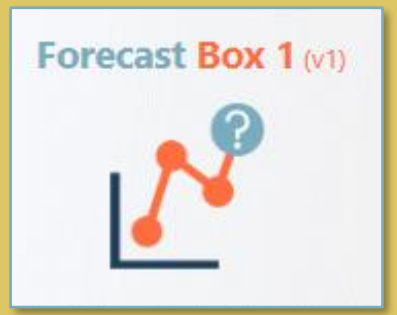
Part 1 - Build box 1 / CAGR

Financial forecast with PowerBI

CAGR

Compound Annual Growth Rate

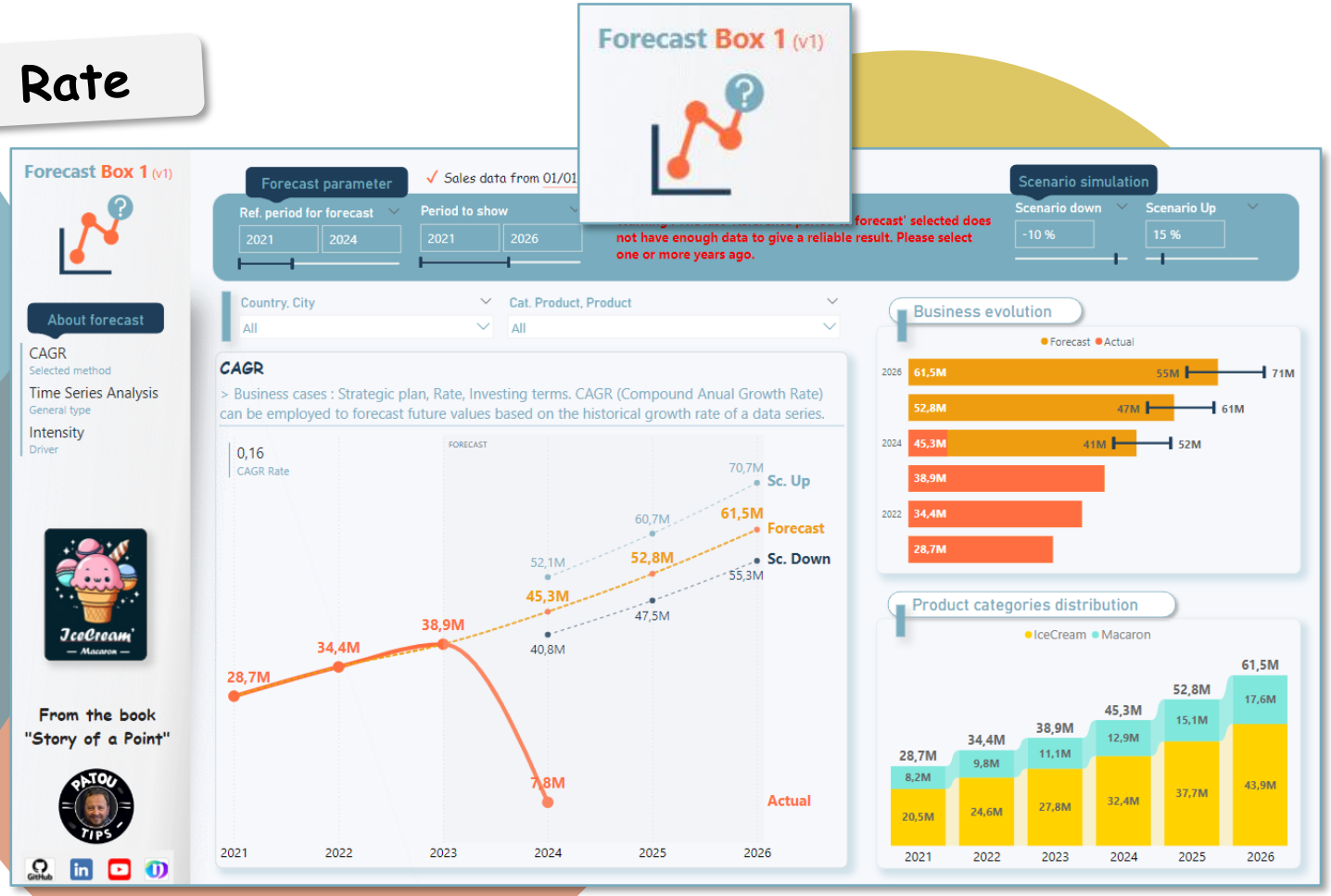
Today, learn to build the Box 1



CAGR, or Compound Annual Growth Rate

CAGR, or Compound Annual Growth Rate, belongs to the family of financial forecasts. It is often used to estimate the return on investment over a given period.

It is a valuable tool for investors and financial analysts to evaluate the performance of an investment or compare the growth of different companies over a period of time.



Links

To test on line (access free)

To practice (PowerBi files free)

When and how to use it?

Typical applications	• Strategic Plan: Many companies need to have a long-term vision, to reassure their shareholders for example, especially for big Firms • Currency growth rate
General type	Time Series Analysis
Drivers used	Intensity
Data required (Reference period)	A minimum of 3 years of sales history, without seasonality cycles. It could be also 3 others period, such month, days. Please note: A period must be complete. The aggregate total is enough
Projection	3-year forecast. Short terms
Identification of the turning point	Poor
Pros	Simple statistical models
Cons	However, it has drawbacks. It does not take into account the ups and downs during the analyzed period. Only the final value and the initial value are taken into account.
Note	The CAGR is an average of performance. The average performance over the years is different from the annual average. The CAGR does not add up! If your performance increases by 30% then by 20%, in the end it does not increase by 50% (30%+20%), but by 26% (1.3*1.2).
Forecast calculations	<u>Step 1: Calculate CAGR:</u> CAGR = (End value/Start value)$^{1/n}$ – 1 → with "n" is the number of period <u>Step 2: Calculate Forecast:</u> Revenue Year N+1 = Revenue Year N * (1+CAGR) Revenue Year N+2 = Revenue Year N * (1+CAGR)^2 Revenue Year N+3 = Revenue Year N * (1+CAGR)^3 Revenue Year N+4 = Revenue Year N * (1+CAGR)^4 Revenue Year N+5 = Revenue Year N * (1+CAGR)^5 Note: A 3 year forecast is an acceptable limit ("Revenue Year N+3). Futher away it's more random.

