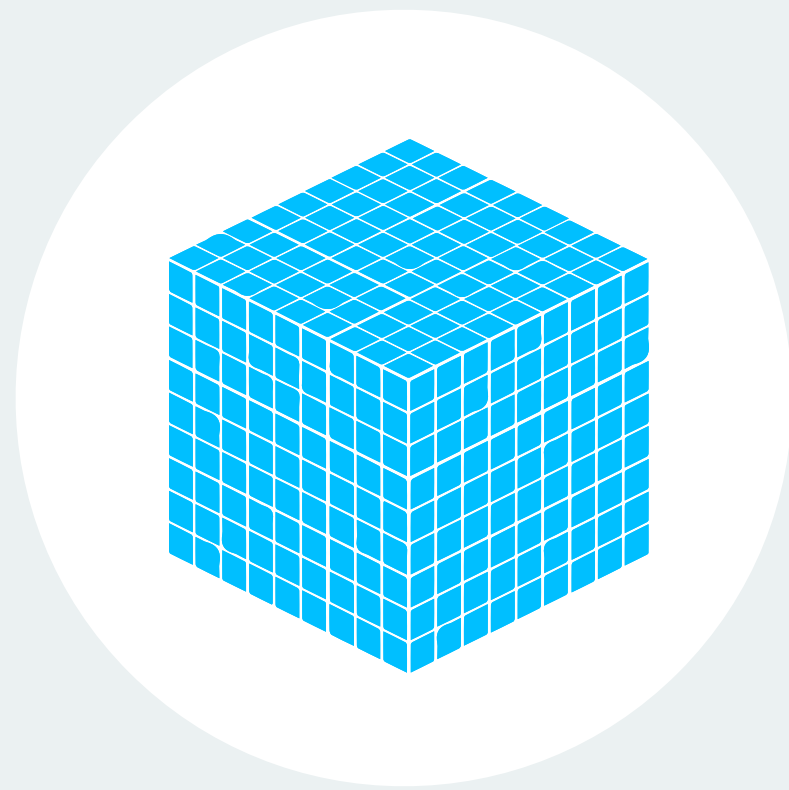# Data Visualization for Mumbai

Akshay Kore
146330007 | IDC IITB
Guide: Prof. Venkatesh R

Vast Quantities of Data

Open Data

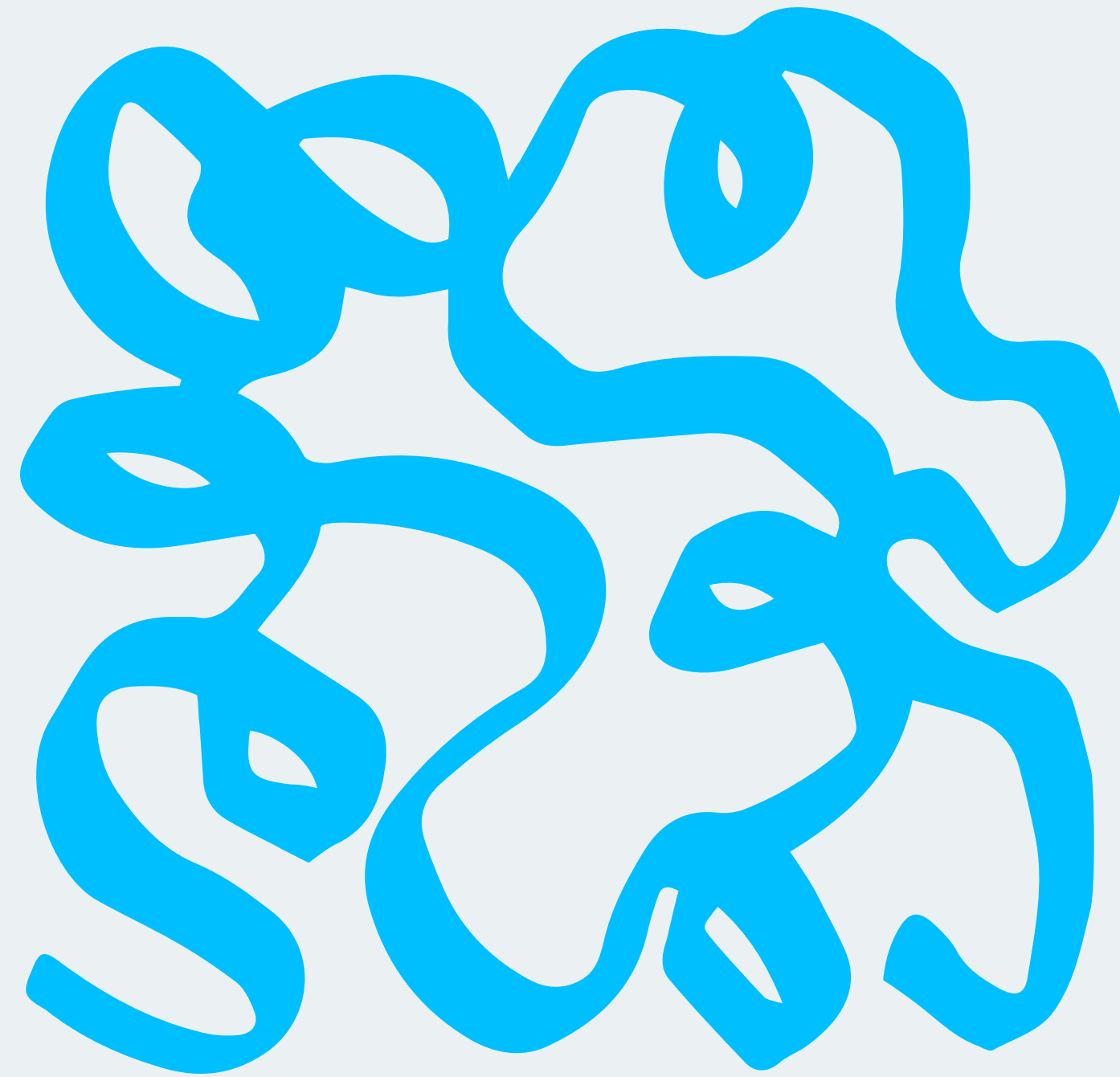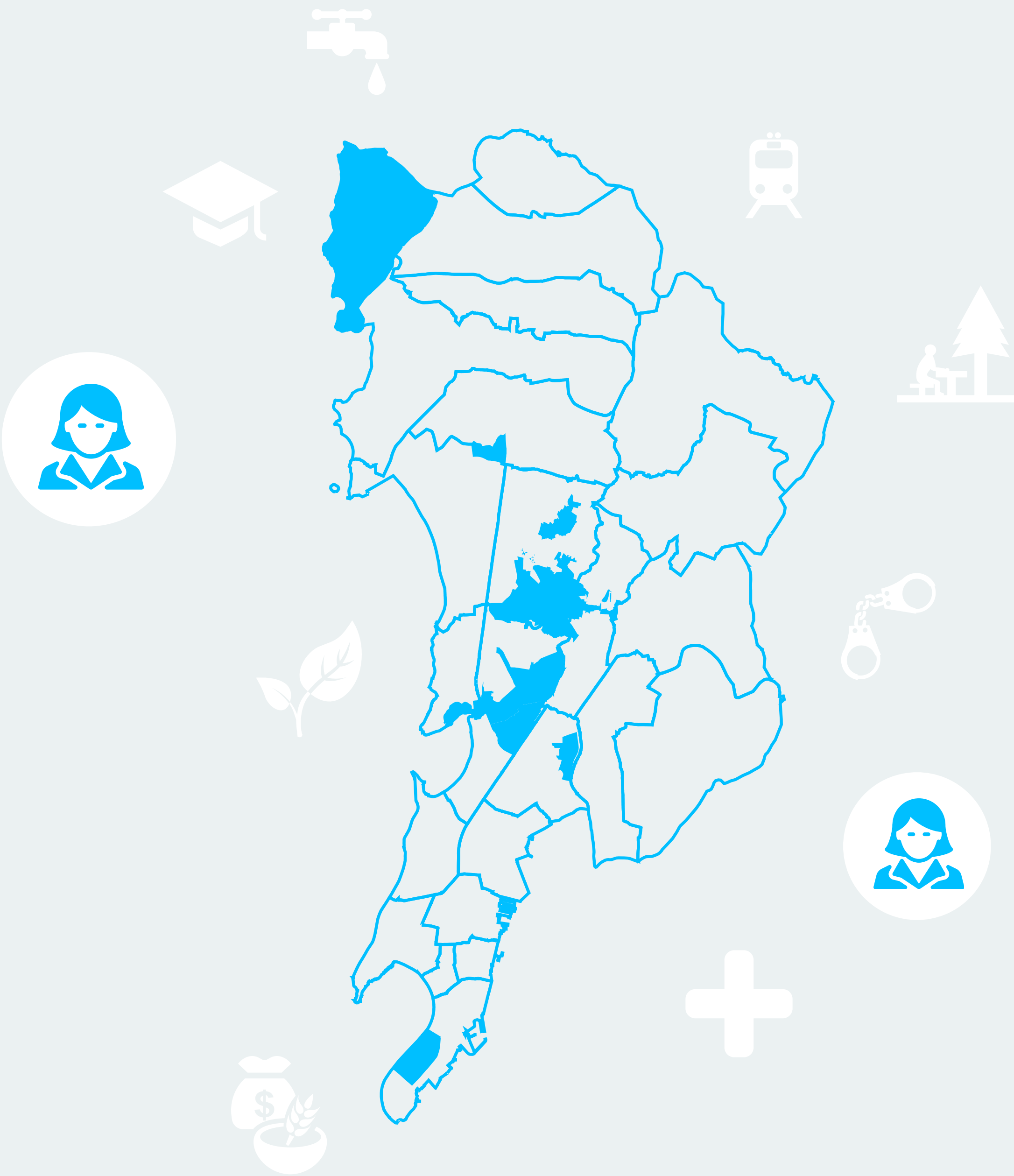No Restrictions of Copyright, Patents

