Final Report

Housing

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1. Affordability of Houses

1.1 Price index per province

In this visualization the price index per province can be seen (from 2016-2020). We see a recurring theme that the western part of The Netherlands is more expensive than the rest of the country. This can be explained. Most large cities are located here and people want to live in this area. Therefore the price is higher, according to supply and demand.

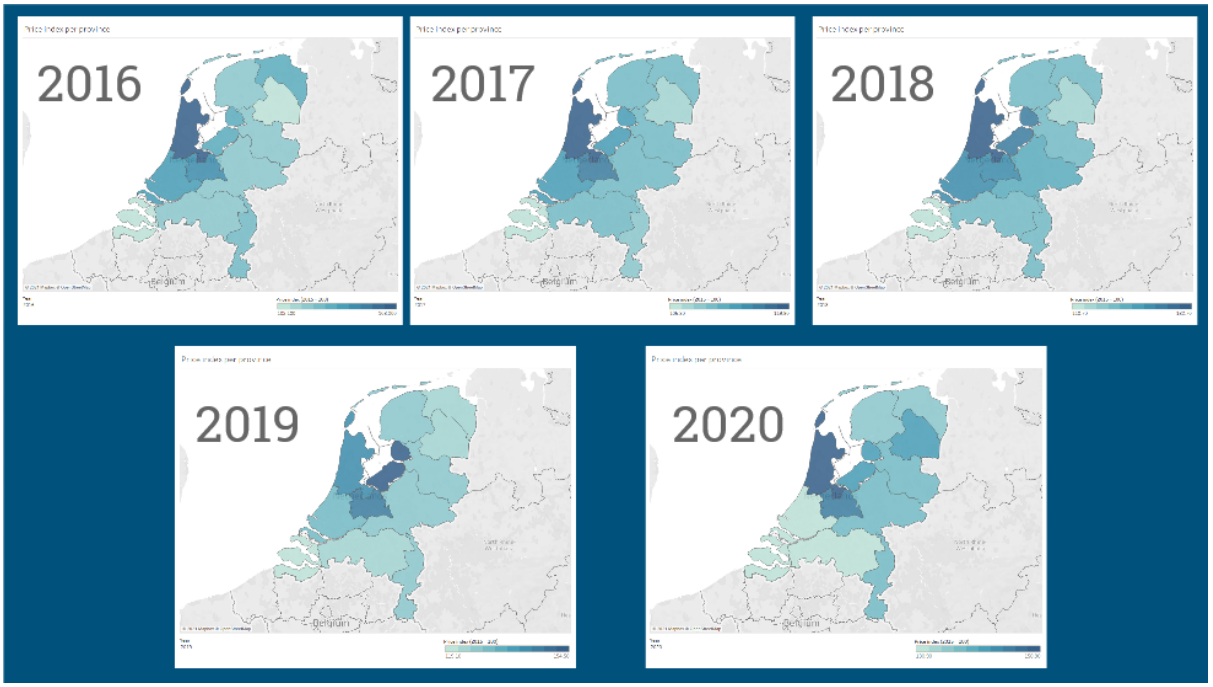

Figure 1.1: Price index per province from 2016 till 2020 (price index 2015 = 100)[1]

1.2 Average house price

In the next visualization we see the average house price of the Netherlands together with the AEX course and its crashes. We can see that the dot-com bubble had a minor effect on the house prices but the financial crisis in 2007 course a major drop.

