Business Intelligence (BI) for Cost Engineering

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Baker Hughes

Helber Macedo

- Costing Manager at Baker Hughes – Subsea Projects
- Author of book A Practical Guide to Cost Engineering (Routledge 2023)
- Certified by AACE – CCP (2014)
- Member of AACE & CaSA
- Has over 18 years of experience in the energy industry.
- The author of a number of technical papers, developed and taught a variety of in-house cost estimating, construction, planning and industrial assembly courses for Petrobras.

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Agenda

- BI definition
- Benefits
- Application
- Tools
- Process
- Database creation
- BI steps
- Challenges
- Q&A

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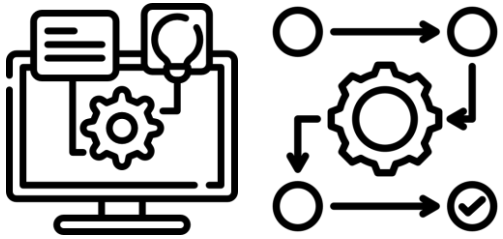
Business Intelligence (BI) Definition

Business intelligence (BI) uncovers insights for making strategic decisions. Business intelligence tools **analyze** historical and current **data** and **present** findings in intuitive visual formats.

Microsoft

Business Intelligence (BI) Definition

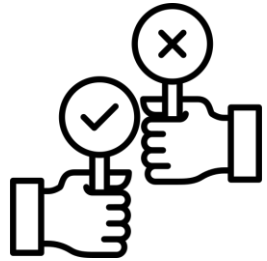
Tools & Methods



Collect, analyse & transform data

Valuable information

Improve decision process



Icons from Flaticon.com

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BI Benefits

- Time optimization 
- From statics view to dynamic visualization 
- Analysis improvement 
- Multiuser 
- Data navigation

Icons from Flaticon.com

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BI Tools

- Power BI
- Tableau
- Spotfire
- And…

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BI Applications Tools

- Project Control
- Cost review and validation
- Schedule analysis
- Benchmark and KPIs

Process

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BI Process

Database creation

Collection & categorization

Standardization

Normalization

Power BI

Configuration

BI Creation

Dashboards/ Reports

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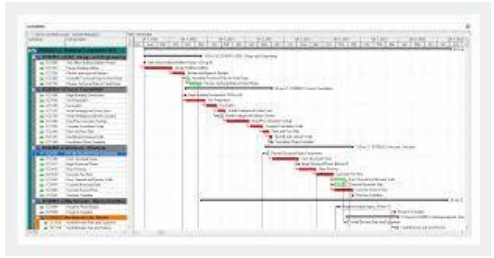
BI Process – Collection & Categorization

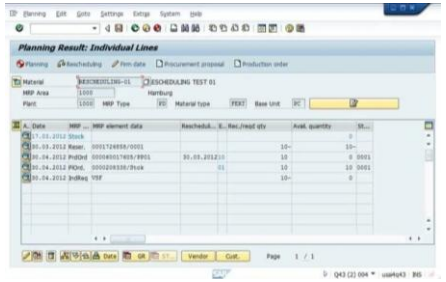
The step defines **what** and **when** the data is collected. Also, Categorization (e.g., cost and schedule) aims to reflect your process (e.g. Project Control for a period). It means that the database could be composed of different sources, such as schedule (e.g., P6) and costs (e.g., SAP).

What

Schedule (P6)



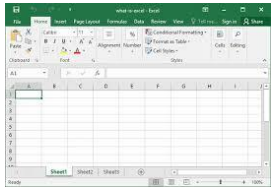
SAP (Cost database)



Cost estimation software

Calendar

Other (e.g., Unit and currency conversion rates)



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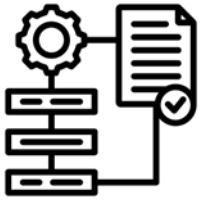
BI Process - Standardization

The standardization aims to ensure that the data collection process is the same for all professionals. It could be automated, so it defines how the data is collected.

The standardisation means that the database should be formatted or should have the required info (columns) always in the same format. The reason is BI should be able to read the data from different projects and it is only possible if the database has the same format.



