

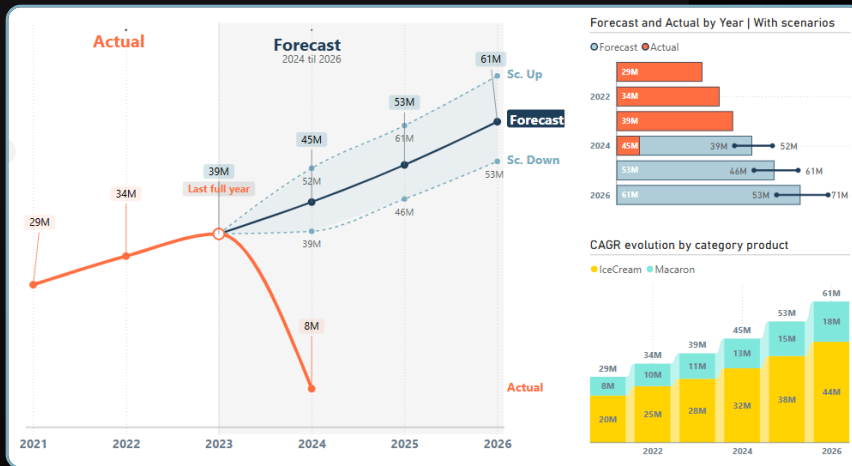
Use case with PowerBI

"Finance Toolbox"

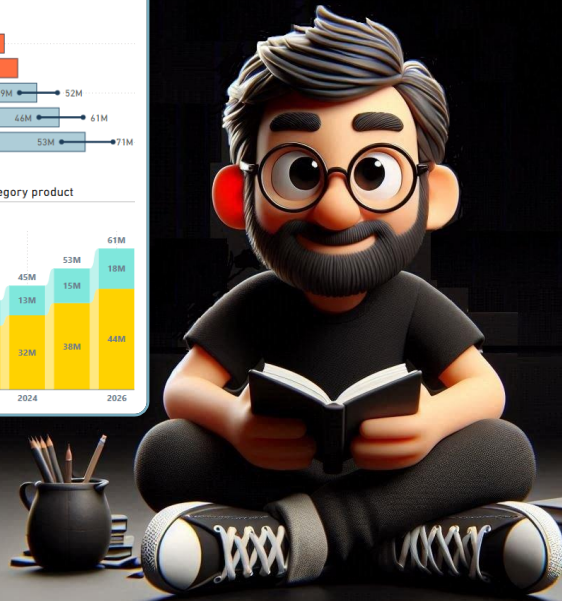
FREE

PowerBI pbix
to practice

Performance of an investment (with CAGR)



Patou Tips #30 ► Toolbox #2



About this Toolbox and datas...



Find all the resources
on the Patou Tips GitHub

[Link GitHub to
resources Toolbox #2](#)

The dataset comes from the fictitious Parisian company "IceCream' Macaron," taken from my book "Financial Forecast with PowerBI: Story of a Point."



In this Toolbox, we want to project sales in the future by generating forecast with the CAGR method

Learn more with my book
**"Story of a Point" Financial
forecast with PowerBi**

Use case with PowerBI

"Finance Toolbox"

Performance of an investment (with CAGR)

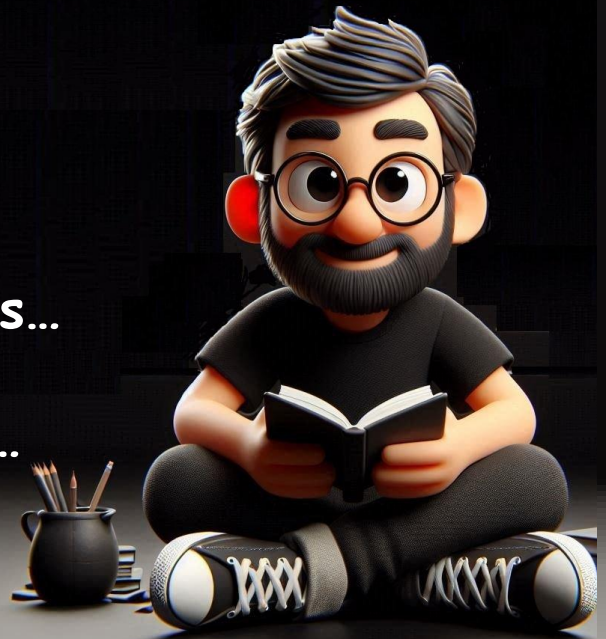
Use case with PowerBI

"Finance Toolbox"



Performance of an investment (with CAGR)

- 1 When and how to use CAGR method?
- 2 How it works?
- 3 About modeling...
- 4 About DAX measures...
- 5 About visualizations...





1

When and how to use CAGR method? Features of this forecast (1/2)

The CAGR (Compound Annual Growth Rate) is a financial concepts used to estimate the performance of an investment or finally like in the toolbox, the performance of sales.

Typical applications	<ul style="list-style-type: none">• 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 (1)	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

Use case with PowerBI

"Finance Toolbox"

(1) More information with my book about forecast drivers.

Performance of an investment (with CAGR)



1

When and how to use CAGR method?

Features of this forecast (2/2)

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.
Notes	<ul style="list-style-type: none">• 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	<p><u>Step 1: Calculate CAGR rate:</u></p> $CAGR = (End\ value / Start\ value)^{1/n} - 1$ <p>→ with "n" is the number of period</p> <p><u>Step 2: Calculate Forecast:</u></p> $\begin{aligned} \text{Revenue Year } N+1 &= \text{Revenue Year } N * (1+CAGR) \\ \text{Revenue Year } N+2 &= \text{Revenue Year } N * (1+CAGR)^2 \\ \text{Revenue Year } N+3 &= \text{Revenue Year } N * (1+CAGR)^3 \\ \text{Revenue Year } N+4 &= \text{Revenue Year } N * (1+CAGR)^4 \\ \text{Revenue Year } N+5 &= \text{Revenue Year } N * (1+CAGR)^5 \end{aligned}$ <p>Note: A 3 years forecast is an acceptable limit ("Revenue Year N+3). Futher away it's more random.</p>

Use case with PowerBI

"Finance Toolbox"

Performance of an investment (with CAGR)

2

How it works?



