CHARTING A DIGITAL FUTURE

GROUP 4
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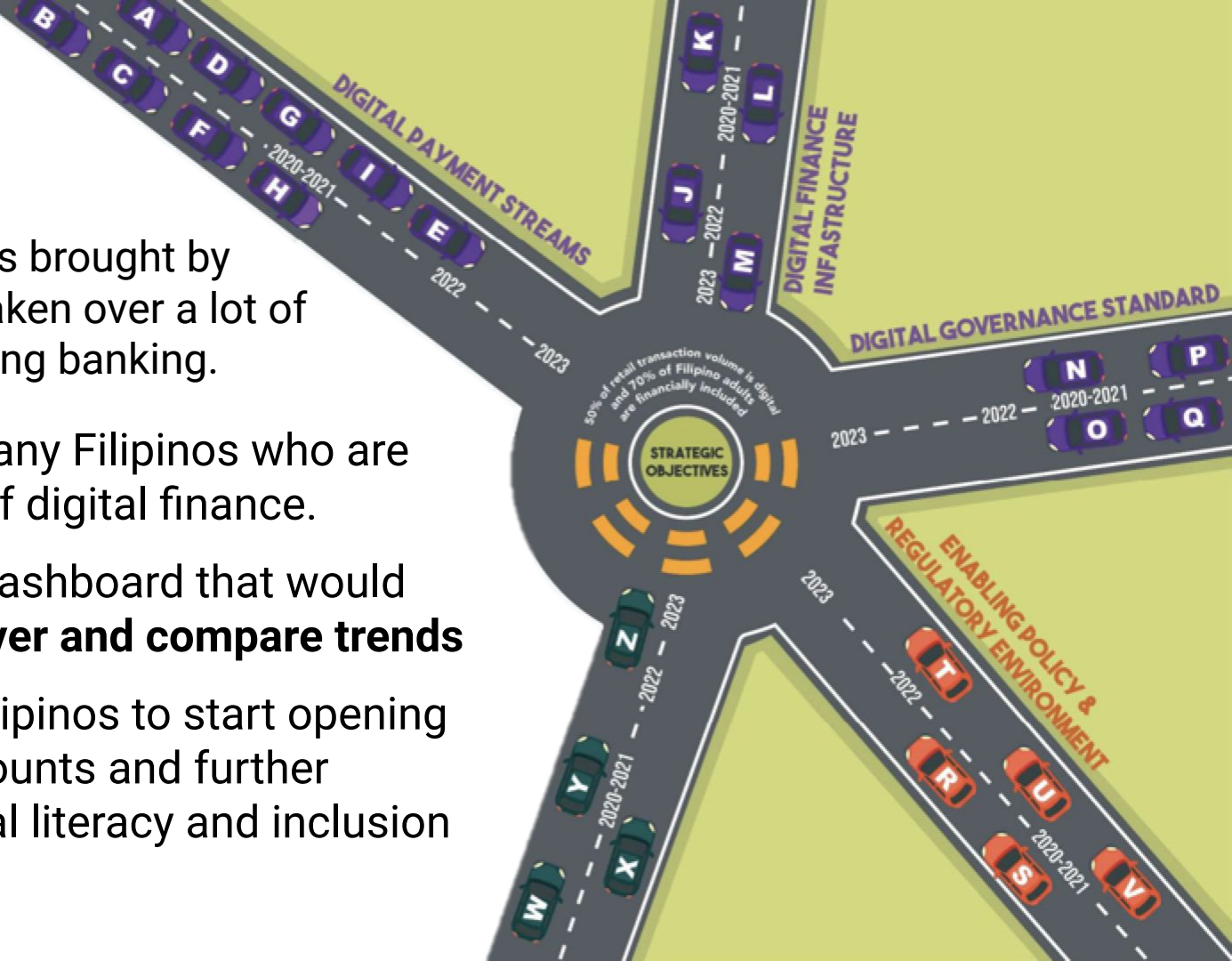
Motivation

- The rapid changes brought by technology has taken over a lot of industries, including banking.
- There are still many Filipinos who are not fully aware of digital finance.
- A visualization dashboard that would help us to **discover and compare trends**
- To encourage Filipinos to start opening digital bank accounts and further promote financial literacy and inclusion in the country.