About IceCream & Macaron
a fictitious company based on Paris.

IceCream & Macaron is a fictitious company based on Paris.

It has 10 stores in 3 European countries. This company manufactures the products sold in these stores, ice cream and macaroons.

Stores are generally launched in summer to amortize their openings more quickly and generate more useful CashFlow.

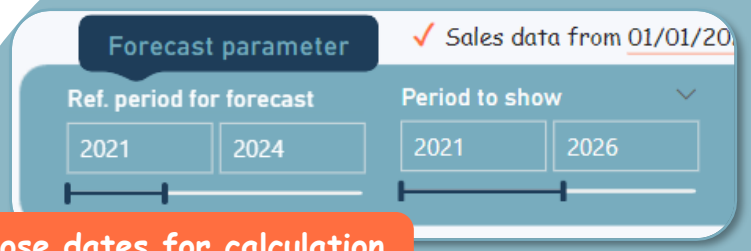
Product are generally launched in the Spring.

The activity is very sensitive to the weather and the end-of-year holidays.

About data	The sales data used in our book runs from January 1, 2021 to March 15, 2024.
Stores	Country: France — City: Paris, Nice, Marseille, Lyon, Nantes, Bordeaux*, Toulouse* Country: Austria — City: Wien Country: Germany — City: Munich Country: Italy — City: Rome * The latest stores to open are Bordeaux (1/8/2021) and Toulouse (1/8/2022).
Products	Category: IceCream — Product: Chocolate, Vanilla, Strawberry**, Lemon**, Mint Category: Macaron — Product: Chocolate, Pistachio, Strawberry, Lemon, Caramel ** → The last 2 product launches, Lemon ice creams (1/3/2021) and Strawberry ice creams (1/3/2022).

We will use the data of the fictitious firm « IceCream & Macaron » for this forecast!

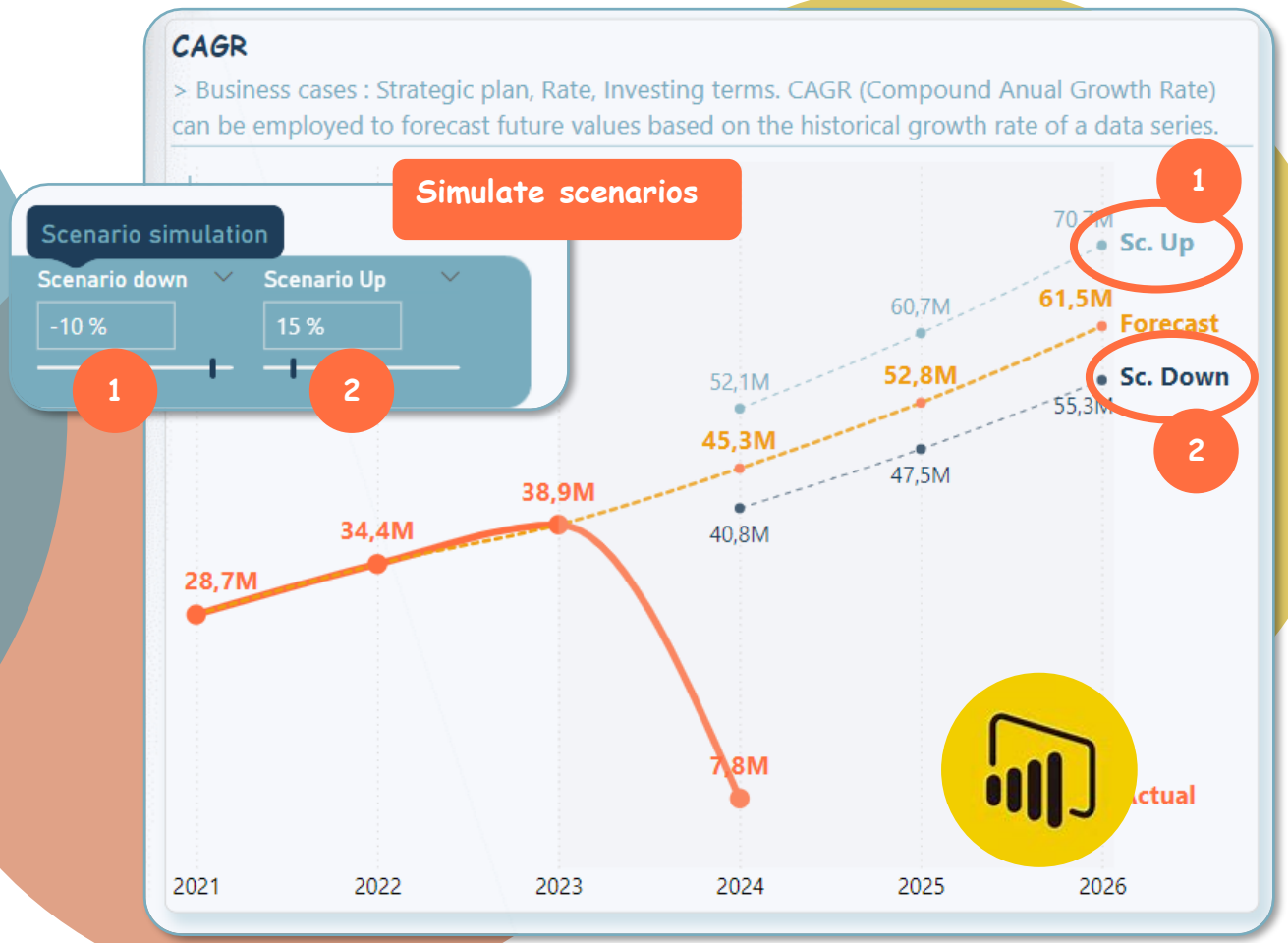
How it works?