✓ Change Project Input

The button "Change Project Input" allows you to configure your CAGR simulation

Project Input

Forecast parameters

1 Reference period for forecast calculation: 2021 to 2024

2 Period to extend forecast: 2021 to 2026

Scenario parameters

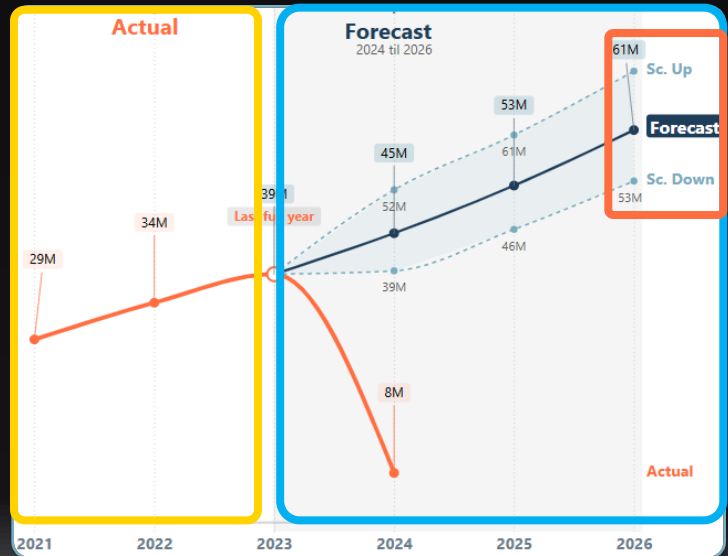
3 Parameter Simulation Down: -13 %

Parameter Simulation Up: 15 %

1 Actual period to be considered for calculating the CAGR.

2 Forecast extension period.

3 Scenarios up and down based on the forecast curve.



Use case with PowerBI

"Finance Toolbox"

Performance of an investment (with CAGR)

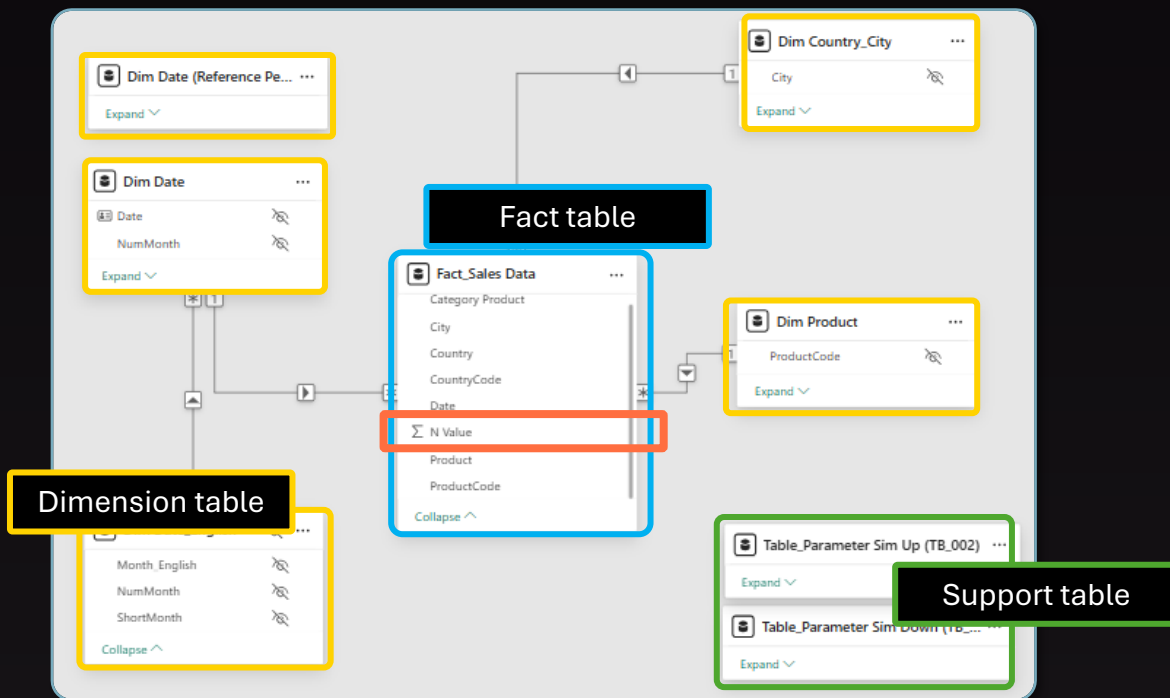
3

About modeling Main architecture...



Star schema

The "N value"⁽¹⁾ is in the heart of the project!



⁽¹⁾ See Patou Tips # 25 "The complete guide to start with PowerBI" for more information.

Use case with PowerBI

"Finance Toolbox"

Performance of an investment (with CAGR)

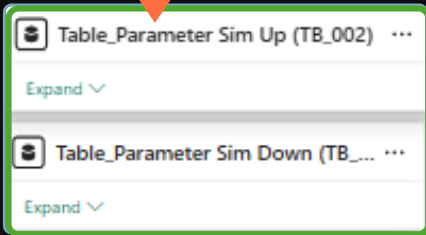
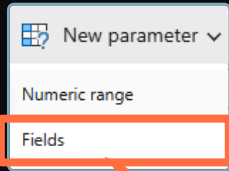
3

About modeling Main architecture...



