Principle of
Data Visualization

How to choose the right chart type for your data presentation

What we will cover….

☞ W hy data visualization?

☞ Data visualization in data-driven story

☞ W hat is data visualization?

☞ Choosing the right chart type

☞ W hat you should keep in mind when visualizing data?

Why data visualization?

☞ Difficult or even impossible to read data table to extract important information.

☞ Human brain can easily digest visual stuffs.

☞ Summarize data where it provides meaningful information.

☞ Well, it's eye-catchy…

How data visualization is used in data driven storytelling

- Cambodia's Fish Catch Numbers Don't Add Up for Fishers

- Is foreign investment truly a force for good?

- Power Play: How Chinese money damned Myanmar's economic transition

- Money flow: Who's investing in Laos, and what problems do they present?

How data visualization is used in data driven storytelling

- Data visualization play role in showing insight along with context.
- When dealing with complex information that is unsuitable for narrative, visualization could solve the problem.
- Data visualization is often used in showing the major findings.

Data visualization play role in showing insight along with context.

**Families That Fish on the Decline**

Percentage of households in different fishery zones of Cambodia who responded that they engaged in fishing activities in the national socio-economic survey
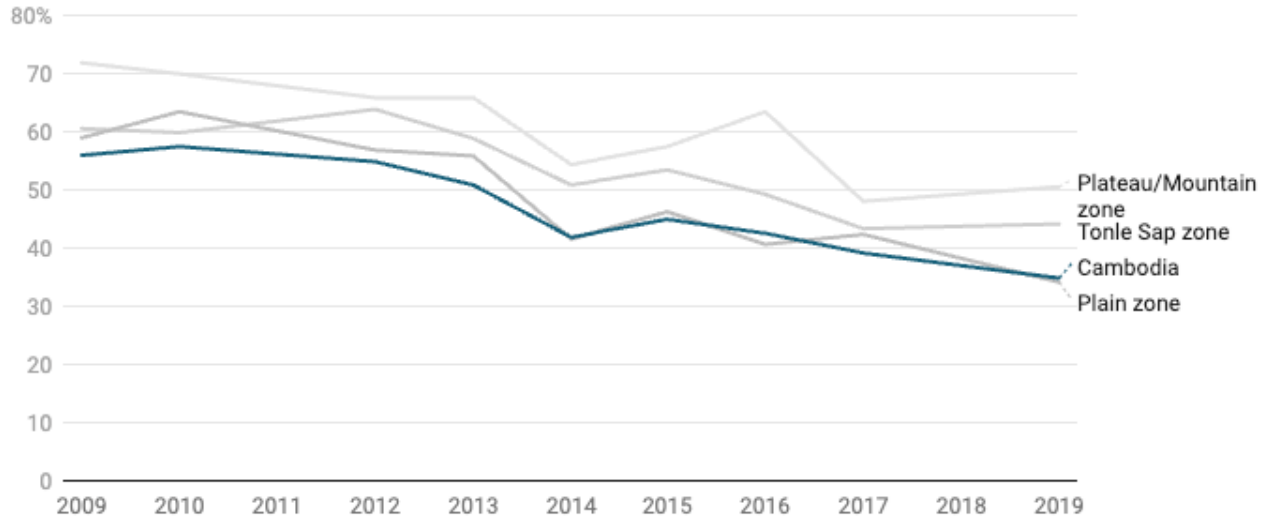
Source: Cambodia Socio-Economic Survey 2009, 2010, 2012, 2013, 2014, 2015, 2016, 2017, 2019-20 · Created with Datawrapper

When dealing with complex information that is unsuitable for narrative, visualization could solve the problem

Where is Cambodia's investment going and coming from?
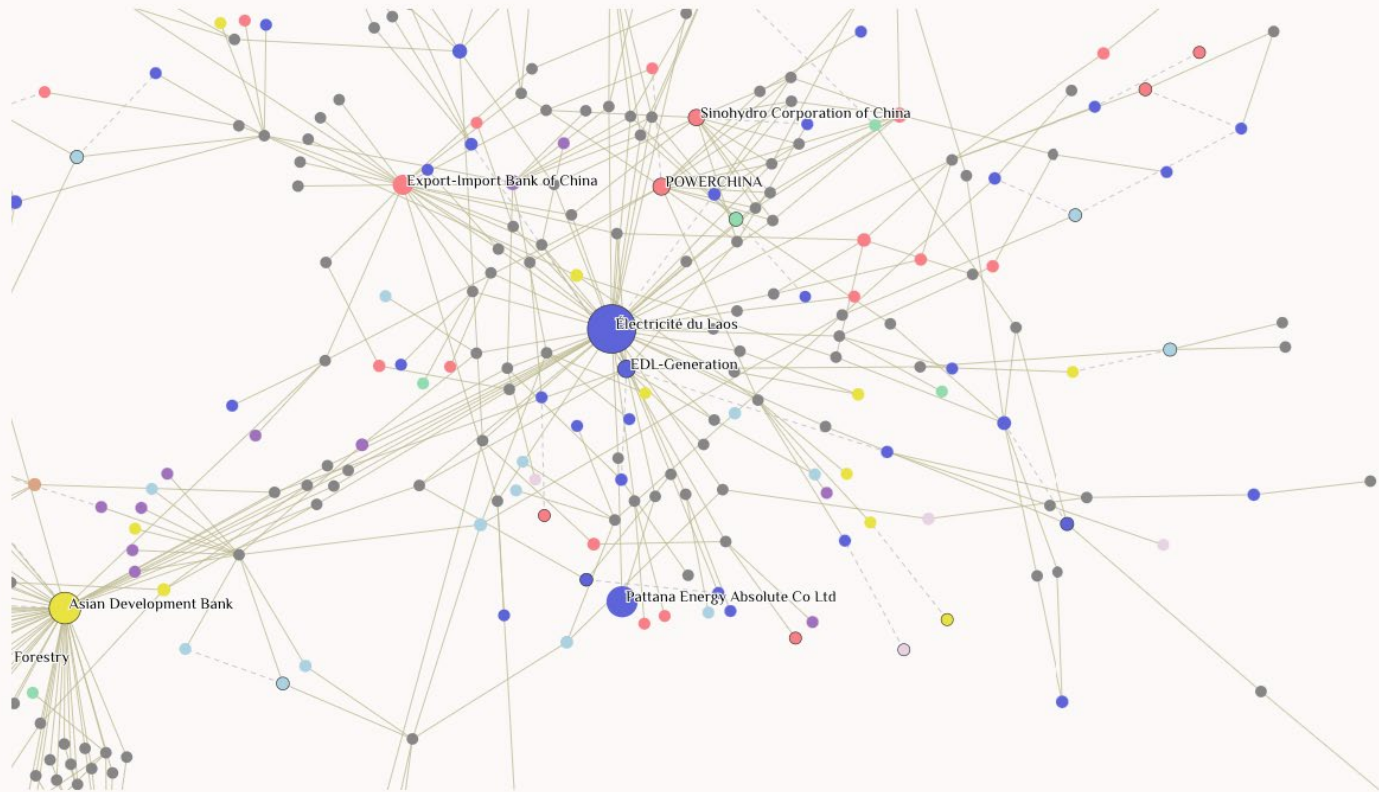Sources and destinations of FDI in 2018 (US$ million)

