Data Storytelling

Data-Driven StoryTelling

1 **Ask Questions to your Data !**
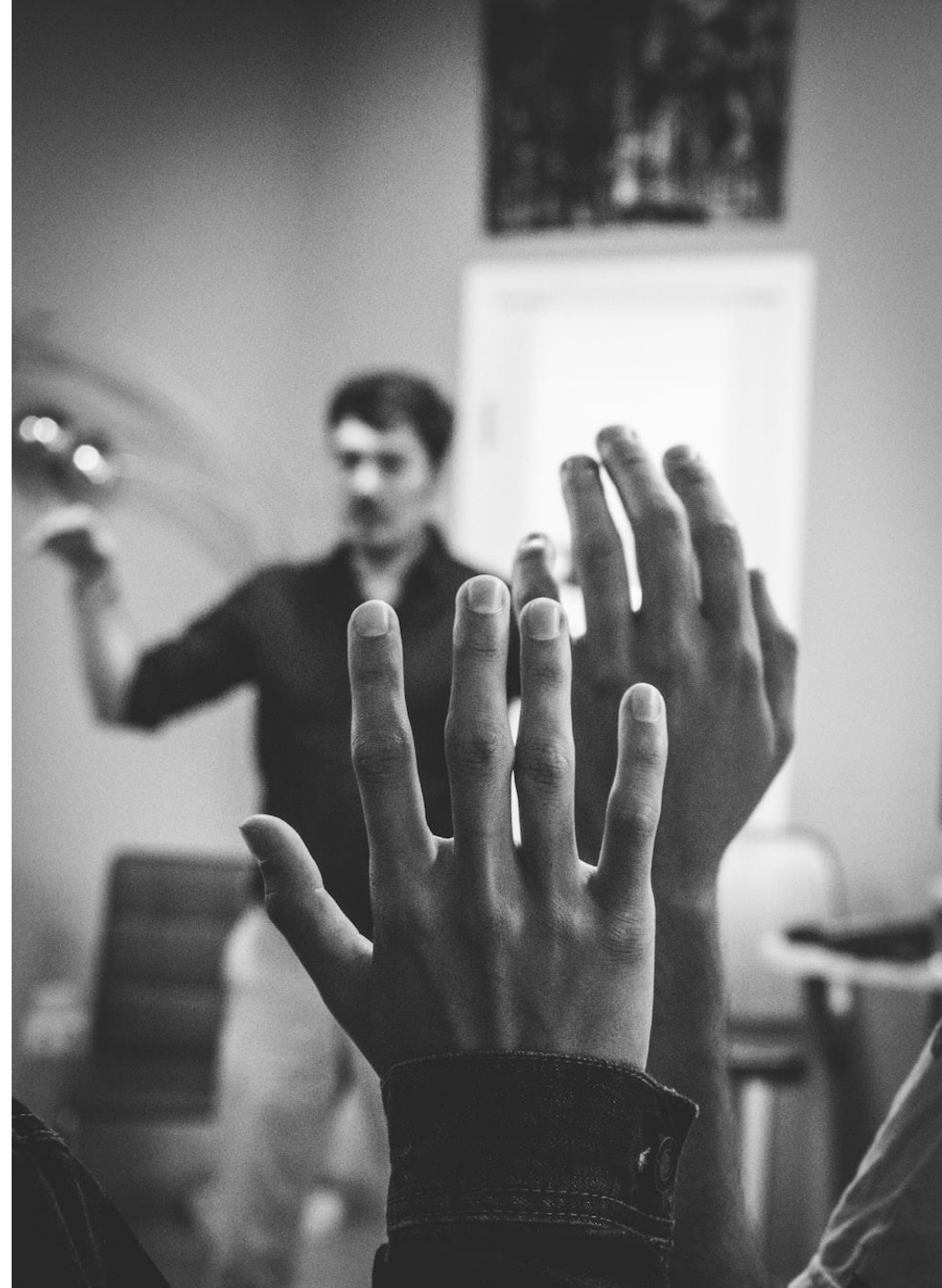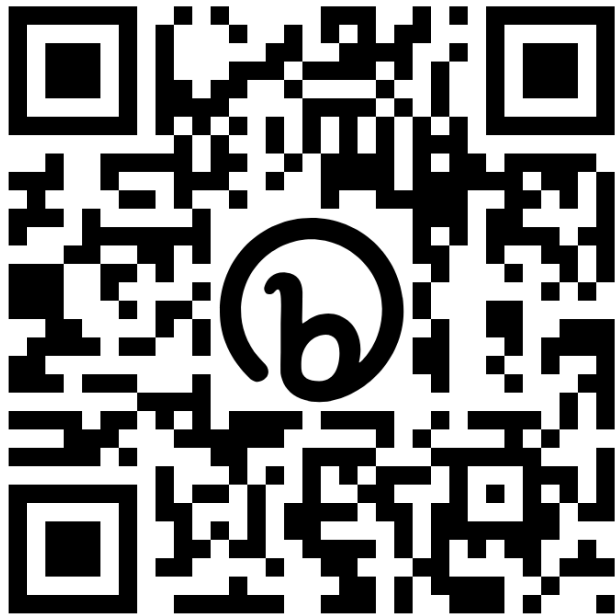
Putting the Framework into Action

Discovery	Insights	Actions	Outcomes
Define the problem • What is the key opportunity? • Engage stakeholders for perspective and concerns	**Explore Data** • Explore data sets to understand how they would help in accepting or refuting the hypotheses	**Link Insights** • Use actionable data insights to explain past outcomes and predict the future landscape • Link insights to financial and operational metrics to specify impact and aid decision making	**Execute Plan** • Develop clear pathways of how insights will be delivered to the right stakeholders at the right time • Ensure the plans meet long term business objectives and help refine solutions in the future
Develop Hypotheses • Answer 'what is likely to happen'? • Use information from stakeholders and other knowledge to refine hypotheses • Choose the hypothesis for which the best data exists	**Analyze Data** • Use Qualitative and Quantitative analysis techniques to use data to validate the hypotheses • Convert outputs into user-friendly formats and visualizations that will help different stakeholders understand the analysis	**Provide Recommendations** • Prioritize insights to build actionable plans • Provide solutions that help business to address future challenges	
Collect Data • Collect relevant internal and external data sets • Validate the accuracy of the data			

Data Driven Decision Making - Simulation Exercise

https://bit.ly/dstuob

2 **Understand your Numbers !**

Statistics

Descriptive Statistics

Understand what your sample data looks like

Probability Distributions

If the sample data fits a probability distribution, use it as a **model** for the entire population

Confidence Intervals

If the sample doesn't fit a distribution, use the central limit theorem to make **estimates** about population parameters

Hypothesis Tests

Continue to leverage the central limit theorem to draw **conclusions** about what a population looks like based on a sample