About "support tables"

"Support tables" are created by the parameter functionality "fields" to adjust project inputs such scenario parameter.



Project Input

forecast parameter

Reference period for forecast calculation: 2021, 2024

Period to extend forecast: 2021, 2026

Scenario parameter

Parameter Sim Down: -13 %

Parameter Simulation Up: 15 %

Use case with PowerBI

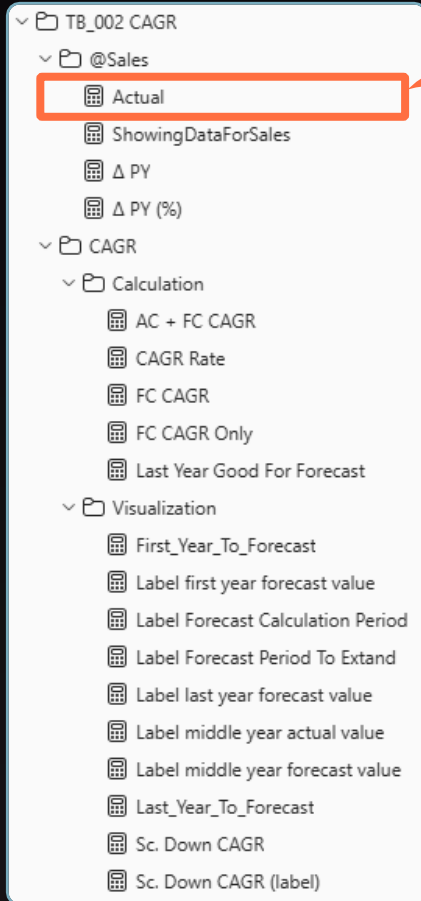
"Finance Toolbox"

Performance of an investment (with CAGR)

4

About DAX measures...

Measures organization



```
1 Actual =  
2 SUM('Fact_Sales Data'[N Value])
```

The sales measure contains the “**N Value**”, this is the pivot measure.

All metrics are organized into two main folders:

- Sales: This folder groups metrics by financial theme.
- CAGR: This folder contains two sub-folders, calculation and visualisation.

Use case with PowerBI

“Finance Toolbox”

Performance of an investment (with CAGR)

4

About DAX measures...

Measure details



« Last Year Good for Forecast » measure

This measure will be very useful for the measure « FC CAGR Calculation » (see next page), and to avoid a bad CAGR simulation.

```

1 Last Year Good For Forecast =
2
3 VAR Last_Year_Reference_Period_Selected =
4 YEAR(CALCULATE(
5     MAX('Dim Date (Reference Period)'[Date]),
6     ALLSELECTED('Dim Date (Reference Period)'[Date])))
7
8 VAR Result =
9 IF(
10     CALCULATE(
11         IF(DISTINCTCOUNT('Fact_Sales Data'[Date]) < 0.8 * DISTINCTCOUNT('Dim Date'[Date]),0,1),
12         'Dim Date'[Year]=Last_Year_Reference_Period_Selected)
13     =0,
14     LASTNONBLANK(all('Dim Date'[Year]),CALCULATE([Actual]))-1,
15     Last_Year_Reference_Period_Selected)
16
17 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.

Use case with PowerBI

"Finance Toolbox"

Performance of an investment (with CAGR)

4

About DAX measures...

Measure details



« CAGR rate » measure

Step 1: Calculate CAGR:

$CAGR = (End\ value / Start\ value)^{1/n} - 1$
 → with "n" is the number of period

```

1 CAGR Rate =
2 VAR First_Year_Reference_Period =
3 YEAR(CALCULATE(
4     MIN('DimDate (Reference Period)'[Date]),
5     ALLSELECTED('DimDate (Reference Period)'[Date])))
6
7 VAR Last_Year_Reference_Period =
8 [Last Year Good For Forecast]
9
10 VAR Number_Of_Year =
11 Last_Year_Reference_Period - First_Year_Reference_Period
12
13 VAR End_Value =
14 CALCULATE([Actual], DimDate[Year]=Last_Year_Reference_Period)
15
16 VAR Start_Value =
17 CALCULATE([Actual], DimDate[Year]=First_Year_Reference_Period)
18
19 VAR Rate_CAGR = DIVIDE
20     (End_Value, Start_Value)^(1/Number_Of_Year)-1
21
22 RETURN Rate_CAGR
  
```

Use case with PowerBI

"Finance Toolbox"

Performance of an investment (with CAGR)

4

About DAX measures...

Measure details



« FC CAGR rate» 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

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

