Mastering Data Analytics
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MASTERING DATA ANALYTICS

PROFILE

- Founder & Trainer at **Mastering Data Analytics**
- **Former Business Analytics Manager at SIFT Analytics Group (HO @Singapore)**
- **Consulting Advance Analytics Projects**: **PVCFC, DFS Global (Duty Free Store) …**
- **Training Data Analytics for BIDV, Merck, HSC, AEON Vietnam, AON , P&G, Prudential, Generali, Coca-Cola …, & many SMEs**
- Familiar technologies: **Qlik Sense, Tableau, Alteryx, Power BI, SQL, SAS VA, Excel, XLSTAT, Palisade, Frontline Solver, Python**…
- Experience data analytics in **Banking, Financial Services (Top 1 in VN) & consulting projects in Retail Industry**
- **Speaker** for Qlik Sense, Power BI, Alteryx and **other public events** & **Judge** for big contest at **RMIT/FTU/UFM/NEU/AIESEC…**
- Qualified DA Certificates: DA100/PL300, Alteryx (Core + Advance), Business Analytics of Cambridge…
- Personal Page: Phuong Thao Analytics (+13K followers)

MASTERING DATA ANALYTICS

BUSINESS INTELLIGENCE

Module 1: Fundamental Business Intelligence Framework & Analytical Thinking

MASTERING DATA ANALYTICS

1. **Fundamental BI** & Analytical Thinking
2. End-to-End BI Workflow in Power BI
3. Descriptive Statistics & Analytics
4. Diagnostics Analytics
5. Analytical Idea Presentation (Dashboard – Insight - Story)
6. Business Intelligence Capstone

MASTERING DATA ANALYTICS

BI FUNDAMENTALS

PART 1: Business Intelligence Terminology

PART 2: Business Intelligence in Corporates

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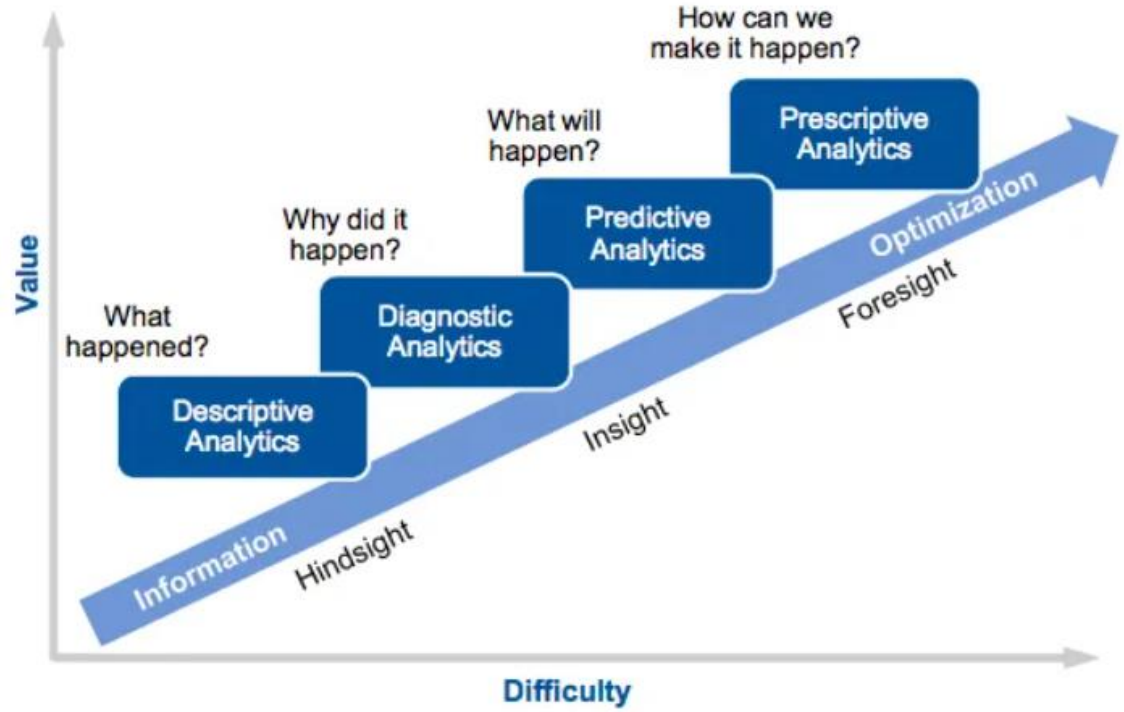
Business Intelligence Terminology
Business Intelligence & Business Analytics

	Business Intelligence	Business Analytics
Collects, Analyzes and Visualizes Data Includes data mining, dashboards and various analytics capabilities	✓	✓
Identifies Pain Points Identifies and offers suggestions to optimize organization pain points discovered in the data	✓	✓
Reporting Presents and organizes data for visualization	✓	✓
Descriptive Analytics Creates a summary of historical data for visualization	✓	✗
Diagnostic Analytics Determines the source of issues discovered by descriptive analytics	✓	✗
Predictive Analytics Makes predictions based on collected data	✗	✓
Prescriptive Analytics Offers solutions for issues found by descriptive analytics and data discovery	✗	✓

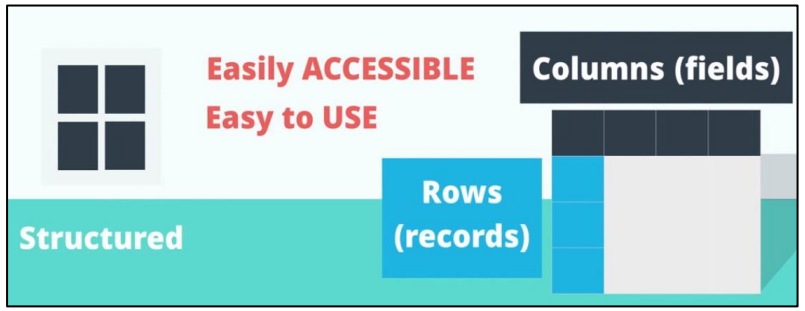
source: SelectHub



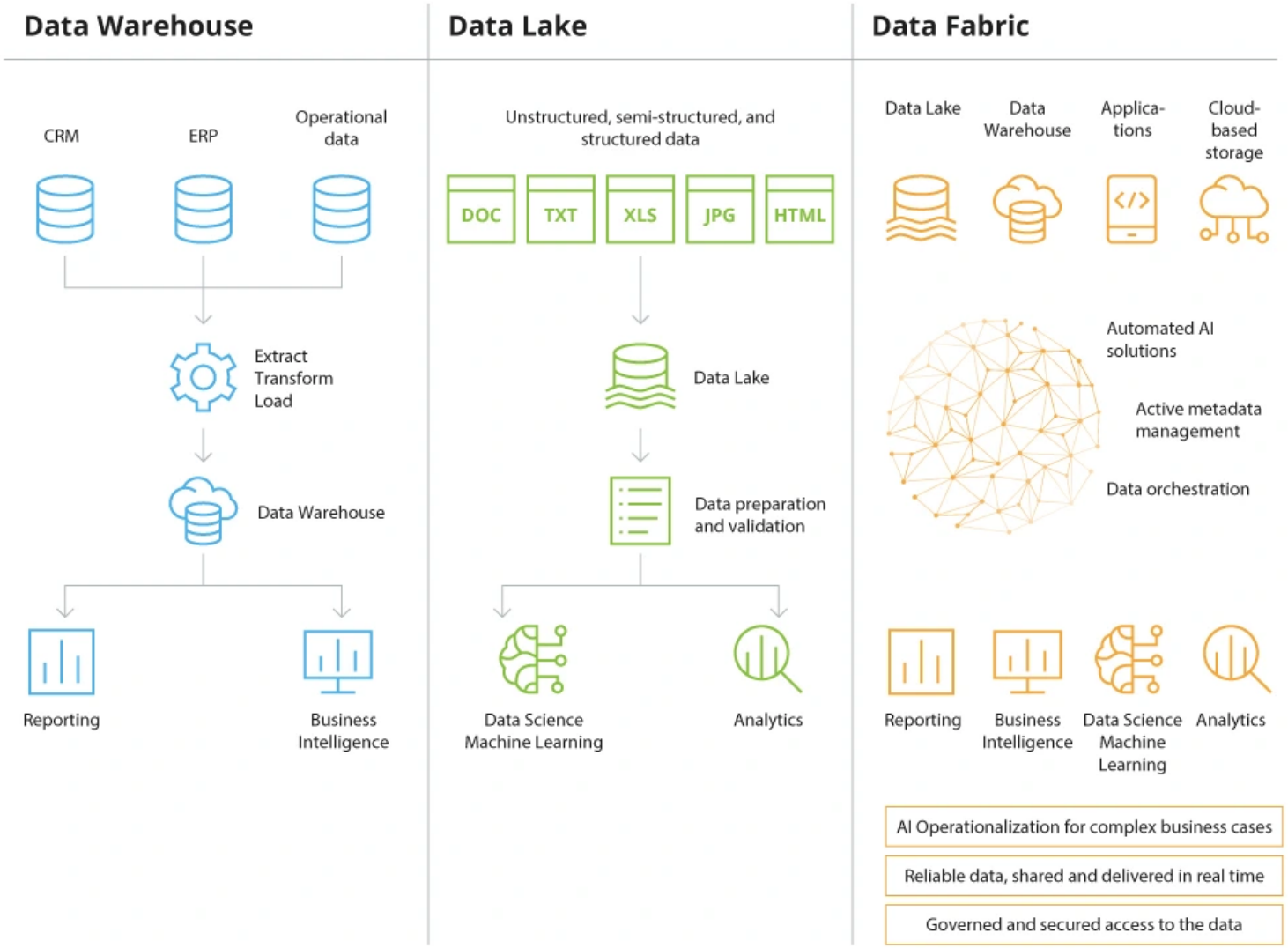
Source: Gartner (March 2012)

Figure 1: Gartner Analytic Ascendancy Model (Gartner, March 2012)

Business Intelligence Terminology
Understanding Data – Categories of Data

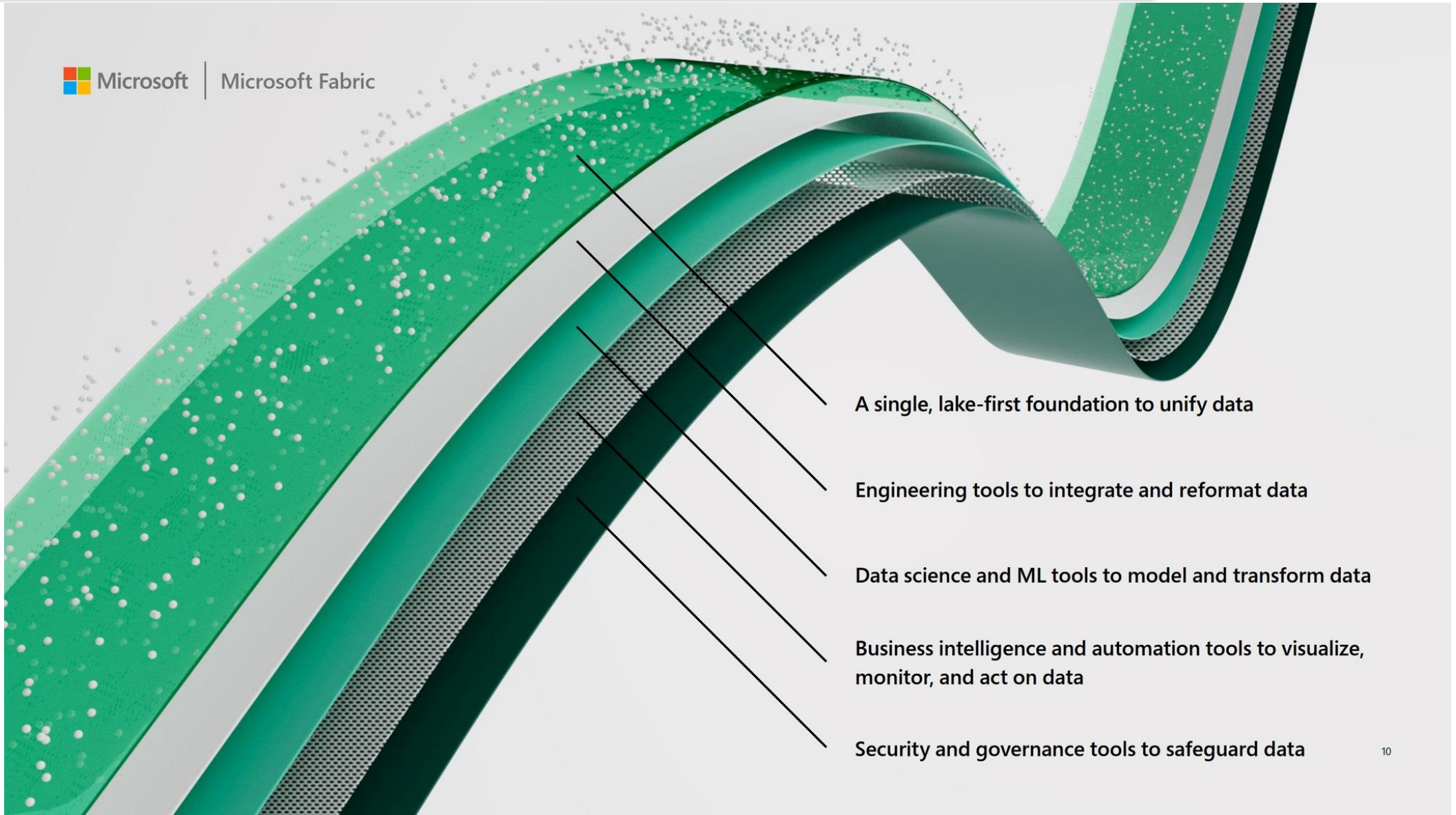


Business Intelligence Terminology
Understanding Data – Categories of Data



LINK

Business Intelligence Terminology
Microsoft Fabric



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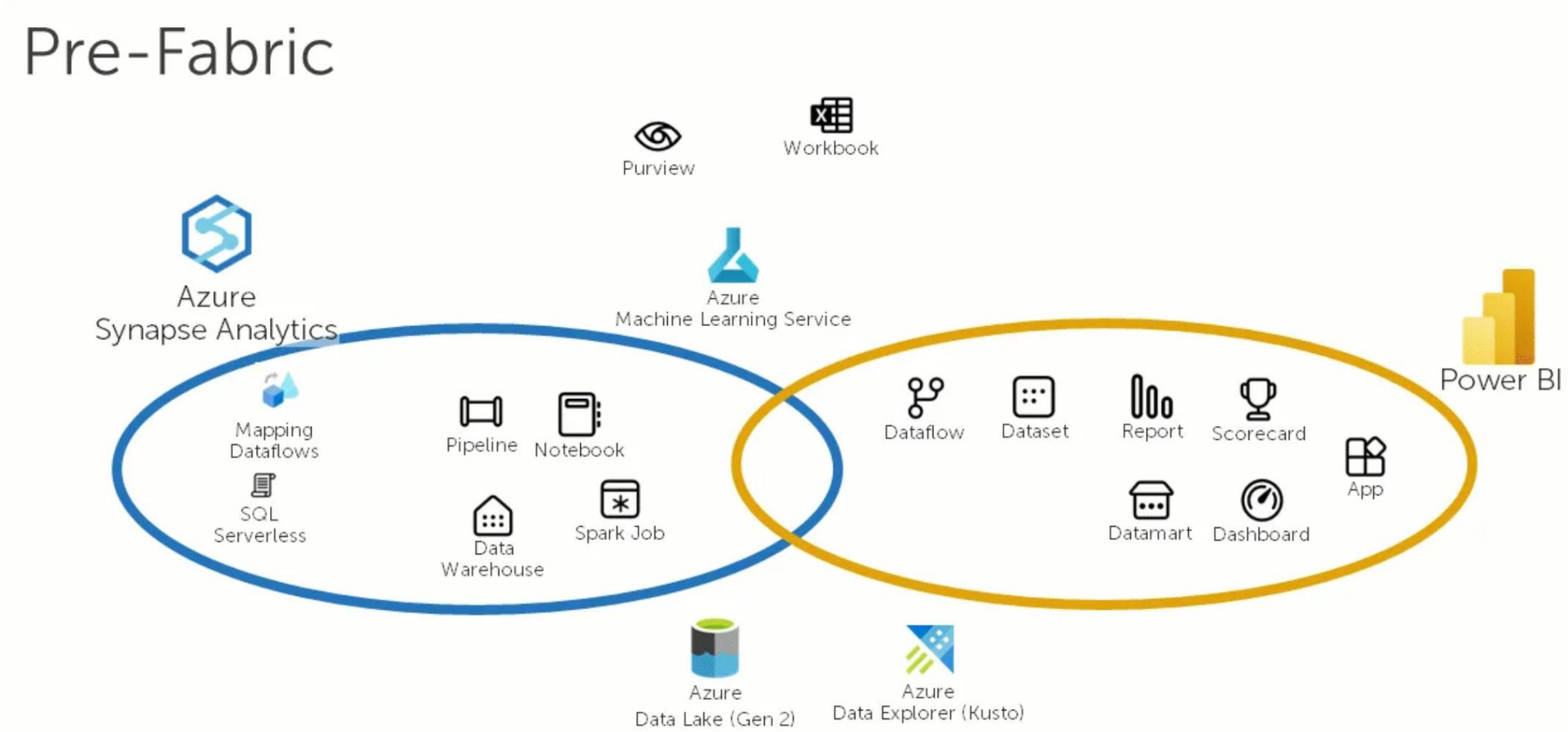

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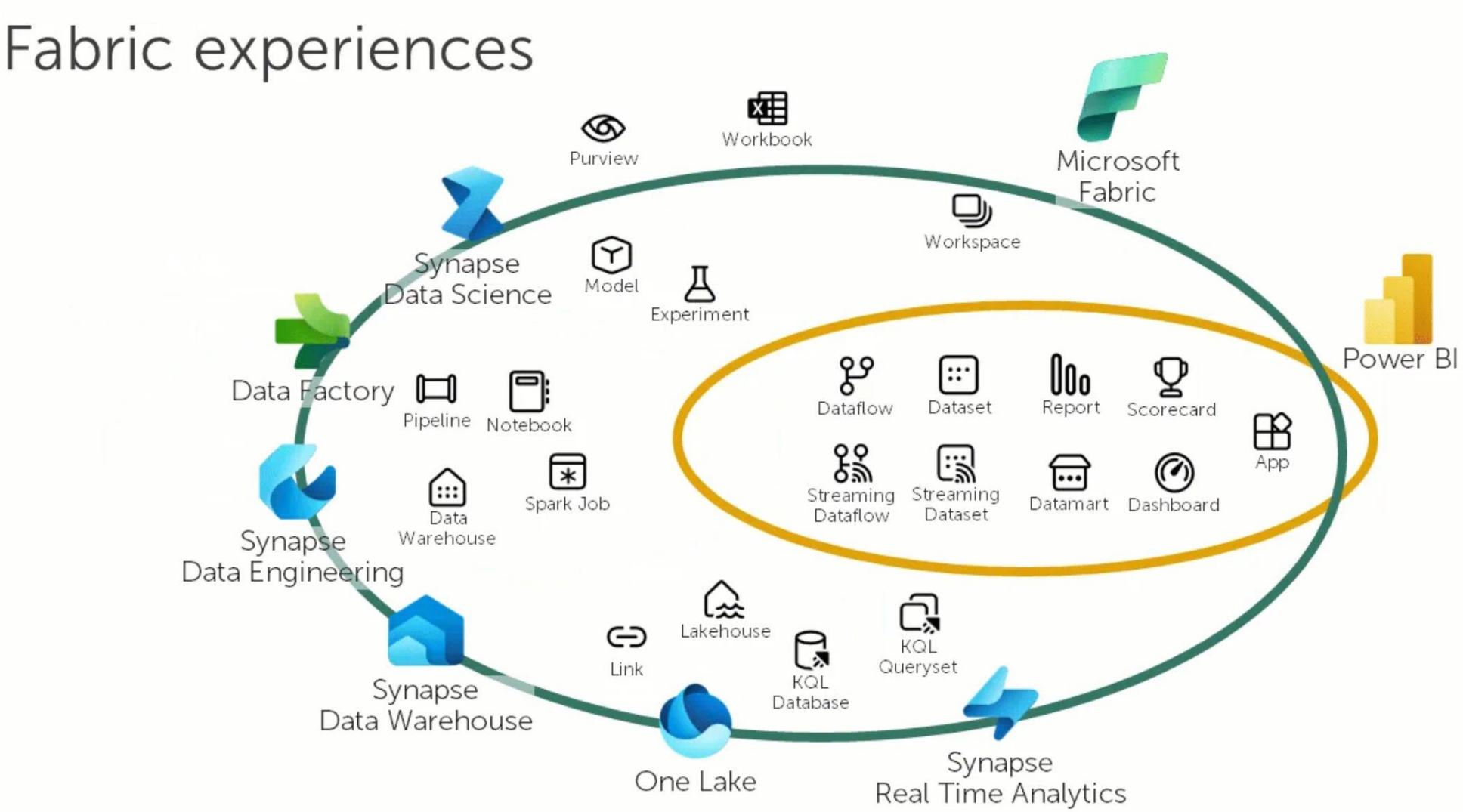
Microsoft Fabric



Business Intelligence Terminology
Understanding Data – Structures of Data

MASTERING DATA ANALYTICS

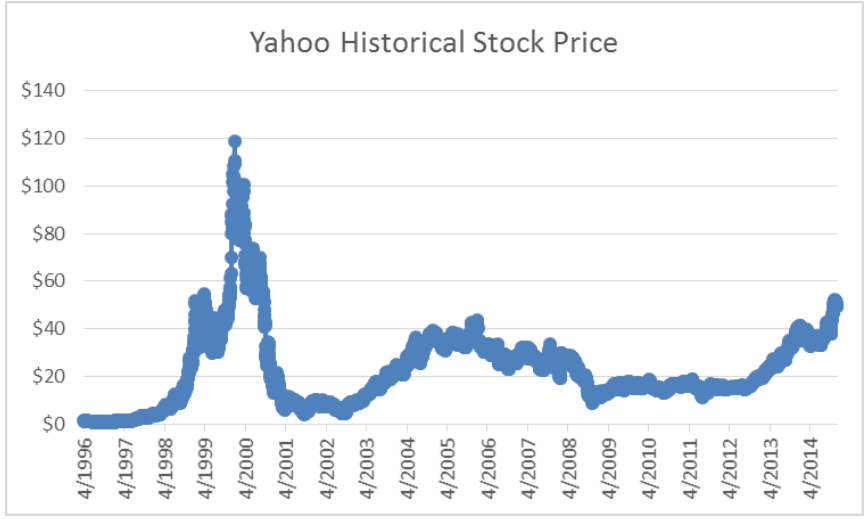
Cross-sectional Data

- Data collected from several elements/entities at the same, or approximately the same, point in time.

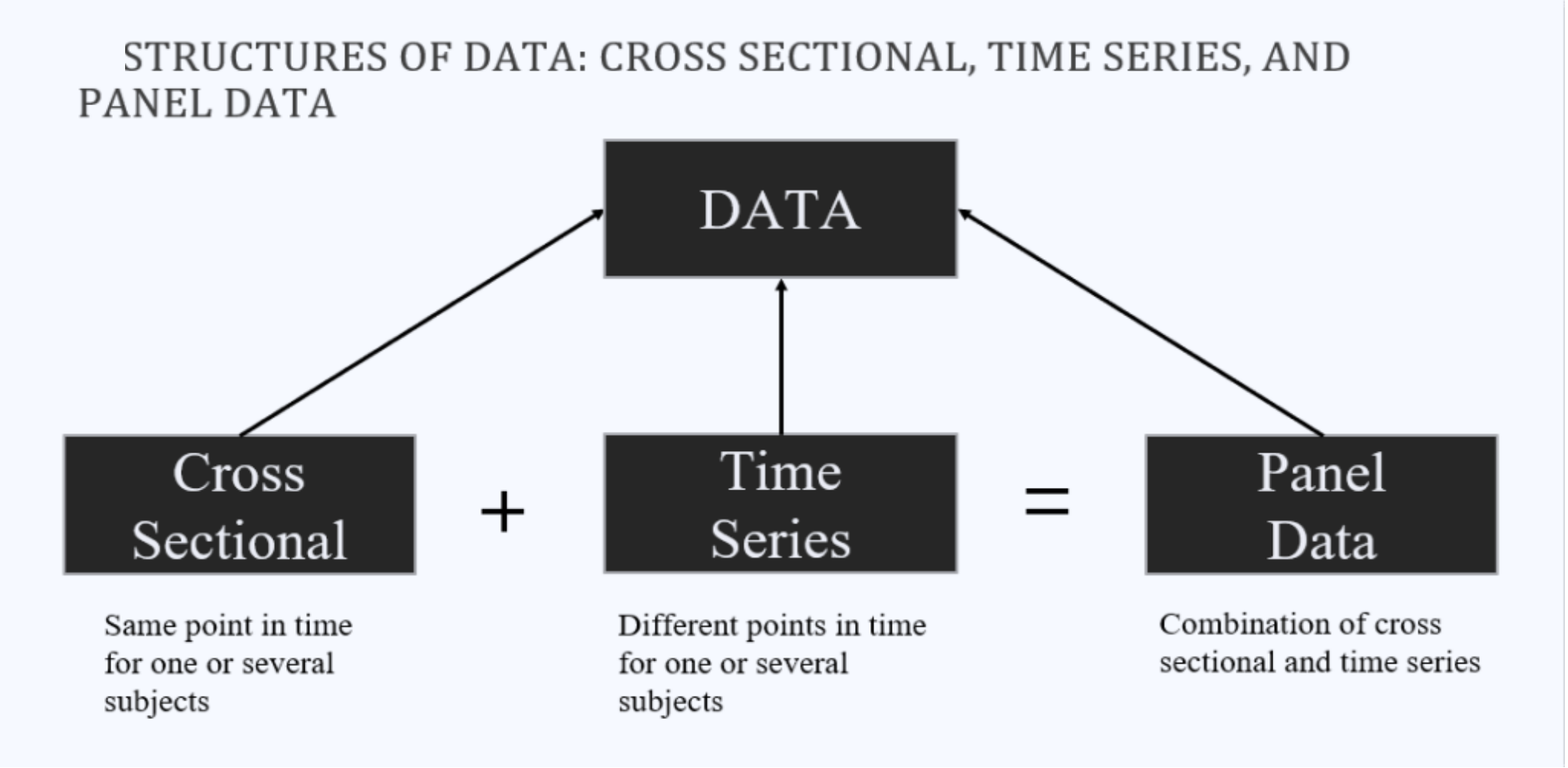
Sep 22, 2015				
	GOOG	**YHOO**	**FB**	**Industry**
Market Cap:	426.88B	28.62B	261.91B	277.63M
Employees:	57148	12500	10955	355
Qtrly Rev Growth (yoy):	0.11	0.15	0.39	0.15
Revenue (ttm):	69.61B	4.87B	14.64B	132.20M
Gross Margin (ttm):	0.62	0.67	0.83	0.58
EBITDA (ttm):	22.62B	541.75M	6.38B	3.47M
Operating Margin (ttm):	0.26	0.02	0.32	0.01
Net Income (ttm):	14.39B	6.94B	2.72B	N/A
EPS (ttm):	21.22	7.2	0.98	0
P/E (ttm):	29.34	4.22	94.47	33.33
PEG (5 yr expected):	1.22	-2.38	1.59	1.07
P/S (ttm):	6.26	6.02	18.39	3.74

Time Series Data

- Data collected over several time periods (Year, Month, Day, Hour…).
- Charts of time series data are common in business and economics.
- Help analysts understand what happened in the past, identify trends over time, and project future levels for the time series.

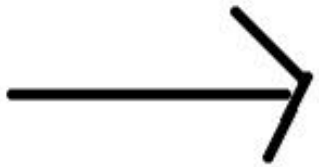


Business Intelligence Terminology
Understanding Data – Structures of Data



Business Intelligence Terminology
Understanding Data – Structures of Data

	A	B	C	D
1		FIRM A	FIRM B	FIRM C
2	3/01/1995	0.191439	0.780436	0.329861
3	4/01/1995	-0.04008	0.332088	0.306904
4	5/01/1995	-0.14042	0.681645	0.820281
5	6/01/1995	-5.65741	0.272911	0.637198
6	9/01/1995	5.898009	0.212024	0.173159
7	10/01/1995	-3.1429	0.719781	0.078806
8	11/01/1995	-6.70905	0.230741	0.090504
9	12/01/1995	6.139131	0.201295	0.409763
10	13/01/1995	-3.19934	0.635427	0.561843
11	16/01/1995	3.282443	0.636448	0.43751
12	17/01/1995	-0.05193	0.655553	0.791657
13	18/01/1995	15.7144	0.013025	0.057594
14	19/01/1995	11.65196	0.535783	0.657062
15	20/01/1995	0.220995	0.65229	0.872535
16	23/01/1995	-14.755	0.092412	0.171942
17	24/01/1995	2.882044	0.68886	0.360246
18	25/01/1995	0.186261	0.544323	0.677453



3/01/1995	FIRM A	0.821848
4/01/1995	FIRM A	-0.04008
5/01/1995	FIRM A	-0.14042
6/01/1995	FIRM A	-5.65741
9/01/1995	FIRM A	5.898009
10/01/1995	FIRM A	-3.1429
11/01/1995	FIRM A	-6.70905
3/01/1995	FIRM B	6.139131
4/01/1995	FIRM B	-3.19934
5/01/1995	FIRM B	3.282443
6/01/1995	FIRM B	-0.05193
9/01/1995	FIRM B	15.7144
10/01/1995	FIRM C	11.65196
11/01/1995	FIRM C	0.220995
23/01/1995	FIRM C	-14.755
24/01/1995	FIRM C	2.882044
25/01/1995	FIRM C	0.186261

Original

Panel Data (Table)

Business Intelligence Terminology
Understanding Data – Structures of Data

Category	Type	2001	2002	2003	Grand total
Fruit	Apples	150	153	162	**465**
	Bananas	332	336	344	**1012**
	Pears	267	266	279	**812**
	Subtotal	**749**	**755**	**785**	**2289**
Vegetables	Cucumber	140	141	152	**433**
	Lettuce	246	245	258	**749**
	Tomatoes	156	161	168	**485**
	Subtotal	**542**	**547**	**578**	**1667**
Grand total		**1291**	**1302**	**1363**	**3956**

Cross Table /Contingency Table / Pivot Table

Year	Month	Category	Type	Sales
2001	January	Fruit	Apples	12
2001	January	Fruit	Pears	21
2001	January	Fruit	Bananas	29
2001	January	Vegetables	Cucumber	9
2001	January	Vegetables	Tomatoes	13
2001	January	Vegetables	Lettuce	22
2001	February	Fruit	Apples	11
2001	February	Fruit	Pears	21
2001	February	Fruit	Bananas	31
2001	February	Vegetables	Cucumber	8
2001	February	Vegetables	Tomatoes	12
2001	February	Vegetables	Lettuce	20
2001	March	Fruit	Apples	9
2001	March	Fruit	Pears	19
2001	March	Fruit	Bananas	32
2001	March	Vegetables	Cucumber	8
2001	March	Vegetables	Tomatoes	11
2001	March	Vegetables	Lettuce	21
2001	April	Fruit	Apples	9
2001	April	Fruit	Pears	18
2001	April	Fruit	Bananas	32
2001	April	Vegetables	Cucumber	10
2001	April	Vegetables	Tomatoes	12
2001	April	Vegetables	Lettuce	21
2001	May	Fruit	Apples	10
2001	May	Fruit	Pears	20

Regular Table

A **cross table** is a two-way table (matrix) consisting of columns and rows.
Also known as a pivot table or a multi-dimensional table.

Business Intelligence Terminology
Understanding Data – Structures of Data

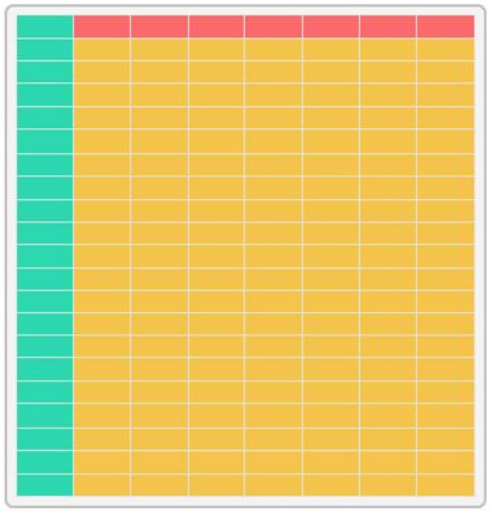
Figure 3.5
Stacked Data

	A	B
1	**Gender**	**Salary**
2	Male	81600
3	Female	61600
4	Female	64300
5	Female	71900
6	Male	76300
7	Female	68200
8	Male	60900
9	Female	78600
10	Female	81700
11	Male	60200
12	Female	69200
13	Male	59000
14	Male	68600
15	Male	51900
16	Female	64100
17	Male	67600
18	Female	81100
19	Female	77000
20	Female	58800
21	Female	87800
22	Male	78900

Figure 3.6
Unstacked Data

	A	B
1	**Female Salary**	**Male Salary**
2	61600	81600
3	64300	76300
4	71900	60900
5	68200	60200
6	78600	59000
7	81700	68600
8	69200	51900
9	64100	67600
10	81100	78900
11	77000	
12	58800	
13	87800	

Business Intelligence Terminology
Understanding Data – Structures of Data



Wide format

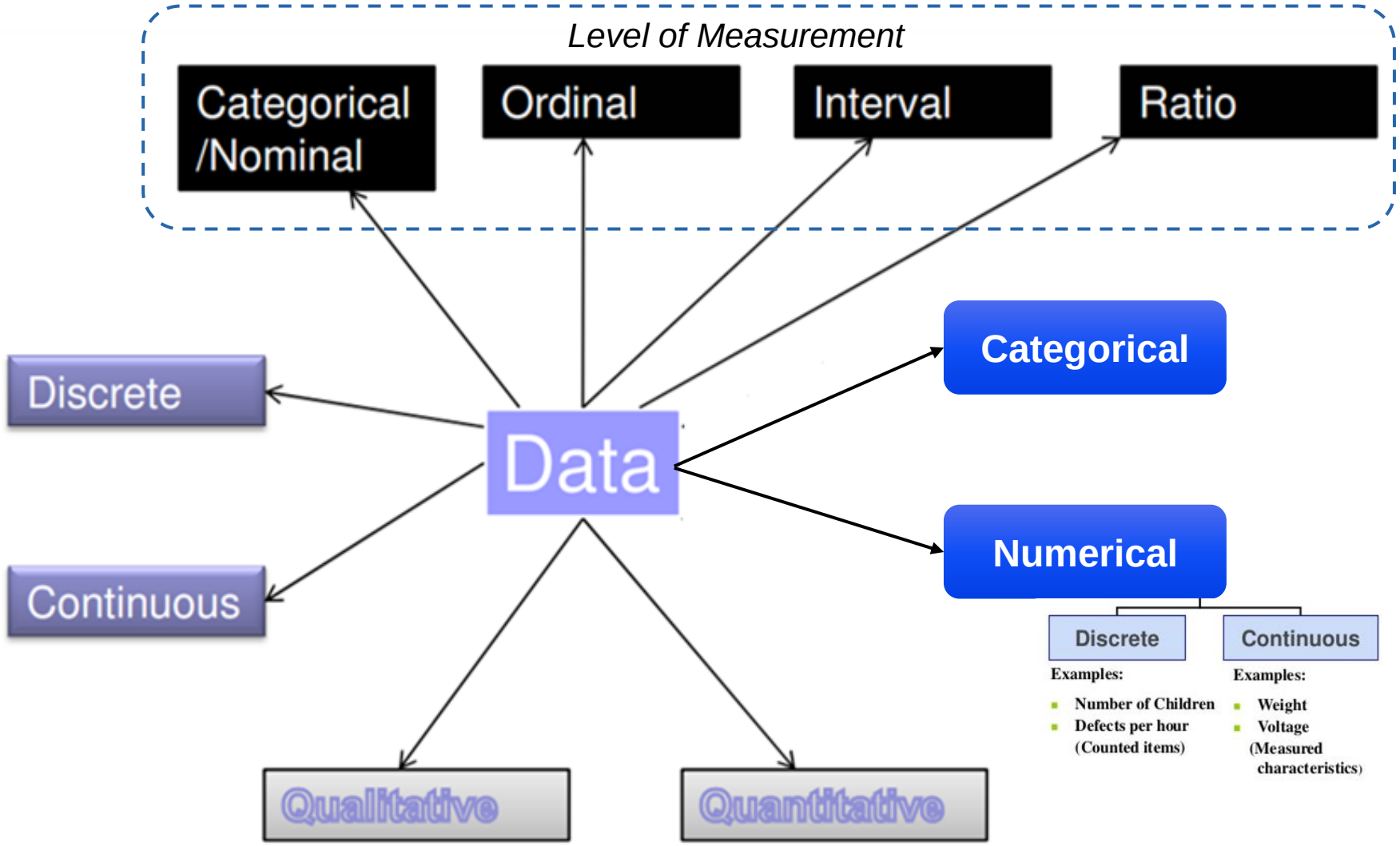
→

Narrow format

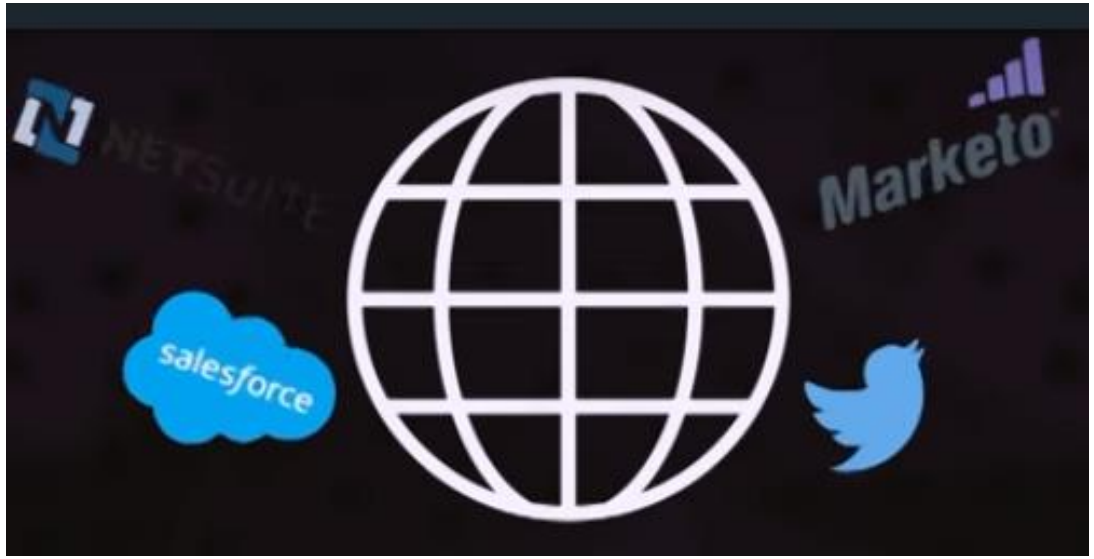
Team	KPI 1	KPI 2	KPI 3
A	88	12	22
B	91	17	28
C	99	24	30
D	94	28	31

Team	KPI Name	Value
A	KPI 1	88
A	KPI 2	12
A	KPI 3	22
B	KPI 1	91
B	KPI 2	17
B	KPI 3	28
C	KPI 1	99
C	KPI 2	24
C	KPI 3	30
D	KPI 1	94
D	KPI 2	28
D	KPI 3	31

Business Intelligence Terminology
Understanding Data – Data Face



Business Intelligence Terminology
Understanding Data – Data Source

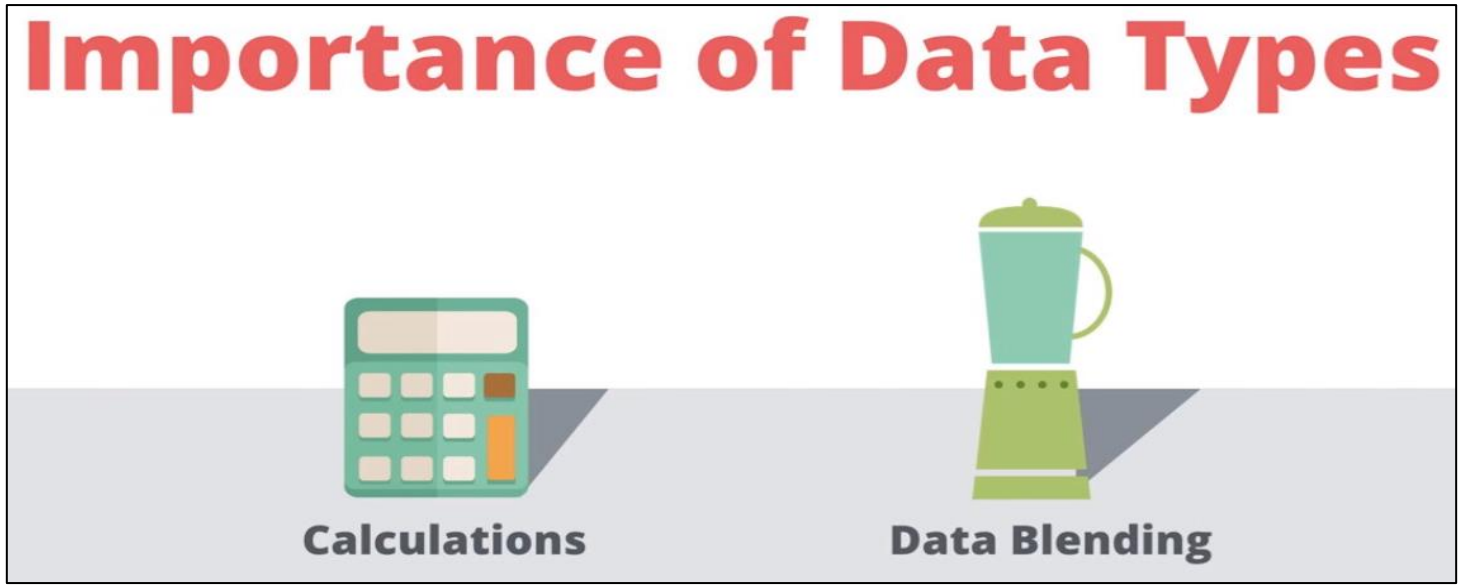


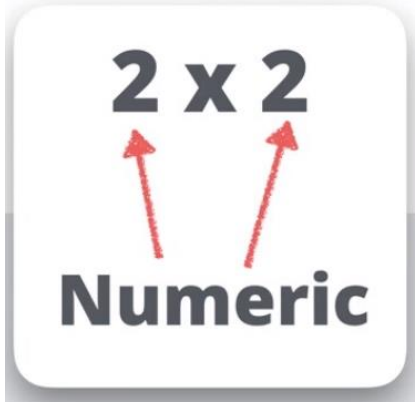
Computer files

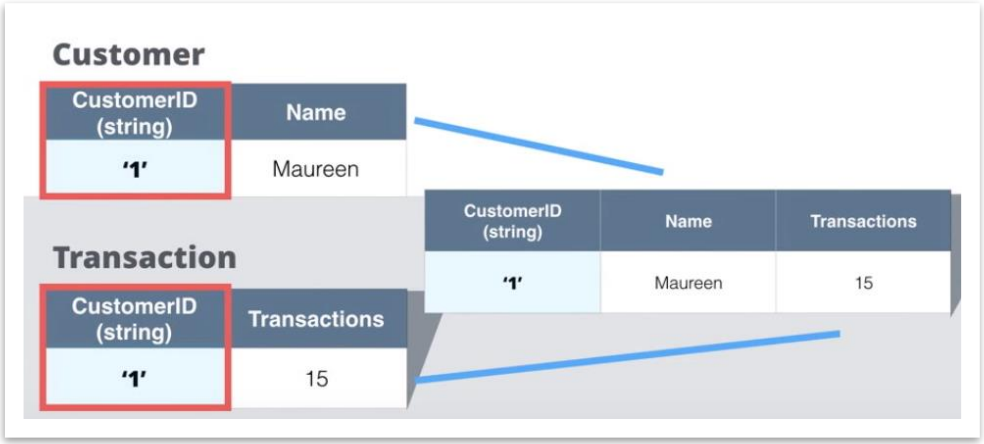
Database

Web-based

Business Intelligence Terminology
Understanding Data – Importance of Data Types







Business Intelligence Terminology
Understanding Data – Data Types

MASTERING DATA ANALYTICS

COMMON FIELD TYPES

Strings	Numeric	Date/Time	Boolean	Special Objects
String data can be declared in a number of different ways depending on the character set required and the anticipated length of the string: ***any kind of characters, alphanumeric, including symbols.***	Numeric data are numbers which can be ***whole numbers***, such as Integers or numbers with decimal places **Byte** **Integer** **Fixed Decimal** **Float** **Double**	Date/time contains a ***specific date***, or a combination of both ***date and time***	The Boolean type is sometimes also called a ***logical type*** and is a conditional flag representing either true or false	*Images* *Maps* *Report objects* *Sound*

Business Intelligence Terminology
Understanding Data – Data Types Exercise

Look at the dataset below. Identify the appropriate data type that fits with these fields:

Employee
Address
Distance
Telecommuter

Employee	Address	City	ZIP Code	Distance	Telecommuter
Jane Doe	230 Commerce	Irvine	92602	34.5	TRUE
John Lee	190 S Glassell	Orange	92866	10.4	FALSE
Marcy Smith	1313 Disneyland Dr	Anaheim	92802	5	FALSE
Sandra Singh	3333 Bristol St	Costa Mesa	92626	25	TRUE
Steve Tran	1900 Associated Rd	Fullerton	92831	12.7	FALSE

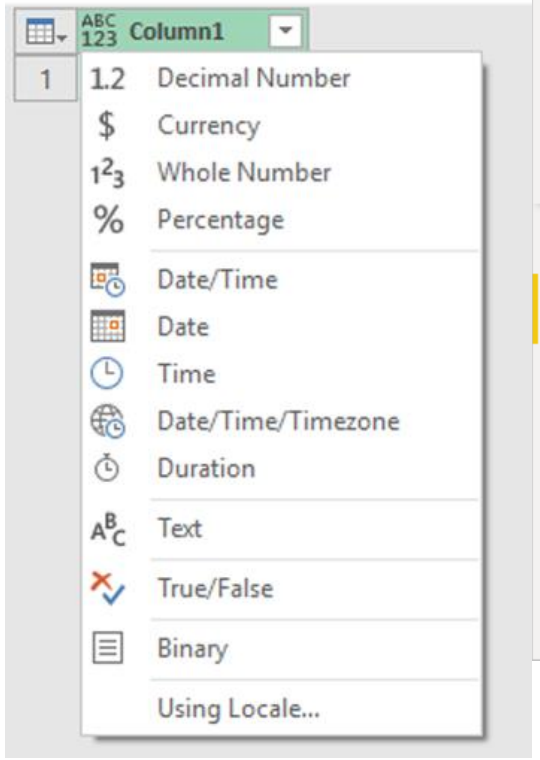
Quiz:
Employee, Address, City, ZIP Code, Distance, Telecommuter

Data Types ?