Visualization Problem

- As a relatively new concept, there are limited visualizations on the topic of digital banking and financial inclusion
- A dashboard focusing on digital finance in the Philippines and comparing it against the East Asia & Pacific region is something that has not been focused on yet
- **Visualization Solution**
  - Digital Banking East Asia and Pacific
  - Digital Banking Overview for the Philippines

Data Sets

- **World Bank**
  - Global Financial Inclusion (Global Findex) Database 2021
    - Mobile Money Account
    - Owns a credit card
    - Owns a debit card
    - Made a digital payment
    - Received digital payments
  - Gross Domestic Product (GDP) Data

- **Bangko Sentral ng Pilipinas**
  - Financial Inclusion Report

DEVELOPMENT TOOLS

Among the tool choices:

- For **data wrangling**
  - Python Pandas, Numpy, Regex
- For **map rendering**
  - Geopandas
- For **different viz components**
  - Plotly Express, Graph Objects, Dash, Dash Bootstrap Components

OVERALL LAYOUT AND DESIGN

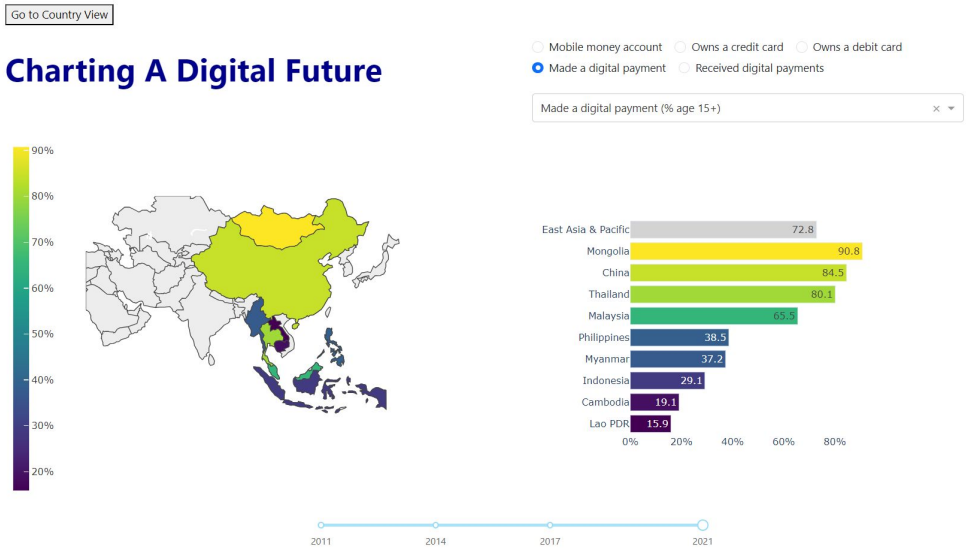
For **Regional View**

Radio buttons, drop down menu, slider:

- provides *options to choose Findex Indicator as well as Year to compare*, among neighboring countries

Map and Horizontal Bar Chart:

- meant to aid users in *comparing the same Findex indicator*, while the horizontal bar *aids in analyzing order of values*, among neighboring countries.



OVERALL LAYOUT AND DESIGN

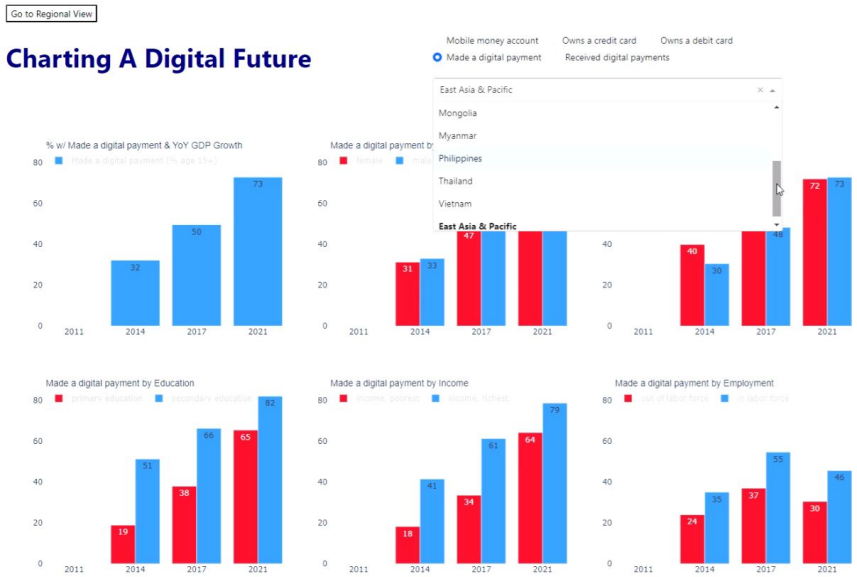
For **Country View**

Radio buttons, drop down menu:

- provides *options to choose Country to focus on*, as well as the *general Findex grouping*

