



# Visualisation tools

# Agenda

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1. Introduction
2. Things to consider when choosing a tool
3. Tool examples
  - Power BI
  - Tableau
  - R Shiny
  - Excel
4. Others
5. A few tips to end on
6. Summary
7. Questions

# Introduction

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- Data has increased, and so have the number of tools available to visualise it!
- Can capture whole story of dataset in a single graph.
- Tools allow:
  - Build of interactive dashboards tracking key business metrics
  - Automatic updates of visuals
  - Connecting and visualising many data sources in one place
  - Easy download of visuals for static reports...
  - ...and don't need to be able to code to do all of above.

# Benefits of data visualisation tools

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- Publish data reports and dashboards online - easy to share.
- Interactive (user can drill into data)
- Hold a lot more information in single view
- Can handle much bigger datasets
- Automatic updates of visuals if new data
- Connecting and visualising many data sources in one place
- Multiple collaborators on single dashboard
- Easy download of visuals for static reports

...and you don't need to code!

# Things to consider when choosing your tool

End users (mobile vs desktop)

Community support & forums

Shareability & security

Reproducibility  
& maintenance

Often you won't have a choice...

Ability to adapt to the tool at hand

Chance to learn and be creative!

Necessary additional  
features & complexity

Connecting your  
data sources  
(number of sources,  
static vs. live)

Number of users  
(view only vs authors)

# Comparisons

## Gartner

Figure 1. Magic Quadrant for Analytics and Business Intelligence Platforms



Source: Gartner (February 2019)

## Benjamin Bach

DataTech Talk  
(slide 8)

# Vistools project

Can be found [here](#).

Project aims to help with making choices when searching for visualisation tools, and is developed at the University of Edinburgh.

The Vistools project interface is a web-based search tool for visualization software. It features a dark header with the title 'VISBROWSER', navigation links 'ADD A TOOL' and 'ABOUT', and a search bar. Below the header is a grid of filters categorized by 'AVAILABILITY', 'PROGRAMMING SKILLS', 'PLATFORM', 'FEATURES', 'TYPE OF DATA', and 'VISUALIZATION'. Each filter category contains a list of options with associated counts. For example, under 'AVAILABILITY', there are 23 'Free' tools, 20 'Open source' tools, and 16 'Paid' tools. The main content area displays a grid of tool cards, each with a thumbnail image, a title, a URL, and a brief description. The tools shown include ColorBrewer 2.0, Iwanthue, RStudio, ChartBlocks, and Gephi. Each card also includes a set of icons representing the tool's features and capabilities.

AVAILABILITY	PROGRAMMING SKILLS	PLATFORM	FEATURES	TYPE OF DATA	VISUALIZATION
23 Free	16 None	13 Apple	17 Web-publishing	26 Numeric	9 Networks
20 Open source	8 Javascript	15 Windows	18 File exports	21 Geographic	21 Maps
16 Paid	3 Python	7 Linux	4 Other	22 Temporal	24 Basic charts
	1 Java	14 Web	7 Wizard	7 Text	10 Advanced charts
	9 Other	5 Library	6 PDF Export	14 Other	10 Other
	4 Matlab	0 Other			

**COLORBREWER**  
<https://colorbrewer2.org/>  
Intended for use as a diagnostic tool for evaluating the robustness of individual colour schemes.

**IWANTHUE**  
<https://medialab.github.io/iwanthue/>  
Colors for data scientists. Generate and refine palettes of optimally distinct colors.

**RSTUDIO**  
<https://rstudio.com/>  
RStudio is an integrated development environment for R, a programming language for statistic...

**CHARTBLOCKS**  
<https://www.chartblocks.com/en/>  
Build a chart in minutes in the easy to use chart designer, choosing from dozens of chart types and then...

**GEPHI**  
<https://gephi.org/>  
Gephi is an open-source network analysis and visualization software package written in Java on the...