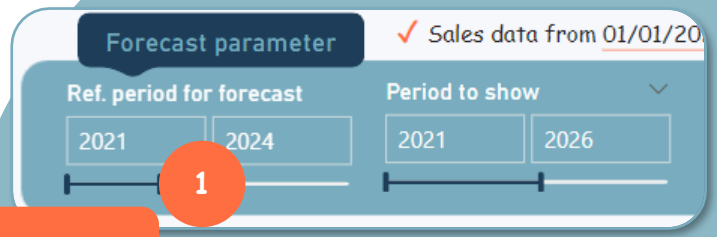
Choose dates for calculation and vizualisation

- **Ref. period for forecast:** Years needed to calculate the CAGR rate.
- **Period to show:** Years to show on the visualizations.

Note : The last year selected to be considered full must have at least 80% of the days in a year with sales. A red message text appears if the condition is not met. Non-full years are not taken into account in the forecast calculations.

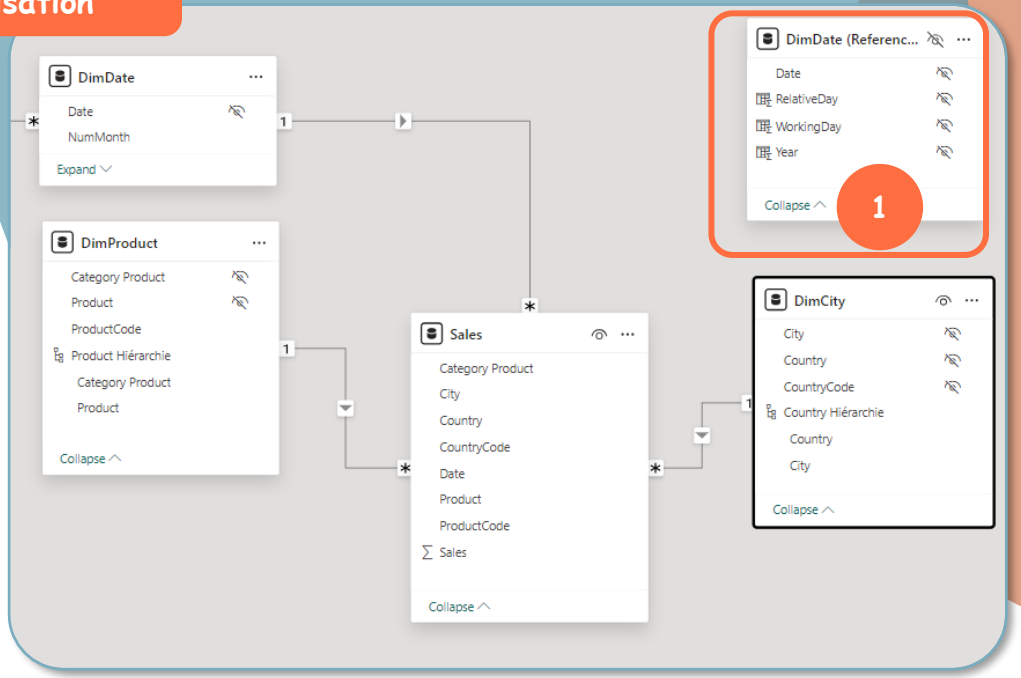


About modelisation...

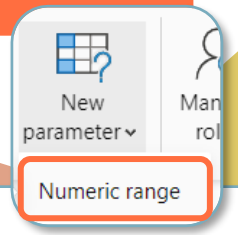


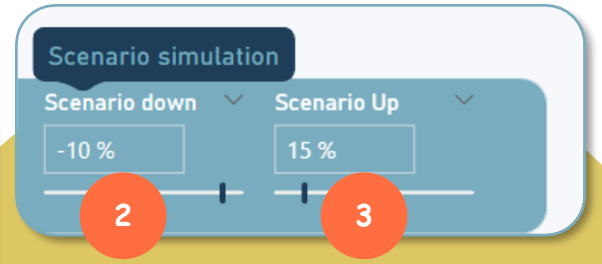
The date from the "Ref. period for forecast" is a discontinuous table

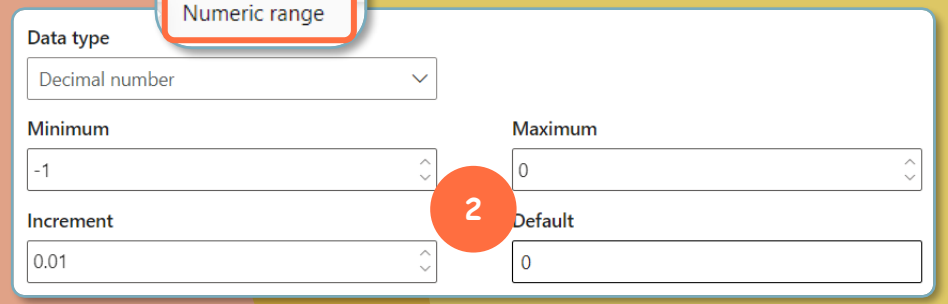
Build modelisation

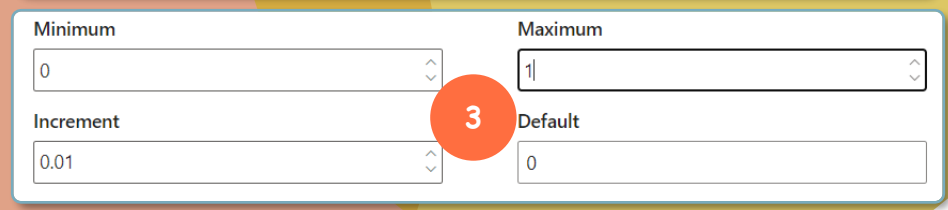


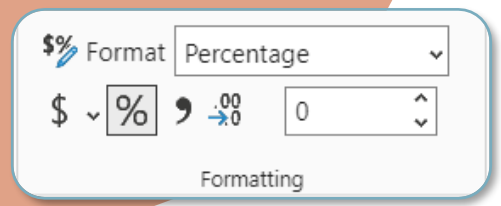
Create 2 parameters for scenario







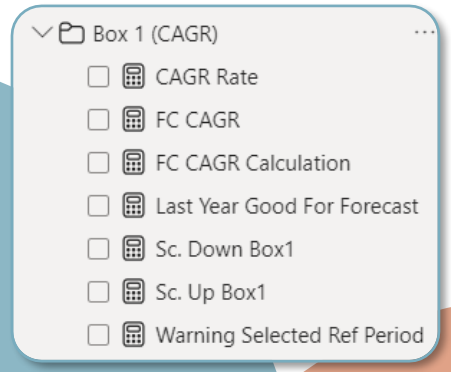




Don't forget to put the values in the "percentage format".