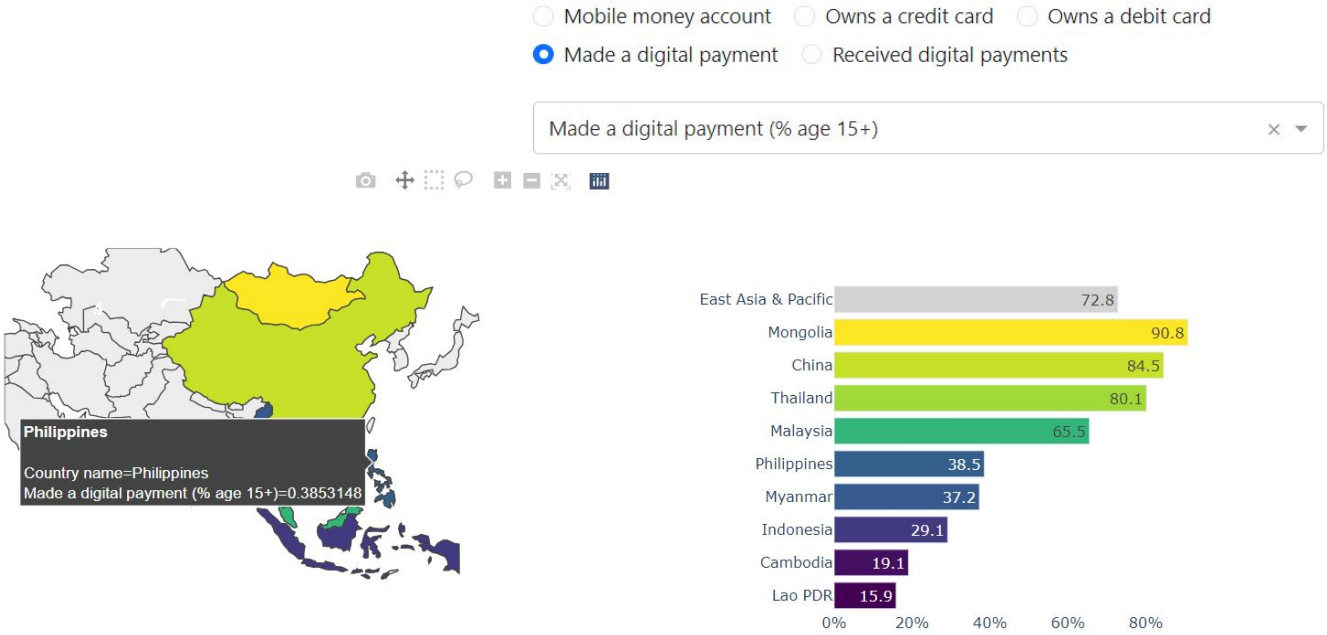
Side-by-Side Charts

- meant to *aid users in comparing trends using different dimensions* (ie. trend of penetration of digital payment usage, male vs female, in PH)



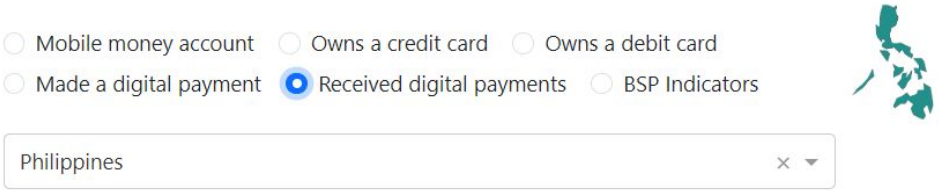
INTERACTIVITY TECHNIQUES

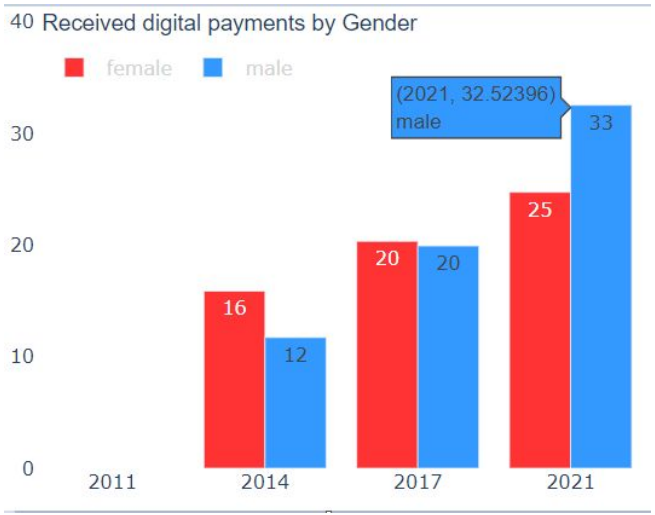
- Hover Over Regional View (Country)



