2024-2025

TELECOMPLUS

BUSINESS INTELLIGENCE II

GROUP 22

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DATA WITH PURPOSE

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INTRODUCTION

In today's rapidly evolving digital environment, data has become one of the most valuable assets for companies, especially in data-intensive industries such as telecommunications.

TelecomPlus is a national telecommunication company operating in a highly competitive environment where agility, customer satisfaction, and operational efficiency are crucial.

In order to make data-driven decisions and gain deeper insight into business performance, this project develops a business intelligence (BI) solution. The goal is to answer key business questions about customer satisfaction, service quality, customer preferences, product trends, revenue trend and market performance through data consolidation, analytical model development, and interactive dashboard creation. The BI solution provides stakeholders with timely, accurate, and visual insights to guide strategic and operational planning.

1. BUSINESS PRESENTATION

TelecomPlus is a telecommunications company offering a wide range of internet and mobile services to both individual and corporate customers across the USA. Its service portfolio includes prepaid and postpaid mobile options, as well as high-speed fiber internet for both residential and business use. With its nationwide infrastructure and its large customer base, **TelecomPlus** plays a key role in empowering digital connectivity across the country. Its competitive position is shaped by a combination of pricing strategy, service quality, and technological innovation.

As of today, TelecomPlus has a market presence across the entire country. The West region (including the West, Southwest, and Midwest areas) accounts for most of their customer base, representing 75% of the total. However, there is still significant growth potential in the East region (Northeast and Southeast), where the remaining 25% of total customers are located.
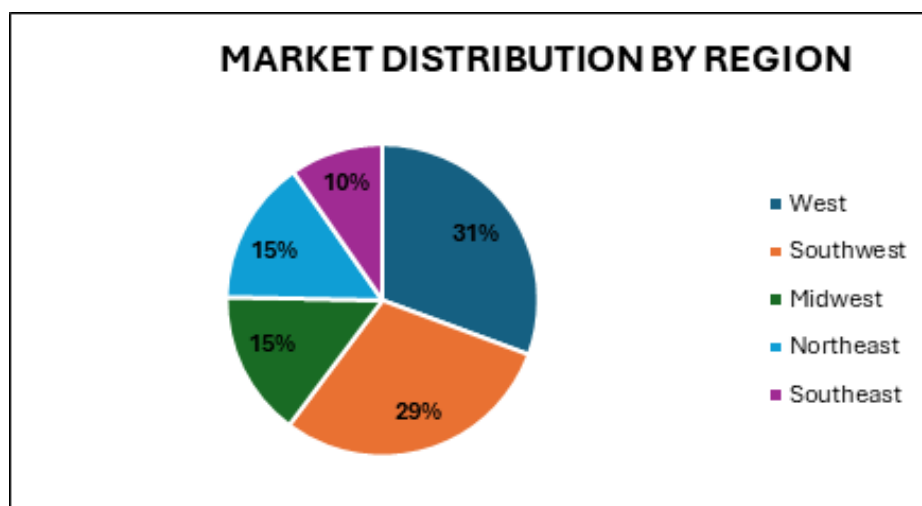
Figure 1: Market Distribution by Region

In terms of revenue, the company has experienced an average annual growth of 5% over the past five years, with the biggest increase happening between 2020 and 2021, when it grew by 12%.
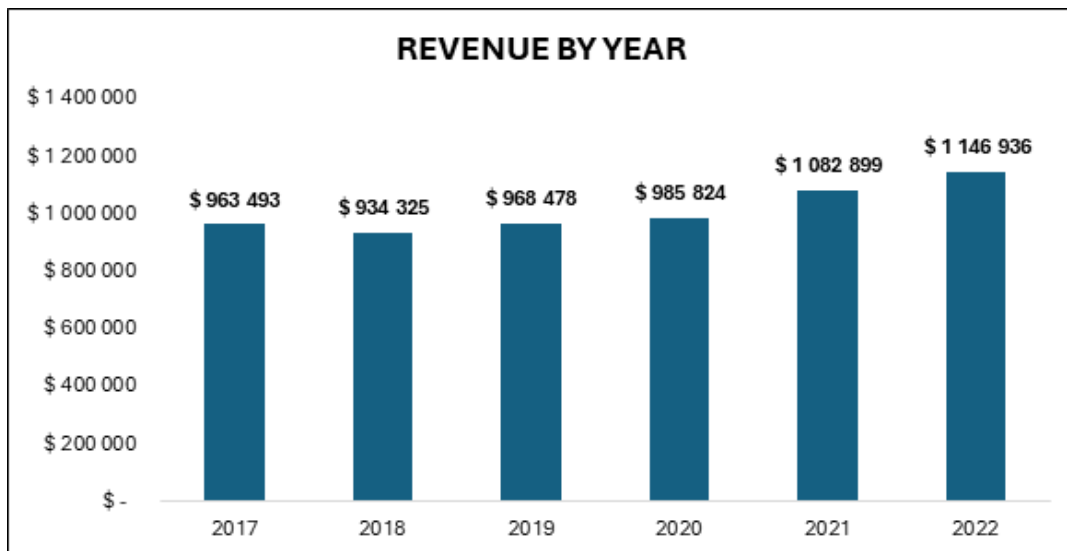
Figure 2: Total Revenue by Year

Following the yearly breakdown of revenue trends, it is possible to verify the distribution of the revenues across the company's products. Clearly, the are differences in revenue contribution across the product portfolio. Notably, the Ultra Fiber Plan stands out as the top revenue-generating product, followed by the Unlimited Postpaid Plan and the Home Fiber Plan, indicating a strong customer preference for high-capacity, long-term connectivity solutions. In contrast, Basic and Premium Prepaid Plans contribute significantly less to total revenue.
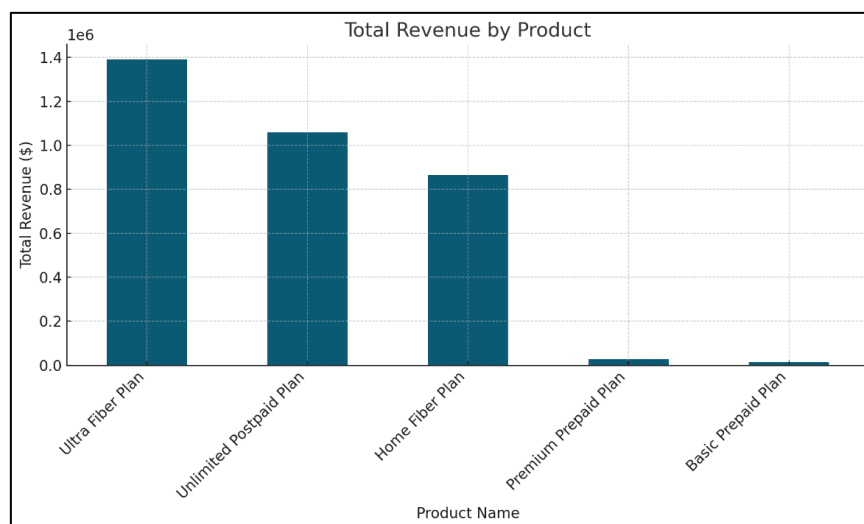
Figure 3: Total Revenue by Product

In terms of customer satisfaction scores, this information is collected during service interactions and is recorded on a scale from 1 to 5, with 1 representing the lowest level of satisfaction and 5 the highest. The distribution of these scores shows a higher concentration in the lower to mid-range values around scores 1, 2, and 3, while fewer interactions are associated with the upper satisfaction levels.

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Figure 4: Customer Satisfaction Score Distribution

Despite these numbers, during recent board meetings, **shareholders have expressed dissatisfaction with the current growth rate, as they feel it is not large enough to ensure the company's profitability in the long term.** To address these concerns, TelecomPlus has strengthened their customer service processes as part of a five-year strategic plan. The goal is to offer closer and more effective support to help customers resolve issues related to our services. Moreover, the company aims to use these customer interactions as an opportunity to attract potential new clients and expand their annual revenue base.

By taking advantage of the rise of digital platforms, TelecomPlus has developed a variety of communication channels to meet the needs of the different market segments, based on their demographics. These channels include remote options, such as digital and phone support, as well as in-person options through our physical stores in New York, Chicago, and Los Angeles.

CHANNEL TYPE	PLATFORM
Digital	Support Email
	Sales Email
	Marketing Email
	Website Chat
	Mobile App Chat
	Facebook Messenger
	Twitter
	Facebook
	Instagram
Voice	Toll-Free Line
	Local Line
	Customer Support Line
In-Person	New York Branch
	Los Angeles Branch

CHANNEL TYPE	PLATFORM
	Chicago Branch

Table 1: Channel Types

The growing competition in the industry makes it essential for TelecomPlus to better understand their revenue streams, customer preferences, and the quality of interactions with the public. This is crucial to improving customer loyalty and overall satisfaction, both before and after the sale of the services offered.

While this overview establishes a solid understanding of the business context, it also brings forward critical questions and operational challenges that need to be addressed. The next section focuses on identifying these key business problems and the role of Business Intelligence in addressing them.

2. BUSINESS PROBLEM

TelecomPlus is dealing with a few big challenges that are holding it back from giving the best service, meeting local customer needs, and growing its revenue.

- **Inconsistent Service Quality Across Channels**

 TelecomPlus lacks a clear understanding of the performance of our communication channels—such as phone, email, chat, and social media—within our customer service area. This makes it difficult to find bottlenecks in customer service, such as excessive wait times and prolonged resolution times. We are committed to providing a better service for our customers.

- **Products That Don't Fit Local Needs**

Customers in different areas have different needs, but **TelecomPlus** doesn't fully understand these regional preferences. This means the company might be offering products that don't fit what local customers really want, missing out on chances to connect with them and build loyalty.

- **Unclear Revenue Sources and Growth Opportunities**

TelecomPlus isn't sure which locations and products are bringing in the most revenue. Without insights into which markets, and product lines are performing best, the company risks investing time and money in the wrong areas, missing out on growth opportunities.

3. DATA WAREHOUSE

The Data Warehouse for TelecomPlus was designed following a star schema to support analytical queries related to customer service performance, product subscriptions, and revenue trends. The Data Warehouse includes two fact tables and six dimension tables, all cleaned and prepared through a structured ETL process using Microsoft Fabric pipelines and Dataflows Gen2.