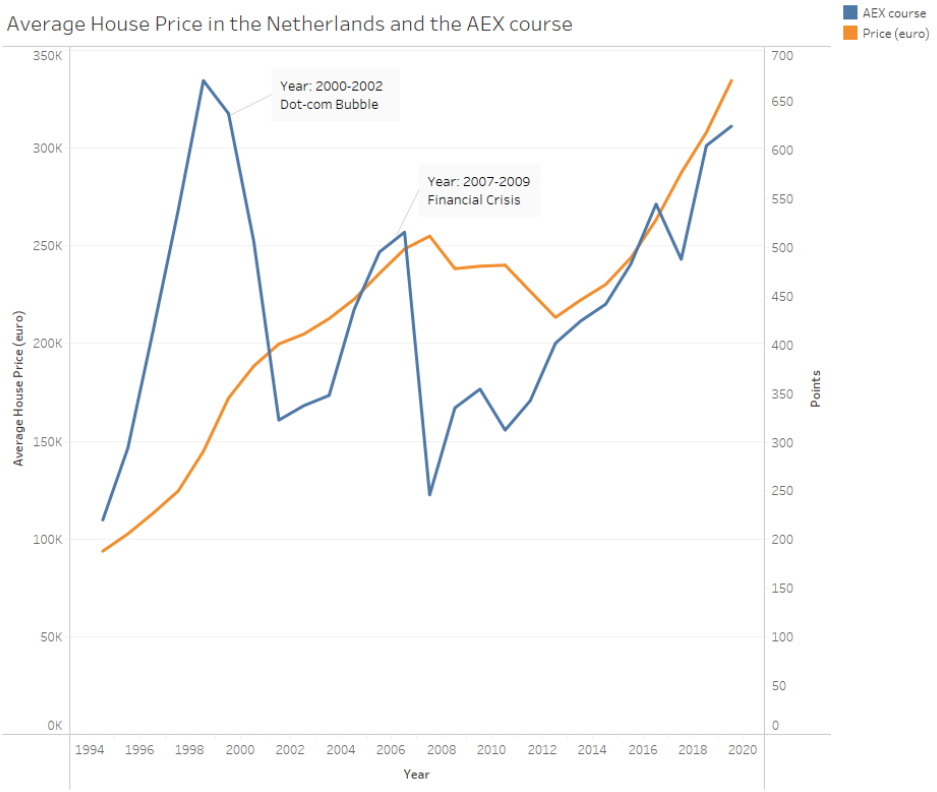

Figure 1.2: Average house price in The Netherlands and the AEX course [2][3]

2. Types of housing

When looking at the affordability of houses you can base this on two things, location and type of house. In the Netherlands there are a lot of different types of housing. Think of apartments, terraced housing and two under 1 roof houses. All different houses have different transaction rates and prices. Here we are going to look at these differences.

2.1 Transactions per house

First we take a look at the transactions per type of house per quarter year. Here you see the streams of the amount of transactions per quarter. You can see which the streams belong to which type of housing and how big it is.

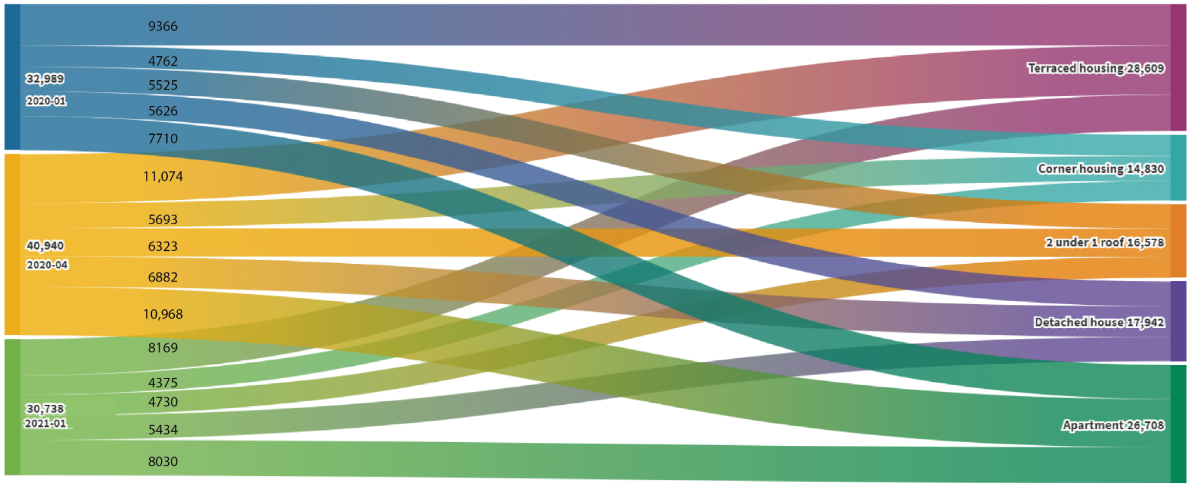

Figure 2.1: Transactions per type of housing per quarter[8]

2.2 Single- versus Multiple-family homes

Secondly, we take a look at multiple and single family homes. The types of housing described above can be divided into one of these two categories. In the visualizations below you see the amount of these types of houses per province. As you can see, there are way less single-family houses than multi-family. Also the West side of the Netherlands holds relatively more houses.