INTERACTIVITY TECHNIQUES

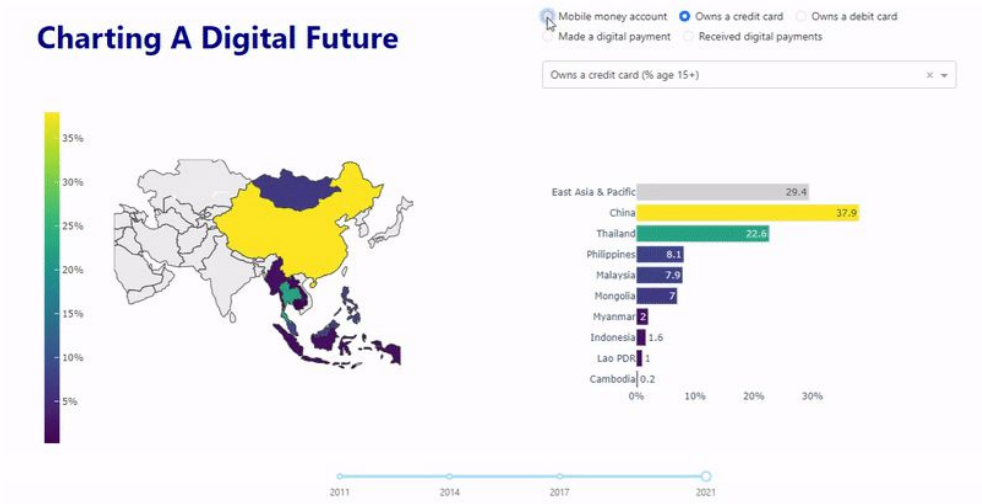
- Hover Over Country Specific View





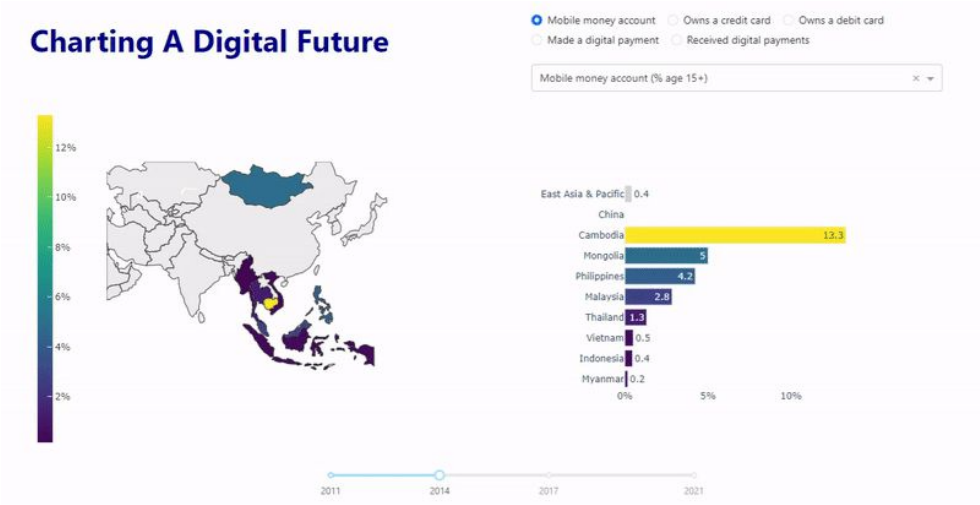
INTERACTIVITY TECHNIQUES

- Selecting a Global Findex Indicator Grouping (Radio Button)



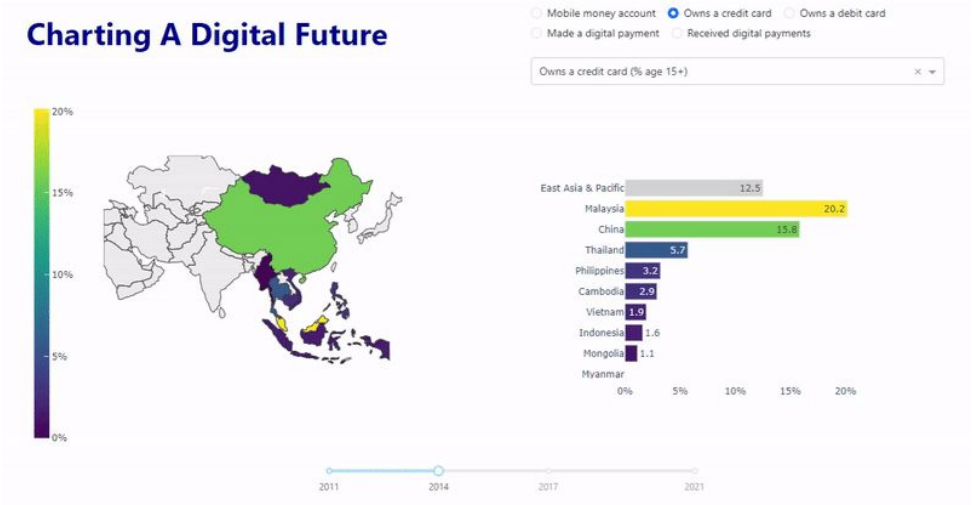
INTERACTIVITY TECHNIQUES

- Selecting specific Global Findex Indicator (Drop Down Menu)



