

Before We Begin...

- Participants should have:
 - Laptops
 - Tableau Public downloaded:
<https://public.tableau.com/en-us/s/download>
 - Create Tableau Public account (will prompt when downloading)
- Tech support available if there are connection issues

Elevate Your Data

Tools for Telling Stories, Finding Insights,
and Empowering Public Understanding

WOR-05
July 5, 3 - 4:30 PM



**Want to do more with data,
but don't know where to start?**

**Enter dashboards.
(and this workshop!)**

**WOR-05
July 5, 3 - 4:30 PM**

Workshop Outline

1. Dashboard Design

20 minute introductory presentation

2. Dashboard Collaging

15 minute activity

3. Visualization Tips

10 minute deeper dive presentation

4. Building a Crowd-Sourced Dashboard

45 minute activity and questions

Housekeeping

- Participants should have:
 - Laptops
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About Kara



Workshop facilitator Kara Naklicki is an urban planner and researcher for the City of Toronto, where she uses data to problem-solve and support the work of fellow planning professionals.

She didn't know she liked data so much until she started working with it.

Workshop Goals

1. Encourage you to have an ongoing relationship with data and dashboards.

It can be hard to extract knowledge from information, and data is often presented in an intimidating way. Let's change that!

2. Enable you to use dashboards and visualization techniques to:
 - a. Expand public access to information
 - b. Empower users to base opinions and decisions on defensible, observable information

Dashboard Design

Presentation Part I

WOR-05
July 5, 3 - 4:30 PM



What are dashboards?

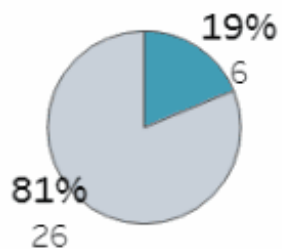
Tool for visualizing and understanding data

Market Value by Team in the 2018 World Cup

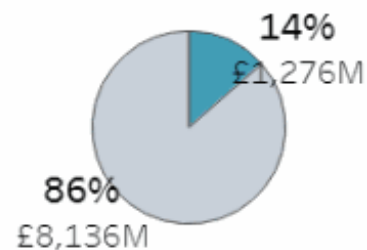


© 2019 Mapbox © OpenStreetMap

% of Teams

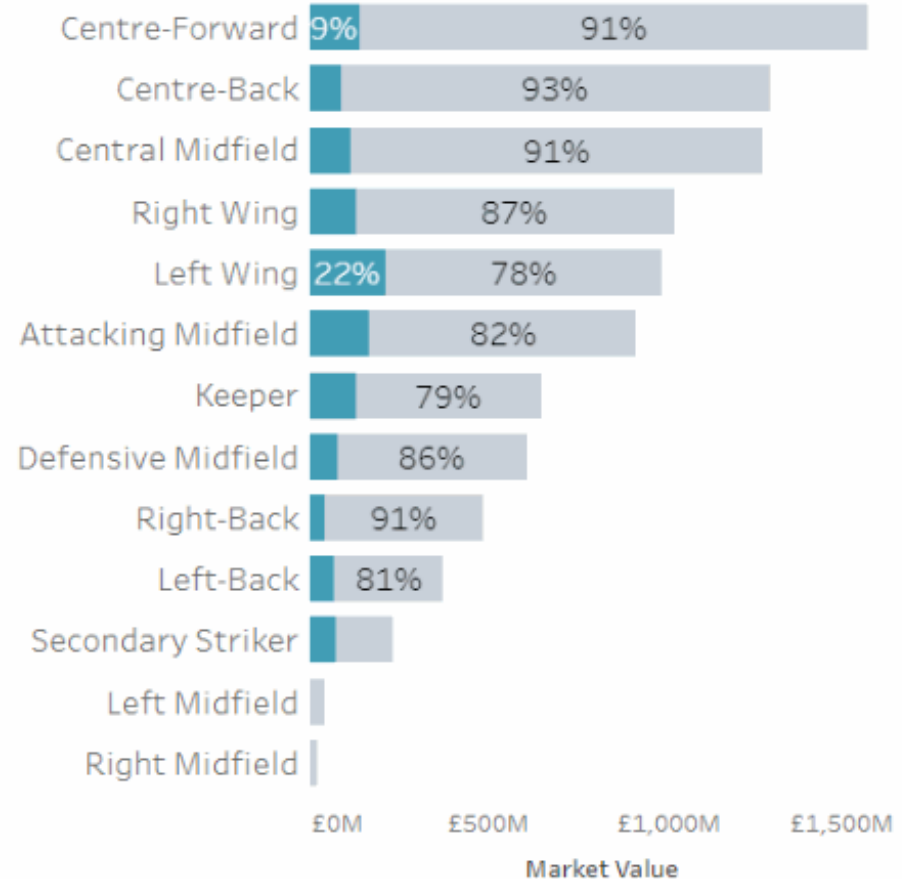


% of Market Value



Market Value by Position

Sort By



What are dashboards?