Regression Analysis

Use additional variables to increase the accuracy of your estimates and make **predictions** based on their relationships
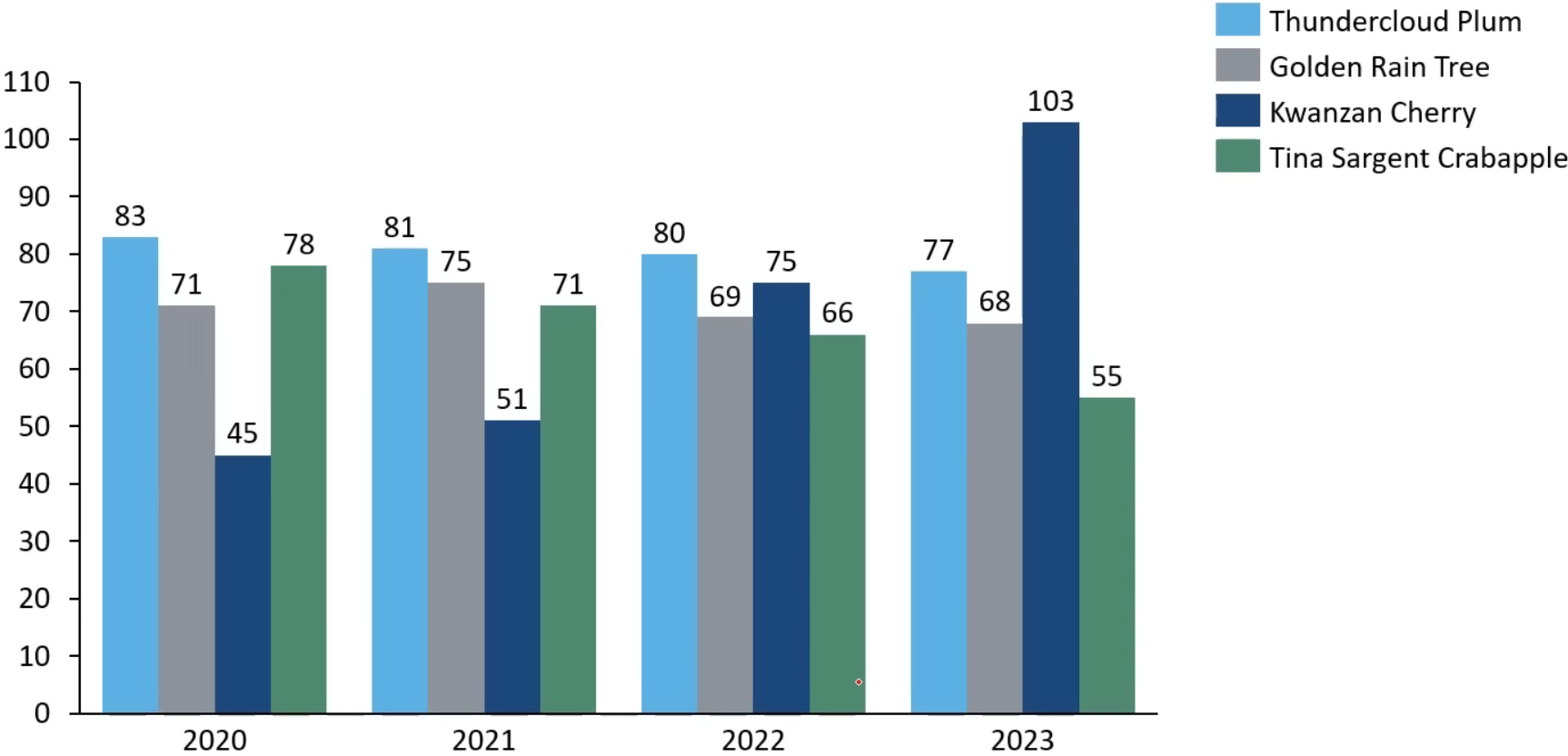
3 **Visualize** your Data!
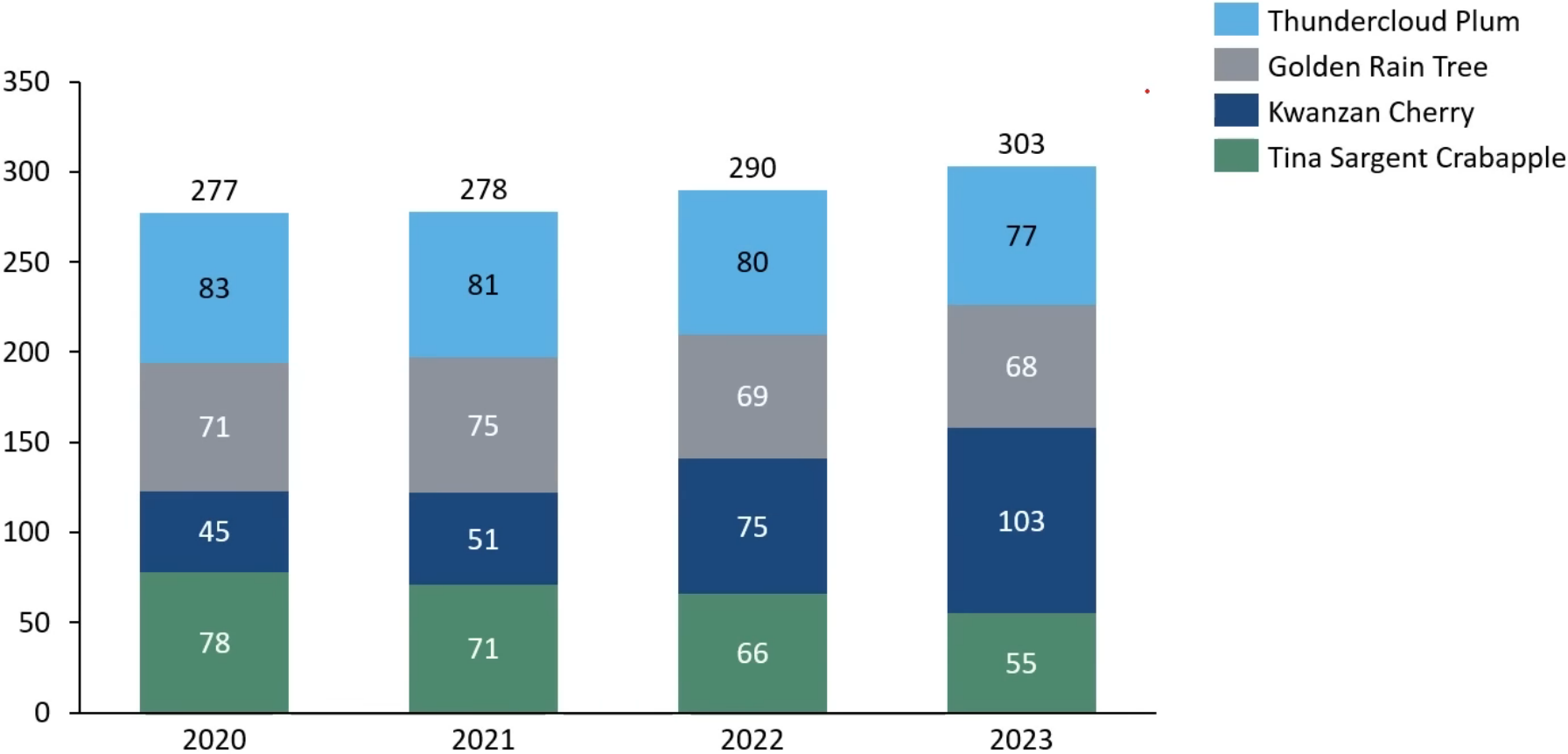
Charts Selection
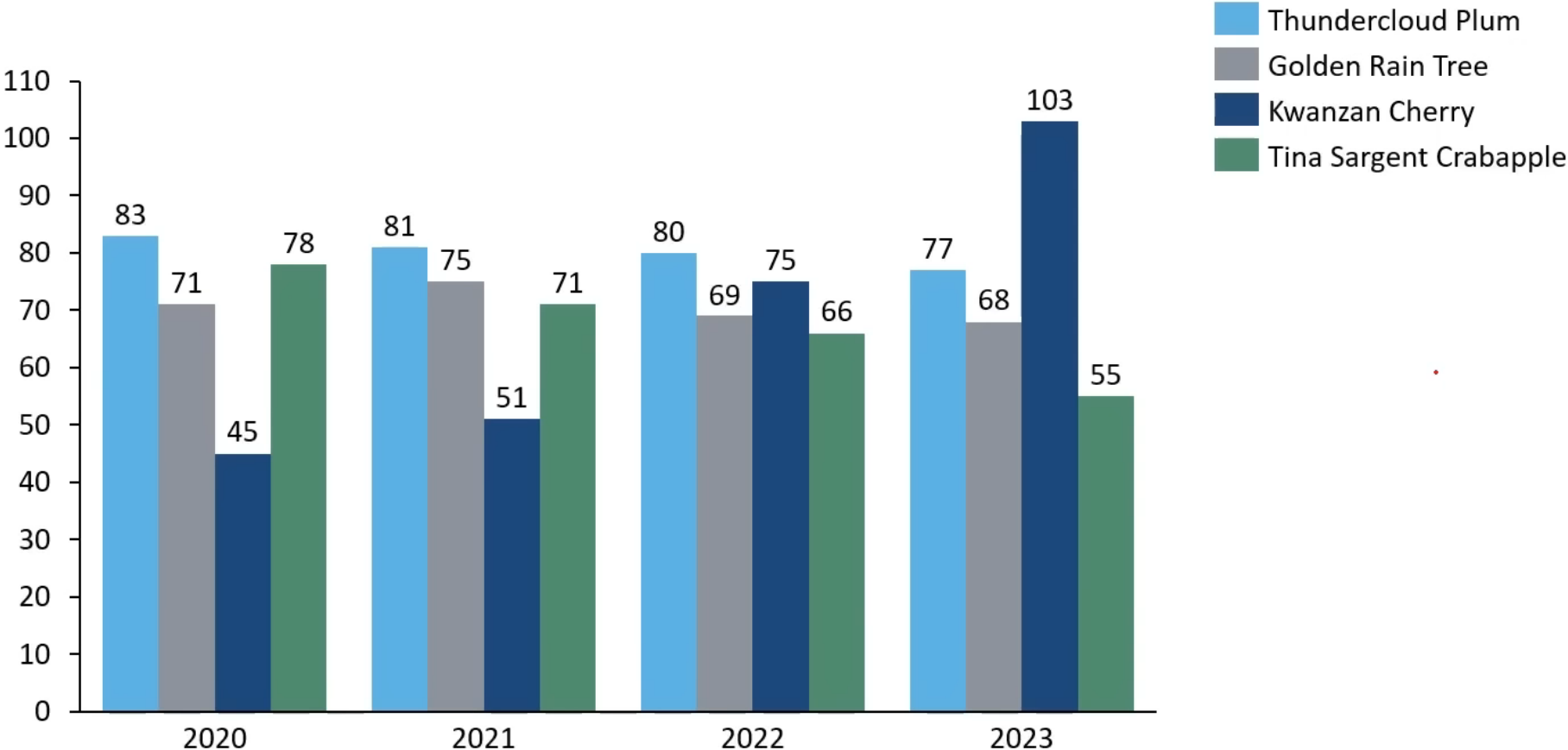
Charts Selection