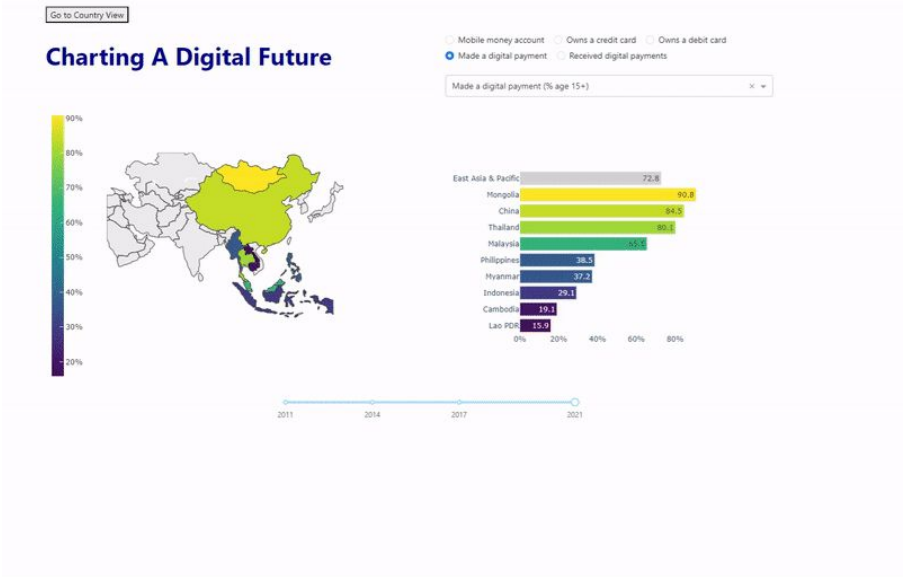
INTERACTIVITY TECHNIQUES

- Selecting specific Year (Slider)



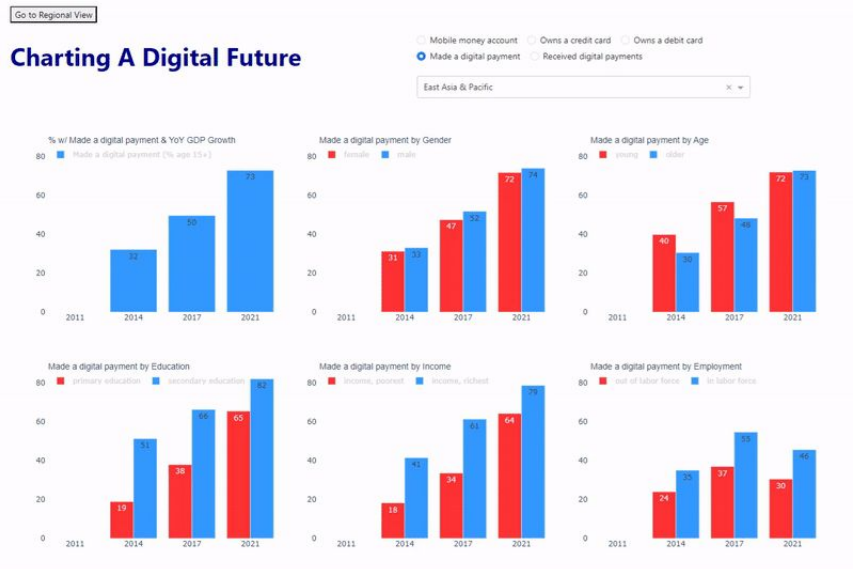
INTERACTIVITY TECHNIQUES

- Selecting specific Country (Drop Down Menu)