3.1. FACT TABLES

3.1.1. fact_customer_interactions_cases

Captures detailed records of customer support interactions.

Column name	Data type	Description
fk_date	INT	Foreign key referencing dim_date (sk_date)
fk_agent	INT	Foreign key referencing dim_agent (sk_agent)
fk_channel	INT	Foreign key referencing dim_channel (sk_channel)
fk_customer	INT	Foreign key referencing dim_customer (sk_customer)
fk_reason	INT	Foreign key referencing dim_reason (sk_reason)
wait_time	FLOAT	The amount of time a customer waits before being attended to by an agent.
resolution_time	FLOAT	The time taken to resolve a customer's issue or complete their request.
satisfaction_score	INT	A numerical rating provided by the customer to indicate their level of satisfaction with the interaction.
interaction_duration	DECIMAL (18, 2)	The total length of time spent on customer interaction.

Table 2: fact_customer_interactions_cases

Fact table / Dimension table	Dim_date	Dim_customer	Dim_agent	Dim_chanel	Dim_plan	Dim_reason
Fact_customer_interactions_case	X	X	X	X		X

Table 3: Bus Matrix for fact_customer_interactions_cases

3.1.2. fact_signups_record

Tracks customer subscriptions and revenue details.

Column name	Data type	Description
fk_signup_date	INT	Foreign key referencing dim_date (sk_date)
fk_termination_date	INT	Foreign key referencing dim_agent (sk_agent)
fk_customer	INT	Foreign key referencing dim_channel (sk_channel)
fk_plan	INT	Foreign key referencing dim_customer (sk_customer)
percentage_discount	DECIMAL (18, 4)	Represents the percentage discount applied to a product
final_price	DECIMAL (18, 4)	The final price of the product or service after any discounts

Table 4: fact_signups_record

Fact table / Dimension table	Dim_date	Dim_customer	Dim_agent	Dim_chanel	Dim_plan	Dim_reason
Fact_signups_record	X	X			X	

Table 5: Bus Matrix for fact_signups_record

3.2. DIMENSION TABLES

3.2.1. DIM_DATE

Time-based dimension for trend analysis.

Column name	Data type	Description
sk_date	INT	Surrogate key
proper_date	DATE	Date in format "dd/mm/yyyy"
monthday_number	INT	Month number
weekday_number	INT	Number of the weekday

Column name	Data type	Description
weekday_name	VARCHAR(20)	Name of the weekday
weekday_name_short	VARCHAR(10)	Shorter version of the name of the day
month_number	INT	Number of the month [1, 12]
month_name	VARCHAR(20)	Name of the month
month_name_short	VARCHAR(20)	Shorter version of the name of the month
quarter_number	INT	Number of the quarter [1, 4]
quarter_name	VARCHAR(10)	Name of the quarter
semester_number	INT	Number of the semester [1, 2]
semester_name	VARCHAR(20)	Name of the semester
year	INT	Year corresponding to the date
is_weekend	VARCHAR (3)	"yes" If the day in on weekend, "No" if it is not
season_number	INT	Number of the season [1,2,3,4]
season_name	VARCHAR(20)	name of the season
Season_name_short	VARCHAR (10)	Shorter version of the name of the season
promotion_seasonality	VARCHAR(50)	Refers to the specific seasonal events or periods during which a promotion is active or targeted

Table 6: dim_date

3.2.2. DIM_CUSTOMER

Details on customer demographics and location.

Column name	Data type	Description
sk_customer	INT	Surrogate key
bk_customer	VARCHAR(10)	Business key of the customer
customer_first_name	VARCHAR(50)	Customer's first name
customer_surname	VARCHAR(50)	Customer's surname
customer_age	INT	Customer's age
customer_gender	VARCHAR(10)	Customer's gender
customer_city	VARCHAR(50)	Customer's city of residence
customer_region	VARCHAR(50)	Region within the country where the city is located
customer_state	VARCHAR(50)	Customer's state of residence
customer_city_longitude	DECIMAL(18, 2)	The geographical coordinate specifying the north-south position
customer_city_latitude	DECIMAL(18, 2)	The geographical coordinate specifying the east-west position
Load_date_time	DATETIME2(2)	The specific date and time when data is imported or loaded into DW

Table 7: dim_customer

3.2.3. DIM_AGENT

Details about support and sales agents.

Column name	Data type	Description
sk_agent	INT	Surrogate key

Column name	Data type	Description
bk_agent	VARCHAR(10)	Business key of the agent
agent_name	VARCHAR(100)	Agent's full name
agent_role	VARCHAR(50)	Agent's role in a team
agent_team	VARCHAR(50)	Agent's teams within a department
agent_department	VARCHAR(50)	Agent's department
agent_experience_years	INT	Agent's years of experience
agent_experience_LVL	VARCHAR(50)	Agent's experience level depending on the number of years.

Table 8: dim_agent

3.2.4. DIM_CHANNEL

Information about customer communication channels.

Column name	Data type	Description
sk_channel	INT	Surrogate key
bk_channel	VARCHAR (10)	Business key of the channel
channel_category	VARCHAR (50)	Channel's main category
channel_type	VARCHAR (50)	Channel's type within a category
channel_platform	VARCHAR (100)	Channel's specific platform depending on the type

Table 9: dim_channel

3.2.5 DIM_PLAN

Describes product plans and categories.

Column name	Data type	Description
sk_plan	INT	Surrogate key
bk_plan	VARCHAR (10)	Business key of the offered plan
product_name	VARCHAR (100)	Name of the product offered
offer_category	VARCHAR (50)	Product's category
offer_type	VARCHAR (50)	Type in which the category is immersed
monthly_price	FLOAT	Product's monthly price
data_allowance	VARCHAR (20)	Total data allowance (in GB)

Table 10: dim_plan

3.2.6. DIM_REASON

Purpose of customer interaction.

Column name	Data type	Description
sk_reason	INT	Surrogate key
bk_reason	VARCHAR (10)	Business key of the reason
reason_name	VARCHAR (50)	Name of the reason for the interaction with a customer.
category	VARCHAR (50)	Groups reasons categories (e.g., "Inquiry," "Assistance").
type	VARCHAR (50)	Specifies the nature or type of interaction

Column name	Data type	Description
		within a category (e.g., "Sales/Onboarding," "Technical Support").
Call_priority	VARCHAR (10)	Indicates the urgency level of the interaction, enabling prioritization in reporting (e.g., "High," "Medium").

Table 11: dim_reason

4. IDENTIFICATION OF BUSINESS NEEDS

Given the business problems previously identified, as well as the implementation of a Business Intelligence solution for TelecomPlus, the following are the needs identified and prioritized by the company that will help provide relevant information and support the achievement of their strategic goals for the next five years.

4.1. IMPROVING SERVICE QUALITY AND CUSTOMER EXPERIENCE

Goal: To gain a clear understanding of how each customer service channel and department perform.

- **What is the average waiting and resolution time for each department?**

Understanding the average waiting and resolution time for each department helps identify bottlenecks in customer service and highlights areas where efficiency can be improved. If certain departments consistently have higher wait or resolution times, it can lead to customer dissatisfaction and churn.

- **What is the average customer satisfaction score for each channel and department?**

It identifies which channels and departments meet customer expectations and highlights areas needing improvement to boost satisfaction and loyalty. High levels of satisfaction can indicate effective processes, while low levels can point to specific channels or departments needing improvement.

- **Which channel resolves interactions the fastest for specific reasons of interaction?**

Understanding which channel resolves interactions, the fastest helps optimize customer service efficiency, reduce wait times, and enhance overall customer satisfaction.

- **What is the volume of interactions handled by each channel for different reasons of interaction?**

Understanding the volume of interactions handled by each channel for different reasons of interaction helps identify demand patterns. It allows the company to optimize staffing, prioritize high-demand channels, and improve service delivery.

4.2. CUSTOMER PREFERENCES AND PRODUCT TRENDS

Goal: To understand the preferences of customers in different areas so that we can deliver the right products to the right audience.

- **Which products have the highest number of subscriptions, broken down by gender and age group?**

Understanding how product preferences differ by gender and age helps tailor marketing strategies, product offerings, and promotions to better meet the needs of specific customer segments, driving higher engagement and sales.

- **What are the top 3 products with the highest number of subscriptions by region?**

Identifying the top products by new subscriptions in each region helps the company understand regional preferences, optimize marketing strategies, and focus on high-demand products to drive growth in specific areas.

4.3. REVENUE ANALYSIS AND MARKET PERFORMANCE

Goal: To analyze revenue patterns across locations, products, and time to help TelecomPlus spot growth opportunities and focus on areas that drive profitability.

- **What are the top 3 locations with the highest revenue?**

This question looks at which areas bring in the most revenue, giving TelecomPlus a sense of its strongest markets. Knowing where the top-performing regions are can guide investment and help the company focus on high-potential areas.

- **How has the annual revenue for each product category changed over time?**

This question focuses on revenue trends over the years for different product categories, like mobile or (fixed) internet plans. By tracking these trends, TelecomPlus can see which categories are growing and which might need a boost, helping with decisions on product development and promotion.

- **Which product types within each category have shown the highest absolute and percentage revenue growth over the past 5 years?**

This question goes into the details of which specific product types are gaining or losing traction. It allows TelecomPlus to focus on expanding the popular products and reconsidering those that

may be underperforming, helping the company stay aligned with customer demand and market trends.

5. SEMANTIC MODEL

The semantic model built on Microsoft Fabric will serve as a key step to answering the business questions raised by the organization and delivering value to TelecomPlus by providing insights that support the achievement of their strategic plans over the next five years. It is comprised of essential components, such as dimensions that provide context, both native and calculated measures, to quantify business performance, and Key Performance Indicators (KPIs) designed to monitor progress towards strategic goals.

The following sub-sections will outline the main components of the semantic model, including its structure, key measures implemented, and how these enable the organization to answer critical business questions for TelecomPlus.

5.1. STRUCTURE OF THE SEMANTIC MODEL

Given the context under which the organization develops, as well as its specific requirements for the BI solution, the semantic model was constructed over the existing tables coming from the existing Data Warehouse. As was previously explained, this Warehouse originally consisted of six-dimension tables and two fact tables.