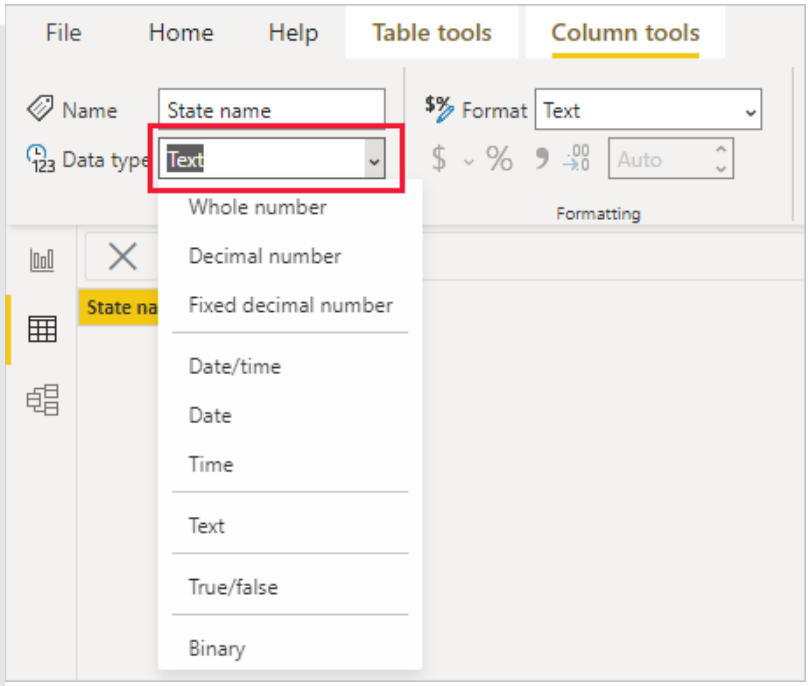
Business Intelligence Terminology

Understanding Data – Data Types vs Data Format

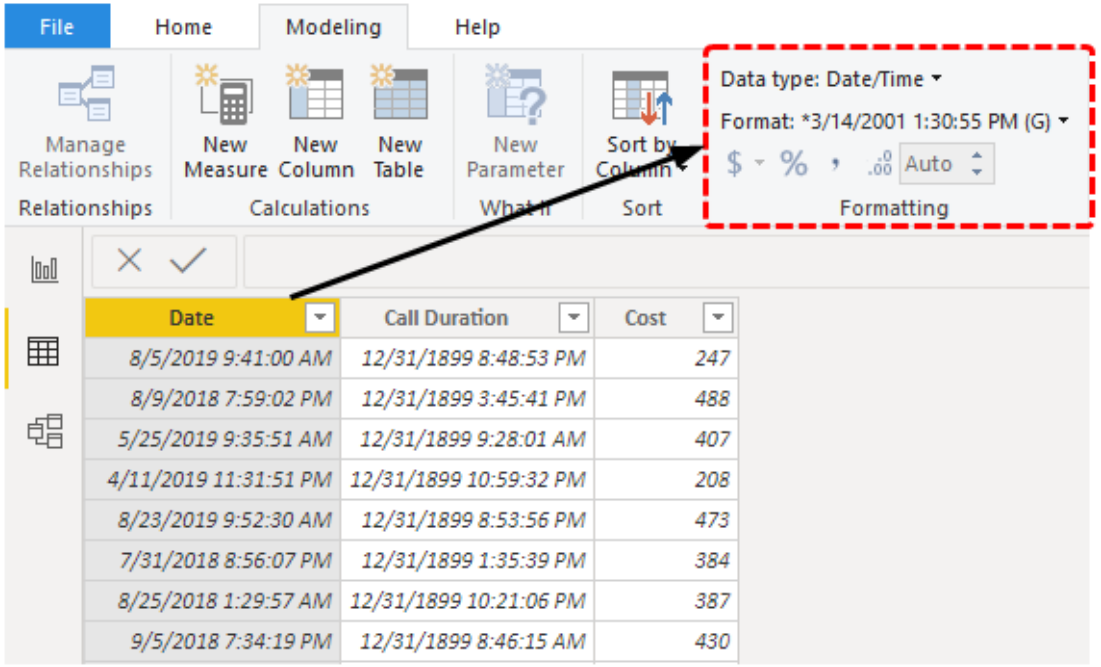
Power Query



Power BI



Power BI (Format Data Type)



Business Intelligence Terminology
Summary

- Business Intelligence vs Business Analytics
- 4 Type of Analytics
- Understanding Data Structure for Analysis
- Data Source (Files, Database, Cloud..etc)
- Data Face (Numerical vs Categorical Variables)
- Importance of Data Type

MASTERING DATA ANALYTICS

BI FUNDAMENTALS

PART 1: Business Intelligence Terminology

PART 2: Business Intelligence in Corporates

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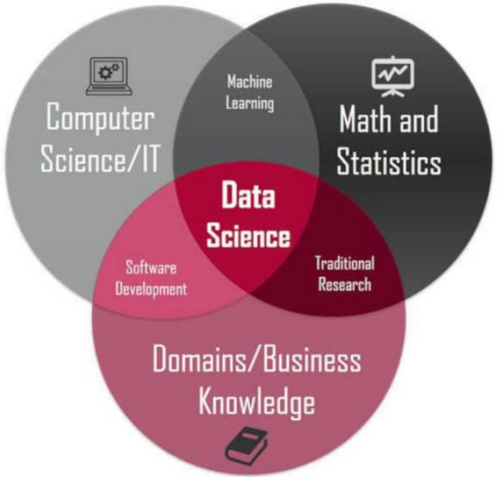
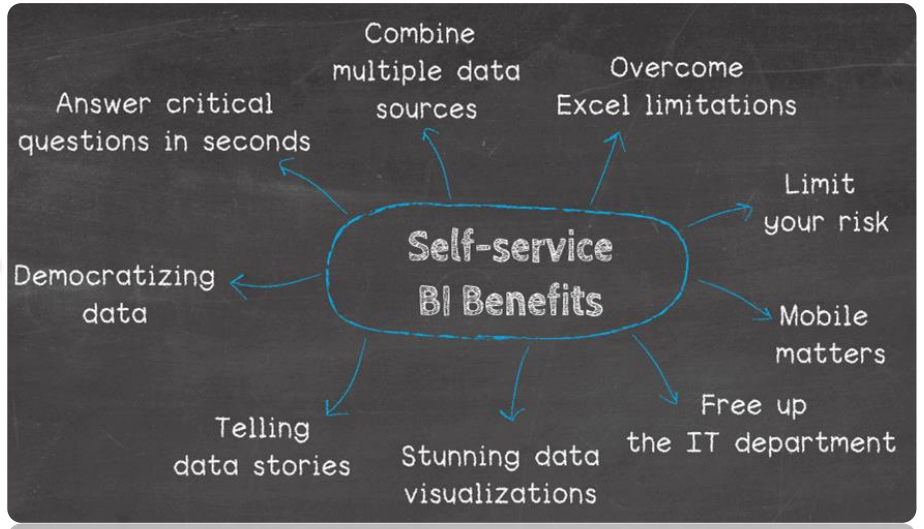
Business Intelligence in Corporates
Self-service BI & Analytics



The Hardest Thing In Data Science
Math & IT isn't the hardest thing in Data Science. Since it's so mature, and documented, and well-known, it's quite possibly *the easiest thing* to conquer in the skillset. The hardest thing about Data Science is ***asking the right question.***



Business Intelligence in Corporates
Self-service BI & Analytics

MASTERING DATA ANALYTICS

Understanding

ORGANIZATIONS EXIST TO CREATE VALUE

Creating value is taking what you know and turning it into action in order to achieve a desired business outcome.

- **Data** must be relevant
- Information must be meaningful
- **Insight** must be **action**able

Agile BI

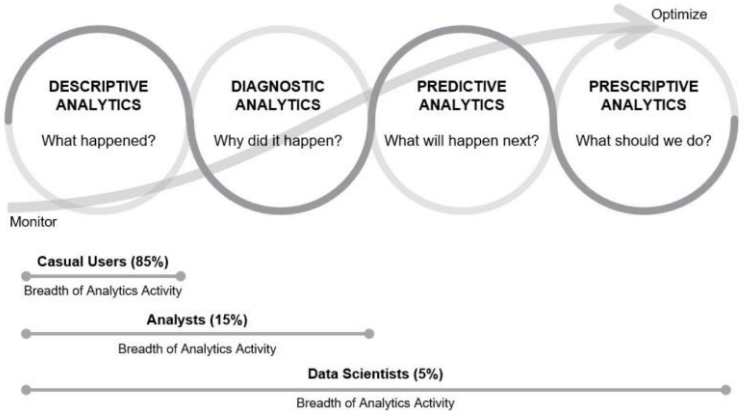
ORGANIZATIONS HAVE TO BE QUICK AND NIMBLE

Agile BI (speed-to-value)

Now, more than ever, business leaders need **access to the right information at the right time in order to act before decision windows close.**

Defining

ANALYTICS IS A JOURNEY TO VALUE ATTAINMENT



Describing

EFFECTIVE SELF-SERVICE IS A BALANCING ACT BETWEEN FREEDOM AND CONTROL

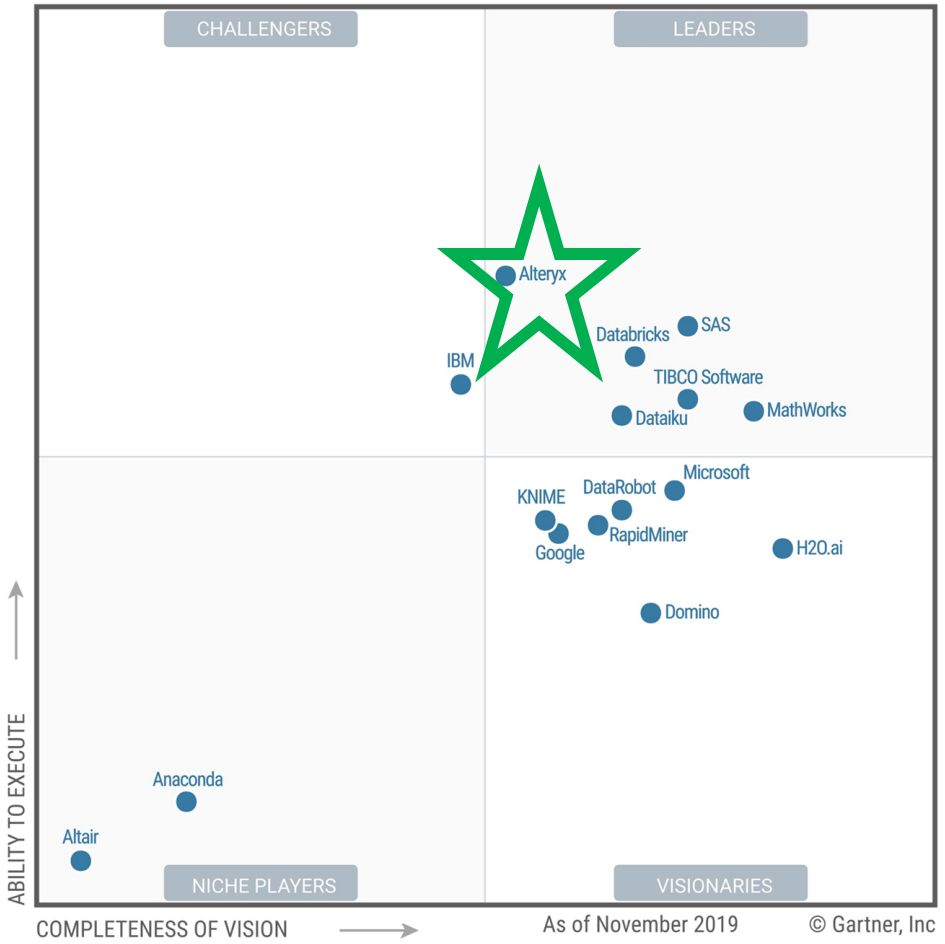
Broaden BI usage while reducing the burden on IT. These companies have learned that the goal of self-service is **not unfettered liberation from IT**, but rather a **partnership** that balances freedom and control, flexibility and standards, governance and self-service

Business Intelligence in Corporates
Self-service BI & Analytics

Figure 1. Magic Quadrant for Analytics and Business Intelligence Platforms

Source: Gartner (February 2020)

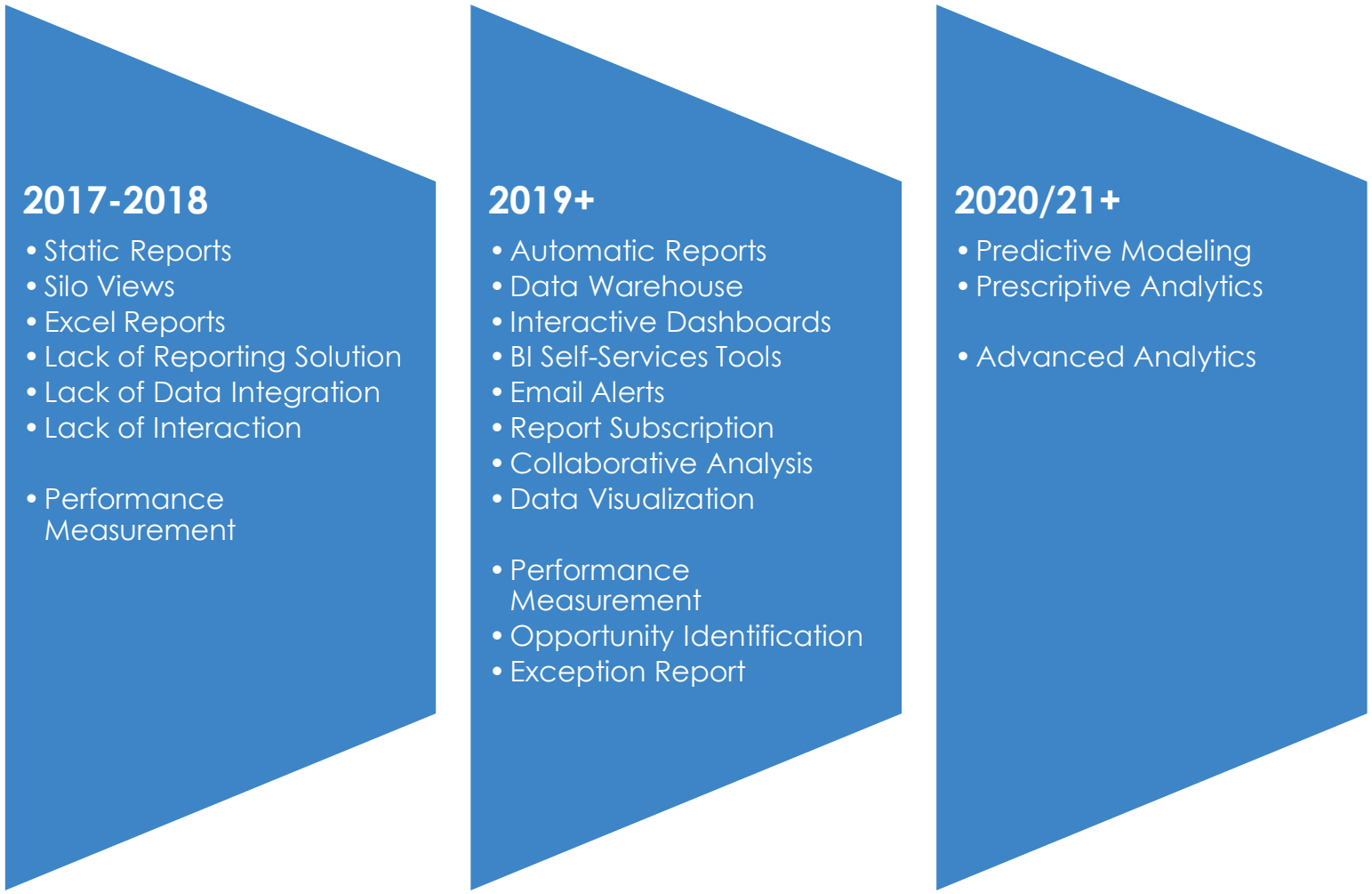
Figure 1. Magic Quadrant for Data Science and Machine Learning Platforms



Source: Gartner (February 2020)

Business Intelligence in Corporates

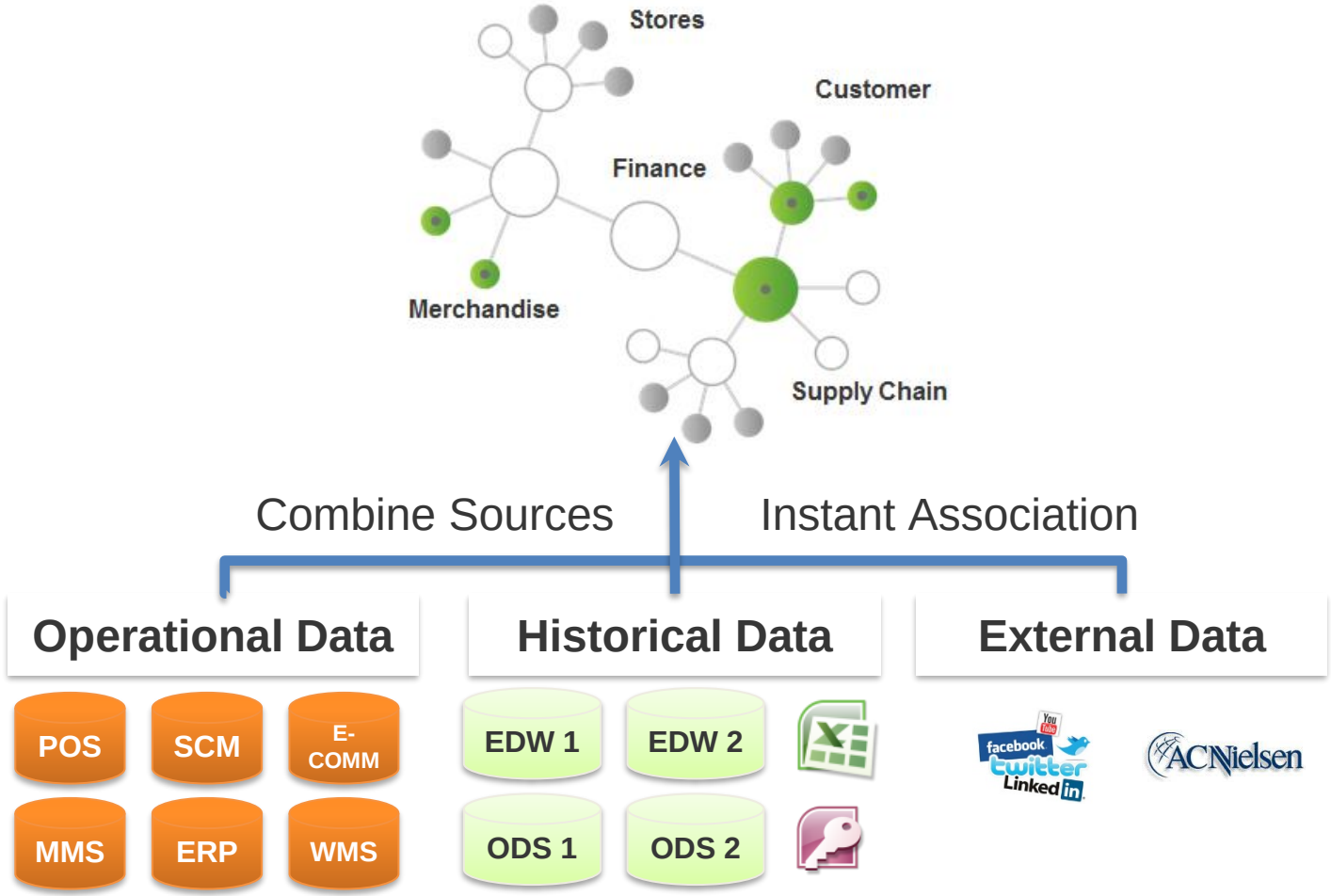
Self-service BI & Analytics



Business Intelligence in Corporates
Analytics structure and Coordination Model

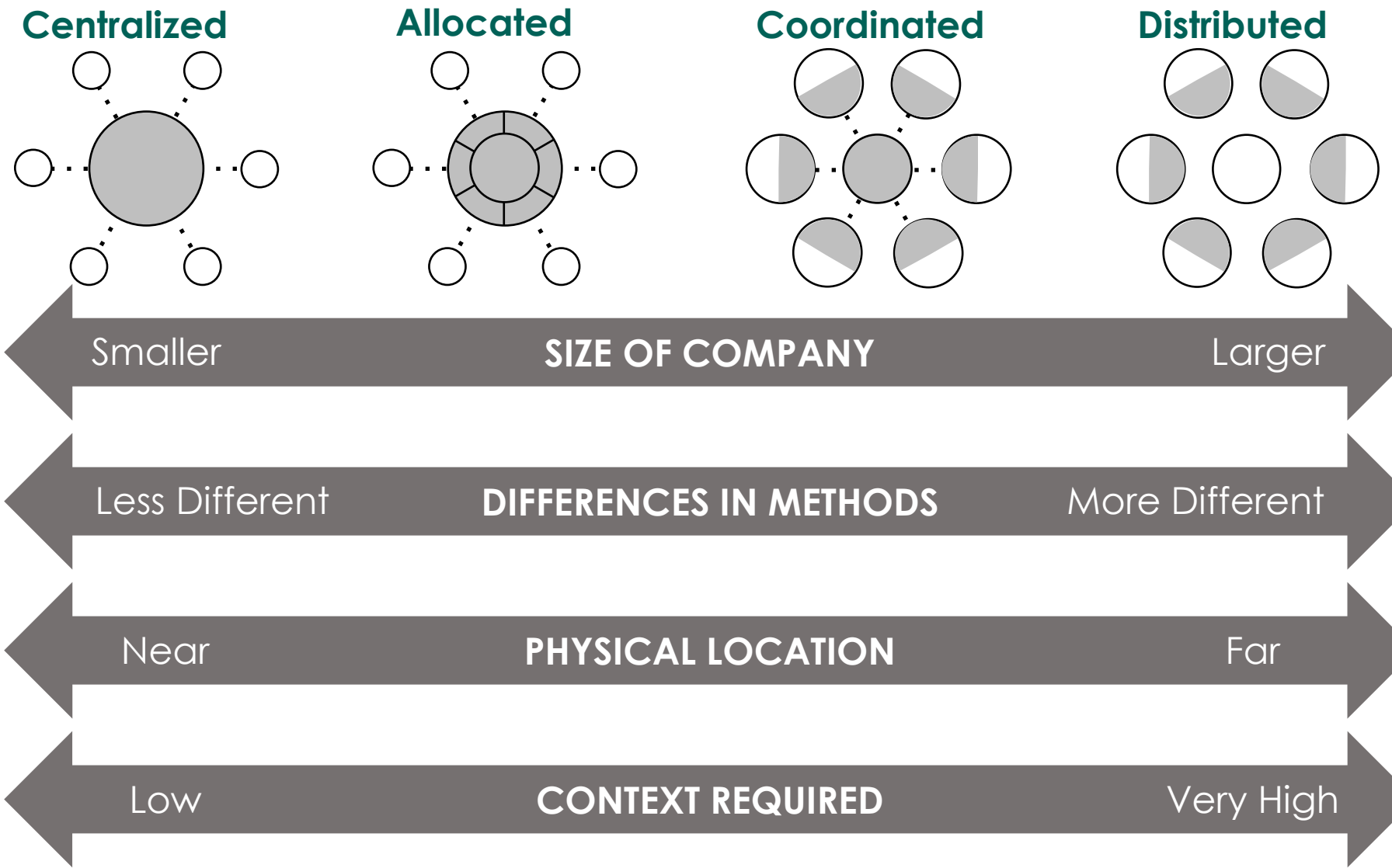
MASTERING DATA ANALYTICS

Business Intelligence Discovery

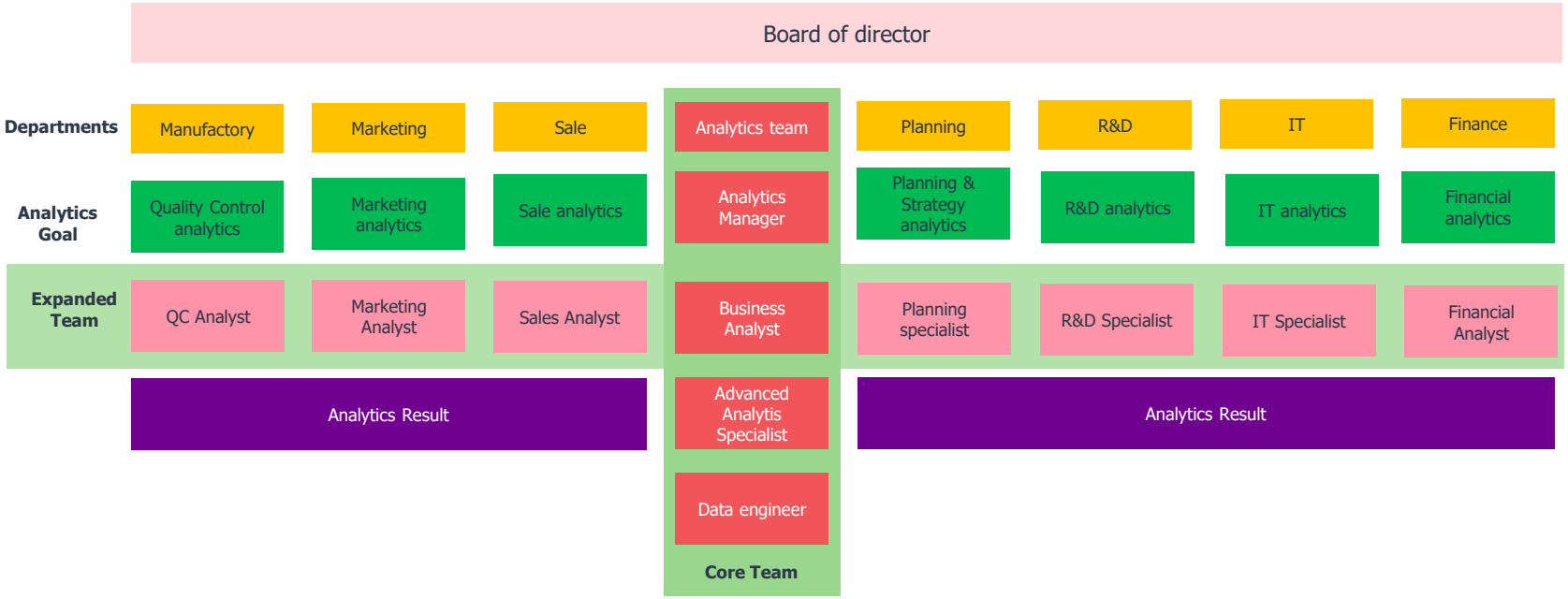


Business Intelligence in Corporates

Analytics structure and Coordination Model



Business Intelligence in Corporates
Analytics structure and Coordination Model



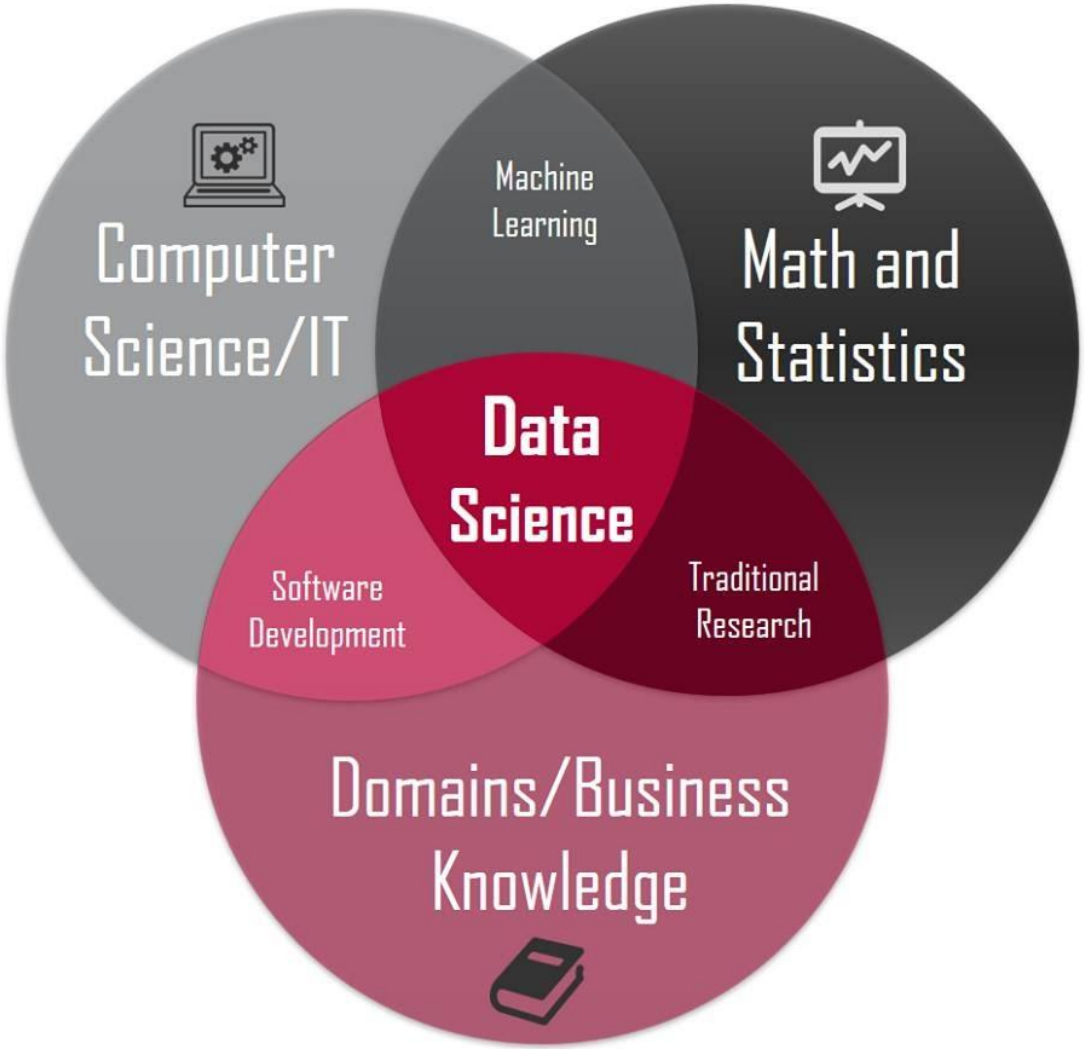
Model of structure and coordination of personnel of analysis team members

Center of Excellence (CoE) model fits into the current context

Under the Board of Directors

- Main member (full time)
- Extensive members: Business, Information and Communication Department, IT, R&D, Finance and Accounting, Human Resource Department (concurrently)

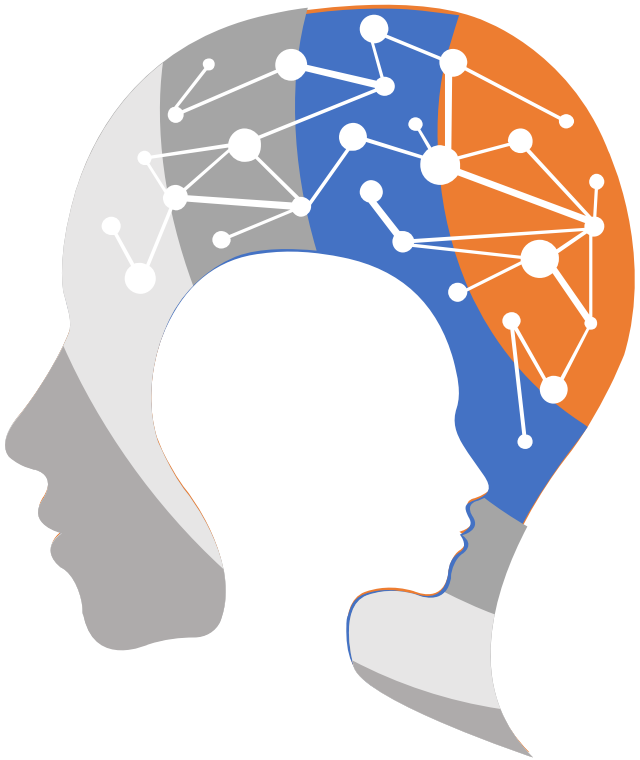
Business Intelligence in Corporates
BI Success (Individual)



Business Intelligence in Corporates
BI Success (Organization)

01. The People Domain

- Organizational Alignment
- The organizational model
- The importance of collaboration
- The right team
- The right support



03. The Technology Domain

- The role of technology
- The self-service architecture
- The place for big data
- The confusing analytics landscape

02. The Process Domain

- Setting priorities
- Balancing risk and reward
- Building requirements that work
- Evaluate and Avolve
- Sell the vision
- Control the Chaos

04. The Data Domain

- Understanding data
- Preparing data
- Data on the edge
- Understanding data science
- Data privacy

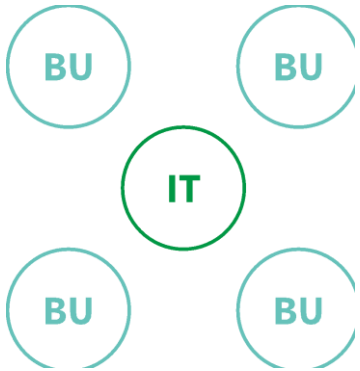
Business Intelligence in Corporates

The Evolution of Business Intelligence

1st Generation

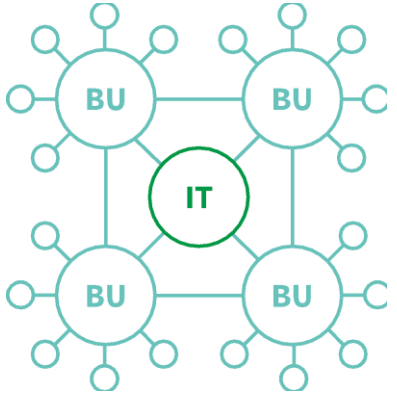
Centralized

2nd Generation



Decentralized

3rd Generation



Democratized

Business Intelligence in Corporates

How can data analytics help organizations?