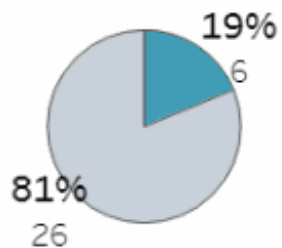
Can include text, graphics, maps

Market Value by Team in the 2018 World Cup

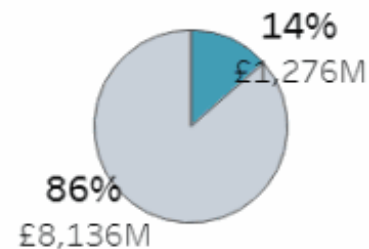


© 2019 Mapbox © OpenStreetMap

% of Teams

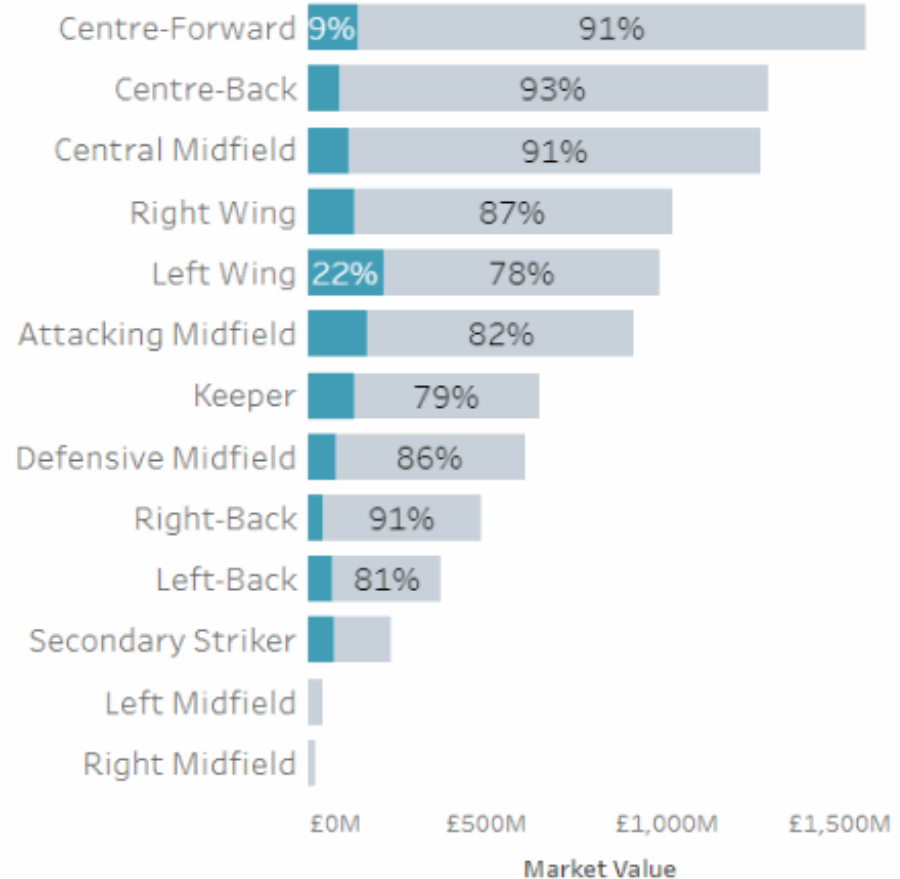


% of Market Value



Market Value by Position

Sort By



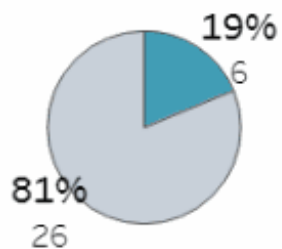
What are dashboards?

Can be static or interactive

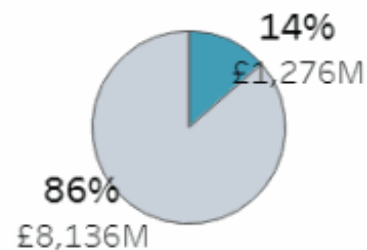
Market Value by Team in the 2018 World Cup