About DAX measure…

We need to write 7 measures!



Write « Last Year Good for Forecast » measure

This measure will be very useful for the measure « FC CAGR Calculation » (see next page)

```
1  Last Year Good For Forecast =
2  VAR Last_Year_Reference_Period_Selected =
3  YEAR(CALCULATE(
4      MAX('DimDate (Reference Period)'[Date]),
5      ALLSELECTED('DimDate (Reference Period)'[Date])))
6
7  VAR Result =
8  IF(
9      CALCULATE(
10         IF(
11 1       DISTINCTCOUNT(Sales[Date]) < 0.8 * DISTINCTCOUNT(DimDate[Date]),0,1),
12     DimDate[Year]=Last_Year_Reference_Period_Selected)=0,
13         LASTNONBLANK(all(DimDate[Year]),CALCULATE([Actual]))-1,
14         Last_Year_Reference_Period_Selected)
15
16 RETURN Result
```

In line the 11, we check whether each year is full (1) or not (0). To be considered full, the number of days with sales must be equal to at least 80% of all the days of the year.

Year	Actual	FC CAGR	Line 11	Last Year Good For Forecast
			1	
2021	28 667 665	28 667 665,00	1	2023
2022	34 420 455	34 420 455,00	1	2023
2023	38 893 290	38 893 290,00	1	2023
2024	7 764 964	45 301 842,14	0	2023
2025		52 766 348,67	0	2023
2026		61 460 802,05	0	2023

We put the conditional line 11 into a Calculate function (lines 9 to 14) to override and force the line context. 2024 is not full, so 2023 becomes the last year considered full.

CAGR, or Compound Annual Growth Rate

Practice and learn

Write « CAGR » measure

Step 1: Calculate CAGR:

1

CAGR = (End value/Start value)$^{1/n}$ – 1

→ with "n" is the number of period

```
CAGR Rate =
VAR First_Year_Reference_Period =
YEAR(CALCULATE(
    MIN('DimDate (Reference Period)'[Date]),
    ALLSELECTED('DimDate (Reference Period)'[Date])))

VAR Last_Year_Reference_Period =
[Last Year Good For Forecast]

VAR Number_Of_Year =
Last_Year_Reference_Period - First_Year_Reference_Period

VAR End_Value =
CALCULATE([Actual],DimDate[Year]=Last_Year_Reference_Period)

VAR Start_Value =
CALCULATE([Actual],DimDate[Year]=First_Year_Reference_Period)

VAR Rate_CAGR = DIVIDE
    (End_Value,Start_Value)^(1/Number_Of_Year)-1

RETURN Rate_CAGR
```

1

Write « FC CAGR Calculation » measure

FC = ForeCast

Step 2: Calculate Forecast:

Revenue Year N+1 = Revenue Year N * (1+CAGR)
Revenue Year N+2 = Revenue Year N * (1+CAGR)^2
Revenue Year N+3 = Revenue Year N * (1+CAGR)^3
Revenue Year N+4 = Revenue Year N * (1+CAGR)^4
Revenue Year N+5 = Revenue Year N * (1+CAGR)^5

2

Note : The value "N" is the measure "Last Year Good for Calculation" (see previous page)

```
FC CAGR Calculation =
VAR Last_Year_Reference_Period = [Last Year Good For Forecast]

VAR Number_Of_Year_For_Calculation =
SELECTEDVALUE(DimDate[Year])-Last_Year_Reference_Period

VAR Rate_CAGR = [CAGR Rate]

VAR Forecast_Calculation =
    IF(
    SELECTEDVALUE(DimDate[Year])>Last_Year_Reference_Period,
    CALCULATE(
        [Actual],
        DimDate[Year]=Last_Year_Reference_Period)
            * (1 + Rate_CAGR) ^ Number_Of_Year_For_Calculation)

RETURN Forecast_Calculation
```

2

Write « FC CAGR » measure

FC = ForeCast

```
FC CAGR =
SUMX(VALUES(DimDate[Year]),
CALCULATE(
    IF(ISBLANK([FC CAGR Calculation]),
        [Actual],
        [FC CAGR Calculation]
    )
))
```

Write « Sc. Up Box1 » measure

Sc. = Scenario

```
Sc. Up Box1 =
    SUMX(VALUES(DimDate[Year]),
        [FC CAGR Calculation]*(1+[Value Growth Up]))
```

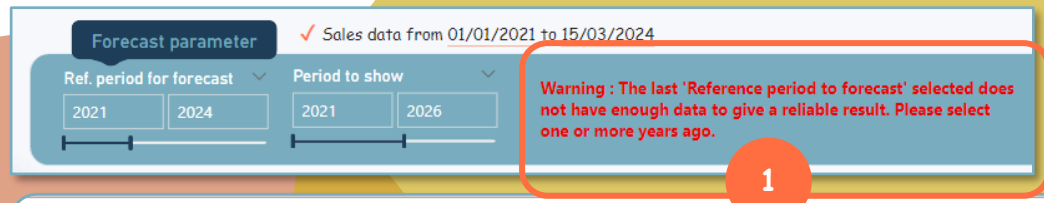
Write « Sc. Down Box1 » measure

Sc. = Scenario

```
Sc. Down Box1 =
    SUMX(VALUES(DimDate[Year]),
        [FC CAGR Calculation]*(1+[Value Growth Down]))
```