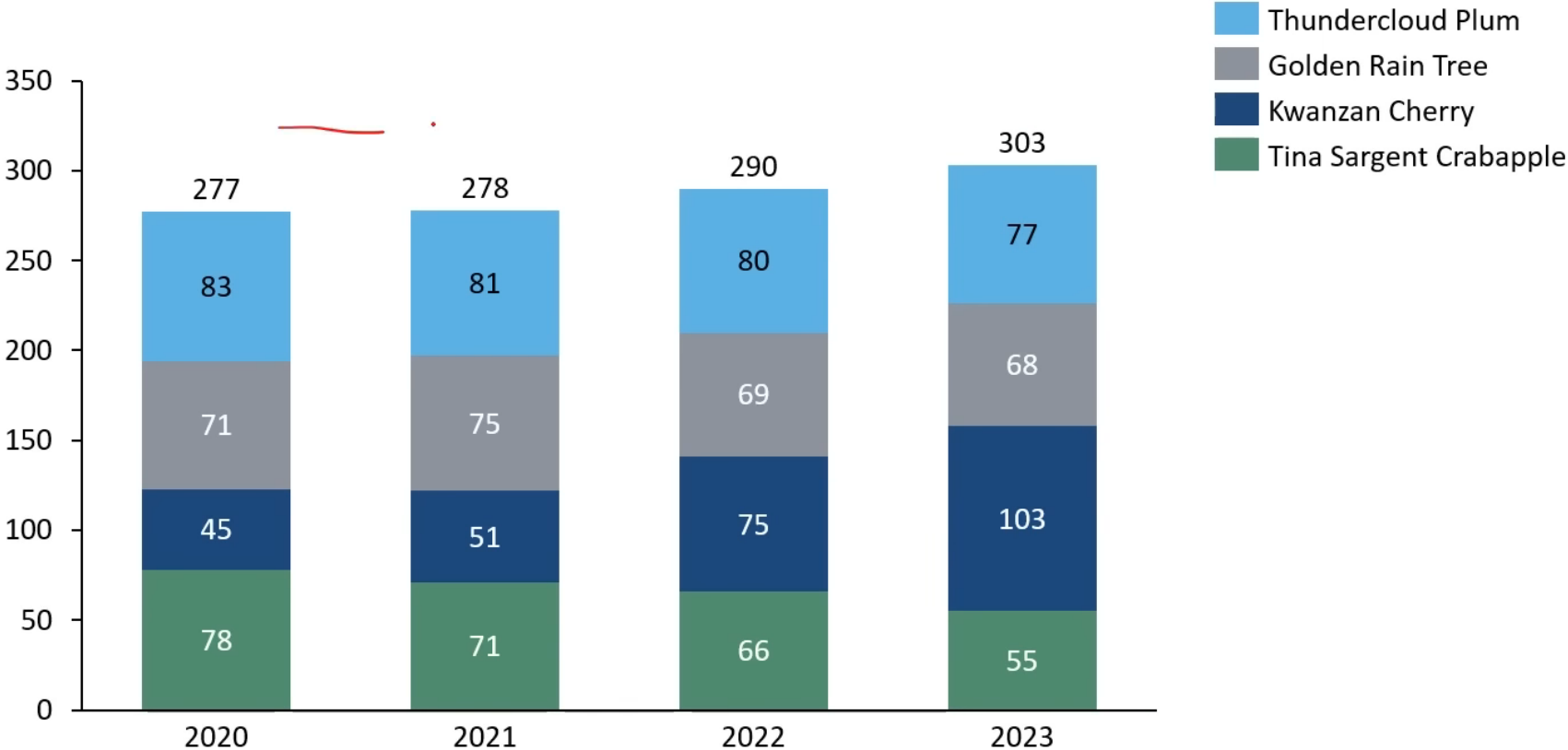Kwanzan Cherry became the best-selling species in 2023
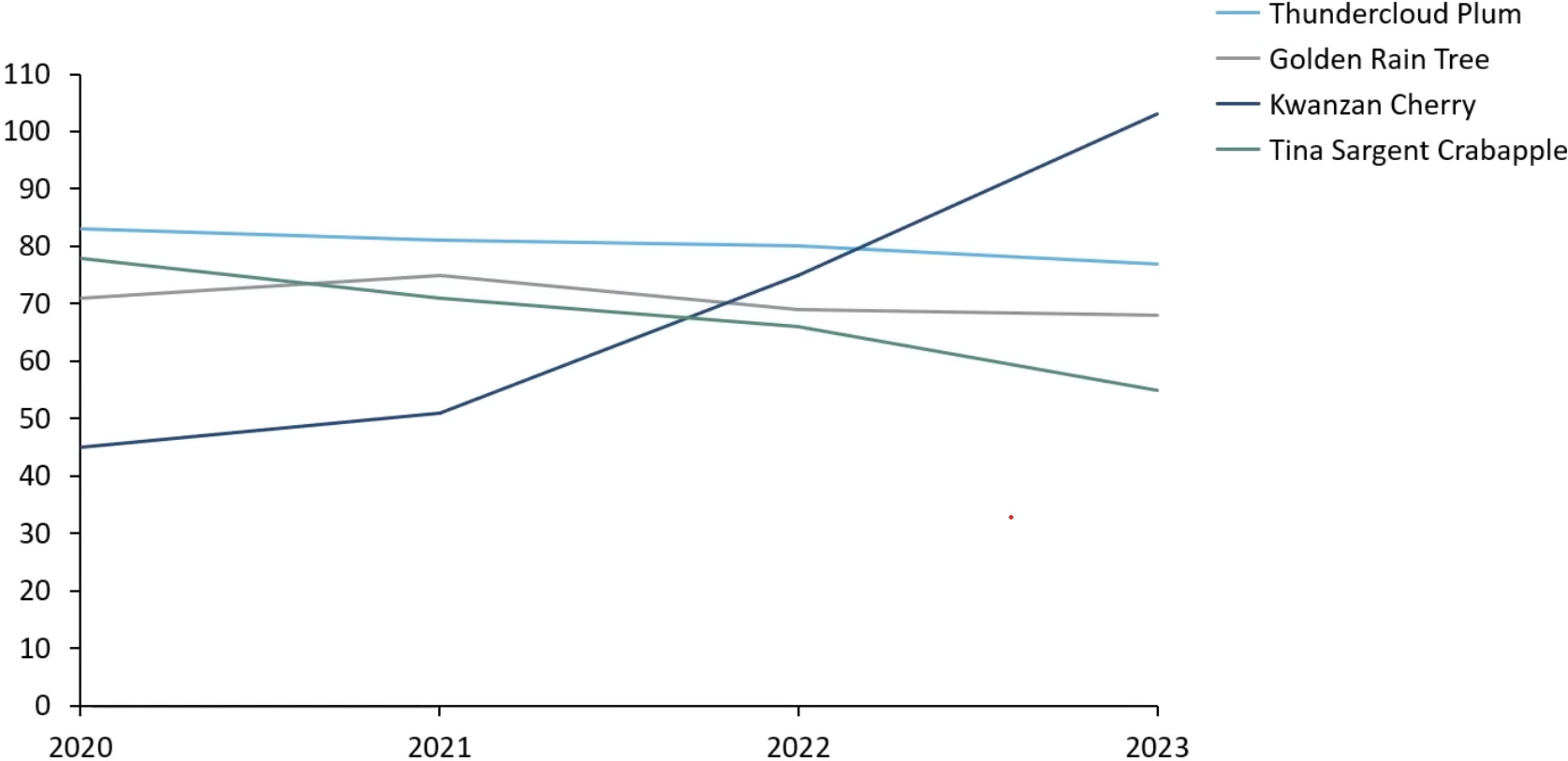
Charts Selection

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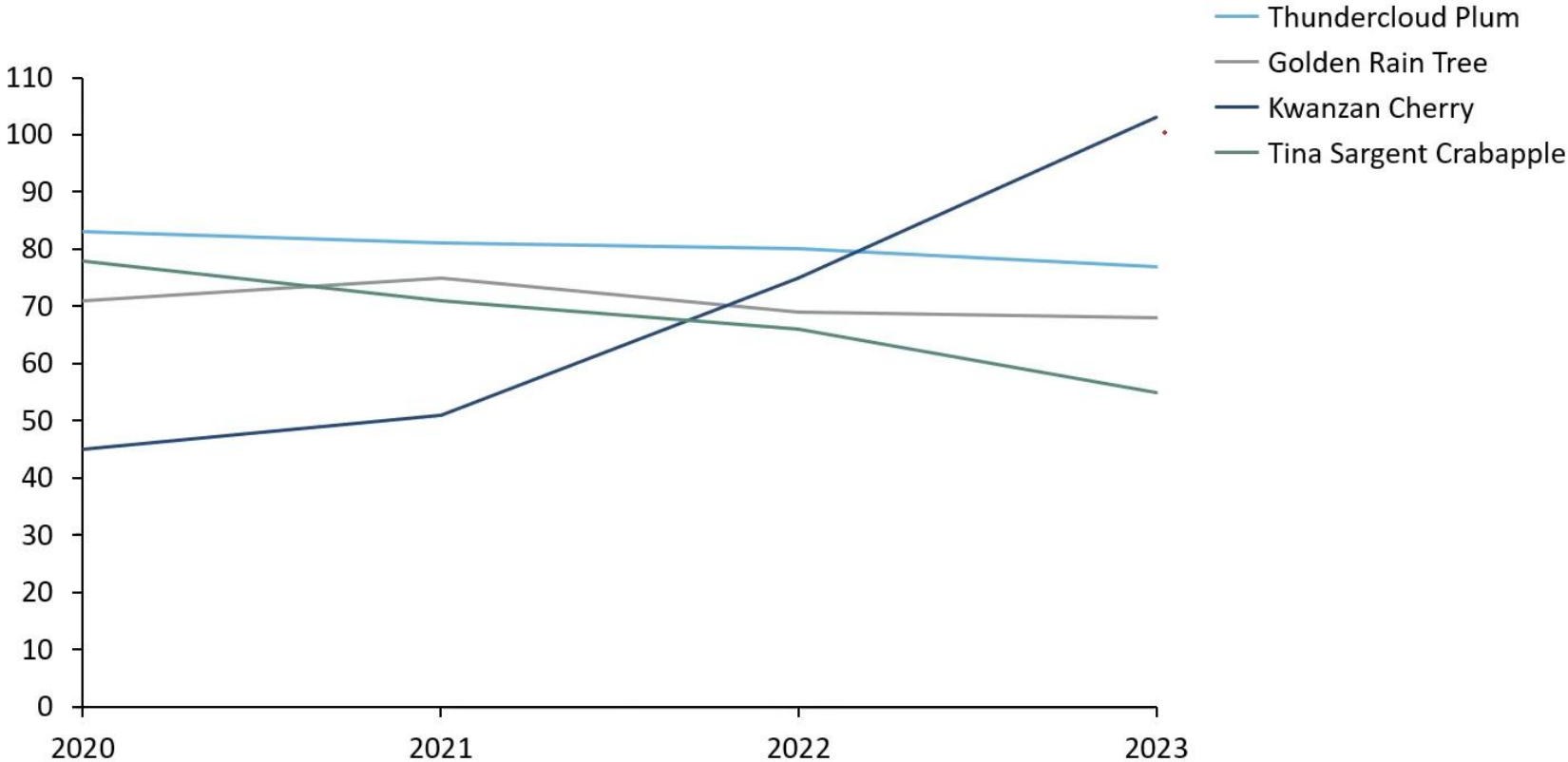Overall tree sales have risen steadily since 2020, driven by Kwanzan Cherry growth
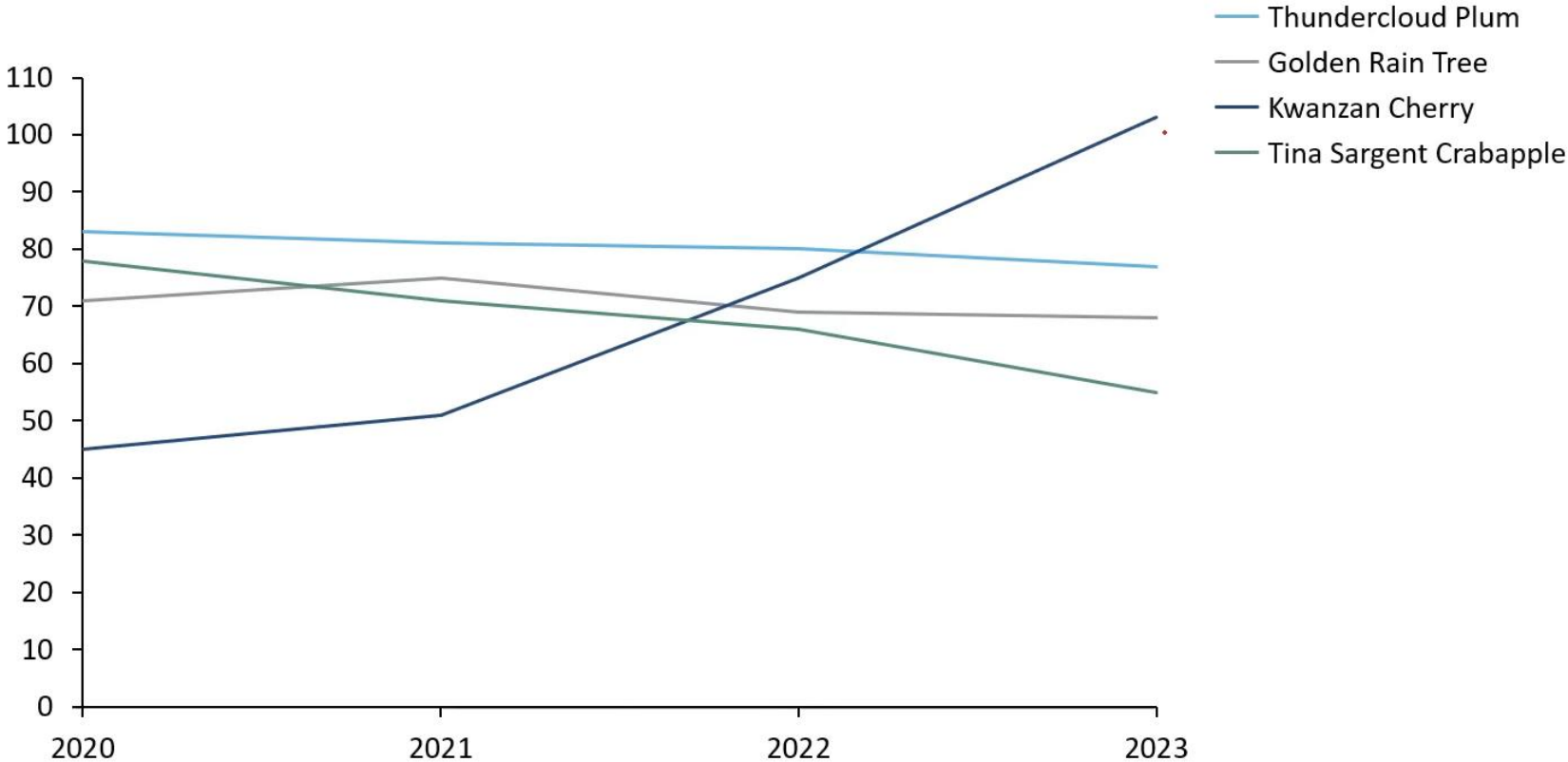
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Amidst lackluster sales for most tree species, sales of Kwanzan Cherry have grown steadily since 2020