Cambodia · Taiwan · Hong Kong · Vietnam · Korea · China
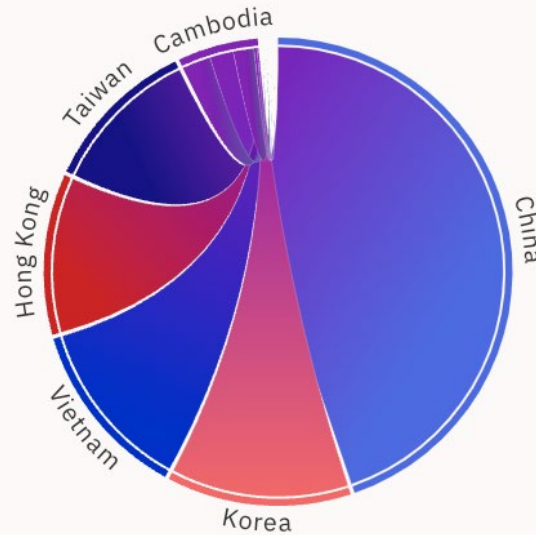
Source: U.S. Department of State

Data visualization is often used in showing the major findings

Is foreign investment truly a force for good?

How much does FDI contribute to Cambodia's GDP?
- GDP (US$ billion) FDI (US$ billion)

Source: World Bank

Where is Cambodia's investment going and coming from?
Sources and destinations of FDI in 2018 (US$ million)