% of Teams

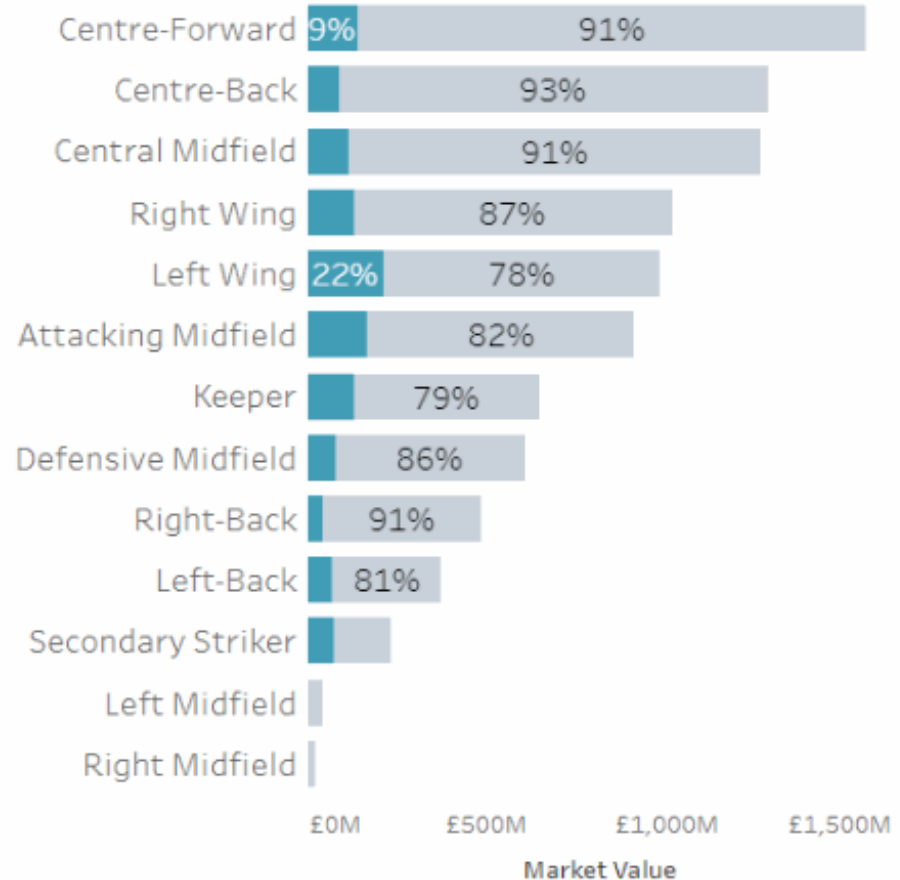


% of Market Value



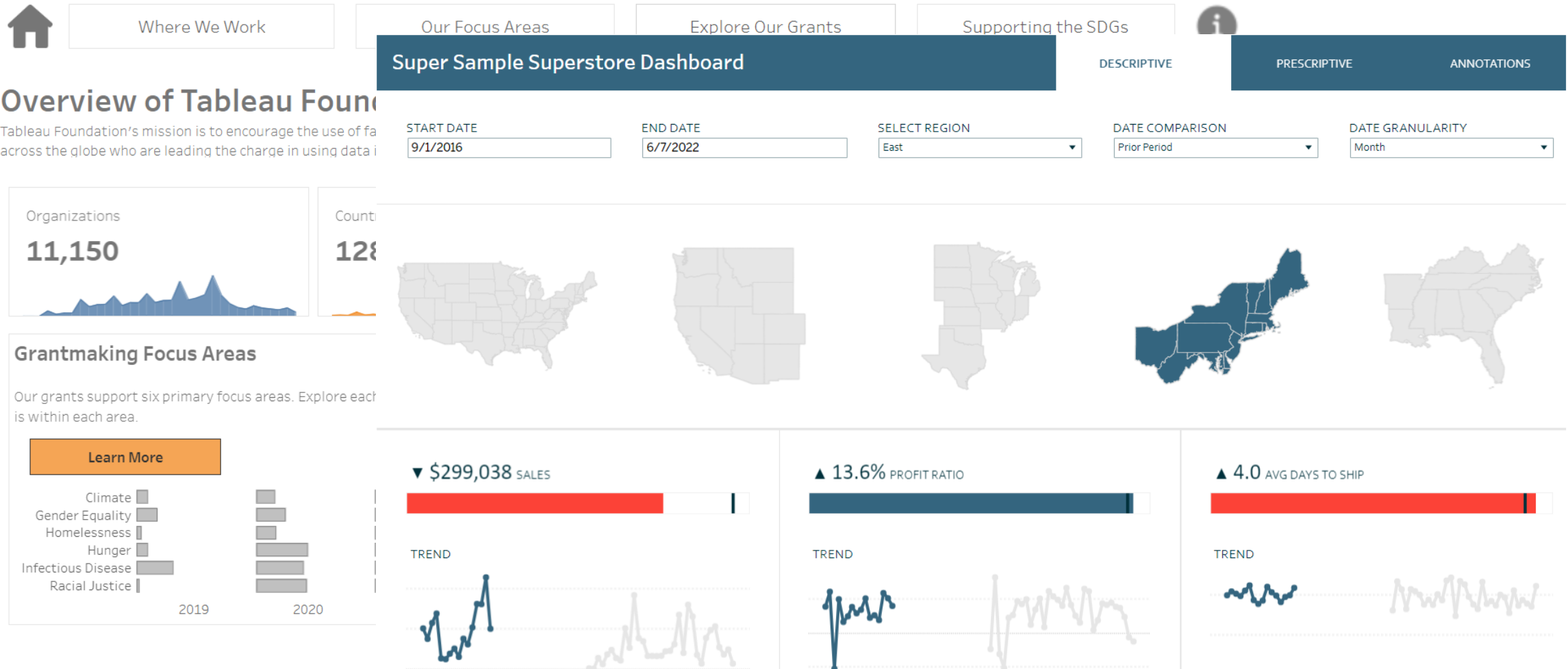
Market Value by Position

Sort By



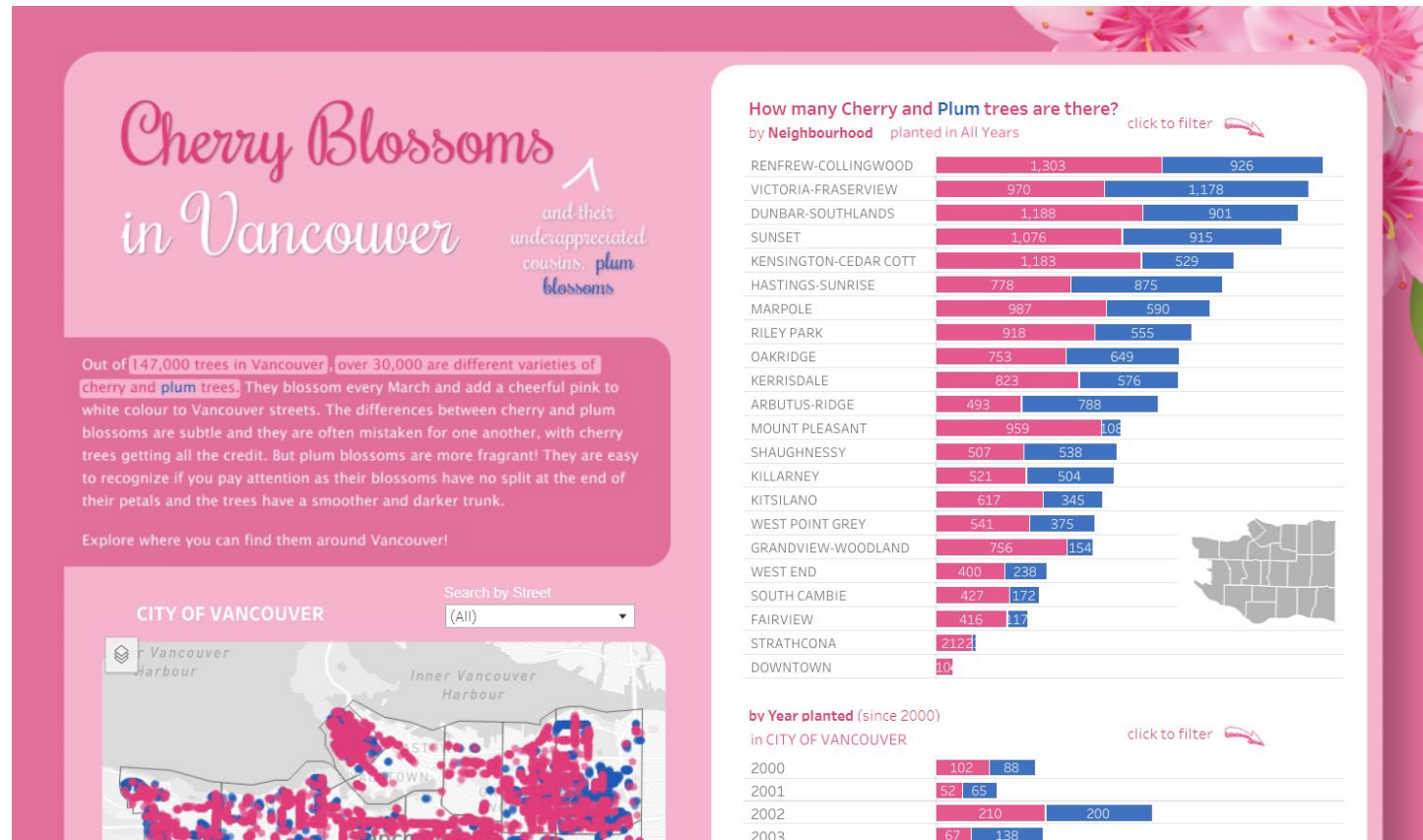
What are dashboards?

Often used to provide regular updates on business performance



What are dashboards?

Can also be used to present data in creative, visual, and more digestible ways to appeal to a broader audience



Why dashboards?

GARBAGE IN THE OCEAN

1 GARBAGE TRUCK IS DUMPED INTO OUR OCEANS EVERY MINUTE



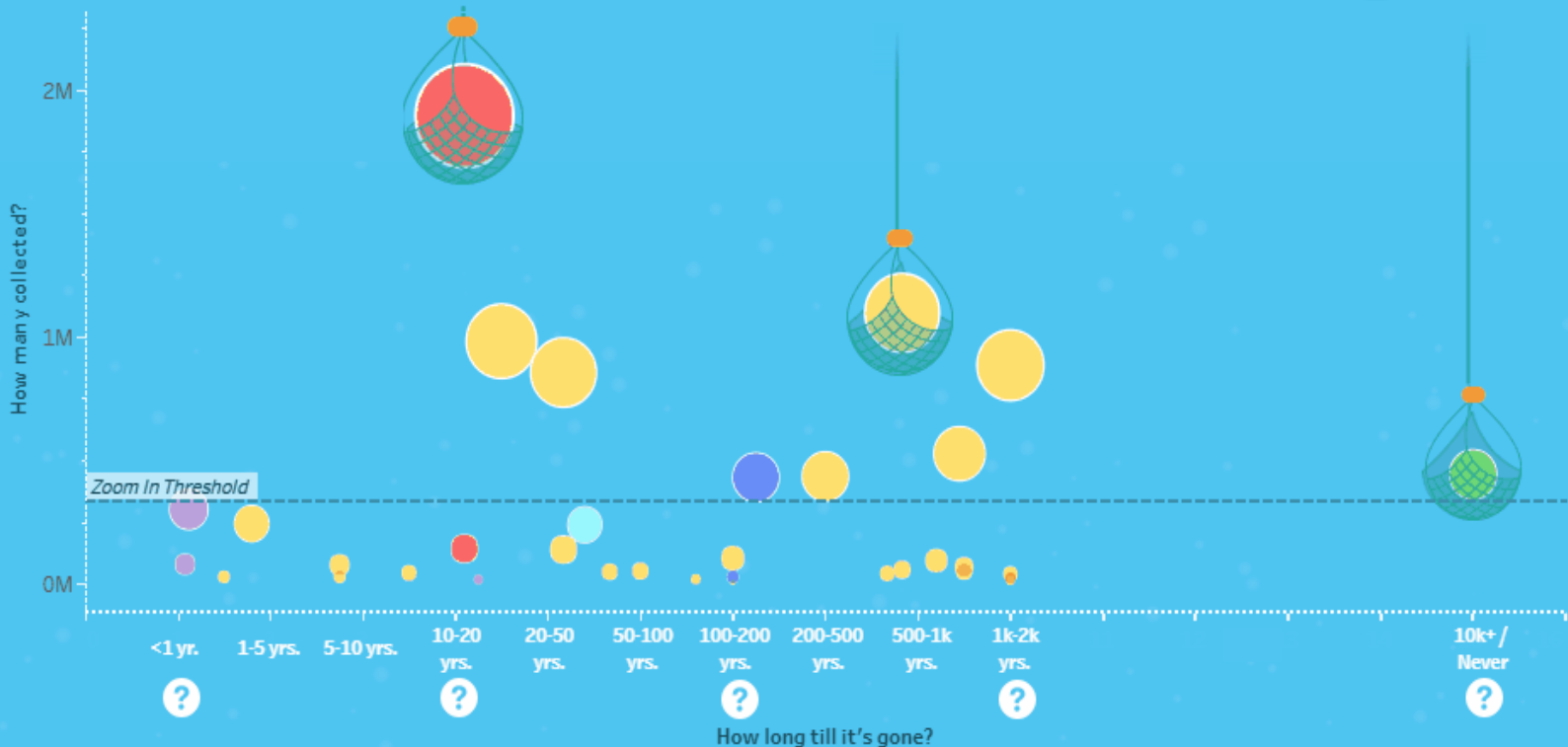
ENVIRONMENTAL RED ALERT

According to a study conducted by the World Economic Forum in 2016, roughly **32% of the annual global plastic production ends up in our oceans**. If nothing changes, experts predict this number is likely to nearly double by 2050, what means there would be more plastic in the ocean than fish by then.