Charts Selection

Amidst lackluster sales for most tree species, sales of Kwanzan Cherry have grown steadily since 2020

Legend:
- Thundercloud Plum
- Golden Rain Tree
- Kwanzan Cherry
- Tina Sargent Crabapple

Charts Selection
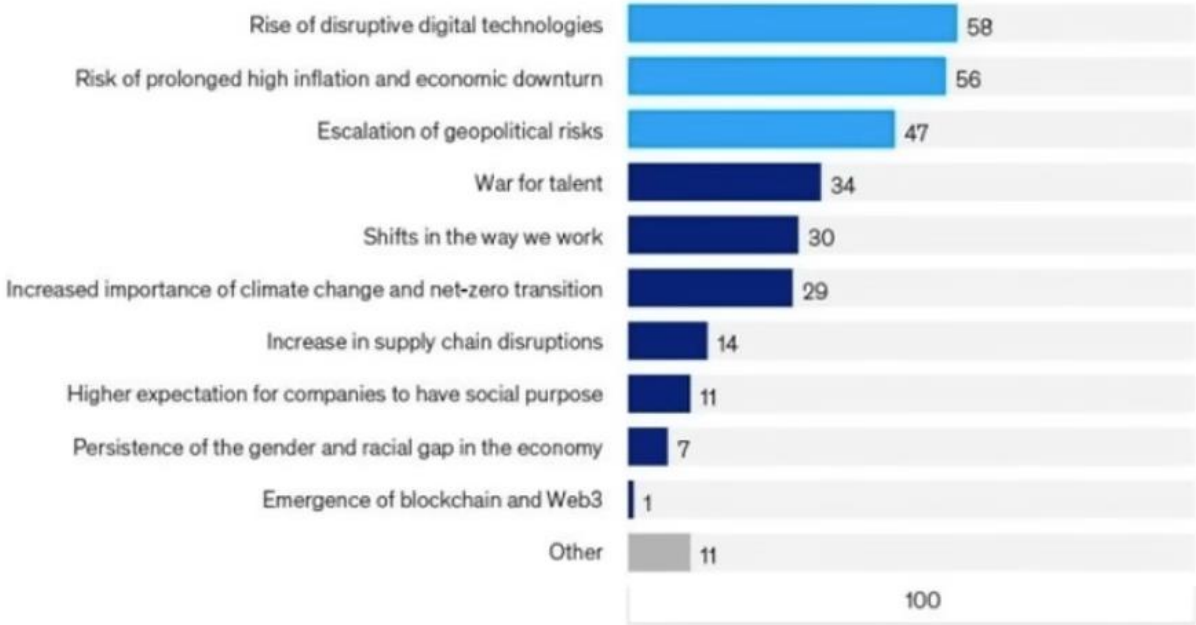

Bar Chart

Charts Selection

Top CEOs identify disruptive technology, the economy, and geopolitics as the most important trends to act on in 2023.

Trends that have the biggest impact on how CEOs are leading their organizations in 2023,[1]
% of respondents (n = 73)

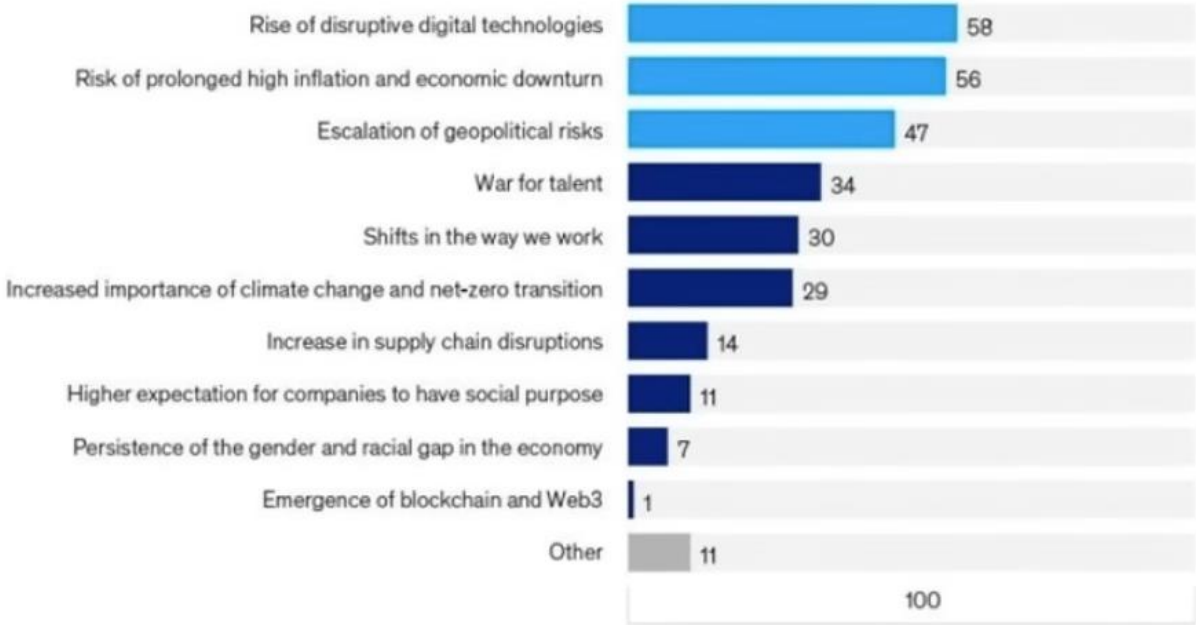| Trend	Value
Rise of disruptive digital technologies	58
Risk of prolonged high inflation and economic downturn	56
Escalation of geopolitical risks	47
War for talent	34
Shifts in the way we work	30
Increased importance of climate change and net-zero transition	29
Increase in supply chain disruptions	14
Higher expectation for companies to have social purpose	11
Persistence of the gender and racial gap in the economy	7
Emergence of blockchain and Web3	1
Other	11
	100

[1]Question: From your perspective as a current or former CEO, which of the following trends will have the biggest impact on how you lead/would lead your organization in 2023 and beyond, compared with past years? Respondents selected their three most important trends.
Source: McKinsey CEO Excellence Survey

McKinsey & Company

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HR Analysis: Employee Retention

Employee Turnover Analysis

Problem Statement: Management wants to understand how to reduce employee turnover.

Goal: HR wants to create an employee retention program.

Task: Analysis, hypothesis and data story on reasons for churn.

Data: ~15,000 employee records.

Questions from Management:

- What is the main cause of turnover?

- Is there something surprising in the data?

- What segment should we focus on?

- Which department has the highest turnover?

- Do we need to increase X or decrease X?

- Where should we put our pilot program

Insight Development

How to develop insights?(W.H.W)

1. **What's the goals of the business?**

   Make money/reduce employee churn/limit recruitment cost

2. **What is the metric of success or failure?**

   Employee retention/churn

3. **What are the trends?(positive or negative)**

   Departments with high and low churn

4. **What influences our metrics and trends?**

   Other metrics' affect on churn

5. **How can we fix the trends?**

   Lowering/increasing X may lower or increase

Tools & Techniques

Tools: Excel and PowerPoint

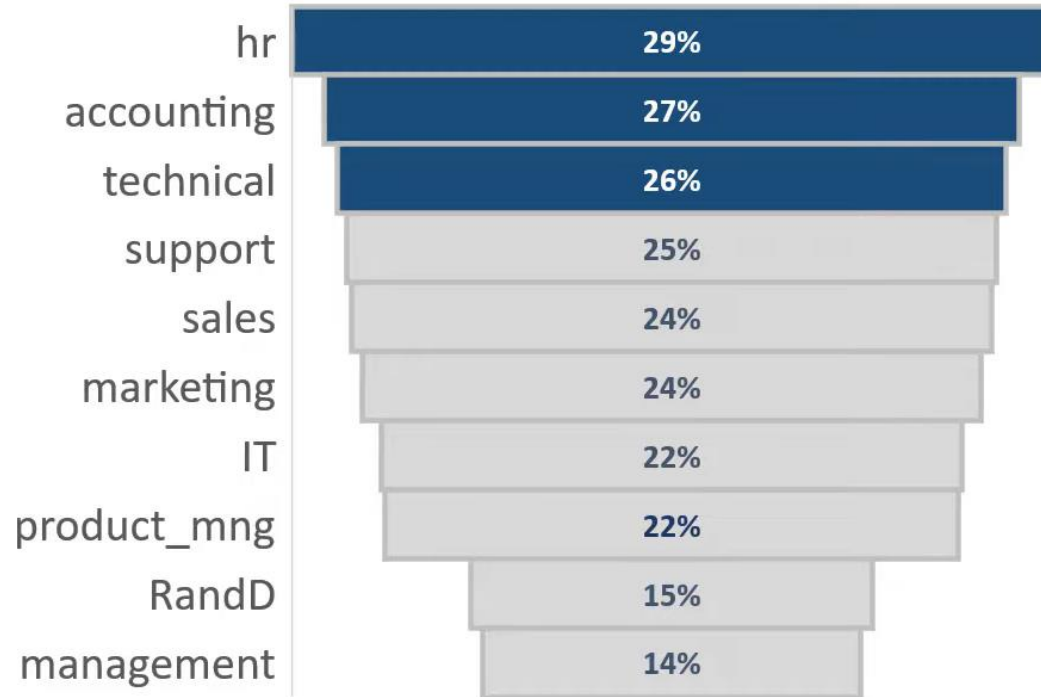**Techniques:** Pivot Table, Power Query, DAX