Big Data

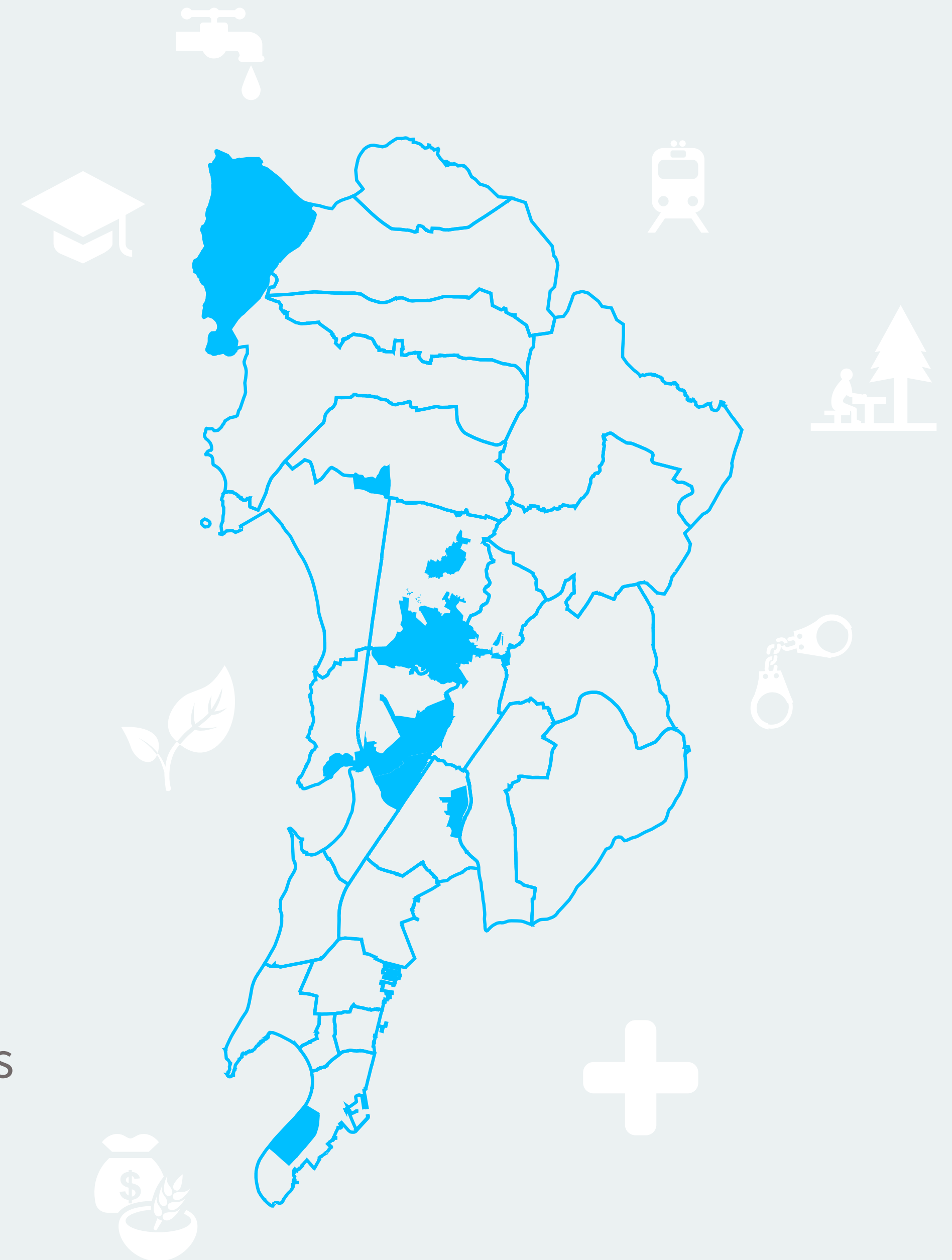Use

Access

Big Data

Messiness

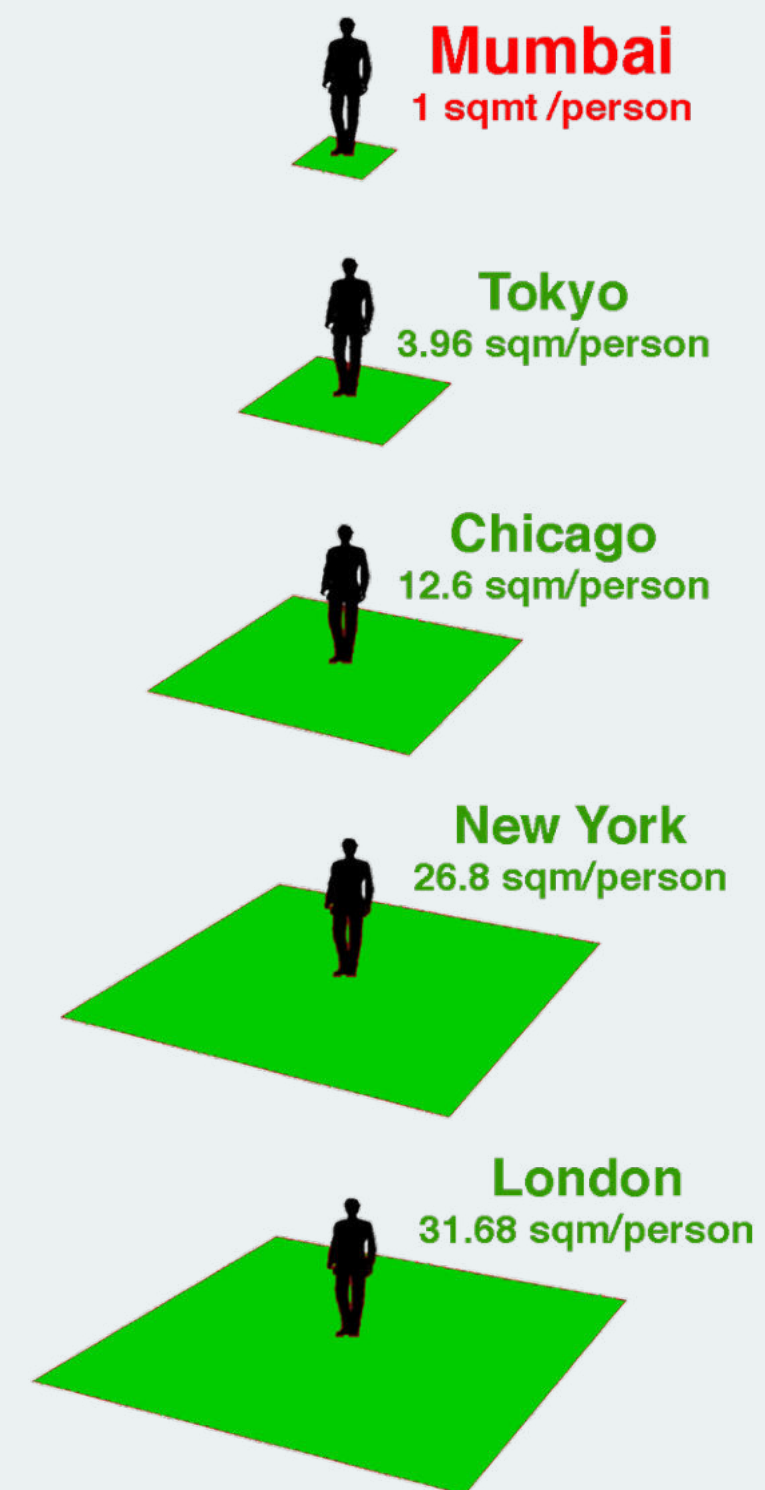# Mumbai's Data

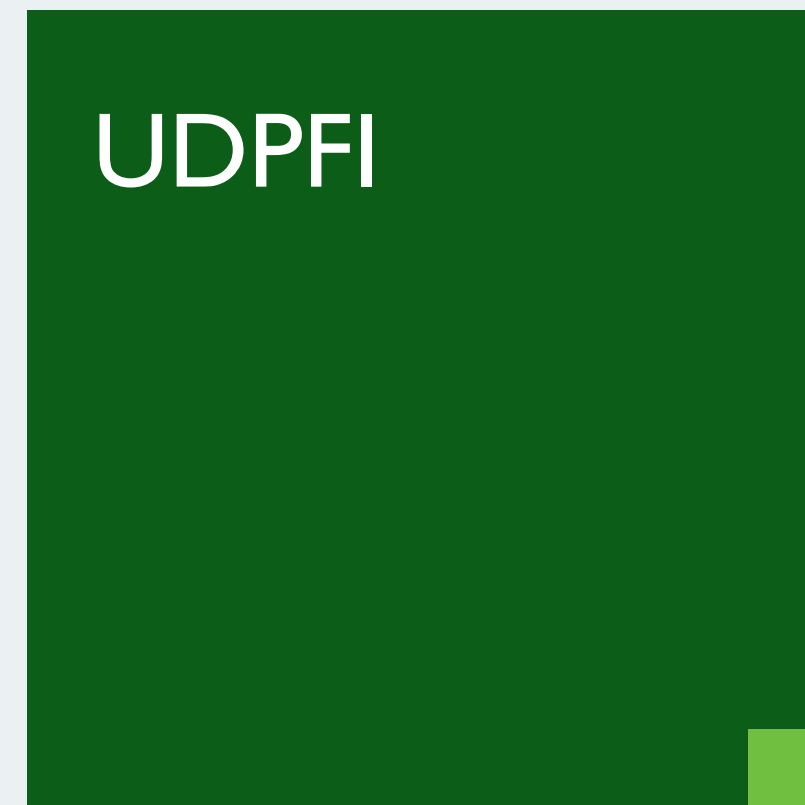# Mumbai's Data

Multiple File Formats

Incomplete Datasets

Preliminary Design Ideas

Comparison between cities

Comparison with standards

Exploratory Visualization

User Studies | Methodology

Contextual Enquiry | Semi-Structured Interview

Affinity Mapping

Users

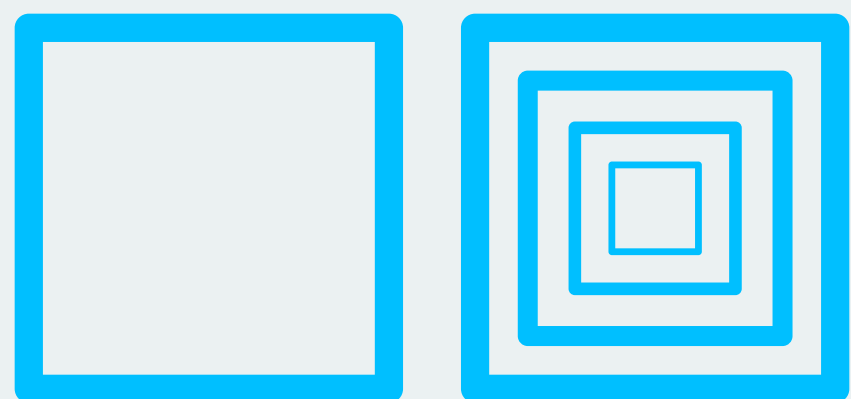|	
Academicians	1
Architects	3
Policy	2
Urban Planners	6
Journalists	2
Total	**14**