On the other hand, as for the structure of the semantic model, it keeps the same number of tables, but its main goal is to provide an additional layer that explains the relationships between the sources, considering the business logic and the information needs the company expects to meet.

In that sense, the first step for constructing the semantic model was to rename the tables into more user-friendly denominations that facilitate the understanding of their role in providing context and observations for in-depth analysis. The following table summarizes the conversion for the eight tables in the new layer:

Former name	New name
Dim_agent	D Agent
Dim_channel	D Channel
Dim_customer	D Customer
Dim_reason	D Reason
Dim_plan	D Plan
Dim_date	D Date
fact_customer_interactions_cases	F Customer Interactions
fact_signups_record	F Signups Record

Table 12: User-Friendly names for semantic model

The attributes in each table were renamed in accordance with standard naming conventions. Detailed information regarding these changes is provided in the appendix of this report. In parallel, a description of each table is presented below:

- ### ▪ D Agent

This table contains information about TelecomPlus agents, including their role, team, and department. It is essential for analyzing **service quality and customer experience** by enabling the breakdown of waiting times, resolution times, and customer satisfaction scores by agent roles and teams, helping to identify areas for improvement in customer service performance across different departments.

This dimension supports organizational performance analysis through its hierarchy of **Department -> Team -> Role**.
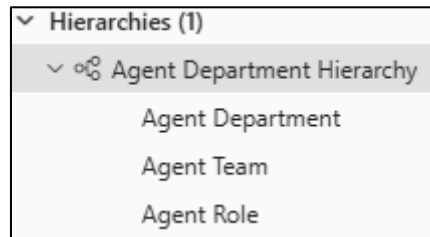

Figure 5: Hierarchy for D Agent table

- ### ▪ D Channel

This table provides context about the different communication channels available for customers, categorized by type and platform. It is vital for analyzing **service quality and customer experience** by allowing the examination of customer satisfaction, resolution times, and interaction volumes across various channels, helping to optimize service efficiency and resource allocation for different interaction methods.

This dimension facilitates analysis of customer interaction channels with its hierarchy of **Category -> Type -> Platform.**
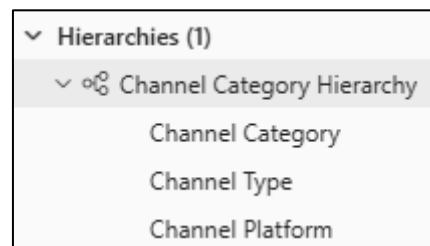

Figure 6: Hierarchy for D Channel table

- ### ▪ D Customer

This table holds demographic and location information about customers, such as age, gender, city, state, and region. It is crucial for understanding **customer preferences and product trends** by allowing the segmentation and analysis of subscription data based on customer demographics and location, answering questions about which products are popular among different customer groups and in different regions. It also helps identify **top-performing locations for revenue analysis**.

This dimension enables geographic analysis with its hierarchy of **Region -> State -> City.**

Figure 7: Hierarchy for D Customer table

- ## D Reason

This table contains the reasons why customers interact with TelecomPlus, such as signing up for a service or requesting support, along with categories and types of interaction. It is important for understanding the **nature of customer needs** and for analyzing **service quality and customer experience** by allowing the differentiation and analysis of interactions based on their purpose, helping to understand the demand for different types of support and sales interactions.

This table has no hierarchies.

- ## D Plan

This table details the subscription plans offered by TelecomPlus, including product name, category, type, and price. It is fundamental for understanding **customer preferences and product trends** by enabling the analysis of which plans have the highest number of subscriptions and for performing **revenue analysis and market performance** assessments by tracking revenue generated by different product categories and types over time.

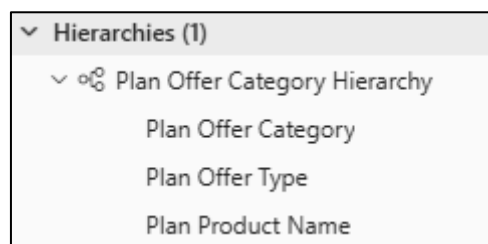This dimension supports product-based analysis with its hierarchy of **Category -> Type -> Product.**

Figure 8: Hierarchy for D Plan table

- ## D Date

This table contains all dates within the data range (2017-2022) and various time-based attributes like year, quarter, and month. Its importance lies in enabling the analysis of **trends over time** for revenue, subscriptions, and service metrics, directly addressing business needs related to **revenue analysis and market performance**.

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This dimension allows for time-based analysis through its hierarchy of **Year -> Semester -> Quarter -> Month -> Date**
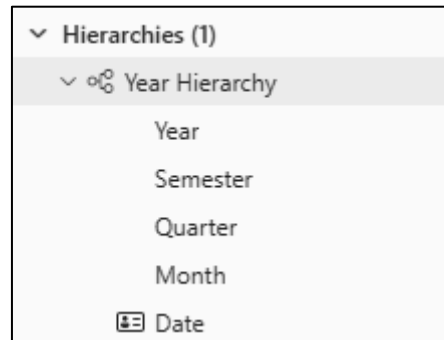
Figure 9: Hierarchy for D Date table

Furthermore, following best practices, these attributes were **sorted by their natural columns** to ensure logical ordering in reports. The full list of attributes for all the tables is available in the appendix of the report:

Attribute	Sorted by
Month	Month Number
Month Name Short	Month Number
Quarter	Quarter Number
Season	Season Number
Season Name Short	Season Number
Weekday	Weekday Number
Weekday Name Short	Weekday Number

Table 13: attribute sorting for D Date table

- ▪ **F Customer Interactions**

This fact table records each customer interaction, including timestamps, agent and channel details, the reason for interaction, wait and resolution times, and satisfaction scores. It is central to analyzing **service quality and customer experience** by providing the measures needed to calculate average waiting and resolution times, average satisfaction scores, and to understand which channels resolve issues fastest for specific reasons.

The following bus matrix describes the connection between this table and the different dimensions:

Fact table / Dimension table	D Date	D Customer	D Agent	D Channel	D Plan	D Reason
F Customer Interactions	X	X	X	X		X

Table 14: Bus matrix for F Customer Interactions

- **F Signups Record**

This fact table records information about customer subscriptions, including the plan subscribed to, signup and termination dates, discounts, and the final price. It is crucial for understanding **customer preferences and product trends** by tracking which plans are being subscribed to, and for **revenue analysis and market performance** by providing the data needed to calculate total revenue, analyzing revenue by product and location, and identifying growth opportunities.

The following bus matrix describes the connection between this table and the different dimensions:

Tables	D Date	D Customer	D Agent	D Channel	D Plan	D Reason
F Signups Record	X X*	X			X	

Table 15: Bus matrix for F Signups Record

*For the D Date table, F Signups Record has two existing connections: one between surrogate **sk_date** and foreign **fk_signup_date** (active); another one between surrogate **sk_date** and foreign **fk_termination_date** (inactive).*

In the end, the semantic model follows a star schema, which is observed in the following image:
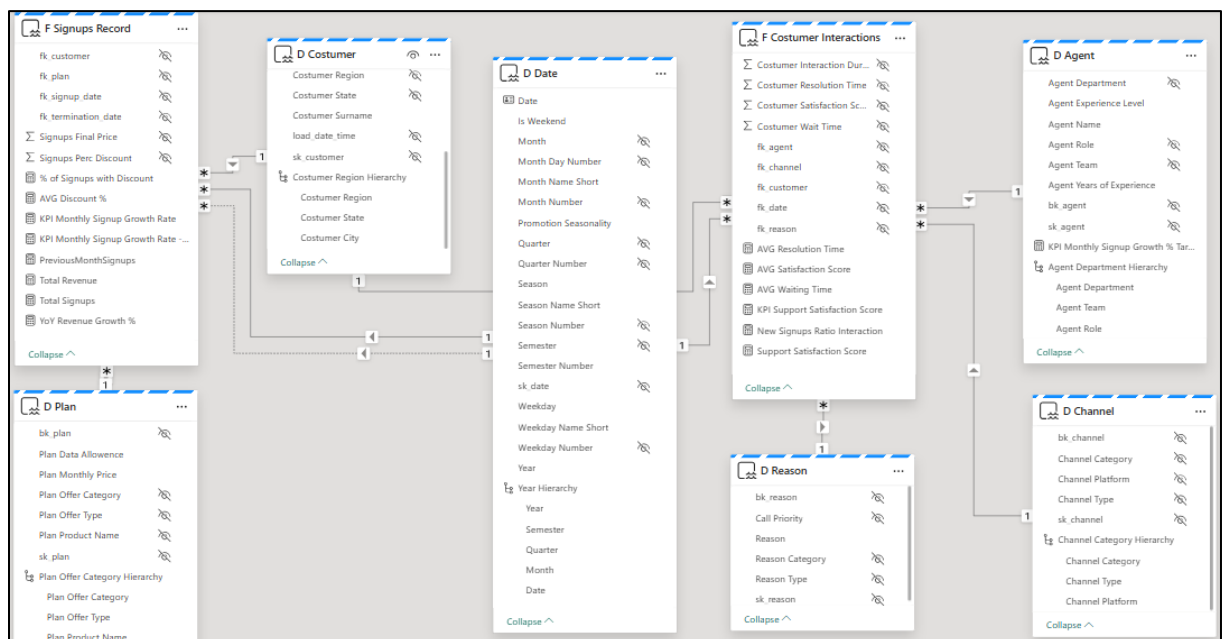

Figure 10: Semantic Model final structure

5.2. CALCULATED MEASURES AND KPI'S

TelecomPlus has focused on upgrading service quality and customer satisfaction, through well-defined KPIs and calculated measures and by examining various aspects of customer interactions, product subscriptions, revenue performance and overall business growth. Each

metric is designed, inside the semantic model, to provide actionable insights and to identify bottlenecks.

5.2.1. MEASURES

5.2.1.1. SERVICE QUALITY AND EXPERIENCE

The core of this initiative begins with measuring the average resolution time and average waiting time for each department using the following formulas:

- **AVG Resolution Time**

```
AVERAGE('F Customer Interactions'[Customer Resolution Time])
```

- **AVG Waiting Time**

```
AVERAGE('F Customer Interactions'[Customer Wait Time])
```

In addition, by calculating the average satisfaction score for each channel and department, Telecomplus can pinpoint areas requiring improvements.

