



# Locating where to start a business in Copenhagen, Denmark

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# Executive summary

- Aim of the study was to identify where to start a business in Copenhagen
- Denmark is an attractive investment location
- Macroeconomic situation in Copenhagen looks positive based on Gross Domestic Product (GDP), population, and GDP per capita, population projections
- Analysed daily passenger numbers in train stations
  - Nørreport and København H identified as locations of interest
- Top 10 most common venues around each station
  - allows the client to identify a niche in a particular area
- Clustering of train stations showed a clear cluster in the city center of Copenhagen, of particular interest investment locations

# Introduction/Business Problem

- Background
  - Copenhagen appears to be an interesting location to start a business
    - sustainability and the first carbon neutral capital in the world by 2025.
    - high rankings in quality of living surveys and Denmark's reputation as the happiest country in the world
    - high GDP per capita and is ranked as one of the best countries for doing business.
- Problem statement
  - What are the demographic trends in Copenhagen (e.g. is the population expected to grow)?
  - What are the economic trends in Copenhagen (e.g. is economic growth likely)?
  - What areas of the city would be attractive for investing in a business (e.g. proximity to major transport hubs)?
  - What types of business are interesting investment opportunities (e.g. there are few coffee shops in area)?
- Target audience
  - A client interested in starting a new business in Copenhagen

# Data acquisition

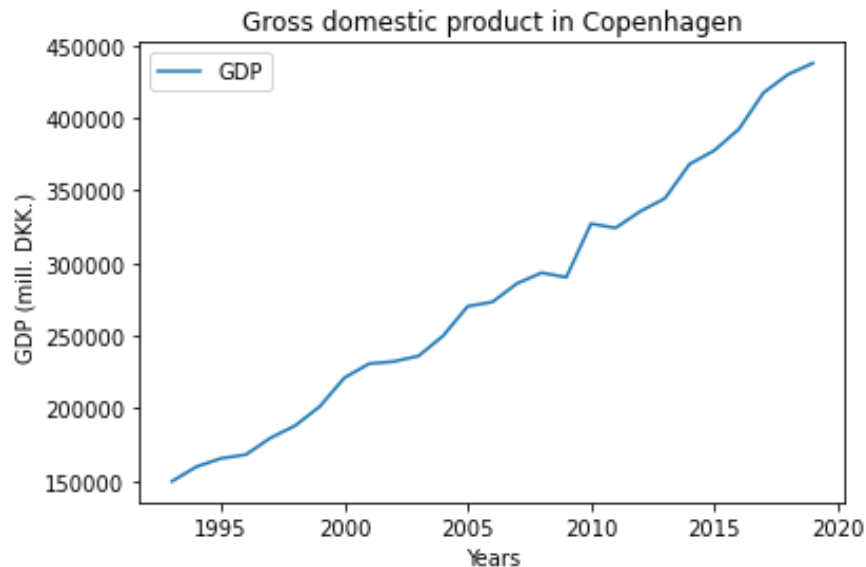
- A number of data sources will be used to investigate the attractiveness of Copenhagen, Denmark as a place to invest
  - Forbes "Best Countries for Business" webpage
    - Rank, Name, GDP Growth, GDP per Capita, Trade Balance/GDP, Population
  - The website of Statistics Denmark has an open data portal that features a wide range of data:
    - Population projections by municipality, GDP and generation of income by region
- To investigate what particular geographical area would be of interest for starting a new business a
  - The Open Data DK data portal features extensive datasets covering Copenhagen
    - Traffic data spreadsheets, station location maps as .geojson files
  - Leverage the Foursquare location data to explore or compare neighborhoods
    - Use the Foursquare API to search for a specific type of venues around a location
    - Retrieve location data from the Foursquare API database

# Data wrangling

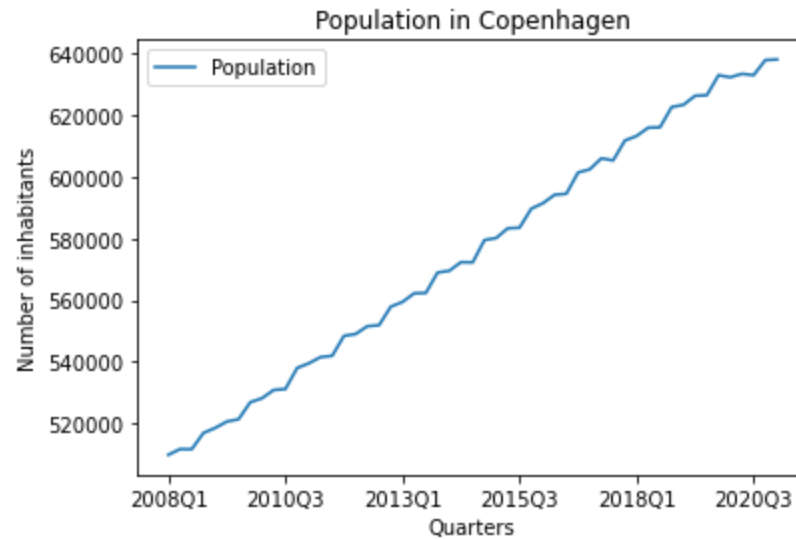
- Statistics Denmark
  - available as .csv files for download
  - removed blank columns, modified headers, changed indices
- Open Data DK
  - Flattening of the nested geojson files
  - Columns with irrelevant features were dropped
  - Characters of the Danish alphabet corrected
  - Geographical coordinates: split the original column into columns with latitude and longitude
  - Coordinates of Copenhagen derived from GeoPy Nominatim
  - Station location data were then plotted using the Folium
- Station passenger data as a .csv download modified by adding headers
- Foursquare venue data were generated by calling the Foursquare API and manipulated to
  - identify the top venue types per station
  - the most common venues per station