User Studies | Insights
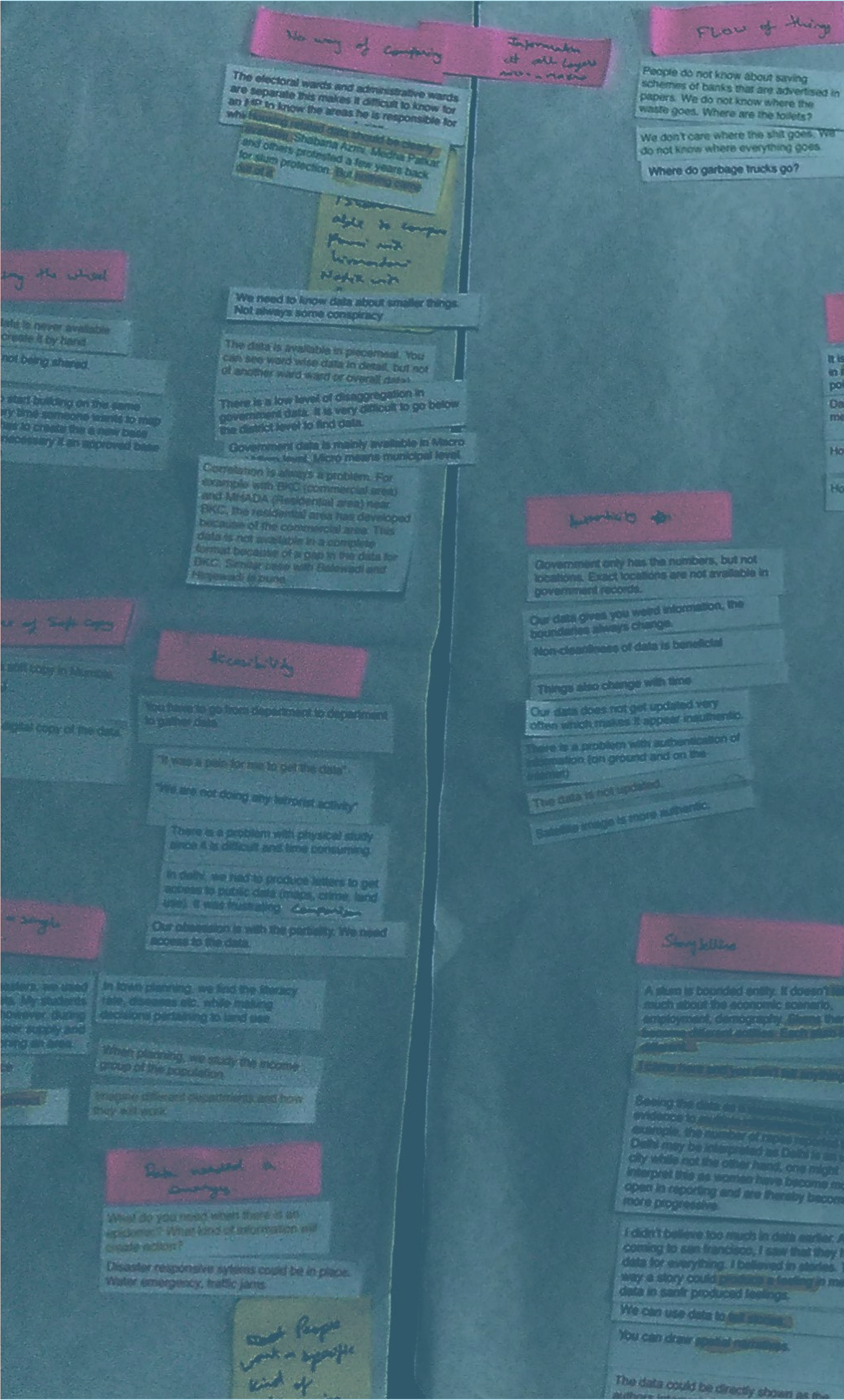

Purpose

Compare

Authenticity

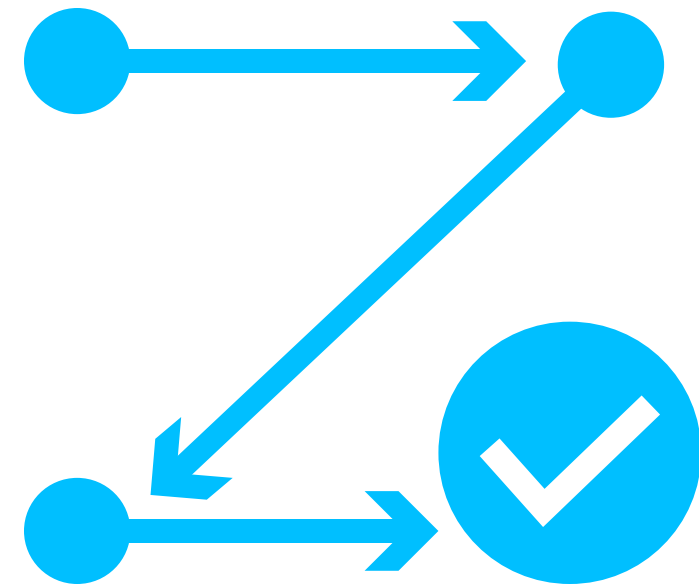Accessibility

Correlation

Desktop and Mobile Usage

User Studies | Need Gaps

Accessibility
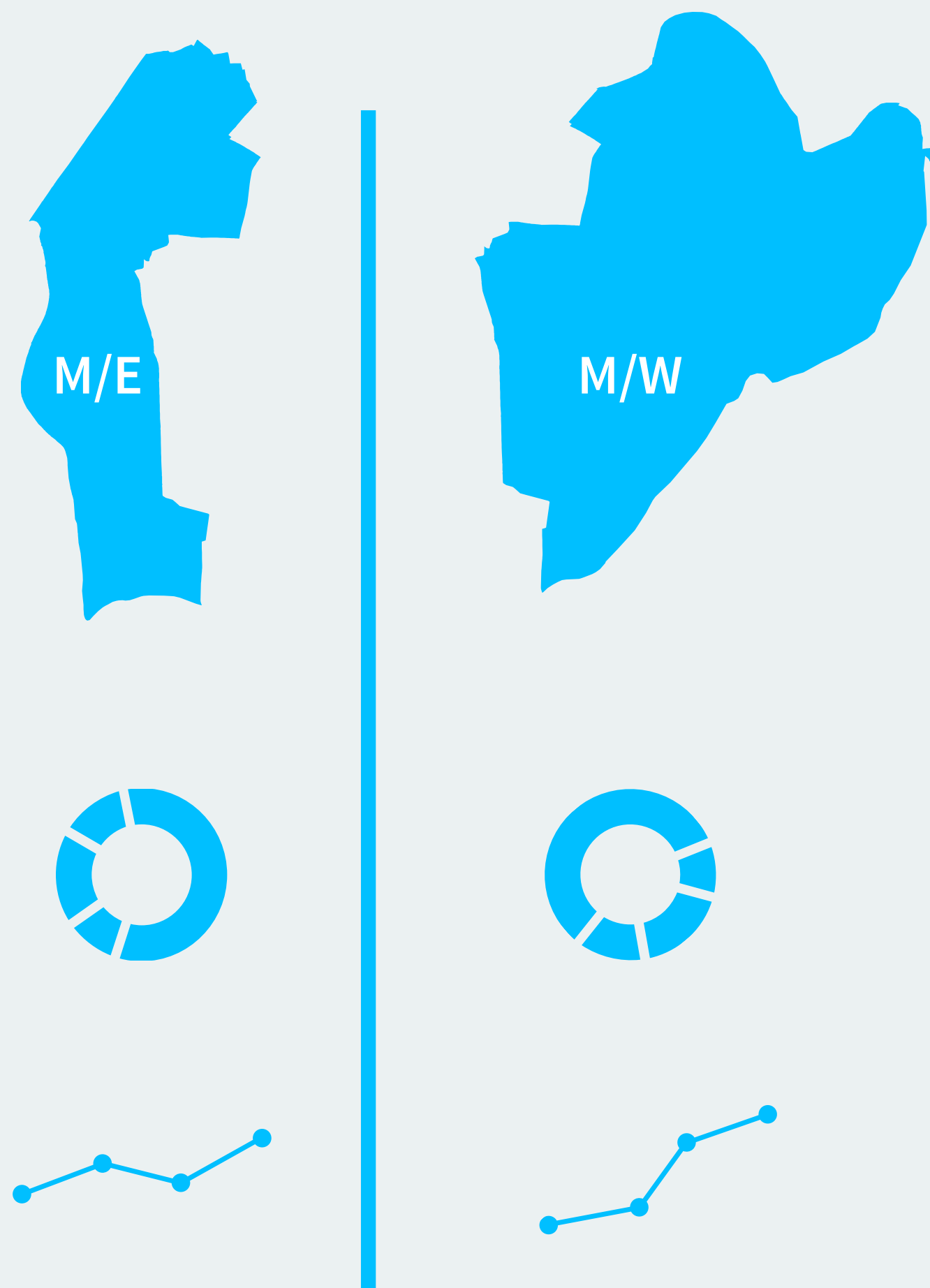
Post Processing of Data

Lack of Technical Expertise

Need of Data on the fly

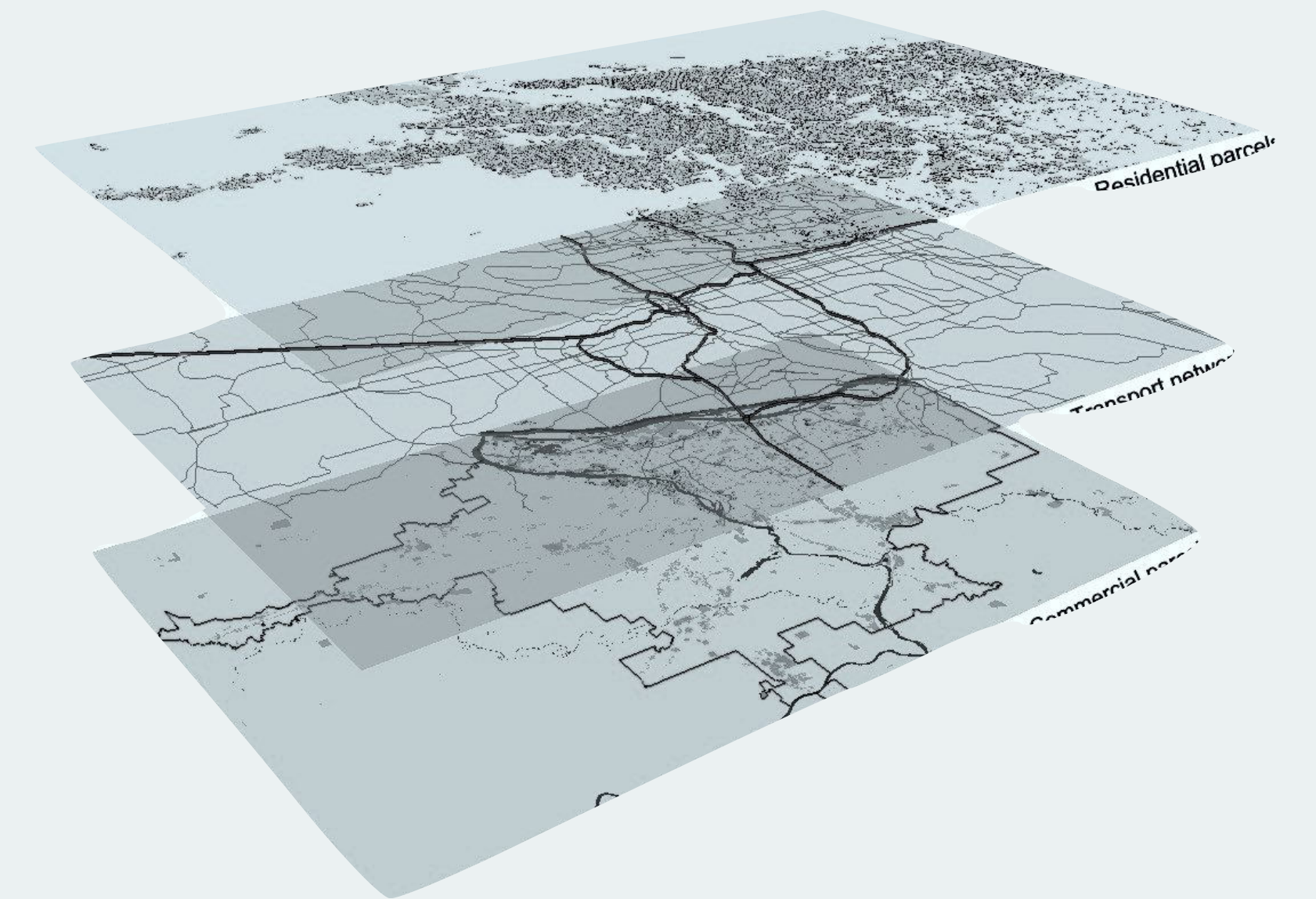# **Initial Design Ideas** | Comparison of Ward Data

M/E

M/W

Ward Boundaries do not exist on ground.