- **AVG Satisfaction Score**

```
AVERAGE('F Customer Interactions'[Customer Satisfaction Score])
```

- **Satisfaction Score – Signups**

```
CALCULATE(
  ROUNDDOWN(
    AVERAGE('F Customer Interactions'[Customer Satisfaction Score]), 0)
  , 'F Customer Interactions'[fk_reason] = 2 )
```

- **Satisfaction Score – Support**

```
CALCULATE(
  ROUNDDOWN(
    AVERAGE('F Customer Interactions'[Customer Satisfaction Score]), 0)
  , 'F Customer Interactions'[fk_reason] = 1 )
```

To better understand service demand, TelecomPlus also records interaction volume by reason and channel allowing for efficient resource allocation.

- **Total interactions**

```
CALCULATE(COUNTROWS('F Customer Interactions'))
```

Signups Ratio Interaction metric that calculates the proportion of all customer interactions that are related to new signups:

- **New Signups Ratio Interaction**

```
DIVIDE(
    CALCULATE(
COUNTROWS('F Customer Interactions'),
'F Customer Interactions'[fk_reason]=1
),
    COUNTROWS('F Customer Interactions')

)
```

5.2.1.2. CUSTOMER PREFERENCES AND PRODUCT TRENDS

In terms of customer behavior, the company oversees product subscription trends across different demographic groups such as gender and age groups. This breakdown helps refine product offerings and marketing campaigns and evaluating the top-performing products in each region, allowing localized marketing and sales initiatives.

- **Total Signups**

```
COUNTROWS('F Signups Record')
```

Also, we calculated **previous year's signups**, to give the company insight to see if we are in an uprising trend compared to the previous year, and to detect at an earlier stage if there are any slowdowns in product interest.

- **PreviousYearSignups**

```
CALCULATE( [Total Signups] , DATEADD('D Date'[Date], -1, YEAR) )
```

5.2.1.3. REVENUE ANALYSIS AND MARKET PERFORMANCE

On the financial side, TelecomPlus identifies the Top 5 revenue-generating locations, which helps inform decisions on resource allocation and market focus, also the revenue is analyzed by product category and tracked over time to assess performance fluctuations

- **Total Revenue**

```
SUM( 'F Signups Record'[Signups Final Price] )
```

- **Previous Revenue**

```
CALCULATE( [Total Revenue], SAMEPERIODLASTYEAR('D Date'[Date]) ) + 0
```

In tandem, the company tracks the percentage of signups that involved a discount, as well as the average discount rate, helping TelecomPlus assess pricing strategies and promotional effectiveness.

- **% of Signups with Discount**

```
DIVIDE (
        CALCULATE(
                COUNTROWS( 'F Signups Record'  ) ,
                'F Signups Record'[Signups Perc Discount] > 0
                ),
        COUNTROWS( 'F Signups Record' )
    )
```

- **AVG Discount %**

```
AVERAGE( 'F Signups Record'[Signups Perc Discount] )
```

- **New Signups Ratio Interaction**

```
DIVIDE(
    CALCULATE(
            COUNTROWS( 'F Customer Interactions')
            ,'F Customer Interactions'[fk_reason]=1
            ),

    COUNTROWS( 'F Customer Interactions' )

    )
```

5.2.2. KEY PERFORMANCE INDICATORES (KPI'S)

To ensure sustainable growth and operational excellence, TelecomPlus has established a set of key Performance Indicators designed to monitor customer acquisition and service quality in a dynamic and measurable way.

5.2.2.1.   YEARLY SIGNUP GROWTH RATE (MSGR)

One such indicator is the Monthly Signup Growth Rate, which compares current signups to the previous months.

- **[KPI] YSGR - Yearly Signup Growth Rate**

```
DIVIDE  (
        [Total Signups] -   [Previous Year Signups]
        , [Previous Year Signups]
        )
+ 0
```

- **[KPI] YSGR (Target)**

```
                        0.085
```

Why this target?

Shareholders have shown concern about TelecomPlus's recent performance in attracting new customers. Over the past year, the **number of new signups grew by only 4%**, which is below expectations. To improve this, the company has set a new **target of 8.5% annual growth in signups**, or about **0.7% growth per month**. This goal is seen as realistic but ambitious, supported by recent marketing investments and plans to expand in the East region, where there is still room to grow. The target also considers better results expected from digital campaigns.

5.2.2.2.   AVERAGE SATISFACTION SCORE (ASS)

Meanwhile, TelecomPlus monitors its **average satisfaction score**. This KPI is seen as essential for enhancing customer loyalty and meeting service excellence standards.

- **[KPI] ASS - Average Satisfaction Score**

```
CALCULATE(ROUNDDOWN(AVERAGE('F Customer Interactions'[Customer
Satisfaction Score]), 0))
```

- **[KPI] ASS (Target)**

```
4.0
```

Why this target?

TelecomPlus sees interactions as a key part of the customer experience, because they can strongly influence whether people stay with the company or recommend it to others. **Research in the industry shows that when satisfaction scores drop below 4.0 out of 5, customers are more likely to leave**. **For this reason, the company set 4.0 as the minimum acceptable score**. This target is also supported by past observations. **Although most satisfaction scores are currently concentrated in the lower to mid-range levels, around 1 to 3** *(refer to Business Presentation for more context on this)*, the few periods when the average score approached or exceeded 4.0 were linked to fewer customer complaints and a more positive perception of the service.

5.2.2.3. *YEAR-OVER-YEAR REVENUE GROWTH PERCENTAGE*

To measure our financial performance, we use the Year-over-Year (YoY) Revenue Growth KPI, which compares current revenue with the same period from the previous year. This KPI provides a clear snapshot of how our revenue is evolving over time, showing the percentage change and helping us track market progress effectively.

- **[KPI] YRG - YoY Revenue Growth %**

```
VAR CurrentRevenue = [Total Revenue]

VAR PreviousRevenue =

    CALCULATE(

        [Total Revenue],

        SAMEPERIODLASTYEAR('D Date'[Date])

    )

RETURN

    DIVIDE(CurrentRevenue - PreviousRevenue, PreviousRevenue) + 0
```

- **[KPI] YRG (Target)**

0.06

Why this target?

The company has had an average annual revenue growth of 5% over the last five years, with the biggest increase of 12% between 2020 and 2021. However, in recent meetings, shareholders have said this growth rate is not enough to ensure long-term profitability *(refer to Business Presentation for more context on this).*

Therefore, a target of 6% annual revenue growth has been set for the Year-over-Year Revenue Growth KPI. This target is slightly higher than the historical average but still achievable given the current conditions and the company's growth plans.

6.   REPORTING & DASHBOARDING – DEVELOPMENT AND STRUCTURE

Given the three established main business problems and their subsequent nine business needs, expressed as questions, we developed a visual dashboard in Power BI that comprises a combination of visible and hidden pages, totaling 7 pages, including 2 embedded paginated reports. In that sense, the structure of the dashboard is summarized in the following table:

Page Name	Goal
Executive Business Overview	It summarizes the three primary KPIs and presents related secondary metrics along with their trends from 2017 to 2022.
Service Quality & Experience	This page is related to the "Improving Service Quality and Customer Experience" group of business needs. It explores the "Average Satisfaction Score" KPI in detail by breaking it down by department and channel. Additionally, this page provides extra metrics such as the number of interactions, waiting and resolution times, and how these average times have changed over the past five years.
Customer Preferences	This page is related to the "Customer Preferences and Product Trends" group of business needs. It provides statistics on the total number of signups and their evolution over time. Additionally, this data is broken down by age group and gender.

Page Name	Goal
Customer Preferences 2	At the top of the "Customer Preferences" page, this section analyzes customer preferences by region and by the hierarchy of the various plans offered by the company (categories, types, products).
Revenue Analysis and Market Performance	This page pertains to the "Revenue Analysis and Market Performance" group of business needs. It analyzes the variation in the percentage of revenue growth along with the absolute revenue values. Additionally, it provides the three regions with the highest revenue, with this metric broken down by plan category.
Paginated Report 1 – Revenue by Product Name	This page, linked to the "Revenue Analysis and Market Performance" page, embeds a paginated report on the total absolute and growth percentage of the revenue broken down by the Plan Offer Category Hierarchy (Plan Category, Plan Type, Plan Product).
Paginated Report 2 – Top 3 products by region and year	This page, linked to the "Customer Preferences 2" page, contains An embedded paginated report detailing the top 3 products by the number of signups for each region and year.

6.1. 'EXECUTIVE BUSINESS OVERVIEW' PAGE
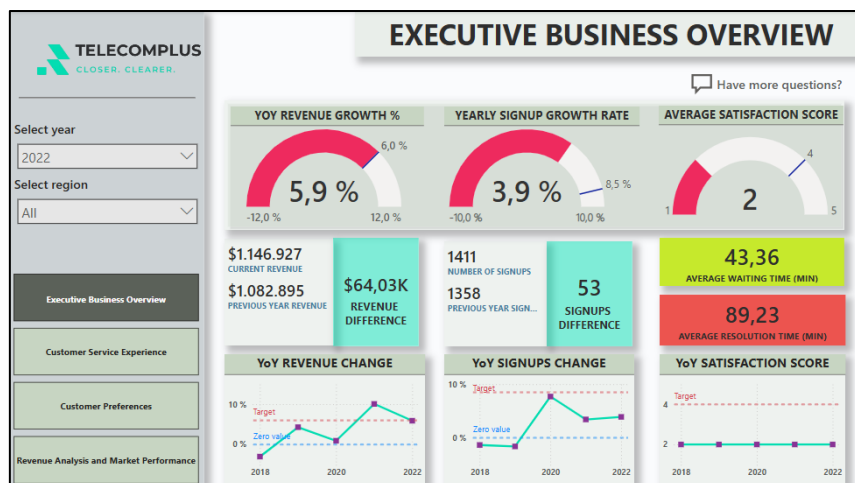
Figure 11: View of 'Executive Business Overview' dashboard page

The "Executive Business Overview" page was structured to provide a clear and quick summary of the company's performance. On the left side, simple filters for year and region were included after identifying the need for users to easily focus on the most relevant data for their analysis. This decision aimed to support comparisons across different periods and regions, which was a recurrent requirement in early feedback sessions.