COLLECTIVE EFFORT

Luckily, the **Ocean Conservancy's International Coastal Cleanup** is there to help. This global initiative has been around for more than 30 years now. In 2011, the organization released a report summarizing 25 years of efforts towards keeping oceans clean and healthy. According to the data, in **25 years** almost **9 million volunteers** across **152 countries** collected more than **144 million pounds** of trash dumped in the ocean and on shores. This is a weight equivalent of approximately **790 Jumbo Jets!**

This quick analysis is based on the 2010 cleanup data. In total, almost **10 million debris items** were collected that year. Not all items have the same impact on environment though. If left floating in the ocean, some of them might never decompose. Explore the chart on the right to see what could be found in the ocean and how long it would take it to degrade if not collected by millions of volunteers across the globe.



Zoom Out

Main Component/Material

Cloth

Glass

Metal

Other/Mixed

Paper & Wood

Plastic

Rubber

RESOURCES

Designed by Kasia Gasiewska-Holc



Why dashboards?

- Communicate complex information simply
- Appeal to visual learners and broader audience
- Create a narrative – tell a story!
- Highlight trends and provide insights
- Enable evidence-based decisions
- Empower users to focus on the information they care about

Dashboard candidates

What are some examples of things that would make interesting dashboards in your organization or work/school context?

Ideas:

- Projects with regular reporting
- Large, public datasets
- Topics of political and public interest
- Complex subjects with competing narratives
- Graphically-heavy, labour-intensive deliverables

Example: [Toronto Ward Profiles](#)

Ward Population **103,805**

Population Growth (2011–2016) **10.5%**

Median Age **35.3**

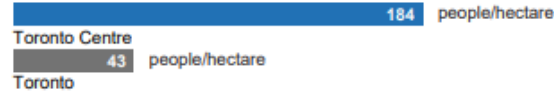
Population Growth (2011–2016)



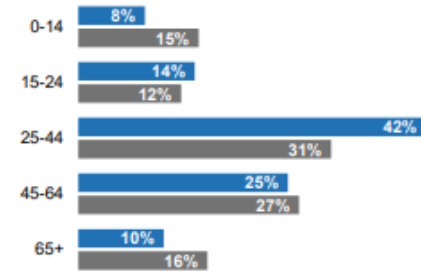
Population Growth (2006–2016)



Density

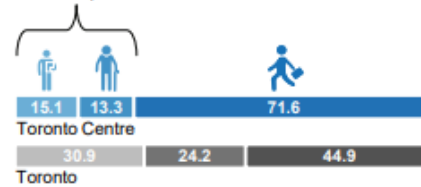


Population by Age Group



Dependency Ratio

28.4 senior and youth dependents for every 100 working age persons

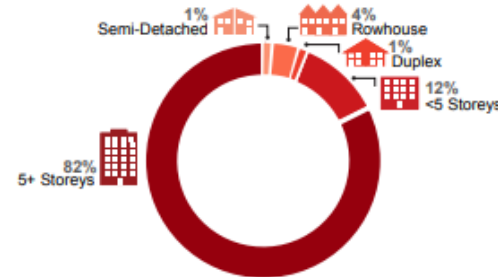


Number of Households **58,510**

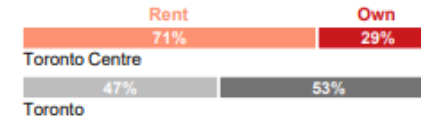
Change in Households (2011–2016)



Occupied Private Dwellings by Structure Type

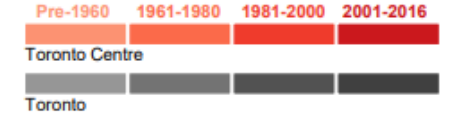


Tenure

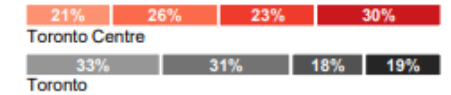


Net New Households (2011–2016) **6,030**

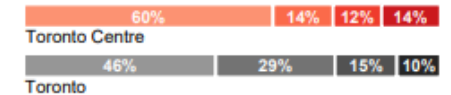
Period of Construction Legend



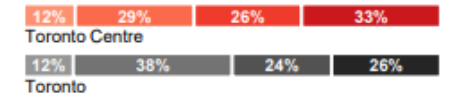
Dwellings by Period of Construction



Ground Related Dwellings by Period of Construction

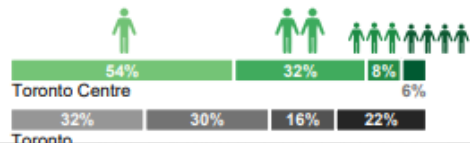


Apartments in Buildings 5+ Storeys by Period of Construction

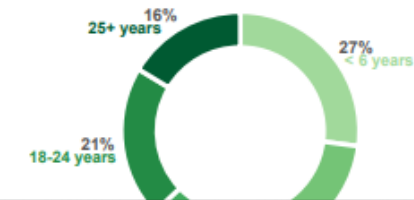


Average Number of People per Household **1.70**

Households by Size

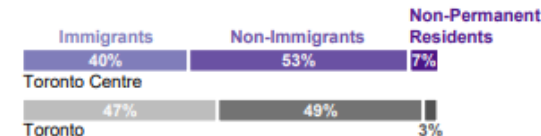


Children Living at Home

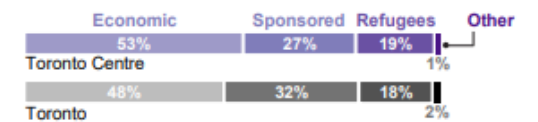


Immigrant Population **39,925**

Population by Immigration Status



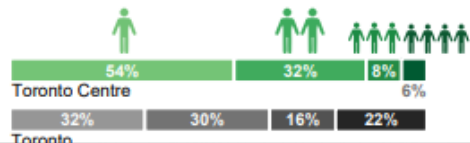
Immigration by Admission Category



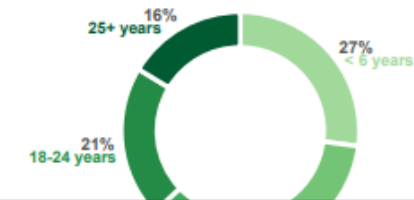
Immigration by Generation

Average Number of People per Household **1.70**

Households by Size

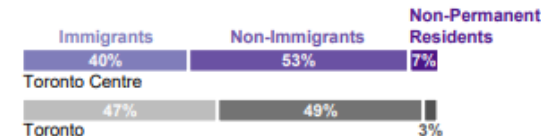


Children Living at Home

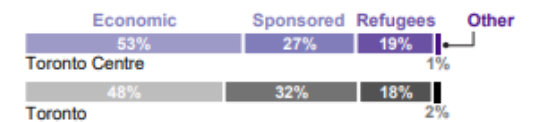


Immigrant Population **39,925**

Population by Immigration Status



Immigration by Admission Category



Immigration by Generation

What is Tableau?