Create the « Warning Selected Ref. Period » measure

This message appear when the user select a year not full

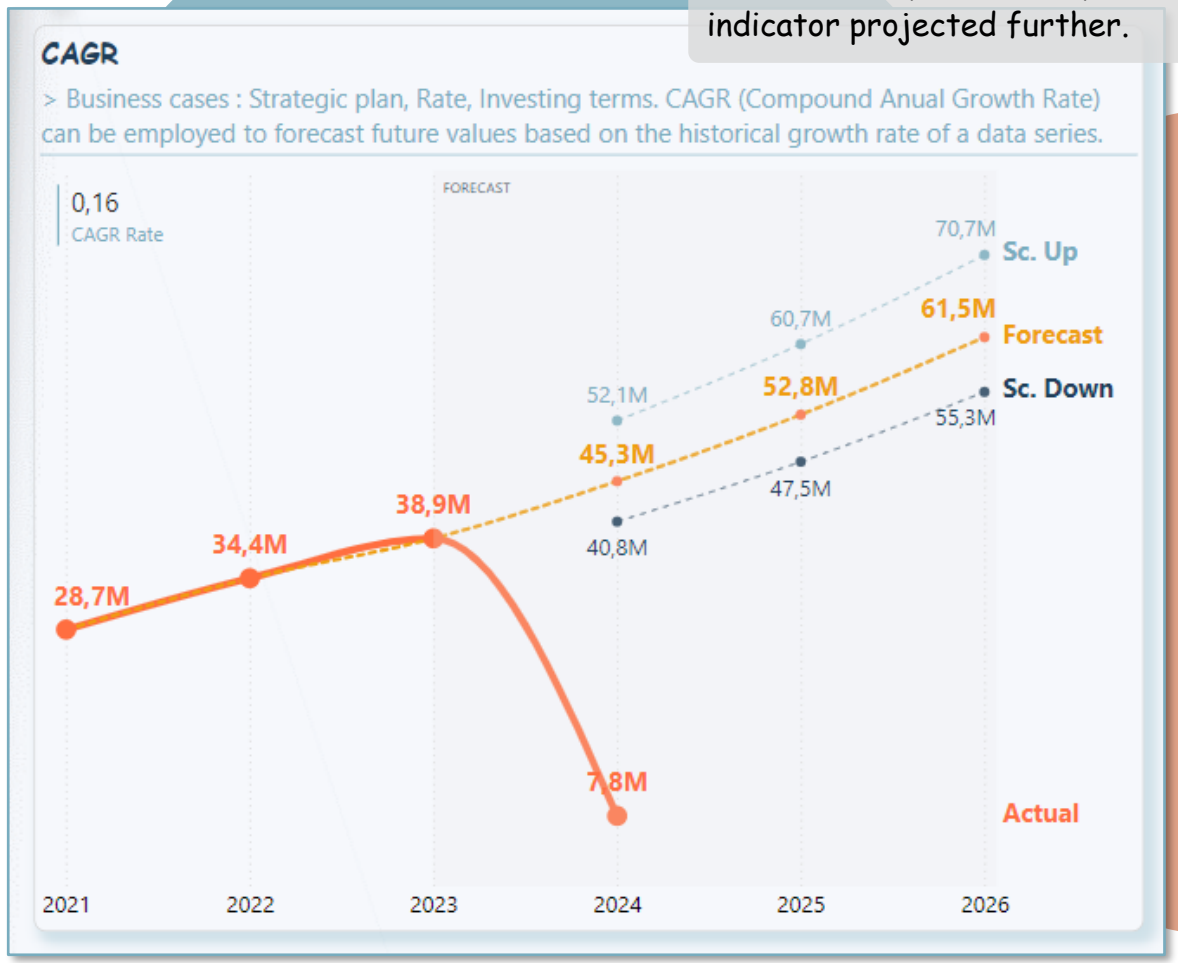


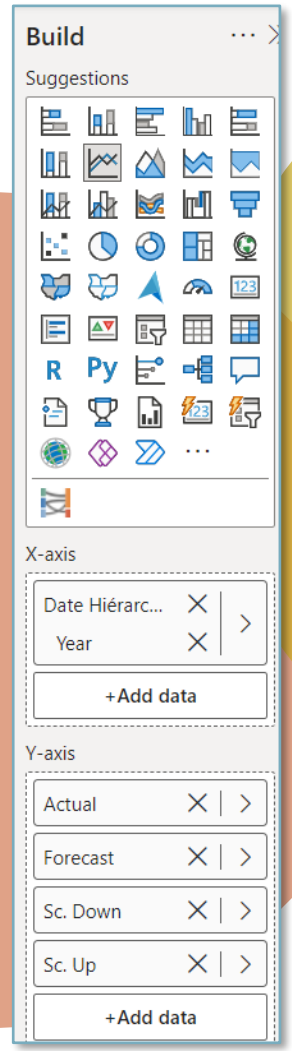

```
Warning Selected Ref Period =
VAR Last_Year_Reference_Period =
YEAR(CALCULATE(
    MAX('DimDate (Reference Period)'[Date]),
    ALLSELECTED('DimDate (Reference Period)'[Date])))

VAR Result =
IF(
    CALCULATE(
        IF(
        DISTINCTCOUNT(Sales[Date]) < 0.8 * DISTINCTCOUNT(DimDate[Date]),0,1),
    DimDate[Year]=Last_Year_Reference_Period)=0,
    "Warning : The last 'Reference period to forecast' selected does not have
    enough data to give a reliable result. Please select one or more years ago.",
    ""
)

RETURN Result
```

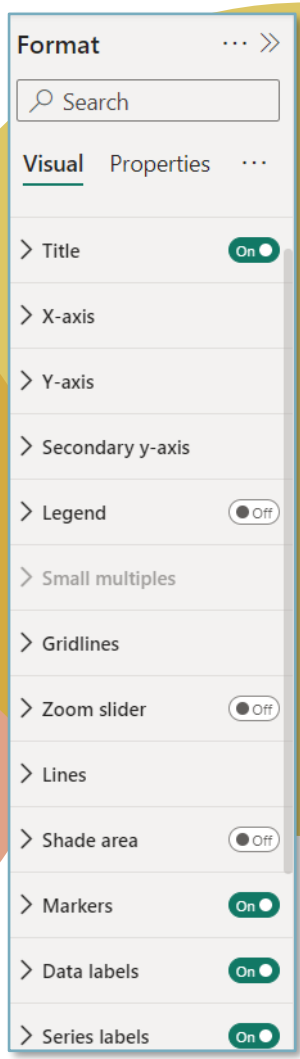
1

About Visualization...

