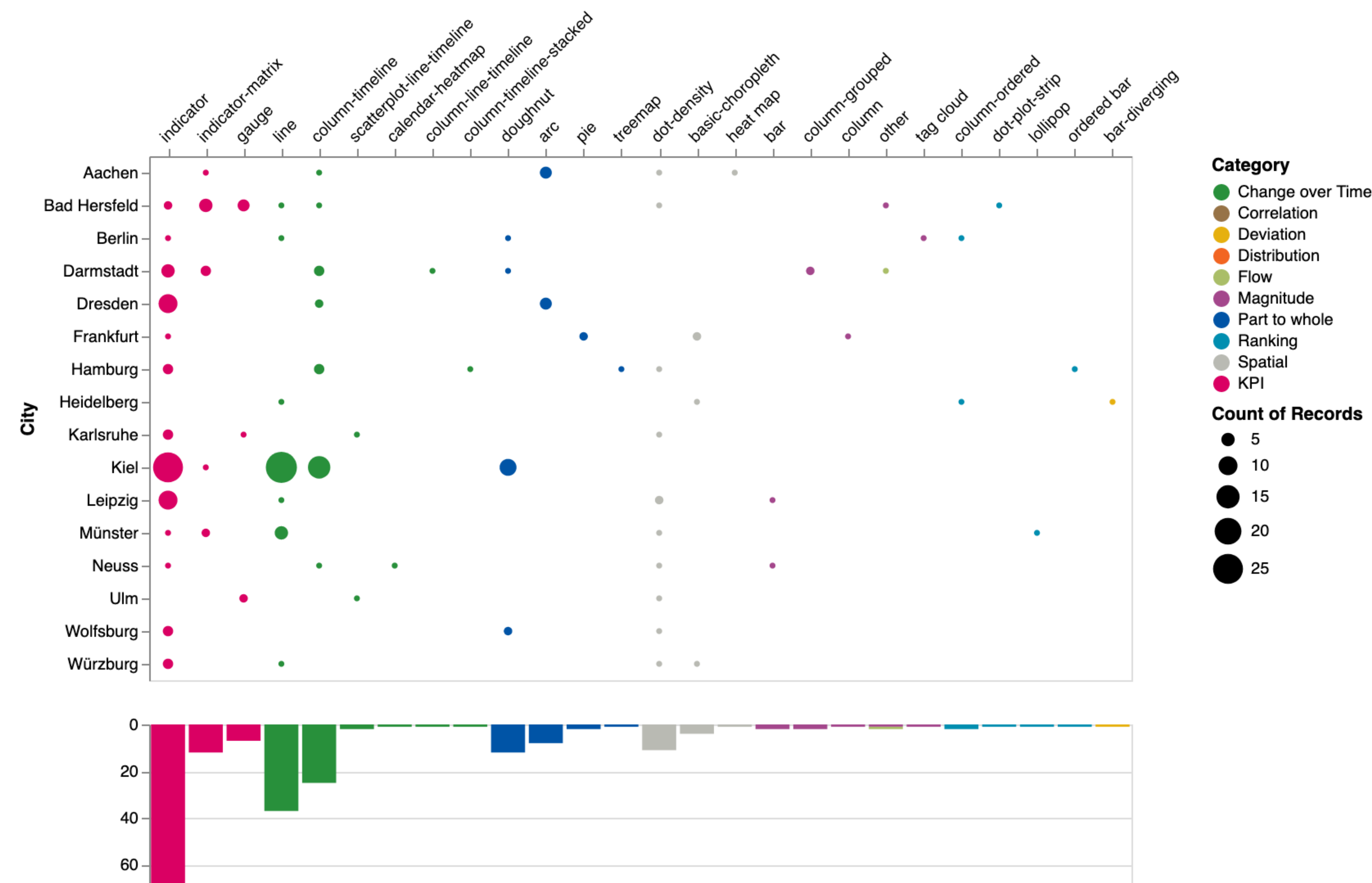# How do city dashboards visualize urban data?

City dashboards are powerful tools for quickly understanding various urban phenomena through visualizing urban data using various techniques. We investigate the most frequently employed visualization techniques in city dashboards. Through analysis of the visualization techniques used, we present our results visually and discuss our findings. We reviewed 16 publicly available dashboards.

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Visualization Use

The visualization displays the use of visualization techniques, in the German city dashboards examined. Each circle indicates the use of a technique, with the size representing the number of occurrences. The histogram on the bottom shows the frequency distribution across all dashboards. It is sorted by the frequency of the associated category, and the colors represent the category of the visualizations from the visual vocabulary. The visualization displays the use of visualization techniques, in the German c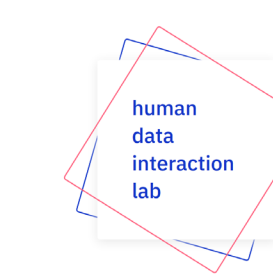ity dashboards examined. Each circle indicates the use of a technique, with the size representing the number of occurrences. The histogram on the bottom shows the frequency distribution across all dashboards. It is sorted by the frequency of the associated category, and the colors represent the category of the visualizations from the visual vocabulary.