```

1 FC CAGR Calculation =
2 VAR Last_Year_Reference_Period = [Last Year Good For Forecast]
3
4 VAR Number_Of_Year_For_Calculation =
5   SELECTEDVALUE(DimDate[Year]) - Last_Year_Reference_Period
6
7 VAR Rate_CAGR = [CAGR Rate]
8
9 VAR Forecast_Calculation =
10   IF(
11     SELECTEDVALUE(DimDate[Year]) > Last_Year_Reference_Period,
12     CALCULATE(
13       [Actual],
14       DimDate[Year] = Last_Year_Reference_Period
15       * (1 + Rate_CAGR) ^ Number_Of_Year_For_Calculation)
16
17 RETURN Forecast_Calculation
  
```

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

Use case with PowerBI

"Finance Toolbox"

Performance of an investment (with CAGR)

5

About visualizations... Find the main colors



For my book "Story of a point", I took my **inspiration** from the book "Super Graphic" by Tim Leong (June 2013). An amazing book for color research.

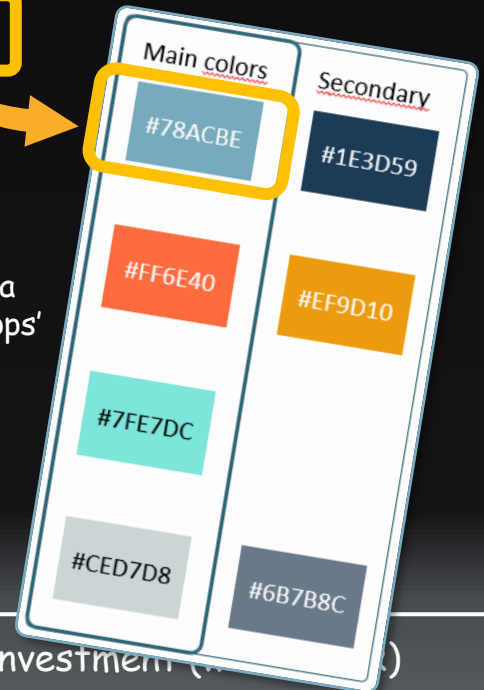
When I find my **main colors**, then I search for the **hexadecimal code** with my smartphone and the "What a color?" mobile application. This application is really useful to catch the color and the hexadecimal code.

With PowerPoint I test a lot of colors until I find **3 main colors** (but here 4) and **3 secondary colors**. My favorite color for the book theme and for PowerBI files is the color called:

"Dark Pastel Blue (hexadecimal code: #78ACBE).



Get hexadecimal code with "what a color?" mobile apps'



Use case with PowerBI

"Finance Toolbox"

Performance of an investment (w...)

5

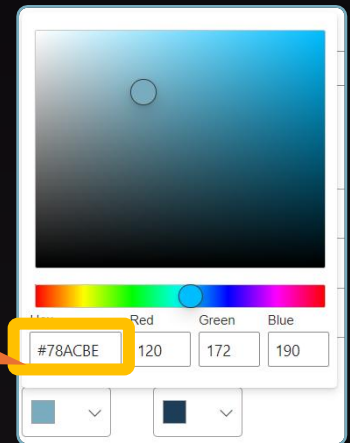
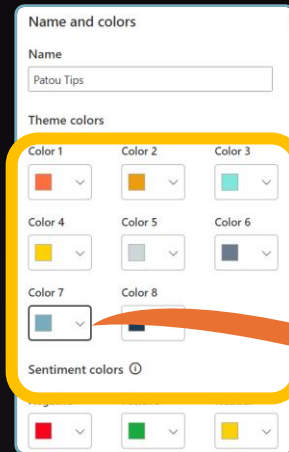
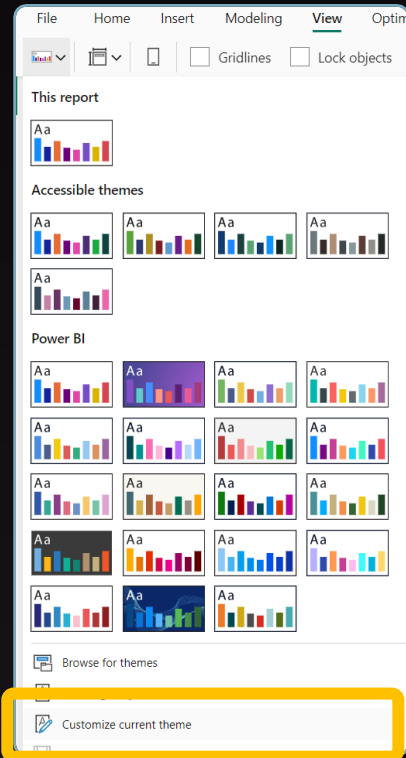
About visualizations...

Create colors theme in PowerBI

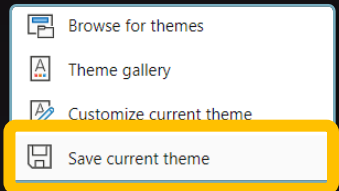


On PowerBI click on
"Customize current theme"
Path: View > Themes

Here it's the creation of the 7 colors that I
choosed before. And I put the hexadecimal
codes for each colors.



Save your final
theme, if you
want to use it for an
another PowerBi
project. A json file
will be create.



Patou Tips Colors.json

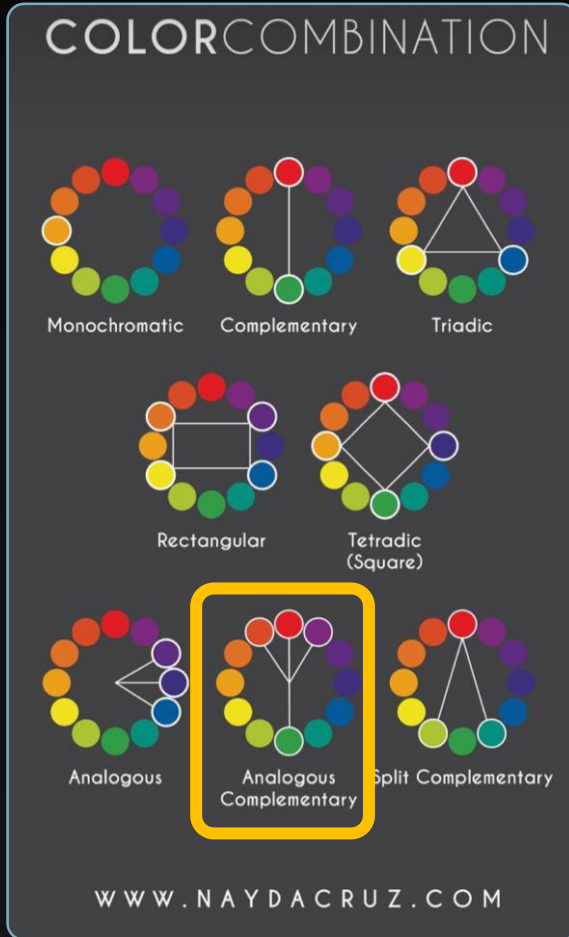
Use case with PowerBI

"Finance Toolbox"

Performance of an investment (with CAGR)

5

About visualizations... Find the good harmony



Anything is possible, but often it's better to create your color theme according to color combination rules.

Sometimes, when I find colors, I reopen my project a few days later just to see if the impact or mood I wanted is still the same.