Comparison of wards does not generate actionable insights

Initial Design Ideas | Layering of Datasets
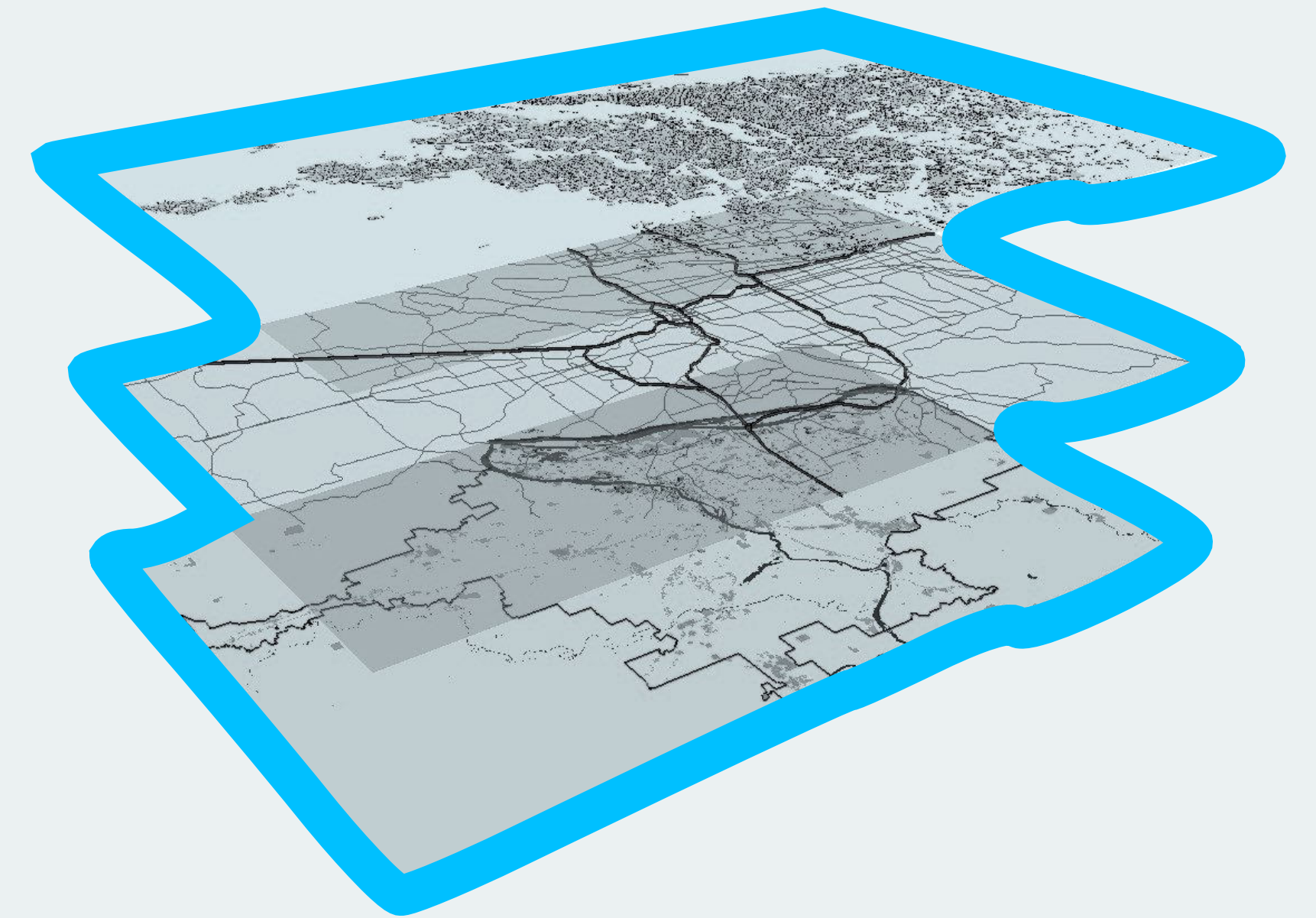

Tangible Layering

Intangible Layering

Initial Design Ideas | Layering of Datasets

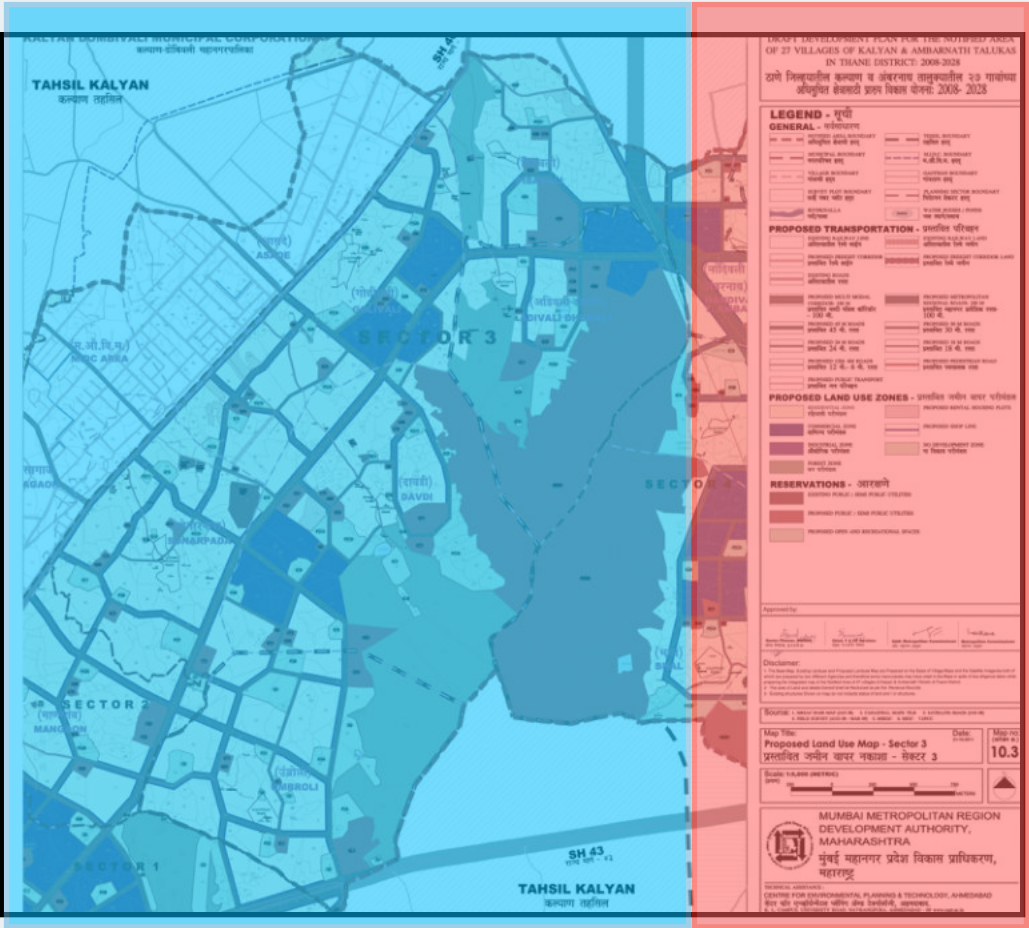
Tangible Layering

Intangible Layering

Metaphor
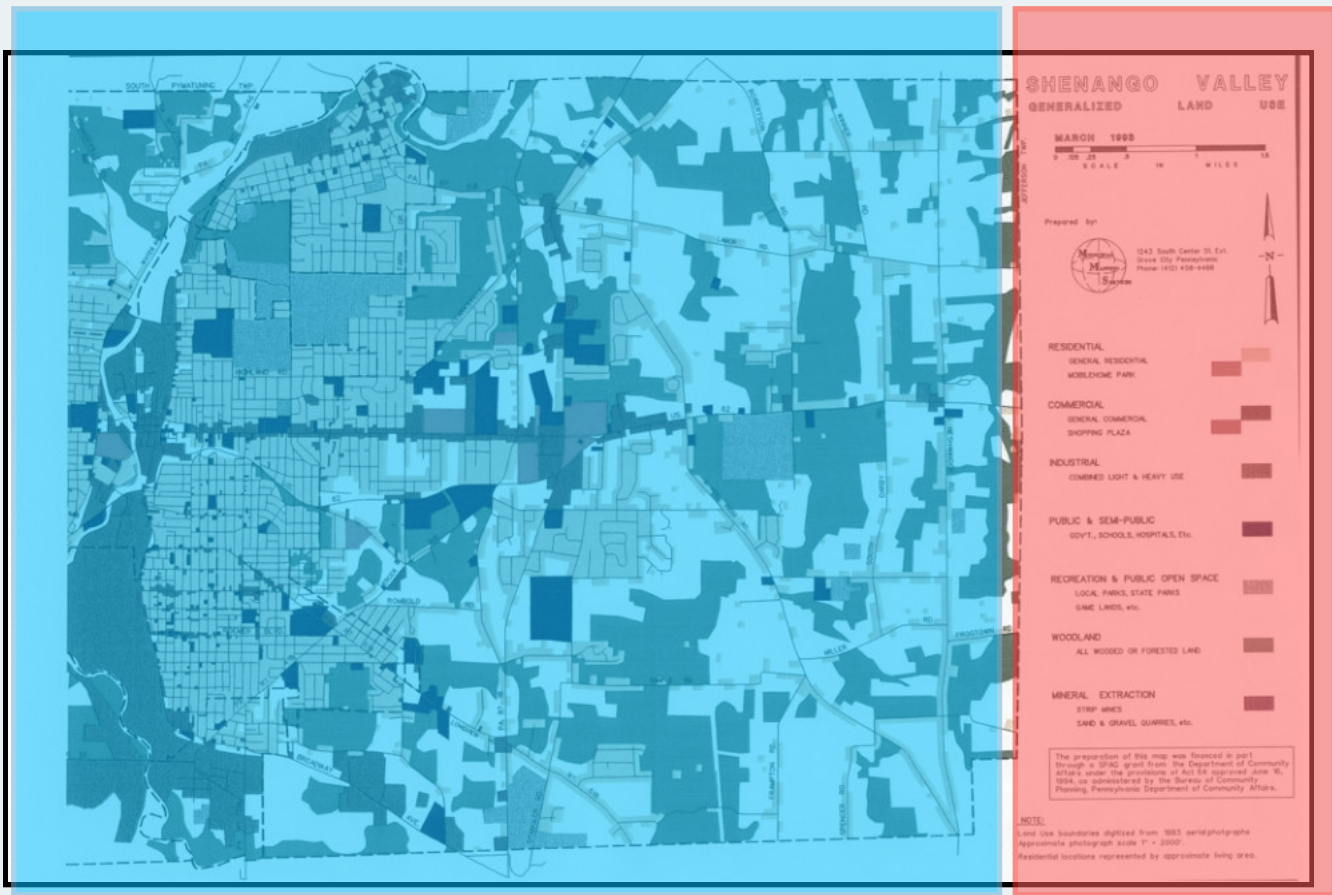
Visualization Frame   Control Panel