At the top, three main key performance indicators (KPIs) along with their targets are displayed using gauges visualizations:

KPI	Description
Revenue Growth %	Shows how much the company's revenue has changed compared to the previous year.
Yearly Signup Growth Rate	Presents the change in the number of new customer registrations over the year.
Average Satisfaction Score	Indicates the overall level of customer satisfaction with the company's service for both support and signups customer services.

These KPIs and their gauge-style visualizations were chosen after testing different options and gathering feedback. Gauges were selected because they provide an immediate sense of progress toward targets, which was identified as important for quick executive assessments.

Below these indicators, cards display current and previous year values for revenue and signups, along with their differences. We decided to highlight increases in Bright Turquoise and decreases in Bright Raspberry to make positive and negative trends easy to identify. This color choice was made after evaluating various palettes and selecting those with the greatest visual impact.

Moreover, on the right, two additional customer service metrics are presented:

- **Average Waiting Time:** represents the typical time customers wait for service.

- **Average Resolution Time:** indicates the average duration taken to resolve customer issues.

Both metrics use a color gradient. Greener colors represent lower times (better performance), while red tones represent higher times (worse performance). This visual approach was chosen to communicate the efficiency of customer service operations. The decision to use a gradient rather than static colors was made to reflect the range of possible outcomes and provide a more intuitive understanding of performance.

The bottom section includes three line charts that illustrate how revenue, signups, and satisfaction scores have changed over the past years. We decided on line charts after realizing that users needed to see trends and patterns over time, which were not as clear using other chart types. Targets and zero values are clearly marked to help contextualize the data.

Overall, the page is structured to be easy to interpret without requiring technical expertise. It provides a general overview of business performance, highlights potential issues, and shows areas of success concisely and visually.

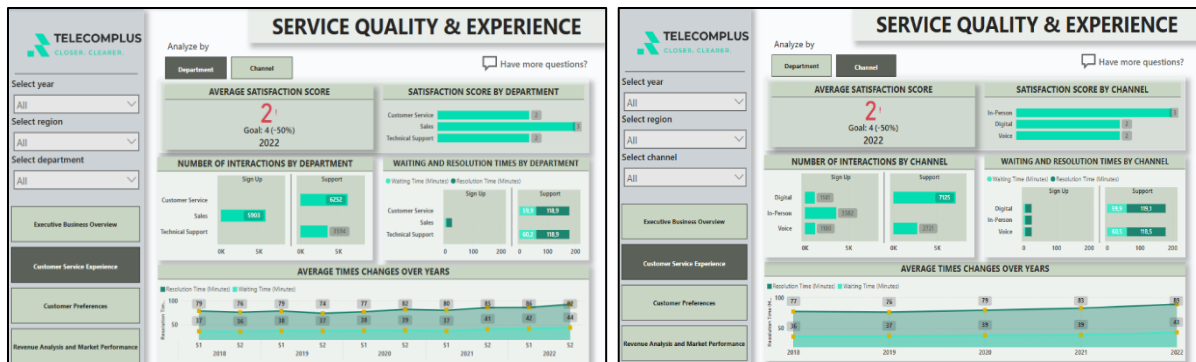## 6.2. 'SERVICE QUALITY & EXPERIENCE' PAGE

Figure 12: View of 'Service Quality & Experience' dashboard page for both 'Deparment' (left) and ' Channel' (right)

The "Service Quality & Experience" page was structured to answer the explicit business needs defined for customer service analysis. To support flexible data exploration, the group implemented a bookmark allowing users to switch between breakdowns by **department** and by **channel**.

Filters for year, region, department, and channel were added to let users focus on relevant subsets of data, supporting more targeted and actionable insights.

For each business question and based on inner feedback, we selected visualizations designed to provide clear and direct answers:

- **What is the average waiting and resolution time for each department?**

Bar charts display waiting and resolution times for each department (or channel), using small multiples to show results for different reasons for interaction (e.g., Sign Up, Support). This makes it easy to pinpoint which departments or channels are experiencing bottlenecks for specific types of interactions, enabling users to identify where improvements are needed.

- **What is the average customer satisfaction score for each channel and department?**

Bar charts, again using small multiples, show satisfaction scores across departments and channels for each reason of interaction. This helps users quickly see which areas and channels meet customer expectations and which need improvement, supporting efforts to boost satisfaction and loyalty.

- **Which channel resolves interactions the fastest for specific reasons of interaction?**

By using small multiples in the waiting and resolution time charts for each channel and reason, the dashboard allows users to directly compare channels for each specific interaction type. This enables the business to identify the most efficient channels and optimize customer service processes accordingly.

- What is the volume of interactions handled by each channel for different reasons of interaction?

Volume is shown via bar charts with small multiples, illustrating how many cases each channel or department handles for each reason. This visualization helps the business spot demand patterns and allocate resources to high-volume channels and reasons, supporting more effective service delivery.

At the bottom, a line chart tracks average waiting and resolution times over several years, providing context for understanding whether performance is improving or declining and helping evaluate the impact of any initiatives.

During development, we iterated several times to ensure the small multiples approach provided clarity without overwhelming users. Combining department and channel breakdowns and ensuring filter interactions worked smoothly were key challenges that shaped the final design.

Overall, each visualization was chosen to directly address the explicit business questions, making it easy for stakeholders to find actionable answers and supporting data-driven improvements in service quality and efficiency.

6.3. 'CUSTOMER PREFERENCES' (PAGES 1 AND 2)

The "Customer Preferences" section is split into two pages to answer business needs about customer preferences and product trends.

6.3.1. Page 1: Customer Preferences by Demographics
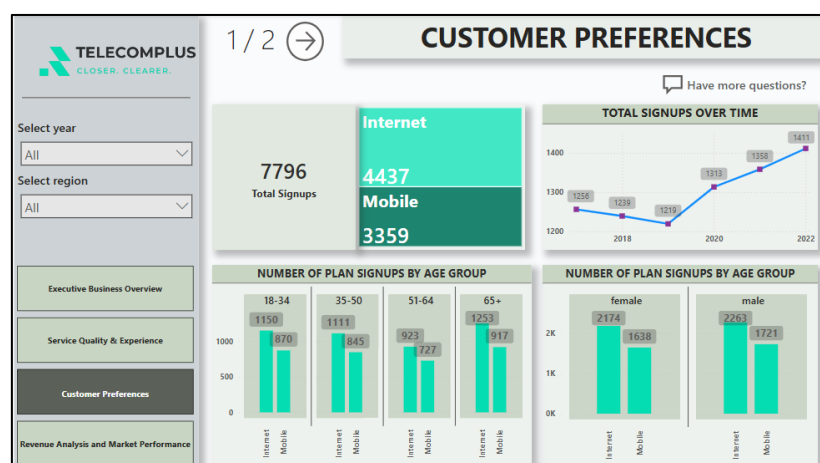
Figure 13: View of 'Customer Preferences' page 1

This first page is focused on showing how different customer segments (by age and gender) subscribe to the company's main products. The goal is to help identify which products are most

popular within each group so that marketing and product teams can better target their strategies. The main business need addressed here is:

- **Which products have the highest number of subscriptions, broken down by gender and age group?**

To answer this, we used bar charts with small multiples. Each age group and gender have its own panel for Internet and Mobile plan categories. We chose small multiples because our early prototypes with all groups in a single chart made it hard to see differences. Small multiples keep things clear and make it easy to spot which products are most popular with each group. This directly helps the business adapt marketing and offers for specific customer segments.

On the first page, we also included extra visualization such as **Total Signups and Plan Offer Category Split cards** and **Total Signups Over Time** to give users a quick overview of overall product demand and how it changes across years. This broader context helps users better understand and interpret the patterns seen in product preferences by age and gender.

6.3.2. Page 2: Customer Preferences by Region
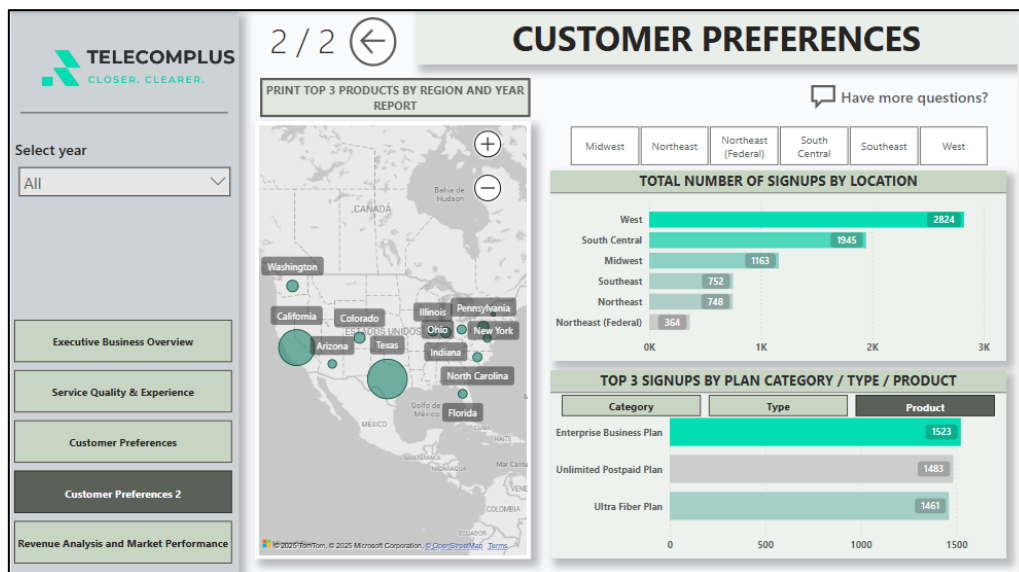
Figure 14: View of 'Customer Preferences' page 2

This second page is built to show how product signups are spread across different areas and to help find out which products are most popular in each place. The main goal is to help teams make better choices about where and what to offer in different regions.