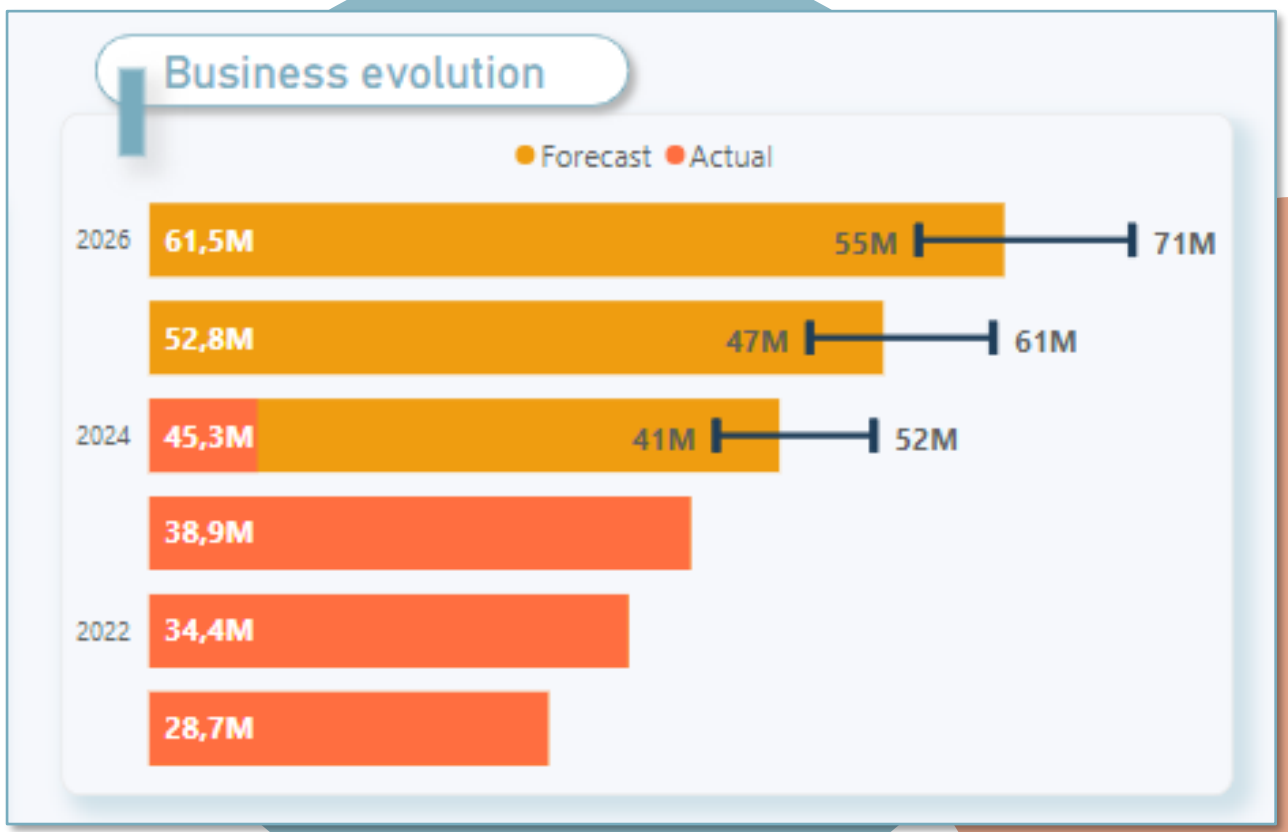
This visualization is very useful to see the deformation of the indicator projected further.

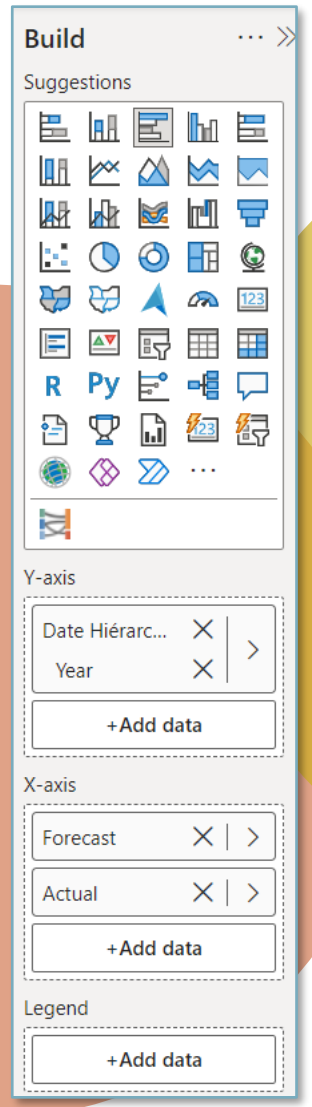


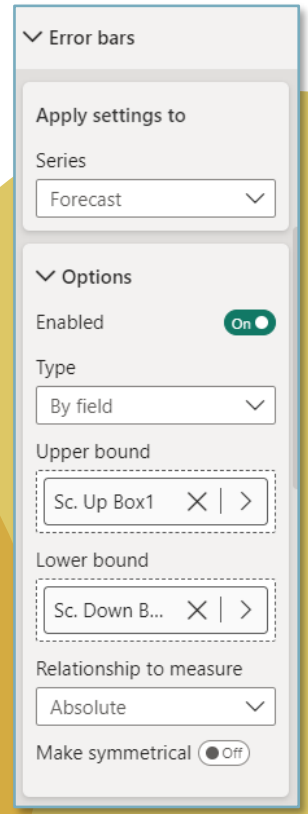


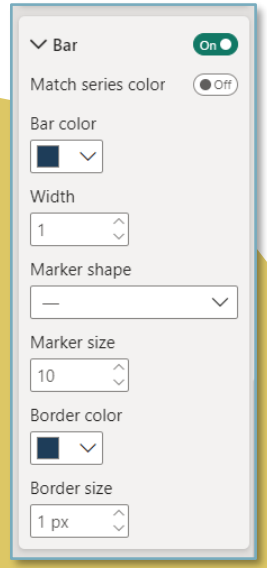


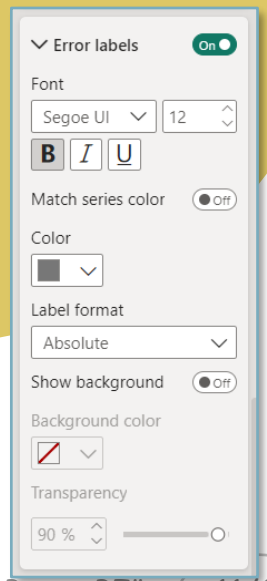
More details on the book "Story of a Point / Financial forecast with PowerBI"