Cambodia, Taiwan, Hong Kong, Vietnam, Korea, China

Source: U.S. Department of State

Total investment (millions of USD)
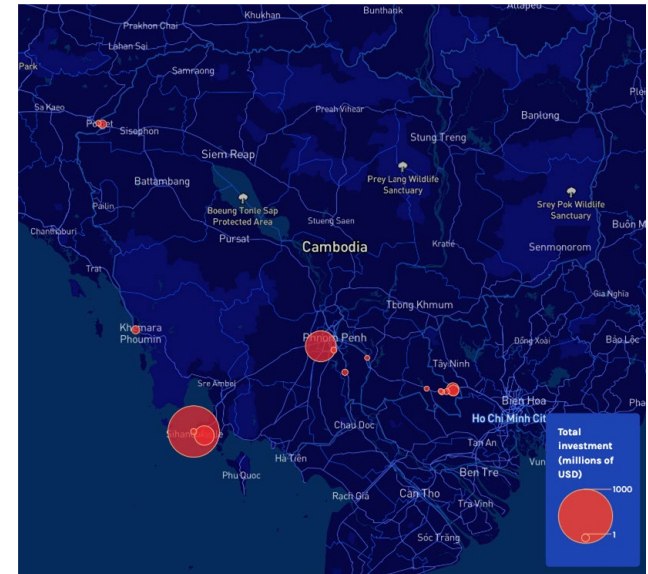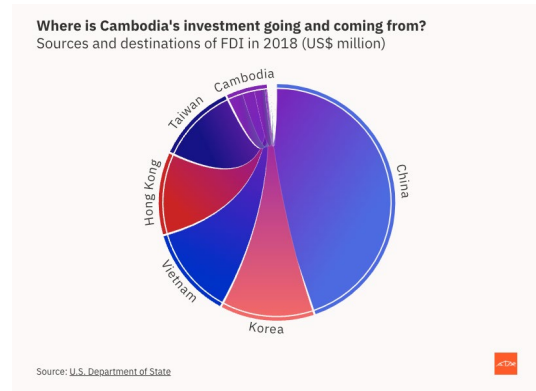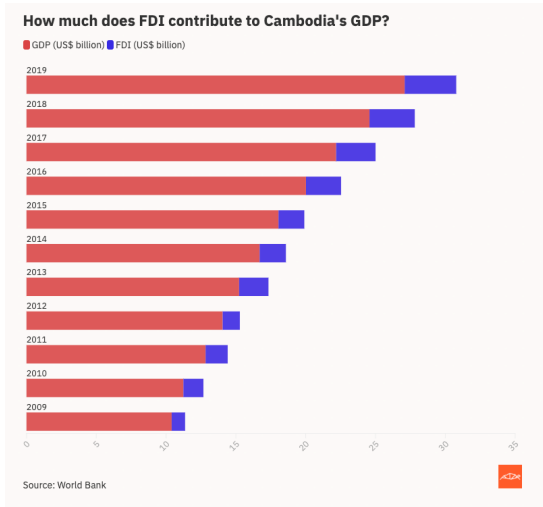
Data visualization - What is? And What is not?
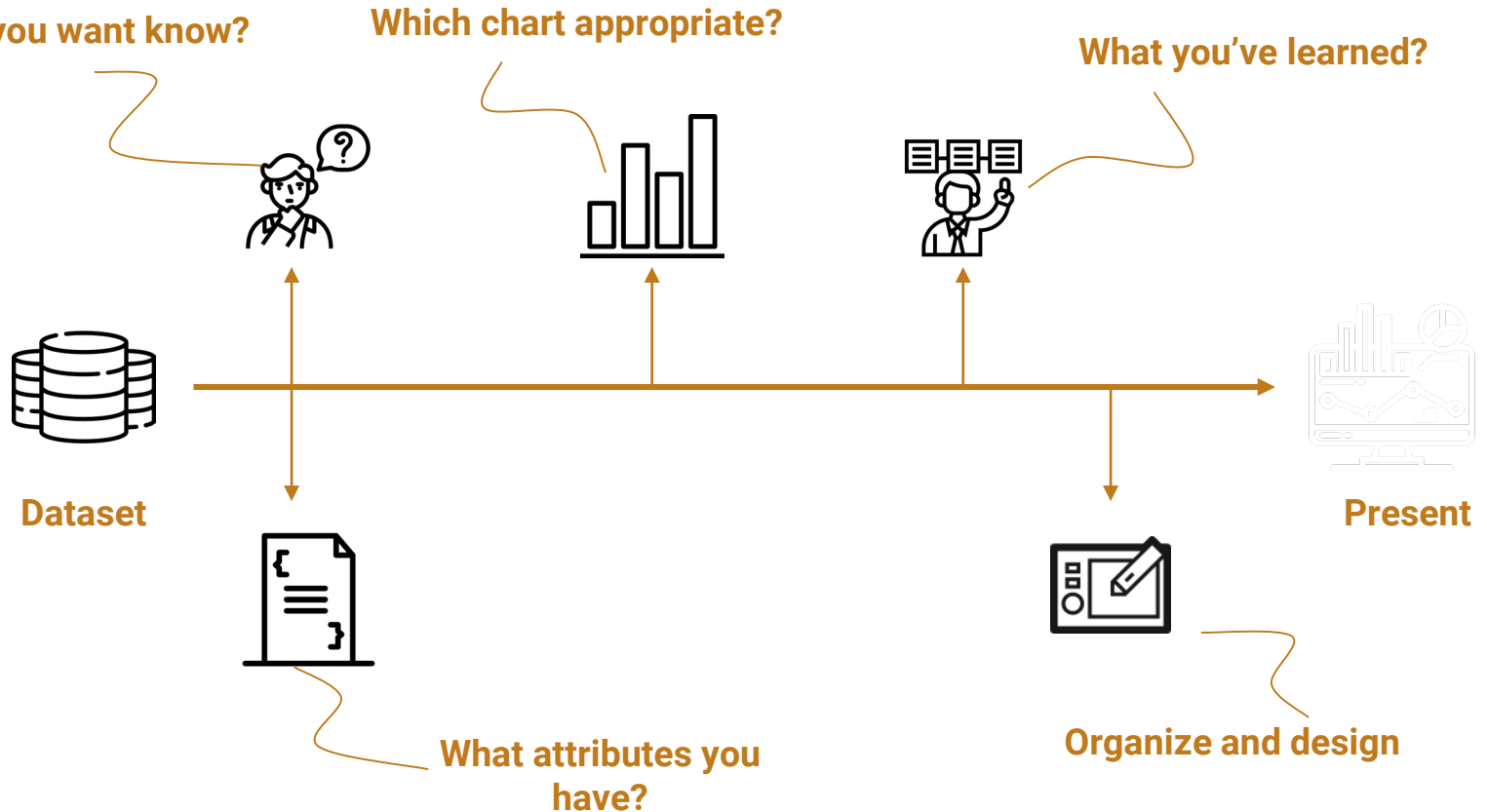
☞ **IT IS** the process of the attempt to transform data into visual feature displaying pattern, trend, and relationship.

☞ **IT IS NOT** merely visual explanation of procedure, concept, or workflow.

What happen you visualize data?

What you want know?

Which chart appropriate?

What you've learned?

Dataset

Present

What attributes you have?

Organize and design

What you want to know?

Election case

- What is the share of votes won by each party?
- What is the share of votes won by each party in each province?
- Which province where the winning party won the largest number of vote?
- Where do the winning party tend to gain the largest share of votes?
- How is the trend of votes obtained by each party since 1998?
- Which party obtain gain the largest number of seats?
- How many commune dominated by each party?

What you want to know?

W hich of the category bellow that your purpose fall into?

☞ Comparison

☞ Distribution

☞ Relationship

☞ Composition

What attributes contained in your dataset?

Knowing what attributes you have, can shape your purpose to be more achievable.

- Attributes are the content of characteristics of individual data record.
  - Qualitative
    - Ordered: *e.g. School (primary, secondary, undergraduate, master, PhD)*
    - Unordered: *e.g. Transportation (Car, Motorbike, Bus, Bicycle)*
  - Quantitative
    - Discrete: *e.g. population, enrollment, age...*
    - Continuous: *e.g. elevation, rainfall, tree cover loss…*
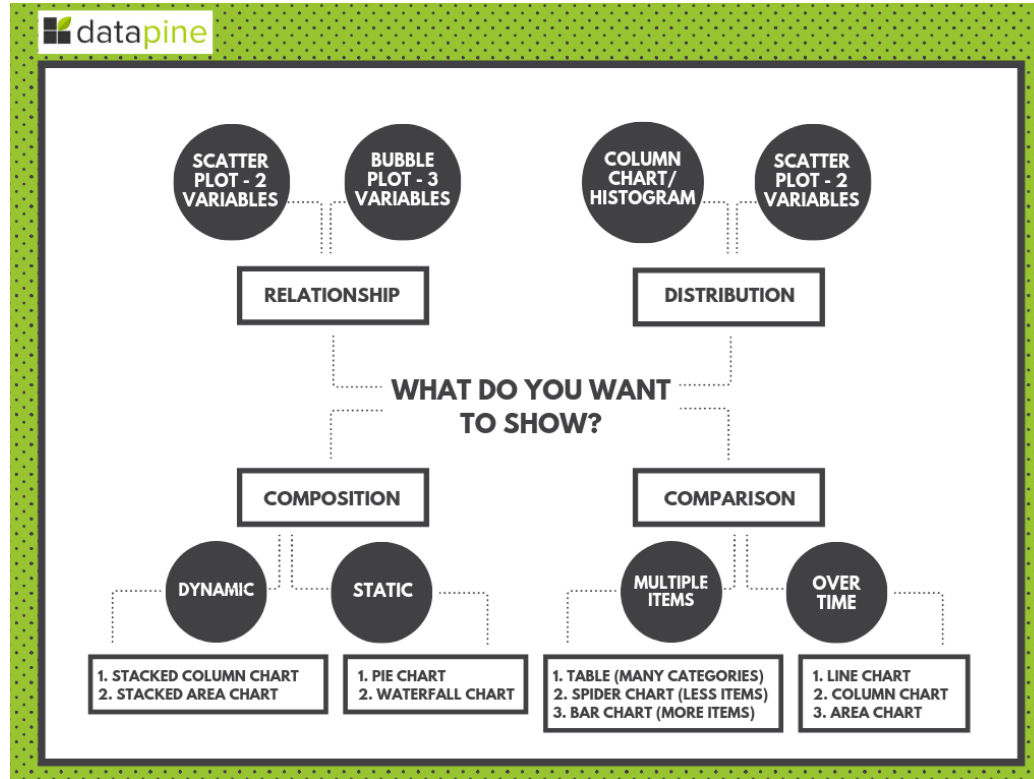
Your purpose determine which chart type to use