1. Fundamental BI & **Analytical Thinking**
2. End-to-End BI Workflow in Power BI
3. Descriptive Statistics & Analytics
4. Diagnostics Analytics
5. Analytical Idea Presentation (Dashboard – Insight - Story)
6. Business Intelligence Capstone

MASTERING DATA ANALYTICS

ANALYTICAL THINKING

PART 1: **Overview Concept**

PART 2: Data Analytics Problem Solving

PART 3: **Qualitative (LOGIC TREE)**

3.1 Logic Tree Fundamentals

3.2 Techniques to build Logic Trees

3.3 The 4 things you need to "get" to understand Logic Trees

3.4 Summary

PART 4: 5 core structures overview

4.1 Algebraic structures

4.2 Process Structures

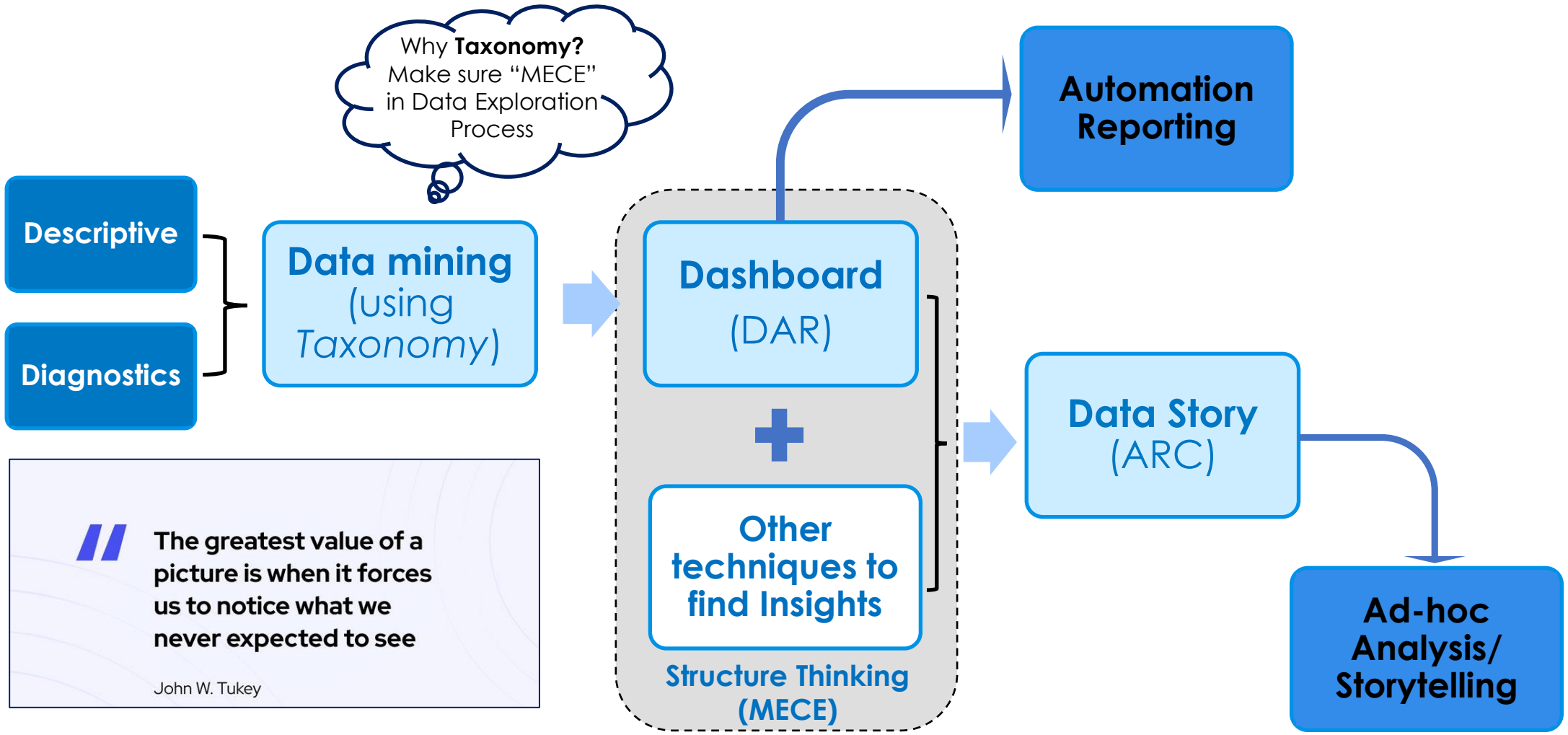
4.3 Conceptual Frameworks

4.4 Segmentations

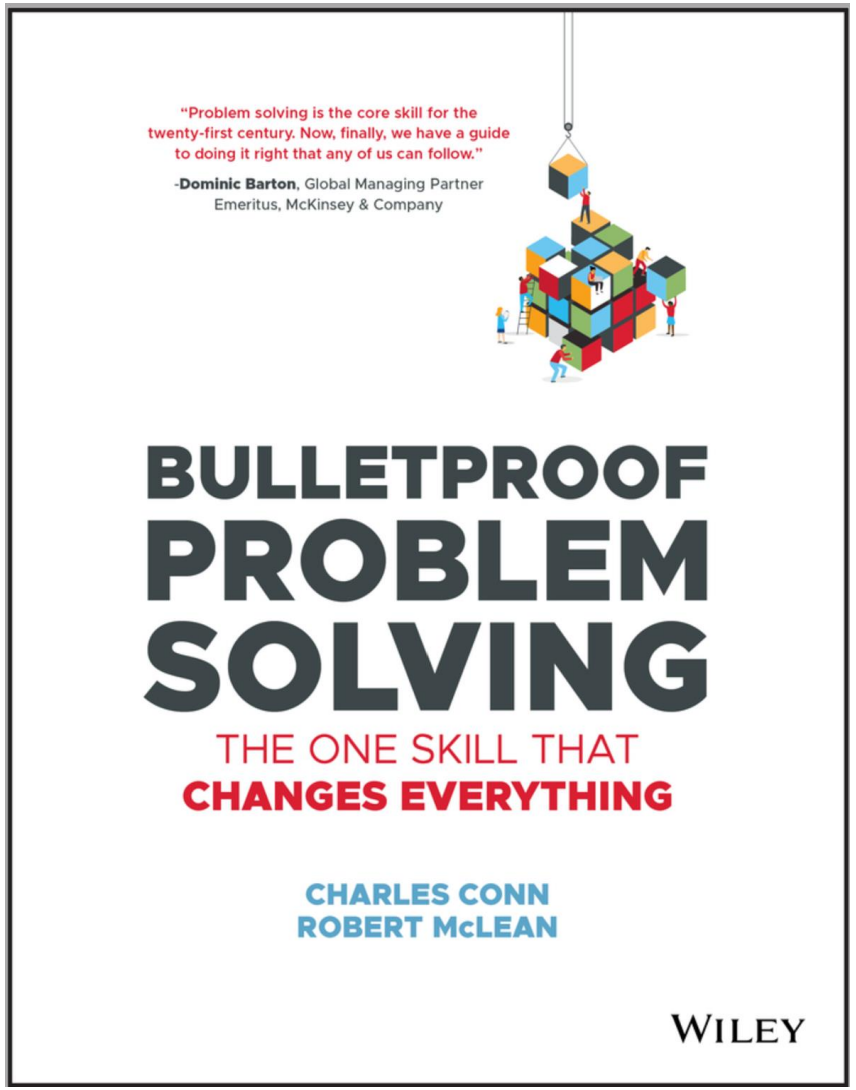
4.5 Opposite Words

4.6 Combine Structures

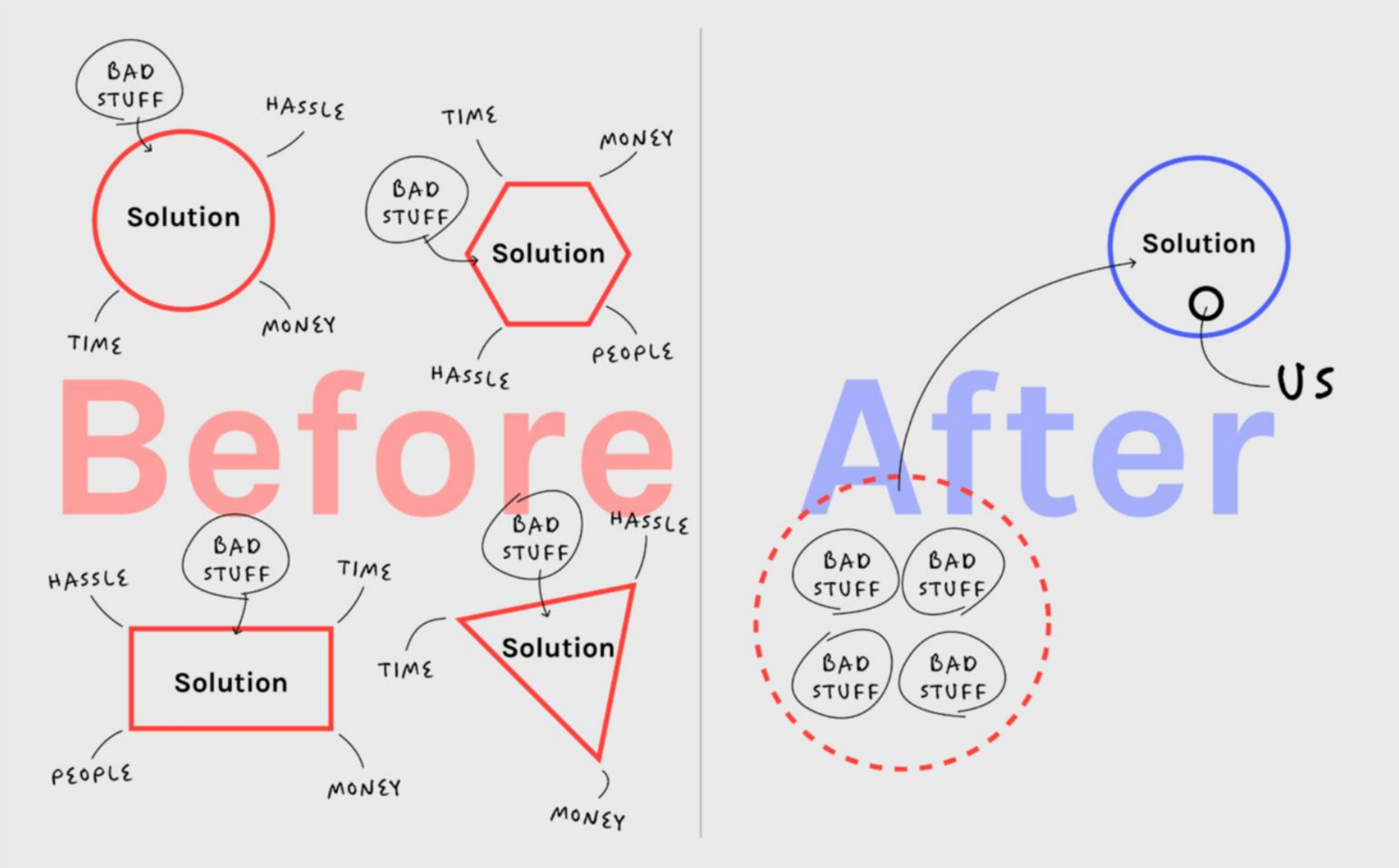
Business Intelligence overview



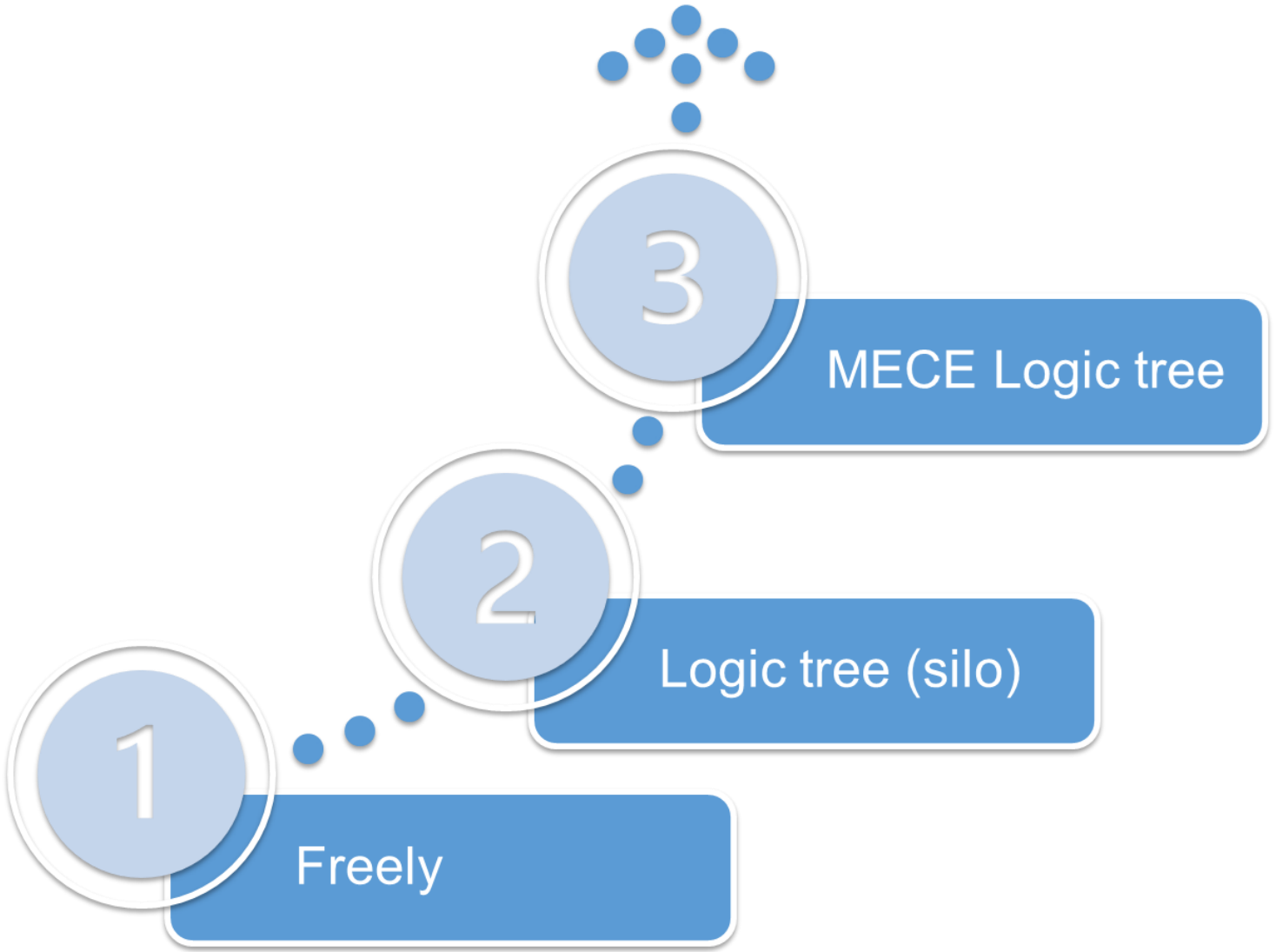
Data Analytics Problem Solving



Data Analytics Problem Solving



3 levels of Analytical Thinking



MASTERING DATA ANALYTICS

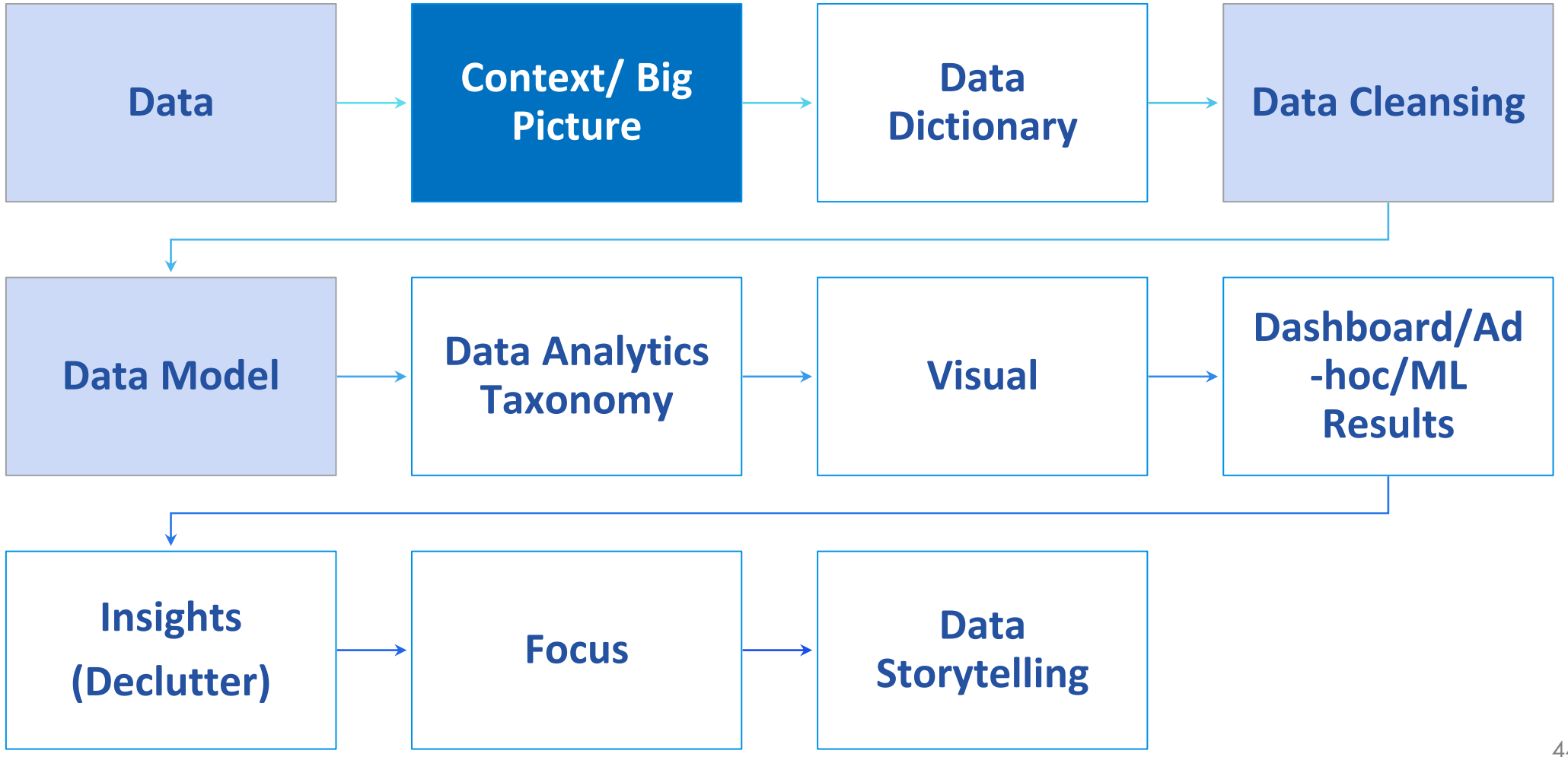
Ad-hoc Analytics: WHEN?

From Reports

From Managers

Why has our ROAS dropped from 150% to 130% over the past month?

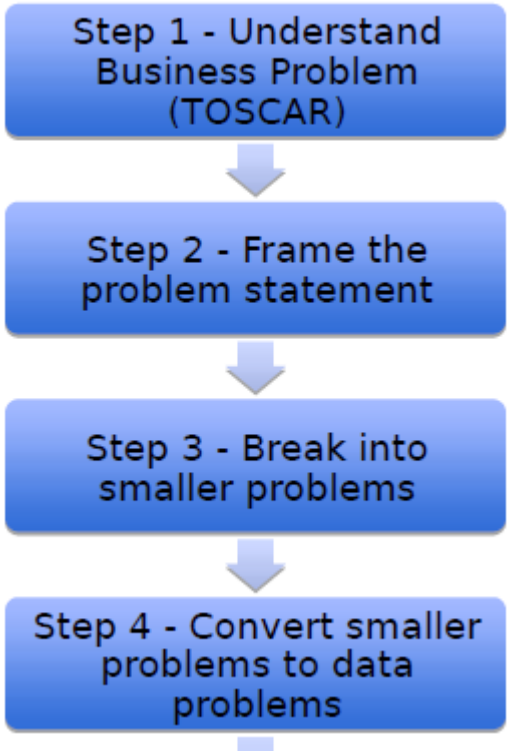
From Data to Story Process



Data Analytics Problem Solving
Understanding the context

MASTERING DATA ANALYTICS

Frameworks for converting business problem into a data problem



Trouble	Owner	Success criteria	Constraints	Actors	Reference
Why? • Why existing customers? • Why now? • Where does it fit in your (Sales Director) priority? • Do we have any Cross-sell practice in place? • Any competition benchmarks?	Sales Director? • Customer Management Director? • Who would own the implementation? • Are the counterparts in Organizations aligned? Do they feel this is a problem? • What does the CEO feel about this problem?	How do we measure success? • Average spend from existing customers? • % of customers buying over a time period? • What would we want to achieve in what time frame? • Can this success be achieved by some other manner?	• How many communications can we do with a customer in a day / week / month? • How much can we spend? • Do we have CRM in place? • Do we capture behavioral data? How much past data do we have? • Any regulations? • Trade offs- NPS, unsubscribe	Sales Team / Director • Customer Management • CEO • Operations team • Brand Communication & Marketing	Have we tried this in the past? • What were the results? • How are Current Cross-sales to existing customers handle?

Data Analytics Problem Solving
Understanding the context

Understanding the real trouble, NOT solutions, NO BIAS

Business Problem:
"I want to increase revenue from our existing customers. Can you help us do a propensity model?" – Head of Sales

Why existing customers,
Why now,
Any regional/ competition benchmark,
Any X-sell practice?

Data Analytics Problem Statement
""Increase x% revenue from existing customers in next y months to reduce reliance on new customers by identifying which customers are likely to X-sell"

Data Analytics Problem Solving
Understanding the context

the **BIG IDEA** worksheet

storytelling with data

Identify a project you are working on where you need to communicate in a data-driven way. Reflect upon and fill out the following.

PROJECT _____

WHO IS YOUR **AUDIENCE**?

(1) List the primary groups or individuals to whom you'll be communicating.

(3) What does your audience care about?

(4) What action does your audience need to take?

(2) If you had to narrow that to a *single person*, who would that be?

WHAT IS **AT STAKE**?

What are the *benefits* if your audience acts in the way that you want them to?

What are the *risks* if they do not?

FORM YOUR **BIG IDEA**

It should:

(1) articulate your point of view,
(2) convey what's at stake, and
(3) be a complete (and single!) sentence.

FIGURE 1.3a The Big Idea worksheet

the **BIG IDEA** worksheet

storytelling with data

Identify a project you are working on where you need to communicate in a data-driven way. Reflect upon and fill out the following.

PROJECT Back-to-school opportunity

WHO IS YOUR **AUDIENCE**?

(1) List the primary groups or individuals to whom you'll be communicating.

the executive team

(3) What does your audience care about?

- Having a highly profitable back-to-school shopping season
- Making customers happy because happier customers spend more
- Beating the competition

(4) What action does your audience need to take?

Agree that training is the right way to deal with inconsistent service levels and approve the resources it will take to make that happen (cost, time, people)

(2) If you had to narrow that to a single person, who would that be?

the head of retail

WHAT IS **AT STAKE**?

What are the *benefits* if your audience acts in the way that you want them to?

- better service levels = happier customers
- happier customers spend more, come back more often, tell friends about their positive experience

What are the *risks* if they do not?

- no action could lead to negative word of mouth
- people shopping with competitors
- reputational risk
- lost revenue

FORM YOUR **BIG IDEA**

It should:

(1) articulate your point of view,
(2) convey what's at stake, and
(3) be a complete (and single!) sentence.

Let's invest in sales associate training to improve the in-store shopping experience and make the upcoming back-to-school season the best revenue generating one yet!

FIGURE 1.3b Completed Big Idea worksheet

Data Analytics Problem Solving
Understanding the context

Solution 1.7: storyboard!

Looking back to Exercise 1.3, my Big Idea was the following:

Let's invest in sales associate training to improve the in-store shopping experience and make the upcoming back-to-school season the best revenue generating one yet!

I'll keep this in mind as I work through the storyboarding steps.

STEP 1: Below is my initial list of potential topics/pieces of content to include from my brainstorming process.

1. Historical context (back-to-school shopping is important)
2. Problem we're trying to solve (historically not data driven)
3. Different ways we envisaged solving the problem
4. Course of action we undertook: survey
5. Survey: customer groups we asked, general demographics, response rates
6. Survey: details on competitors we included
7. Survey: questions we asked, open and close date of survey
8. Data: how our store compares across the various items
9. Data: how this breaks down across stores and regions
10. Data: how we compare to the competition
11. Data: how competitor comparison breaks down by stores & regions
12. Good news: where we're doing best or beating competition (with store breakdown)
13. Bad news: where we're doing worse or lower than competition (with store breakdown)
14. Areas for improvement
15. Potential remedies
16. Recommended course of action: invest in sales training
17. Resources needed (people, budget)
18. What this will solve
19. Projected timeline
20. Discussion to have/decision to be made

STEP 2: Figure 1.7 illustrates how I might curate the preceding list into a storyboard.

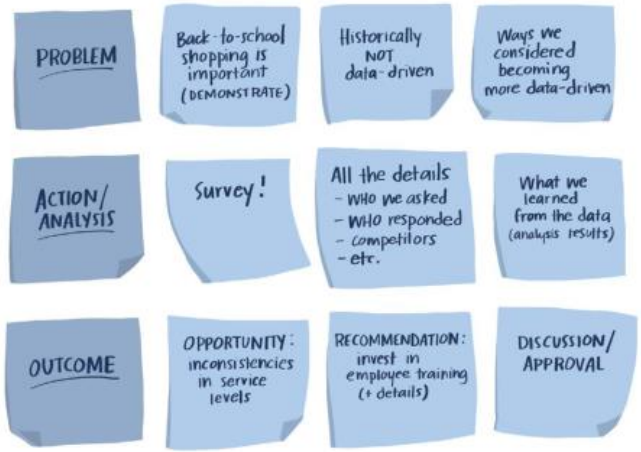


FIGURE 1.7 Back-to-school shopping: a potential storyboard

STEP 2: Figure 1.8 illustrates how I could curate the preceding list into a storyboard.

FIGURE 1.8 Pet adoption pilot program: a potential storyboard

Data Analytics Problem Solving

Part 1: Logic Tree Fundamentals - Overview

MASTERING DATA ANALYTICS

Part 1: Logic Tree Fundamentals

Part 2: Techniques to build Logic Trees

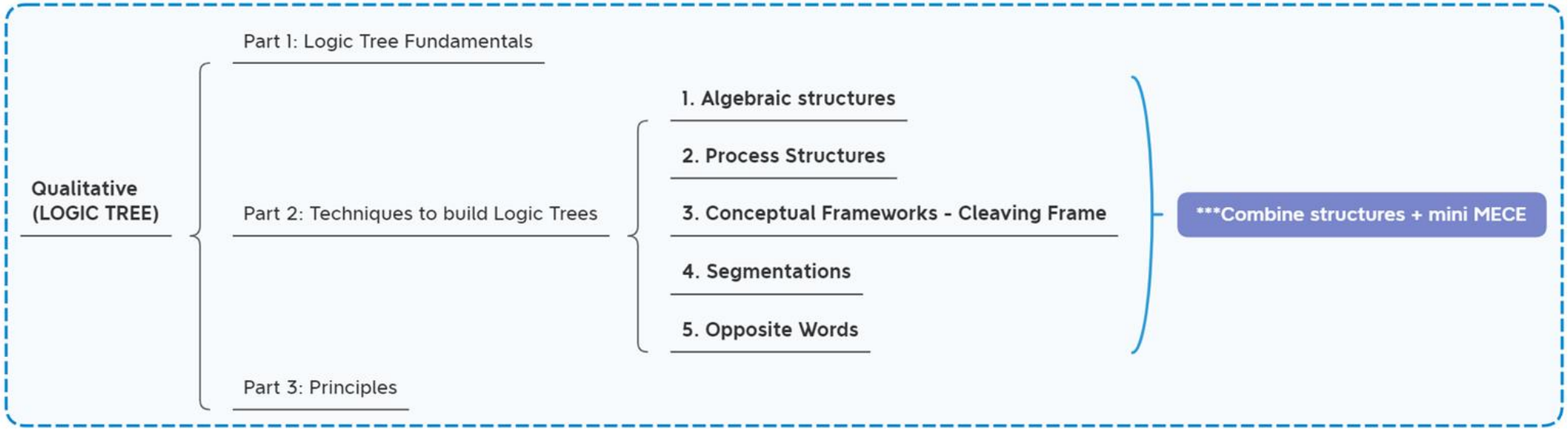
Part 3: Principles

"No adventurer should explore a territory without a good map. And no smart problem solver should start solving a problem without a good structure thinking."

Data Analytics Problem Solving
Part 1: Logic Tree Fundamentals - Overview

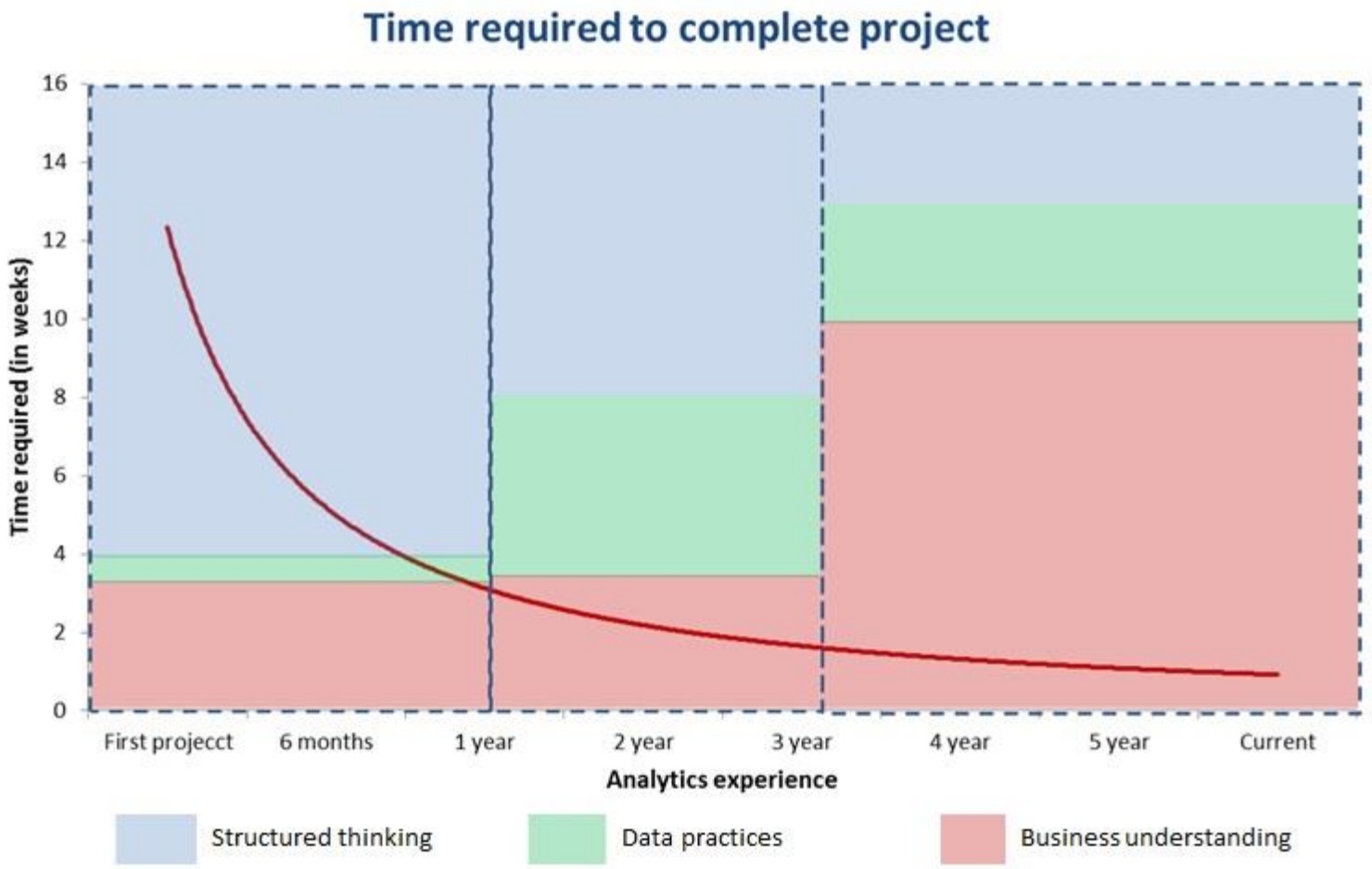
- Consultants from **MBB** (**McKinsey, BCG, Bain) and other consulting firms** use logic tree as a "map" to **solve both simple and complex problems.** For this reason, it's one of the **most widely used problem solving tools**. This is **the most fundamental tool** to **structure and solve problems in a systematic way**.

- You can't have one toolbox that is perfect for every problem, but you can assemble a toolbox that is perfect for each job if you have a few different boxes to choose your tools from and you have familiarity with them. If you learn to tie-up these **five techniques in a coherent way**, you will learn to create issue trees from scratch.



Data Analytics Problem Solving

Part 1: Logic Tree Fundamentals - Overview

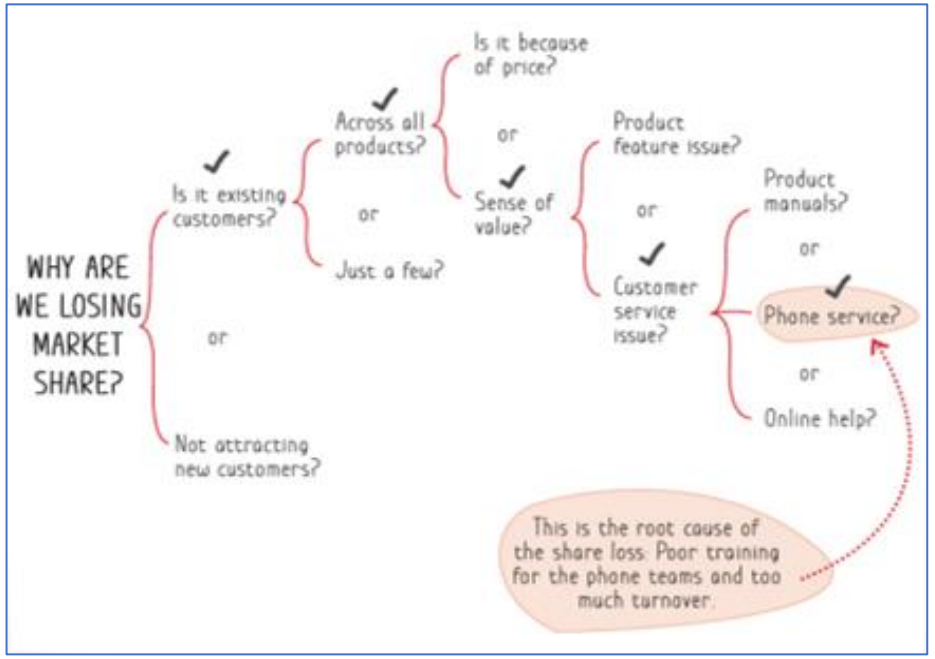


- **Red line** in the graph shows how **time to complete a project** (in weeks) has come down with experience
- With in each of three blocks (< 1 year; 1 – 3 year; 3+ years), the area of color shows the factor responsible for drop in time.
- For example, during the first block, time required to complete the project comes down from 12+ weeks to 3 weeks and **75% of this drop is because of structured thinking.**

Data Analytics Problem Solving
Part 1: Logic Tree Fundamentals - Overview

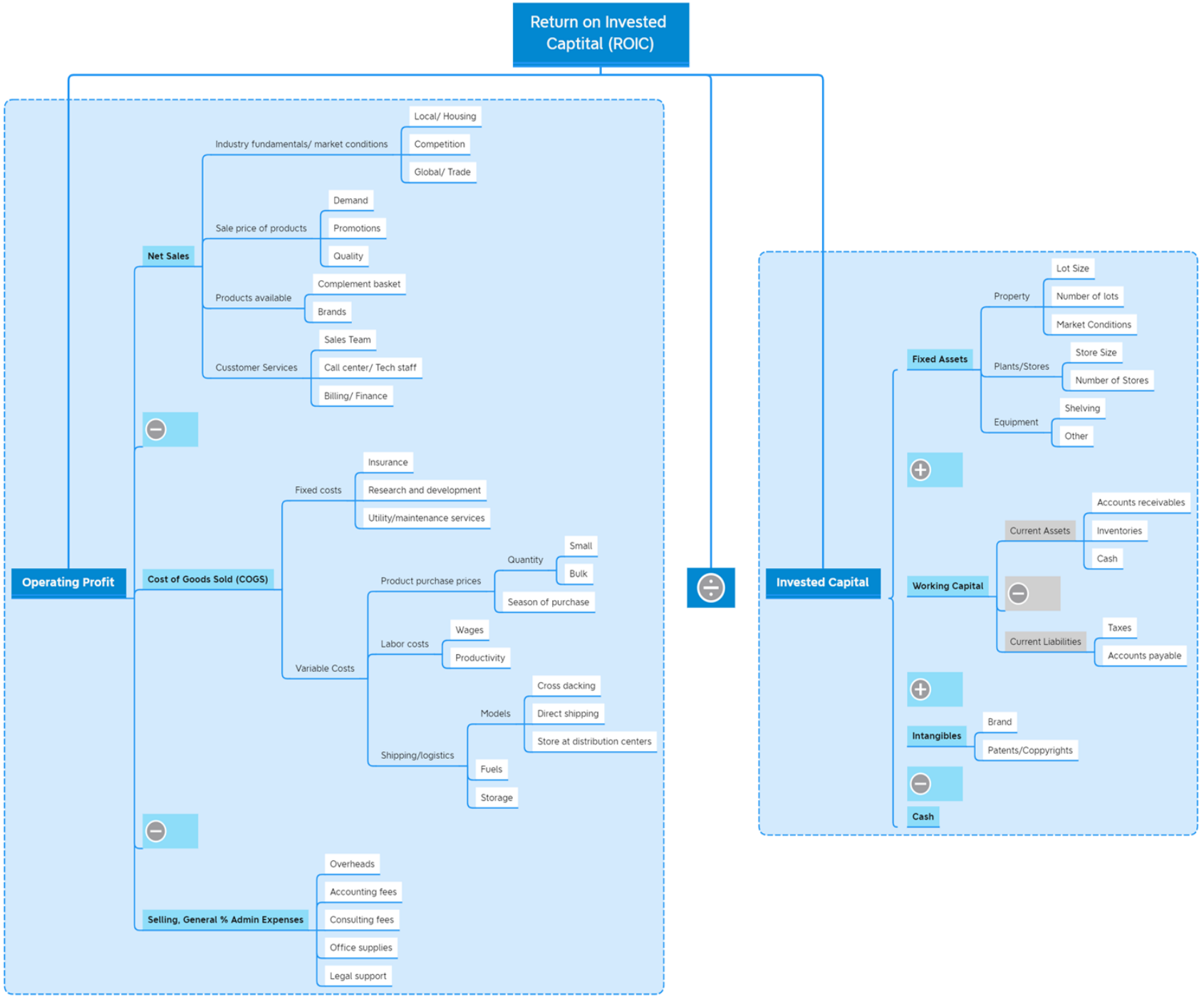
The 4 things you need to "get" to understand Logic Trees

1. They are a "**map**" of your problem
2. Issue Trees are *the* tool for "**dividing and conquering**"
3. Issue Trees are excellent for **prioritization**
4. You can have **"problem trees" and "solution trees"**



Data Analytics Problem
Part 1: Logic Tree Fundame

1. They are a "**map**" of your

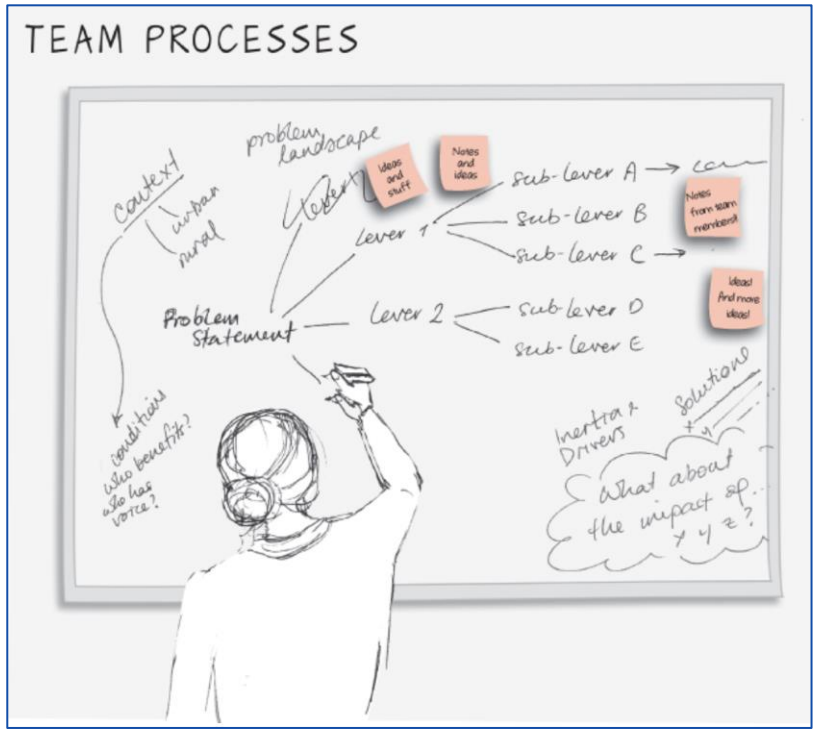


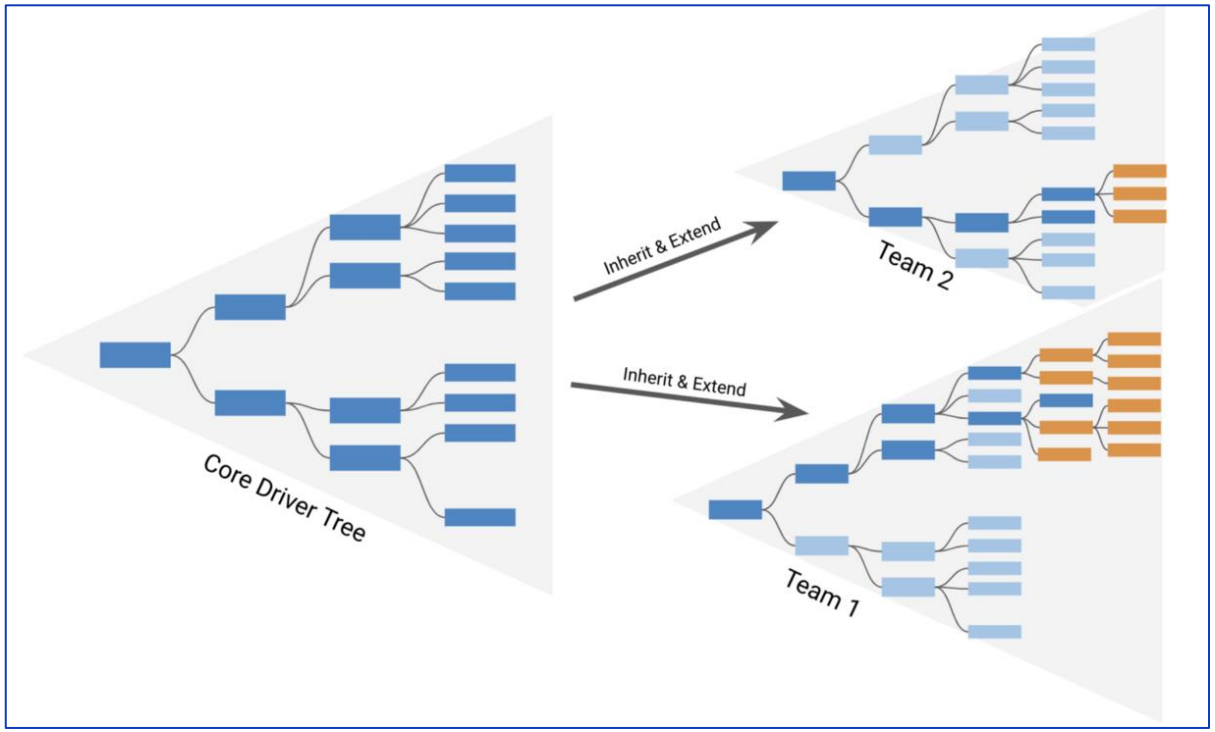
Data Analytics Problem Solving

Part 1: Logic Tree Fundamentals - 4 things

Never met a person that can **generate that many ideas** with **just the prompt question** (how to improve customer retention) and **without building an Issue Tree first**. **Our brains seem to get confused with that many ideas.** But if you add structure (forced constraints), you can think freely about each part without worrying about missing something.

It is often difficult to see the structure of the problem, **team brainstorming** is hugely valuable, especially when trying different lenses or cleaving frames.





Data Analytics Problem Solving
Part 1: Logic Tree Fundamentals - 4 things

Why do I want to use **Logic Trees (brainstorm)** for mapping out types of solutions?
Why **not** just **Brainstorm freely**?

Logic Trees (brainstorm)	Reasons	Extra documents
(1) Your ideas are gonna be way more organized	• This helps you communicate your ideas with others. • And it also helps you **organize** everyone's ideas into a coherent whole. • And then better prioritize those ideas and even "divide and conquer" the implementation of them. You know, all the good stuff Issue Trees allow you to do.	
(2) Creativity from constraints	• This is counter – intuitive, but bear. • There's significant research showing that having some **constraints** make people MORE creative, not less.	Link 1: https://www.fastcompany.com/3067925/how-constraints-force-your-brain-to-be-more-creative Link 2: https://medium.com/stanford-d-school/want-some-creativity-crank-up-the-constraints-5728a988a635 Link 3: https://hbr.org/2013/01/how-intelligent-constraints-dr
(3) They force you to see whole categories of ideas you wouldn't have seen before.	**Ex:** Take the "Make it costly to unsubscribe" category for example. • When I came up with it, I was thinking about financial costs. You know, contracts and stuff. • But when I saw the word "financial" coming up in my mind, I immediately noticed that there could also be "non-financial" costs, such as having to go to a physical retail store to cancel the service or losing your dear phone number that you had for 8 years and all your friends and business connections have. • I didn't have these "**non-financial costs**" **ideas** before I create the category for them. Which is another big advantage for using Issue Trees to come up with solutions for your problems. **You can see the larger picture.**	

2. Issue Trees are *the* tool for "**dividing and conquering**"

It so happens that this "divide and conquer" strategy is not only good for dealing with military opponents, but **also GREAT for dealing with Big, Hairy, Complex problems**, **separating them and dealing with a part of their forces one at a time.** It's much easier to deal with one cockroach a hundred times than with a hundred cockroaches at once.