The main business question here is:
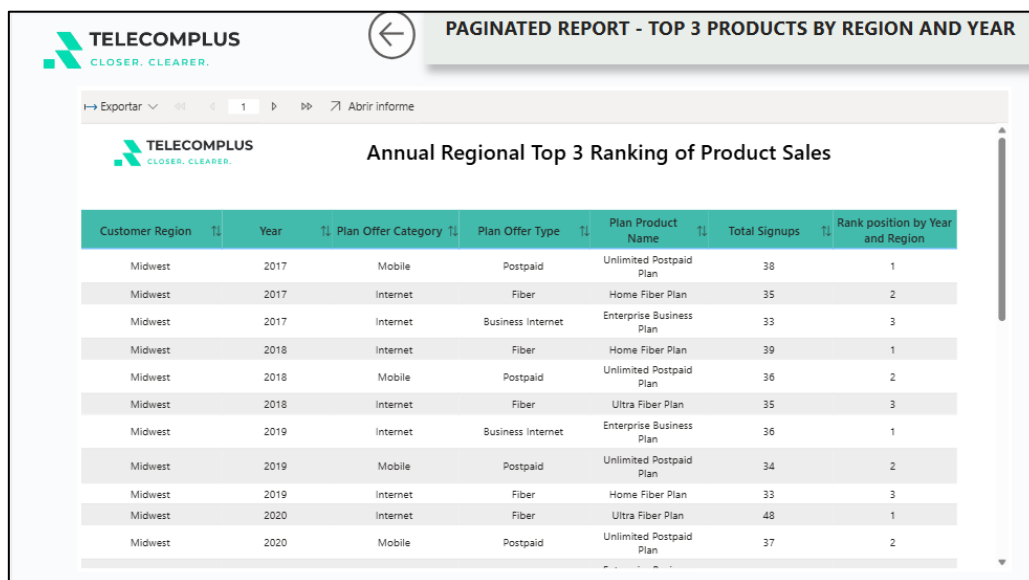
- **What are the top 3 products with the highest number of subscriptions by region?**

To help answer this, we included several visuals:

- The map shows each state with a bubble—the bigger the bubble, the more signups there are in that state. This makes it easy to spot which states have more customers.
- Next to the map, a horizontal bar chart adds up the total signups for each broad region, so you can quickly compare demand between regions.
- At the bottom, there's a bar chart with a navigation bar (slick nav) that allows switching between Plan Category, Plan Type, and Product Name. This navigation was designed to make it clear and straightforward to move top-down through the plan offer hierarchy, starting from a broad view (Plan Category), then narrowing down to more detail (Plan Type), and finally reaching the specific products (Product Name). The chart always shows the Top 3 using a TOP N filter at the selected level and updates based on any filters applied on the page.

It is worth noting that no single visual answers the business question completely on its own. Instead, it is the combination of the map (for state details), the bar chart (for regional totals), and the Top 3 chart (for product information) that together provide the full answer.

For those needing a clear, direct answer—specifically, the exact top 3 products by region and year—a link to a paginated report was added. This report presents a straightforward table with the required details.

Figure 15: Embedded paginated report

The paginated report, called "Annual Regional Top 3 Ranking of Product Sales," is organized as an easy-to-read table. Each row shows the region, year, product category, product type, product name, total signups, and the product's rank for that region in the same year.

The main goal of this report is to show, in a simple way, which products are the most popular in every region and year. By laying out information like this, it becomes much easier to spot patterns, compare how products are doing in different places, and decide where to put more focus on sales or marketing.

During the development of this page, the focus was on keeping things simple and easy to use. Different combinations were tested, and using a mix of state, region, and product visuals made it much easier to explore the data and address the business needs effectively.

6.4. 'REVENUE ANALYSIS AND MARKET PERFORMANCE' PAGE
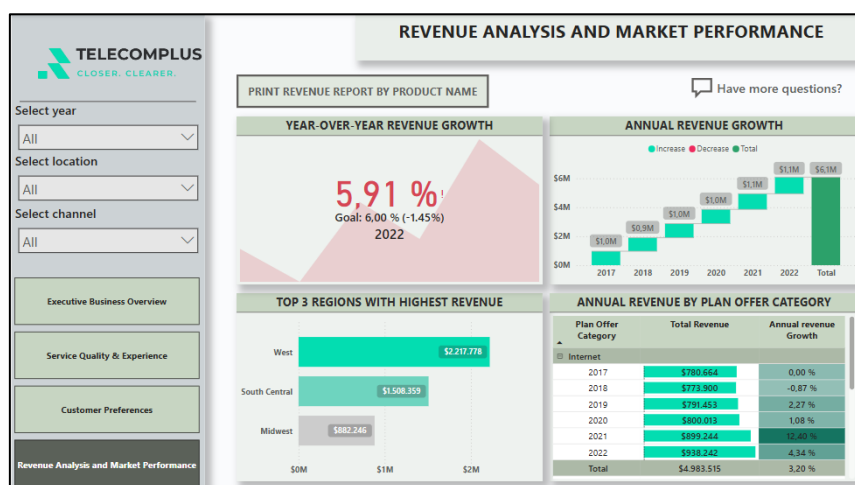
Figure 16: View of 'Revenue Analysis and Market Performance'

The "Revenue Analysis and Market Performance" page was structured to answer the main business needs related to revenue results and market trends. To support flexible data analysis, filters for year, location, and channel were included on the left side, allowing the focus to adjust easily for different time periods, regions, or sales channels.

For each business question, visualizations were chosen and designed to provide clear and direct insights:

- **What are the top 3 locations with the highest revenue?**

  A horizontal bar chart displays the three regions with the highest revenue, making it easy to see where the company's strongest markets are.

- **How has the annual revenue for each product category changed over time?**
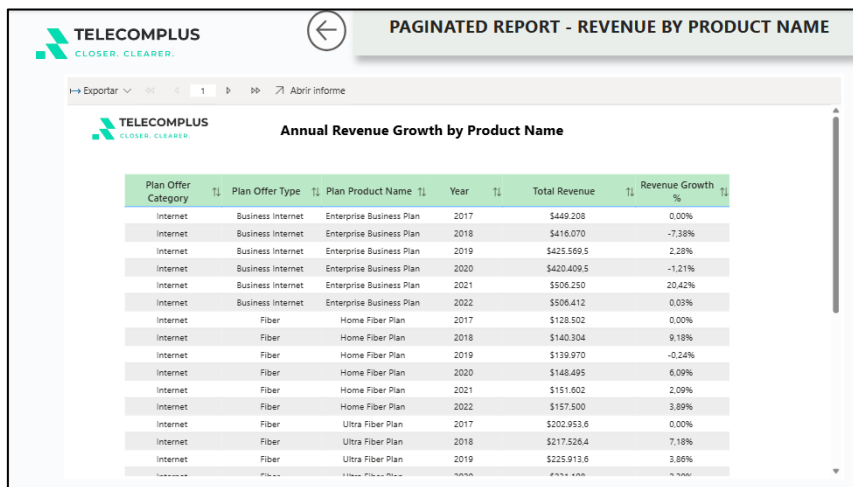
  Revenue trends are shown in two ways:

  - A bar chart at the top right shows the company's total annual revenue year by year, including the distinction between increases and decreases.

- A detailed table below breaks down total revenue and annual growth for each plan offer category, helping to compare categories like Mobile and Internet and see which ones are growing or declining.

- **Which product types within each category have shown the highest absolute and percentage revenue growth over the past 5 years?**

   The same detailed table includes annual growth rates for each plan offer category, making it possible to quickly spot which product types have gained the most in absolute and percentage terms.

In addition, a KPI card at the top left shows the latest year-over-year revenue growth, comparing it to the goal for that year. This gives a fast overview of whether the company is on track with its growth targets.

Moreover, a button at the top links directly to an embedded paginated report ("Print Revenue Report by Product Name") on a new page inside the dashboard. This paginated report provides a detailed table with revenue growth by product name, helping to answer the business needs more explicitly and giving access to data that may not fit directly on the main dashboard. This report will be explained in more detail in the next section.

Figure 17: Embedded paginated report

The paginated report, "Annual Revenue Growth by Product Name," is set up as a simple table. Each row shows the plan offer category, plan offer type, product name, year, total revenue, and revenue growth percentage for that year.

The main goal is to make it easy to see how each product's revenue changes over time. With this layout, users can quickly spot which products are growing or declining, compare results across product types, and use this information to guide product strategy and planning.

7. EXTRA FABRIC DEVELOPMENTS

7.1. DESIGNING PAGINATED REPORTS ON 'REPORT BUILDER' TOOL

Due to the known limitations of Microsoft Fabric Services when it comes to designing and customizing paginated reports, we decided to use proper tools such as **Power BI Report Builder** to give them a more uniform look as well as make a structure that would serve better for the interests of information of the stakeholders of the company. In that sense, the following are the specific enhancements delivered on the two previously presented paginated reports:
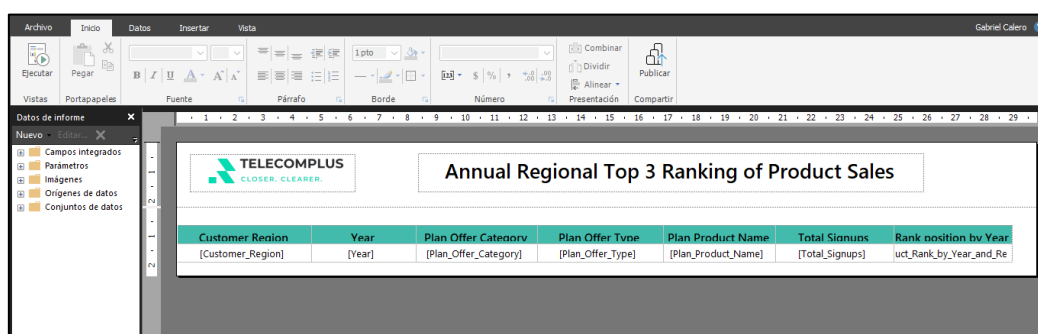
7.1.1. TABLE FORMATTING AND STYLING

Figure 18: Paginated Report structure on PBI Report Builder

To design these paginated reports, we started by adding a header section at the top of each page. We inserted the TelecomPlus logo on the left side of the header and placed the titles in the center, making sure they were bold and easy to read.

For the tables, we applied a background color to the header row to help the column names stand out and make the tables easier to read. We also made sure the text in the header rows was centered for a clean look. The titles and logos are evenly aligned, and the overall layout is simple and clear.

7.1.2. APPLYING FILTERS AND SORTING

To present the information in a more organized way to the final user, we applied filters and sorting rules inside Report Builder. Take for example the case of the "ANNUAL REGIONAL TOP 3 RANKING OF PRODUCT SALES" paginated report.