- Software for turning data into visualizations (graphics), and combining visualizations into dynamic, interactive dashboards
- Example: City of Toronto COVID-19 dashboard

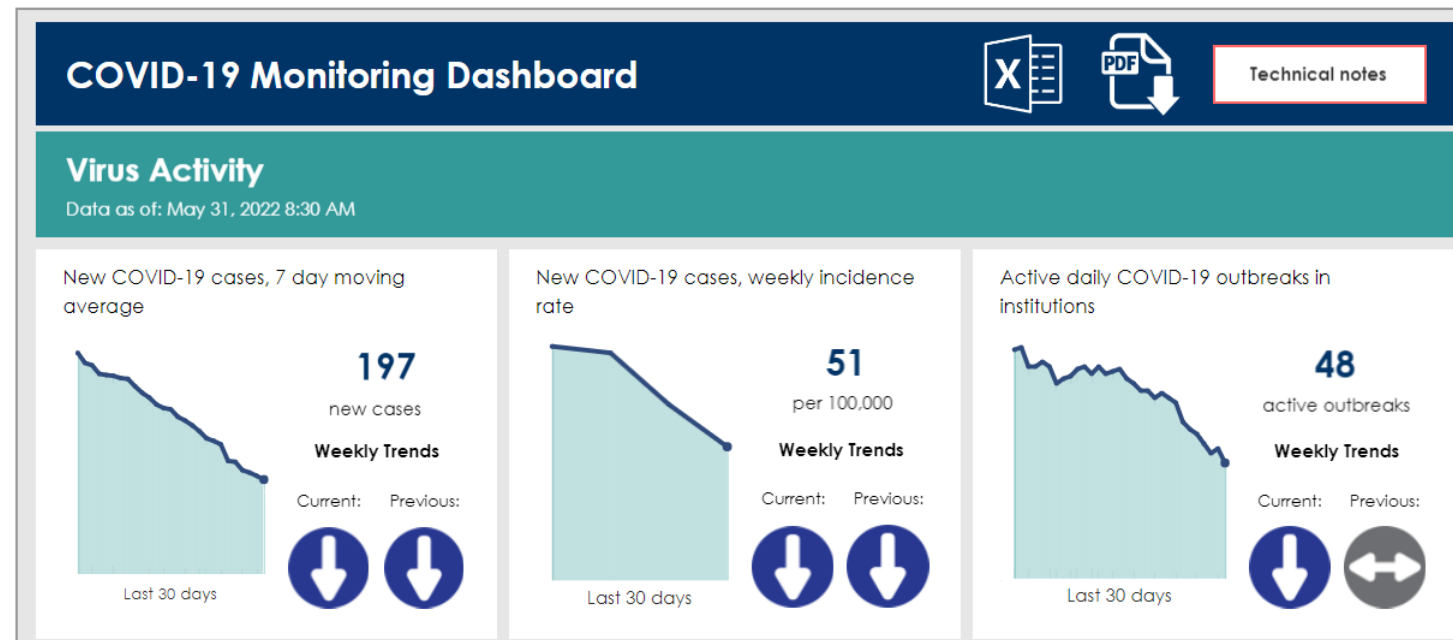


Tableau Public

Free version of Tableau Software:

<https://public.tableau.com/>

Caveat: all data is hosted online, on Tableau's servers

Only use with public, non-confidential data!

Kara's dashboard examples:

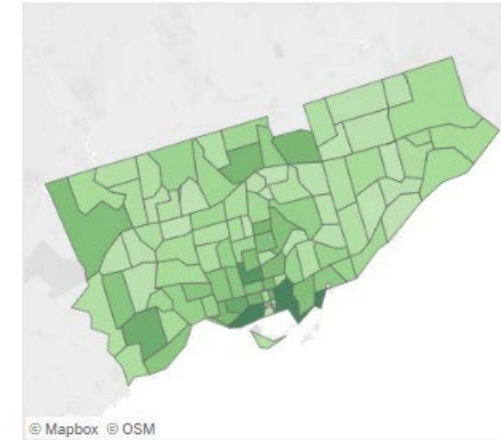
<https://public.tableau.com/app/profile/kara.naklicki>

Completed Green Roofs in Toronto, 2010 - 2022

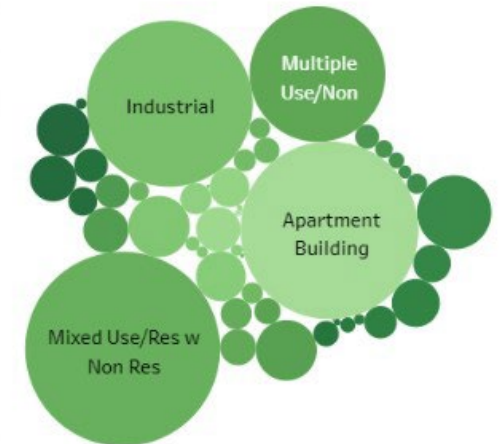
This dataset contains statistics for completed green roof building permits in Toronto between 2010 and 2022. Select an area on the map or chart below to update the dashboard with more detailed information.

Search by first 3 digits of postal code:

(All) ▼



Green Roof Area by Structure Type



The graph below shows the amount of completed green roof area in square meters in green, and the number of completed permits in yellow.

Legend
■ Completed Permits
■ Green Roof Area



Dashboard Design

This workshop will focus on three principles:

1. Audience
2. Accessibility
3. 'Good' design

Dashboard Design

Audience

Who is the dashboard's primary audience?

What are they using the dashboard for?

Use the answers to these questions to create a dashboard outline as your first step in the design process.

Examples:

Senior management, performance measurement

Members of the public, to learn about a project

Business owners, market research

Dashboard Design

Accessibility

Well-designed dashboards are visually simple, and intuitive for people of all abilities to use.

Design for accessibility from the start so that your dashboards reach the widest possible audience.

What are your region's accessibility requirements?

Consult WCAG (Web Content Accessibility Guidelines) to supplement:
<https://www.w3.org/WAI/standards-guidelines/wcag/>

Dashboard Design

What is 'good' design?

Makes a product more useful and understandable.

Is honest and thorough, yet aesthetic.

- [Dieter Rams \(industrial designer\)'s principles of good design](#)

How do we accomplish 'good' design within dashboards?

- **Context and clarity**
- **Guided analytics**
- **Visualization techniques**

Dashboard Collaging

Interactive Activity I

WOR-05
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Dashboard Collaging

- Let's experiment!
- Create a collaged dashboard using images from magazines and hand-drawn elements to present an issue using the principles we've discussed. The data can be fictional!
- **15 minute** activity
- Materials supplied:
 - Letter size white paper
 - Magazines, scissors, markers, tape
- We'll review collages together if we have time

Visualization Tips

Presentation Part II

WOR-05
July 5, 3 - 4:30 PM



Visualization Tips

Let's think strategically about how data visualizations are created to best facilitate **interaction** and **understanding**.