How

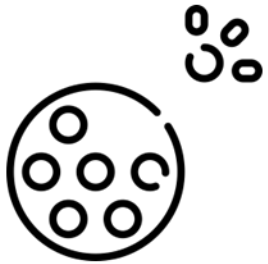
	A	B	C	D	E	F	G	H	I
1	ID	Description	Cost	A	B	C	D	...	N
2									
3									
4									
5									
6									
7									
8									
9									
10									
11									
12									
13									

BI Process - Normalization

1 **Data Study & Understanding**

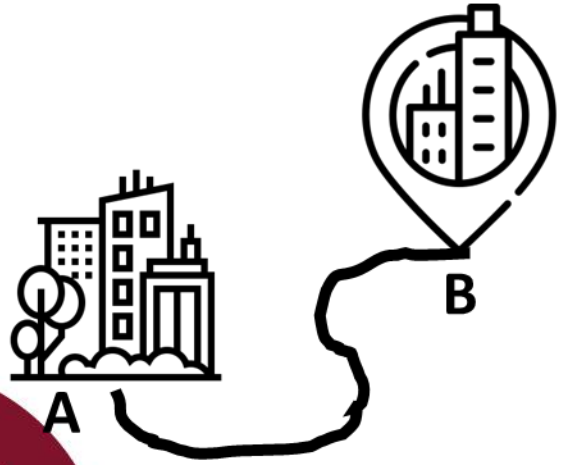
2 **Data cleaning**

3 **Outliers**

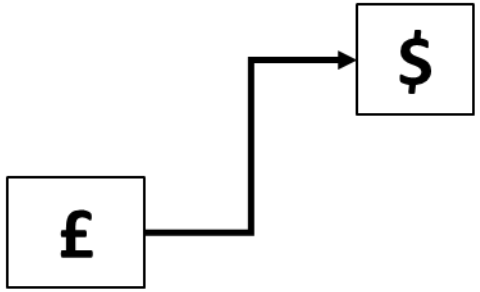


4 **Escalation**

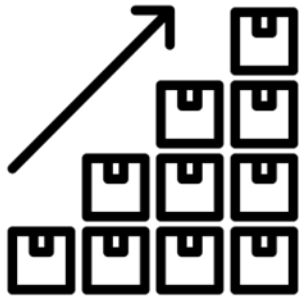
5 **Location**



6 **Currency Rate conversion**



7 **Quantity**



8 **Statistics**

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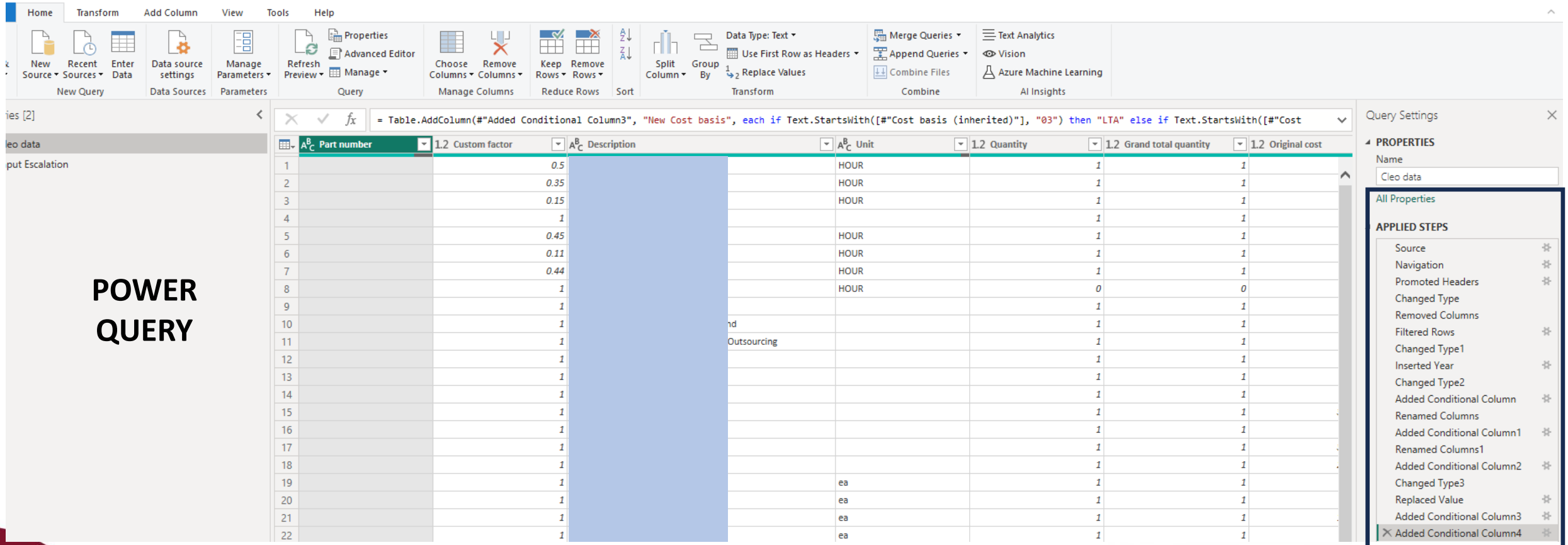
BI Process - Configuration