# Exploratory Data Analysis

## Gross Domestic Product (GDP) Population



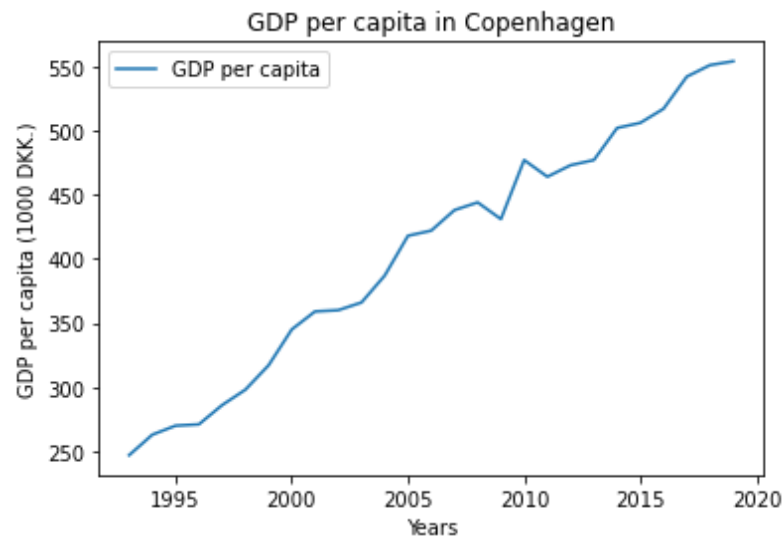
GDP has almost tripled from around 150 billion danish kroner in 1993 to 450 billion danish kroner in 2019.



Population has been steadily increasing from 509.861 in 2008 to 638.117 in 2021.

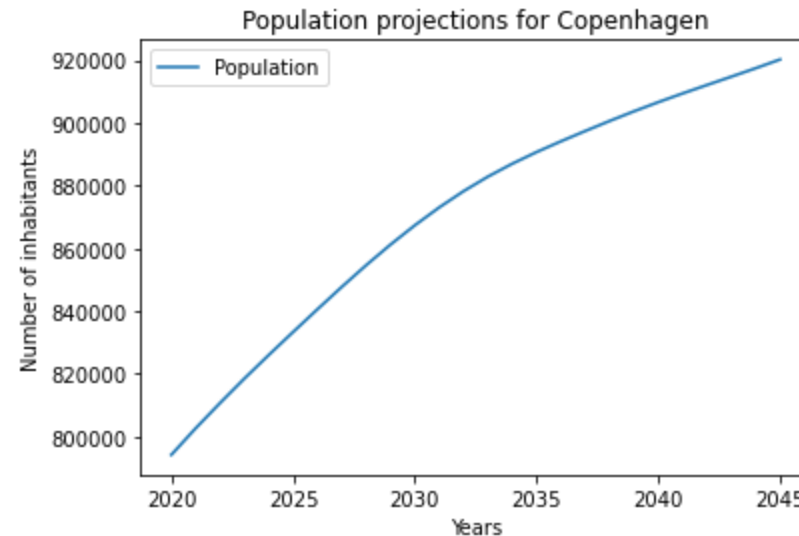
# Exploratory Data Analysis

## GDP per capita



GDP per capita has increased from 247.000 danish kroner per capita in 1993 to 554.000 danish kroner in 2019.