datapine

SCATTER PLOT - 2 VARIABLES   BUBBLE PLOT - 3 VARIABLES   COLUMN CHART/ HISTOGRAM   SCATTER PLOT - 2 VARIABLES

RELATIONSHIP   DISTRIBUTION

WHAT DO YOU WANT TO SHOW?

COMPOSITION   COMPARISON

DYNAMIC   STATIC   MULTIPLE ITEMS   OVER TIME

1. STACKED COLUMN CHART
2. STACKED AREA CHART

1. PIE CHART
2. WATERFALL CHART

1. TABLE (MANY CATEGORIES)
2. SPIDER CHART (LESS ITEMS)
3. BAR CHART (MORE ITEMS)

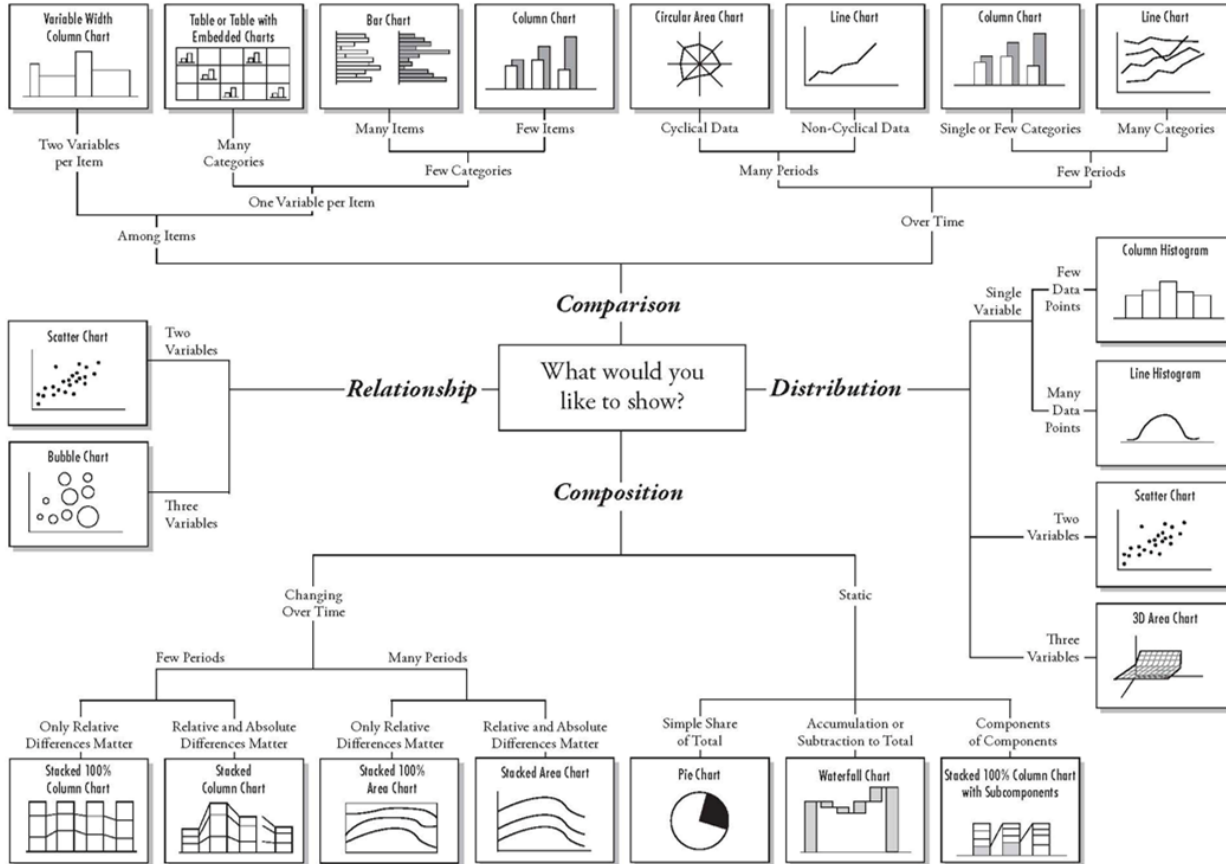1. LINE CHART
2. COLUMN CHART
3. AREA CHART

Chart Suggestions—A Thought-Starter

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Let's explore common used charts