These tips come from experience, observations from user groups, and courses. Credit due especially to Unilytics' Data Visualization Best Practices course, highly recommended for further exploration of this subject: <https://unilytics.com/data-visualization/data-visualization-best-practices/>

Why visualization?

Same as 'why dashboards?':

- Communicate complex information simply
- Appeal to visual learners and broader audience
- Highlight trends
- Provide insights
- Empower public understanding

Let's dig a little deeper with some visual examples.

Why visualization?

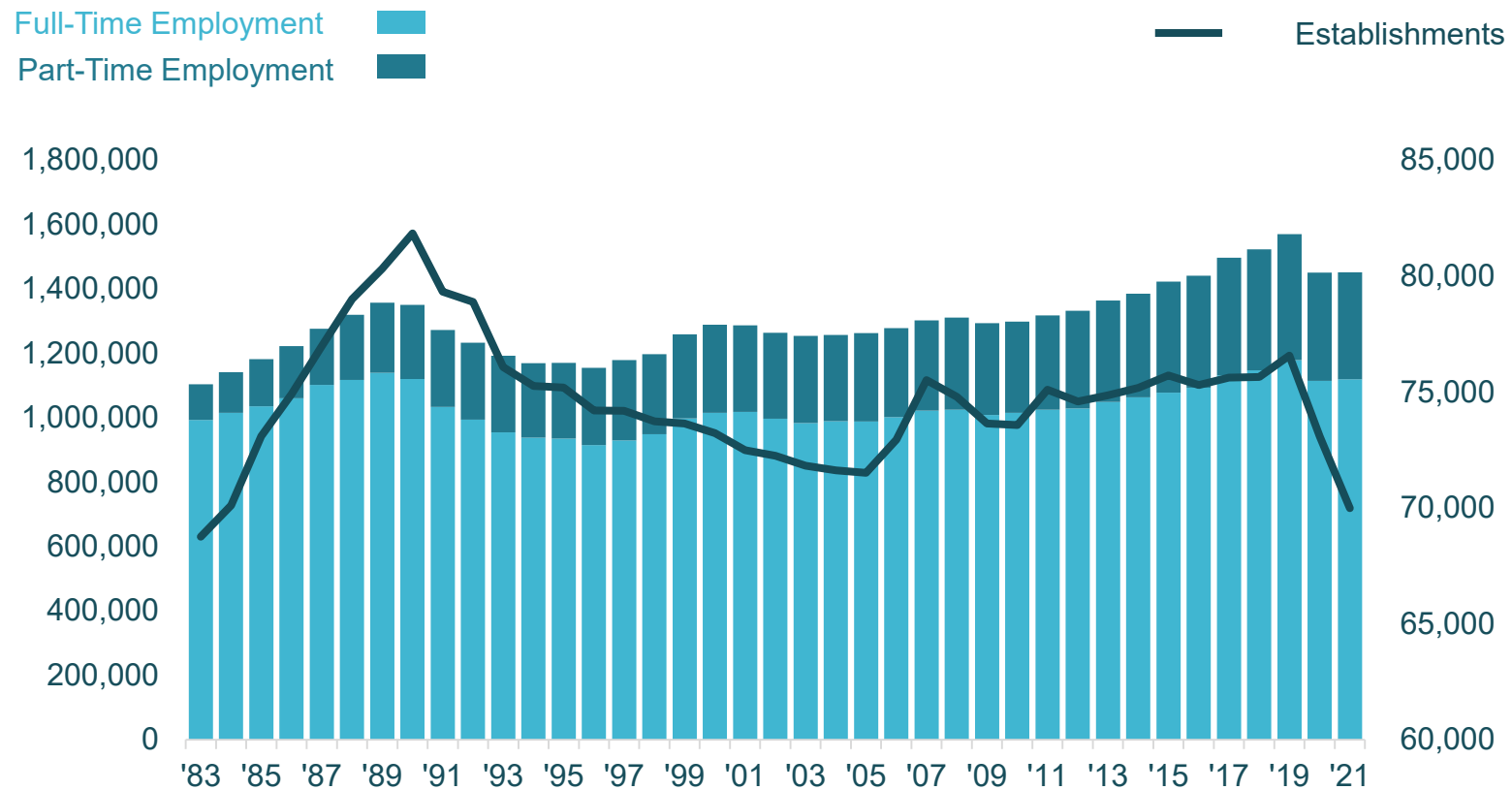
Full and Part-Time Employment in Toronto, 1983-2021

Year	Full Time Employment	Part Time Employment	Total Employment	Businesses	Year	Full Time Employment	Part Time Employment	Total Employment	Businesses
1983	992,410	111,270	1,103,680	68,750	2003	982,990	270,700	1,253,690	71,810
1984	1,015,100	126,390	1,141,490	70,100	2004	989,100	267,850	1,256,950	71,620
1985	1,035,120	146,530	1,181,650	73,090	2005	988,420	273,790	1,262,210	71,510
1986	1,059,850	162,560	1,222,410	74,910	2006	1,001,060	276,950	1,278,020	72,940
1987	1,101,400	174,380	1,275,780	76,960	2007	1,021,320	280,300	1,301,620	75,510
1988	1,117,220	202,100	1,319,320	79,000	2008	1,024,880	285,970	1,310,850	74,790
1989	1,138,790	217,750	1,356,540	80,310	2009	1,008,380	284,810	1,293,190	73,640
1990	1,120,020	230,070	1,350,080	81,830	2010	1,014,620	283,680	1,298,300	73,570
1991	1,032,840	239,130	1,271,970	79,320	2011	1,024,200	293,100	1,317,300	75,100
1992	993,790	239,150	1,232,940	78,880	2012	1,028,850	302,720	1,331,570	74,590
1993	954,620	237,150	1,191,770	76,070	2013	1,048,300	315,560	1,363,850	74,850
1994	937,590	231,310	1,168,900	75,250	2014	1,063,550	320,860	1,384,390	75,180
1995	935,010	234,900	1,169,910	75,190	2015	1,077,930	344,350	1,422,280	75,710
1996	914,840	239,370	1,154,210	74,200	2016	1,092,700	348,090	1,440,790	75,290
1997	929,450	249,070	1,178,510	74,190	2017	1,131,690	364,560	1,496,250	75,620
1998	948,900	248,150	1,197,040	73,730	2018	1,147,010	375,870	1,522,880	75,640
1999	997,380	260,850	1,258,230	73,630	2019	1,178,940	390,850	1,569,800	76,560
2000	1,015,290	273,090	1,288,390	73,220	2020	1,114,090	335,820	1,449,910	73,080
2001	1,017,850	268,500	1,286,340	72,480	2021	1,119,350	332,170	1,451,520	69,990
2002	996,710	266,600	1,263,310	72,250					

Source: Toronto Employment Survey, 1983-2021

Why visualization?

Full and Part-Time Employment in Toronto, 1983-2021



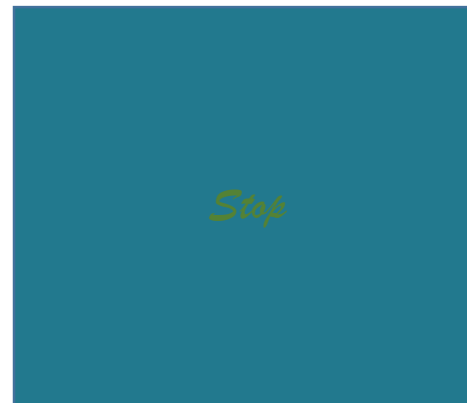
Source: Toronto Employment Survey, 1983-2021

The human brain likes pictures!