DROPDOWN BUTTON :
TAKES THE USER TO
ADDITIONAL PAGES

CLOSE
PANEL

DROPDOWN
ELEMENT

OPEN
PANEL

LEGEND ELEMENT

VISUALIZATION
CONTROL PANEL

SATELLITE
VIEW

ADD DATA LAYER

CHECKBOX : TOGGLE
LAYER VISIBILITY

REMOVE
LAYER

LEGEND ELEMENT

NAME OF
LAYER

COLOR OF
LEGEND

LIST OF
AVAILABLE
DATASETS

DATALIST ELEMENT

DATALIST
ELEMENT

CHECKBOX : SELECT
DATA LAYER TO ADD

ADD SELECTED
DATASETS

DESKTOP WIREFRAME

Preliminary Heuristic Evaluation | Insights

Center the Map

Change Base
Map View

Share
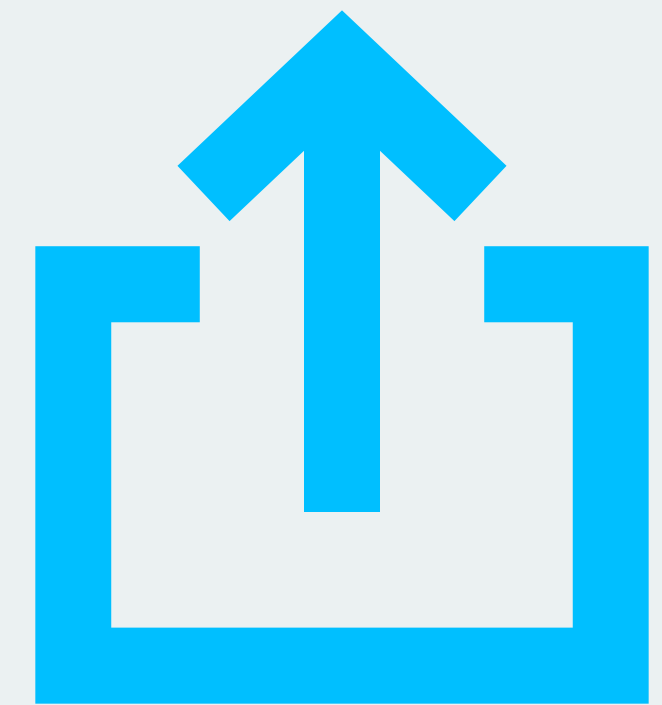Visualizations

www.mumbaidata.in

Limitations

- Need of familiarity with certain data terminologies

- Always needs access to the internet

- Need of technical expertise to upload datasets

- Error in the positioning of layers on the coordinates
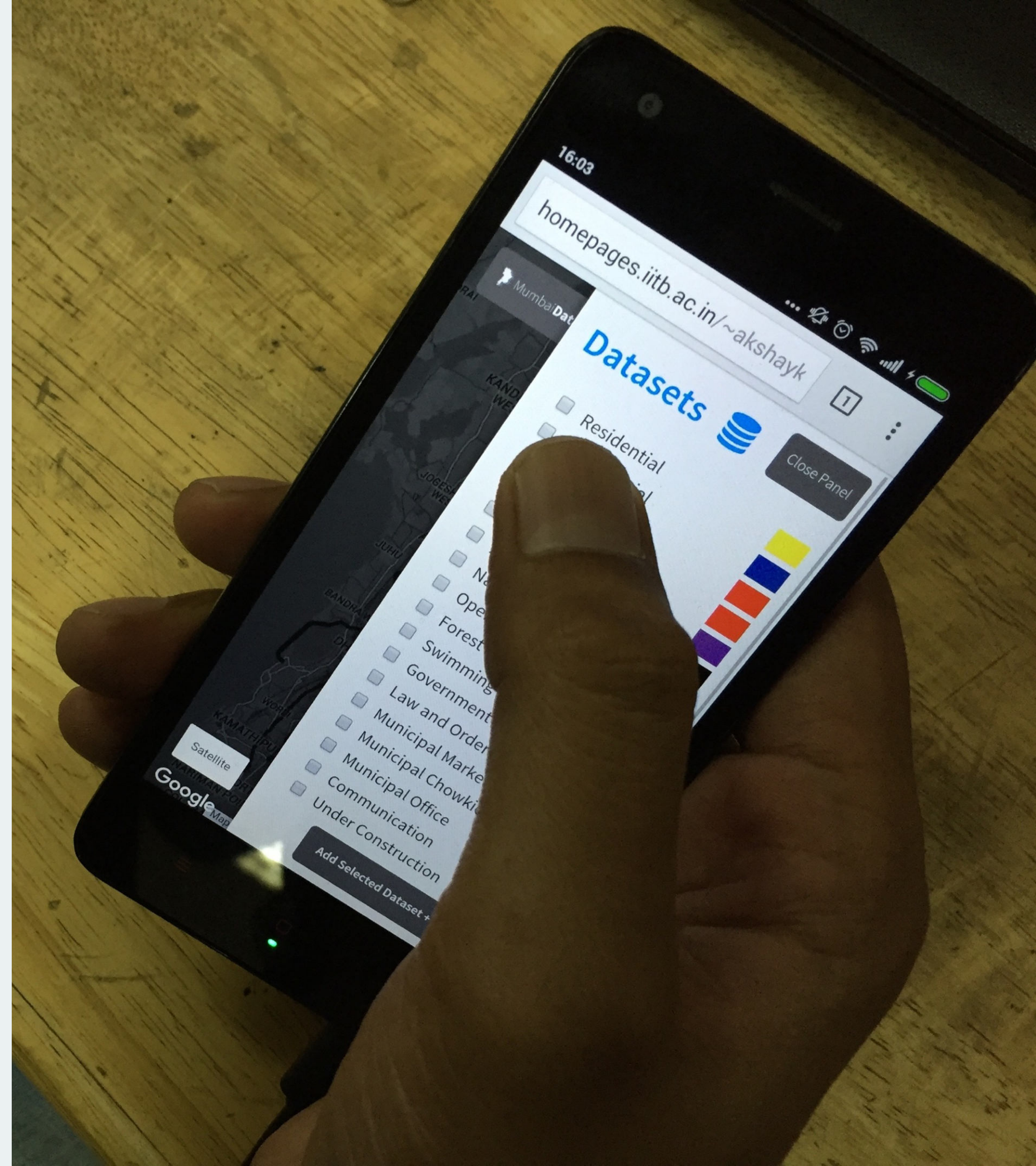
Evaluation | Think Aloud Test

To check the usability of the tool on a
Desktop, Tablet and Mobile form factor.