Statistics: Mean, Median, Sum, Count, Percentile

Visuals: Stacked Bar, Boxplot, Funnels, Pie Charts

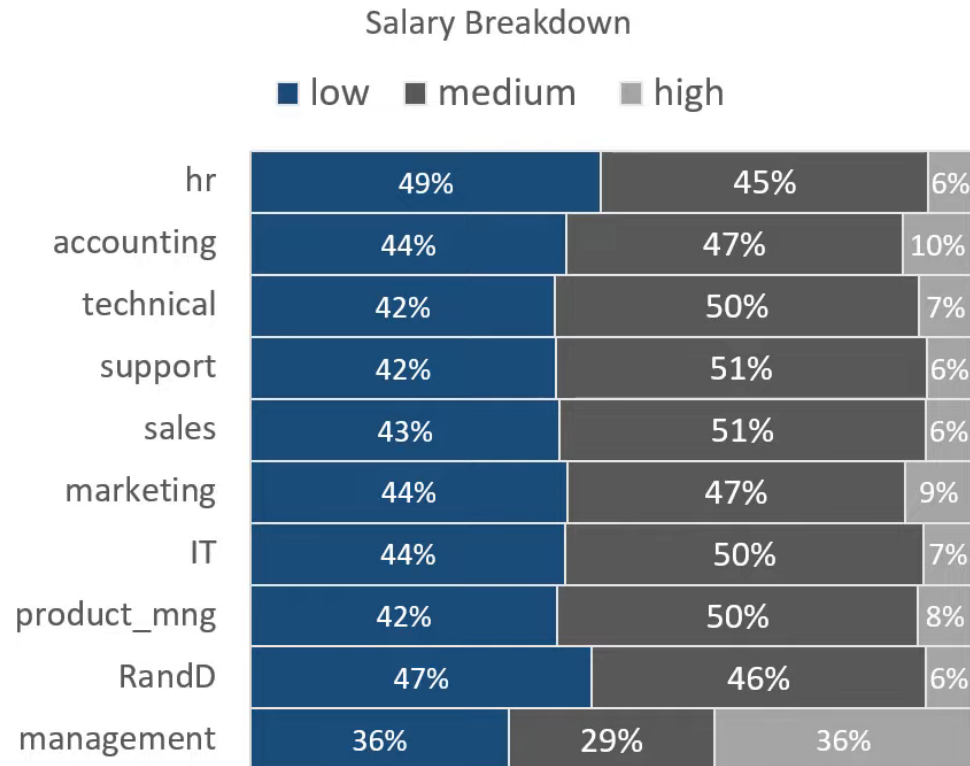# Where Do We Have the Most Churn?

24%

Company Turnover

Department	Turnover
hr	29%
accounting	27%
technical	26%
support	25%
sales	24%
marketing	24%
IT	22%
product_mng	22%
RandD	15%
management	14%

DEPARTMENT TURNOVER

These departments have the most churn. However, we need to ask what is the representation of these departments in the company and what is driving this churn?

Does Salary Affect Employee Retention?

High Churn & Low Salary
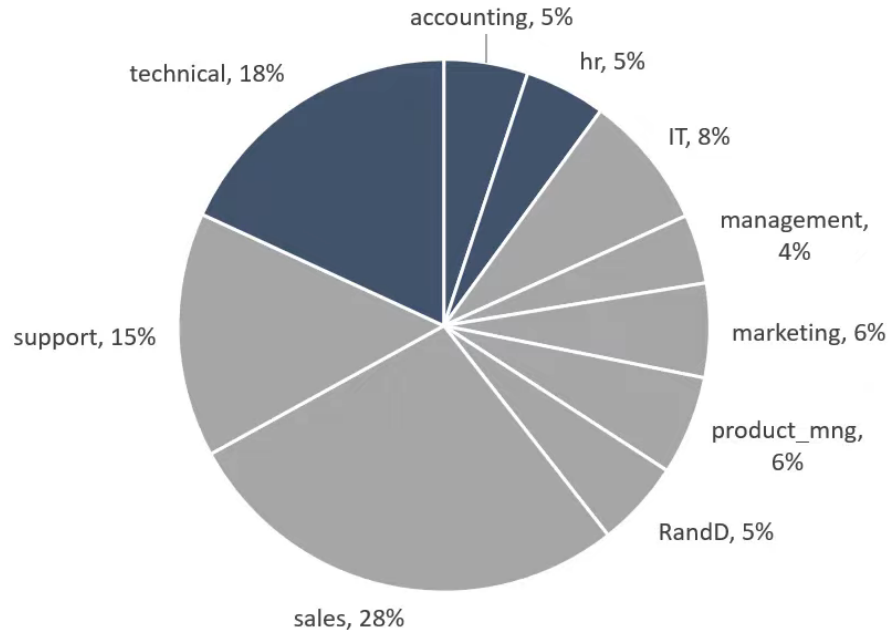The departments with the most churn also have the most employee in the low salary range.

Salary Breakdown

■ low ■ medium ■ high

Department	low	medium	high
hr	49%	45%	6%
accounting	44%	47%	10%
technical	42%	50%	7%
support	42%	51%	6%
sales	43%	51%	6%
marketing	44%	47%	9%
IT	44%	50%	7%
product_mng	42%	50%	8%
RandD	47%	46%	6%
management	36%	29%	36%

Salary
Although salary are lower for the top 3 departments with the lowest retention. Not all the categories have the lowest salaries. However, high medium and high salaries do show greater retention.

Is Working Long Hours Affected Churn ?

Who is working the longest hours ?

Percent of Employees Working more Than

Chart values by department:
- management: 7%
- RandD: 8%
- marketing: 8%
- support: 9%
- product_mng: 9%
- hr: 9%
- IT: 10%
- accounting: 10%
- sales: 10%
- technical: 11%
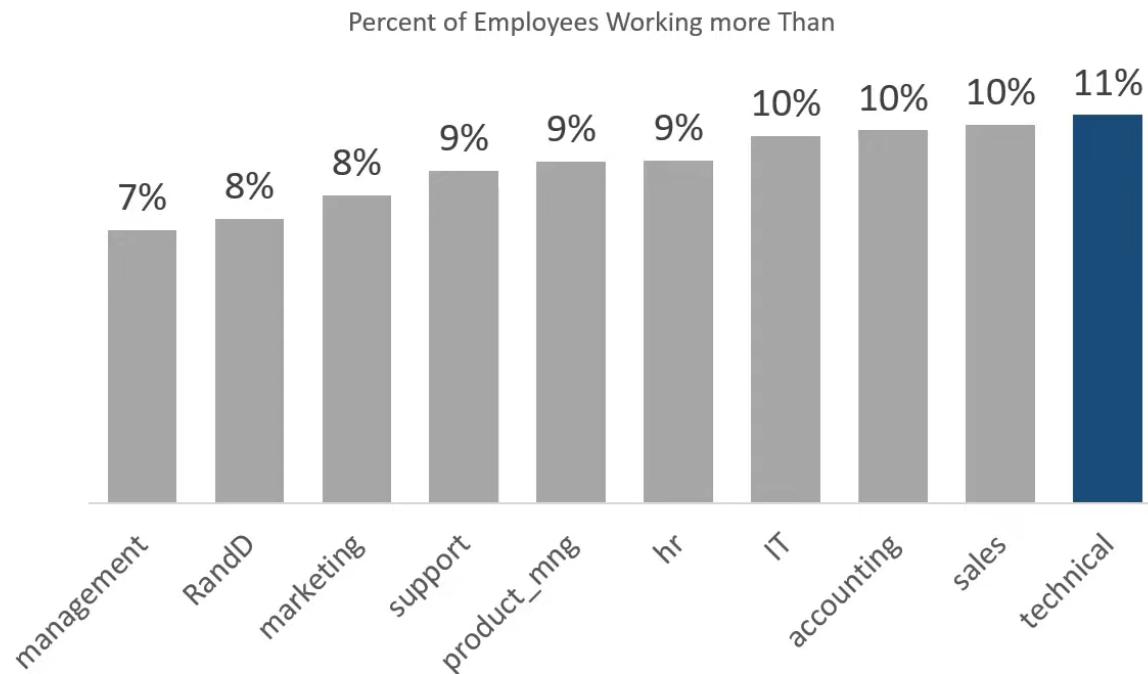
Top 3 Departments by Churn and Long Hours

When evaluating the long hours outliers which would be at the 90th percentile. It's easy to determine that the technical department has the highest amount of employee in this segment.

Summary & Recommendations

Summary:

The **overall churn of the companies sits at 24%.** This indicates that there may be an issue since the **industry average is between 12 and 15%.**