Power BI

Configuration is the first step in the BI tool. Configuration means preparing and transforming the database, such as removing columns or rows, creating new columns, deleting empty rows, etc.



POWER QUERY

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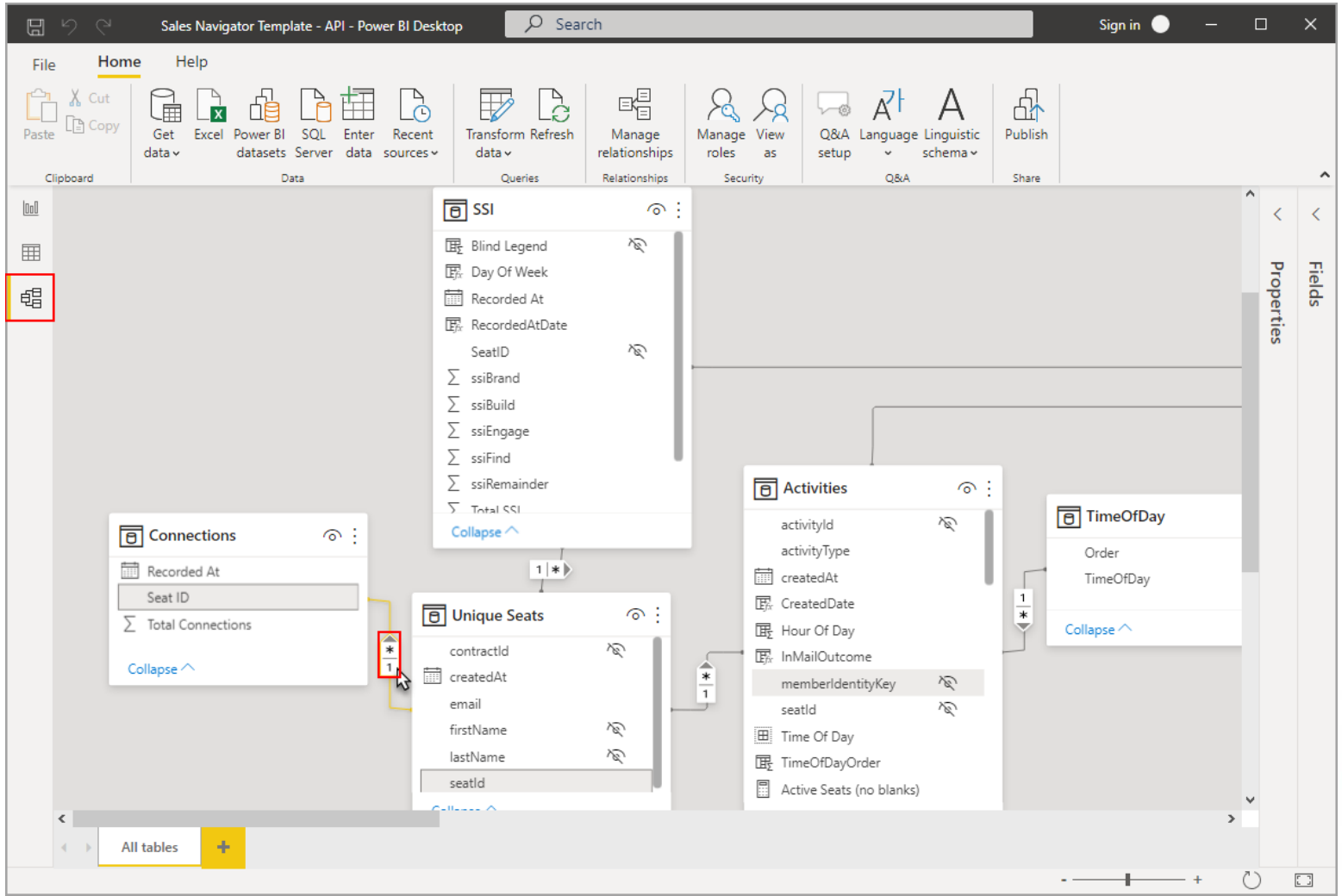
BI Process - Configuration