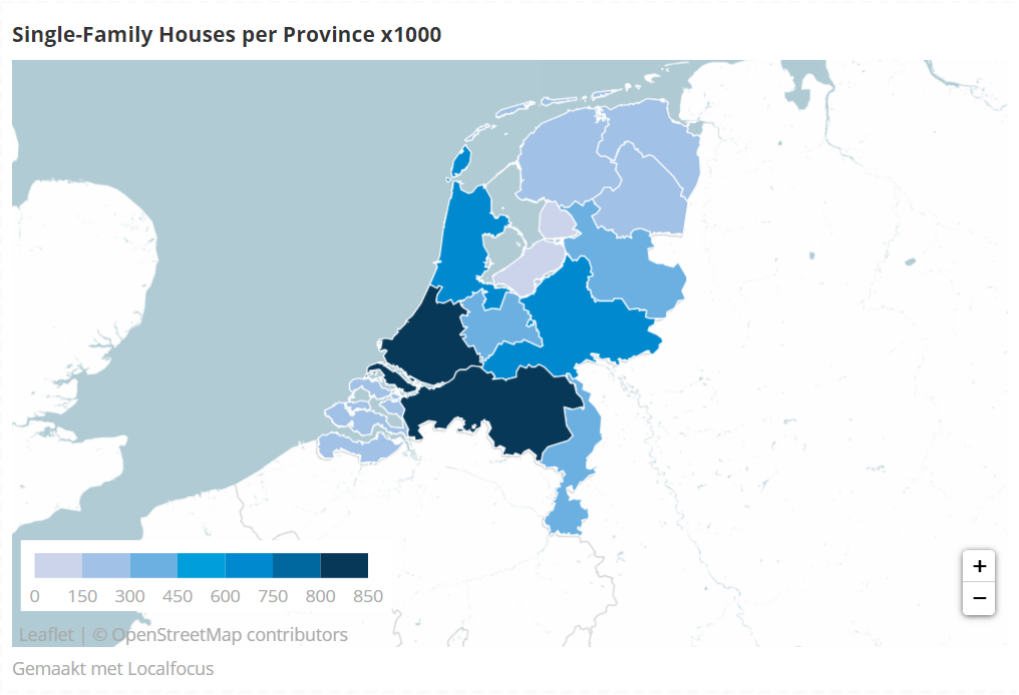

Figure 2.2b: ***Single-family*** *homes and multiple-family homes per province [7]*

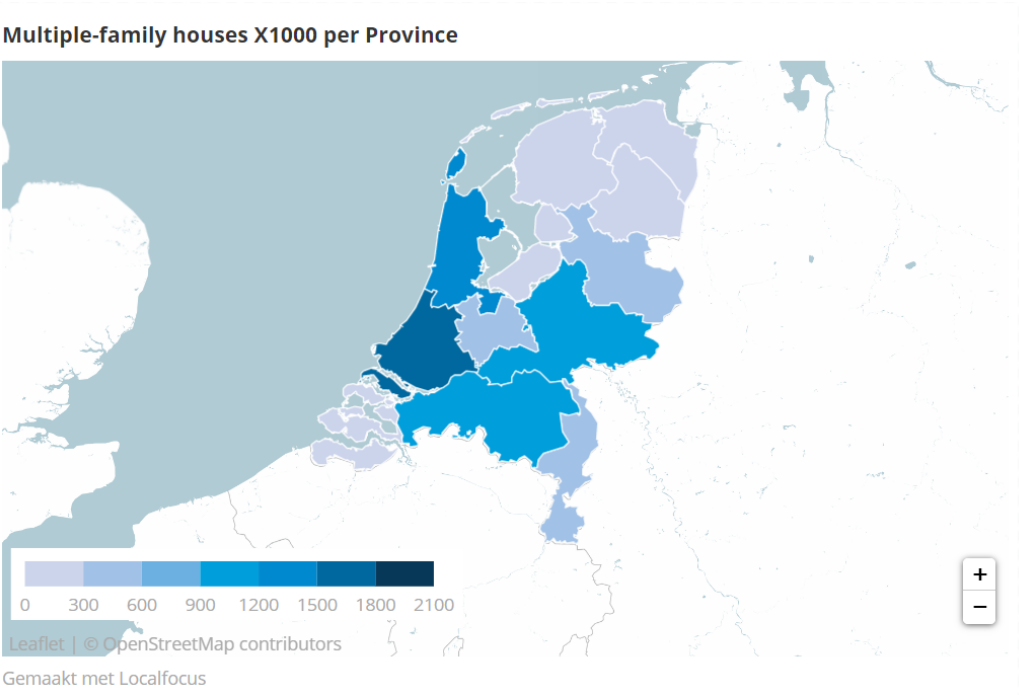

Figure 2.2b: ***multiple-family*** *homes and multiple-family homes per province [7]*