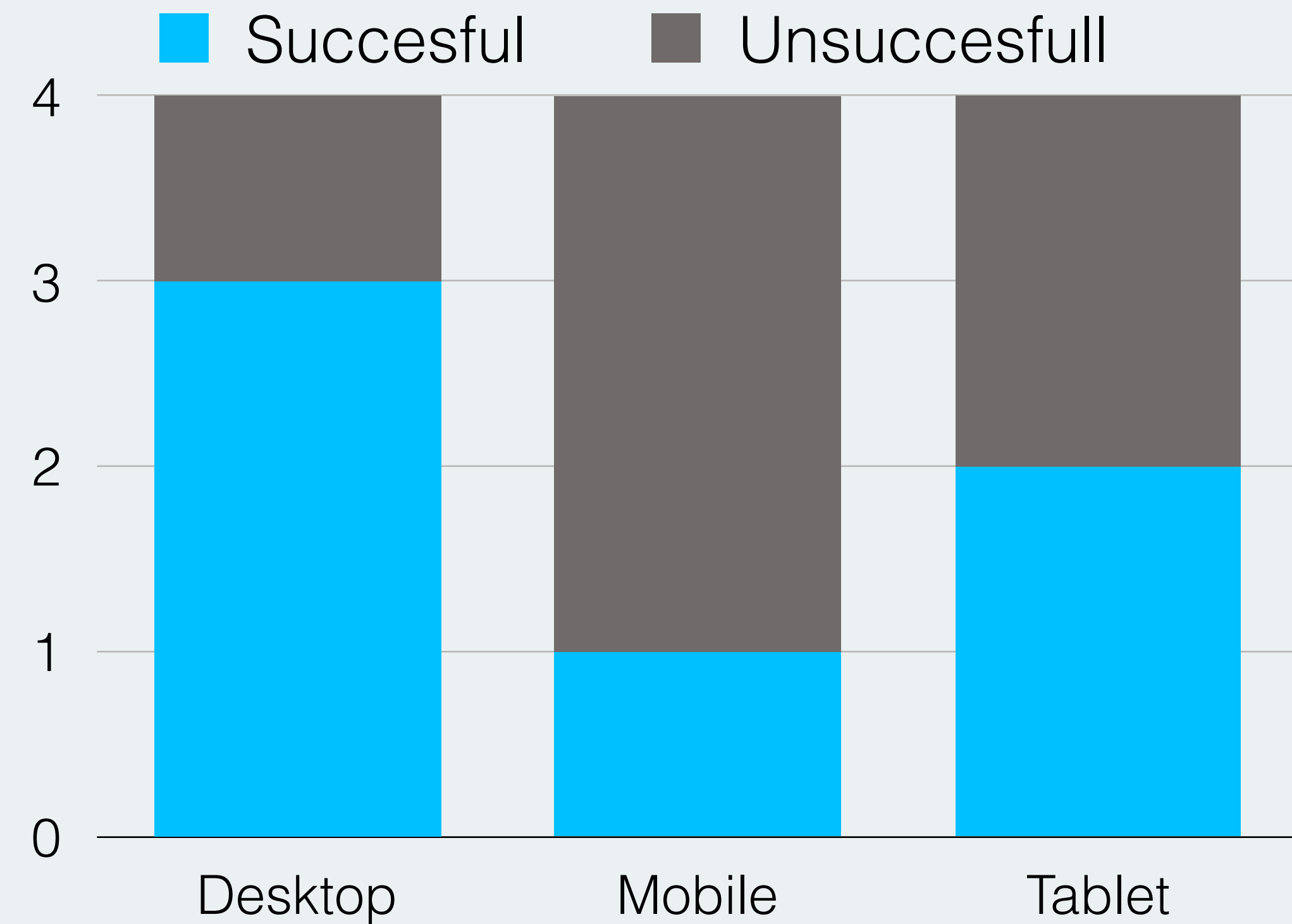Number of Users : 12

Desktop : 4
Mobile : 4
Tablet : 4

Evaluation | Think Aloud Test
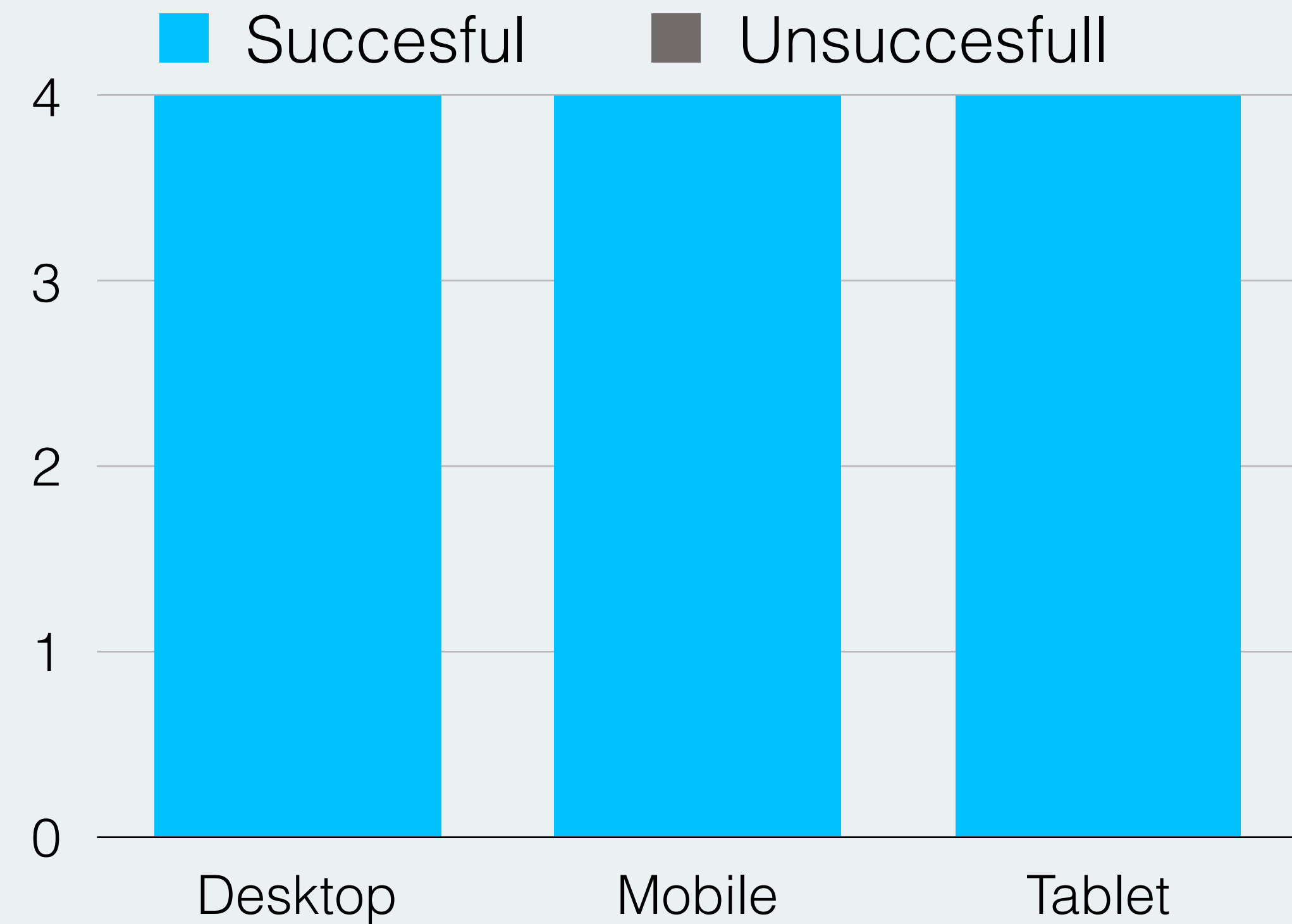
Task 1 : Add any dataset

To check the findability of the add dataset button

Evaluation | Think Aloud Test

Task 2 : Add specific datasets.

To check the findability of the dataset.

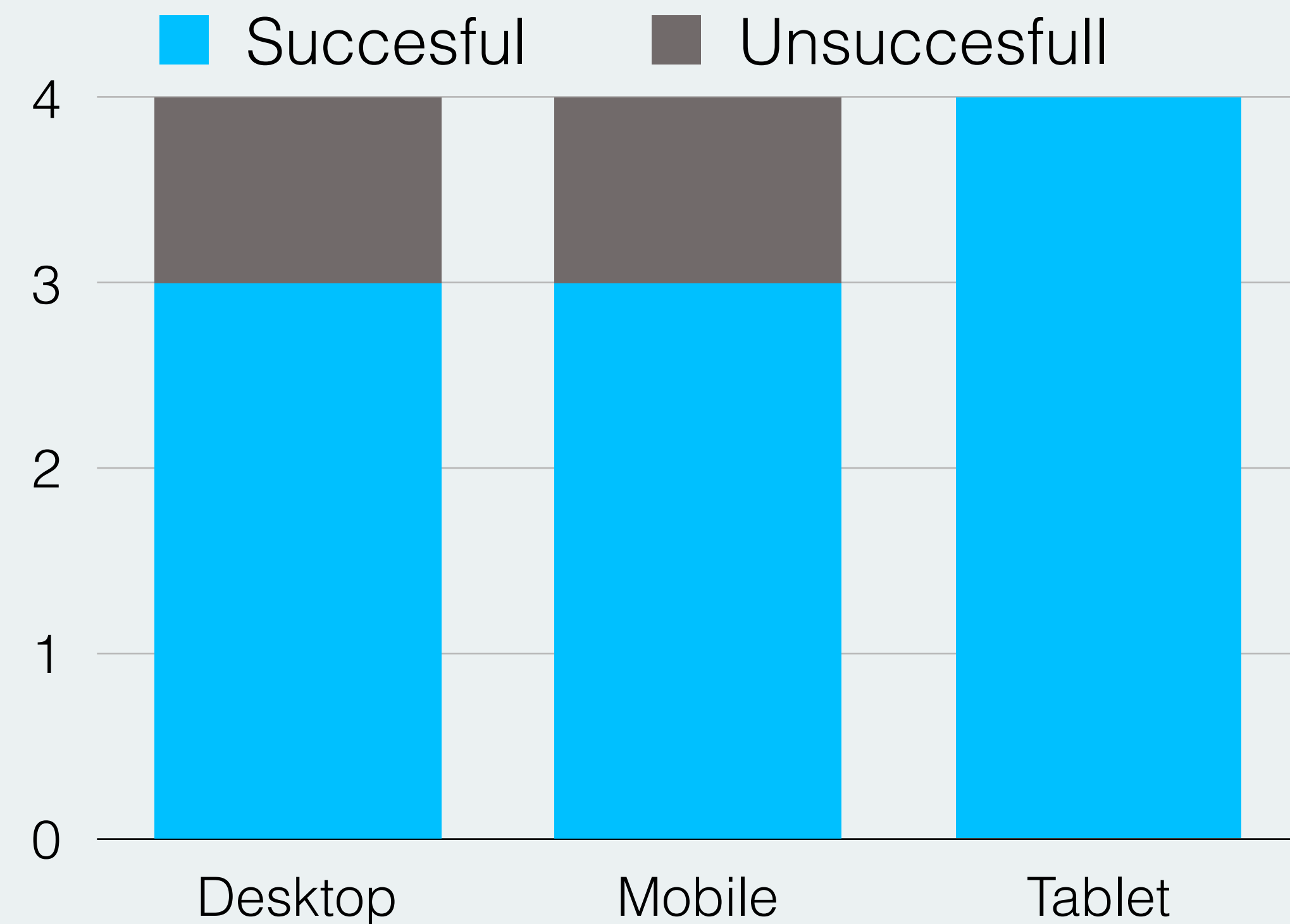# Evaluation | Think Aloud Test

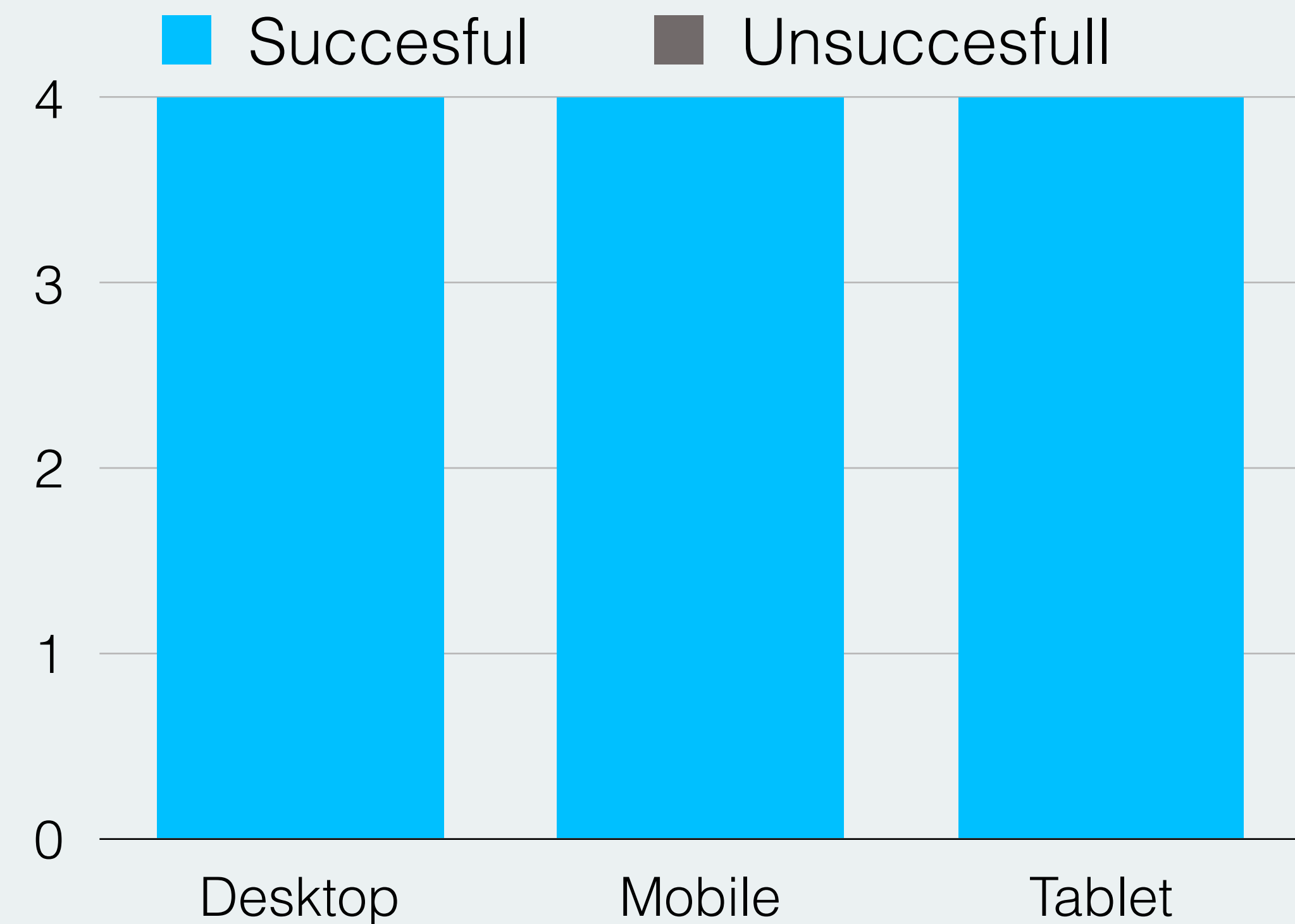**Task 3 : Hide one dataset and remove another from the control panel**

To check the usability of the legend buttons. Remove or Hide.