- Pie chart

- Column chart

- Line chart

- Table

- Pictogram
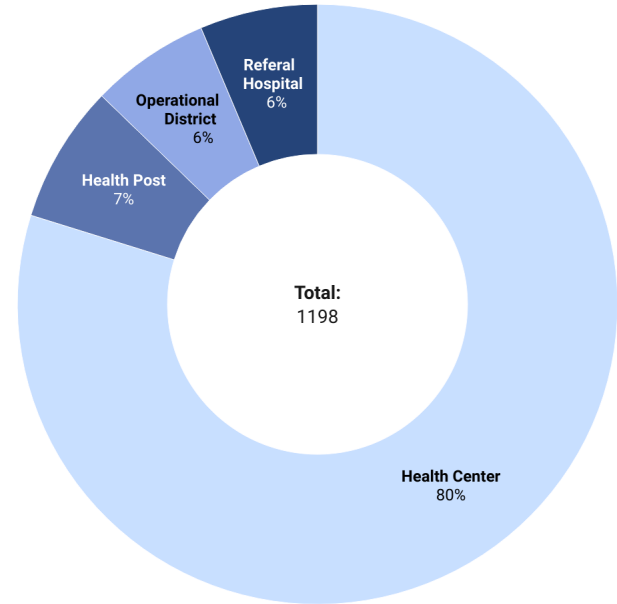
- Map chart

- Hierarchy chart

Pie chart is for part‐to‐the‐whole

What is the share of health center?

Which category is the most dominate?

Most of hospitals in Cambodia are health center

Referal Hospital 6%

Operational District 6%

Health Post 7%

Total: 1198

Health Center 80%

Health Center   Health Post   Operational District   Referal Hospital
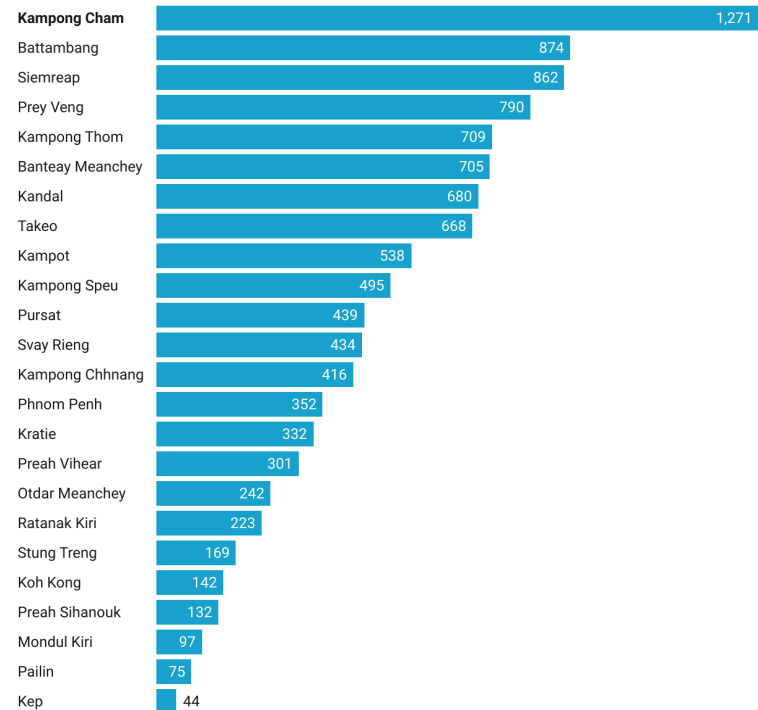
Created with Datawrapper

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Column chart is for comparison of magnitude

It allows for comparing absolute value between categories.

It's suitable for numerous categories.

Kampong Cham have the largest number of school

| Province	Value
Kampong Cham	1,271
Battambang	874
Siemreap	862
Prey Veng	790
Kampong Thom	709
Banteay Meanchey	705
Kandal	680
Takeo	668
Kampot	538
Kampong Speu	495
Pursat	439
Svay Rieng	434
Kampong Chhnang	416
Phnom Penh	352
Kratie	332
Preah Vihear	301
Otdar Meanchey	242
Ratanak Kiri	223
Stung Treng	169
Koh Kong	142
Preah Sihanouk	132
Mondul Kiri	97
Pailin	75
Kep	44

Created with Datawrapper

Line chart is for observe trend

You can tell whether it increase or decrease and how strong the trend.

Line chart is only suitable for visualizing value changing over time.

Thailand and Vietnam are the biggest consumer of power in the region where the consumption is drastically growing
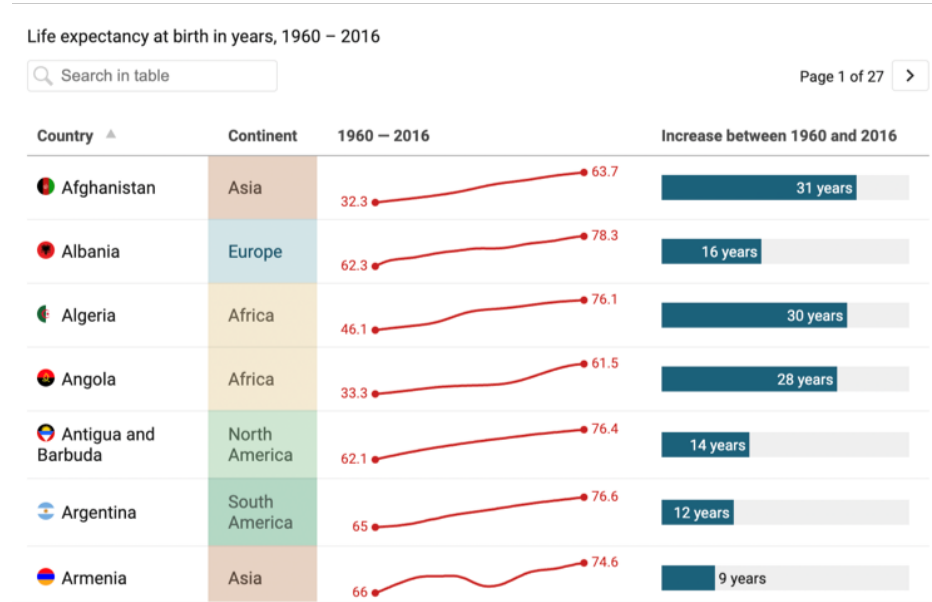Power consumption by country (TWh)
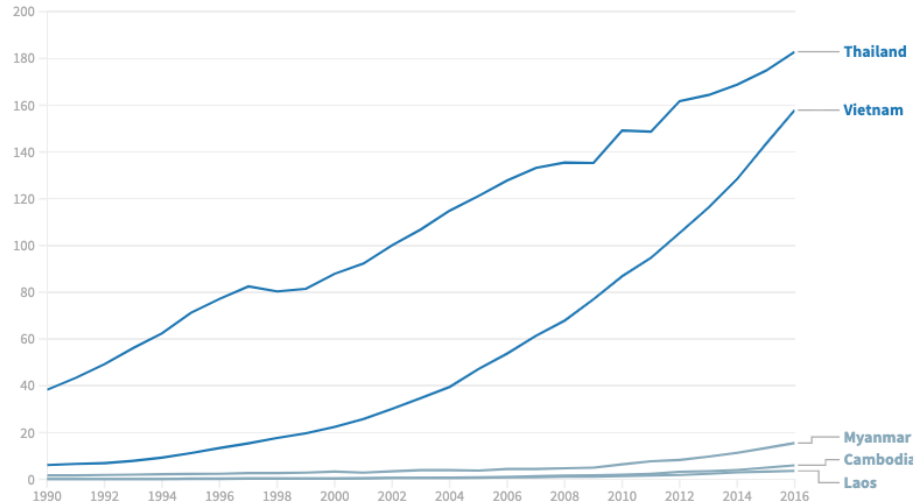
Source: Greater Mekong Subregion Statistical Database • Chart produced by Open Development Cambodia (ODC)