But **if you try making it more specific without the help of an Issue Tree,** you're gonna **end up with one of two things**:

(1) An **incomplete list** of possible hypotheses (like the one you probably wrote down on your piece of paper)

(2) A **HUGE list with hundreds, even thousands of hypotheses** (which, at the end of the day, you don't even know if it's complete anyway)

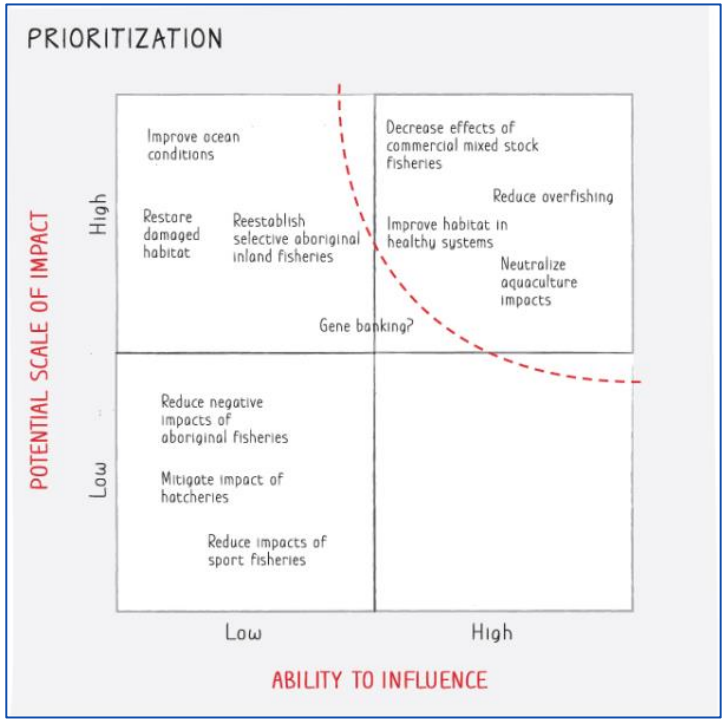
Data Analytics Problem Solving
Part 1: Logic Tree Fundamentals - 4 things

3. Issue Trees are excellent for **prioritization**

Before we start to invest significant time and effort into work **planning and analysis**, we have to **prune our trees.** Focus your early efforts on the big levers that you can pull**.**

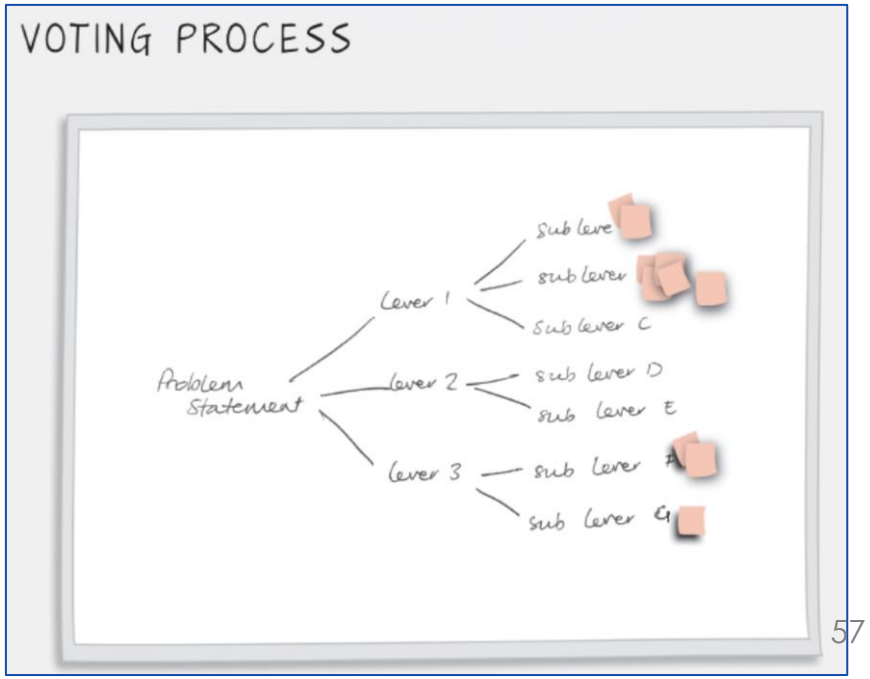
Logical reasoning and a bunch of assumptions to prioritize

Size of potential impact and **whether you can affect it.**



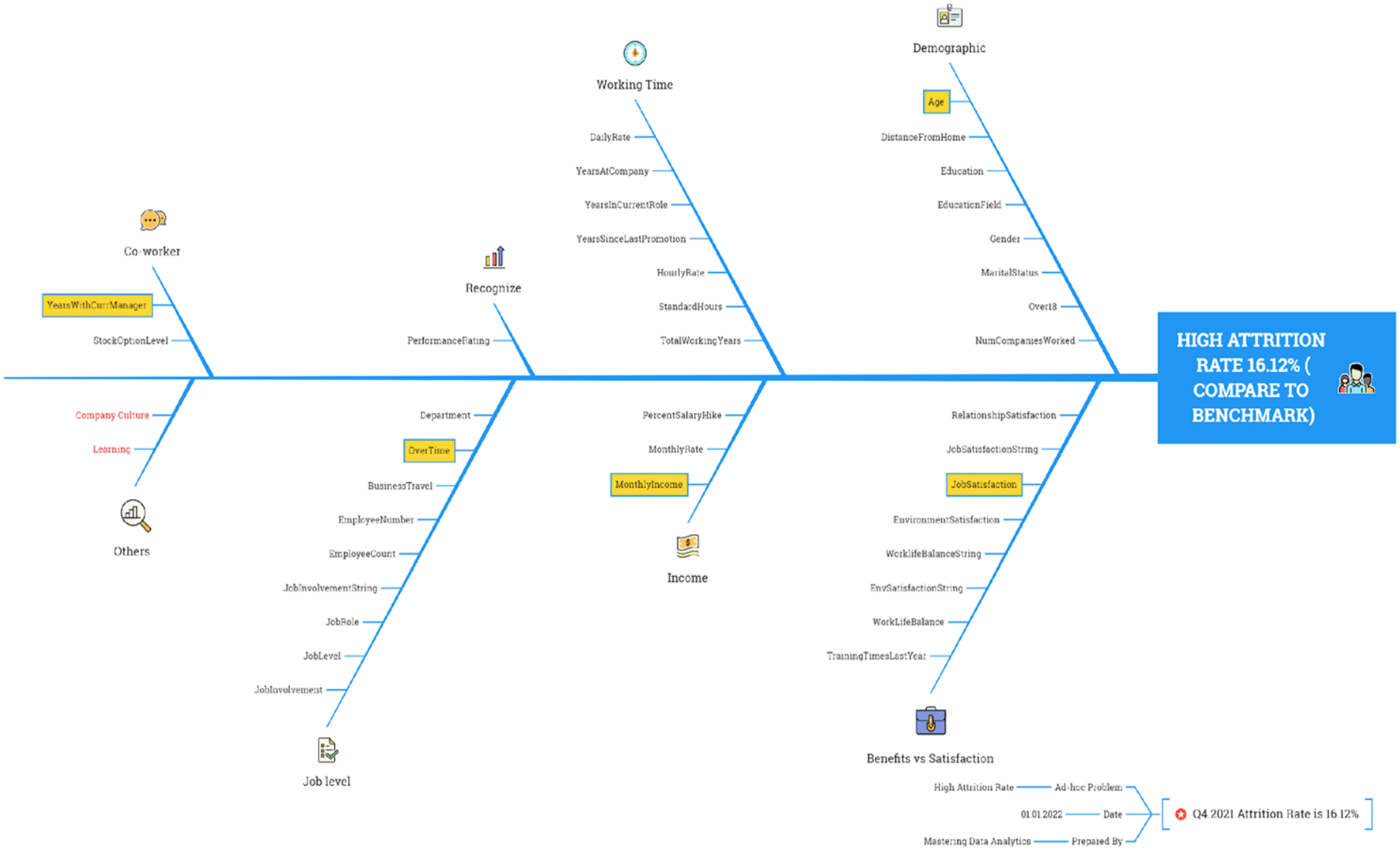
Brainstorm

Another technique we have used is giving every team member 10 sticky notes and let them allocate them in a **voting process** for priority analyses.

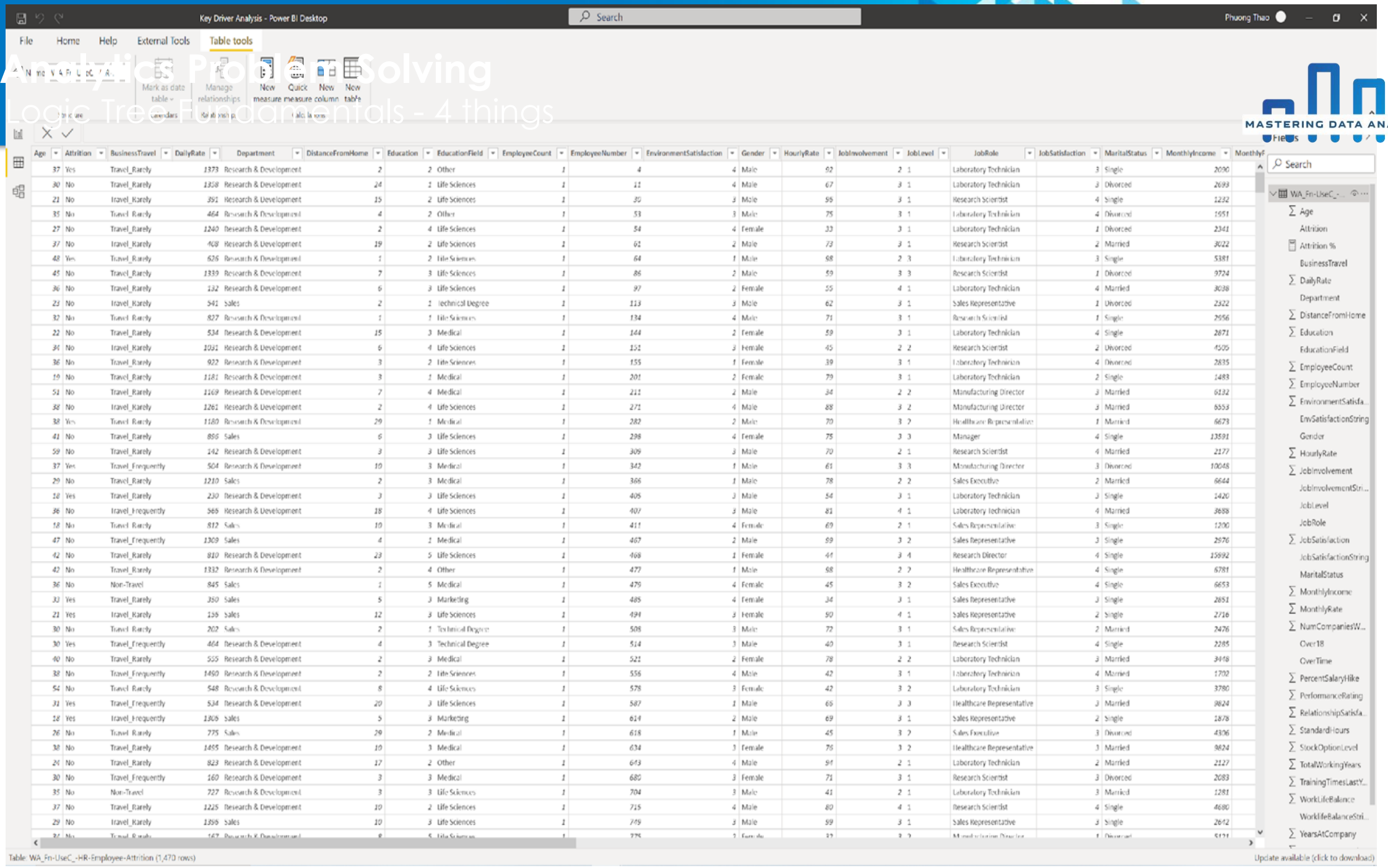


Data Analytics Problem Solving

Part 1: Logic Tree Fundamentals - 4 things

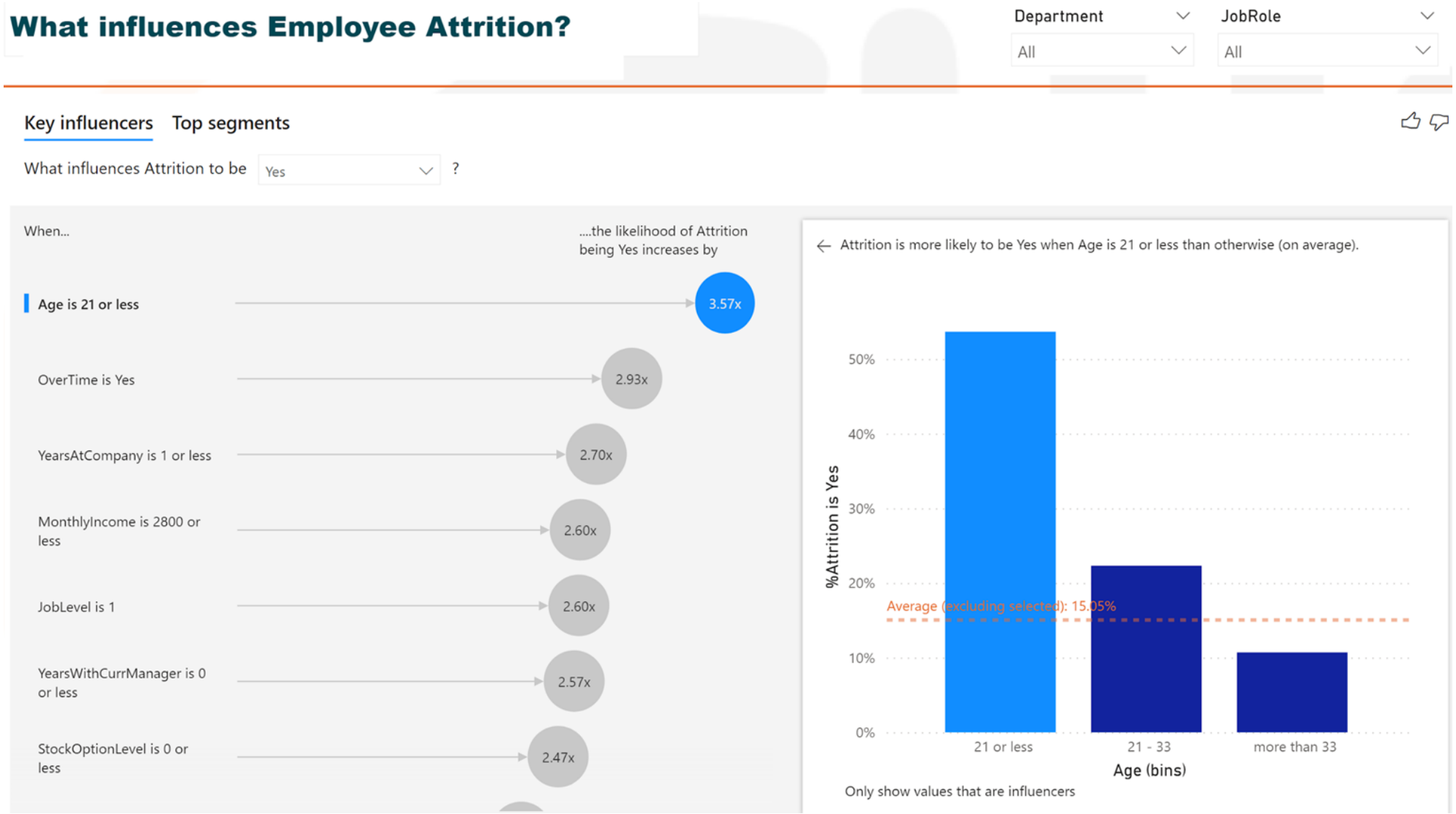


Data Analytics Problem Solving
Part 1: Logic Tree Fundamentals - 4 things



MASTERING DATA ANALYTICS

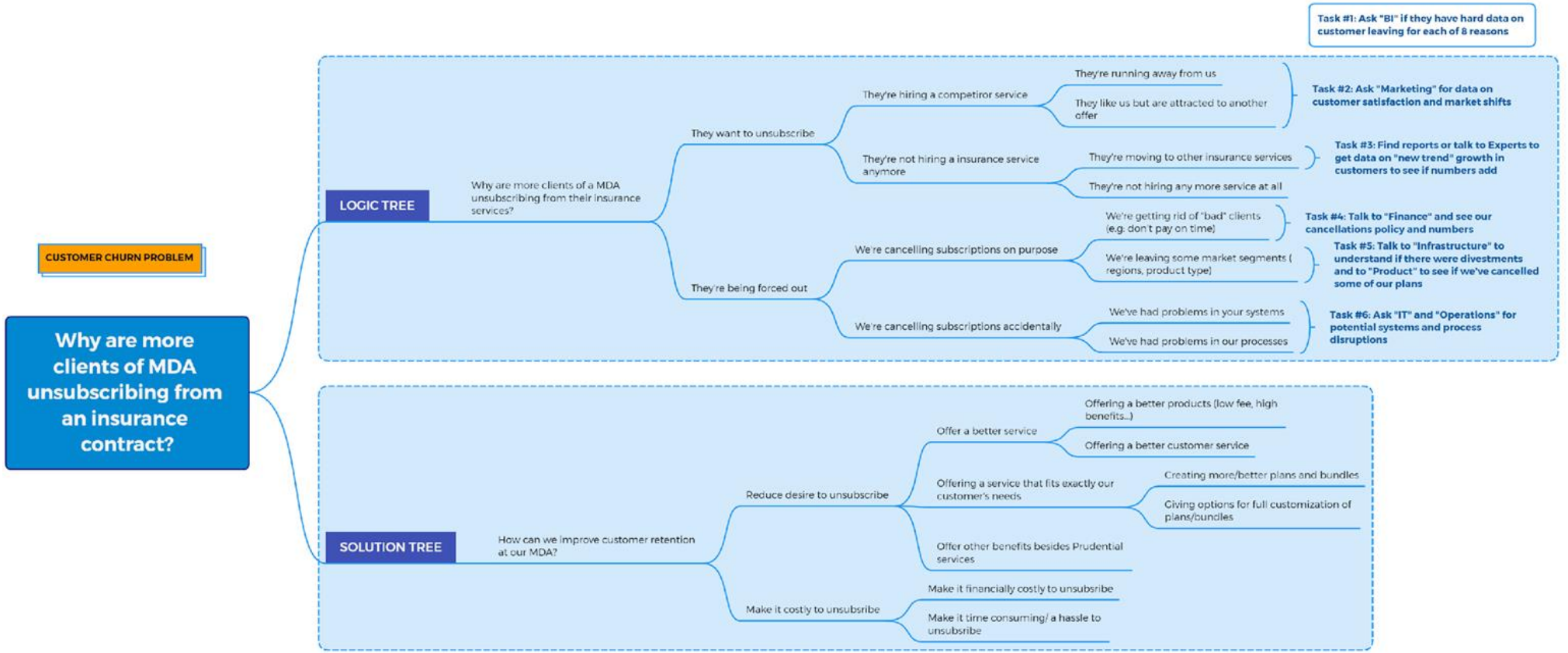
Data Analytics Problem Solving
Part 1: Logic Tree Fundamentals - 4 things



Data Analytics Problem Solving
Part 1: Logic Tree Fundamentals - 4 things

MASTERING DATA ANALYTICS

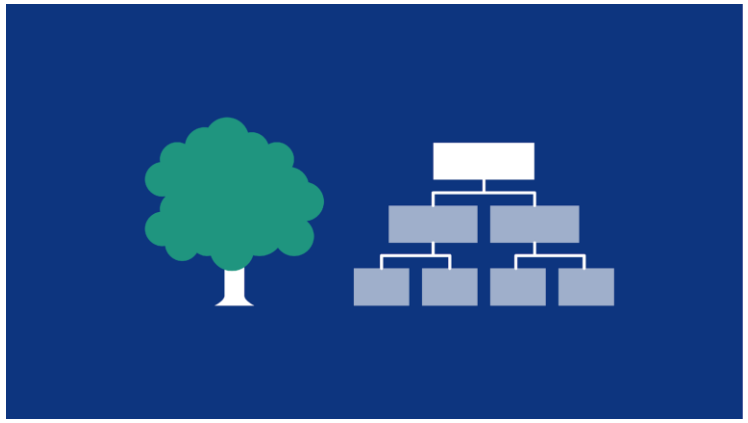
4. You can have **"problem trees" and "solution trees“ (Or solution after analyzing process)**

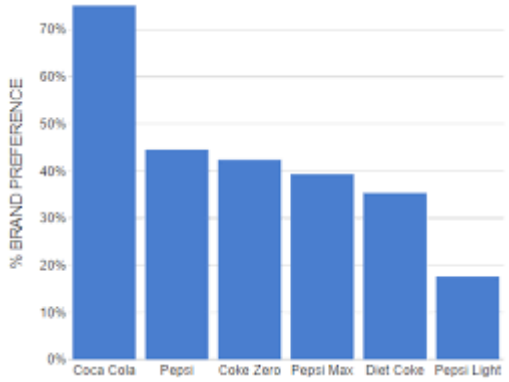


A consultant who can figure out **what's causing a problem *every single time*** is a pretty good asset to the team.

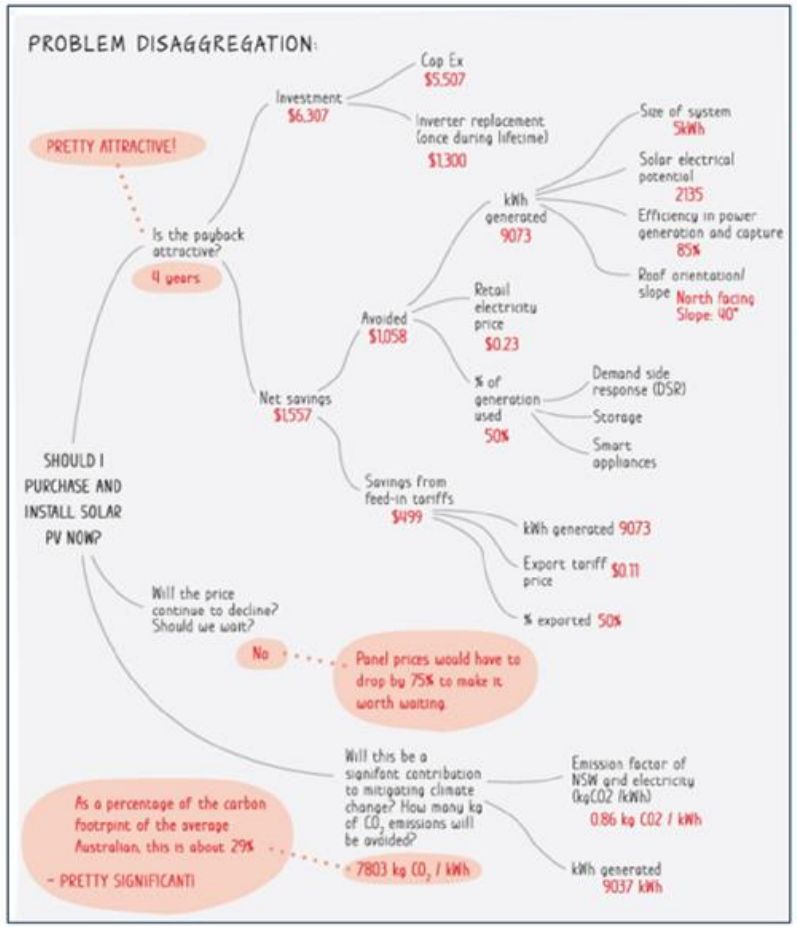
But to have a consultant that not only can do that, but who can also figure out the **best solutions to those problems *every single time*** is even better!

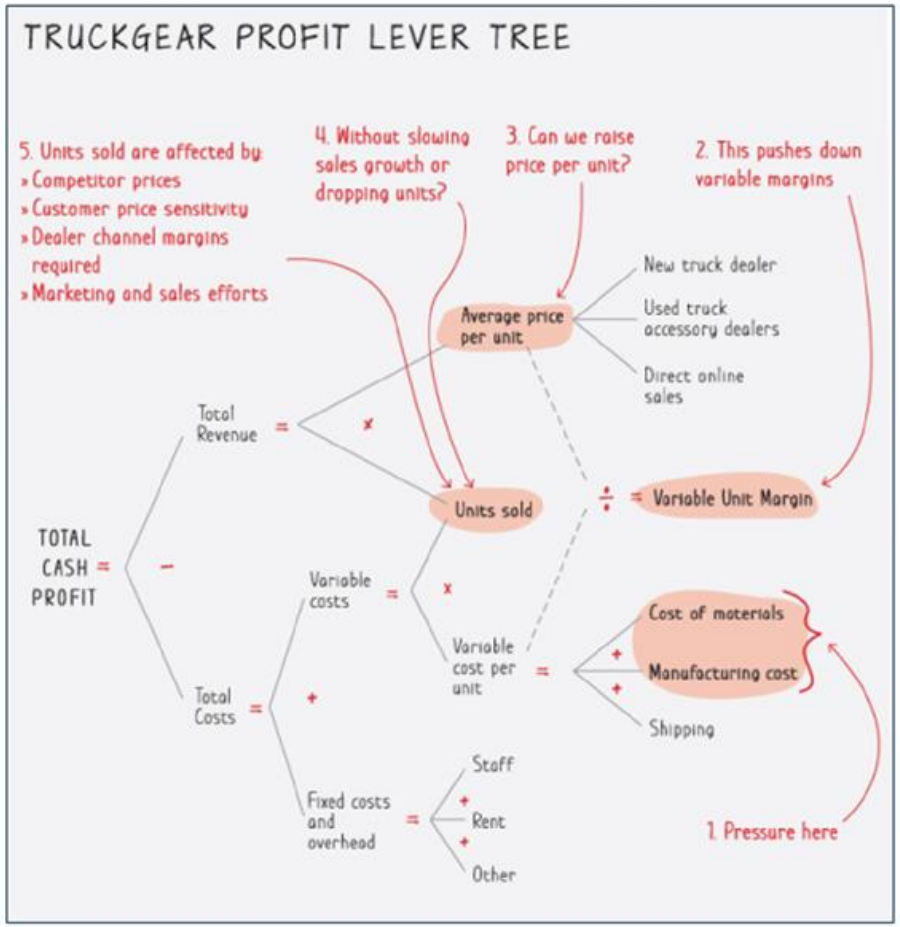
Data Analytics Problem Solving
Part 1: Logic Tree Fundamentals

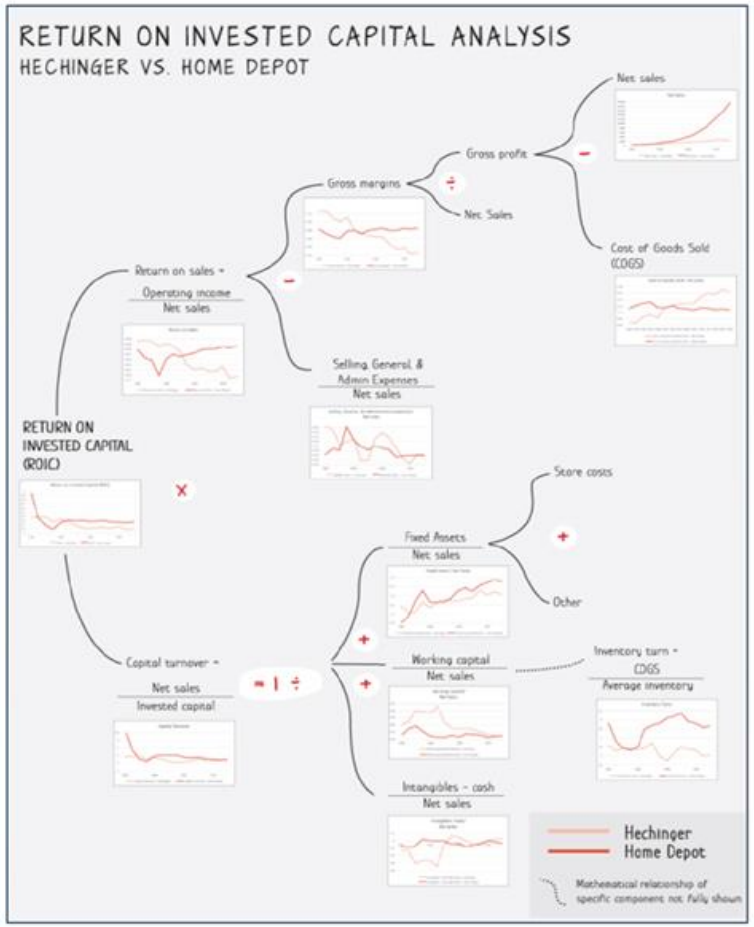




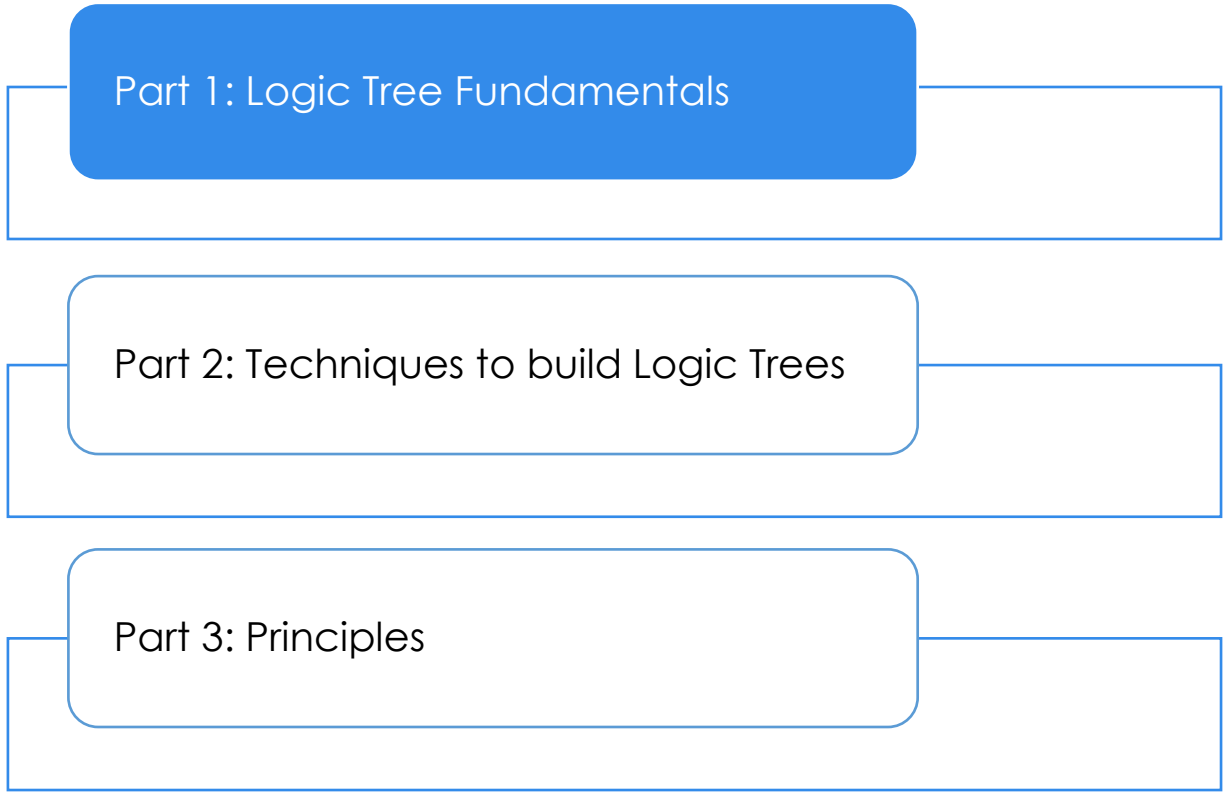
Data Analytics Problem Solving
Part 1: Logic Tree Fundamentals







Data Analytics Problem Solving
Part 1: Logic Tree Fundamentals - Summary



Summary:

1. Team Brainstorming to create logic trees
2. Using Logic Trees to brainstorm, NOT Brainstorm freely
3. Prioritization
4. Logic Trees -> Solution Trees
5. Logic Trees: Calculation/Number/Chart/Color

Data Analytics Problem Solving

Part 2: Techniques to build Logic Trees - Overview

MASTERING DATA ANALYTICS

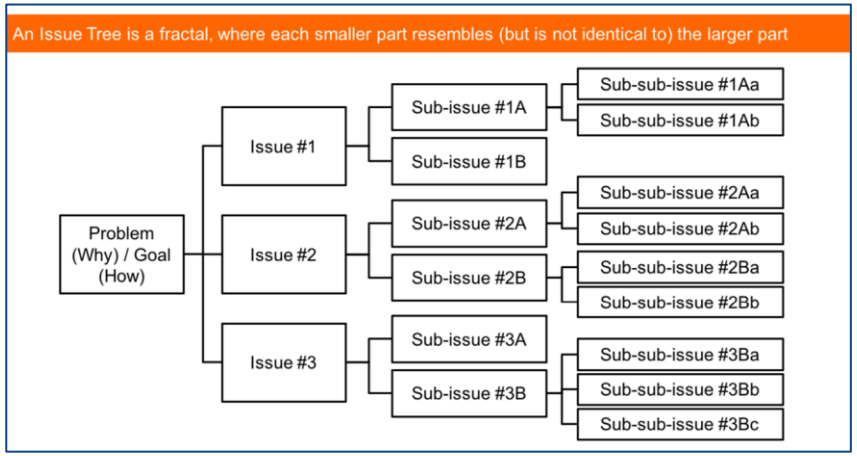
Part 1: Logic Tree Fundamentals

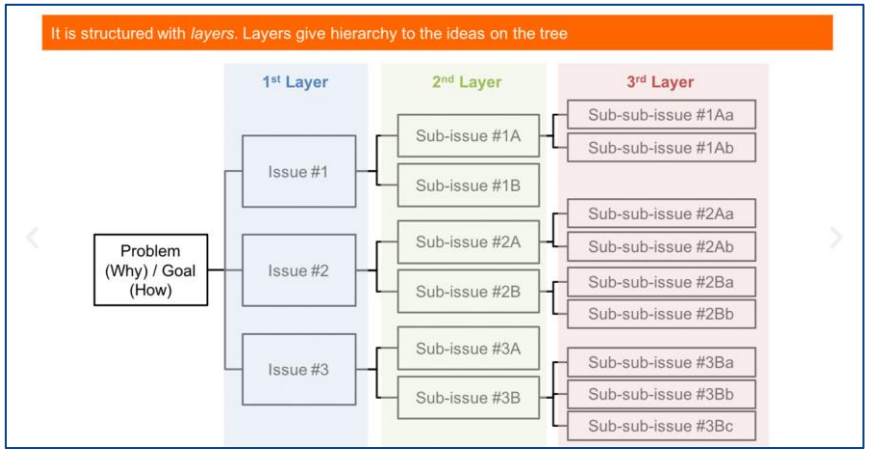
Part 2: Techniques to build Logic Trees

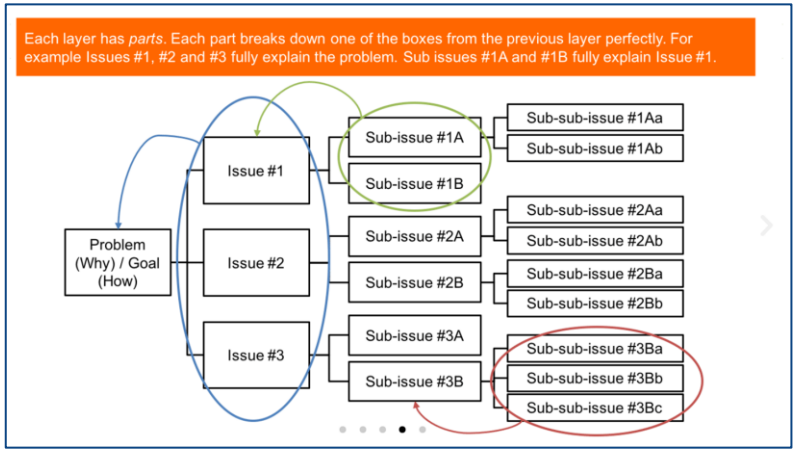
Part 3: Principles

Data Analytics Problem Solving

Part 2: Techniques to build Logic Trees - Step-by-step





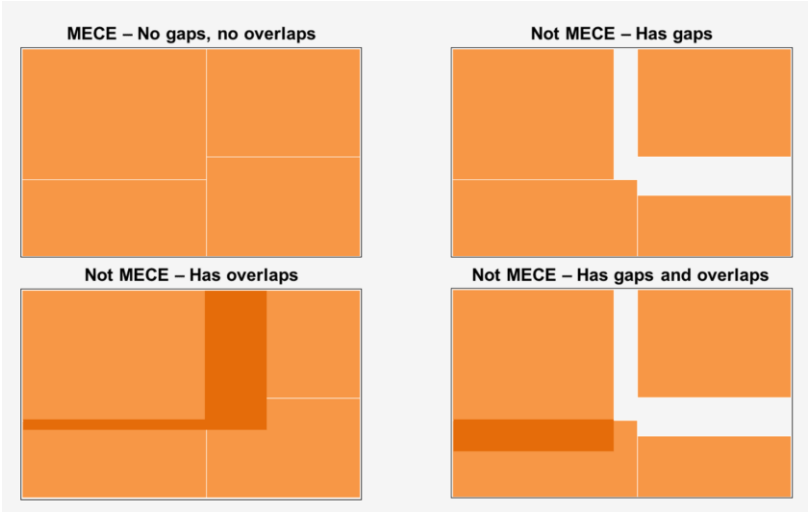


You can go as deep as you want in your Issue Trees (as many layers as you want).

And you can make some areas of your tree deeper than others.

But each *part* must FULLY explain the previous *bucket* from the previous *layer*.

To do this you use the MECE principle.



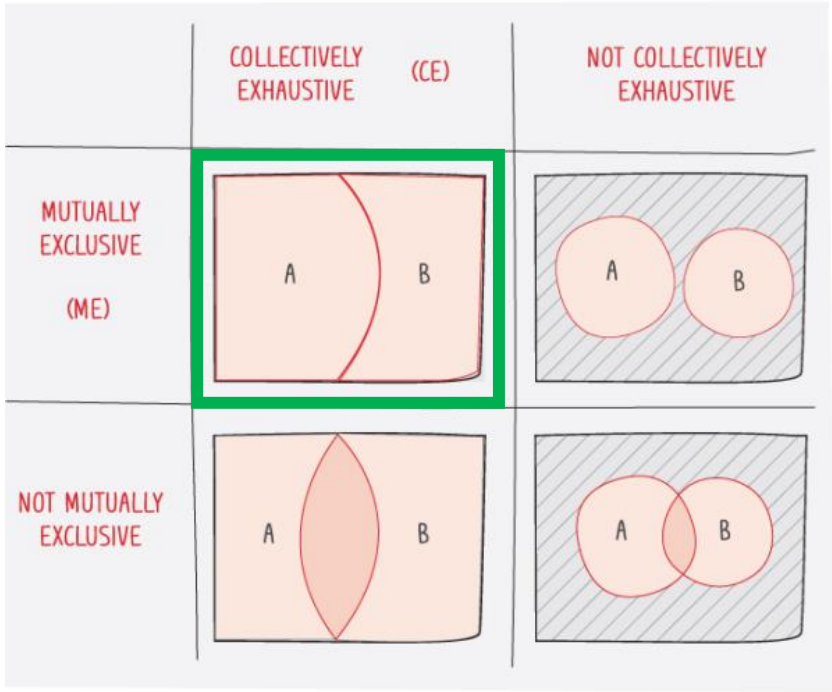
Takeaway #1: Break down a numerical problem mathematically as long as the math remains meaningful/insightful – then **get more layers using qualitative "mini-MECE-structures"**

Takeaway #2: **Stop** each branch **when it can reasonably explain the source of the problem**

Takeaway #3: You can **still go deeper** in the buckets you need

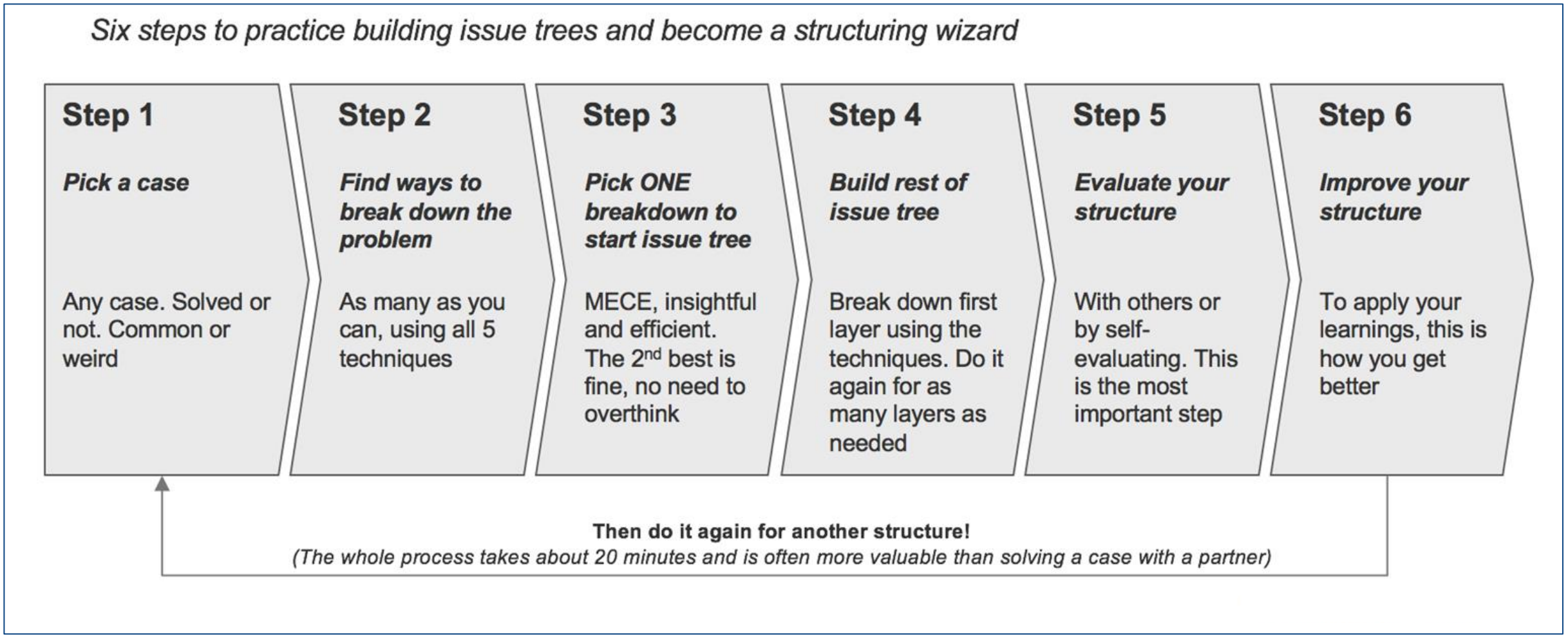
MECE stands for **"mutually exclusive, collectively exhaustive".** Because this tree **confuses or overlaps** some of its branches, it isn't MECE. It's a mouthful, but it is a really **useful concept**.
MECE: mutually exclusive (**no overlapping branches**) and collectively exhaustive (**no missing branches**).
Trees should have branches that are:

Mutually Exclusive	The branches of the tree **don't overlap**, or contain partial elements of the same factor or component. This is a little hard to get your head around, but it means that the core concept of each trunk or branch of the problem is self-contained, not spread across several branches.
Collectively Exhaustive	Taken as a whole, your tree contains ***all* of the elements of the problem, not just some of them.** **If you are missing parts, you may very well miss the solution to your problem.**



Data Analytics Problem Solving

Part 2: Techniques to build Logic Trees - Step-by-step



How many structures can you come up with to structure that problem? One? Three? Six?