INTERACTIVITY TECHNIQUES

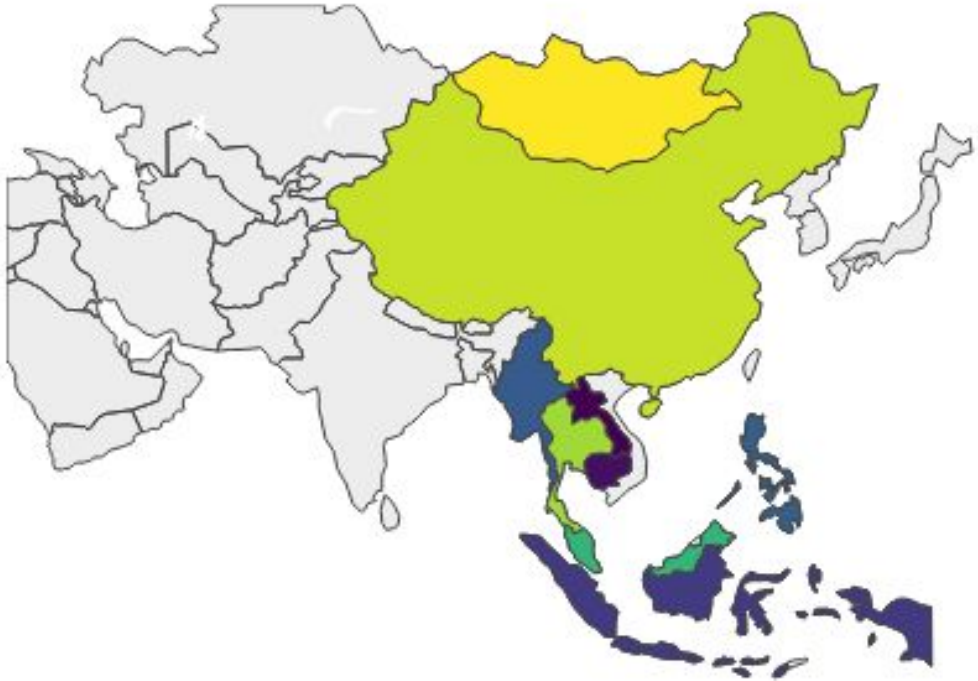
- Selecting specific BSP Indicator (Drop Down Menu, Radio Button)



IDIOM CHOICES AND JUSTIFICATIONS

Choropleth Map

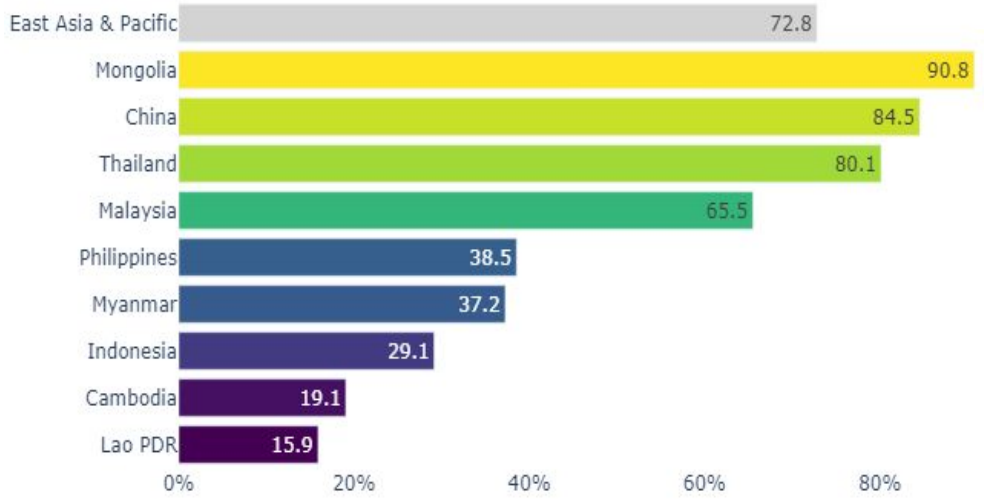
- This idiom provides an intuitive way to represent data across different regions. East Asia consists of several countries and a choropleth map displays the degree of adoption of digital payments for each country.