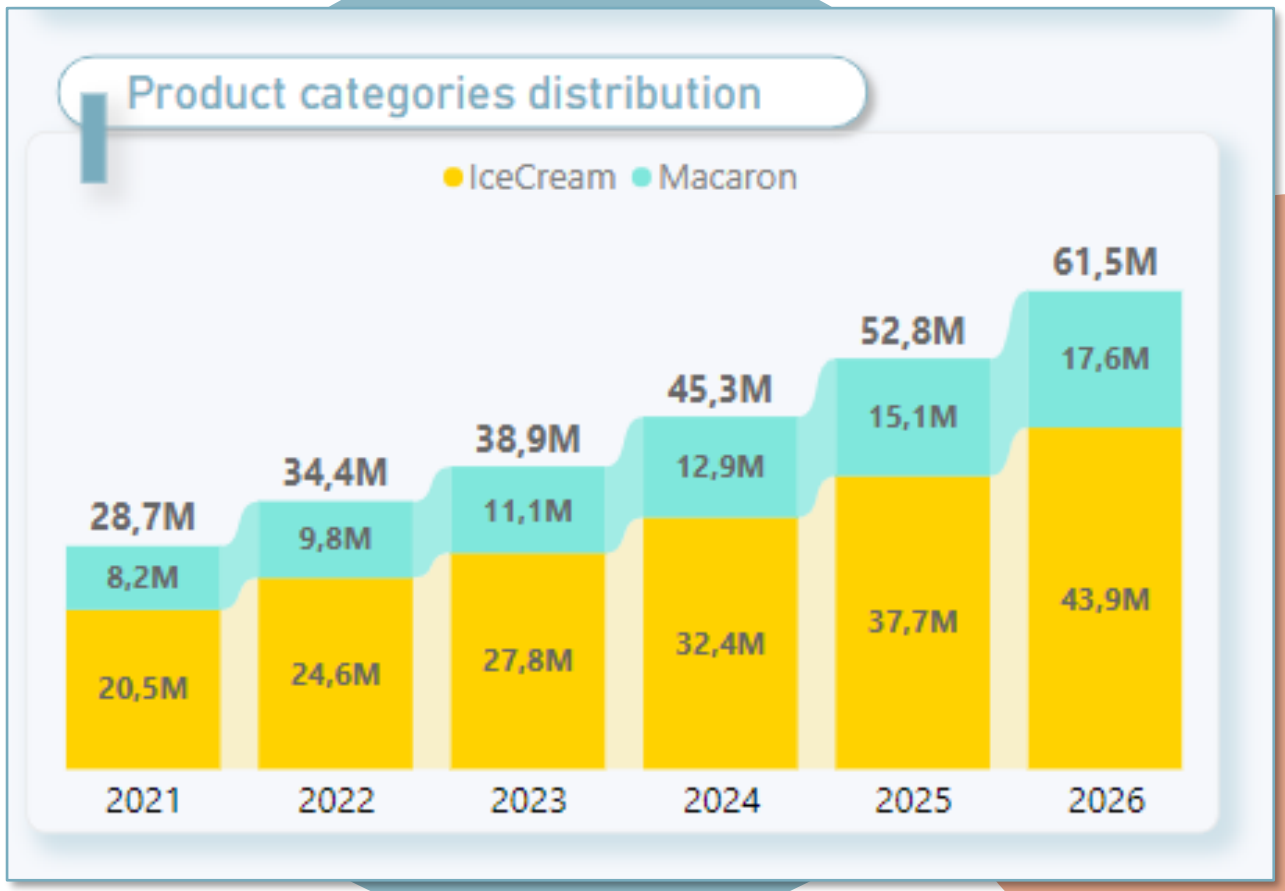


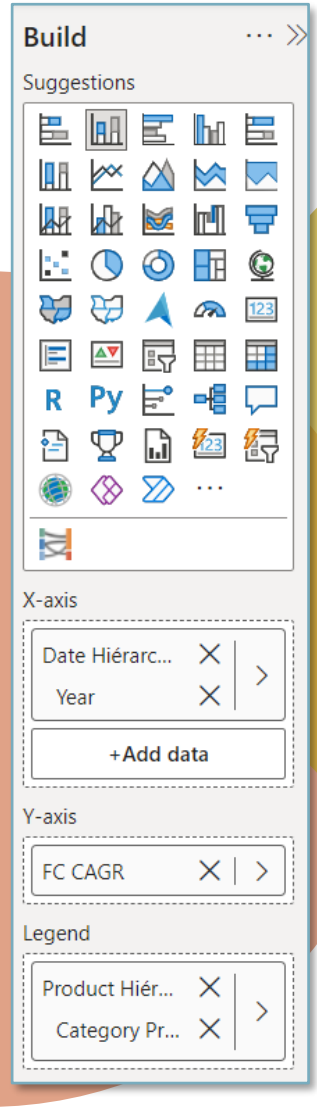


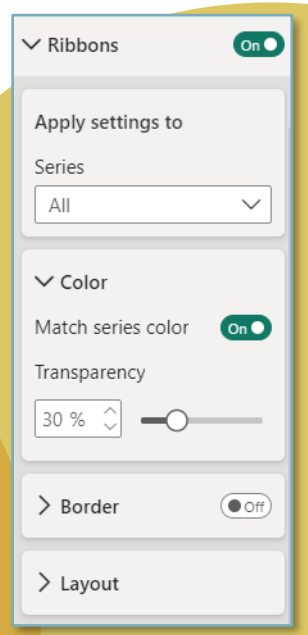


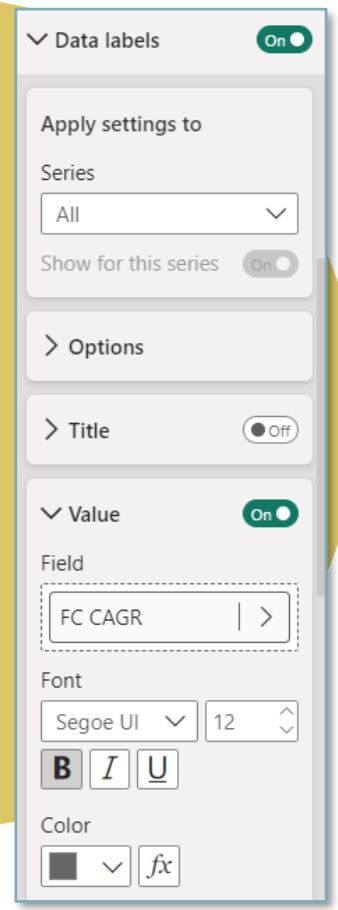


More details on the book "Story of a Point / Financial forecast with PowerBI"