Power BI

Model view shows all of the tables, columns, and relationships in your model. This view can be especially helpful when your model has complex relationships between many tables.



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BI Process - Configuration

Power BI

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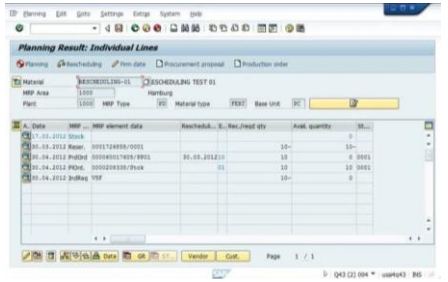
SAP (Cost database)



Cost estimation software

Calendar

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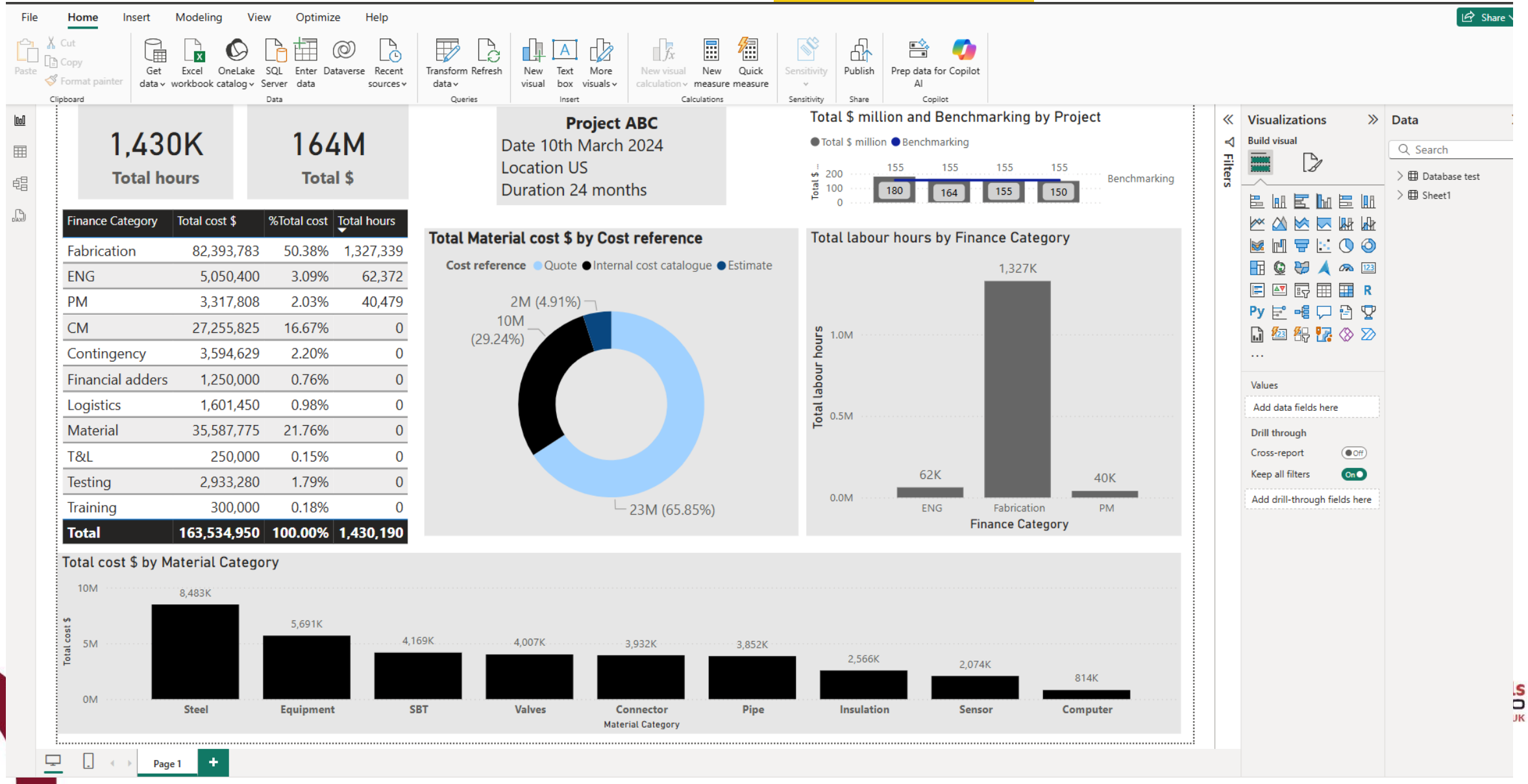
BI Process – BI Creation