Table is for exploring data in interactive way

It can index each record of information which allow reader to examine the individual in detail.

Table should be added visual element that allow readers to spot the interesting features.

Life expectancy at birth in years, 1960 – 2016

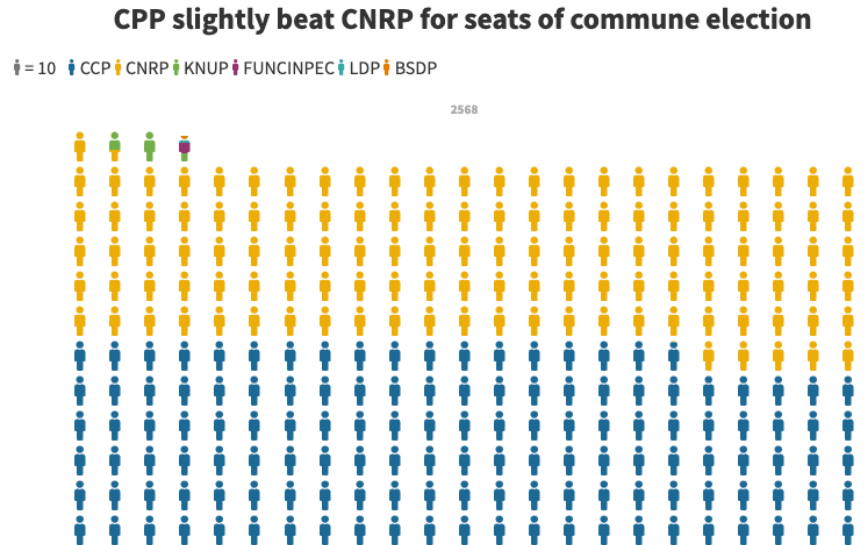| Country	Continent	1960 – 2016		Increase between 1960 and 2016
Afghanistan	Asia	32.3	63.7	31 years
Albania	Europe	62.3	78.3	16 years
Algeria	Africa	46.1	76.1	30 years
Angola	Africa	33.3	61.5	28 years
Antigua and Barbuda	North America	62.1	76.4	14 years
Argentina	South America	65	76.6	12 years
Armenia	Asia	66	74.6	9 years

Search in table

Page 1 of 27

Pictogram is for pictorial comparison and composition

Pictogram is more intuitive than pie and column chart.

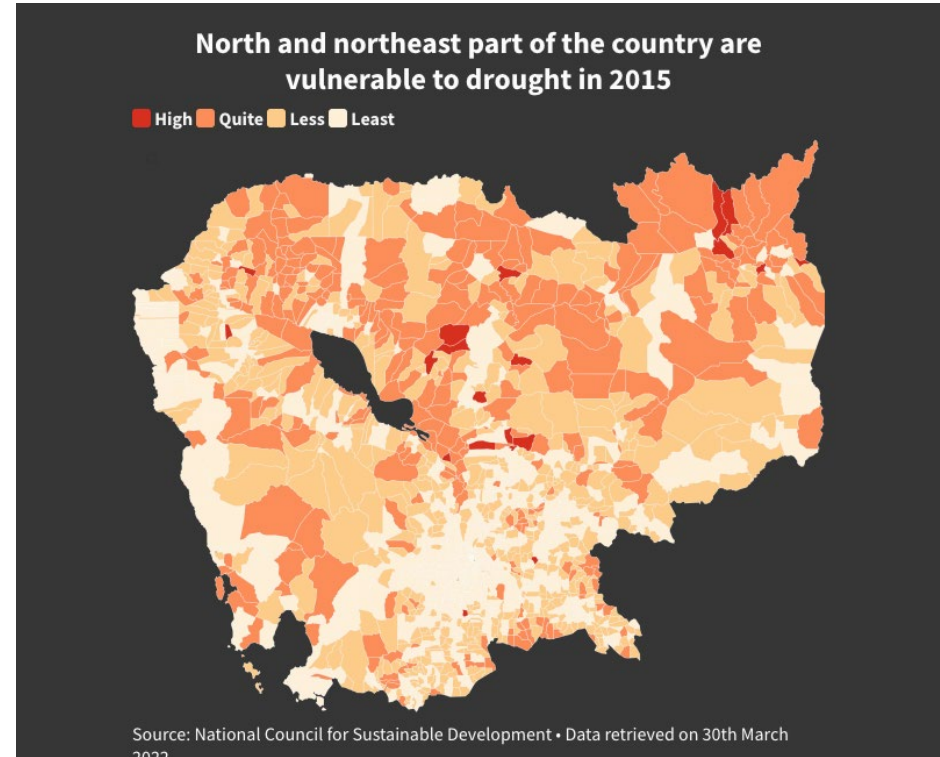It is ideal for discrete data. Ex: Population, School, Household..etc.