That's **13 structures**!

For any given problem, you can **create MANY structures that fit**, all of them MECE, many of them good enough to impress your interviewer. And you can learn this skill by **understanding and practicing five simple patterns**, which I have nicely grouped in the image above.

There are **three core techniques that you must learn. These are "Algebraic structures", "Process structures" and "Conceptual frameworks".** The **other two**, **"Segmentations" and "Opposite words"** are easy to learn and will help you get out of **tricky situations**, but they **aren't as important.**

Conceptual frameworks are by far the **toughest technique to master**. You should expect to spend quite a bit of time working with them because they're also the most versatile tool out there (especially for **strategy** cases).

Data Analytics Problem Solving

Part 2: Techniques to build Logic Trees – 5 core structures overview

MASTERING DATA ANALYTICS

Must learn

Toughest technique to master

Tricky situations, easy but lack of insights

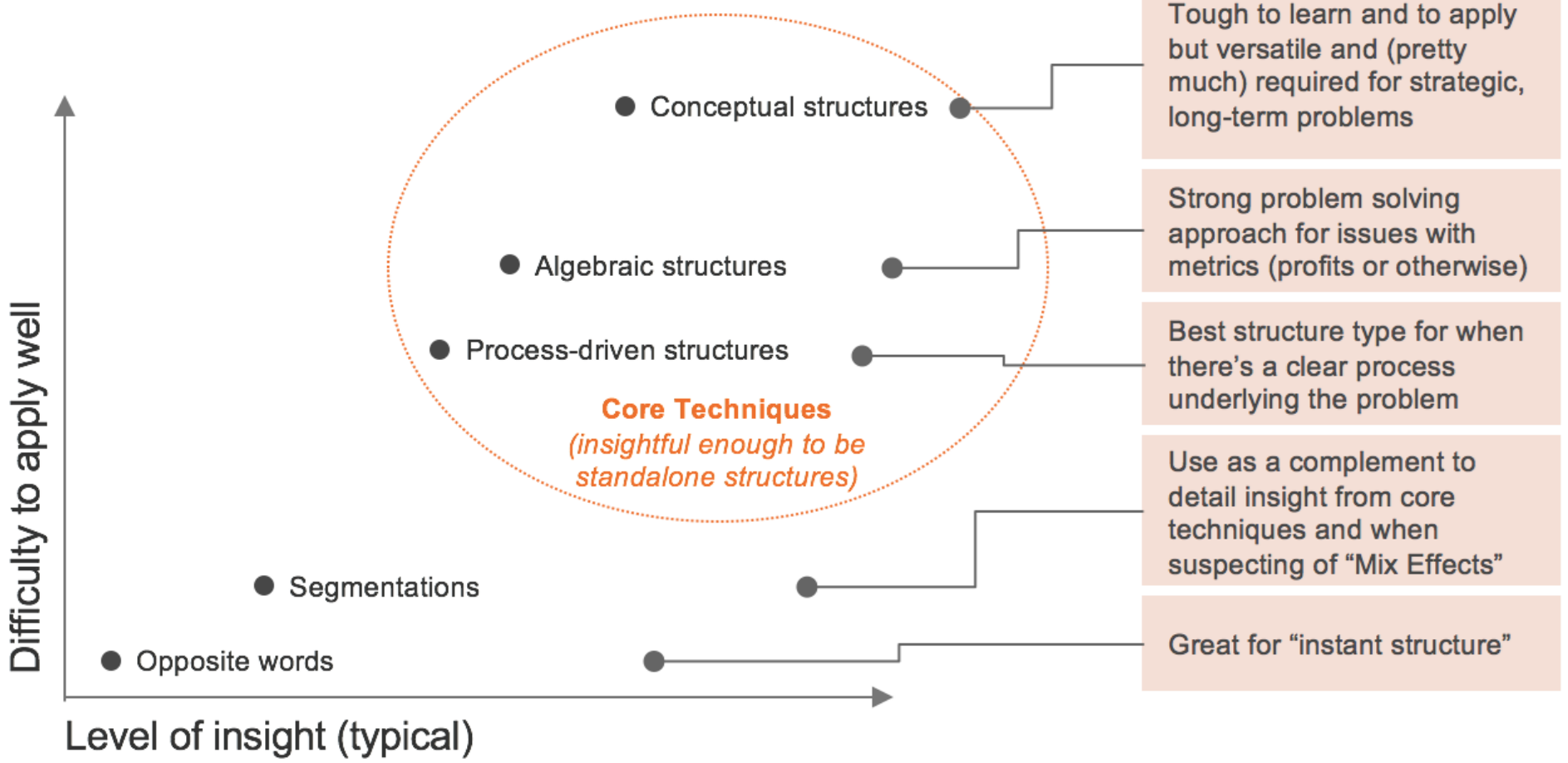
The 2 minute recap to "The 5 Ways to be MECE"

Technique	*What it is this technique like*	*A famous framework from each technique*	*Structuring the "how to increase store sales" problem using each technique*
Algebra Structures	A math equation derived from the drivers of a variable	The Profitability Equation: "Profits = Revenues – Costs"	Increase # of customers ✖ Increase $ spent per customer
Process Structures	A break down of the problem's underlying process into its stages	The Marketing Funnel: "Awareness -> Opinion -> Consideration -> Preference -> Purchase"	Increase store traffic ⇨ Increase % who pick up product ⇨ Increase % of pickers that buy ⇨ Increase $ spent per buyer
Conceptual Frameworks	A proven qualitative categorization of a problem's parts	The 3Cs of Strategy: "Customers, Company, Competition"	Improve Product Portfolio; Improve Store Location /Visibility; Improve Prices; Improve Advertising/ Awareness
Segmentations	A "slicing up" of the problem into its visible parts	Customer segmentations: could be by Age, Region, Income Levels, etc.	Sell to non-buyers; Sell more to people who bought once; Sell more to people who bought more than once
Opposite Words	A Yin-yang-like division of the problem into its opposite, complementary parts	"Supply vs. Demand"; "Internal vs. External"; "Financial vs. Non-Financial"	Through marketing actions; Through non-marketing actions

Data Analytics Problem Solving

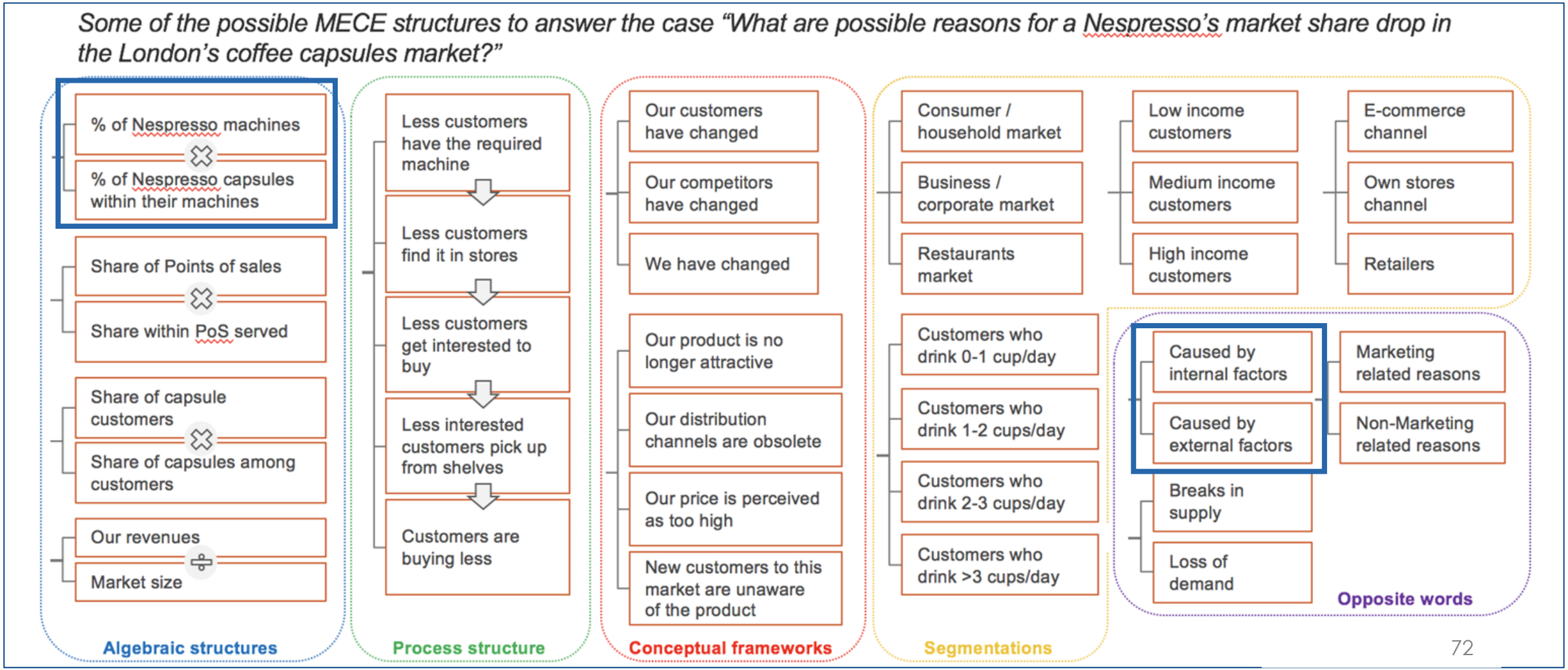
Part 2: Techniques to build Logic Trees – 5 core structures overview

Not all basic structuring techniques are equally strong: some are more difficult, more insightful than others



Data Analytics Problem Solving

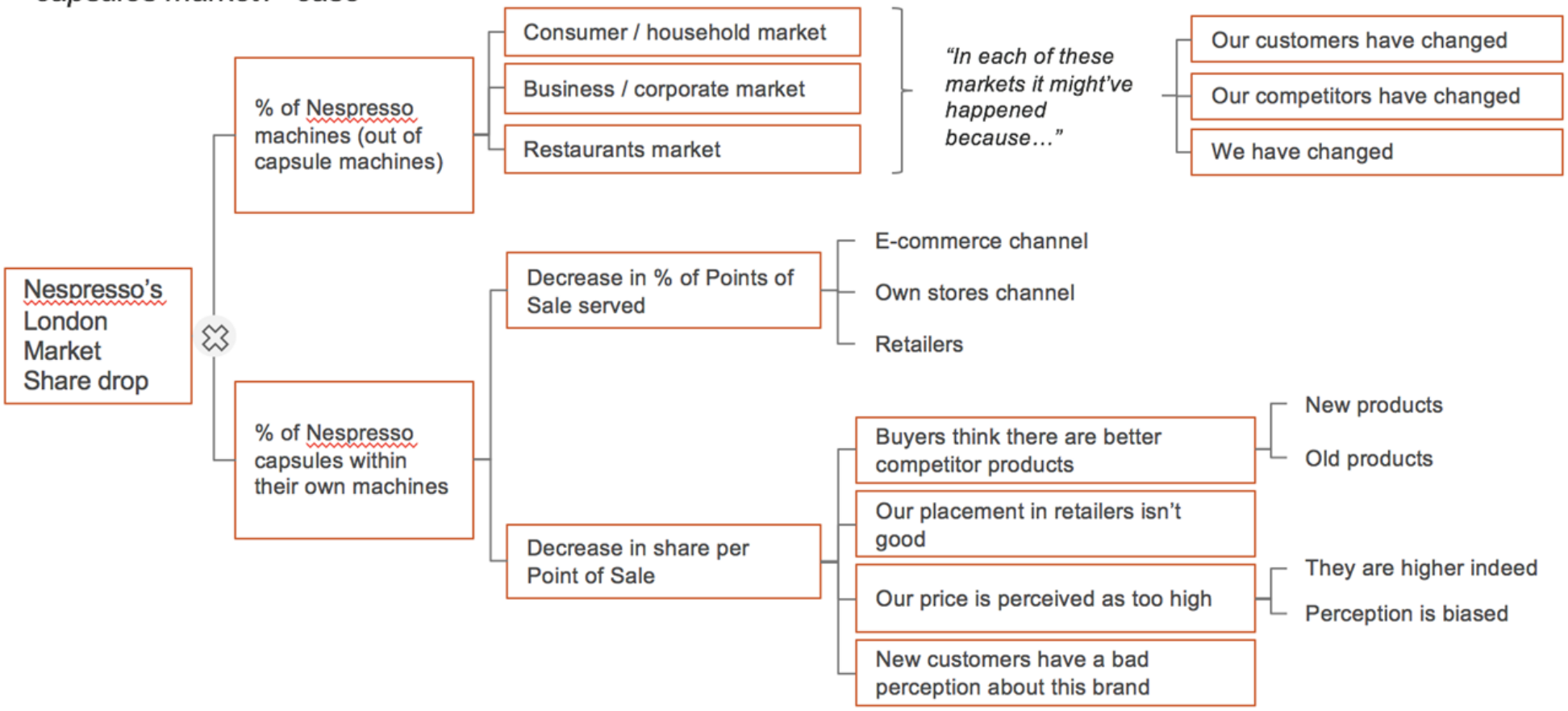
Part 2: Techniques to build Logic Trees – 5 core structures overview



Data Analytics Problem Solving

Part 2: Techniques to build Logic Trees – 5 core structures overview

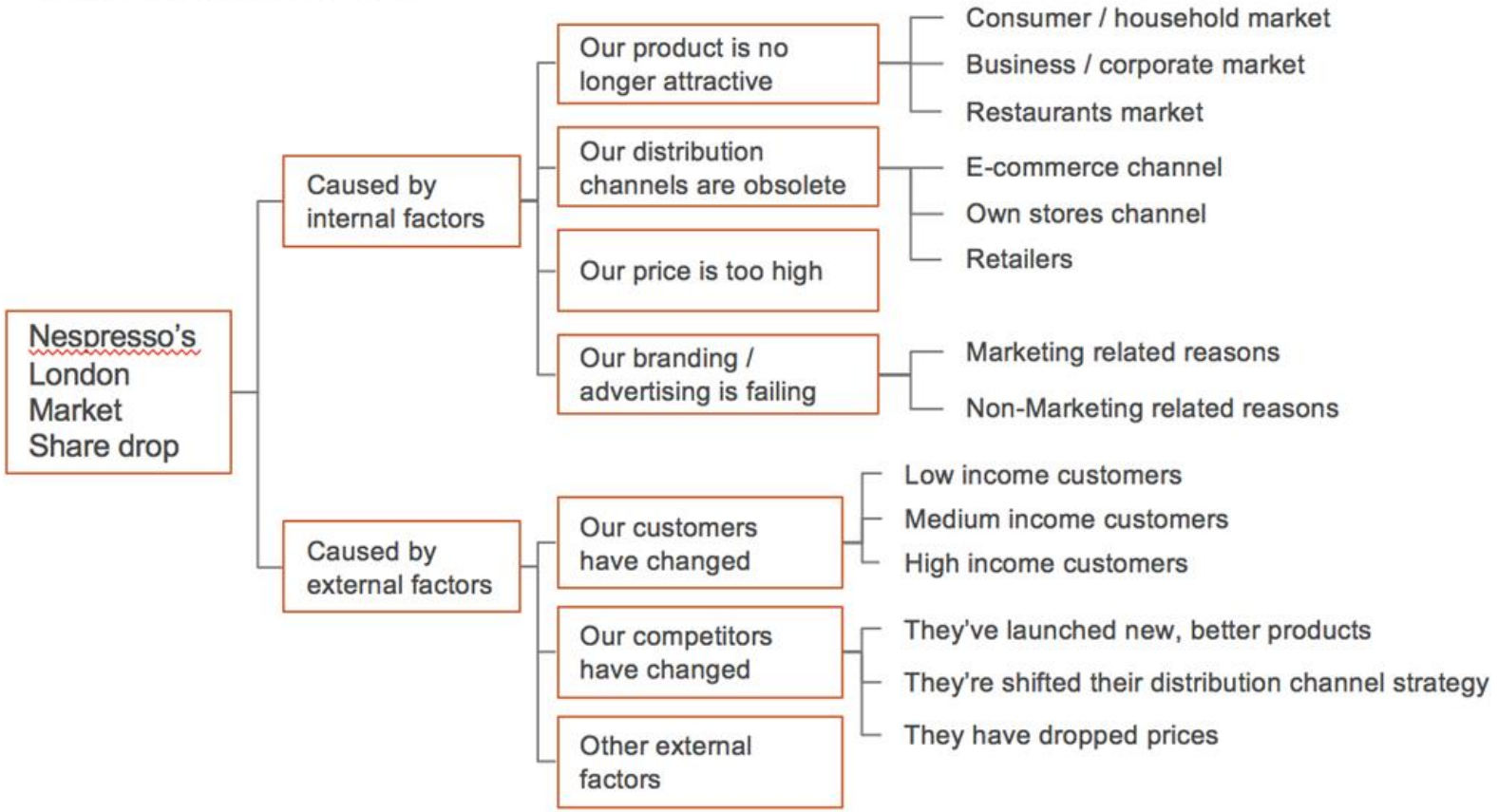
An example of an issue tree for the "What are possible reasons for a Nespresso's market share drop in the London's coffee capsules market?" case



Data Analytics Problem Solving

Part 2: Techniques to build Logic Trees – 5 core structures overview

An example of a poor issue tree for the "What are possible reasons for a Nespresso's market share drop in the London's coffee capsules market?" case



Data Analytics Problem Solving

Part 2: Techniques to build Logic Trees - Summary

Part 1: Logic Tree Fundamentals

Part 2: Techniques to build Logic Trees

Part 3: Principles

Summary:

1. 6 steps to build Logic Trees
2. 5 core structures for data analytics
3. Can combine many structures for analyzing

MASTERING DATA ANALYTICS

The 5 ways to be MECE – Algebraic Structures

$$y = x + (\sqrt{a} \times b \div c)$$

Difficulty to learn: ★★★★☆

Limits: Only use in problems in numerical variables (ex: profitability, not a yes-no decision).

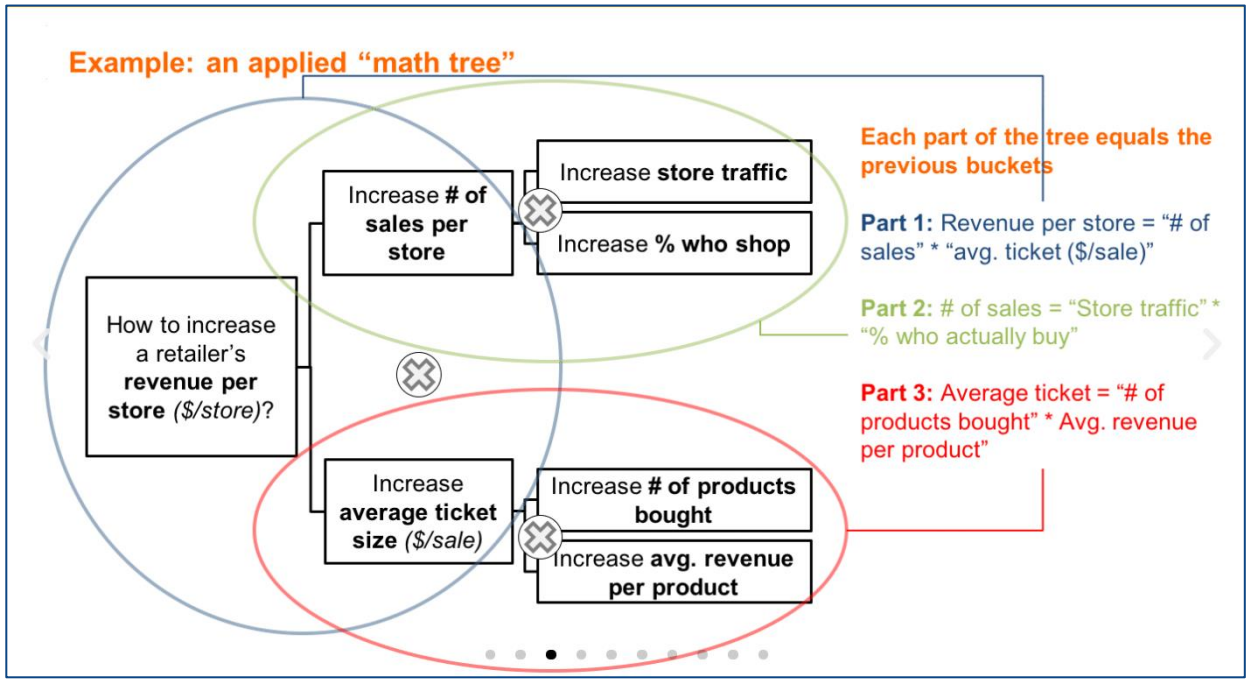
Risks: Behind every number there's something going on in real life (we call these "qualitative"), many candidates get obsessed with the numbers and never go that deep.

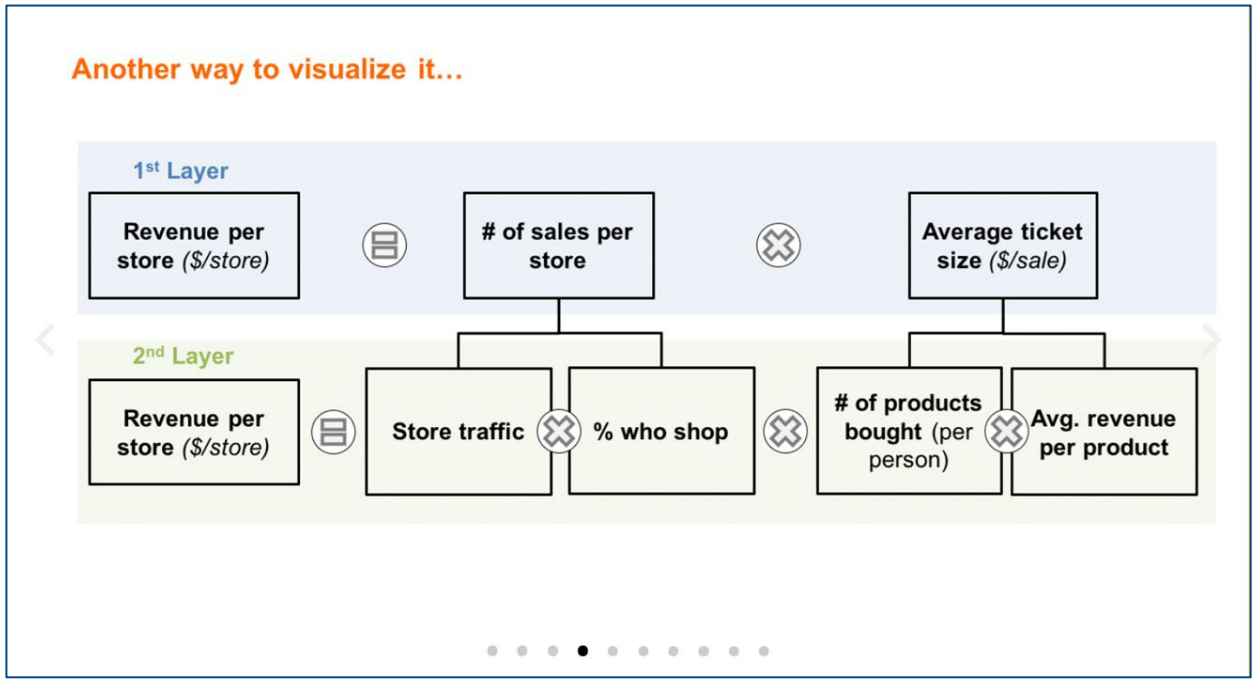
Use when: These structures are super strong for short-term numerical problems. If you have a problem of this type and find it difficult to find a formula, consider using a Process structure. If it's a long-term problem, consider using a Conceptual framework.

Data Analytics Problem Solving

Part 2: Techniques to build Logic Trees –

(1) Algebraic structures

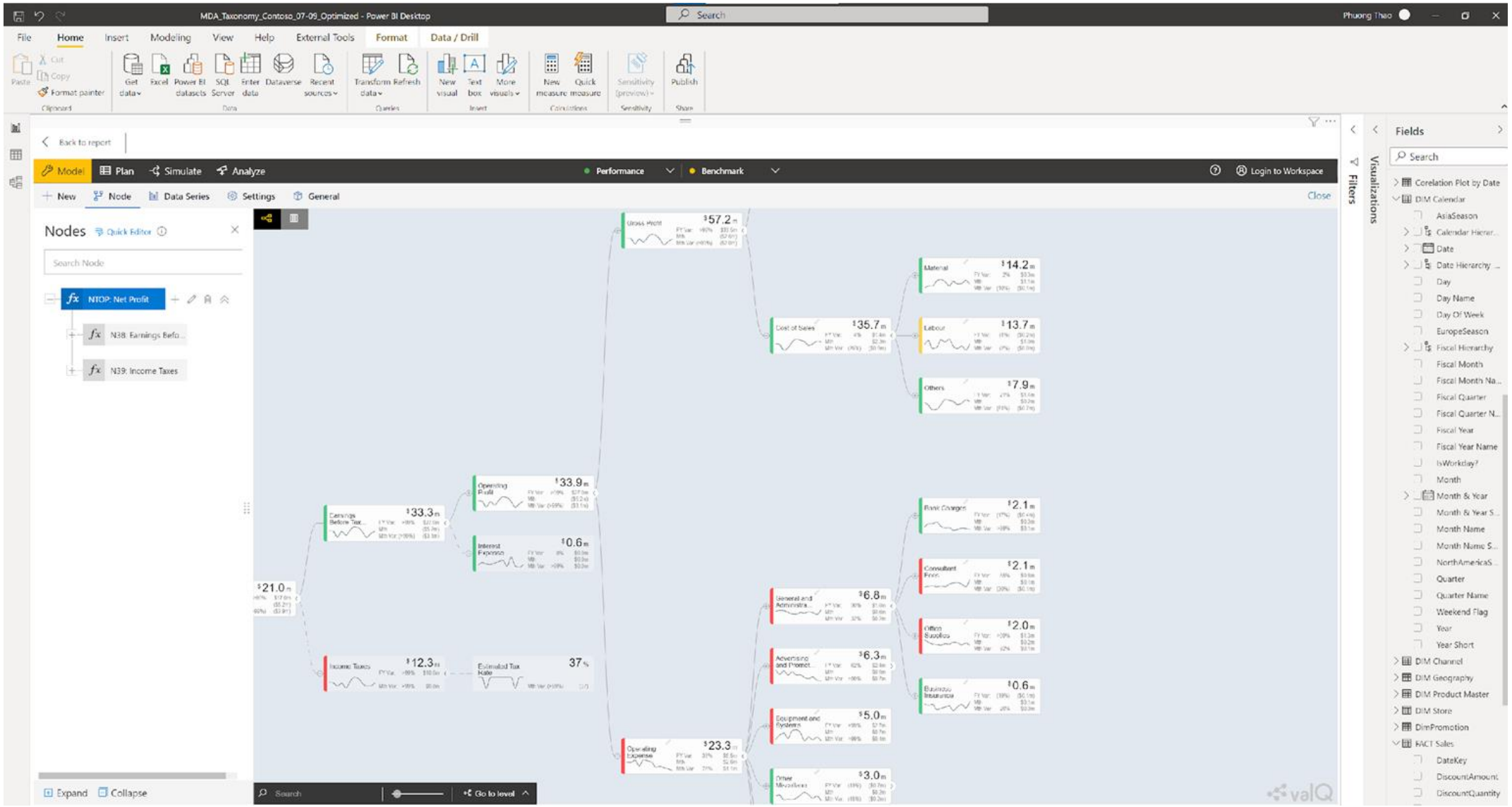




Data Analytics Problem Solving

Part 2: Techniques to build Logic Trees –

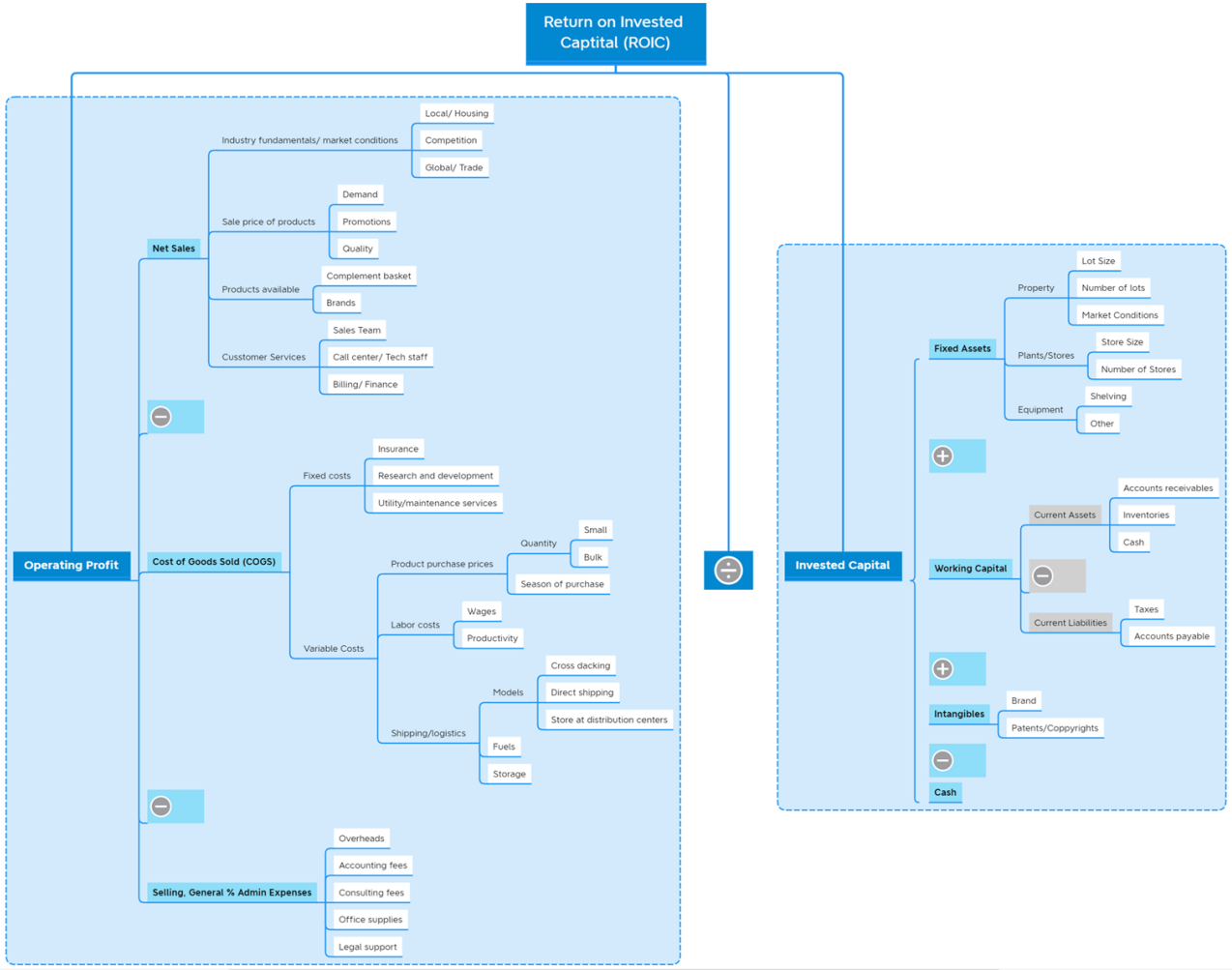
(1) Algebraic structures

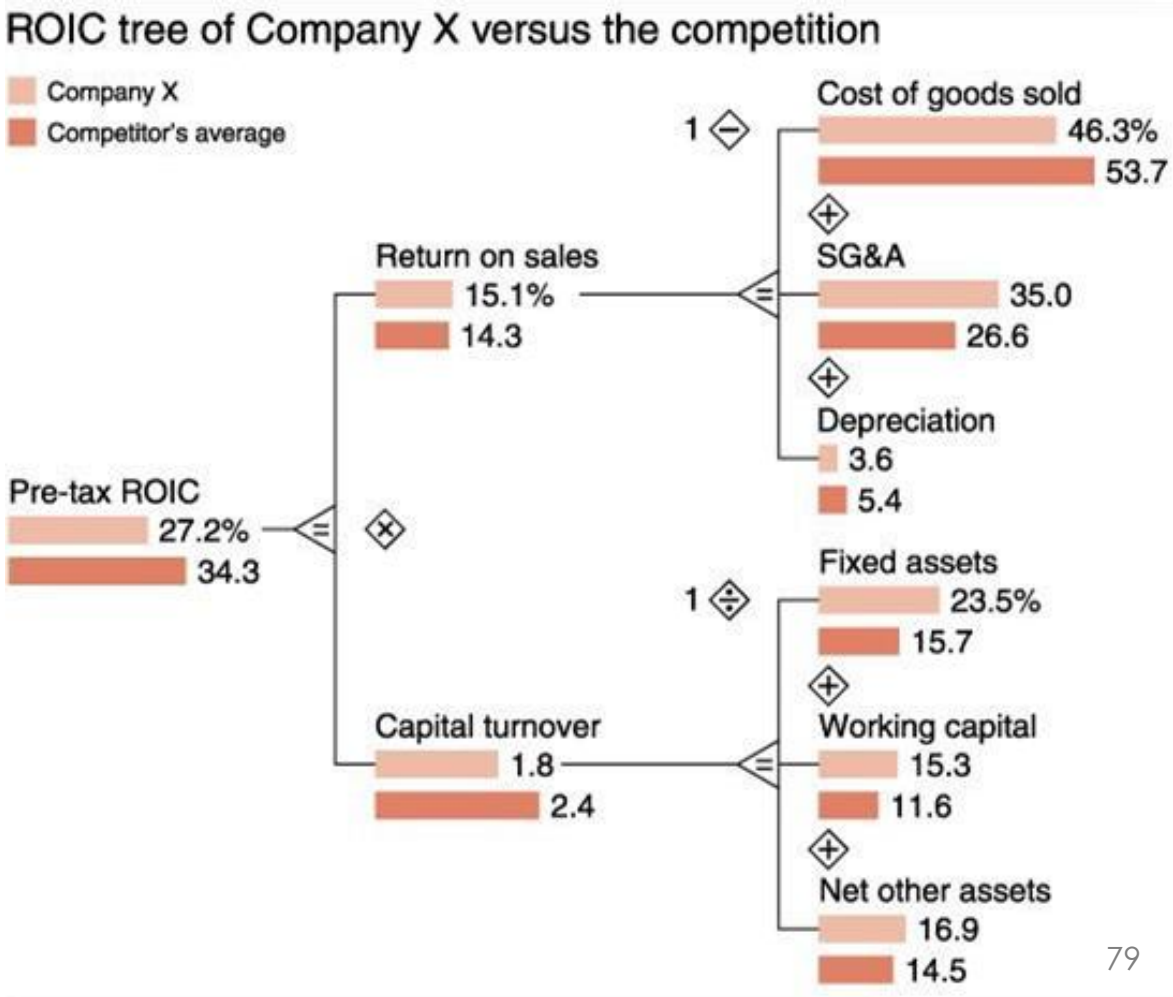


Data Analytics Problem Solving

Part 2: Techniques to build Logic Trees – (1) Algebraic structures

There is **no absolute right or wrong way to construct trees (maybe have many formulas).**





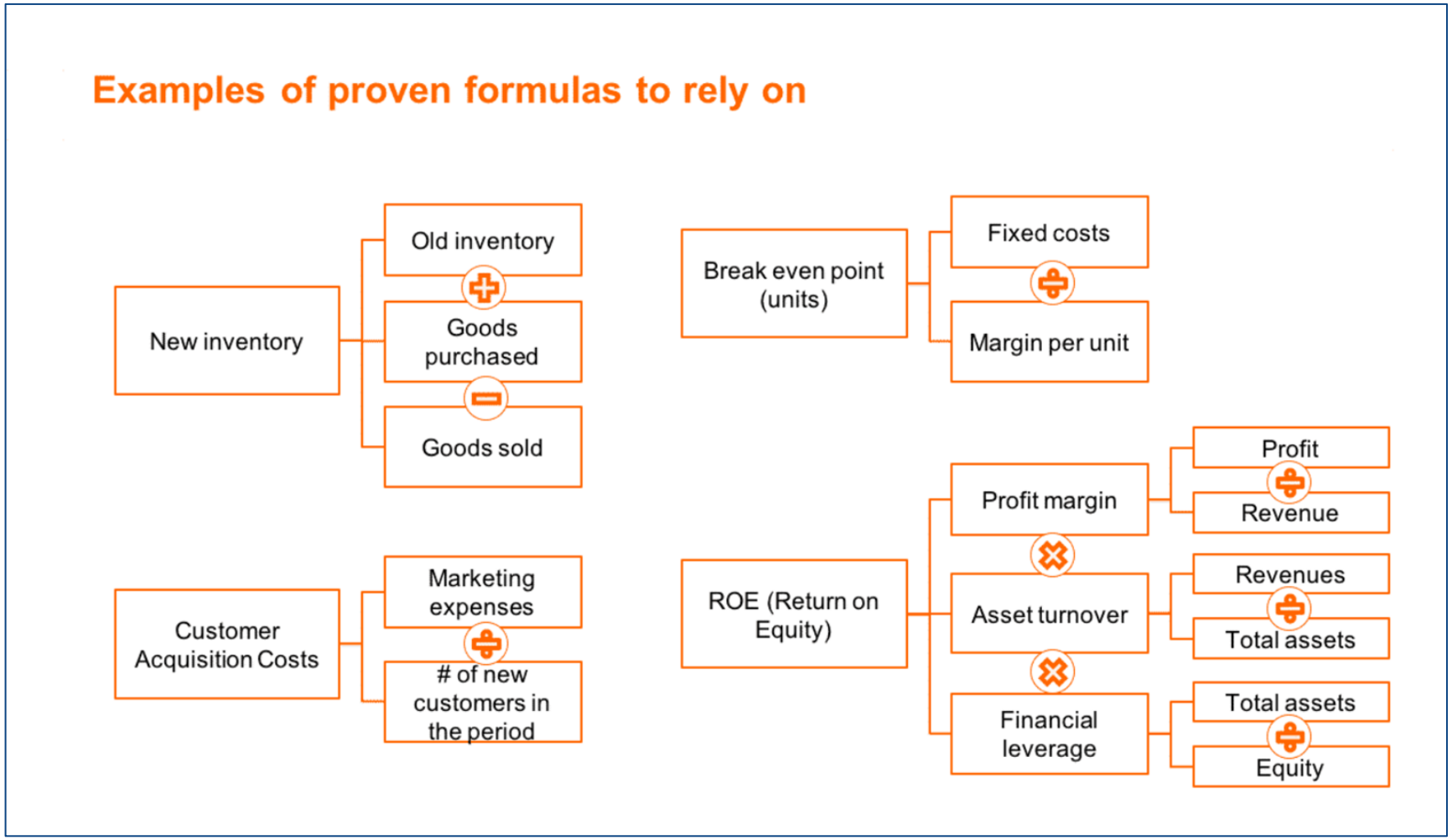
Most people see them done and think they can **easily do it**, but it all goes downhill when they actually grab a piece of paper and attempt to do these trees. So, here are **four methods** to actually create your "mini-equations" to break down each bucket:

#1. Use a proven formula
#2. The "Dimensional Analysis" method
#3. The Funnel method
#4. Use a sum of segments

MASTERING DATA ANALYTICS

#1. Use a proven formula

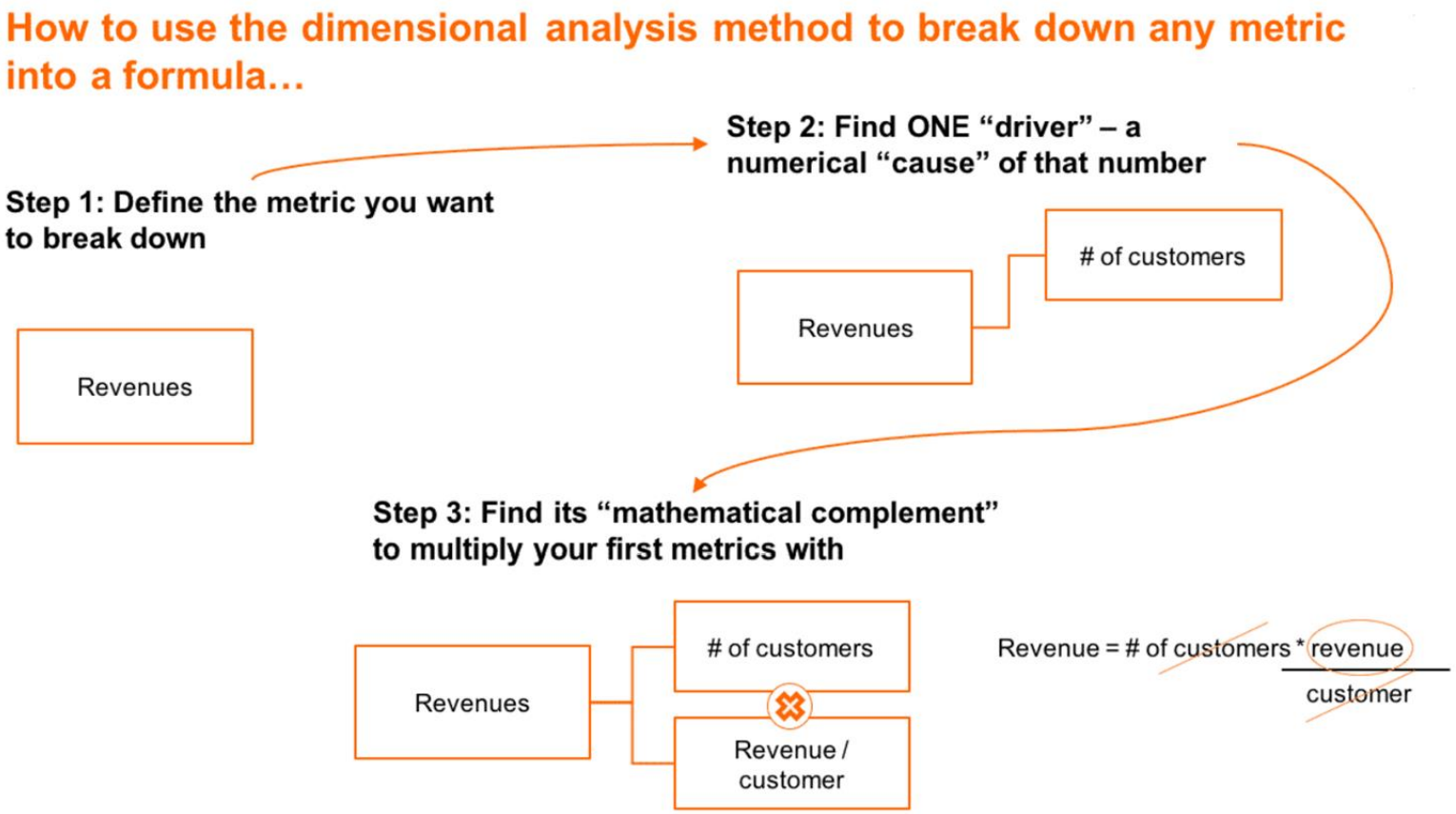
Most of the time you **don't need to reinvent the wheel**. If you know a formula that fits the problem well, **just use it**!