Power BI



Finance Category	Total cost $	%Total cost	Total hours
Fabrication	82,393,783	50.38%	1,327,339
ENG	5,050,400	3.09%	62,372
PM	3,317,808	2.03%	40,479
CM	27,255,825	16.67%	0
Contingency	3,594,629	2.20%	0
Financial adders	1,250,000	0.76%	0
Logistics	1,601,450	0.98%	0
Material	35,587,775	21.76%	0
T&L	250,000	0.15%	0
Testing	2,933,280	1.79%	0
Training	300,000	0.18%	0
Total	**163,534,950**	**100.00%**	**1,430,190**

BI Challenges

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BI Challenges

- Training
- Database quality
- Process knowledge (what and how you want to show the data)
- Continuous improvement
- Maintenance

Conclusion

Conclusion

- Business Intelligence can promote standardisation, time optimisation, and dynamic data visualisation.
- BI is not magic; if the cost database is poor, the dashboard will not be robust and can lead to misinterpretation and errors.
- Training and continuous improvements are key to successfully implementing BI in organizations.

A Practical Guide To Cost Engineering

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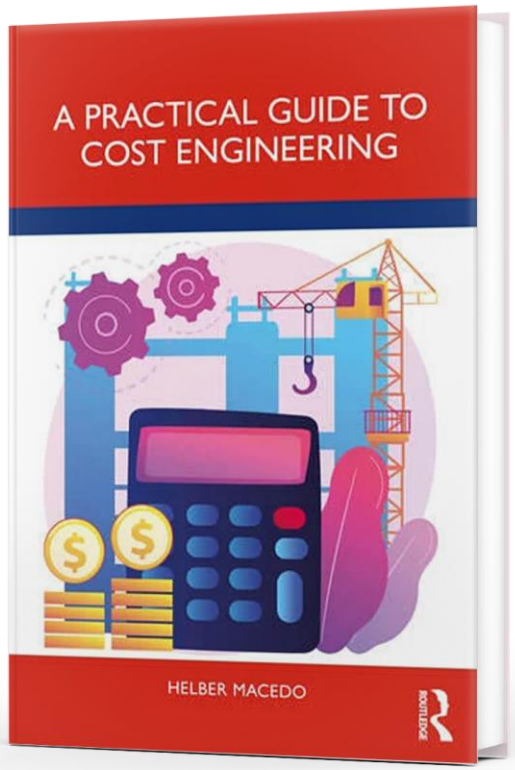

Direct link to the book:
https://www.routledge.com/A-Practical-Guide-to-Cost-Engineering/Macedo/p/book/9781032505824

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Thank you!
Questions?

Thank You

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