CPP slightly beat CNRP for seats of commune election

👤 = 10 👤 CCP 👤 CNRP 👤 KNUP 👤 FUNCINPEC 👤 LDP 👤 BSDP

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Source: Open Development Cambodia

Map chart is for spatial comparison and distribution

Choropleth Map

It is ideal for comparing and observe the pattern spatially for data representing each county.
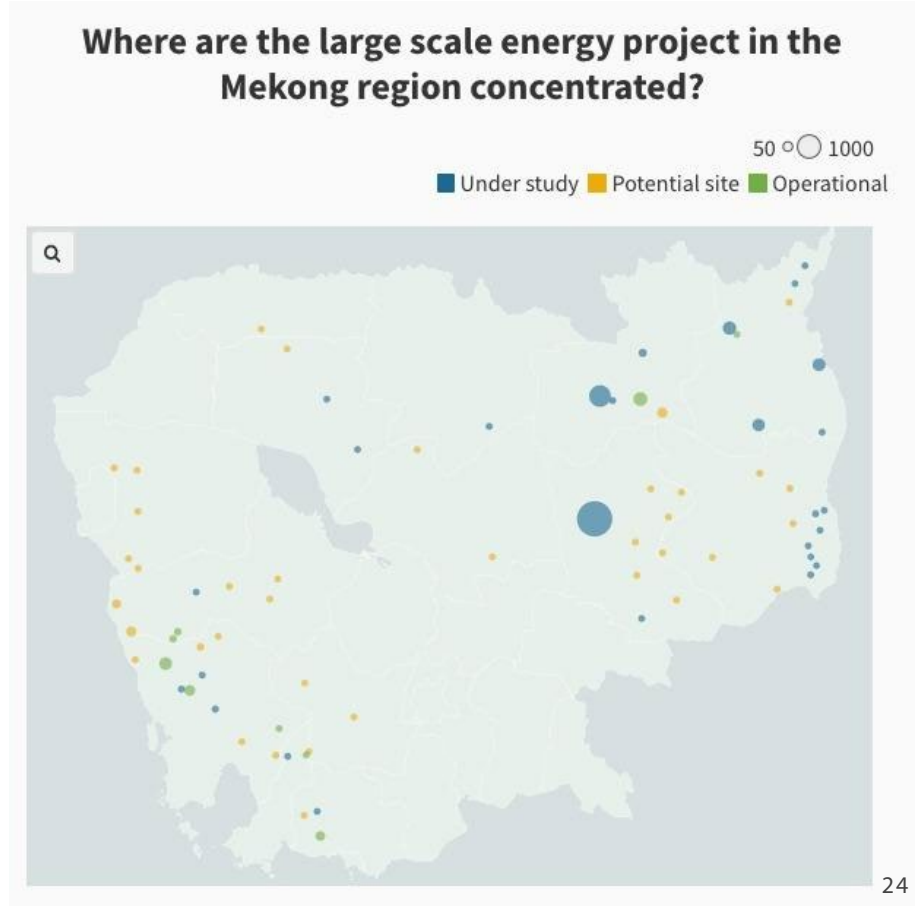

North and northeast part of the country are vulnerable to drought in 2015

High Quite Less Least

Source: National Council for Sustainable Development • Data retrieved on 30th March 2022

Map chart is for spatial comparison and distribution

Symbol Map

It is ideal for comparing and observe the pattern spatially for each data point.

Where are the large scale energy project in the Mekong region concentrated?

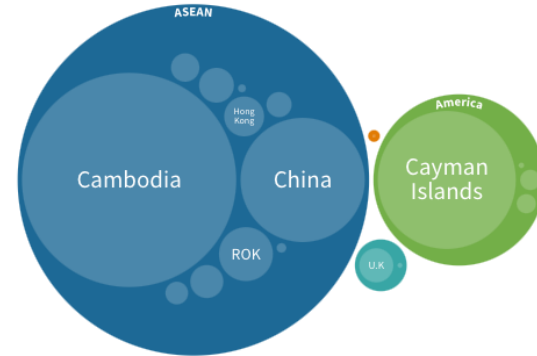50 ○ ○ 1000
■ Under study ■ Potential site ■ Operational

Hierarchy chart is for sub -category comparison

It is ideal for comparing absolute value at sub-category level.

It is suitable for continuous data.
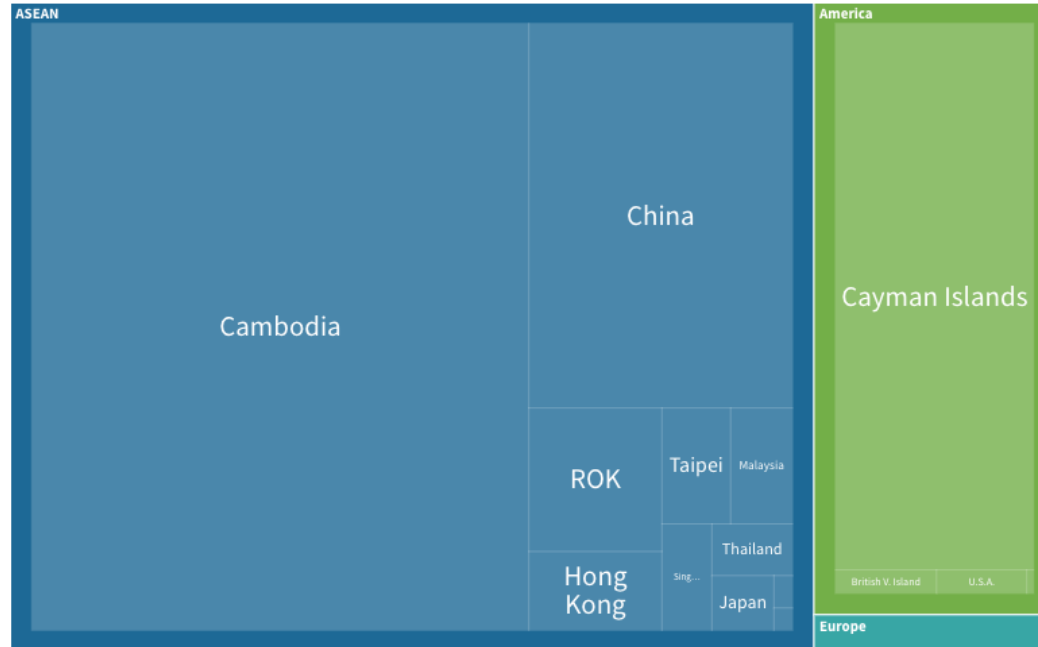
Investment trends in Cambodia by region 2020

