on the company's revenue stream.

**Units Sold Card:** This card indicates the number of units sold for the filtered product category. It provides insights into the volume of sales and aids in understanding the popularity and demand for specific products within the category.

**Top Products by Revenue Bar Chart:** This bar chart visualizes the top five products within the selected product category, ranked by revenue generated. It allows users to identify the highest revenue-generating products and make informed decisions regarding inventory management, marketing strategies, and product promotion.

**Product Types by Revenue Bar Chart:** This visualization presents the revenues associated to each product type, giving an idea of the preferred product types of the customers.

**Total Revenue by Product Double Bar Chart:** The double bar chart presents the total revenue by product for each date, accompanied by a secondary bar representing the revenue from the previous year. Additionally, a time series line graph displays the percentage sales growth for each date. The date hierarchy was used to allow the users to drill down to quarter, month and day. This visual representation helps users track revenue trends, compare current performance to the previous year, and assess the growth rate of each product over time.

This information provides Brikint's management with the means to make informed decisions based on data concerning inventory management, marketing strategies, and product promotion. The Product page offers a robust tool for assessing and enhancing the performance of different product categories. Additionally, it incorporates filtering options enabling users to choose specific products and categories for analysis, thereby providing a high degree of flexibility. This page facilitates the analysis of employee-specific performance as well.



The **Store Page** of the dashboard offers a comprehensive view of store performance and staff role performance in sales. It includes various graphics to analyze and evaluate KPIs relevant to store operations. The following components have been integrated into this page:

**Revenue Year-to-Date (YTD) Card:** This card displays the total revenue generated in millions for the selected store or store filter. It also includes the KPI indicating the progress towards reaching the revenue target. Additionally, the numeric value of the difference between the actual revenue and the target is presented.

**Sales Contribution Card:** This card provides the percentage contribution of the filtered store or store filter to the overall sales revenue. It helps users understand the significance of the selected store or store filter and its impact on the company's overall sales performance.

**Sales Volume Card:** This card indicates the sales volume in units for the filtered store or store filter. It provides insights into the quantity of products sold, aiding in understanding store performance from a volume perspective.

**Actual to Target Ratio Card:** This card provides the proportion of the actual revenues for each store compared to the target, with conditional color formatting differentiating if we have surpassed or not the target. It indicates how each store is doing compared to the target in an easy manner.

**Target and Revenue Comparative Line Chart:** This chart represents a comparison over time between the target revenue and actual revenue for the selected store or store filter. It allows users to visualize the revenue performance over time and identify trends, successes, or areas for improvement.

**Total Revenue by Role Stacked Bar Chart:** This chart showcases the total revenue generated by each staff role within the selected store or store filter. It provides a visual representation of the contribution made by different roles to the store's overall revenue.

**Sales Contribution by Category Pie Chart:** This chart displays the percentage sales contribution of different product categories within the selected store or store filter. It helps identify the most prominent product categories in terms of sales and informs decisions related to inventory management and marketing strategies.

Once again, the filtering options facilitate the dynamic analysis of Store and Role performance over time, thereby aligning with the specified business inquiries. If we consider the fact that each store in the dataset is associated with three employees, one for each role, this particular page can be employed for the examination of performance at an individual employee level.

The **Manufacturer Page** of the dashboard provides a comprehensive view of manufacturer performance and their impact on Brikint's sales revenue. The following components have been integrated into this page:

**Revenue Year-to-Date (YTD) Card:** This card displays the total revenue generated in millions for the selected manufacturer or manufacturer filter. Additionally, the numeric value of the difference between the actual revenue and the target is presented. This KPI enables users to assess the performance of each manufacturer in relation to revenue goals and identify manufacturers that have met or exceeded their targets.

**Sales Contribution Card:** This card provides the percentage contribution of the filtered manufacturer or manufacturer filter to the overall sales revenue. It helps users understand the significance of the selected manufacturer or manufacturer filter and its impact on the company's sales performance.

**Sales Volume Card:** This card indicates the sales volume in units for the filtered manufacturer or manufacturer filter. It provides insights into the quantity of products sold from each manufacturer, aiding in understanding their sales performance from a volume perspective.