As explained before, this report shows the top 3 products by total number of signups by year in every region. To display the information properly, we created the ***'Product Rank by Year and Region'*** DAX measure, which basically returns a ranking position to a specific product given the context of the region, and the year and using the 'Total Signups' measure as a reference:

```
Product Rank by Year and Region =
RANKX(
    ALLSELECTED('D Plan'[Plan Offer Category], 'D Plan'[Plan
Offer Type], 'D Plan'[Plan Product Name]),
    CALCULATE([Total Signups]),
    ,
    DESC,
    Dense
)
```

When it comes to Report Builder, we applied the filter on the referenced measure to display the TOP 3 positions for each year in the selected region:

Figure 19: Filter configuration

Afterwards, we applied a sorting rule so to organize the table in ascending order (A-Z in the case of strings), given the result of first 'Customer Region', then 'Year', and finally the ranking position of 'Product Rank By Year and Region':

Figure 20: Sorting rules

The results of these filter and ordering rules are as follows:

Customer Region	Year	Plan Offer Category	Plan Offer Type	Plan Product Name	Total Signups	Rank position by Year and Region
Southeast	2017	Internet	Business Internet	Enterprise Business Plan	28	1
Southeast	2017	Mobile	Postpaid	Unlimited Postpaid Plan	25	2
Southeast	2017	Internet	Fiber	Ultra Fiber Plan	22	3
Southeast	2018	Internet	Business Internet	Enterprise Business Plan	27	1
Southeast	2018	Mobile	Postpaid	Unlimited Postpaid Plan	23	2
Southeast	2018	Internet	Fiber	Home Fiber Plan	22	3

Figure 21: Result of the paginated report

7.1.3. PARAMETER CREATION

According to [Microsoft documentation](#), parameters are a way to control the data in the paginated reports, and are commonly used to create and apply slicers that filter out the information displayed to the end user. In our specific case, and with the purpose of not overwhelming the stakeholders with lengthy reports, we aimed to narrow down the information to each region at a time, covering for the full five years of available data.

To create the slicer on the paginated report, we created a parameter named '*Region*', and configured it to display the unique values for the '*Region*' column in the '*DIM Customer*' table of the Semantic Model
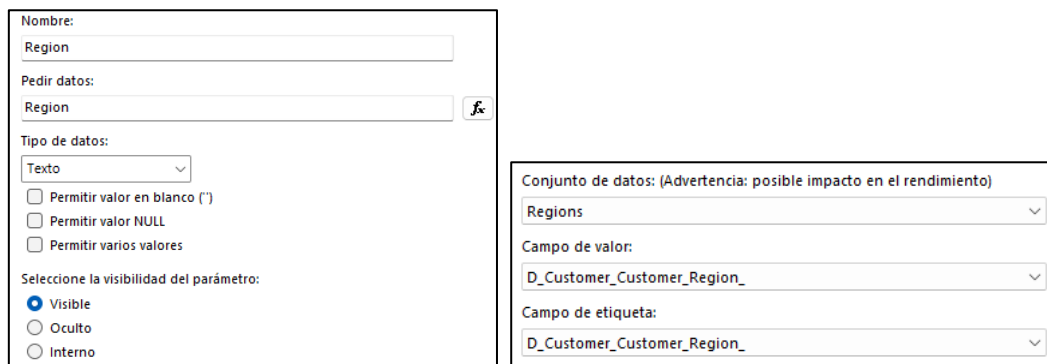
Figure 22: Parameter configuration on Report Builder

After the parameter creation, we included it in the query for the dataset used in the report. We referenced the parameter using a FILTER DAX function to filter out the table by the selected value of the parameter in the 'Customer Region' column:

Figure 23: Dataset query in Report Builder including the created parameter.

Finally, after making the necessary configurations and publishing the report on Fabric, we proceeded to include it in our BI dashboard, along with a slicer that allows the end user to select their preferred region. For this, we first used the 'Paginated Report' visualization on PBI

Desktop and dragged the column 'Customer Region' from the Semantic Model into the 'Parameters' field. This will later allow the slicer to be sync with the visualization:
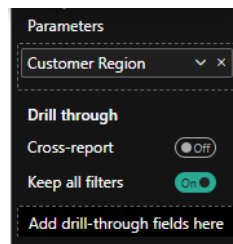
Figure 24: 'Paginated Report' visualization configuration

Then, the paginated report was selected directly from Fabric to be included in the visualization. During a follow-up configuration, the 'Customer Region' which had been included before, had to be selected once again to match the parameter of the report with the column of the semantic model:

Figure 25: 'Paginated Report' visualization configuration

Finally, a slicer was introduced in the dashboard and configured with the 'Customer Region' column from the 'D Customer' DIM table. This allows the end user to select their preferred location, and the report will be automatically updated to display the information:

Figure 26: Paginated report with slicer

7.2. PAGE-BASED REPORT TOOLTIP

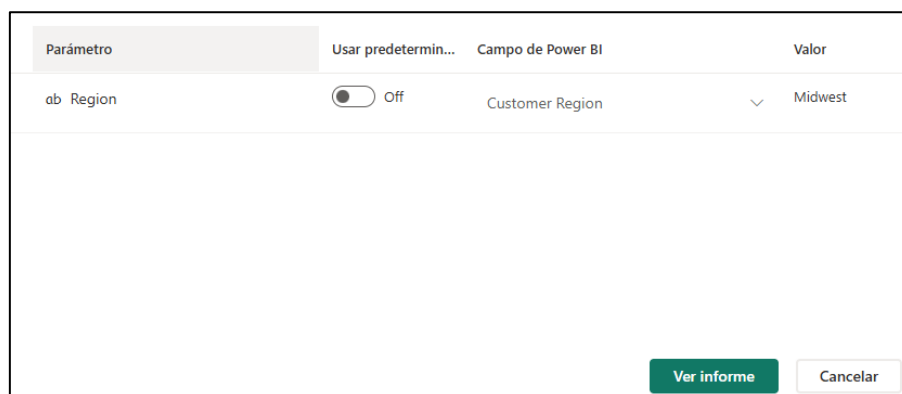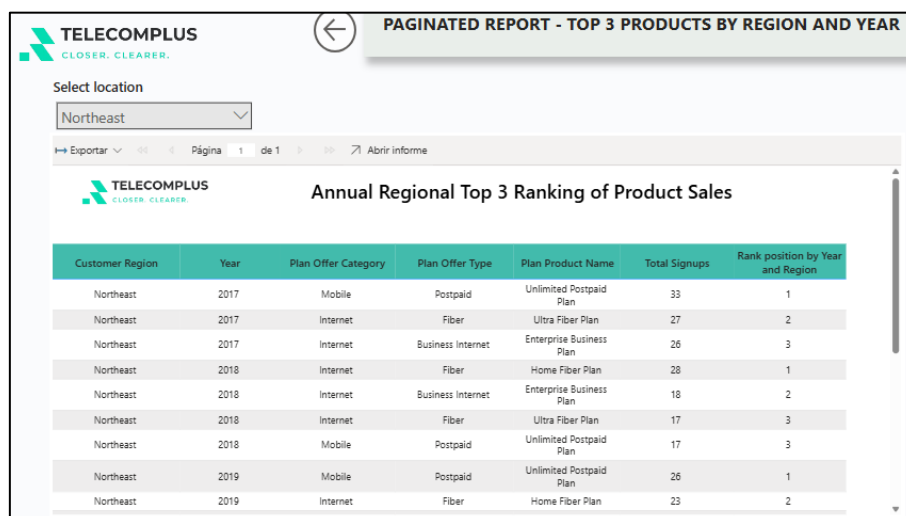In order to give detailed information to the map visualization in the 'Customer Preference 2' table, we decided to include a page-based report tooltip that displays a bar chart of the cities with the most signups when hovering over a state's bubble.

For doing this, a new page was created in the dashboard and a horizontal bar chart was included and configured using the 'Customer City' column from 'D Customers' table as the Y-axis, while the 'Total Signups' measure was set as the X-axis. Then, in the 'Format page' configuration the option 'Allow use as tooltip' was enabled to allow for the page to be used as a tooltip; in 'Canvas setting' configuration, the page was resized accordingly by selecting the 'Tooltip' option.
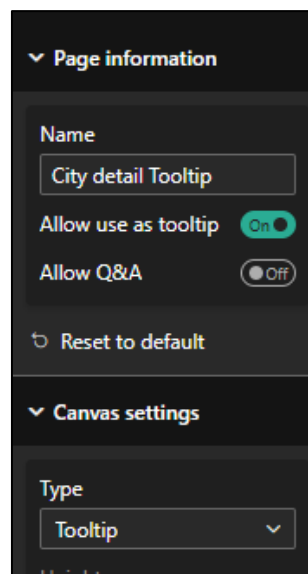

Figure 27: Tooltip page configuration

Finally, back in the 'Customer Preference 2' page, the map was configured to display the new page as a tooltip, giving the following result after hovering over the 'Texas' bubble, as an example:
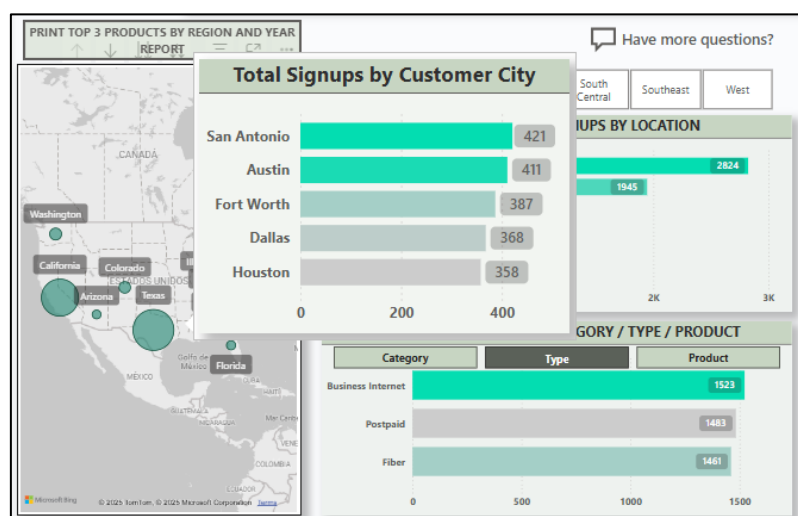

Figure 27: page-based tooltip result

7.3. HIERARCHICAL DRILL-DOWN NAVIGATION WITH BOOKMARKS

To make a more streamlined experience for the end user we tried bookmarks to enhance the navigation along the 'TOP 3 SIGNUPS BY PLAN CATEGORY / TYPE / PRODUCT' bar chart in the 'Customer Preference 2' page, due to its inherent complexity in displaying the information given the multiple ramifications of the involved hierarchy.