Source: Ministry of Foreign Affair and International Cooperation

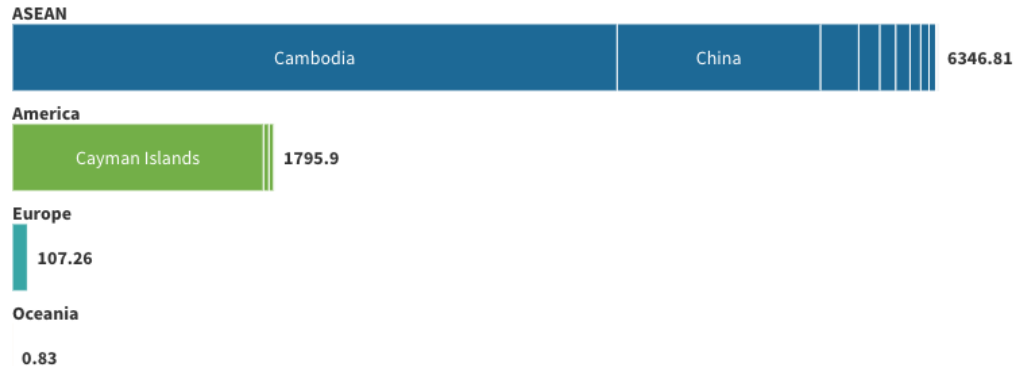# Hierarchy chart is for sub‑category comparison

Investment trends in Cambodia by region 2020

Source: Ministry of Foreign Affair and International Cooperation

Hierarchy chart is for sub - category comparison

Investment trends in Cambodia by region 2020

ASEAN

| Cambodia | China | | | 6346.81 |

America

| Cayman Islands | 1795.9 |

Europe

107.26

Oceania

0.83

Source: Ministry of Foreign Affair and International Cooperation

Graph library

Financial Times Visual Vocabulary:
https://ft-interactive.github.io/visual-vocabulary/

Data to Viz:
https://www.data-to-viz.com/

Dataviz Catalogue:
https://datavizcatalogue.com/search.html

Visualize to explore

You visualize to explore insights!

Question we might have when explore the visualized data:

- What is interesting about the features in the chart?

- Why it is like that? And what will be the consequences?

- What is relevant that explain or make it more meaningful?

Visualize to explore

Special economic zones in Cambodia.

- How the SEZs are distributed?
- W here do the SEZs are mostly concentrated?
- W hy they show in these pattern?
- W hat would be the impact?
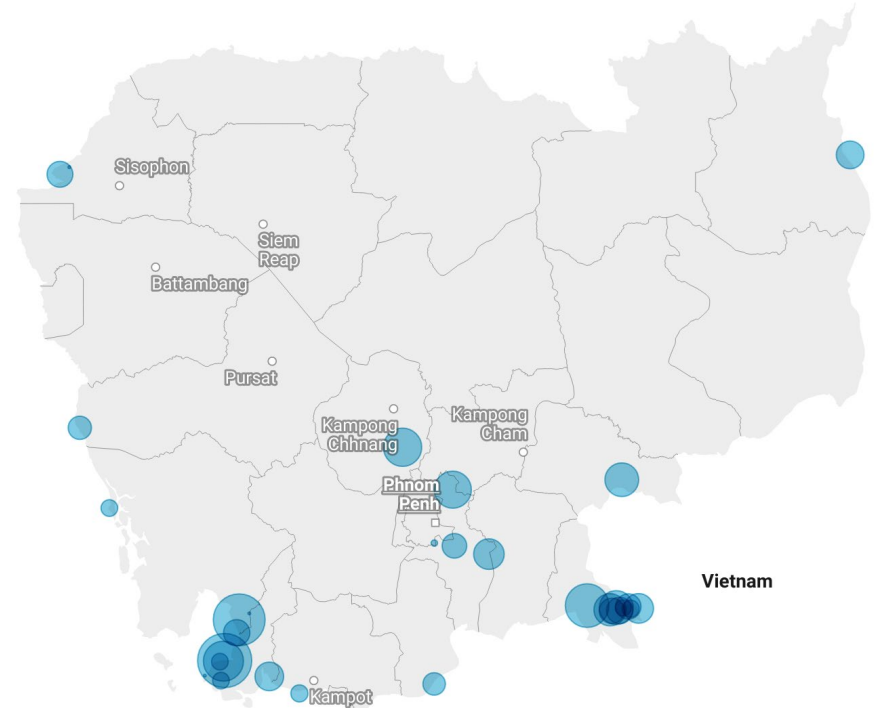
Then visualize to explain

You explain the insight you found in the visualization.

- Where in the chart the audiences should pay attention?

- What is the insight the audiences should know?

What you produce when you produce chart?

☞ Data visualization allows us to see the pattern, relationship, and trend.

☞ From these visual presentations, we can explore what is interesting.

☞ It helps us to digest for deep understanding.

☞ That is called insight, the actionable information for telling story and support decision making.

☞ **The goal is not the chart but the insight in it.**

☞ **And you ain't show chart but insight, your message to the intended audiences.**

Recap

- Data visualization allows us to draw clear and deep insight through visual representation.
- Data visualization is the visual representation of data in where pattern, trend, and distribution can be revealed for the investigation.
- What to consider when visualizing data: Purpose, Chart type, Findings, Design.
- Remember that when you produce chart, you produce insights.
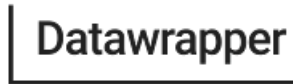
Tools for data visualization

Flourish

R Programming

Datawrapper

Python

Google Sheet

Microsoft Excel

Data visualization demo using Datawrapper