MASTERING DATA ANALYTICS

#2. The "Dimensional Analysis" method

This method is amazing because it lets you **break down almost any metric** into a formula really quickly – the only thing to be careful with is to not lose meaning in the process and end up with a formula that is mathematically right but doesn't make any sense to actual human beings.



MASTERING DATA ANALYTICS

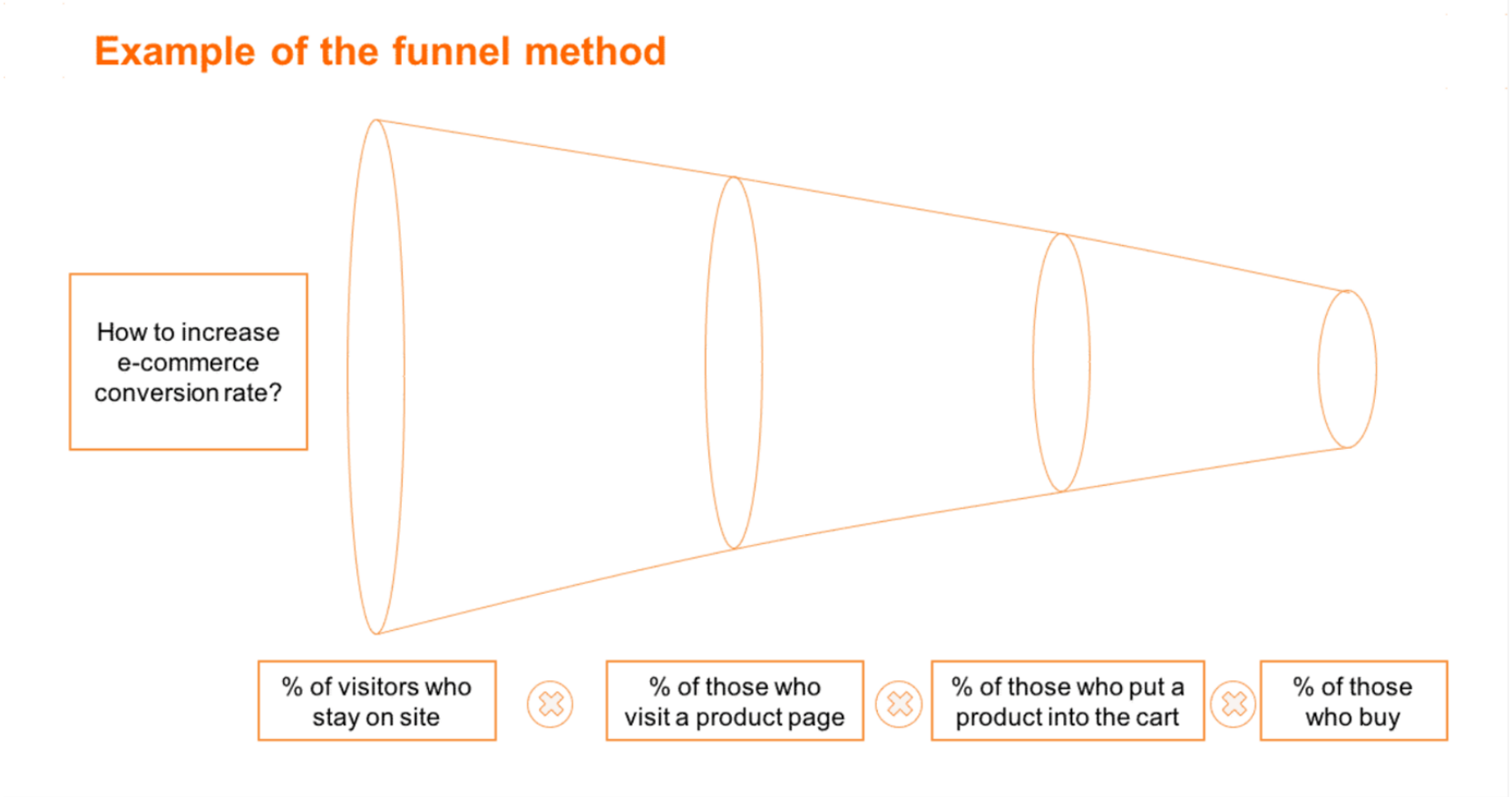
#2. The "Dimensional Analysis" method

Product Centric: Revenue = Quantity * Price
Sale Centric: Revenue = # of Sales * Avg. Ticket
Customer Centric: Revenue = # of Customers * Revenue per Customer

MASTERING DATA ANALYTICS

#3. The Funnel method

This works wonders when the target metric is a percentage or is **the end result of a funnel**. Funnels are everywhere: Sales, Product Development, Process Optimization. All you have to do is to find these funnels and then break them into stages.

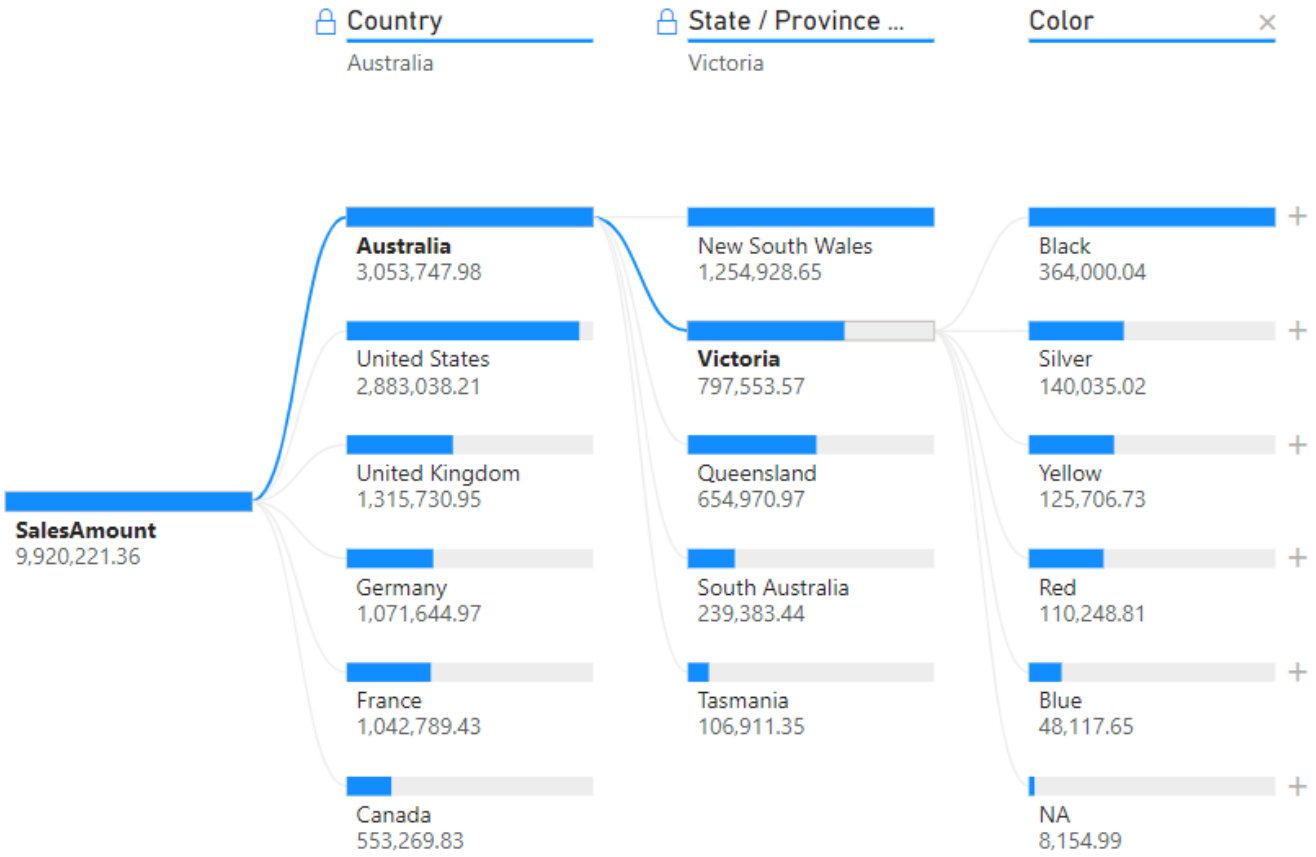


MASTERING DATA ANALYTICS

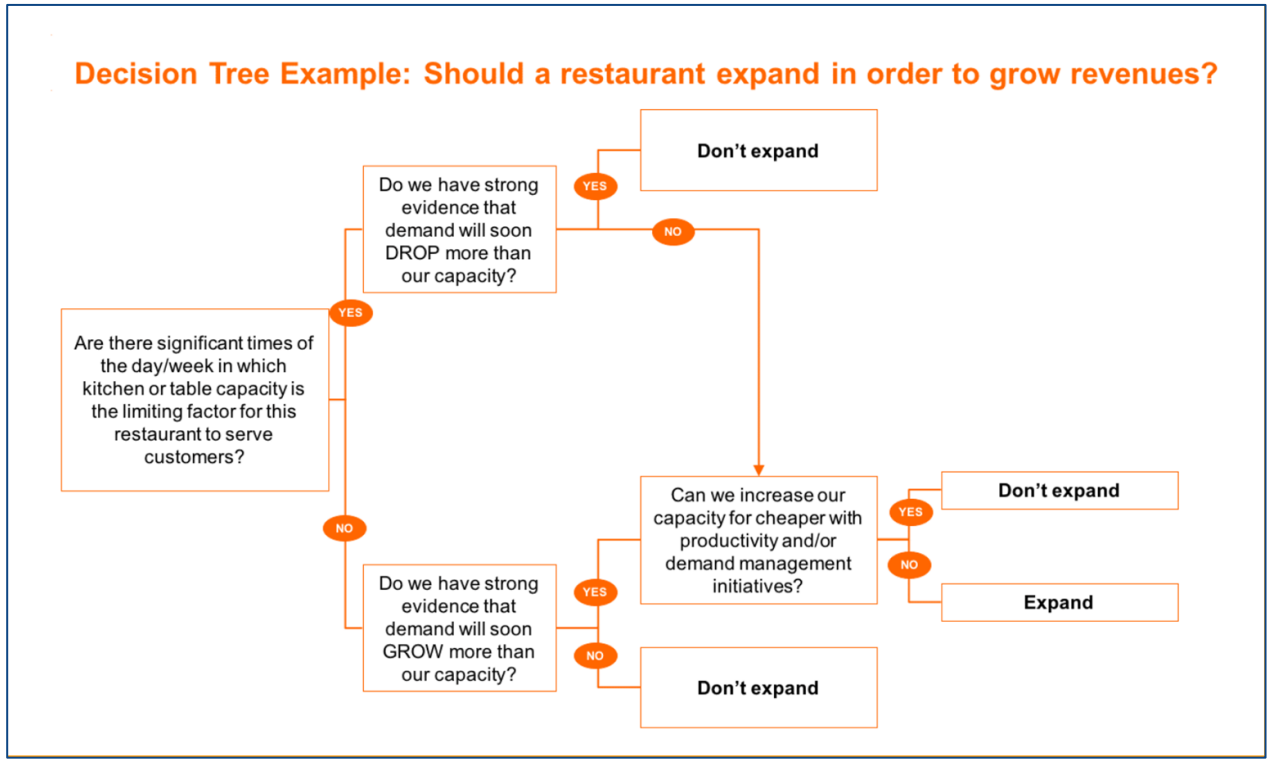
#4. Use a sum of segments

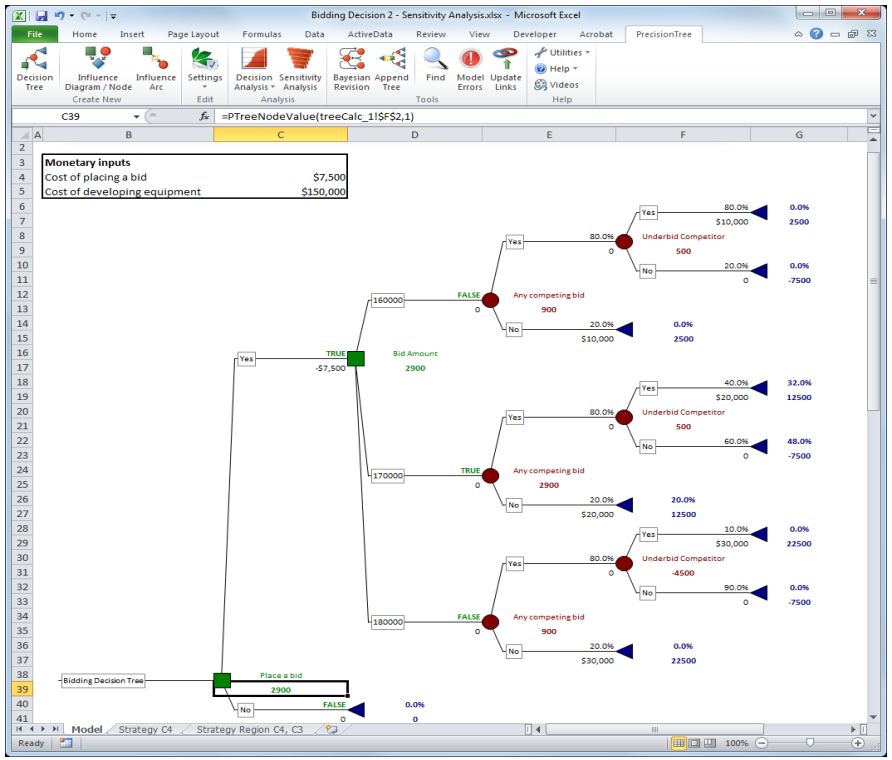
This is my least favorite method because it **doesn't go too much into the structure of the problem**, but **simply slices it out**. **However, it can be useful.** For example, if you're working with a conglomerate and their profits are down, it might be useful to **segment that conglomerate into its different businesses**.

Or if you're trying to understand a company's **market share drop** in a certain category, it might be useful to just **break it down** into the market shares of its **product lines.**



If you wanna go a step further you can use what they call "**boolean operators**": **AND functions, OR functions and so on**. And if you want to go a third step further, you can use "conditional operators", the most famous of which are IF functions. **Decision Trees** are basically regular Issue Trees with "conditional operators", **IF-THEN functions**.



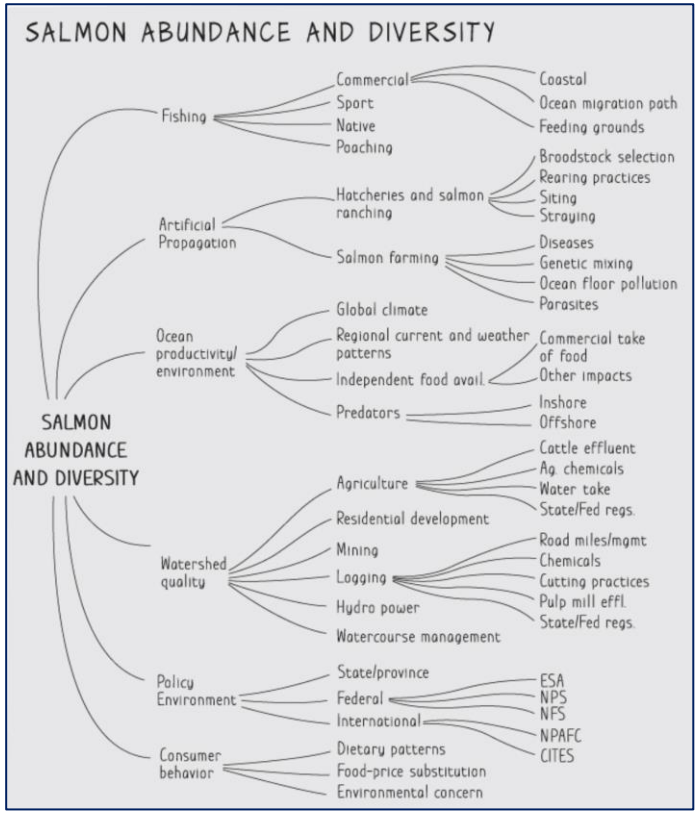


Data Analytics Problem Solving

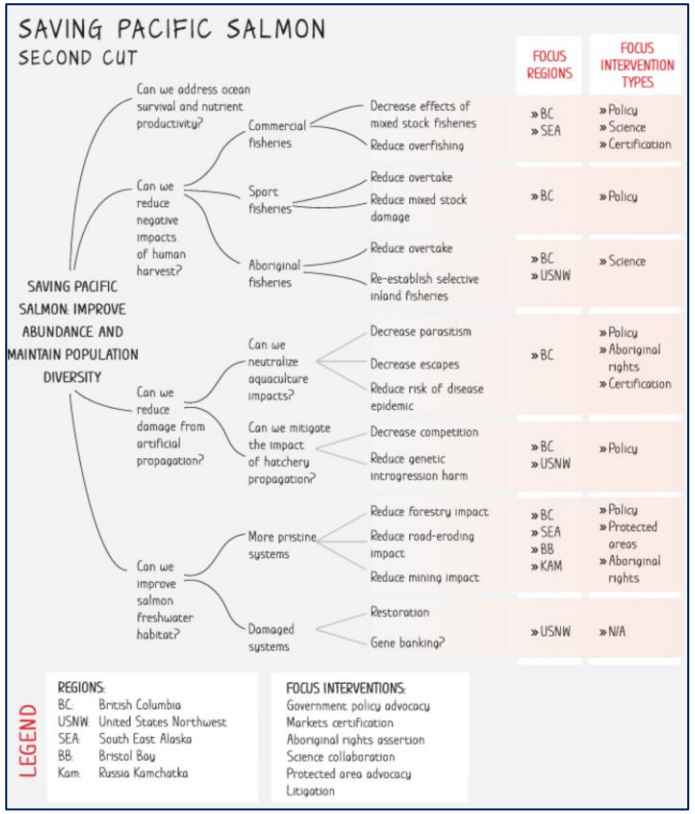
Part 2: Techniques to build Logic Trees –

(1) Algebraic structures

OR functions: **Develop Hypothesis Tree**



MECE



Data Analytics Problem Solving

Part 2: Techniques to build Logic Trees – (1) Algebraic structures

MASTERING DATA ANALYTICS

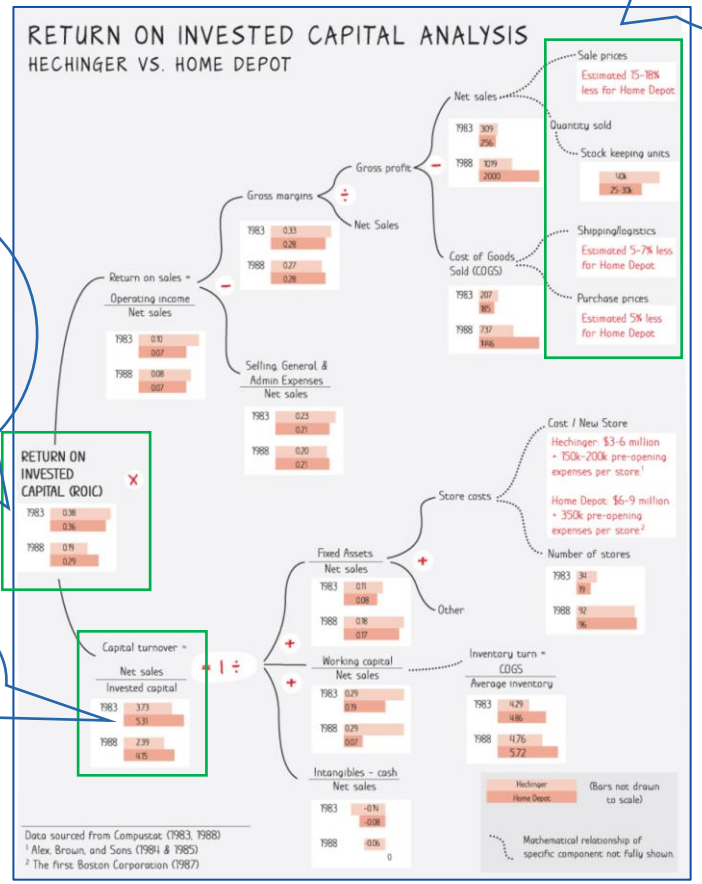
Real case study: Hechinger vs Home Depot

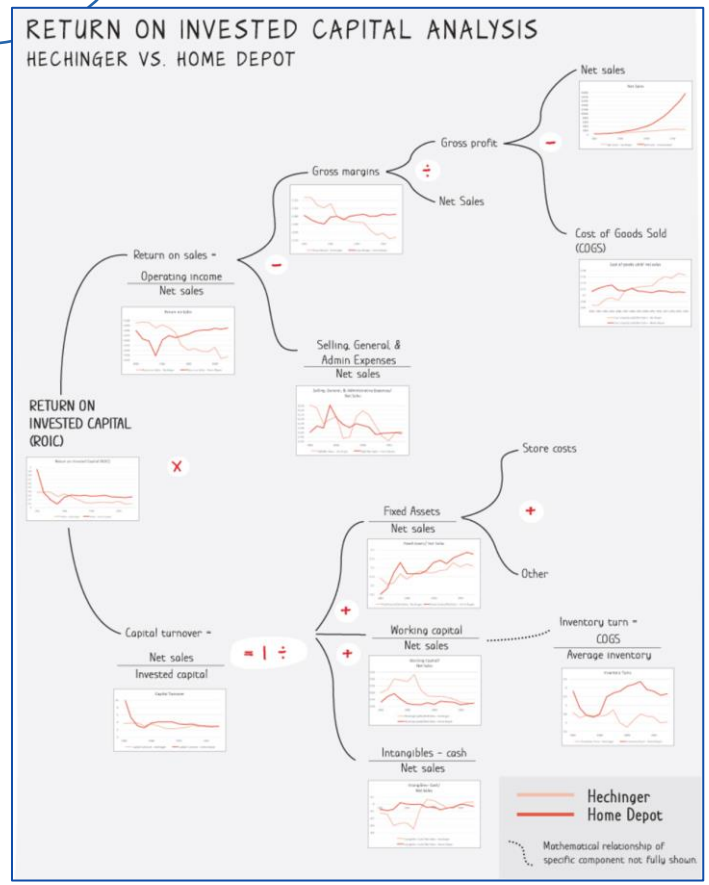
External Data

Low-cost/ low-price strategy

Growing much faster

Higher asset productivity





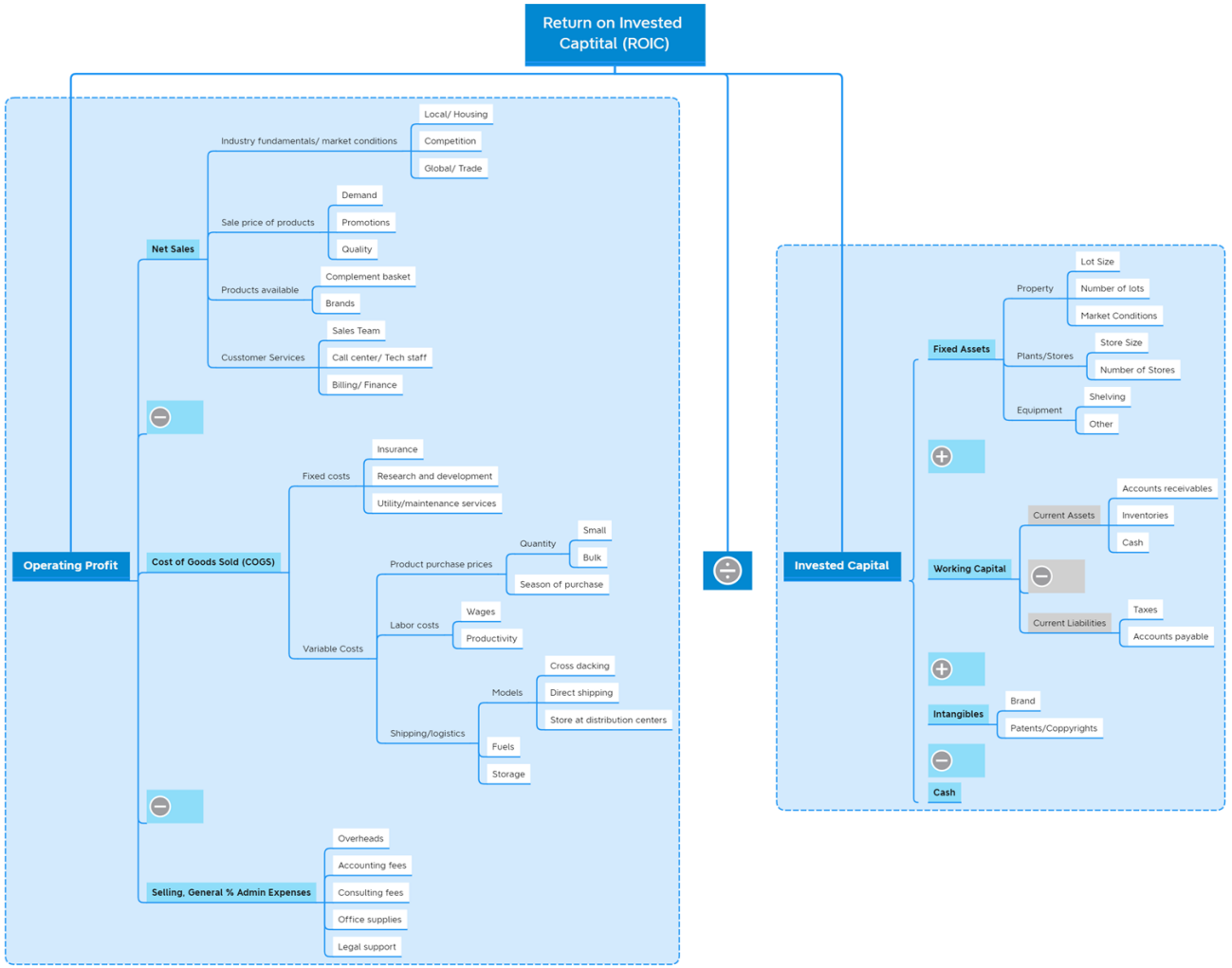
Data Analytics Problem Solving

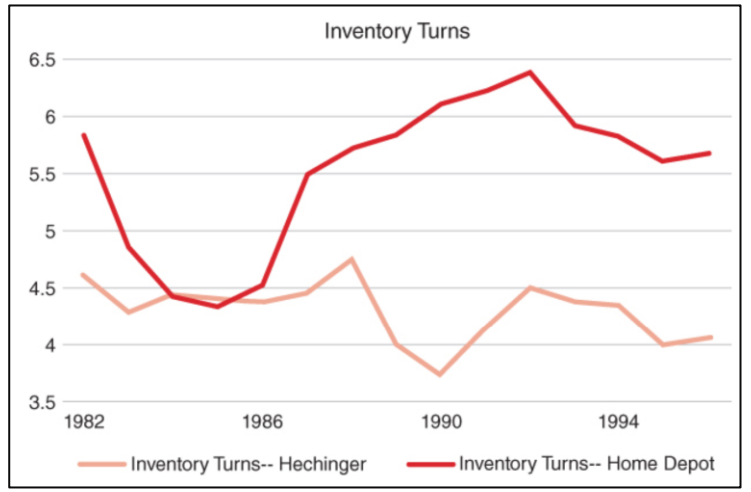
Part 2: Techniques to build Logic Trees –
(1) Algebraic structures

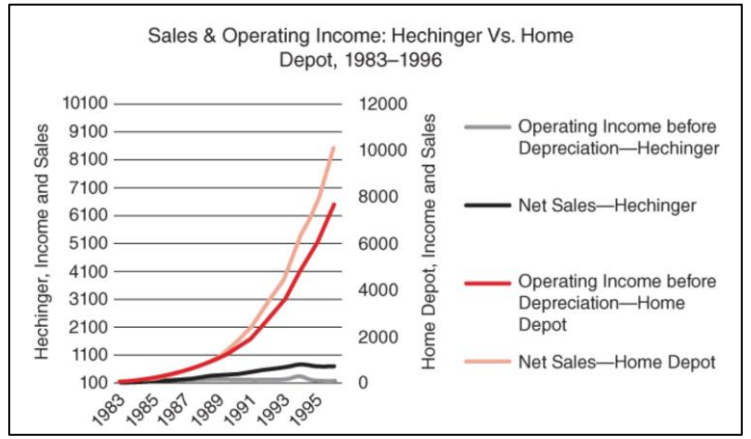
MASTERING DATA ANALYTICS

Generalized version

Internal Data



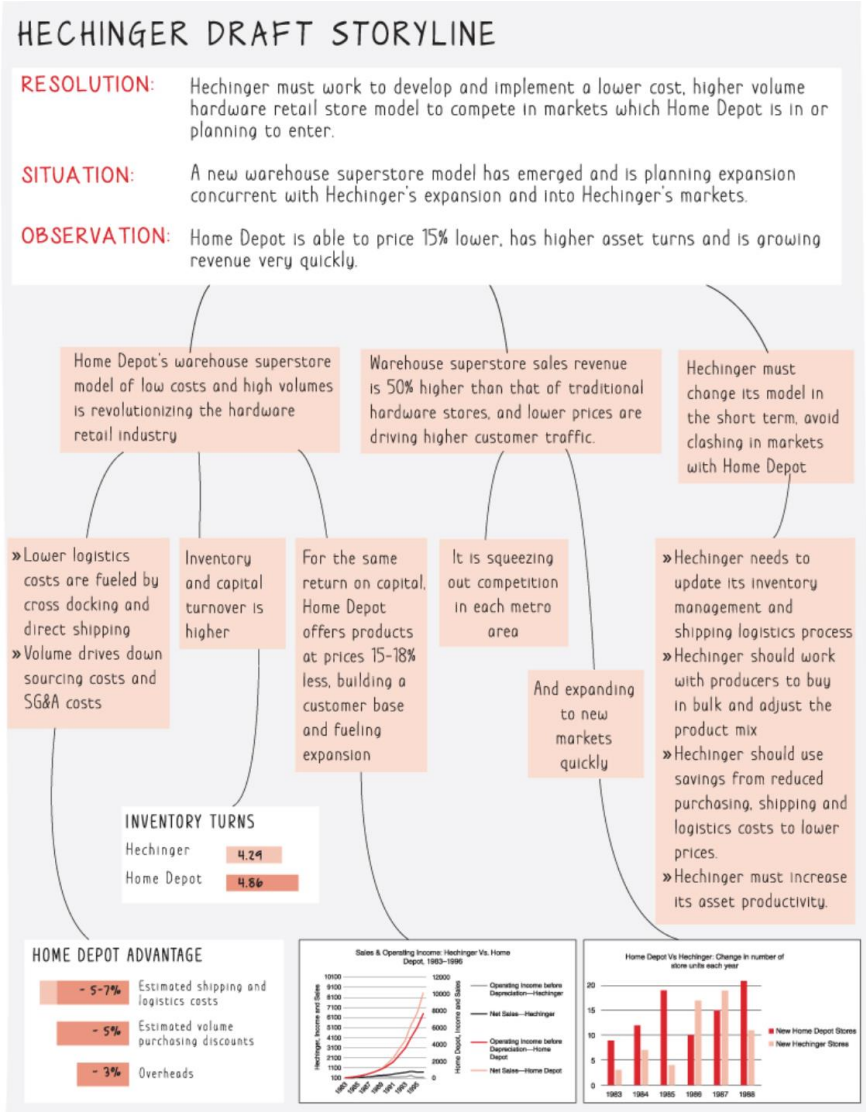




Data Analytics Problem Solving

Part 2: Techniques to build Logic Trees –

(1) Algebraic structures

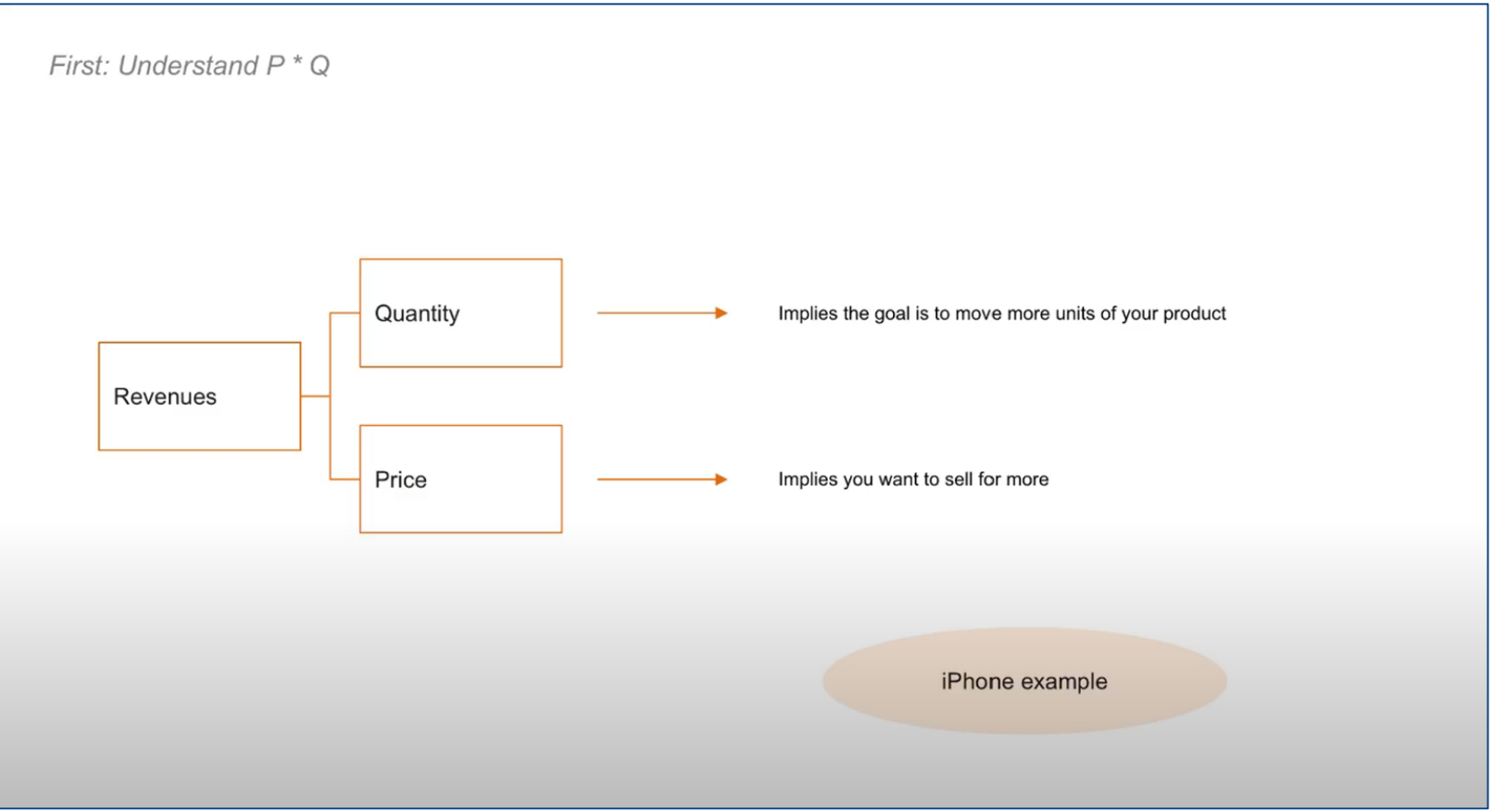


Data Analytics Problem Solving

Part 2: Techniques to build Logic Trees –
(1) Algebraic structures

Same as P*Q:

- Consulting Revenue Model (Example) = # of Projects (X) Revenuve per project
- Website Revenue Model (Example) = # of Visitors (X) Revenue per Visitor

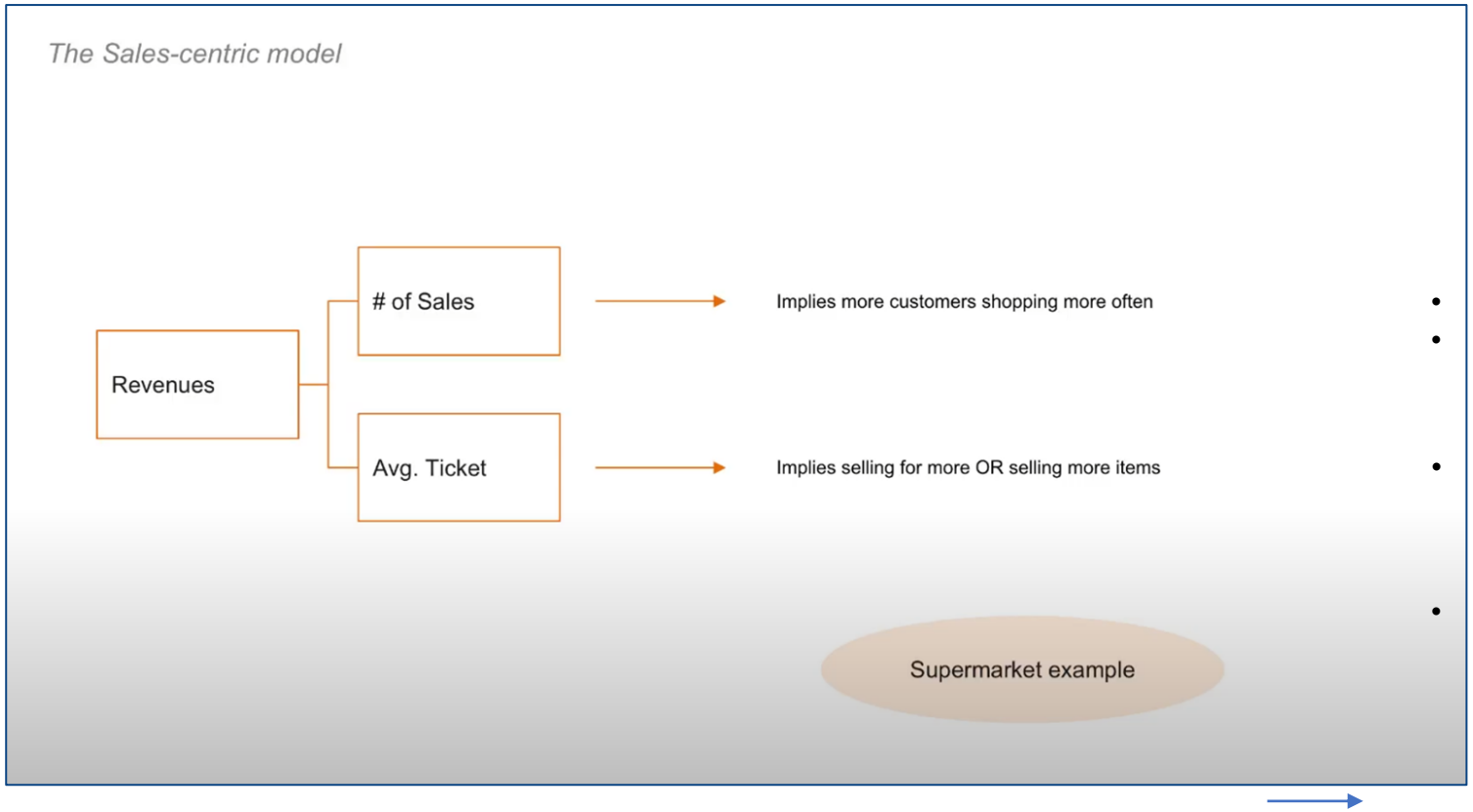


"Product Centric Models": P*Q

- Cross Sell (Combo)
- Increase
- Increase price, not drop quantity too much
- Upsell (128GB->256GB)

MASTERING DATA ANALYTICS

3 Alternative **Revenue** Models



"Product Centric Models": P*Q

Beyond P*Q model

1. "Sale Centric Models" (Transaction approach)