Sometimes I change the theme 4 or 5 times!



The combination that I chose is nearly of the "analogous complementary" harmony.

Use case with PowerBI

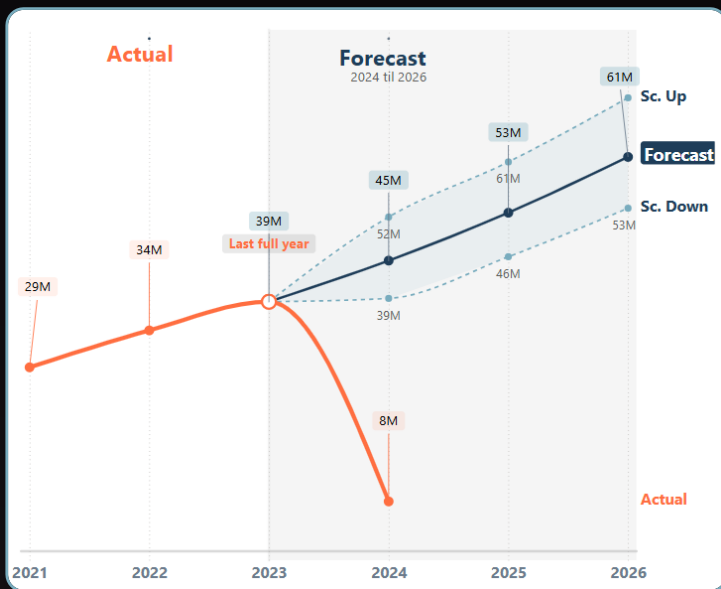
"Finance Toolbox"

Performance of an investment (with CAGR)

5

About visualizations...

Line chart with scenario



More details on the PowerBI file (pbix). See link on the second page or in the comment of the LinkedIn post.



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

Use case with PowerBI

"Finance Toolbox"

Performance of an investment (with CAGR)

5

About visualizations...

Bar chart with bullet chart (1/2)



Clustered bar
chart
visualization

Image created
with PowerPoint

Y-axis

Date Hierarchy × | >

Year × | >

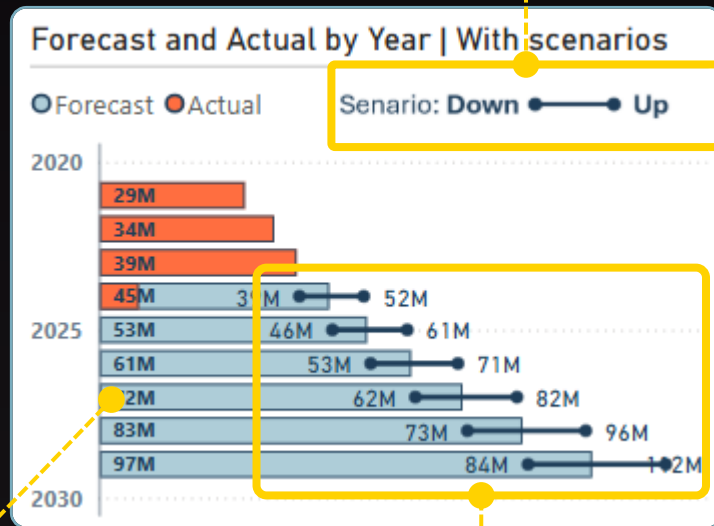
+Add data

X-axis

Forecast × | >

Actual × | >

Put Forecast and
Actual measures
in this order.



1 Actual and forecast bar

2 Scenario: range of forecast

Use case with PowerBI

"Finance Toolbox"

Performance of an investment (with CAGR)

5

About visualizations...

Bar chart with bullet chart (2/2)



1 Actual and forecast bar

▼ Bars

Apply settings to

Series

All

> Color

> Border ☒

▼ Layout

Reverse order ☐

Sort by value ☐

Space between categories

20 %

Space between series

100 %

Overlap ☒

Flip overlap ☐

Don't forget to select "Overlap" option.

2 Scenario: range of forecast

▼ Error bars

Apply settings to

Series

Forecast

▼ Options

Enabled ☒

Type

By field

Upper bound

Sc. Up CAGR (label) × | >

Lower bound

Sc. Down CAGR (label) × | >

▼ Markers ☒

Marker shape

•

Size

4 px

These two measures will add scenario values

Use case with PowerBI

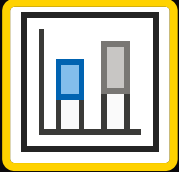
"Finance Toolbox"

Performance of an investment (with CAGR)

5

About visualizations...

Bar chart with ribbons (1/2)



Stacked column
chart
visualization

X-axis

Date Hierarchy × | >

Year × | >

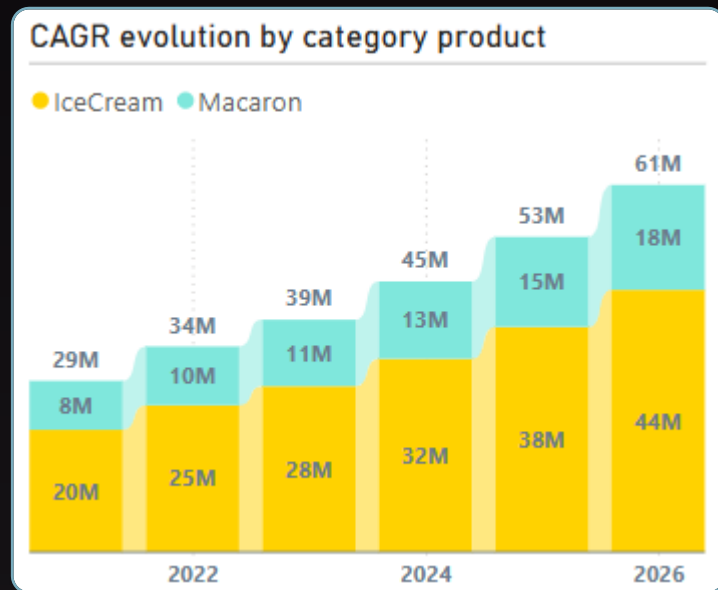
+Add data

Y-axis

AC + FC CAGR × | >

Legend

Category Product × | >



Use case with PowerBI

"Finance Toolbox"

Performance of an investment (with CAGR)

5

About visualizations...

Bar chart with ribbons (2/2)



▼ Ribbons On

Apply settings to

Series

All

▼ Color

Match series color On

Color

Transparency

50 %

> Border Off

▼ Layout

Space between ribbons and colum...

0 %

▼ Data labels On

Apply settings to

Series

All

Show for this series On

▼ Options

Orientation

Horizontal

Position

Auto

Label density

50 %

Overflow text On