## Population projections

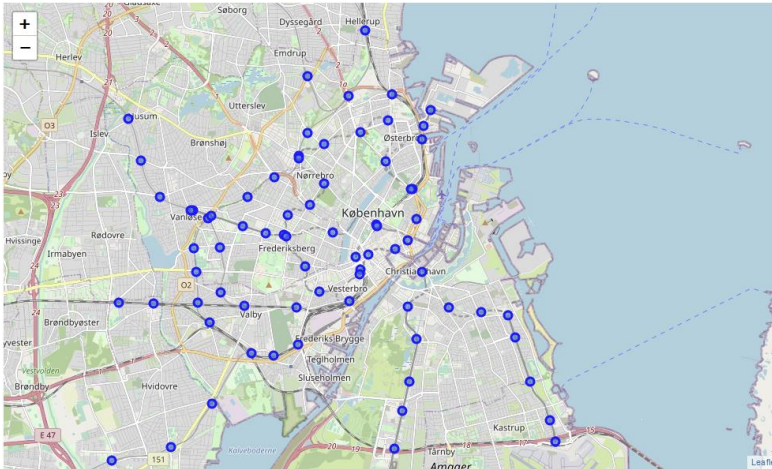


Population projections the population reaching around 880.000 in 2030 and reach 920.236 in 2045 .



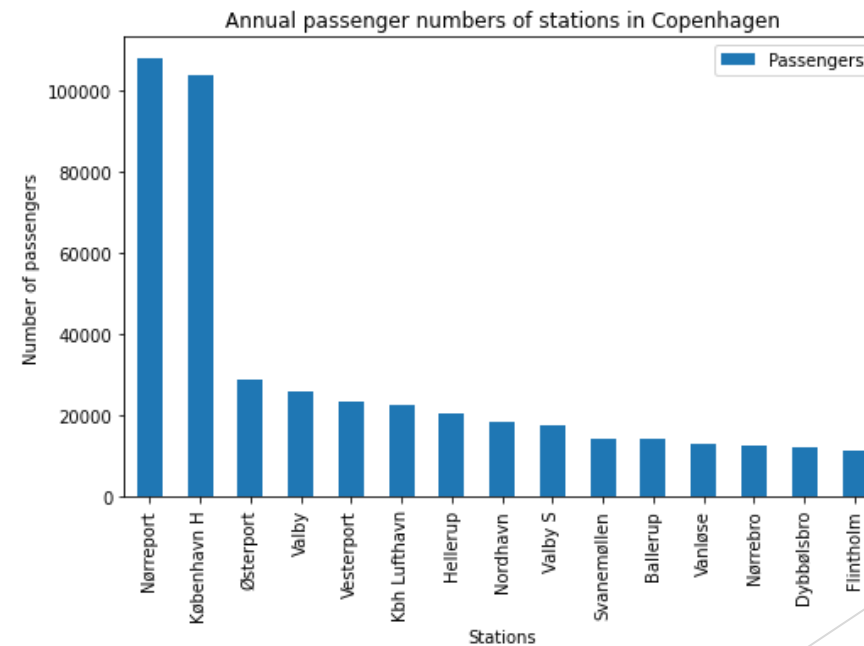
# Exploratory Data Analysis

## Geographical data



Coordinates, station type, station name and the name of the town in which the station is located.

## Station passenger data



Outliers Nørreport with 107.800 daily passengers and København H with 103.600 daily passengers.