We have identified 3 candidates for a pilot program who have the highest churn. Out three segments, the **technical has the greatest number of employees at 18% at churn of 26% while HR(29% churn) and accounting(26 % churn) make up 5% of employee each, respectively**.
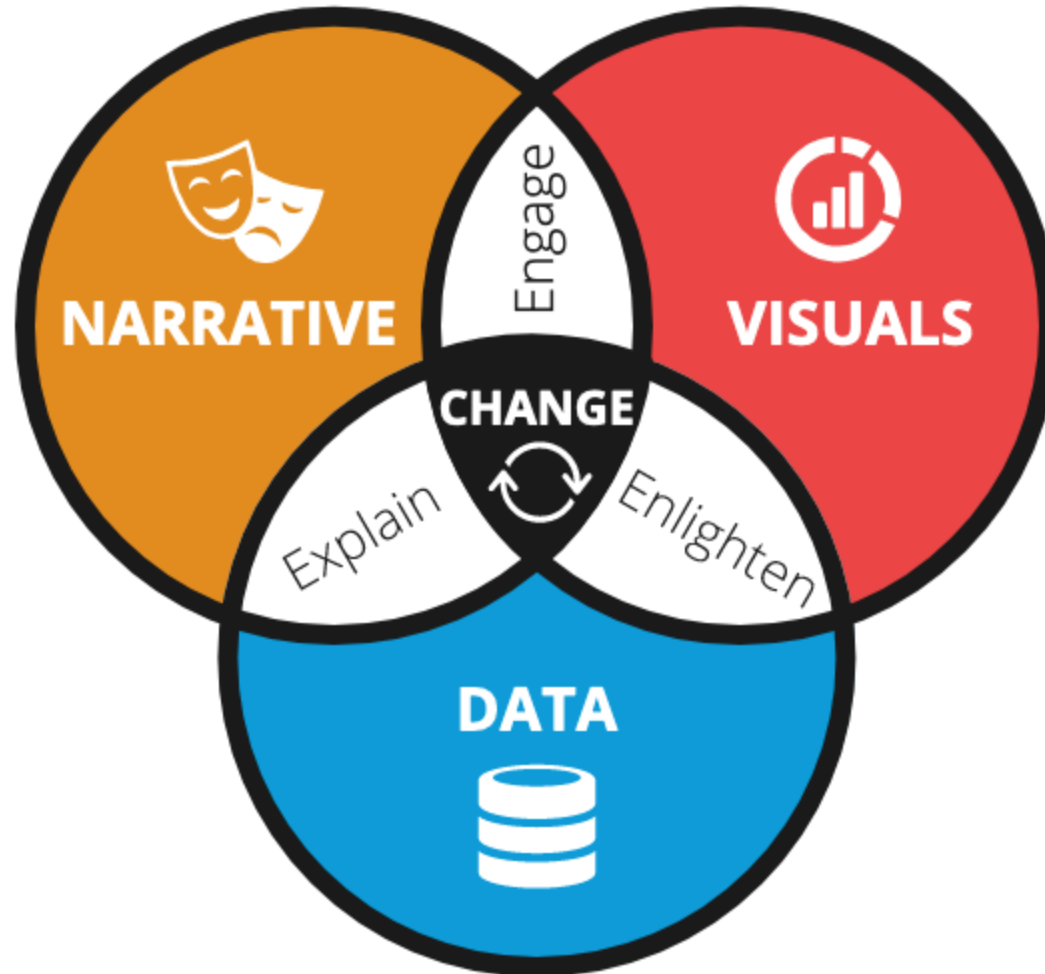
Salary and work hours may factor into the department churn with these segments having the majority of employees in the low and mid salary ranges. **Technical employees have 11% of employee working more than 267 hours month or more per month. This would be the best candidate for the pilot program.**
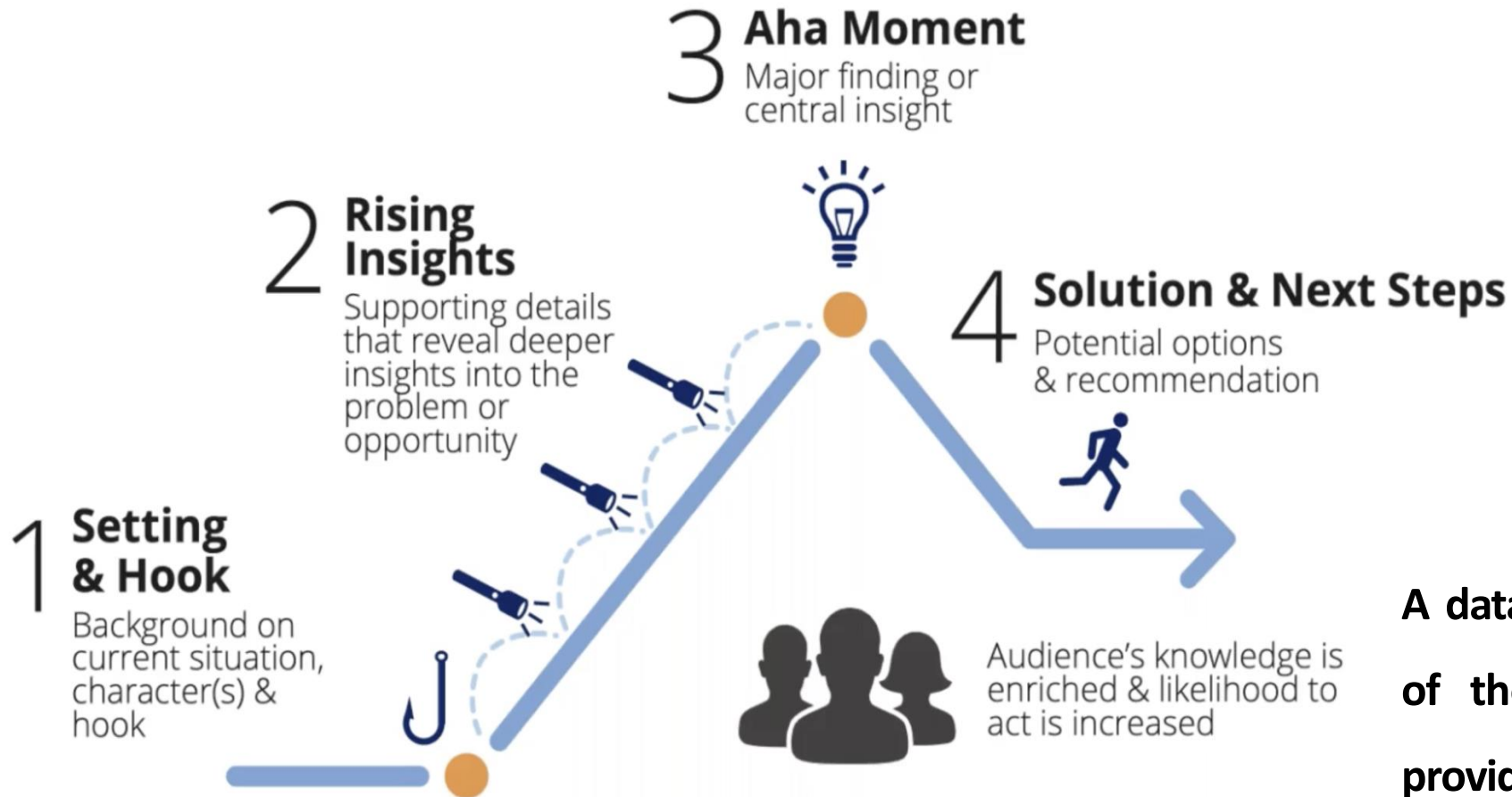
4 Data **Storytelling**
Connect Dots!

# Telling Effective Data Stories with Narrative, Data, and Visuals

Narrative Structure

3 Aha Moment
Major finding or central insight

2 Rising Insights
Supporting details that reveal deeper insights into the problem or opportunity

1 Setting & Hook
Background on current situation, character(s) & hook

4 Solution & Next Steps
Potential options & recommendation

Audience's knowledge is enriched & likelihood to act is increased

A data story **begins** by setting the scene of the current situation, **proceeds** by providing insights that **lead** up to the central insight, and **ends** with relevant recommendations.

Identify Right Data for Your Data Story

Calculated metrics may be more insightful than total values.
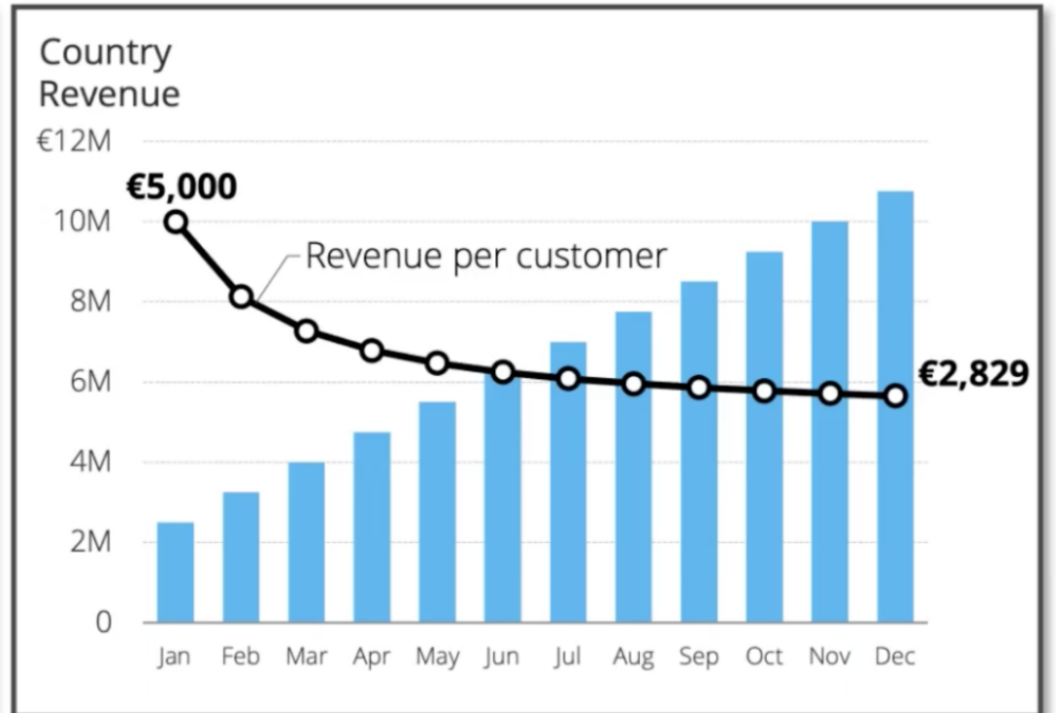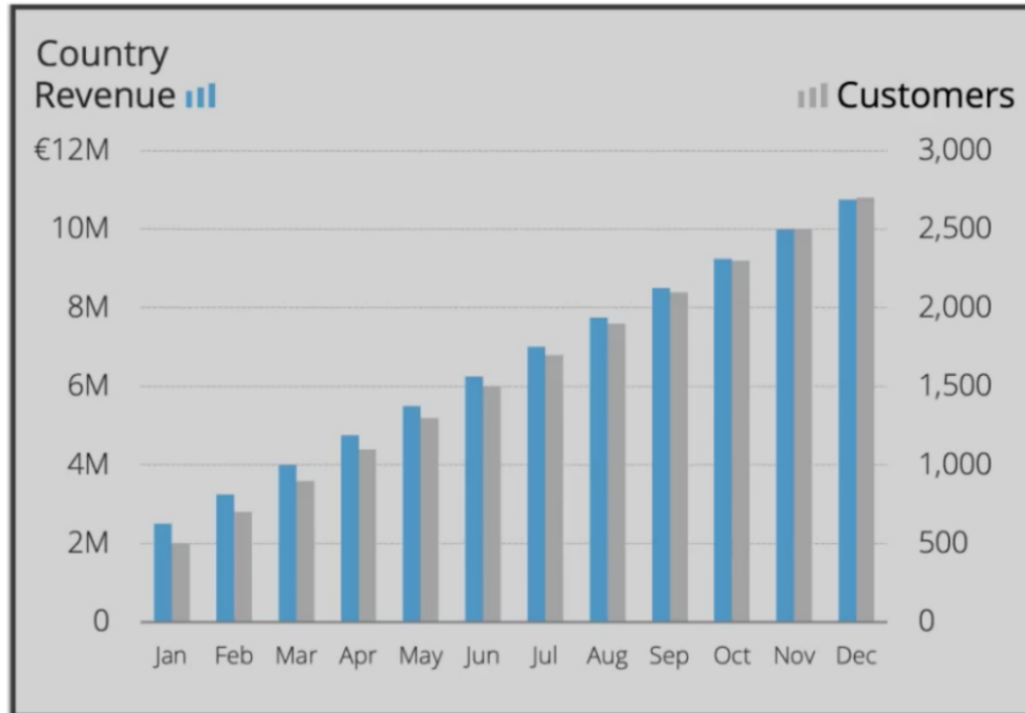
Explicitly demonstrating that the revenue per customer is falling (right) is a better choice than plotting the total revenue and customer side-by-side (left)
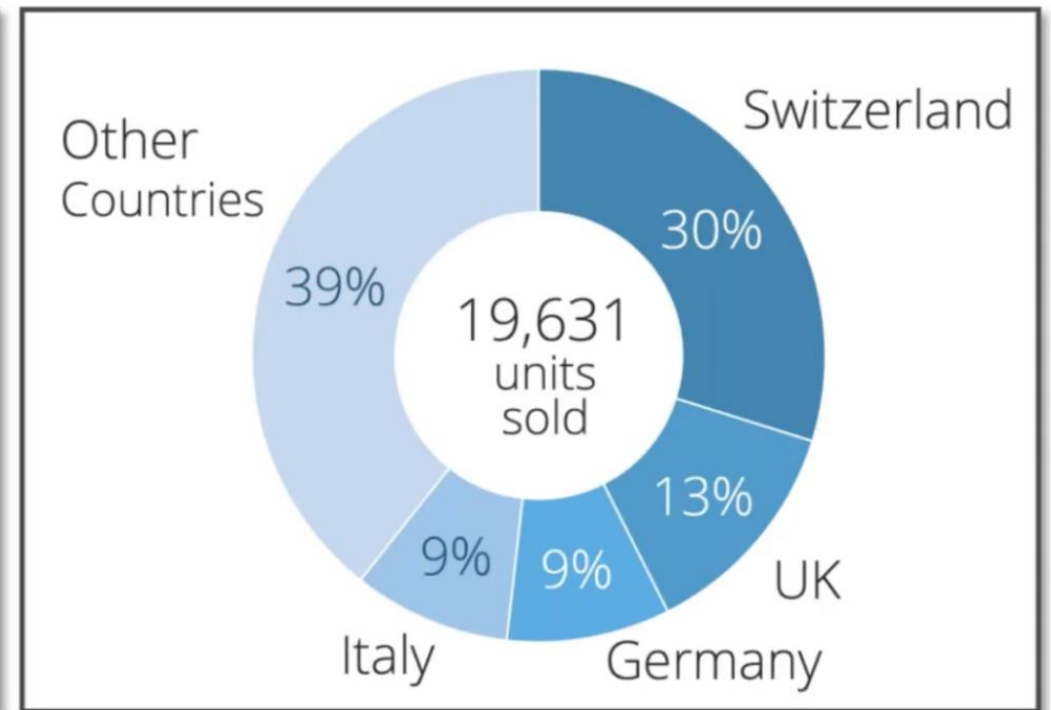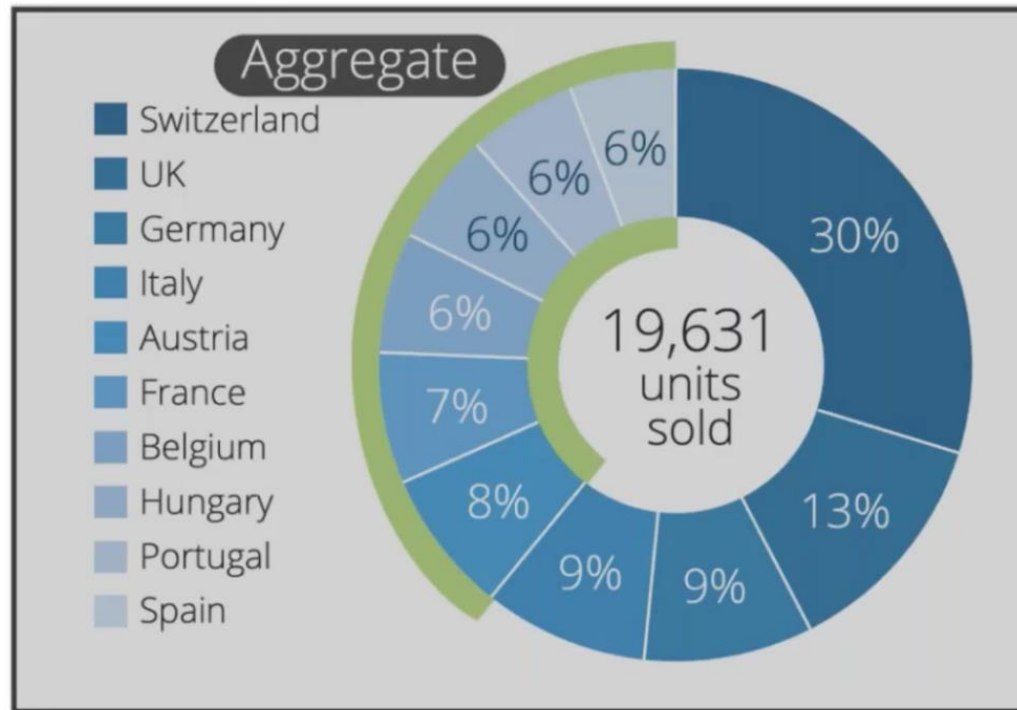
Aggregate Less Important Information