Optimize label display Off

> Title Off

▼ Value On

Field

AC + FC CAGR

▼ Total labels On

▼ Values

Font

Segoe UI

10

B *I* U

Color

Display units

Auto

Value decimal places

Auto

Split positive and negative Off

Use case with PowerBI

"Finance Toolbox"

Performance of an investment (with CAGR)

5

About visualizations...

UI/UX: Create Pop-Up (1/4)



Pop-ups are truly one of the best practices for giving your users the freedom to adjust their work. This creates interactivity and interest in a PowerBI project.

The diagram illustrates a 'Project Input' form with several interactive elements highlighted by callouts:

- Shapes:** A callout points to the top-left corner of the form, indicating the use of shapes for layout design.
- Buttons:** A callout points to a red 'X' button in the top-right corner, indicating the use of buttons for user interaction.
- Form Structure:**
 - Forecast parameter** (Section Header)
 - Reference period for forecast calculation:** Includes input fields for '2021' and '2024' with a range slider below them.
 - Period to extend forecast:** Includes input fields for '2021' and '2026' with a range slider below them.
 - Scenario parameter** (Section Header)
 - Parameter Sim Down:** Includes an input field with the value '-13 %' and a range slider below it.
 - Parameter Simulation Up:** Includes an input field with the value '15 %' and a range slider below it.

Use case with PowerBI

"Finance Toolbox"

Performance of an investment (with CAGR)

5

About visualizations...

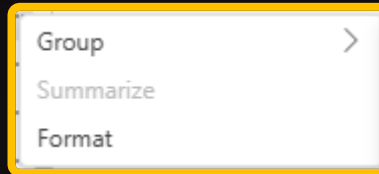
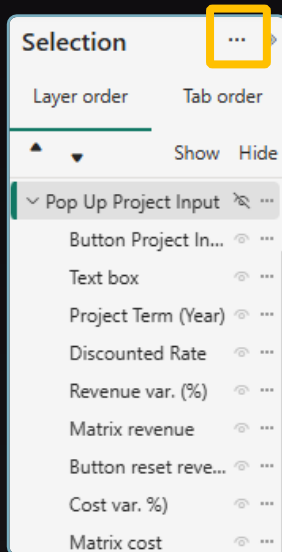
UI/UX: Create Pop-Up (2/4)



Organise objects with "Selection panel"

This step is important to better manage the different objects in your Pop-Up and also to create interactivity with bookmarks (see next page).

In the selection panel, gather all the objects of a Pop-Up into a group



I prefer to group all the objects of a Pop-Up. It will be more easier to work with the bookmarks.

> Here I named it "Pop-Up Project Input"

Use case with PowerBI

"Finance Toolbox"

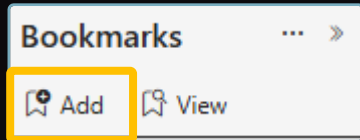
Performance of an investment (with CAGR)



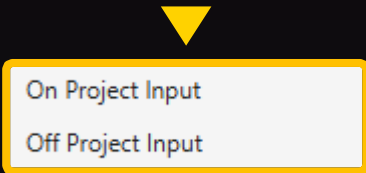
5

About visualizations... UI/UX: Create Pop-Up (3/4)

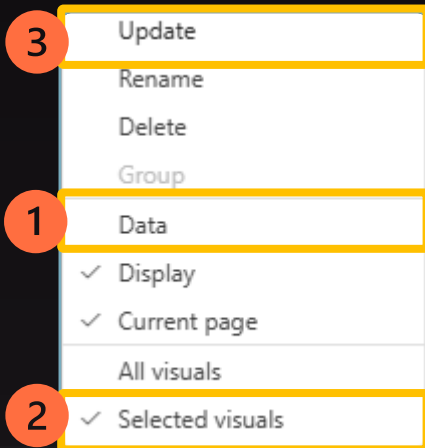
Create "Bookmarks" for the Pop-Up



In the Bookmarks panel, add two bookmarks:



> Create one to show the pop-up (On) and one to close it (Off).



For each Bookmark,