Evaluation | Think Aloud Test

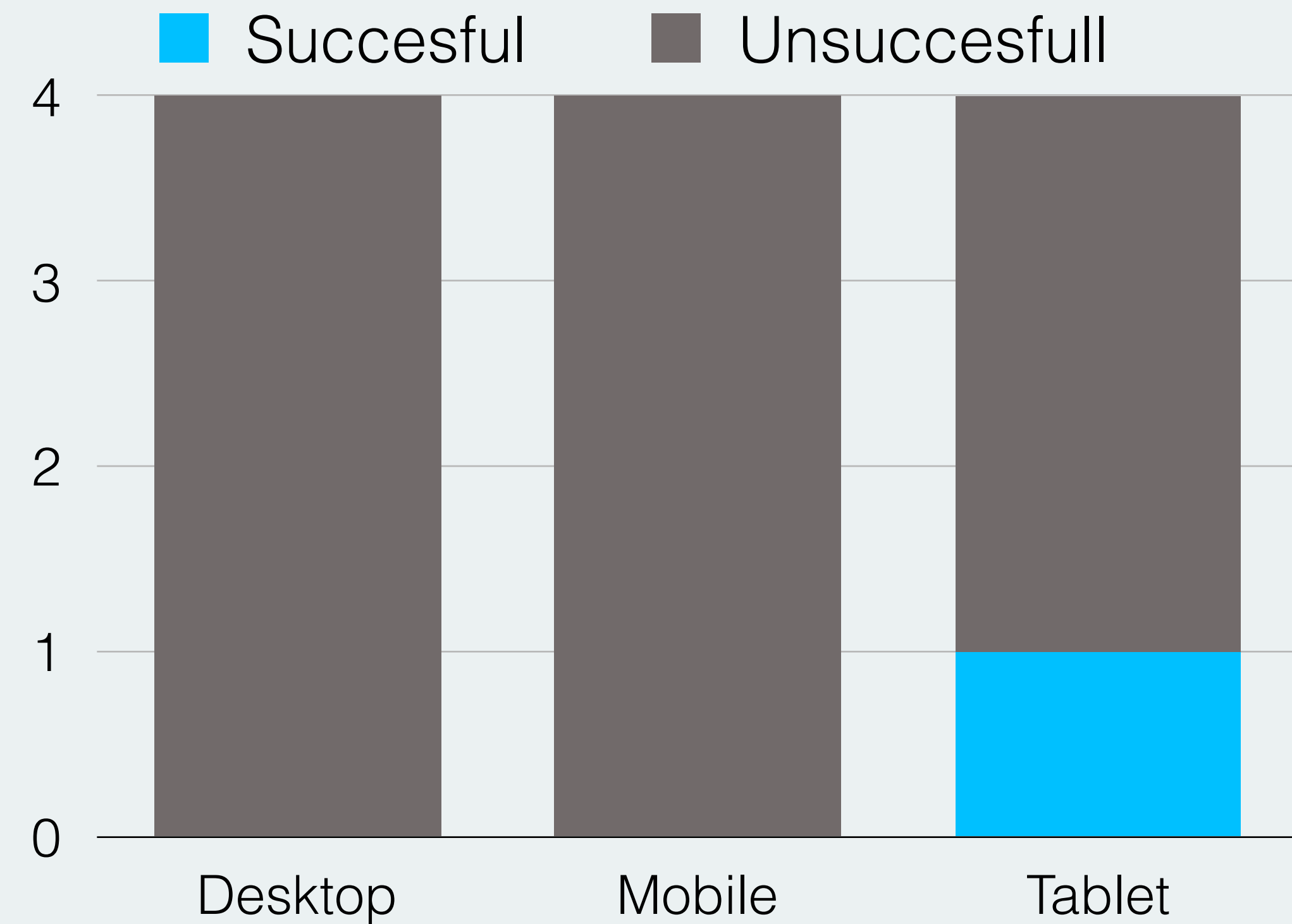**Task 4 : Convert the map into a satellite view**

To check the findability of the satellite view button.

Evaluation | Think Aloud Test
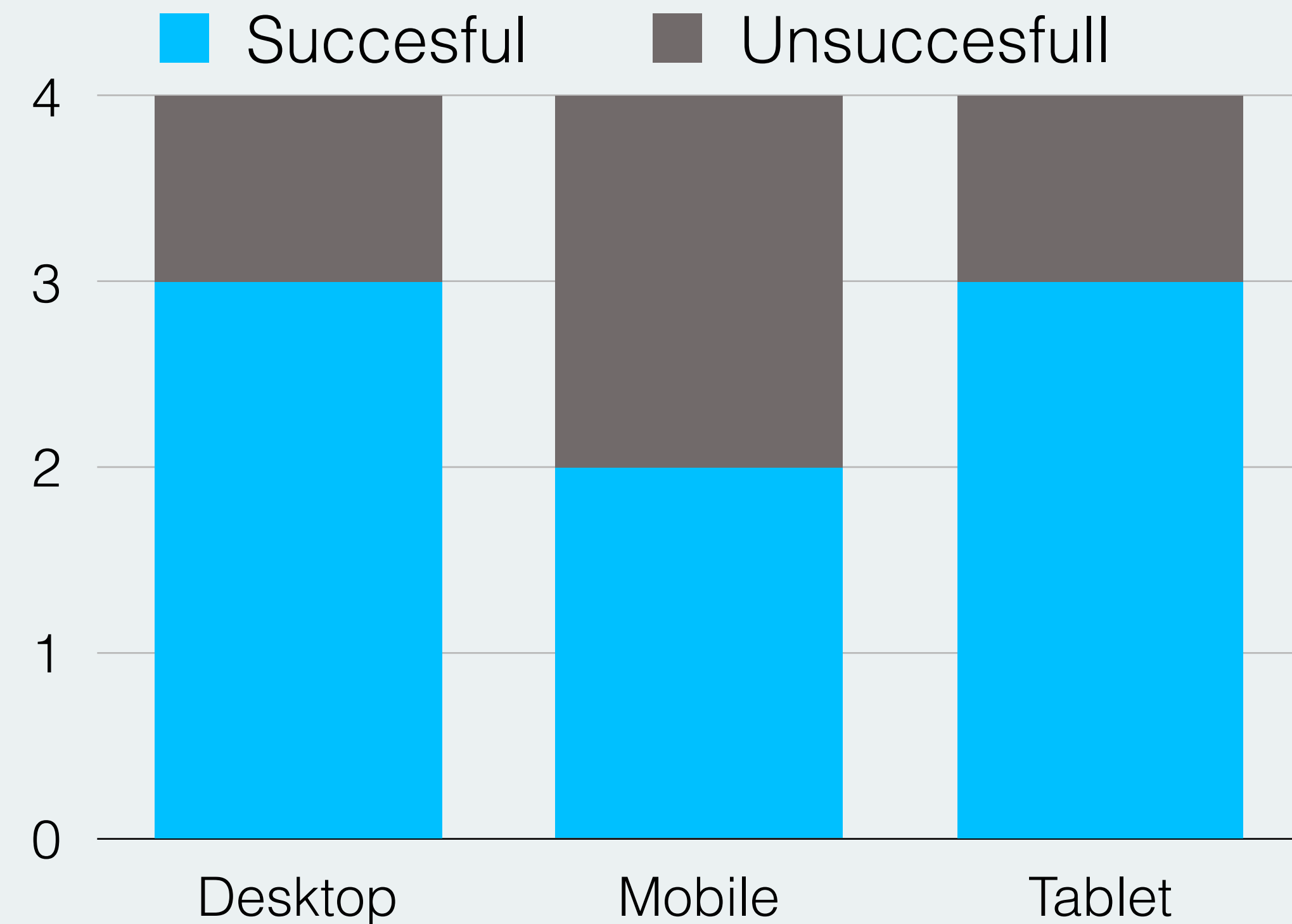
Task 5 : Go back to the default view

To check the usability of the map view options.

Evaluation | Think Aloud Test

Task 6 : Zoom in to powai lake and go back to default zoom and center.

To check the usability of the center map button.

Evaluation | Think Aloud Test | Findings

Users found it easy to use the application for simple visualization tasks once a pattern was found.

Most users found it difficult to find and use advanced features like center map and map view settings.