To simplify charts, you can **aggregate less critical data** to reduce the cognitive load.
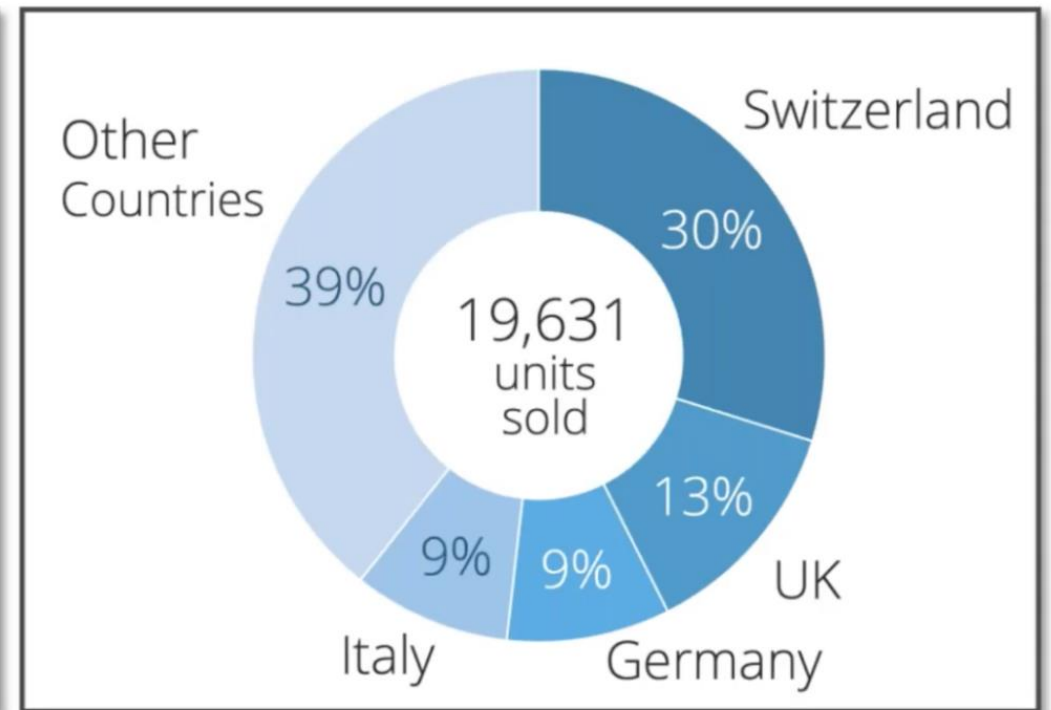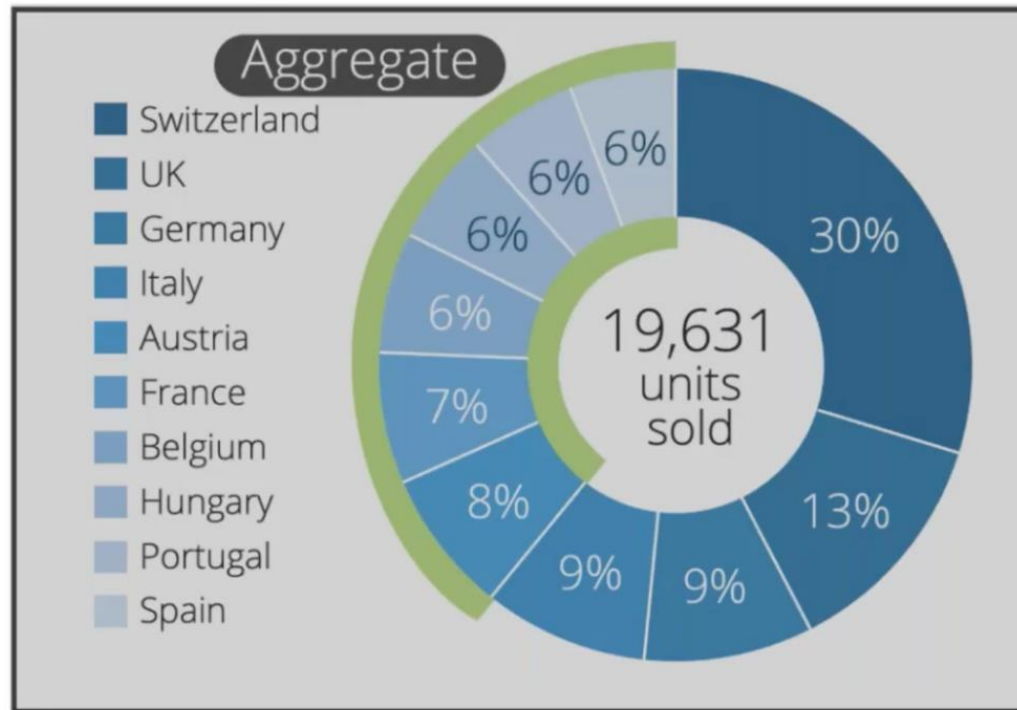
The market shares of the largest markets become apparent when the smallest markets are aggregated.

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StoryTelling
Framework

SCQA

Situation

Complication

Question

Answer

Situation

Complication

Question

Answer

Should we acquire this company?
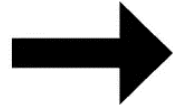
Situation How things are right now

⇩

Complication A change in the situation (why presentation is needed)

⇩

Question What gets raised by the complication

⇩

Answer Resolution to the question

Situation → Disney is looking to grow revenue with a new park

Complication → They need to decide where to open the new park

Question → Where should Disney open its next theme park?