# Examples





**Power BI**

# Power BI

- A lot cheaper than many other options
  - Free (with Microsoft Office) BUT only if creating own reports or ok posting publicly (so not secure data)
- Can run R scripts
  - Need Pro license to render visuals
  - Not all packages supported
- Custom visuals
- Regular updates
  - Can post suggestions on community forums
- Lots of community support & blogs
- Connect to lots of data sources
- Accessible to non technical audience (intuitive for excel users).
- Mobile version – can get notifications for changes
- Interacts well with other Microsoft products
- Real time updates

- Not available on macOS
- Not free to publish or share securely (Pro license is \$10 a user per month)
- Rigid structure
  - Data structure
  - Report structure
- Limit data size
  - 10GB per workspace – any bigger...the cloud
- DAX (Data Analysis Expression) can complex after basic manipulation.
- Limit to the data preparation abilities



Power BI

**EXAMPLE**

[Example](#)



+ a b l e a u<sup>®</sup>

# Tableau

- Free Tableau Public (BUT can only save dashboards publicly so needs to open data).
- Has 'story' functionality which is nice for presenting dashboards.
- Available across operating systems.
- Can run R scripts
- Lots of community support & blogs
- Connect to lots of data sources
- Accessible to non technical audience
- Mobile version – can get notifications for changes
- Real time updates

- Can be expensive if have many people creating dashboards and want to save securely (\$70/per person/month as Creators license)
- Limited data prep - have 'Tableau Prep' tool but part of paid 'Creator' license.



[Example dashboard](#)

[Example story](#)



Examples

# R Shiny

- Customisable & flexible
- Open source
- Good support & tutorials
- Outside of server hosting costs, R Shiny is completely free
- Use all of R tools for analysis/visualisation/modelling
- Customisable with CSS and HTML
- Interactive to user input

- Not really a 'package' – beyond base R skills required
- Skilled needed to modify or update
- Difficult to debug
- Documentation not as good as other R packages





Excel

# Excel

x

- Most businesses have it
- Most business people have experience/  
can use
- Free (with Microsoft Office)
- Quick
- Good for prototype before investing

- Much less flexible
- Only handles very small amount of  
data
  - Can aggregate but reduces  
flexibility
- Can't connect to data/auto refresh
- Not good for sharing/collaborating
- Limited visuals
- Slow if too many formulas/data



Excel

**EXAMPLE**

# Others

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## Drag & drop

- **Datawrapper** – prepared data, data journalists ([here](#))
- **Flourish** - Data journalism, nice story functionality ([here](#))
- **Qlik** – Qlikview & QlikSense

## Coding

- **Plotly** - ‘Dash’ (Shiny for Python), plots on ggplot2 can be made interactive ([here](#))
- **D3** – JavaScript library, R package ‘r2d3’
- **Leaflet** – package in R, specific to mapping

# A few tips to end on...

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1. If get into an issue where have built in a tool and **can't securely share**
  - Potential work around - delete all data but keep one a dummy row to maintain structure then share
2. Get **end users & purpose agreed** before building:
  - Questions – why are you tracking this KPI? What action will you take if there is a change?
3. Sketch out or **wireframe** up design and get it agreed upon before by all end users before beginning.
  - Balsamiq (<https://balsamiq.com>)
4. Avoid overload, **simple** is often better.
5. **Flaticon** for icons (<https://www.flaticon.com>)

# Summary

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- Data visualisation is key of communication for any data analyst.
- A lot of factors to consider when choosing tool, but may be restricted by business/client.
- **Power BI** can be cost effective and relatively accessible to non-coders but does have limitations in structure, and not available on macOS.
- **Tableau** is relatively accessible to non-coders but can get pricey for secure data.
- **R Shiny** is hugely flexible and open source but can be a steep learning curve.
- **Excel** can be great for prototypes before more investment but hugely limited in creativity and data size.
- Many players in the market and need to consider budget, purpose and data before making a choice.

**Go give some a go!**

Questions?