IDIOM CHOICES AND JUSTIFICATIONS

Horizontal Bar Chart

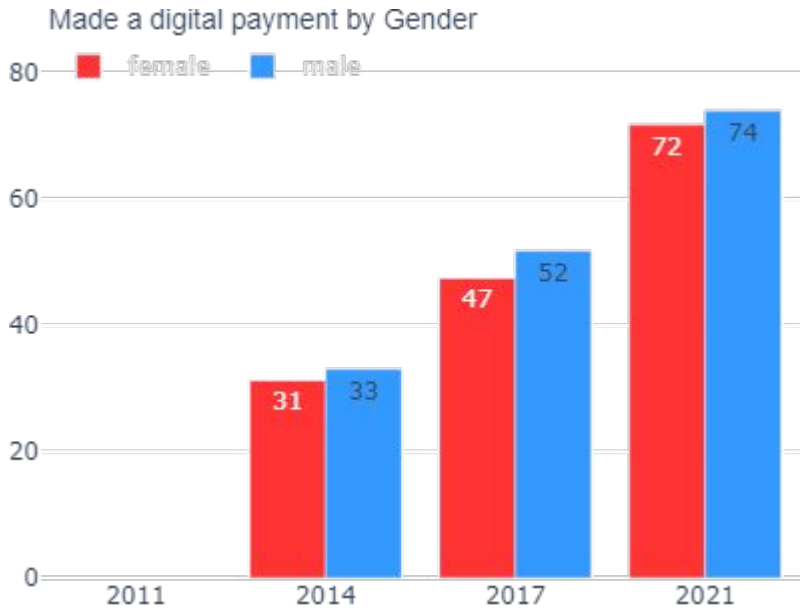
- This idiom is meant to complement choropleth map by aiding users in comparing and understanding ranking of attributes among countries, which may not be readily intuitive in a choropleth map. The same color scale from the choropleth map is adopted for consistency.



IDIOM CHOICES AND JUSTIFICATIONS

Group Bar Chart

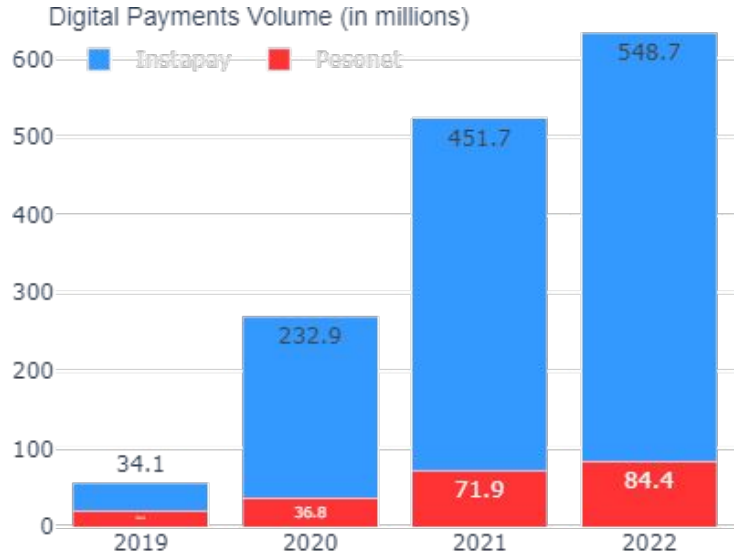
- We used this idiom to compare data sets grouped together under categories on the same axis. Using this, we allow users to answer questions such as: *what is the % difference of digital payments adoption between male and females, for each year (in a specific country)?*



IDIOM CHOICES AND JUSTIFICATIONS

Stacked Bar Chart

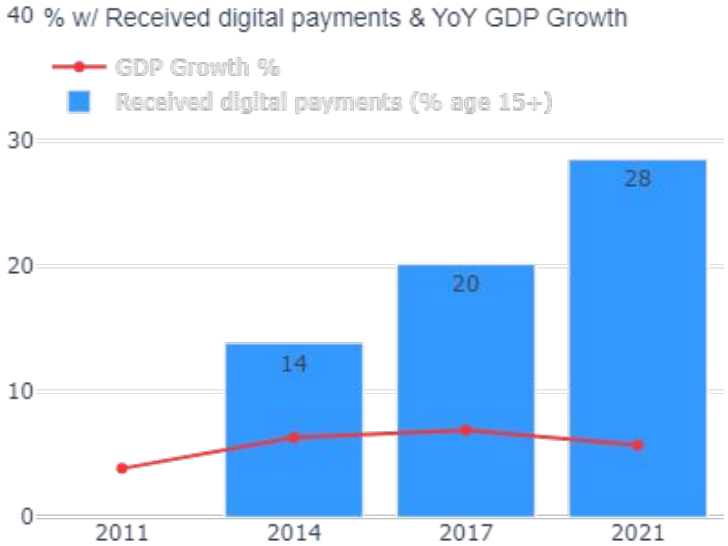
- This idiom allows users to visualize how each category contributes to the total. We can visually inspect the relative magnitude of each category through the bar heights. Using this, we allow users to answer questions such as: *what is the contributions of Instapay and Pesonet transactions to the total Digital payment volume, for each year (in the Philippines)?*