Answer → Disney should open its next park in _____

Context of the work

Since the William and Flora Hewlett Foundation began investing in open education resources in 2002, the field has grown significantly: the past decade has seen an influx of OER and increased awareness and adoption

However, more work remains to push the OER movement from the sidelines of mainstream education into the center of the classroom

The Foundation engaged the Boston Consulting Group in late 2012 to evaluate the state of the current ecosystem in the United States and to help understand how to measure the movement's progress towards a sustainable, mainstream end-state

This document contains a summary of BCG's findings, which were based on primary and secondary research, including dozens of interviews of experts and participants in the OER movement and a survey of ~375 K – 12 teachers and educators
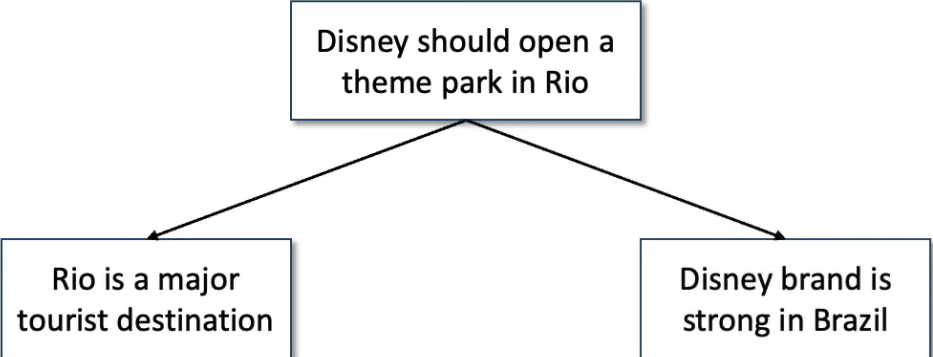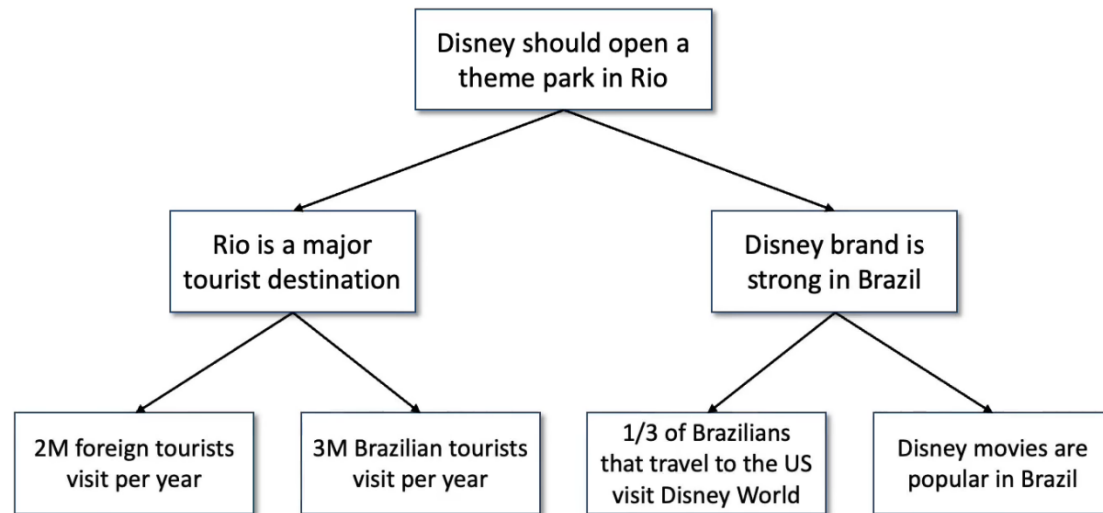
Pyramid
Principal
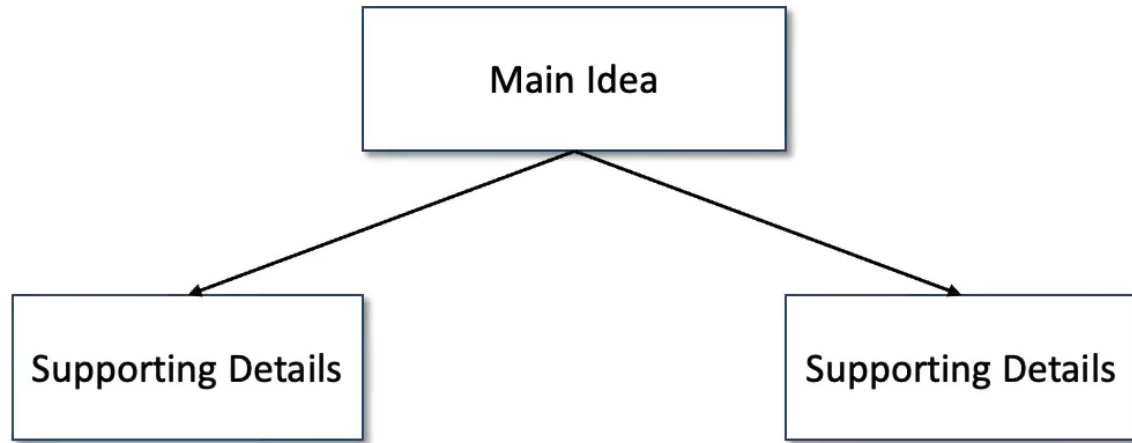
Where should Disney build a new theme park?

```
            ┌──────────────────────┐
            │  Disney should open a │
            │   theme park in Rio   │
            └──────────────────────┘
              ╱                  ╲
             ╱                    ╲
┌──────────────────┐      ┌──────────────────┐
│   Rio is a major  │      │  Disney brand is  │
│ tourist destination│      │  strong in Brazil │
└──────────────────┘      └──────────────────┘
```
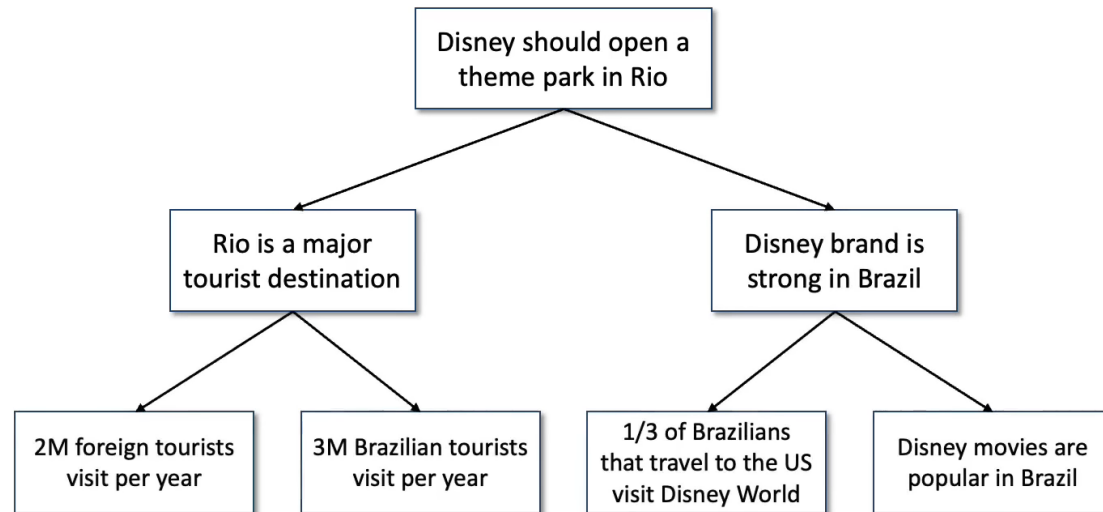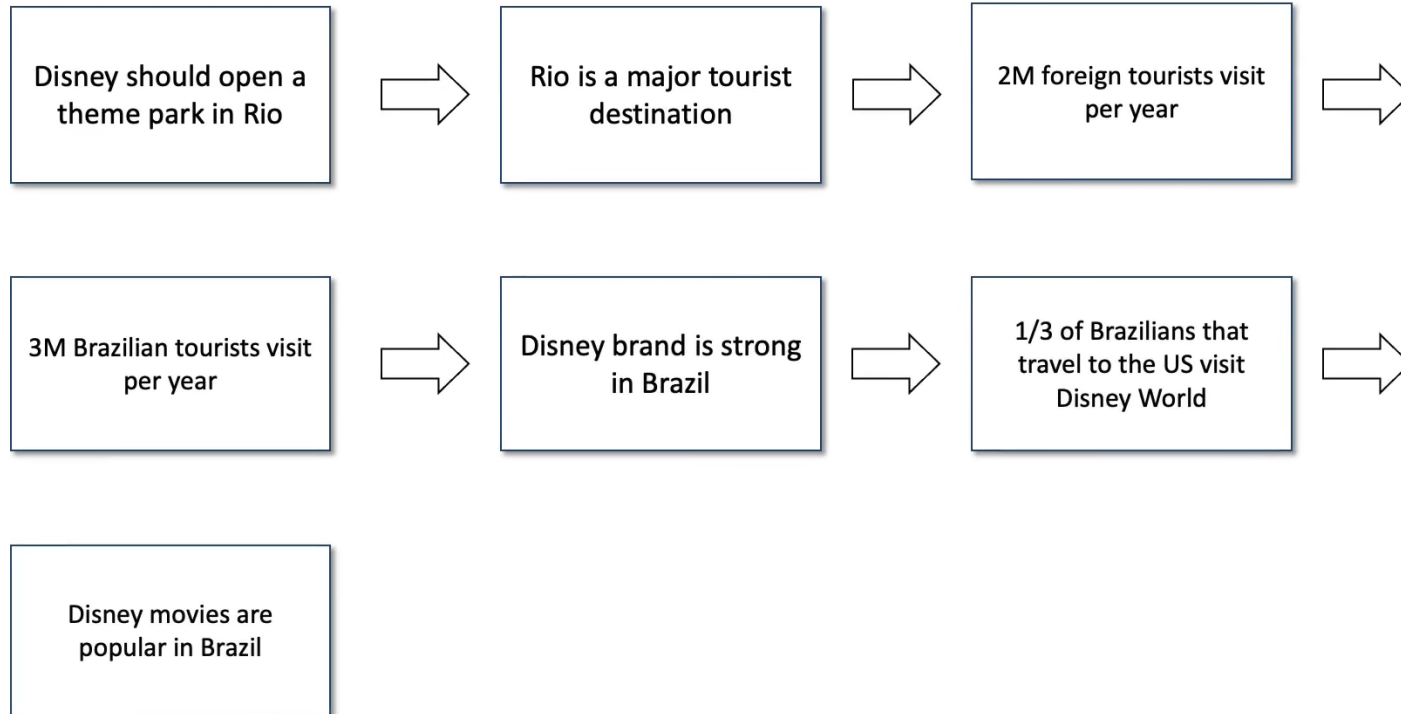
Where should Disney build a new theme park?

Where should Disney build a new theme park?

Where should Disney build a new theme park?

| Disney should open a theme park in Rio | → | Rio is a major tourist destination | → | 2M foreign tourists visit per year | → |

| 3M Brazilian tourists visit per year | → | Disney brand is strong in Brazil | → | 1/3 of Brazilians that travel to the US visit Disney World | → |

| Disney movies are popular in Brazil |

Where should Disney build a new theme park?

Situation: Disney is looking to grow revenue with a new park

Complication: They need to decide where to open the new park

Question: Where should Disney open its next theme park?

→

Disney should open a theme park in Rio

→

Rio is a major tourist destination

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2M foreign tourists visit per year

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3M Brazilian tourists visit per year

→

Disney brand is strong in Brazil

→

1/3 of Brazilians that travel to the US visit Disney World

→

Disney movies are popular in Brazil

Situation:

You want to build a presentation that's easy to understand

Complication:

It can be difficult to make data-heavy presentations clear

Question:

How can you make your presentation easy to understand?

Answer:

Structure your presentation using the SCQA framework and Pyramid Principle

Structure Your Presentation
SCQA Framework
Pyramid Principle