3. Availability of housing to different age groups

3.1 Link between age and availability

After seeing affordability and availability of housing, we can find a pattern between the pricing & availability of housing for specific age groups. Once we look at the following visualization, we can see the distribution of different ages across the Netherlands. You can compare this with the availability and average cost of a house. One example is that you can see that there are a lot of 25-45 year old people located around Amsterdam. On the other maps you can see that there are also a lot of unoccupied houses around that area, for which the prices are also higher when you compare it to the east of the Netherlands. This way you can see relations between the age groups, availability of houses and the average price range.

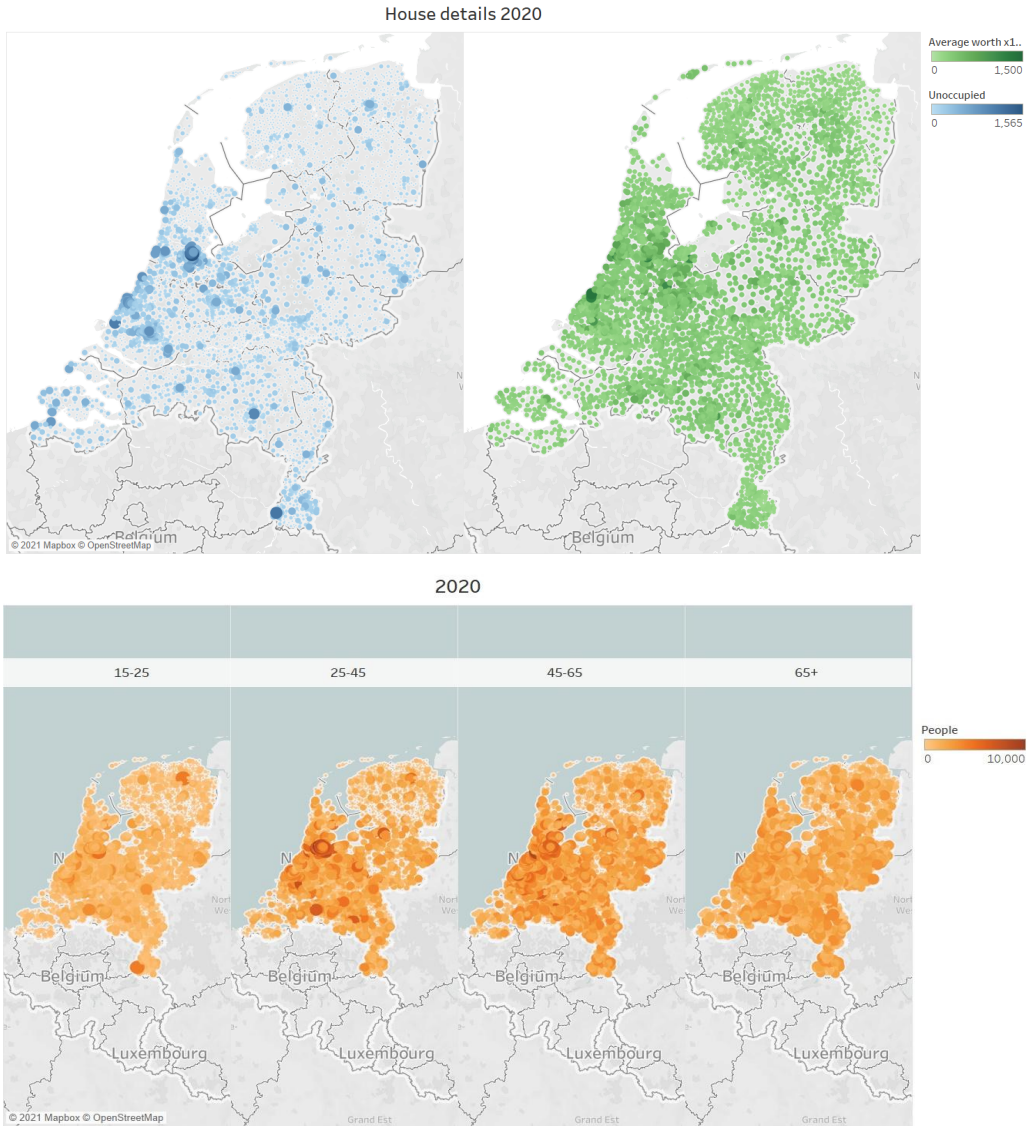

Figure 3.1: heatmaps showing population distribution

3.2 Distribution & availability of houses

The next visualization shows the house distribution over time compared to the average housing price. You can see that there is an increasing trend happening for the average housing price. Over the years the amount of people living alone has increased a lot more than other categories, such as “Two