**Actual to Target Ratio Card:** This card provides the proportion of the actual revenues for each manufacturer compared to the target, with conditional color formatting differentiating if we have surpassed or not the target. It is a fast way to verify how each manufacturer is doing compared to the target in an easy manner.

**Bar Chart of Top Products by Revenue:** This bar chart visualizes the top products produced by the selected manufacturer or manufacturer filter, ranked by revenue generated. It allows users to identify the highest revenue-generating products associated with each manufacturer, aiding in strategic decision-making regarding product selection, marketing, and inventory management.

**Total Sales Amount by Country World Map:** This world map showcases the importance of each manufacturer by region to the overall revenue of the company

**Current and PY revenue by Manufacturer double bar chart:** This chart allows the analyze of comparative manufacturer performance and dimension importance for the company.

This page serves as a valuable tool for analyzing manufacturer performance and optimizing partnerships, thereby contributing to the growth and success of the company. Furthermore, the logo of the filtered manufacturer has been incorporated to enhance interpretability during the analysis of a particular partner.





The analysis on the **Strategy Page** includes key economic indicators such as inflation rate, average unemployment growth, average GDP growth, market share trends, retail market size, and revenue growth comparison with main competitors. These insights aim to guide strategic decision-making and offer an overview of possible actions going forward. The information is divided by countries (the user chooses which using a filter) because there are strong strategic differences between them. No option is provided for Nigeria because there was not sufficient data available.

**Inflation Rate KPI:** This card displays the inflation rate for each market in which Brikint operates, excluding Nigeria. Inflation is a critical economic indicator that affects consumer purchasing power and market conditions. Monitoring inflation rates helps Brikint assess pricing strategies and adjust business operations accordingly.

**Average Unemployment Growth Card:** This card presents the average growth rate of unemployment for each market. Unemployment trends impact consumer spending and market demand. Understanding average unemployment growth allows Brikint to gauge the labor market and anticipate potential changes in consumer behavior.

**Average GDP Growth Card:** This card showcases the average growth rate of Gross Domestic Product (GDP) for each market. GDP growth is a fundamental indicator of overall economic performance. Monitoring average GDP growth rates helps Brikint identify markets with higher growth potential and allocate resources effectively.

**Market Share by Year Line Area Graph:** This graph depicts the market share of Brikint over time for each market. It provides insights into Brikint's position relative to its main competitors and enables the evaluation of market dominance or potential threats. Analyzing market share trends aids Brikint in assessing its competitive advantage and devising strategies to maintain or expand its market presence.

**Retail Market Size by Year Line Area Graph:** This graph represents the retail market size for each market over time. It helps Brikint understand the overall market potential and growth trajectory. Analyzing retail market size trends allows Brikint to identify markets with significant growth opportunities and align its strategies accordingly.

**Revenue Growth Comparison with Main Competitor Double Bar Chart:** This double bar chart compares Brikint's revenue growth with that of its main competitors in each market. In each year it provides a visual comparison of revenue performance and highlights areas where Brikint may excel or lag behind its competitors. This information enables Brikint to identify competitive threats and opportunities, facilitating strategic decision-making.

Through the utilization of this information, Brikint can discern potential avenues for growth, alleviate risks, and uphold a competitive advantage within the markets in which it operates. The Strategy page serves as a valuable instrument for informing and propelling Brikint's strategic endeavors in the future.

# CONCLUSION

In conclusion, with this dashboard, Brikint can discover the necessary answers it requires from both an operational and strategic standpoint in order to enhance its decision-making capabilities and optimize its business processes. The analysis of sales can be conducted through various angles and perspectives, utilizing the different pages and numerous filters provided. A color mode has also been incorporated to enhance the user experience.

Special attention has been devoted to addressing the business needs and inquiries specified by the stakeholders. To accomplish this, the visualizations and overall layout have been meticulously selected to effectively communicate the pertinent information in a lucid and captivating manner.

As a prospective enhancement, Brikint could contemplate expanding the dashboard's coverage to encompass other functional areas of the business, thereby enabling the organization to maintain its position as a leader in data-driven decision making.



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