Before all, **select the group of object in the selection Pane** (see previous page), then:

- 1 - Unselect "Data"
- 2 - Select "Selected visuals"
- 3 - Then "Update"

Use case with PowerBI

"Finance Toolbox"

Performance of an investment (with CAGR)



5

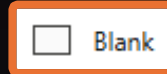
About visualizations...

UI/UX: Create Pop-Up (4/4)

Create buttons and their interactivity

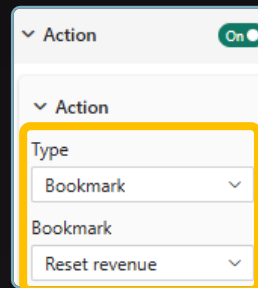
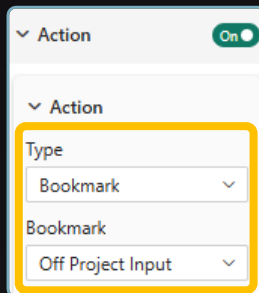
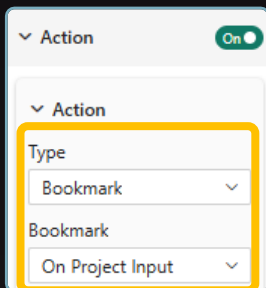
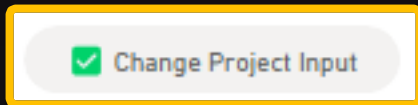
1

Create buttons

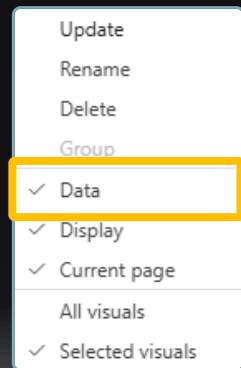


2

Create a bookmark for each button (see previous page) and place the bookmark on the "action" configuration button



Don't forget to put on for "data"



Use case with PowerBI

"Finance Toolbox"

Performance of an investment (with CAGR)

5

About visualizations...

UI/UX: How it works button (1/4)



Create a movie to help your users in PowerBI



The idea:

When the user drag on hover the mention "how it works?" ...

...A movie appear inside the PowerBI dashboard to help the users!

Inspired from my book "Story of a point"

Inspired from my book "Story of a point"

A tip every week!

Follow me!

Like me!

Share me!

Financial Toolbox
Performance of an investment

Simulation

Country & City All

Category & Product All

Chart

Table

Simulation wrap-up: The investment or sales performance calculation using the CAGR method is based on actual data from 2021 til 2023

Financial Toolbox
Performance of an investment or sales (with CAGR)

Simulation

Country & City All

Category & Product All

Chart

Table

Simulation wrap-up: The investment or sales performance calculation using the CAGR method is based on actual data from 2021 til 2023 and the forecast period for evaluating future performance is from 2024 til 2029. The rate of return by year, the resulting CAGR rate is 0.16.

Simulation Input

2021 til 2023
Calculation Period
2024 til 2029
Forecasting Period

☒ Change Simulation Input

Simulation Results

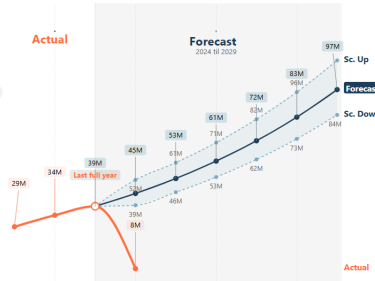
0.16
CAGR Rate
513 604 783
Actual + Forecast
512 260 169
Scenario Up
397 005 625
Scenario Down

A tip every week!

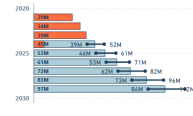
Follow me!

Like me!

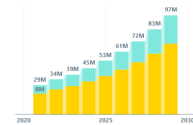
Share me!



Forecast and Actual by Year | With scenarios

☒ Forecast ☒ Actual Scenario: Down Up


CAGR evolution by category product

☒ IceCream ☒ Macaron


Toolbox #2 v1

Toolbox #2 v1