parents”. When more people want to live alone, more houses are needed. The basics of economics, more demand means a higher price. This graph shows this relation. We can not for sure say that this is the reason because a lot of other things like inflation, building costs, etc. need to be looked at to be sure this is a cause of the growing price average.

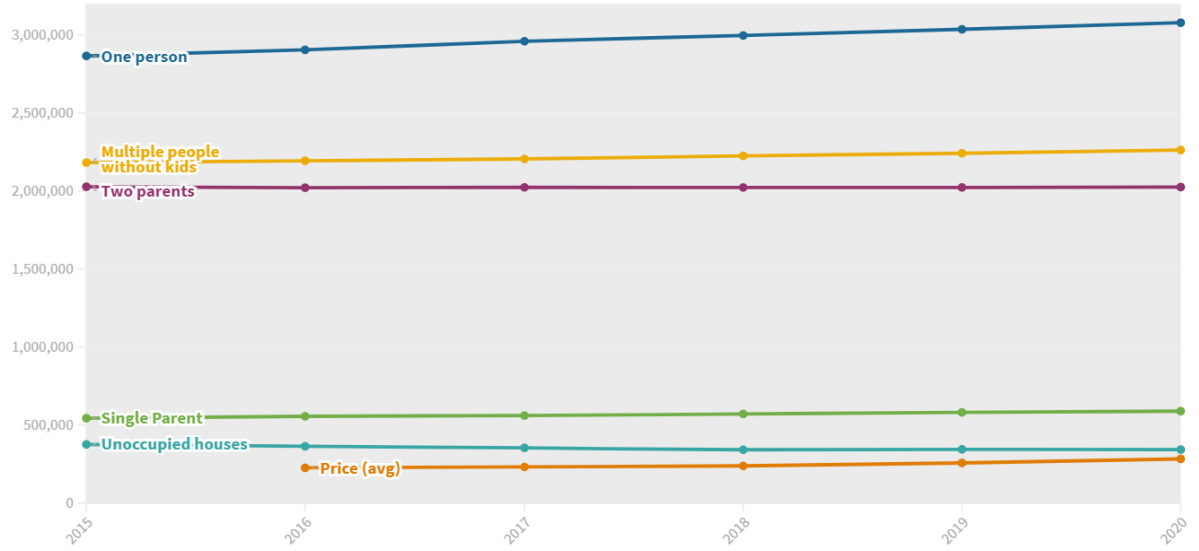

Figure 3.2: House distribution over time compared to the average housing price.

4. Buying vs. Renting in Enschede & the Netherlands

Since availability of housing has been at a higher level in the past few years, being aware of the cost/value effectiveness between buying and renting would benefit people looking for accommodation. This information can also be of use to groups of people that would be looking to buy/rent property such as migrants or even immigrants.

4.1 Value of Buying/Renting (€ per m²)

In this short animation, the value of renting and buying is compared by dividing the average cost of renting/buying with the average living area in order to get a price per m^2 for each method. In the first part the comparison is limited to Enschede, however by the end you can see long term renting in other cities such as Amstelveen and Amsterdam.