Methodology

[1]

- The Visual Vocabulary of the Finacial Times(FT) was used as classification scheme.
- Each tile was mapped to the reffering visualisation and categorie
- The data was aggregated into the categories and cities

Conclusion

- A wide mix of diverse visualization techniques being used.
- Simple visualizations showing a single value have been used most frequently and time series secondly
- The dashboards typically use diverse data sets
- Tiles and visualizations are mostly not coordinated
- An opportunistic, technology-driven development seems common.

Tiles and Layout

Each dashboard consists of multiple tiles, varying in size and visually distinct, each featuring typically one visualization representing a single data set. Nearly all dashboards (15/16, 93%) are multi-topic, and combine tiles of different data sets in one view. We also coded the positions and dimensions of each tile to identify the layout and space occupied by each visualization. It was found that maps occupy more space per tile compared to KPIs, but are only used 1–2 times per dashboard compared to 1-25 KPI tiles per dashboard. In the figures above, we demonstrate our layout analysis with the dashboard of Bad Herfeld. Note how it mostly consists of tiles visualizing one or multiple KPIs (such as indicators, and gauges), with only three tiles using a visualization for a different purpose.
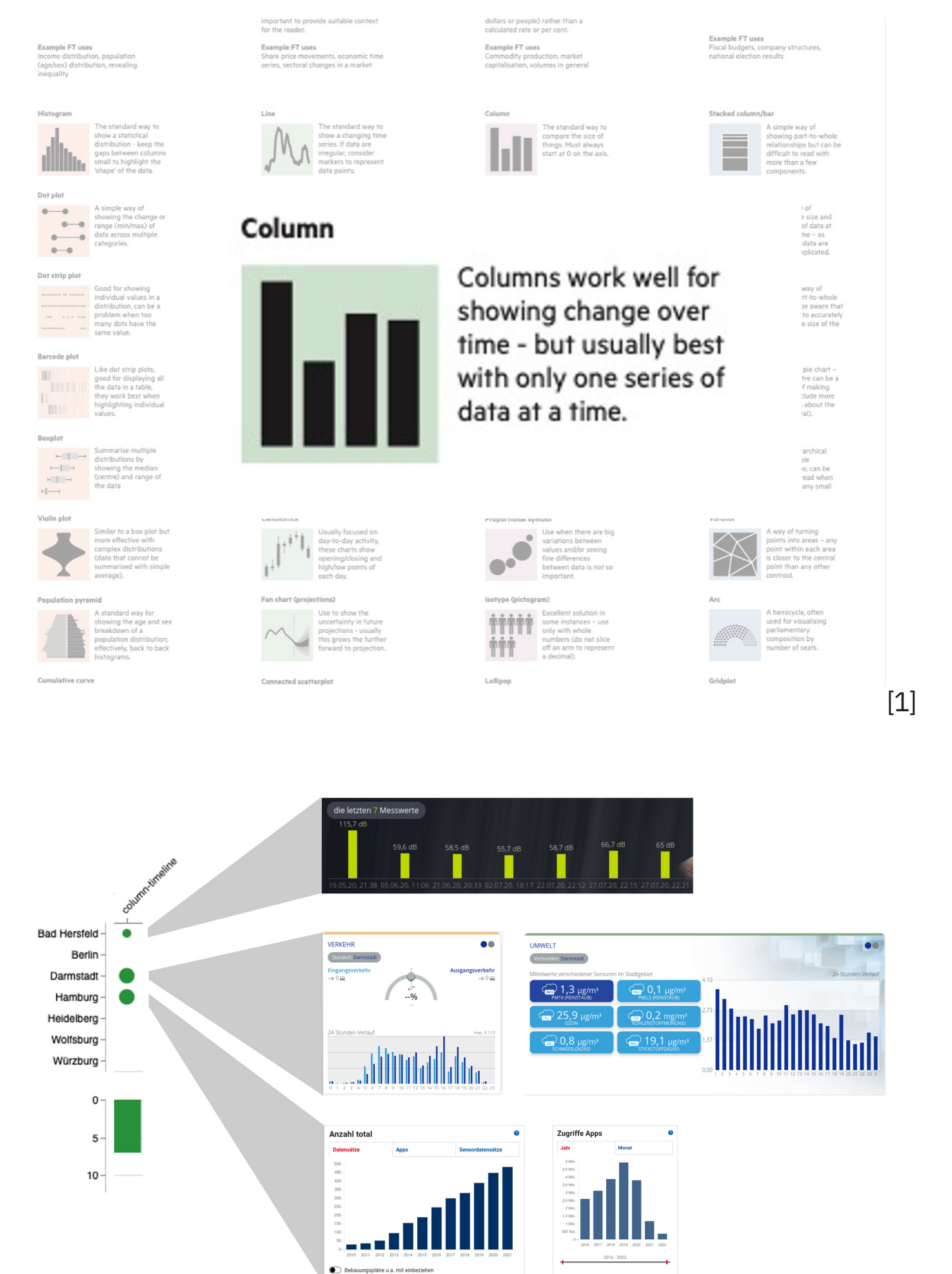
Future work

Currently, the tile analysis of the city dashboars is based only on the Visual Vocabulary. For future analyses, these can also be examined using existing dashboard design patterns. This would allow observing several aspects, such as the use of the screen space or interaction possibilities.

[1] FT Finacial Times, "Visual Vocabulary," Feb. 18, 2021. https://ft-interactive.github.io/visual-vocabulary/