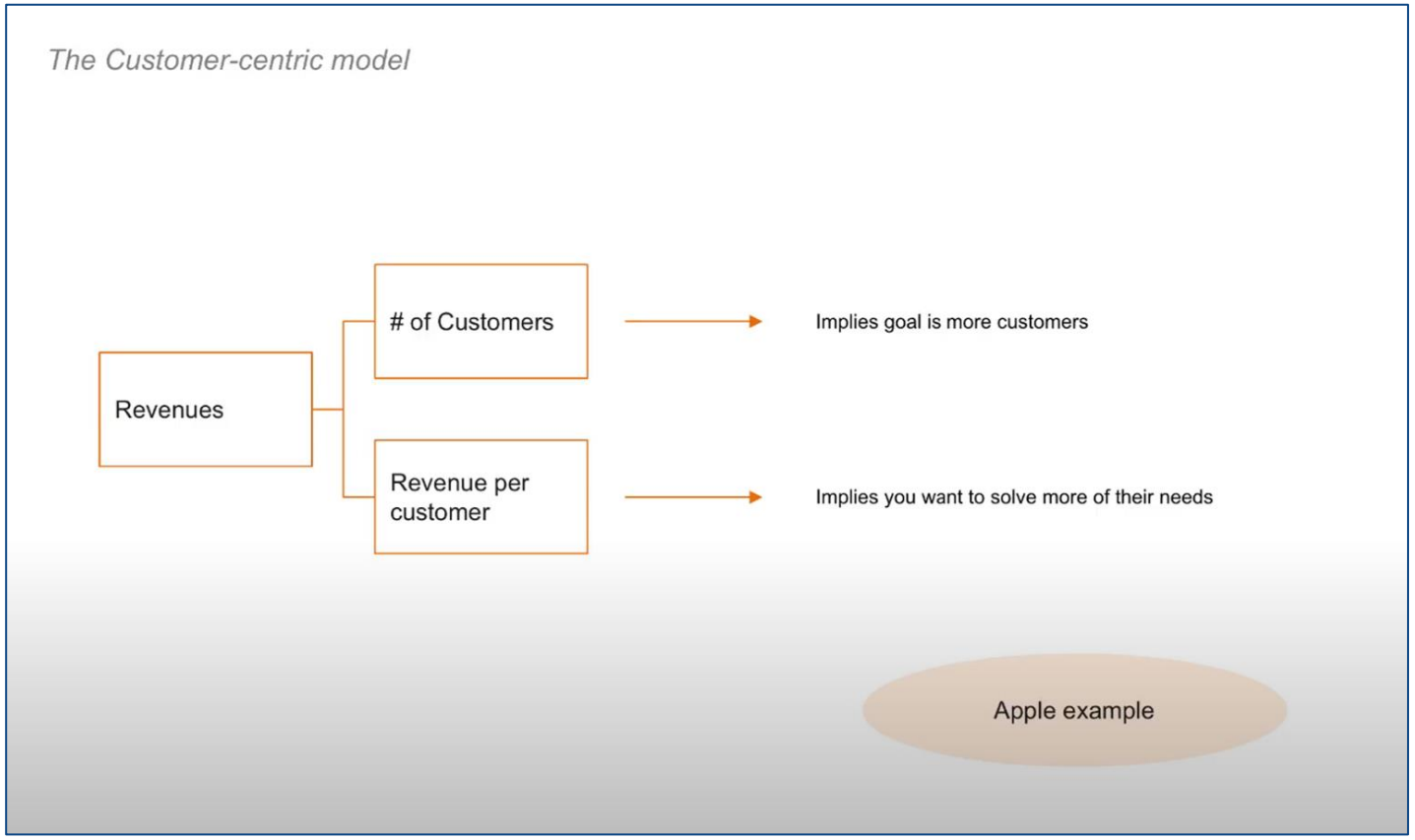
- Good products portfolio => increase traffic
- Not selling more products => moving more units

- More items

- Product centric model is not meaningful:
  - ➢ Sell more products=> sell more transactions
  - ➢ Higher price=> optimize revenue of each sale
    - Example No.1 : push products close to the cashier => sale more items than it is sale items for a higher price
    - Example No.2 : loyalty program
    - Example No.3 : good portfolio products => visit more often

MASTERING DATA ANALYTICS

3 Alternative **Revenue** Models



"Product Centric Models": P*Q

Beyond P*Q model

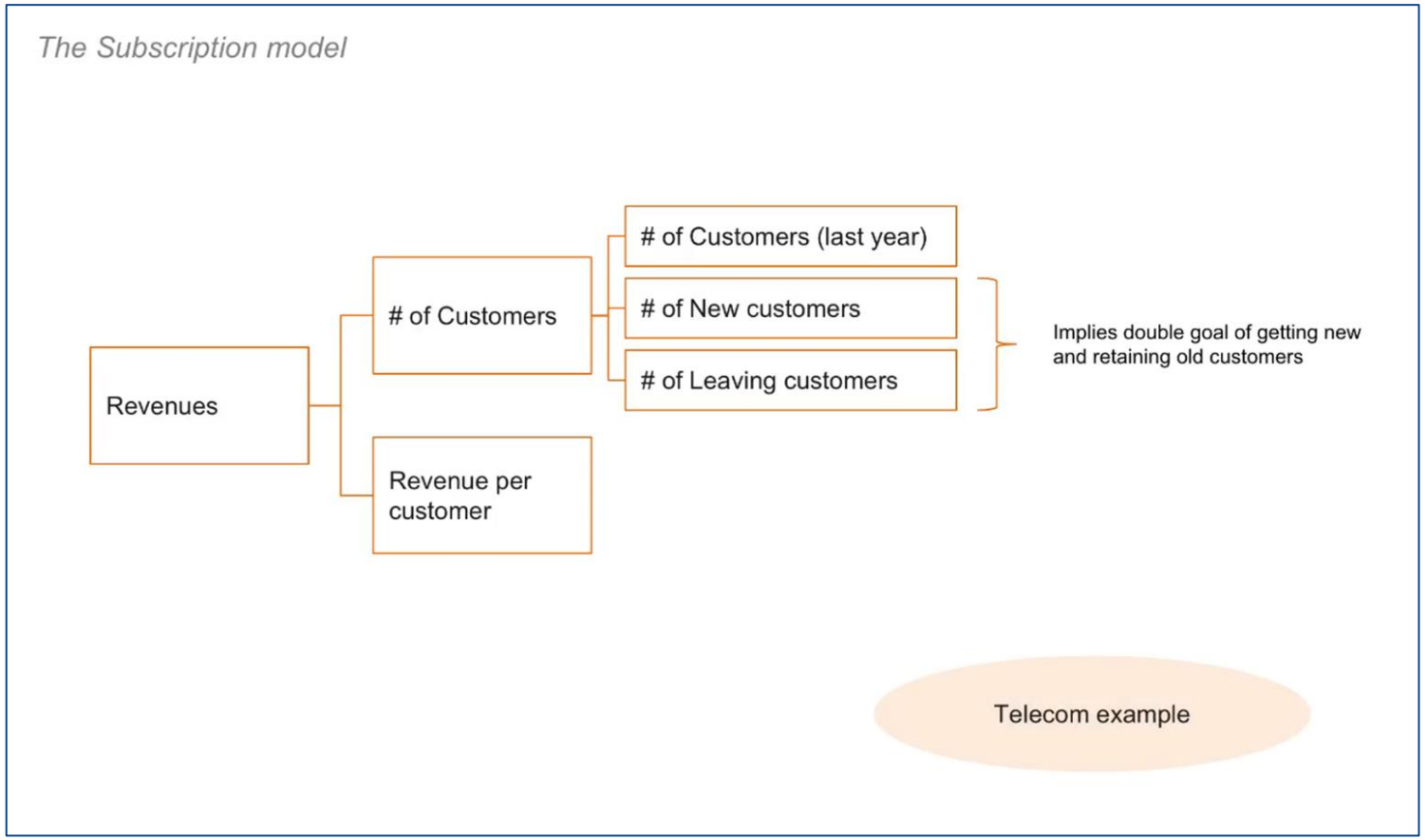
2. "Customer Centric Models" (longer-time view of the sales centric models)

- Could be Supermarket/ Retailer
- Example No.1 : Amazon developed different types of products: Kindle, Amazon Prime, they do their own publishing => can publish books or can buy as well
- Example No.2: Iphone/ Macbook/ Apple Store Subscribe/iCloud (when develop 1 product => think ecosystem products

"Some businesses are better off using a customer-centric revenue model, others will thrive more in a more 'transactional' approach"

MASTERING DATA ANALYTICS

3 Alternative **Revenue** Models



"Product Centric Models": P*Q

Beyond P*Q model

3. Subscription model

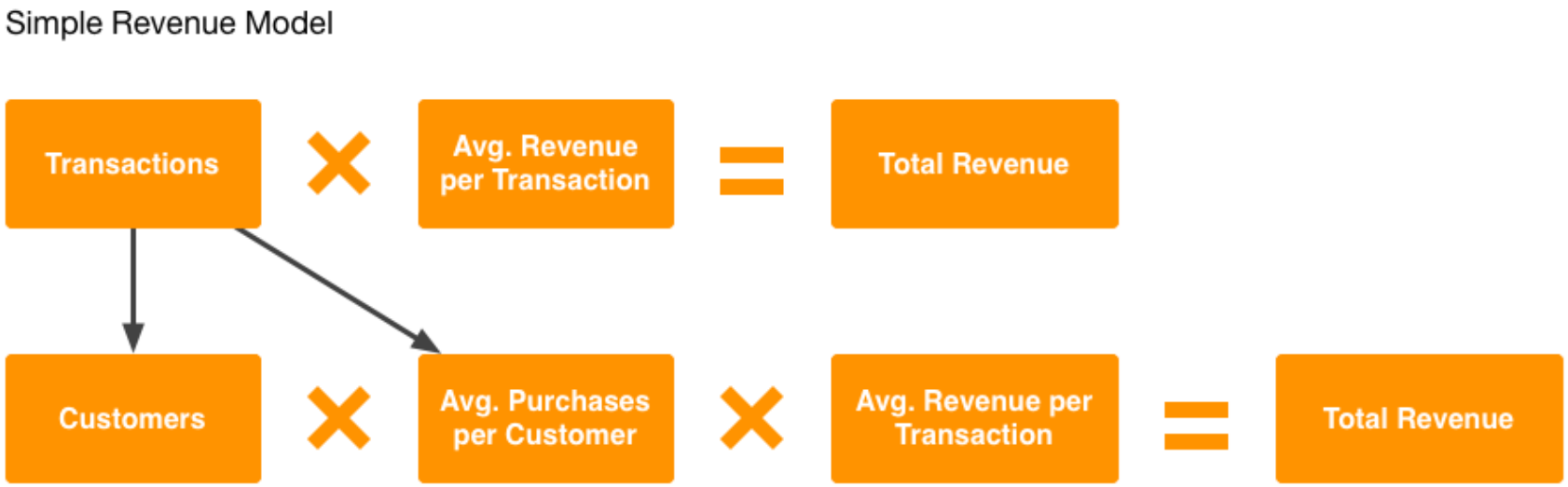
- In Subscription model your **main concern is how to retain customers** then you have secondary concern of **how to get new customers** and **how to make your current customer spend more.**

- Ex: Netflix does their strategy they've not create new products so that you can buy more from them, they worried about keeping you within the Netflix ecosystem so **they do all these new movies TV series that they don't charge anything** more for you because **their main concern is to keep you on their platform, keep you on their recurring revenues so they have a healthy business** (this is slightly different way to see the business)

"There are several mathematically right, MECE ways to break down revenues but each is more meaningful in a situation than the others"

Ex: Amazon: Sale Centric Model or Customer Centric Model

Revenue was driven by essentially the same **three factors**:
- the **number of customers** making purchases,
- the **number of purchases** that those customers make, and
- the **size of those purchases.**

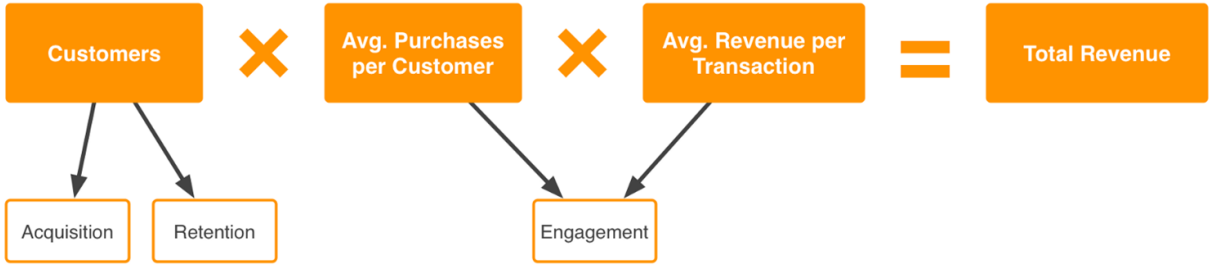


Data Analytics Problem Solving

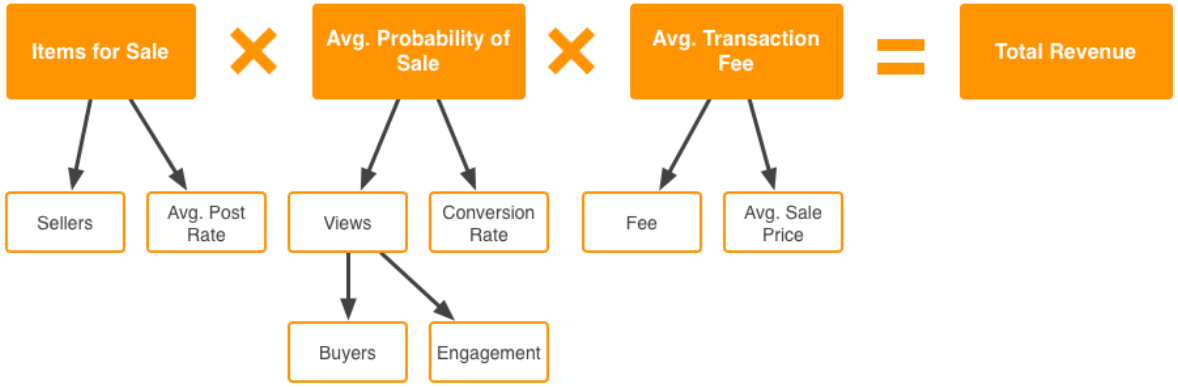
Part 2: Techniques to build Logic Trees –

(1) Algebraic structures

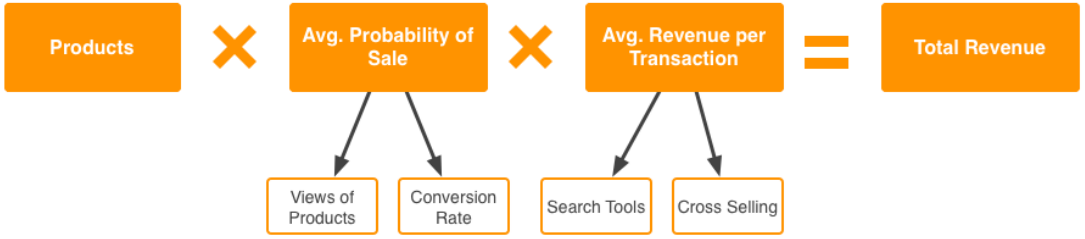
How the Customer Lifecycle Drives the Revenue Model



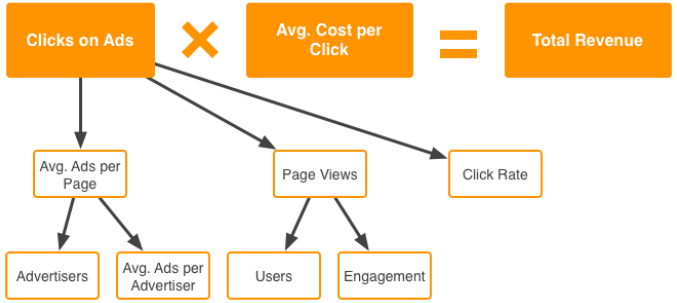
Marketplace Revenue Model



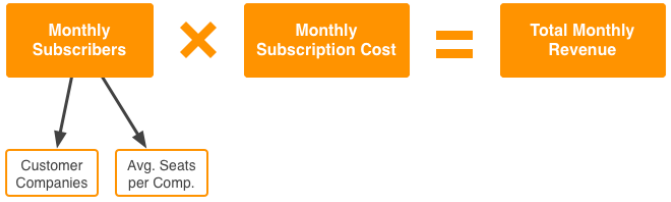
E-Commerce Revenue Model



Community or User Generated Content Revenue Model



SaaS Revenue Model



Data Analytics Problem Solving

Part 2: Techniques to build Logic Trees –

(1) Algebraic structures

Resource: https://medium.com/growthzilla

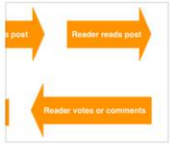
2.1.1 Understanding Your Customers' Journey

To identify the opportunities for growth along the customer lifecycle, it is first important to understand the customer's experience...

Kimmy Paluch
Jun 21, 2017 · 8 min read

2.1.2 Modeling Your Business for Growth

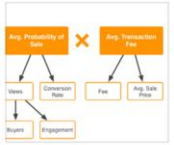
If there is one concept that we hope to convey, it is that fostering growth for your product should be systematic and strategic rather than...



Sergio Paluch
Jun 22, 2017 · 7 min read

2.1.3 Common Revenue Growth Models

When modeling a business, it's best to begin with its core: how it generates revenue. By starting at the most fundamental level, you can...



Sergio Paluch
Jun 24, 2017 · 8 min read

2.1.4 Customer Growth Models

In the previous section we covered common revenue growth models to understand how companies make money on different types of products. In...

2.2 The Customer Lifecycle

Let's review the customer lifecycle before we dive too deeply into strategy since it will serve as the basis for a lot of the concepts in...

Sergio Paluch
Jul 7, 2017 · 14 min read

2.3 Strategizing and Prioritizing Experiments

This post is part of the Growthzilla Book series, which is an online draft of the print edition that will be available in 2018.

Sergio Paluch
Jul 13, 2017 · 4 min read

2.4 Running Successful Growth Experiments

By utilizing experimentation to help us decide if changes to product, marketing, and operations are effective, we avoid having to rely...

Sergio Paluch
Jul 15, 2017 · 10 min read

2.5 Iterating on Previous Growth Experiments

A key part of the growth science methodology is iteration. It's not enough to form one hypothesis, test it, and implement a change. If you...

Data Analytics Problem Solving

Part 2: Techniques to build Logic Trees – (1) Algebraic structures

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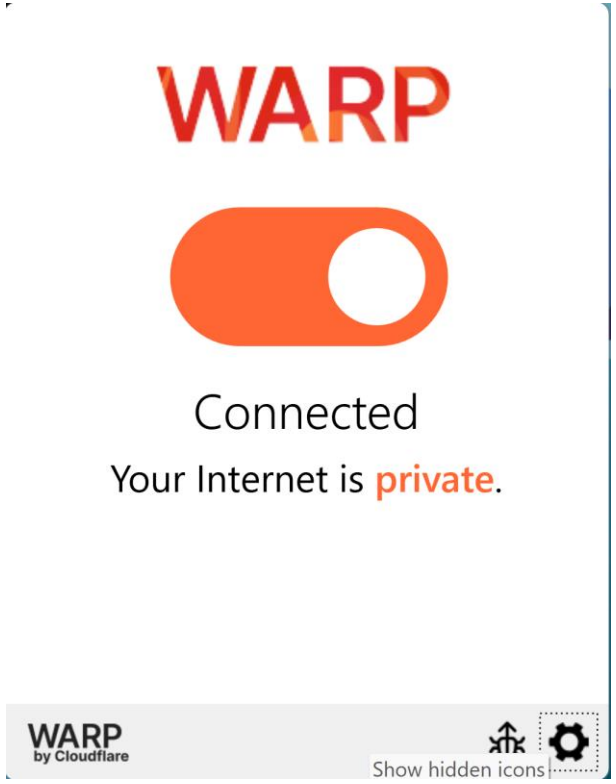
CLOUDFLARE



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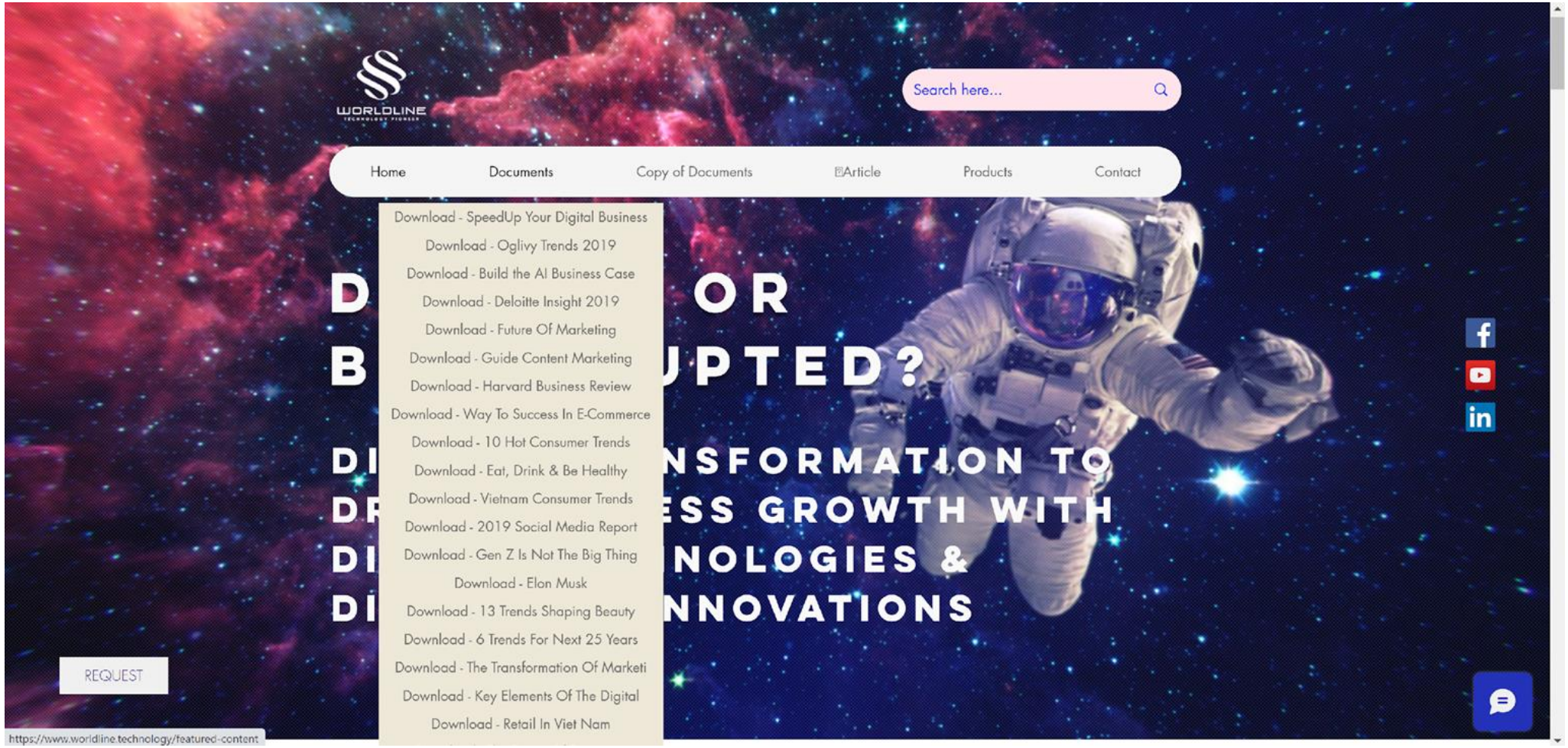
Data Analytics Problem Solving

Part 2: Techniques to build Logic Trees –
(1) Algebraic structures



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Quantitative Methods
FRA
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Fixed Income
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MASTERING DATA ANALYTICS

The 5 ways to be MECE – Process Structures

Difficulty to learn: ★★★☆☆

Limits: Only use in problems that follow a predictable process (ex: manufacturing, not business strategy).

Risks: It is common to overlook an important part of the process, especially when lacking business sense and asking few questions. In this case your structure won't be exhaustive.

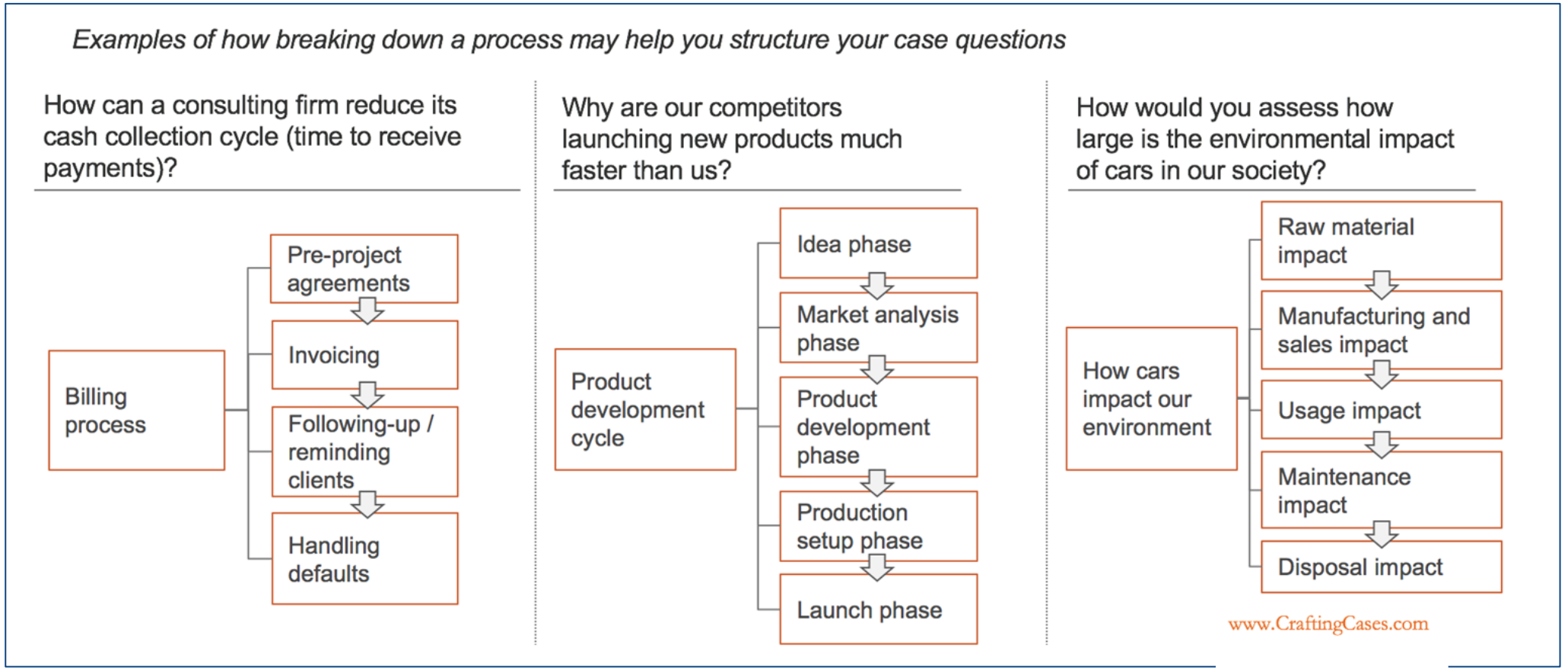
Use when: There is clearly a process underlying the problem / issue. Examples of these are manufacturing, sales and hiring. If you have reason to hypothesize that only part of the process is key to the issue, there's an even stronger reason to use this type of structure

The great thing about processes is that they **have a beginning**, some steps in the **middle** and then **an end**. **Breaking down any problem that has an underlying process into its steps is a sure way to be MECE**. You can't miss a thing because you're covering the whole process and everything happens within that contained reality.

Data Analytics Problem Solving

Part 2: Techniques to build Logic Trees – (2) Process structures

Here are a few examples of how you can **break down the problem's underlying process** to have a clear, MECE structure to solve different problems:

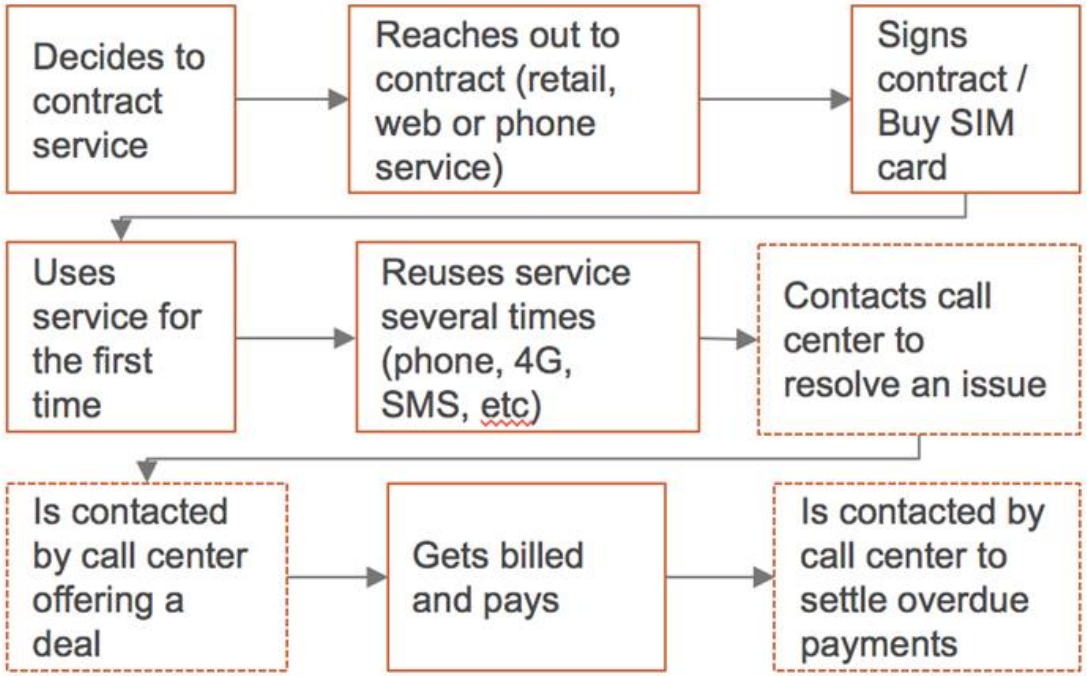


Data Analytics Problem Solving

Part 2: Techniques to build Logic Trees –

(2) Process structures

How a customer interacts with a mobile[1] provider



Reasons why customer satisfaction has dropped

Satisfaction on contracting service	▪ Hard to contract ▪ Conditions / plans aren't clear ▪ Conditions / plans aren't desired ▪ Hard to setup for first usage
Satisfaction with usage	▪ Poor coverage ▪ Lots of call drops ▪ Unavailable / slow internet ▪ Unsatisfied with other services
Satisfaction with call center	▪ Support staff can't solve problems ▪ Support is unavailable / takes too long to answer ▪ Too many marketing calls
Satisfaction with billing	▪ Payment process is complex / takes time ▪ Bills come with errors ▪ Overdue payments contact is too harsh with small matters

1 I've limited to mobile, but it work work as well for a full service telecom company (although it would be more complex)

But **some problems aren't numerical problems nor processes**. Even if you practice mind-stretching, you can't really find an underlying process to it. Or maybe it's a **long-term problem**, and the qualitative issues and interrelationships between the parts are more important than the parts themselves. What do you do, then?

Then it's time to use the third **core structuring technique**. A technique so powerful you can arguably solve any case through it, but **difficult enough to take more time to learn than all others combined, conceptual frameworks are their name.**

Conceptual frameworks are the hardest type of structure to achieve a MECE result, but using them is essential to many cases. **If the problem cannot be broken down as a formula or as a process, conceptual structures are pretty much the only way to go.** And even some cases that could be structured using algebra or as a process would be a better fit for a conceptual framework.

MASTERING DATA ANALYTICS

The 5 ways to be MECE – Conceptual Frameworks

Difficulty to learn: ★★★★★

Limits: You need to know a framework *specific* to your situation.

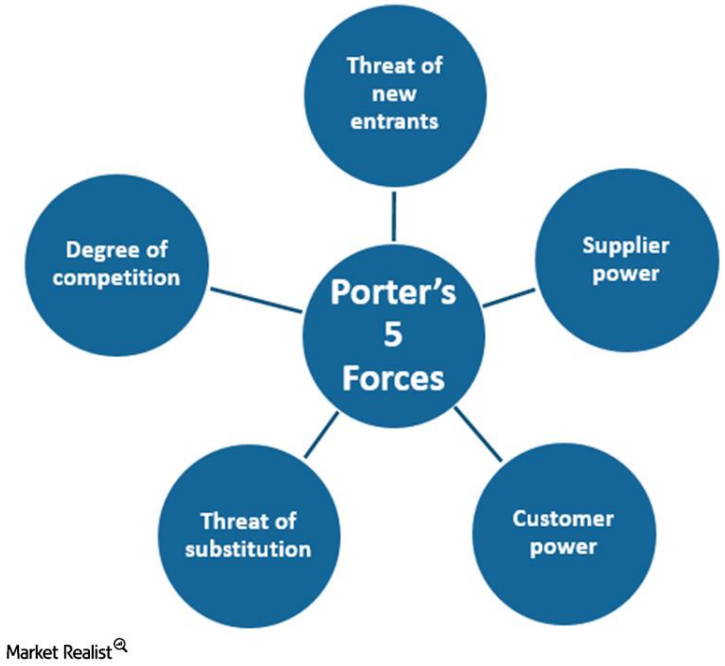
Risks: Using a framework that does not apply, being unable to adapt it to the specifics of your situations and not being able to connect it to algebra and process structures. The last two are usually symptoms of not understanding your framework well enough.

Use when: These are the most insightful but hardest to use. They're great for qualitative problems and long-term problems, where quantitative data is unavailable or unreliable. They aren't good for diagnostics.

Data Analytics Problem Solving

Part 2: Techniques to build Logic Trees –

(3) Conceptual Frameworks

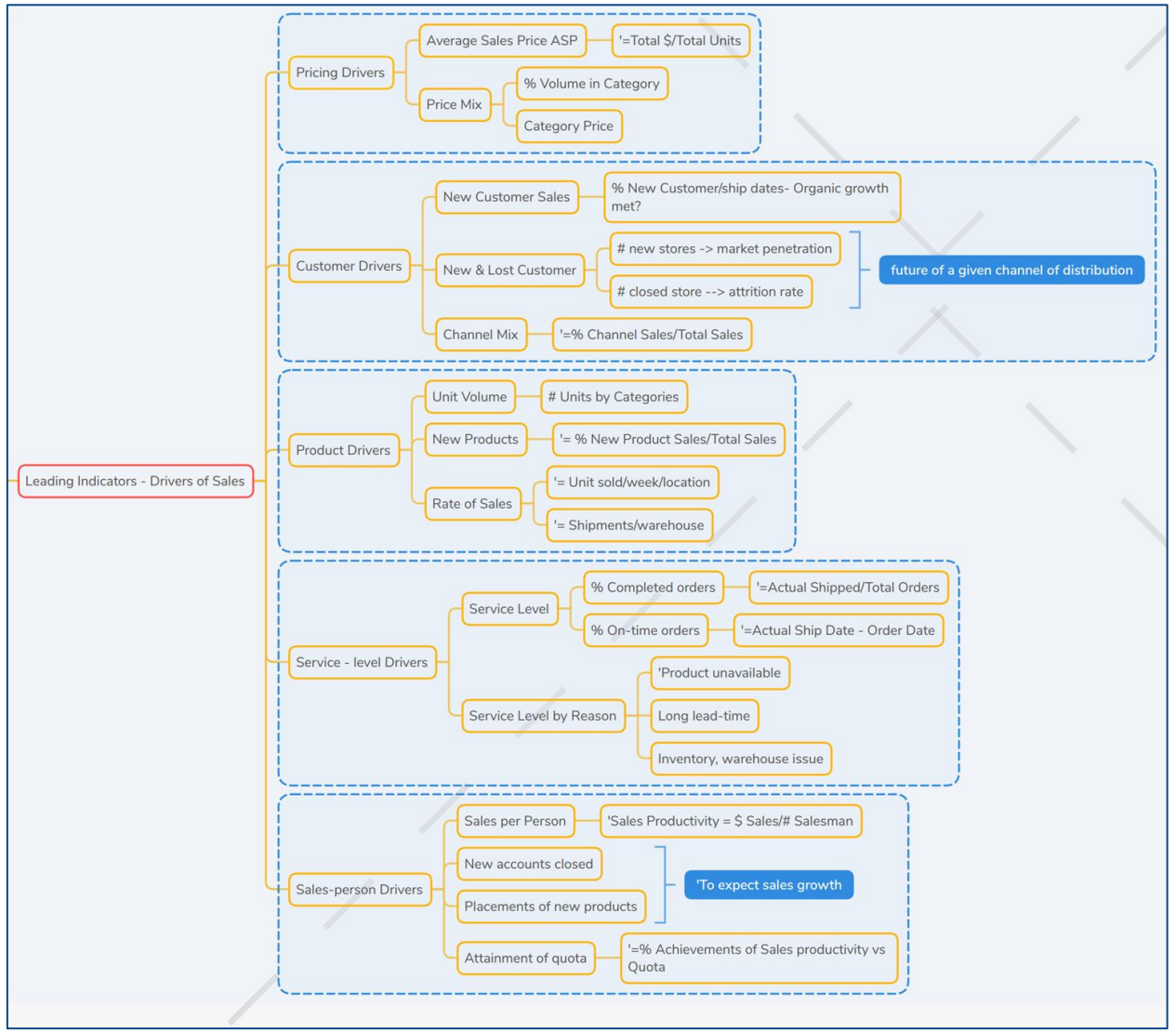


Data Analytics Problem Solving

Part 2: Techniques to build Logic Trees –

(3) Conceptual Frameworks

SALE



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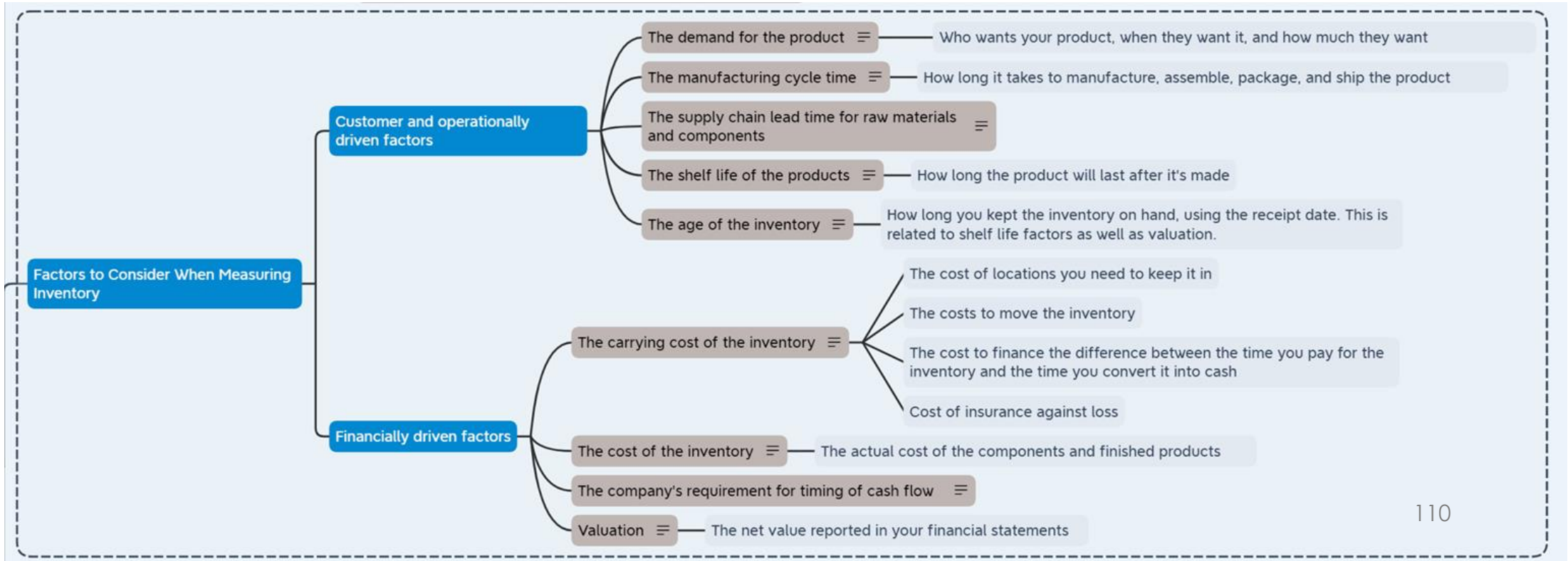
Part 2: Techniques to build Logic Trees – (3) Conceptual Frameworks

Conceptual frameworks are structures based on categories of concepts. They usually come straight from theory but can be adapted if you understand it well enough. Examples of these frameworks are the **3Cs, the 4Ps, Porter's 5 Forces, "People, Process, Systems" framework,** another example of a lesser known, but widely used framework is the Trust Equation, which says to build and maintain trust you need **four factors: Credibility, Reliability, Intimacy and (a lack of) Self-Orientation.**

INVENTORY



Data Analytics Problem Solving

Part 2: Techniques to build Logic Trees – (3) Conceptual Frameworks

MASTERING DATA ANALYTICS

For business problems it almost always makes sense to **start with a profit lever or return on capital tree**.
As you get more experienced, **try the broader set of cleaving frames** from the later part; different slices through the problem yield different insights.

In fact many business problems benefit from this **particular type of problem disaggregation**, because it shows the levers of revenue (price, volume, market share), costs (fixed, variable, overheads), and asset utilization so clearly, and in mathematical relationship to each other.

This chart shows a toolkit of what we call **cleaving frames for different kinds of problem.** Good problem solvers have toolkits like this that act as **lenses to visualize potential solutions**. They try on **one or more theoretical frames** to see which one is likely to be the **best fit** for the problem at hand. **Often they combine more than one frame** to make progress on particular problems.