To achieve this, we created a bookmark for each level of the hierarchy and grouped them under the name of 'Signups bar chart'.

Then, we added a 'Bookmark' button type to the dashboard and configured it to navigate through the grouped bookmark 'Singnups bar chart', resulting in an intuitive way to quickly change between levels of the hierarchy.
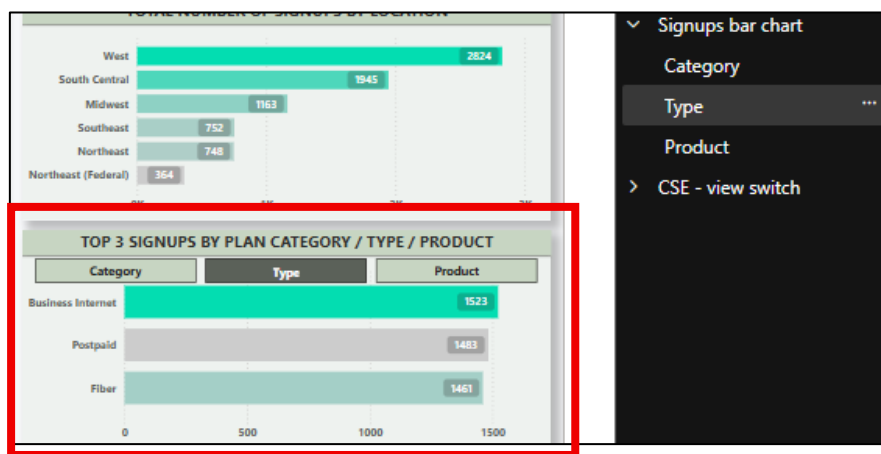
Figure 28: Bookmark creation

8. CRITICAL ASSESSMENT

This Business Intelligence project for TelecomPlus provided us with a practical and insightful learning experience, moving beyond theoretical concepts to address real-world business challenges. As students who navigated a full BI lifecycle in both the first and second semester of the master's, some key lessons emerged from the process of building a solution from the data warehouse to the final dashboard.

Lesson 1: The Importance of understanding and iterating business needs

One of the most significant takeaways was the realization that a successful BI solution is deeply rooted in understanding the end-users' requirements. The project began with identifying explicit business problems and translating them into specific questions the dashboard needed to answer. We learned that this initial identification is just the starting point, as the process of designing dashboard pages involves continuous iteration. This highlighted that BI development is an iterative dialogue with the end users, constantly seeking to refine how data is presented to best support decision-making.

Lesson 2: Navigating tool ecosystems and limitations

No single tool provides a perfect solution for every task. While Microsoft Fabric served as a foundational platform for developing the different project requirements, we encountered limitations, particularly when designing highly structured reports like the paginated reports. This led us to leverage specialized tools like Power BI Report Builder. The need to use Report Builder and subsequently integrate these reports back into the main Power BI dashboard taught us the value of understanding the strengths and weaknesses of different tools within a BI ecosystem and the importance of being able to combine them effectively to meet specific reporting needs.

Lesson 3: The semantic model to understand the business

Developing the semantic model proved to be a critical step, not just technically, but in terms of making the data accessible. A key aspect of this was renaming tables and attributes to more user-friendly terms. Although the underlying data structure remained technical, creating this layer with clear, business-oriented names and logical sorting for dimensions like Date and Customer made the data significantly easier for us when it came to building visualizations.

This experience reinforced the learning that the semantic model is vital for bridging the gap between the technical data infrastructure and the business logic, ensuring that stakeholders can easily understand and trust the data they are interacting with.

Lesson 4: Enhancing user experience

Exploring and implementing features that improve the user experience, such as the page-based report tooltip for map visualizations and hierarchical drill-down navigation using bookmarks, taught us that the impact of a BI solution goes beyond merely presenting data. These additional features allow users to explore data more intuitively and gain deeper context without additional effort. This emphasizes that investing time in user experience features can enhance the usability and add value to the final BI solution.

9.   CONCLUSION

For TelecomPlus, the successful implementation of this Business Intelligence solution marks a transformative step towards becoming a truly data-driven organization, directly addressing long-standing operational challenges and strategic objectives. Previously, they were facing difficulties understanding their service quality across various channels, identifying regional customer preferences effectively, and understanding revenue sources and growth potential. These issues impacted on their ability to provide consistent customer experience, optimize product offerings, and report relevant insights to stakeholders.

The capabilities provided by this BI solution empower TelecomPlus in several critical areas:

- **Improving Service Quality and Customer Experience:** the company now has the visibility to analyze performance by channel and department, identifying bottlenecks through average waiting and resolution times and pinpointing areas for improvement using average customer satisfaction scores.

- **Understanding Customer Preferences and Product Trends:** The solution enables them to segment and analyze product subscriptions by demographics like age and gender, facilitating tailored marketing and product strategies. Crucially, top management can now identify top products by region, guiding localized sales initiatives and capitalizing on specific market demands.

- **Analyzing Revenue and Market Performance:** The BI tool provides essential transparency into the company's financial results. Stakeholders can easily identify top-performing locations to guide investment and analyze revenue trends across product categories and types over time.

The inclusion of the Key Performance Indicators directly links the BI insights to their core strategic goals and addresses shareholder expectations. Monitoring these against defined targets becomes essential for tracking progress and ensuring accountability.

In conclusion, this BI project has successfully transformed raw data into actionable knowledge that is fundamental to decision-making. By providing clear and interactive insights, the solution directly enables the company to improve operational efficiency, enhance customer satisfaction and loyalty, capitalize on growth opportunities, and strengthen their competitive position. The business value delivered is indispensable for achieving their long-term strategic objectives and ensuring profitability in the dynamic and competitive telecommunications market.

APPENDIX

LIST OF USER-FRIENDLY NAMES IN THE SEMANTIC MODEL

DW TABLE	DW NAME	KEY?	SM NAME
dim_agent	sk_agent	Y	sk_agent
dim_agent	bk_agent	Y	bk_agent
dim_agent	agent_name		Agent name
dim_agent	agent_role		Agent Role
dim_agent	agent_team		Agent Team
dim_agent	agent_department		Agent Department
dim_agent	agent_experience_years		Agent Years of Experience
dim_agent	agent_experience_LVL		Agent Experience Level
dim_channel	sk_channel	Y	sk_channel
dim_channel	bk_channel	Y	bk_channel
dim_channel	channel_category		Channel Category
dim_channel	channel_type		Channel Platform
dim_channel	channel_platform		Channel Type
dim_customer	sk_customer	Y	sk_customer
dim_customer	bk_customer	Y	bk_customer
dim_customer	customer_first_name		Customer First Name
dim_customer	customer_surname		Customer Surname
dim_customer	customer_age		Customer Age
dim_customer	customer_gender		Customer Gender
dim_customer	customer_city		Customer City
dim_customer	customer_region		Customer Region
dim_customer	customer_state		Customer State
dim_customer	customer_city_longitude		City Longitude
dim_customer	customer_city_latitude		City Latitude
dim_customer	load_date_time		load_date_time*
dim_reason	bk_reason	Y	bk_reason
dim_reason	sk_Reason	Y	sk_reason
dim_reason	call_priority		Call Priority
dim_reason	reason_name		Reason
dim_reason	reason_category		Reason Category
dim_reason	reason_type		Reason Type
dim_plan	sk_plan	Y	sk_plan
dim_plan	bk_plan	Y	bk_plan
dim_plan	product_name		Plan Product Name
dim_plan	offer_category		Plan Offer Category
dim_plan	offer_type		Plan Offer Type
dim_plan	monthly_price		Plan Monthly Price
dim_plan	data_allowance		Plan Data Allowance
dim_date	sk_date	Y	sk_date

DW TABLE	DW NAME	KEY?	SM NAME
dim_date	proper_date		Date
dim_date	monthday_number		Month Day Number
dim_date	weekday_number		Weekday Number
dim_date	weekday_name		Weekday
dim_date	weekday_name_short		Weekday Name Short
dim_date	month_number		Month Number
dim_date	month_name		Month
dim_date	month_name_short		Month Name Short
dim_date	quarter_number		Quarter Number
dim_date	quarter_name		Quarter
dim_date	semester_number		Semester Number
dim_date	semester_name		Semester
dim_date	year		Year
dim_date	Is_weekend		Is Weekend
dim_date	Season_number		Season Number
dim_date	Season_name		Season
dim_date	Season_name_short		Season Name Short
dim_date	promotion_seasonality		Promotion Seasonality
fact_signups_record	fk_signup_date	Y	fk_signup_date
fact_signups_record	fk_termination_date	Y	fk_termination_date
fact_signups_record	fk_customer	Y	fk_customer
fact_signups_record	fk_plan	Y	fk_plan
fact_signups_record	percentage_discount		Signups Perc Discount
fact_signups_record	final_price		Signups Final Price
fact_customer_interactions_cases	fk_agent	Y	fk_agent
fact_customer_interactions_cases	fk_channel	Y	fk_channel
fact_customer_interactions_cases	fk_customer	Y	fk_customer
fact_customer_interactions_cases	fk_date	Y	fk_date
fact_customer_interactions_cases	fk_reason	Y	fk_reason
fact_customer_interactions_cases	wait_time		Customer Wait Time
fact_customer_interactions_cases	resolution_time		Customer Resolution Time
fact_customer_interactions_cases	satisfaction_score		Customer Satisfaction Score
fact_customer_interactions_cases	interaction_duration		Customer Interaction Duration

*The **load_date_time** attribute was originally created for the Slowly Changing Dimension process of the table **dim_customer** table in the DW. We decided to keep its original name and have it hidden inside the semantic model.*