- Present information in a way that allows the brain to process it quickly based on visual cues
- Use colour, emphasis, size and shape to lead the way
 - For example, think of a stop sign's colour, shape, font size and use of capitalization



VS



The power of visualization

How many letter Ks are there below?
Time how long it takes you to find them all.

G R C I E D K C W H U X Q K N
F T I A M E W Q H O S W Q I Z
L Y K P J Z B N O Z K G S R T U
F O D M R K I U Q H V P Z E T

The power of visualization

How many letter Ks are there below?
Faster?

G R C I E D K C W H U X Q K N
F T I A M E W Q H O S W Q I Z
L Y K P J Z B N O Z K G S R T U
F O D M R K I U Q H V P Z E T

More visualization techniques

Use different visual strategies based on the type of data.

Example: **Colour**

For categorical data (e.g. months, names), use different colour hues:

January

February

March

For quantitative data (e.g. counts), use different colour shades:

10 participants

100 participants

1,000 participants

Yes, Please

- **Simple and clear**

- Title, brief instructions, filters up top or on right, stick to 2-3 visualizations
- Limit font types and colours
- Design for different device types (e.g. desktop, mobile, tablet) – stack vertically rather than horizontally

- **Accessible to all**

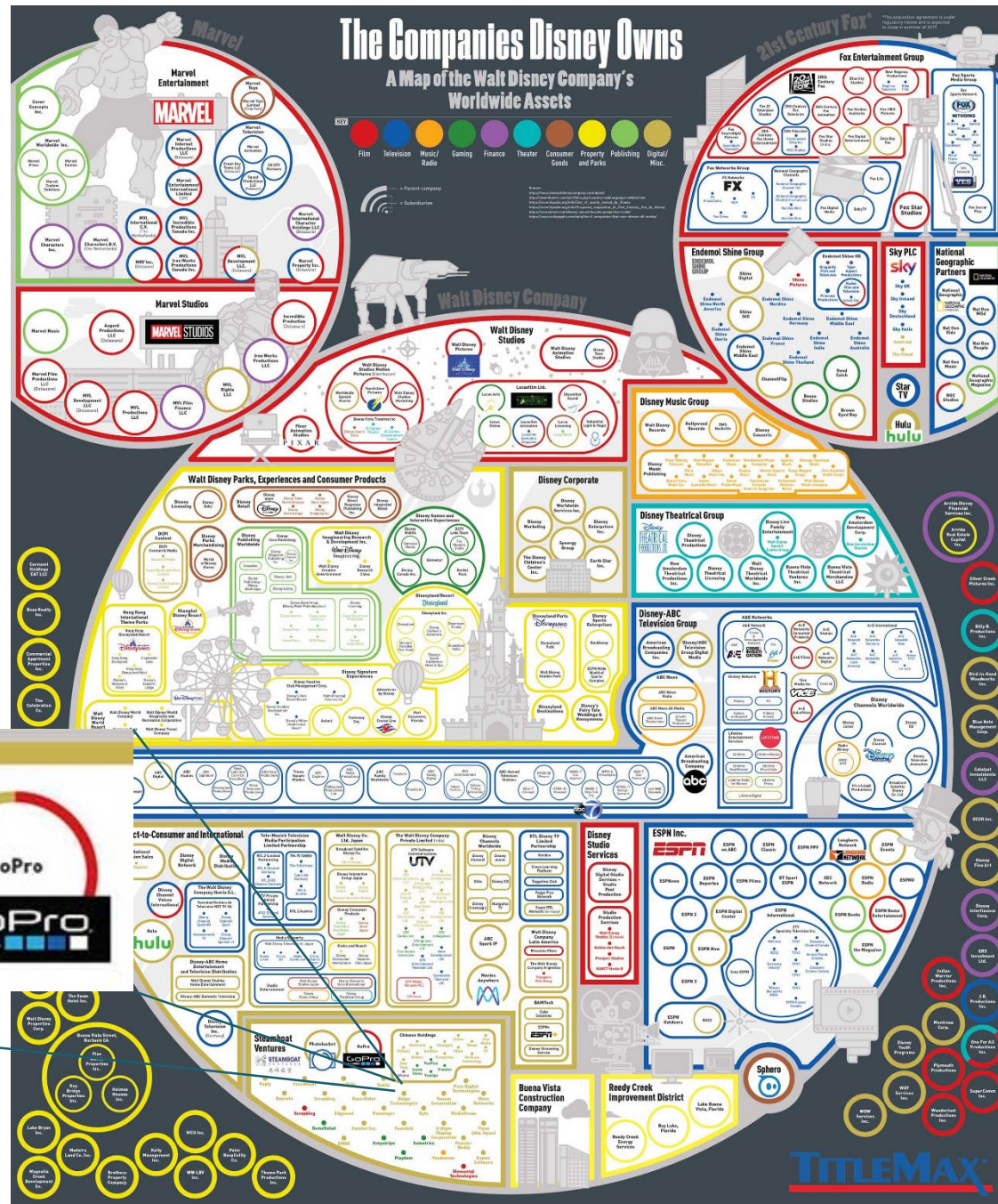
- Use Colour-blind friendly palette
- Alternative text (alt text) and captions
- Logical reading order: left-right, top-bottom

No, Thank You

- **Large tables:** hard to read, interpret, quickly see trends
- **Pie charts:** harder to compare slices visually compared to bars
- **Fancy fonts, many colours:** stick to 2 or 3
- **Many visualizations or views:** should fit mostly on one screen
- **Many themes:** organize dashboard around a central point or question

No, Thank You

The trap of too much information...



Steamboat Ventures
STEAMBOAT VENTURES
思博投资

Photobucket

GoPro
Get it HERO.

Building a Dashboard

Interactive Activity II

WOR-05
July 5, 3 - 4:30 PM



Creating a Dataset

Typically, dashboards are created with data that already exists. You can use Open Data portals for data to experiment and learn with if your organization does not have any public datasets.

For this workshop, we will create a dataset together based on your responses to a quick questionnaire:

<https://bit.ly/elevatequestionnaire>

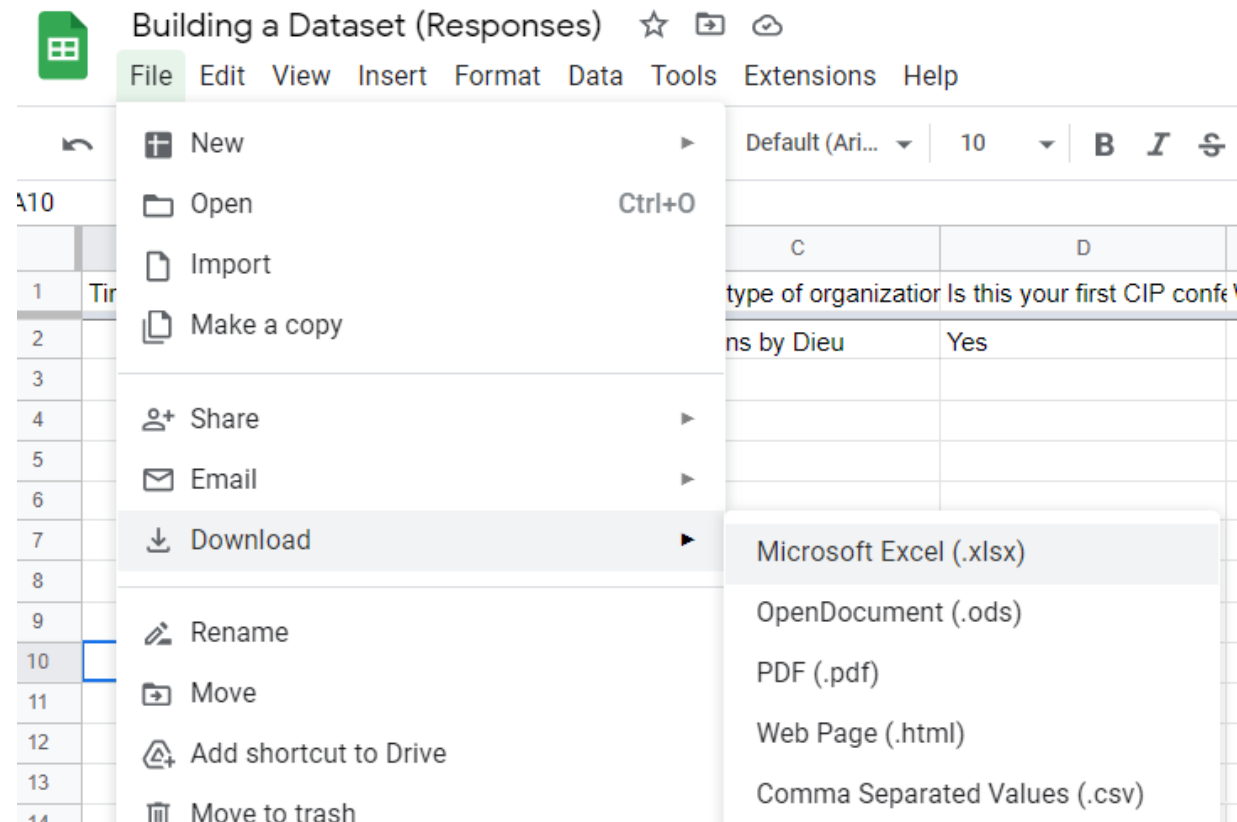
Take 2-3 minutes to fill in your responses.

Dataset to Dashboard Demo

Let's review the responses together:

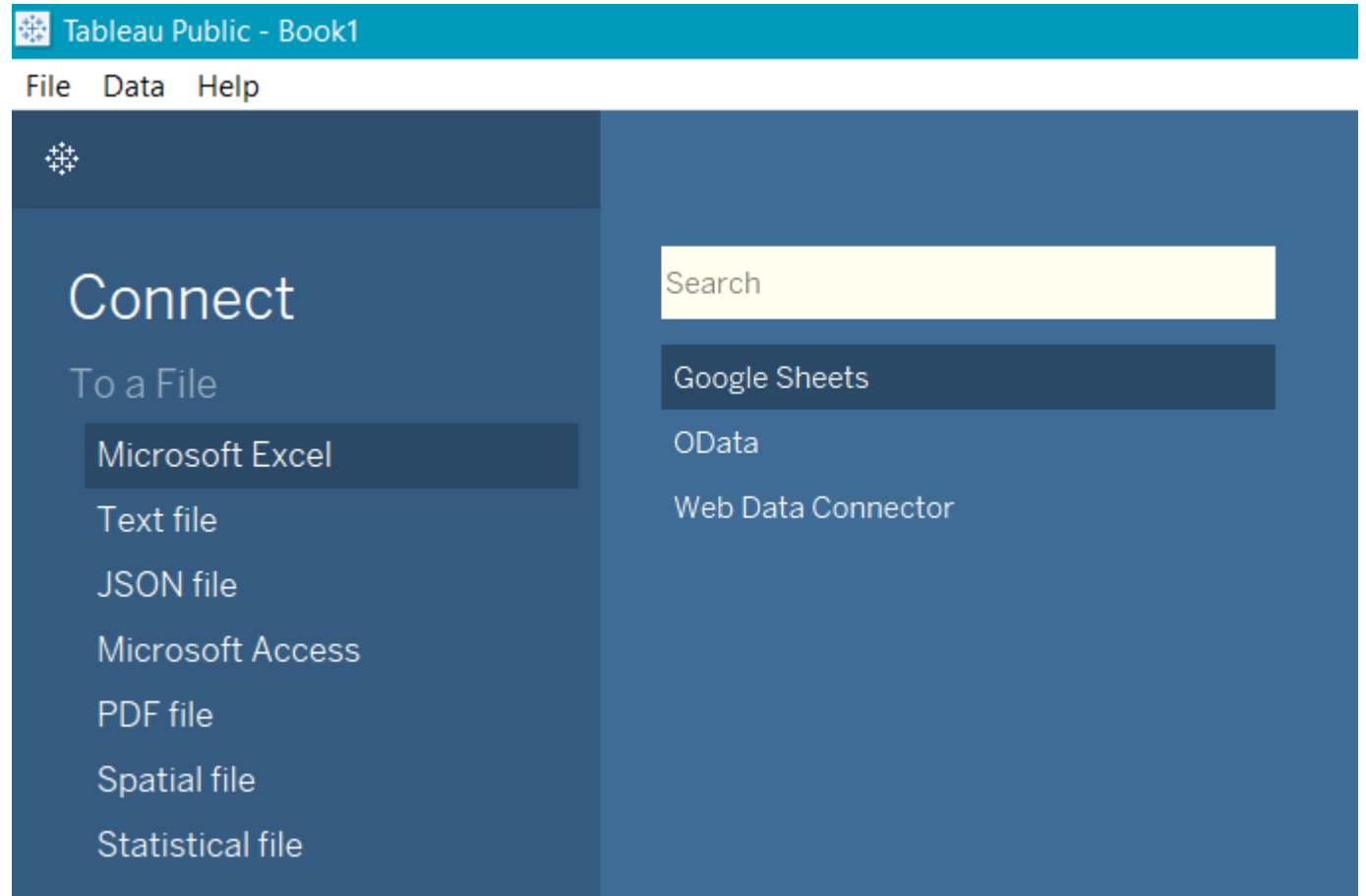
<https://bit.ly/elevateresponses>

Download the file:
File / Download /
Excel or CSV



Dataset to Dashboard Demo

- Open the data file and check that it downloaded properly
- Open Tableau Public
- Connect to a file
 - Microsoft Excel for .xlsx
 - Text file for .csv



Resources

Tableau

- Accessibility: <https://www.tableau.com/products/accessibility>
- Tableau Public tutorials: <https://public.tableau.com/en-us/s/resources>
- Dashboard guide: <https://www.tableau.com/solutions/business-dashboards>

Open Data

- Canada: <https://open.canada.ca/en/open-data>
- Ontario: <https://data.ontario.ca/>
- Toronto: <https://open.toronto.ca/>

Accessibility

- Color Brewer (colour palettes): <https://colorbrewer2.org/>
- Contrast Checker: <https://contrastchecker.com/>

Kara - feel free to contact me at kara.naklicki@toronto.ca

 <https://www.linkedin.com/in/karanaklicki/>

 <https://twitter.com/KNaklicki>

Elevate Your Data

Tools for Telling Stories, Finding Insights,
and Empowering Public Understanding

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