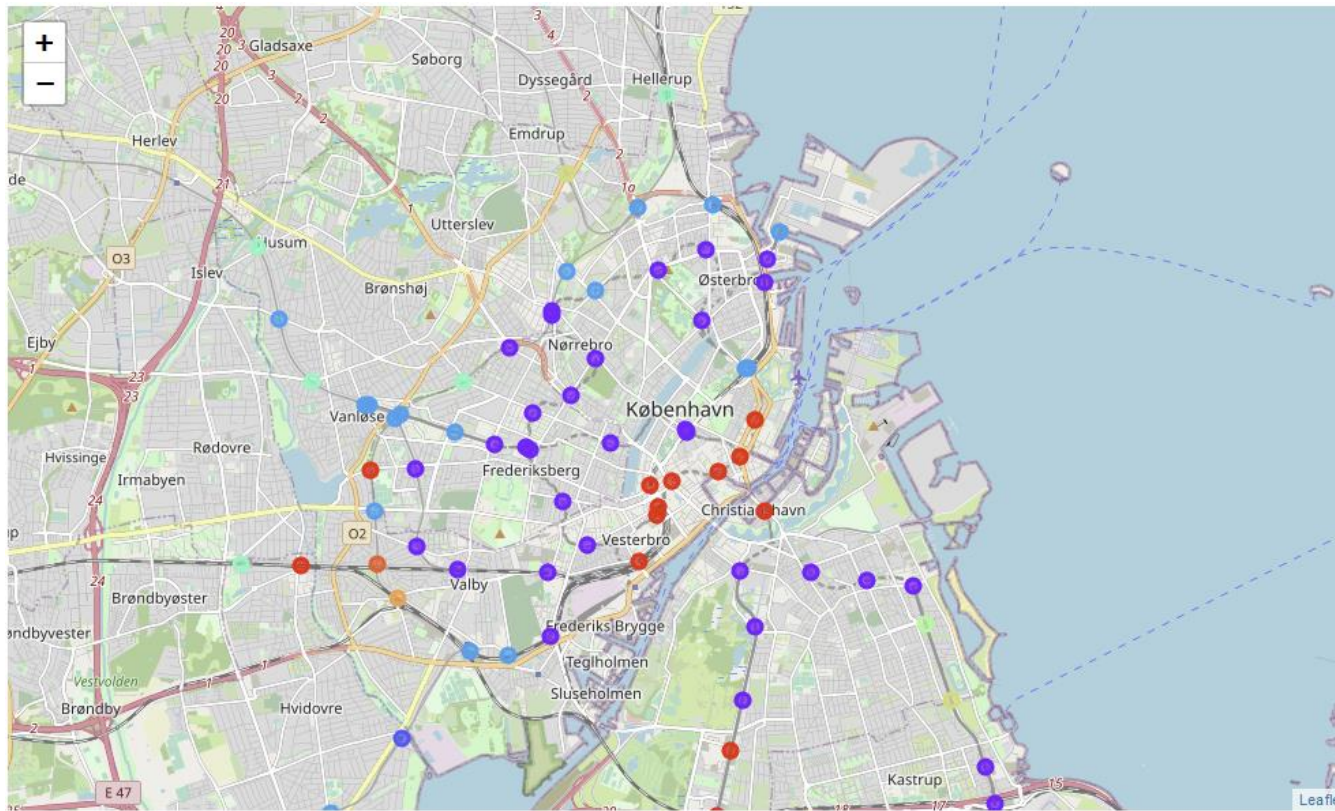
# Foursquare data

## Top 10 venues per station

Name	Cluster Labels	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue	5th Most Common Venue	6th Most Common Venue	7th Most Common Venue	8th Most Common Venue	9th Most Common Venue
Kastrup	1	Pizza Place	Supermarket	Racetrack	Mediterranean Restaurant	Liquor Store	Scandinavian Restaurant	Department Store	Fish & Chips Shop	Fast Food Restaurant
Langgade	1	Pizza Place	Convenience Store	Coffee Shop	Burger Joint	Supermarket	Bar	Record Shop	Train	Train Station
Peter Bangs Vej	1	Soccer Field	Cheese Shop	Pizza Place	Grocery Store	Scandinavian Restaurant	Sporting Goods Shop	Supermarket	Gaming Cafe	Thai Restaurant
KB Hallen	0	Soccer Field	Train Station	Sporting Goods Shop	Bus Station	Restaurant	Lake	Athletics & Sports	Gym	Park
Vigerslev Allé	8	Indian Restaurant	Moving Target	Park	Karaoke Bar	Gym	Department Store	Fish Market	Fish & Chips Shop	Fast Food Restaurant
...	...	...	...	...	...	...	...	...	...	...
Gammel Strand	0	Plaza	Cocktail Bar	French Restaurant	Coffee Shop	Jazz Club	Bar	Furniture / Home Store	Hotel	Restaurant
Marmorkirken	0	Scandinavian Restaurant	Café	Restaurant	Hotel	Bakery	Art Museum	Plaza	Breakfast Spot	Coffee Shop
Trianglen	1	Bakery	Coffee Shop	Café	Italian Restaurant	Ice Cream Shop	Soccer Stadium	Bar	Sushi Restaurant	Vietnamese Restaurant
Kongens Nytorv	0	Scandinavian Restaurant	Restaurant	Coffee Shop	French Restaurant	Clothing Store	Steakhouse	Bar	Furniture / Home Store	Wine Bar
Orientkaj	3	Grocery Store	Scandinavian Restaurant	Furniture / Home Store	Harbor / Marina	Wine Bar	Italian Restaurant	Office	Department Store	Dessert Shop

# K-Means Clustering

Cluster of stations



# Conclusion

- Denmark as an investment location
  - reputation for sustainability
  - high rankings in quality of living and happiness
  - ease of doing business we were able
- Macroeconomic situation in Copenhagen
  - Gross Domestic Product (GDP), population, and GDP per capita in Copenhagen have been increasing steadily
  - population projections for the city show the current trend continuing
  - substantiates quantitatively that the city is an attractive investment location.
- Clients want to invest in locations with high foot traffic
  - analysed data on daily passenger numbers in the train stations
  - identified in Nørreport station and København H as locations of interest
- Identified the top 10 most common venues around each station
  - allows the client to identify a niche in a particular area.
- Clustering of train stations also showed a clear cluster in the city center of Copenhagen, which includes and could be of particular interest as locations for potential investors.

# Future directions

- Integrate real estate costs
  - monthly rent and utilities significant part of monthly expenses
- Consider future infrastructure investments
  - metro or train stations planned to open up in the near future
  - lower costs and future growth in the customer base