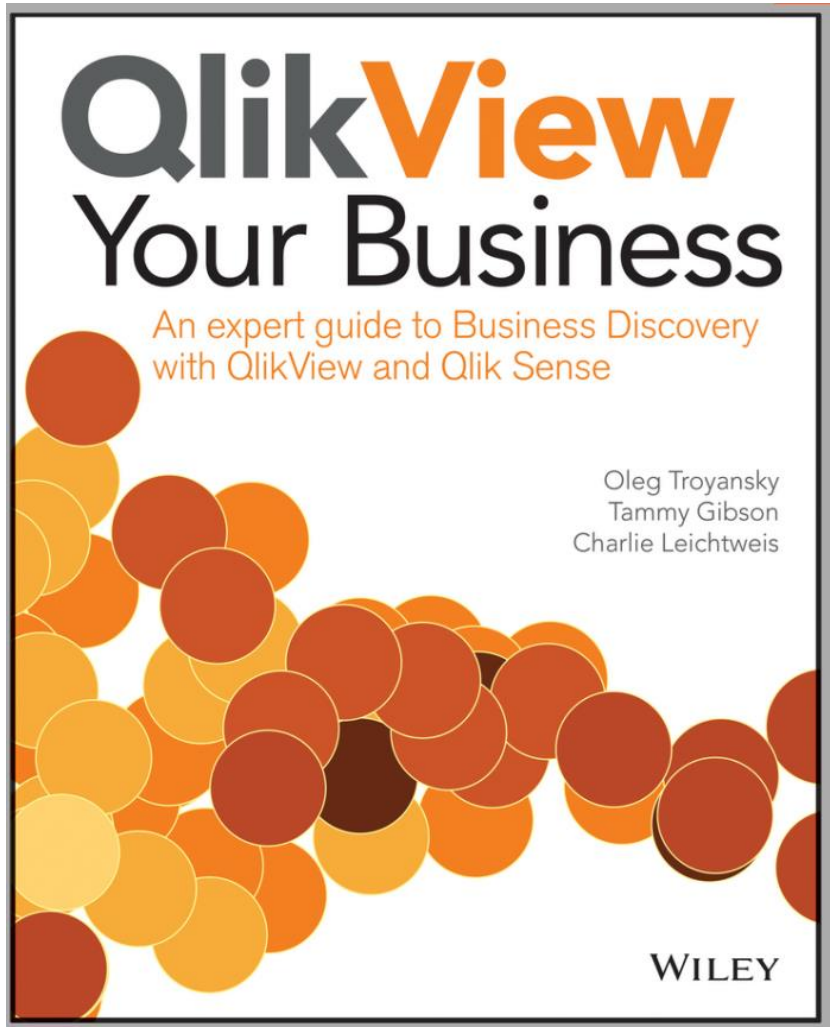
CLEAVING FRAMES

BUSINESS

Frame	Elements	Example
» Price/Volume	» Market share, awareness, trial, repurchase, elasticities	» Product entry strategies
» Collaborate/Compete	» Where to play, how to fight, acquiring a reputation, signalling	» Any competitive situations » CSIRO Wifi
» Market/Ability to compete	» Opportunity, competitive position, capabilities, resources	» Entry/start up » BHP
» Invest/Harvest	» Growth/Share, explore vs exploit, disruptive entrants	» Portfolio of activities » BHP
» Margins/Asset turns	» Return to capital, valuing options	» Business model construction » Home Depot–Hechinger
» Scale/Scope	» Size vs breadth	» Social media platforms
» Capital/Noncapital	» Rent, own, borrow, share, zero-basing	» Asset efficiency » Uber, Airbnb
» Principal/Agent	» Aligning incentives, monitoring	» Compensation, insurance, second-hand markets
» Asset/Options	» Valuing potential (real and potential), puts/calls	» Multi-play investment games
» Customer/ Shareholder	» Competing perspectives	

Data Analytics Problem Solving

Part 2: Techniques to build Logic Trees – (3) Conceptual Frameworks



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CHAPTER 11

MASTERING DATA ANALYTICS

The 5 ways to be MECE – Segmentations

Difficulty to learn: ★★☆☆☆

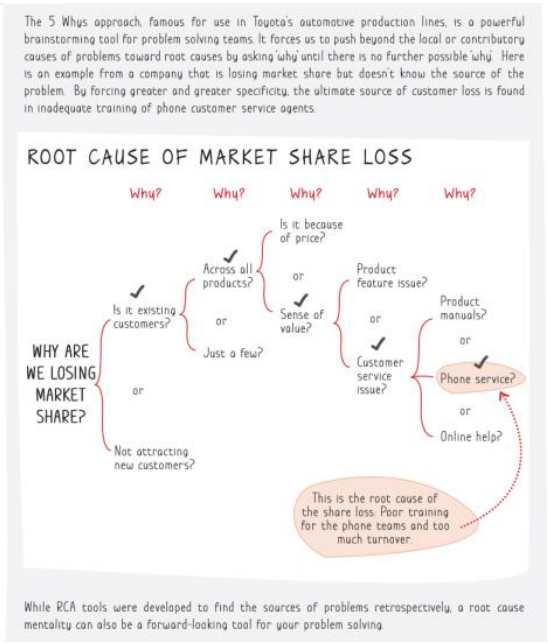
Limits: You can only segment one criterion at a time, and there may be dozens possible and equally likely.

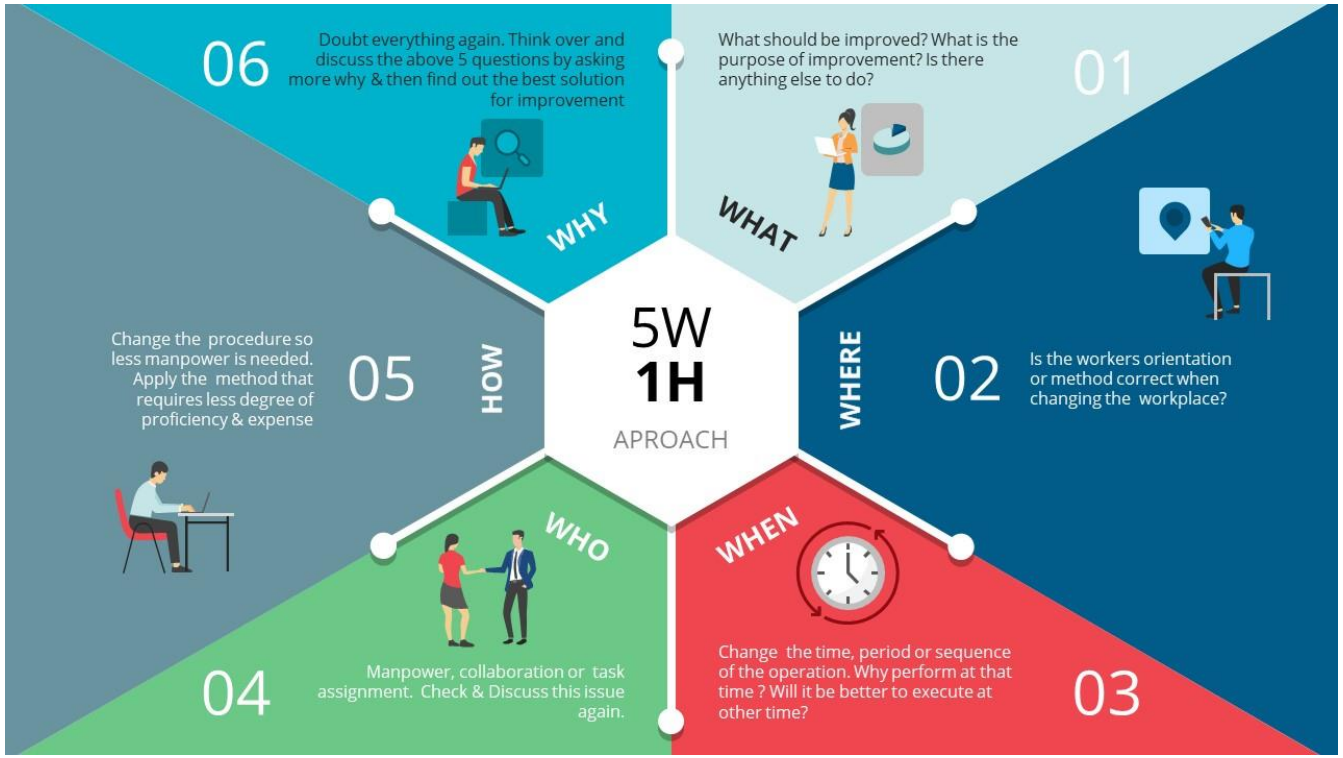
Risks: Choosing the wrong segmentation pattern yield no results, trying many seems like guessing if miscommunicated.

Use when: As a complement to another structure, when there is reason to think one segment has different behavior than others, or when you want to test for the "mix effect".

Data Analytics Problem Solving

Part 2: Techniques to build Logic Trees – (4) Segmentations



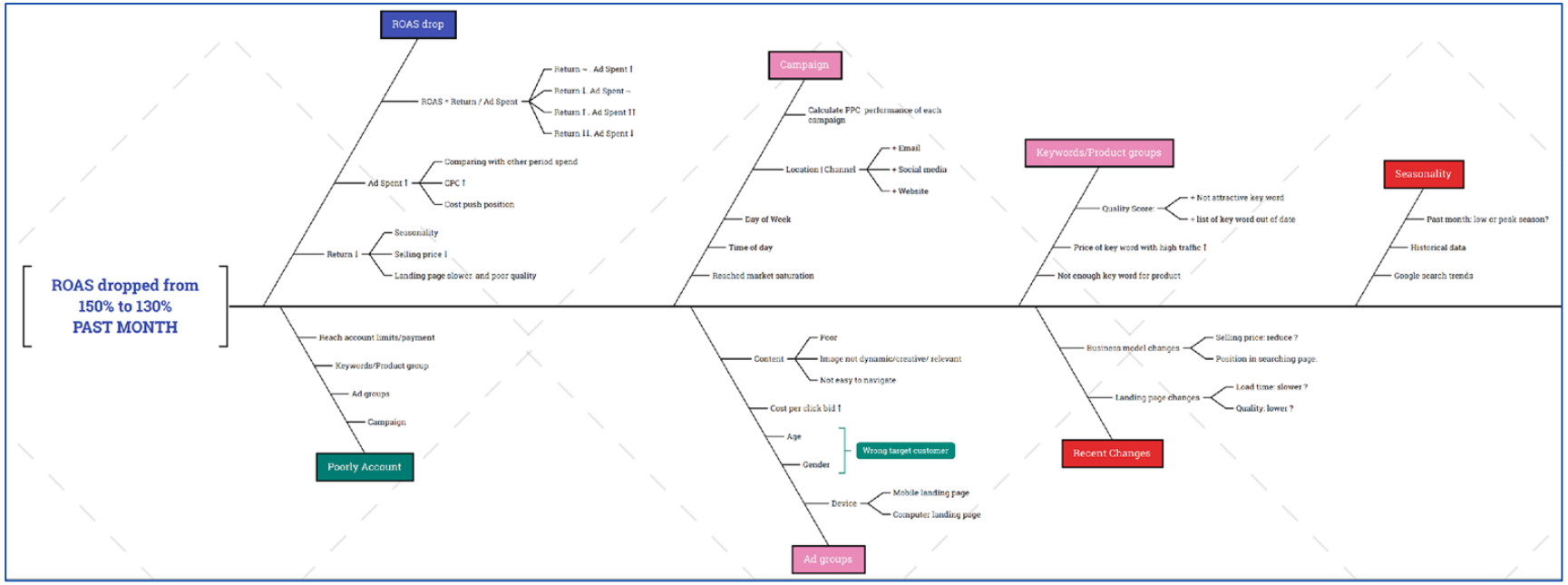


Data Analytics Problem Solving

Part 2: Techniques to build Logic Trees – (4) Segmentations

Segmenting is essentially **cutting a slice of the problem**. For instance, you could segment a company's customers by age group (0-20, 21-40, 41-60, 61+), by gender (male, female), by country, etc. Another example: you could segment a company's revenues by product line, by country, by type of customer, by month, etc.

**Notice how segmenting is different than finding the mathematical drivers (the essence of the Algebraic structures) in that you have a clear criterion to slice the data here.*



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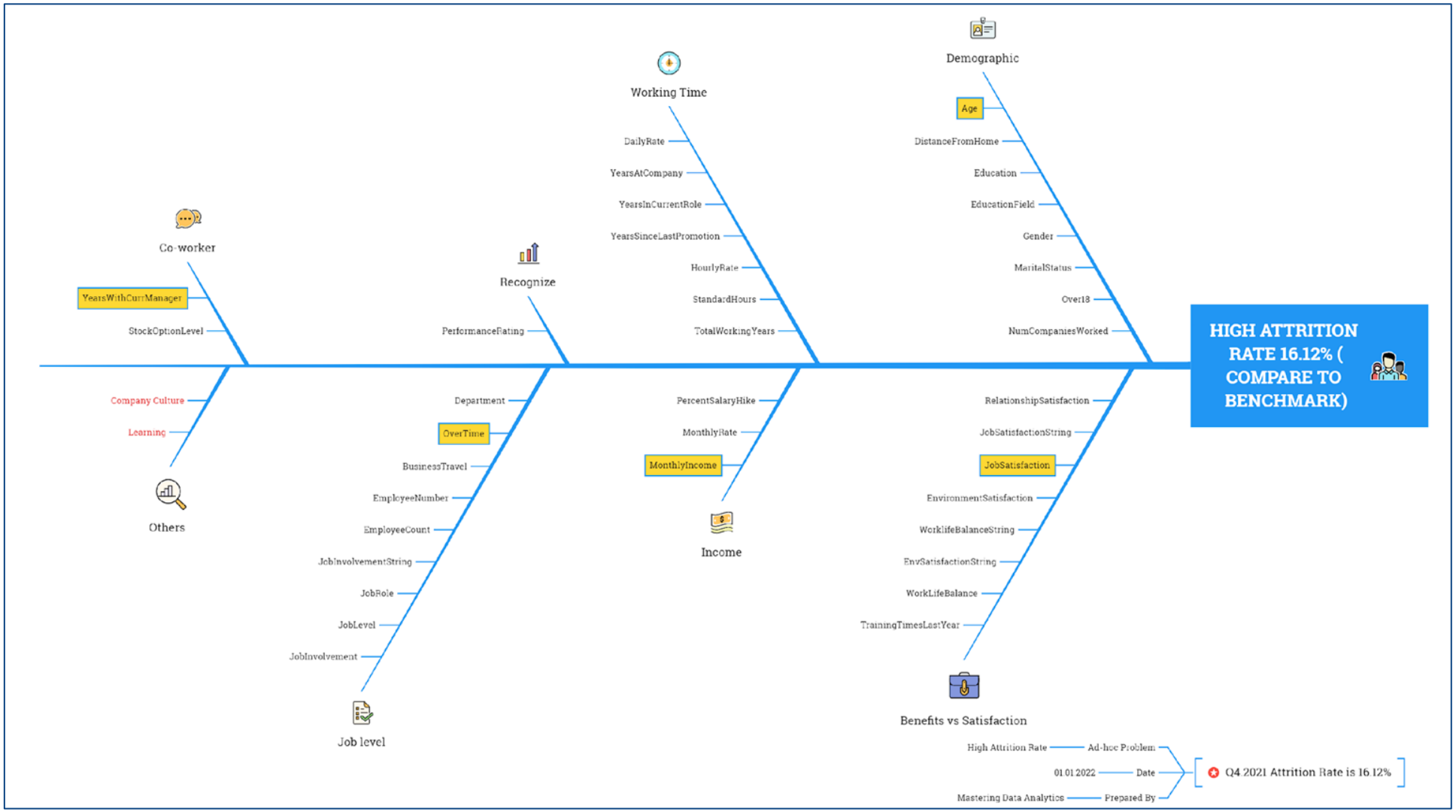
Part 2: Techniques to build Logic Trees – (4) Segmentations



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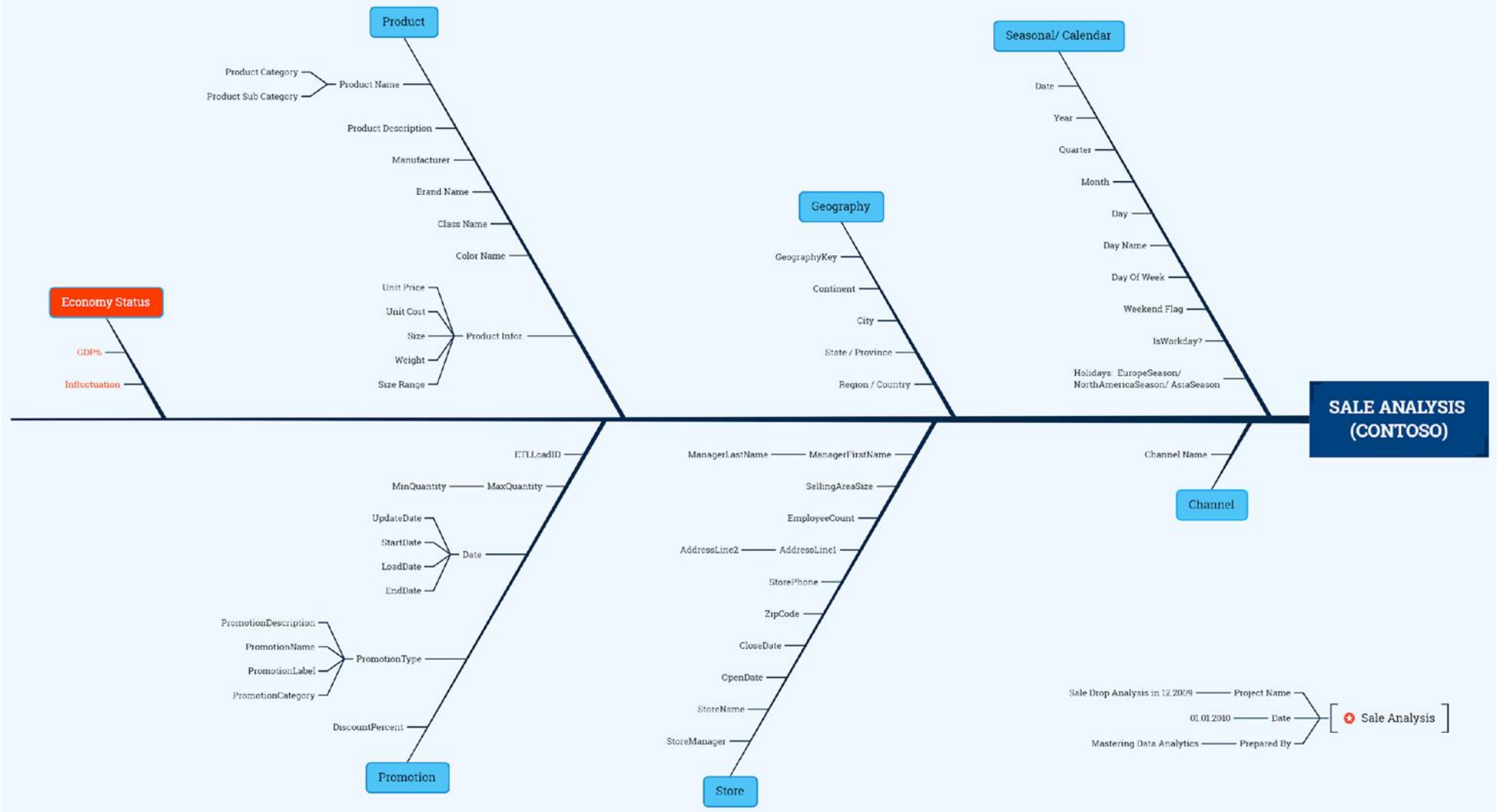
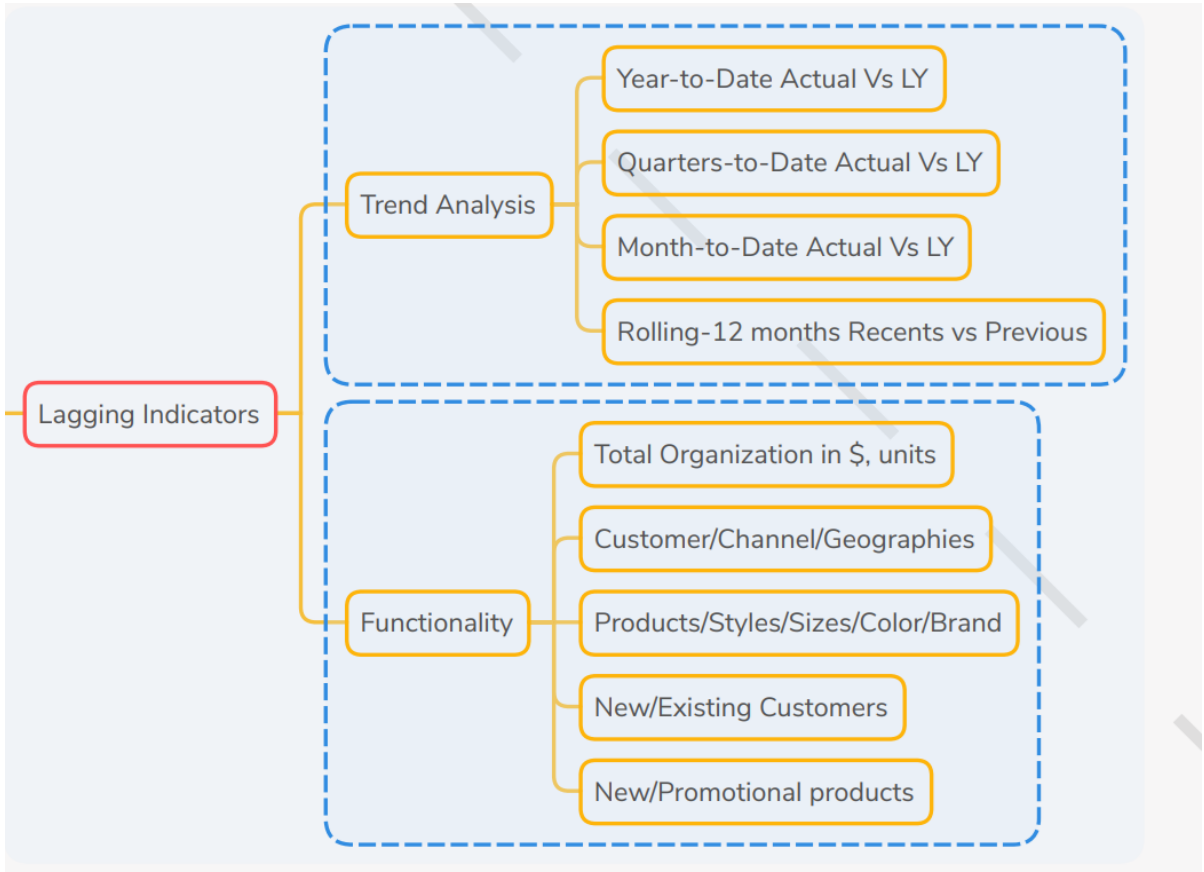
Part 2: Techniques to build Logic Trees – (4) Segmentations



Data Analytics Problem Solving

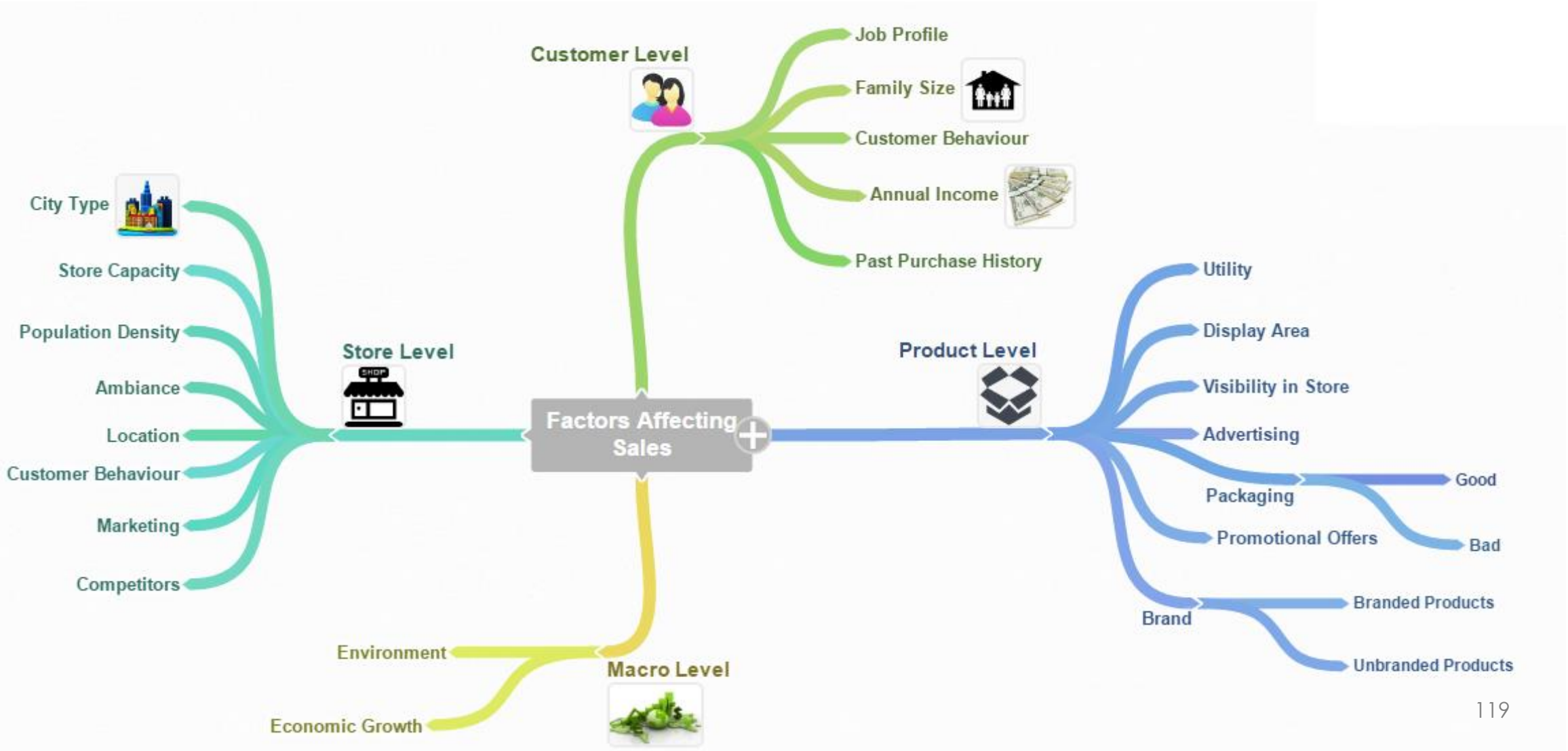
Part 2: Techniques to build Logic Trees – (4) Segmentations

SALE



Data Analytics Problem Solving

Part 2: Techniques to build Logic Trees – (4) Segmentations



MASTERING DATA ANALYTICS

Store Level Hypotheses :

1. **City type:** Stores located in urban or Tier 1 cities should have higher sales because of the higher income levels of people there.
2. **Population Density:** Stores located in densely populated areas should have higher sales because of more demand.
3. **Store Capacity:** Stores which are very big in size should have higher sales as they act like one-stop-shops and people would prefer getting everything from one place
4. **Competitors:** Stores having similar establishments nearby should have less sales because of more competition.
5. **Marketing:** Stores which have a good marketing division should have higher sales as it will be able to attract customers through the right offers and advertising.
6. **Location:** Stores located within popular marketplaces should have higher sales because of better access to customers.
7. **Ambiance:** Stores which are well-maintained and managed by polite and humble people are expected to have higher footfall and thus higher sales.

Product Level Hypotheses:

1. **Brand:** Branded products should have higher sales because of higher trust in the customer.
2. **Packaging:** Products with good packaging can attract customers and sell more.
3. **Utility:** Daily use products should have a higher tendency to sell as compared to the specific use products.
4. **Display Area:** Products which are given bigger shelves in the store are likely to catch attention first and sell more.
5. **Visibility in Store:** The location of product in a store will impact sales. Ones which are right at entrance will catch the eye of customer first rather than the ones in back.
6. **Advertising:** Better advertising of products in the store will should higher sales in most cases.
7. **Promotional Offers:** Products accompanied with attractive offers and discounts will sell more.

MASTERING DATA ANALYTICS

Customer Level Hypotheses

1. **Customer Behavior:** Stores keeping the right set of products to meet the local needs of customers will have higher sales.
2. **Job Profile:** Customer working at executive levels would have higher chances of purchasing high amount products as compared to customers working at entry or mid senior level.
3. **Family Size:** More the number of family members, more amount will be spent by a customer to buy products
4. **Annual Income:** Higher the annual income of a customer, customer is more likely to buy high cost products.
5. **Past Purchase History:** Availability of this information can help us to determine the frequency of a product being purchased by a user.

MASTERING DATA ANALYTICS

Macro Level Hypotheses

1. **Environment:** If the environment is declared safe by government, customer would be more likely to purchase products without worrying if it's environment friendly or not.
2. **Economic Growth:** If the current economy shows a consistent growth, per capita income will rise, therefore buying power of customers will increase.

After this step, We'll download the data and proceed with data analysis stages.

MASTERING DATA ANALYTICS

Root Cause Analysis

PPC stands for pay-per-click, a model of internet marketing in which advertisers pay a fee each time one of their ads is clicked. Essentially, it's a way of buying visits to your site, rather than attempting to "earn" those visits organically. Search engine advertising is one of the most popular forms of **PPC**

MASTERING DATA ANALYTICS

5. Opposite Words

The 5 ways to be MECE – Opposite Words

Difficulty to learn: ★☆☆☆☆

Limits: No limits, this one's a wildcard.

Risks: Opposite word pairs is *never* the most insightful way to break down a problem, use too much and it almost sounds like cheating.

Use when: As a last resort if you're unable to use other methods or if the question is not important enough to deserve more than a simple, quick structure. Notice you'll impress no interviewer by using this method.

5. Opposite Words

Two appropriate times to use it are when you need a **quick structure just to organize speech** and when you **can't find another type of structure to work with.**

Data Analytics Problem Solving

Part 2: Techniques to build Logic Trees – (5) Opposite Words

Step #2: Break down the 1st layer using one of the 5 Ways to be MECE

Be careful with what you choose – this will define the quality of the rest of your Issue Tree

How to improve the quality of new recruits in a small consulting firm?

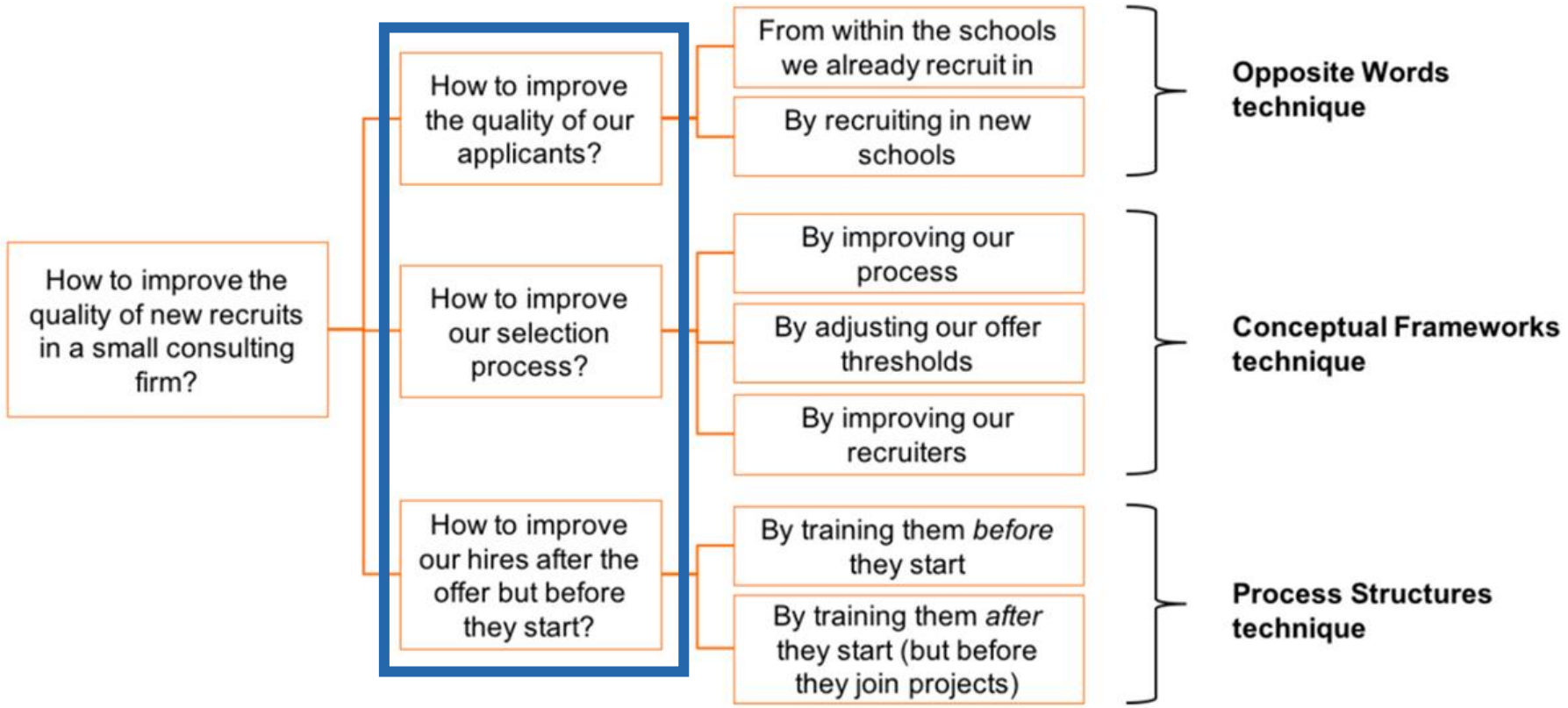
Opposite Words	Process Structure	Segmentation	Conceptual framework
How to improve the quality by changing the recruiting pool?	How to improve the quality of our applicants?	How to improve the quality of our top tier school recruits?	How can we get smarter people?
How to improve the quality with no change to the recruiting pool?	How to improve our selection process?	How to improve the quality of our mid-tier school recruits?	How can we get people who work harder?
	How to improve our hires after the offer but before they start?	How to improve the quality of our lower-tier school recruits?	How can we get people with the right experience?
			How can we get people with the right cultural fit?

Which structure would you choose as a 1st layer and why?

Data Analytics Problem Solving

Part 2: Techniques to build Logic Trees – Combine Structures

Step #3: Create a 2nd layer (and further) by breaking down *each bucket* into another "mini MECE structure" from the 5 Ways to be MECE



"mini MECE structure"

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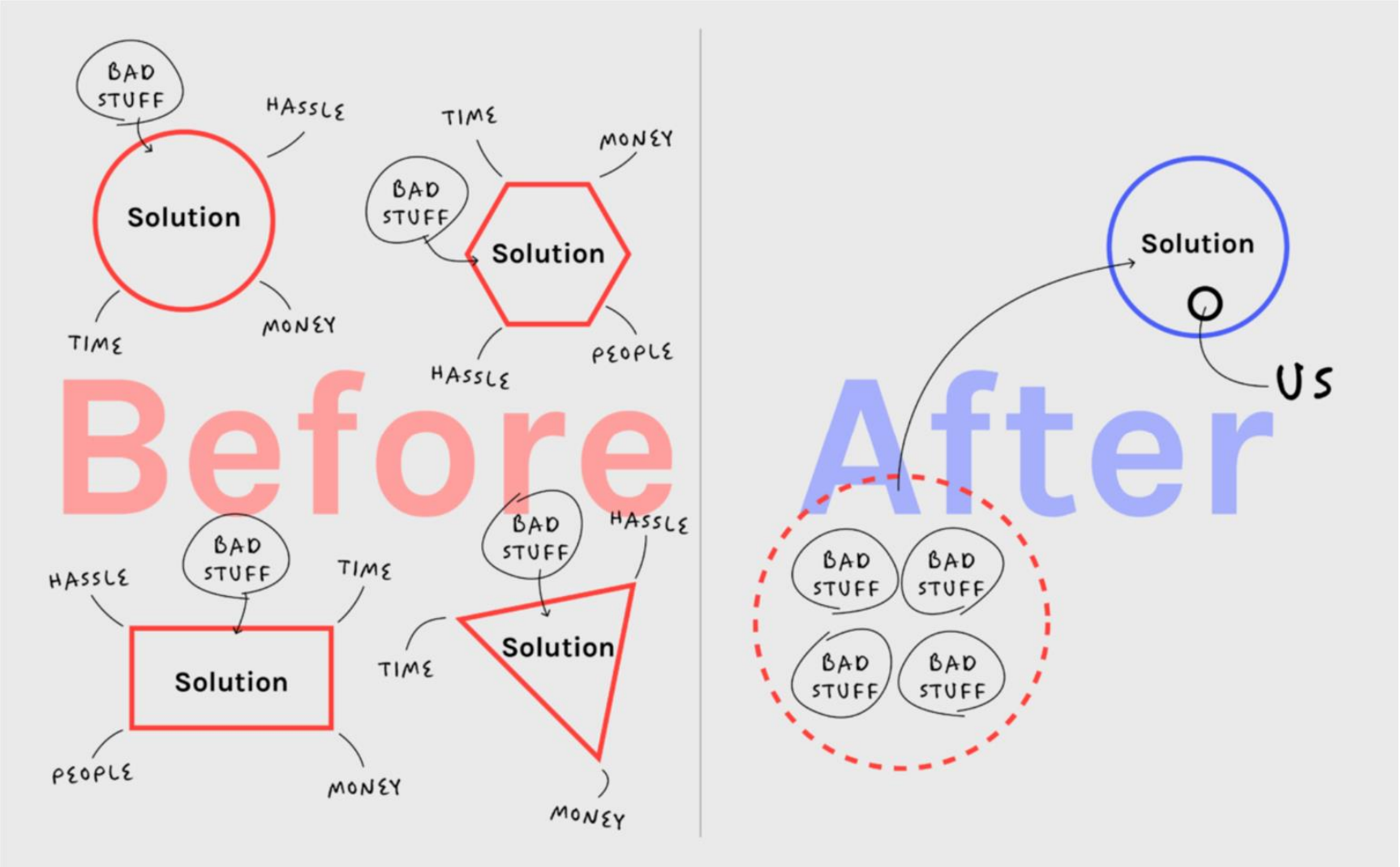
Part 2: Techniques to build Logic Trees – Combine Structures



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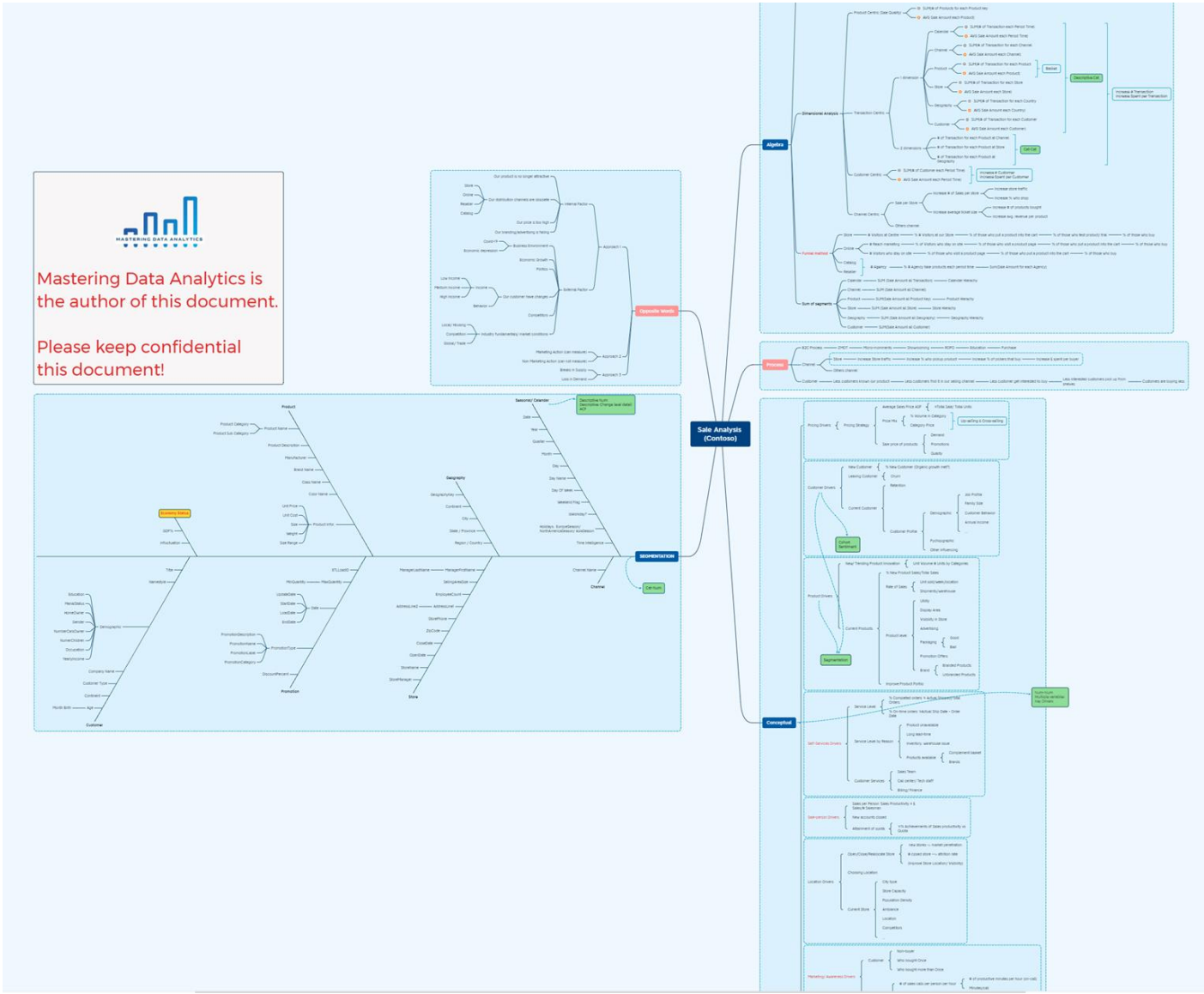
Part 2: Techniques to build Logic Trees – Combine Structures



Reference

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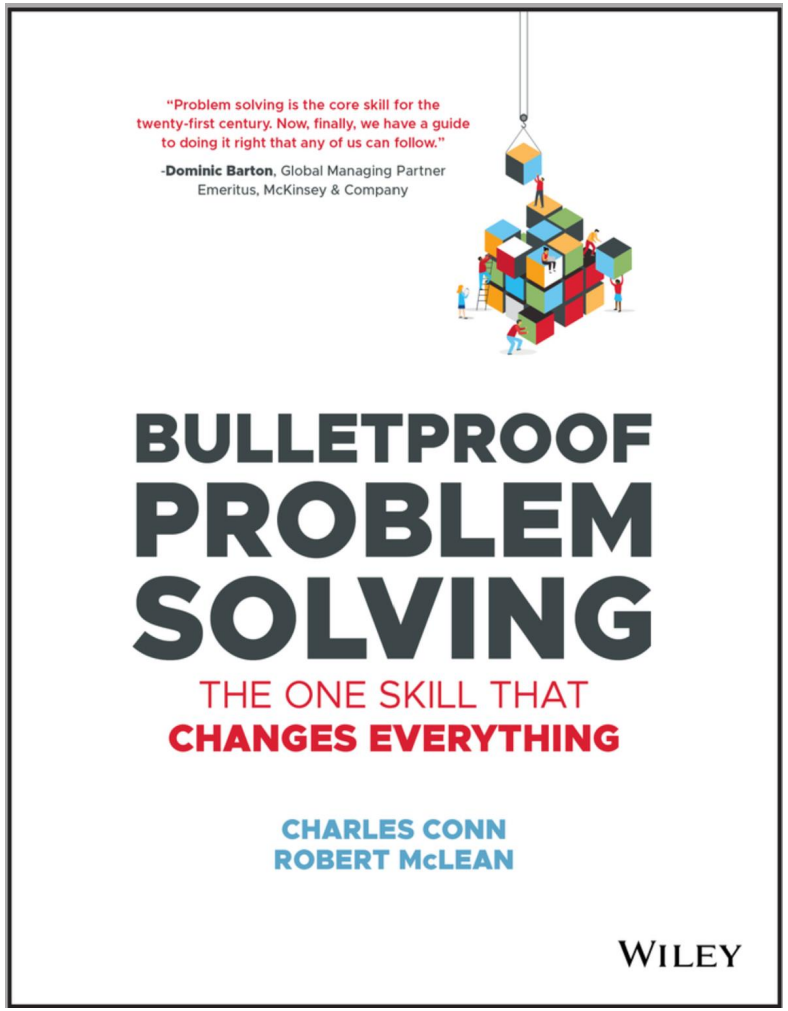
McKinsey&Company



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THANK YOU