It was found that the tablet form factor tested the best with users followed by desktop and mobile.
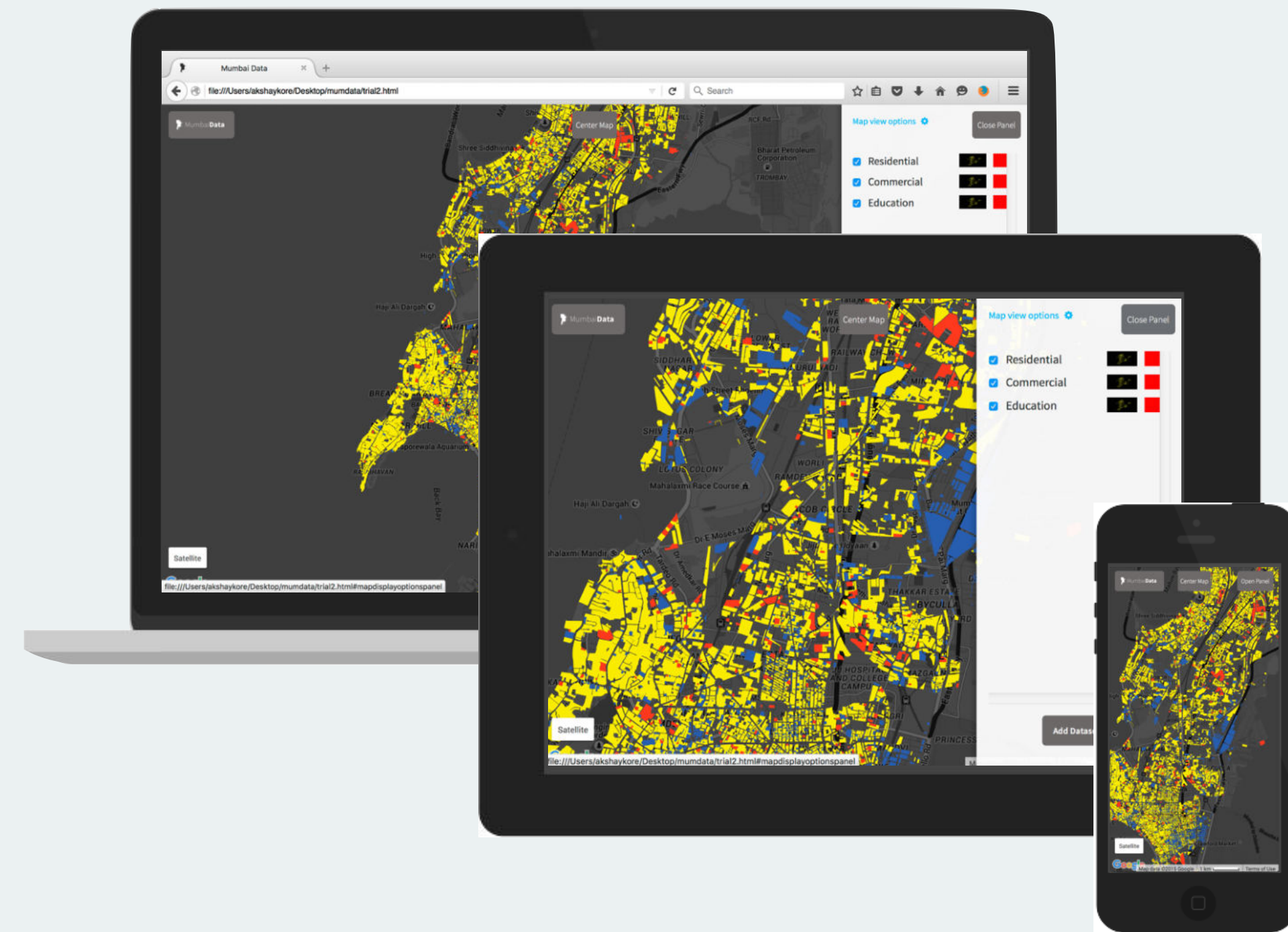
Evaluation | Expert Feedback | Findings

All the users found the idea very interesting.

14 out of 19 users found the tool to be easy to use.

15 out of 19 users said that they would be willing to use the tool.

12 out of 19 users found the absence of the sharing / download visualization feature to be a major problem.

One user said that the tool is good for doing quick research.

There was a problem of accuracy that was noticed by 9 out of 19 users.

All users suggested additional datasets to be included in the tool.

Learnings

Conceptual

Introduced to Information Visualization Techniques
Designing Data Visualizations
Design Process
Big Data and Open Data Theory

Technical

Programming in HTML, CSS, Javascript and MongoDb
Prototyping Tools like Indigo Studio, MarvelApp

Future Work

Multiple Language Support

Participatory Data Creation

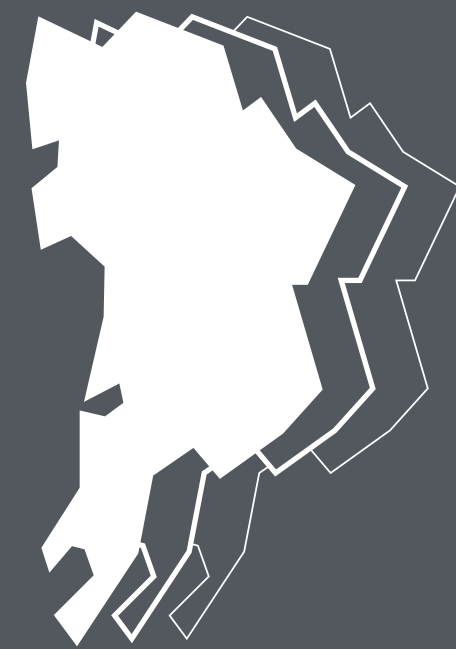Sharing and exporting of visualization

Personalization of the visualization

Include Non-Spatial Datasets

Add user profiles and saved states

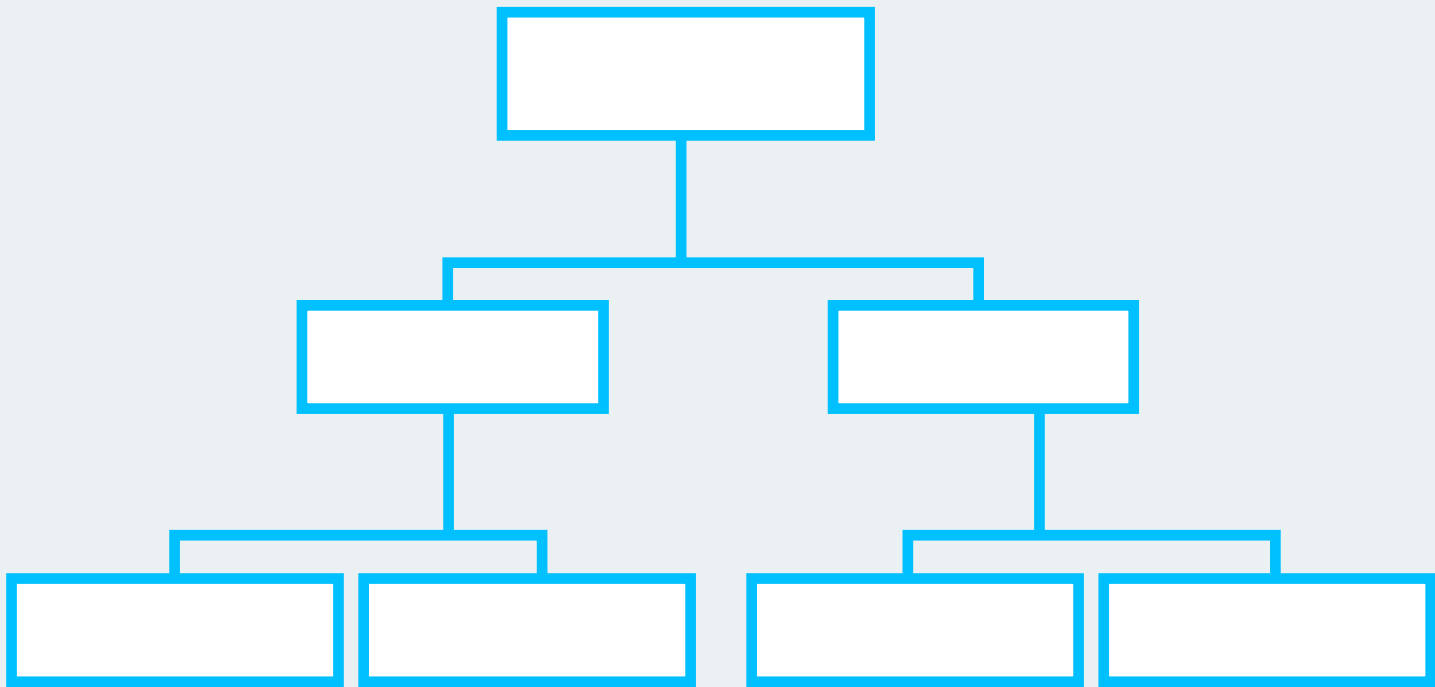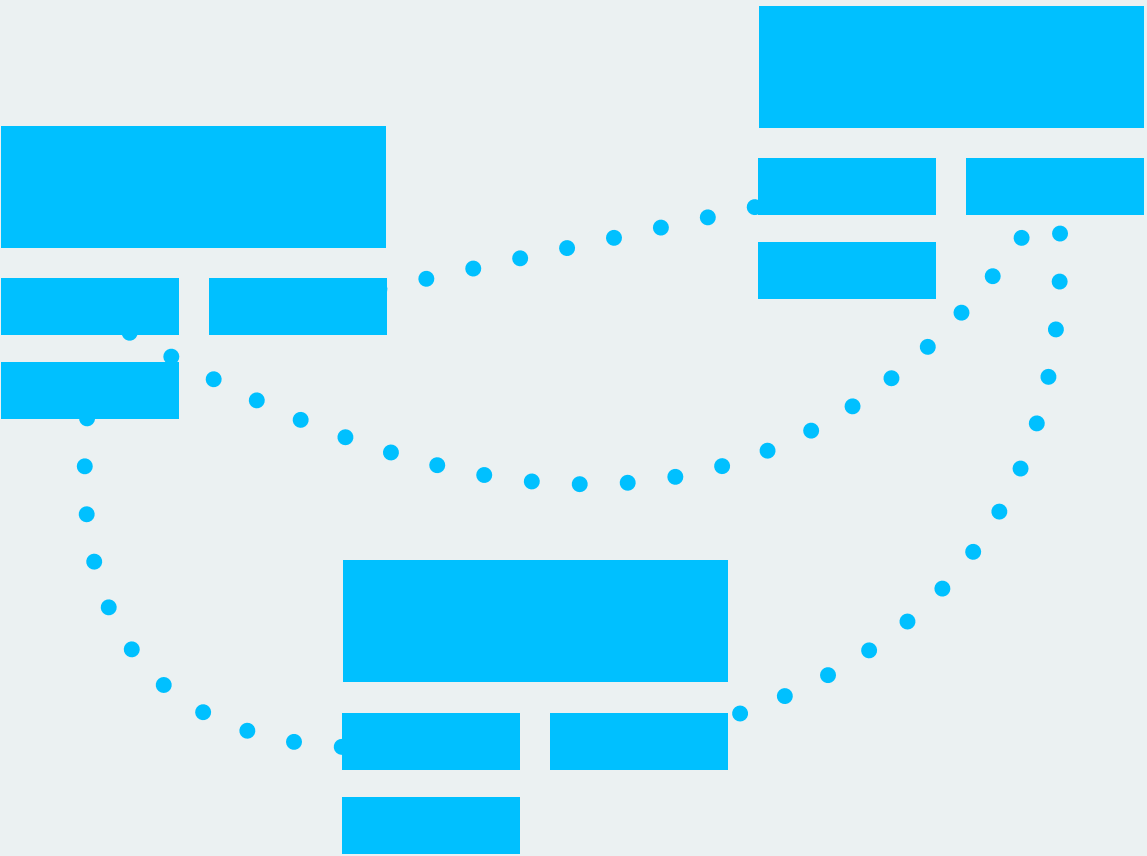Combining Spatial and non-spatial data analysis

Conclusion

www.mumbaidata.in

Big Data

$$N = All$$

Big Data

Hierarchy

Correlation