IDIOM CHOICES AND JUSTIFICATIONS

Combo Line and Bar Chart

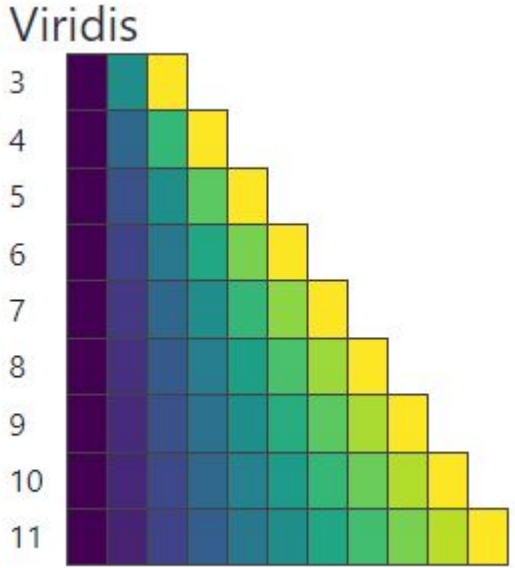
- We used this idiom to visualized mixed data, one coming from GDP dataset and another from Findex dataset. The motivation is to allow users to compose dual insights, *ie. does the GDP trend for this country roughly coincide with their digital adoption trends?*



IDIOM CHOICES AND JUSTIFICATIONS

Color Choices

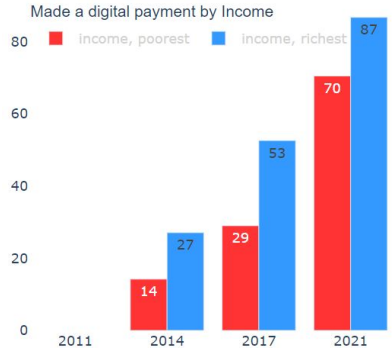
- Viridis Palette: Up to 10 Categories
- Hex codes:
  - #fde725, #b5de2b, #6ece58, #35b779, #1f9e89, #26828e, #31688e, #3e4989, #482878, and #440154

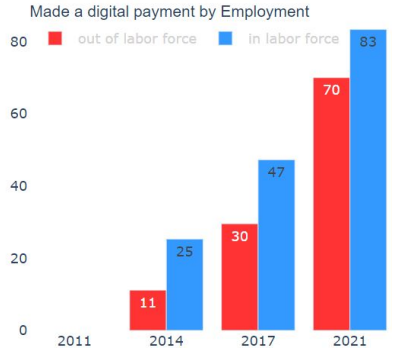


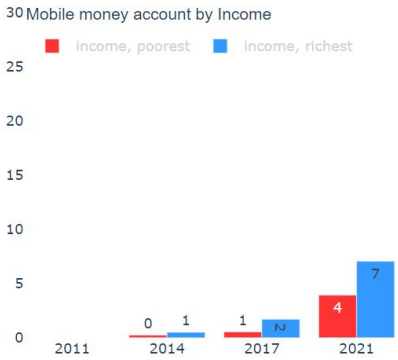
IDIOM CHOICES AND JUSTIFICATIONS

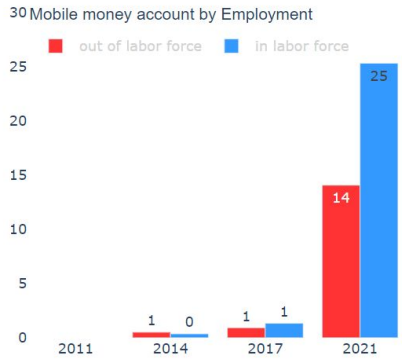
Height Choice

- This data reduction technique is considered given that some attributes have very low values. In Country view, graph *y-axes* is adopted to the maximum value given, instead of the default 100% to ensure that trends will still be visible.









CONCLUSIONS

Coming back to the motivation for this project, the group's aim was to address research questions focusing on:

- Demographic profiles of digital banking adopters
- Current state of digital banking adoption in the PH, and how it fares with peers in the East Asia and Pacific region
- Growth rate of digital finance vs economic growth in a country

With this app, layouts, idiom choices and interactivity techniques, we hope to enable users to find spatial relationships and compare trends within the dynamic landscape of digital finance across East Asia and the Pacific, seamlessly.

LESSON LEARNED

- Data collection, wrangling, cleaning
  - Global Findex data set has extensive dimensions, however lacked consistency in survey years and hence, very sparse. Only 63 out of 1233 attributes were retained.
  - BSP data set is available only as PDF reports which required manual collection, which poses a challenge for scalability
- Visualization
  - Choice of idioms are vast and can be overwhelming
  - Developing an app has a steep learning curve (*ie errors can be very vague which makes debugging painful, layouts in different browsers can be troublesome etc*). Fundamentals in web dev and coding would be helpful, if we want focus more effort on the next level analysis (*ie. descriptive vs storytelling, how to avoid making graphs lie etc.*)

DEMO

Charting A Digital Future

Questions?