Start with PowerBI

"From Rookie to Rock"

Performance of an investment (with CAGR)

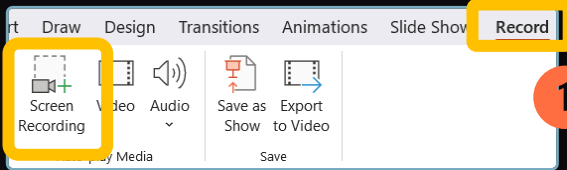
5

About visualizations...

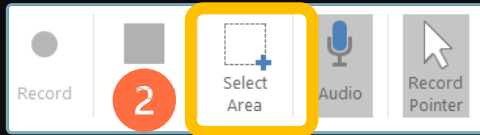
UI/UX: How it works button (2/4)



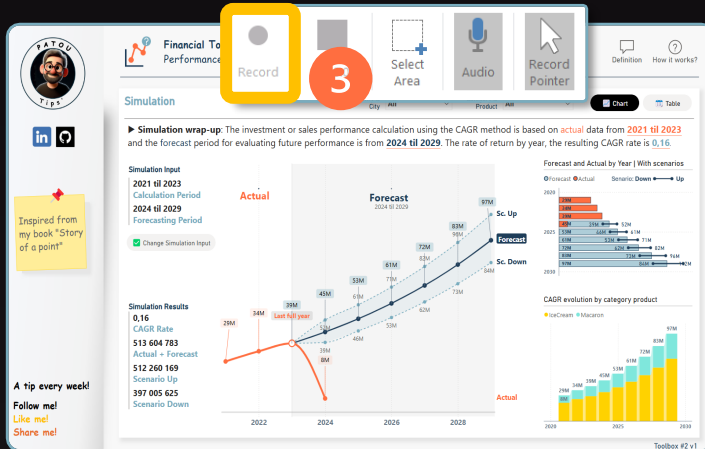
Create the movie in PowerPoint



1 On PowerPoint:
Path: Record > Screen
Recording



2 A pop-up appear, with
the button "Select
Area" select the area
on your PowerBi
project. A dashed red
line indicate you the
area.



3 Click on **record** to start
and the touches
⬆ + 🏠 + Q to stop the
movie. It's done!

Start with PowerBI

"From Rookie to Rock"

Performance of an investment (with CAGR)

5

About visualizations...

UI/UX: How it works button (3/4)



Save the movie as an animated GIF

File name:	How it works.mp4
Save as type:	Media File (*.mp4)



How it works.gif

In PowerPoint save your record as MP4 format

Use an online service or a software to convert your file from MP4 format to an animated GIF. Here I use "Convertio"

On PowerBI, create a new page for the animated GIF

Settings of the page

Format
...
>>

Page information

Name

Page type

Canvas settings

Type

Height

Width

Vertical alignment

Canvas background

Color

Image

Image fit

Transparency

Start with PowerBI

"From Rookie to Rock"

Performance of an investment (with CAGR)

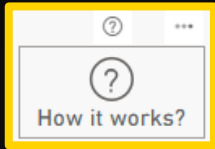
5

About visualizations...

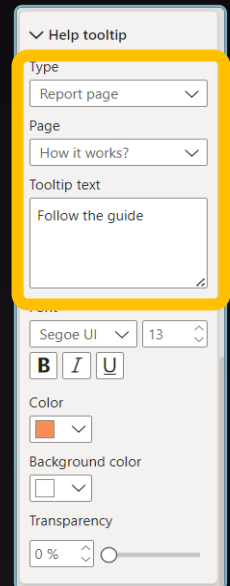
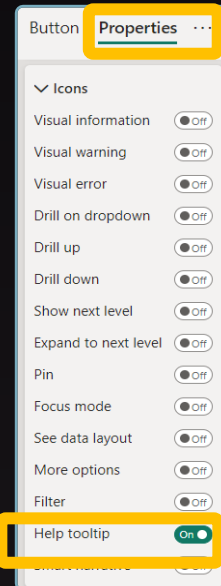
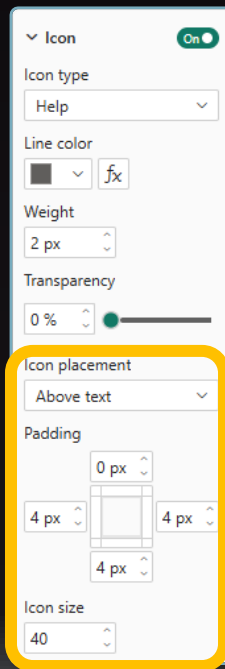
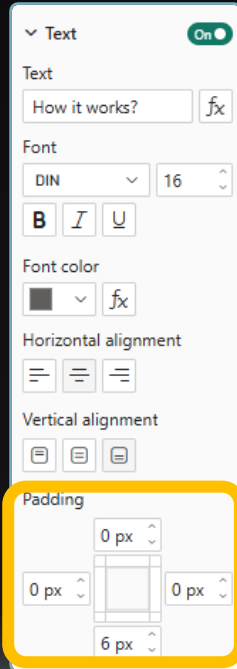
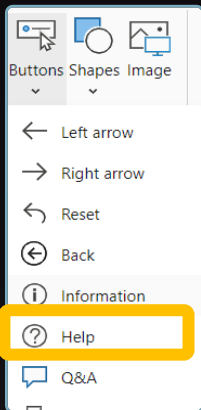
UI/UX: How it works button (4/4)



On PowerBI, create a button



The final result: Drag on hover the button "How it works?" a help symbol (?) appear, To drag on hover this symbol will display the movie.



Start with PowerBI

"From Rookie to Rock"

Performance of an investment (with CAGR)

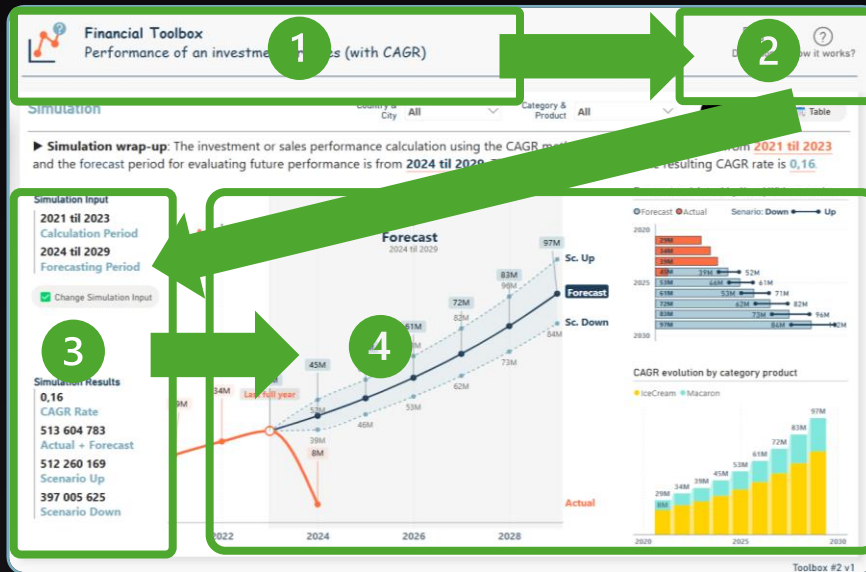
5

About visualizations...

Storytelling: "Z reading pattern".



The organization and prioritization are with the "Z reading pattern". The natural reading direction is often from left to right and from top to bottom in a "Z" shape.



1 Topic of the projet

3 KPI of the project

2 Help and definition

4 Visualization of the project

Use case with PowerBI

"Finance Toolbox"

Performance of an investment (with CAGR)

Don't forget!
This isn't the truth, it's just my truth!

Patou Tips



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