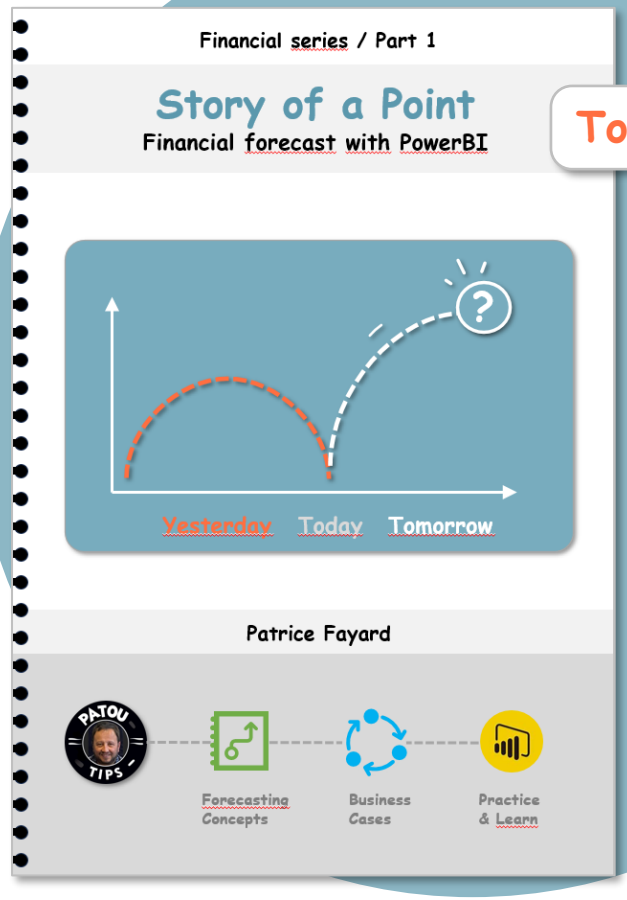






More details on the book "Story of a Point / Financial forecast with PowerBI"

Go further with my book « Story of a Point »



To Learn*

Financial forecast with PowerBi

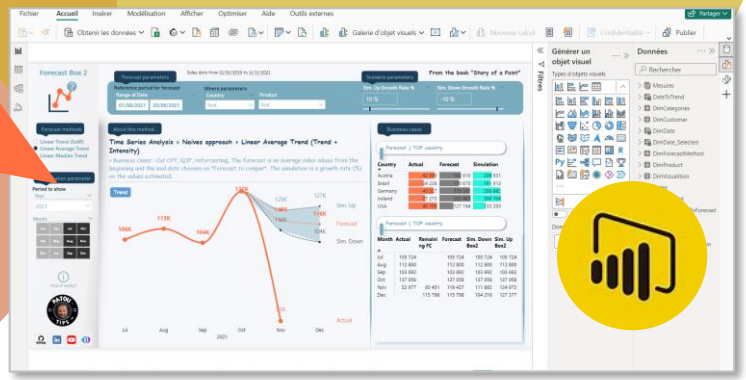
- Forecasting concepts
- Practice and learn with PowerBI
- Build your own forecast with the "forecast boxes"

**Buy a book and get the eBook for free and always get the free updates

Available in book and e-book
*English : **December 2024***
French : January 2025
German : March 2025

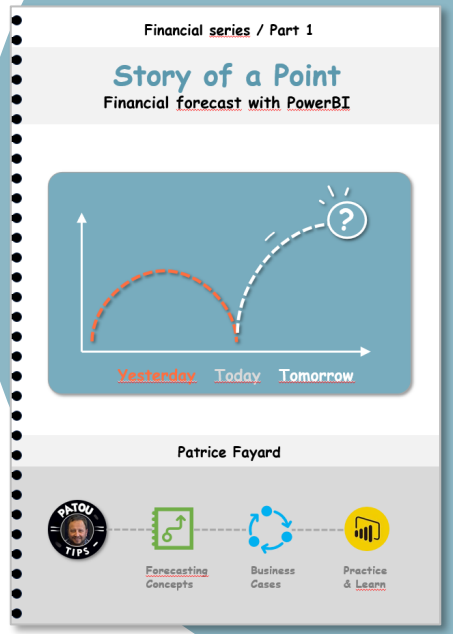
To test on line (access free)

To practice (PowerBi files free)



Financial Series

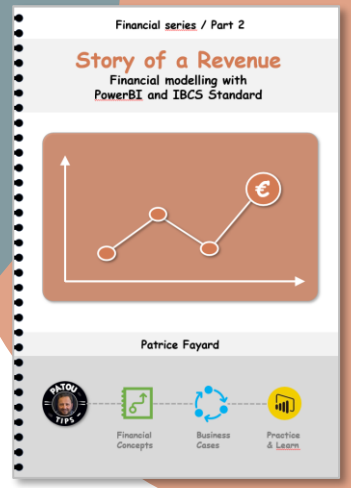
How to predict my Business?



Story of a Point
Financial forecast with PowerBi

Available in book and e-book
*English : **December 2024***
French : January 2025
German : March 2025

How to follow my Business?



Story of a Revenue
Financial Modelling with PowerBi

Available in book and e-book
*English : **December 2025***
French : January 2026
German : March 2026

How to explain my Business?

Story of a Business
Financial Storytelling with PowerBi

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French : January 2027
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it's just my truth!

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