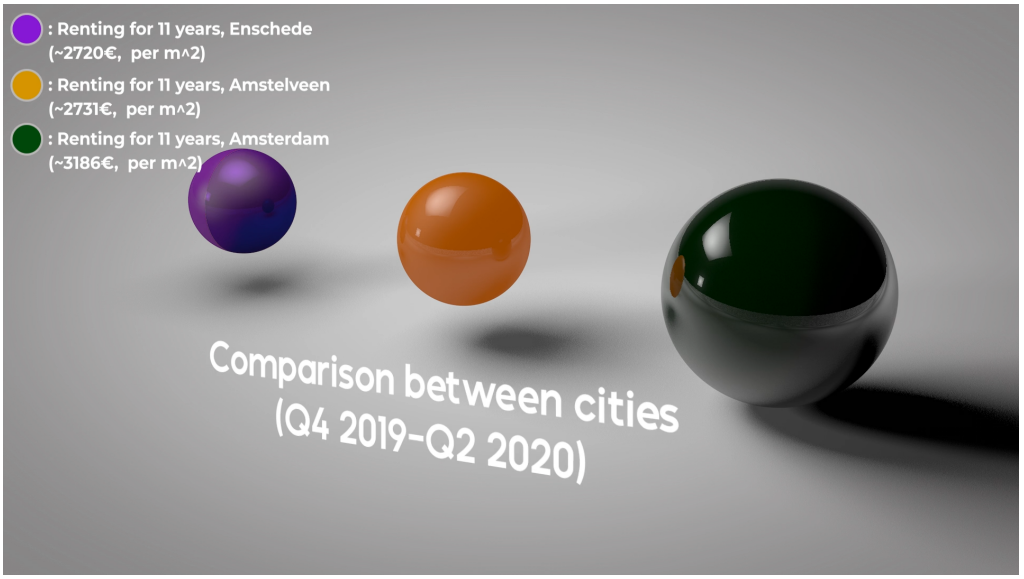

Figure 4.1: Long term renting between Dutch cities [4] [5]

4.2 Average cost of living between Buying/Renting in Enschede

This next animation shows the average cost of short term and long term renting, as well as buying a property in Enschede. Furthermore the average living area can be seen in the top right corner for each method of accommodation.

Figure 4.2:Buying vs renting property in enschede, retrieved from [5] [6]

5. Migration within The Netherlands

The next topic relates well to the affordability and availability of housing, as this might say something about population shifts through the country. These visualizations were made with data from cbs [9][10].

5.1 Migration trends in The Netherlands between cities

When looking at the housing price index per year outlined in the first section, we see the housing market is most expensive in North-Holland and South-Holland. If we look at the flow map showing migration trends in 2017, we see a noticeable migrational movement out of The Hague in 2017, which is the most densely populated city in The Netherlands. At first glance there seem to be clear migrational shifts between the north of The Netherlands and the south, and from the west to the east.

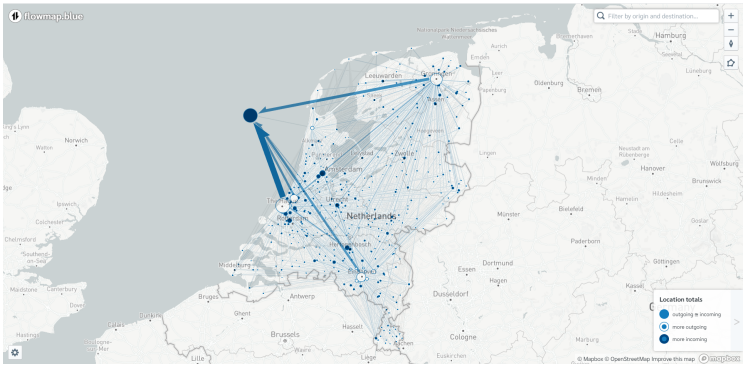

FIgure 5.1a&b: Static images of migration (and emigration) trends in The Netherlands retrieved from Flowmap.blue.com, where image (b) has clustering enabled and image (a) does not

FIgure 5.1c: Static image showcasing a hover effect for the city of The Hague and surrounding clustered cities (28 total), where the outgoing arrows represent the amount of migrated people from the city in their width

FIgure 5.1d: Static image showcasing a selection effect for 'Out of Country', where the outgoing arrows represent the amount of immigrated people

5.2 Average urbanicity rating based on population totals and population density for postal area codes in The Netherlands

This trend from west to east is confirmed by the next visualization, as we see steady declines in the average Urbanicity ratings of postal area codes in the east from 2016/17 until 2020, and marginal increase for areas in the north, south and west.
This visualization showcases the average urbanicity rating per postal area code per year, where urbanicity is a rating from one to five entailing the degree of how urban an area is. With the width of the pillars showing the area's population related to the population density. This bar chart can be applied to migrational trends by judging shifts in average urbanicity ratings and can even help predict population shifts and municipal construction plans.

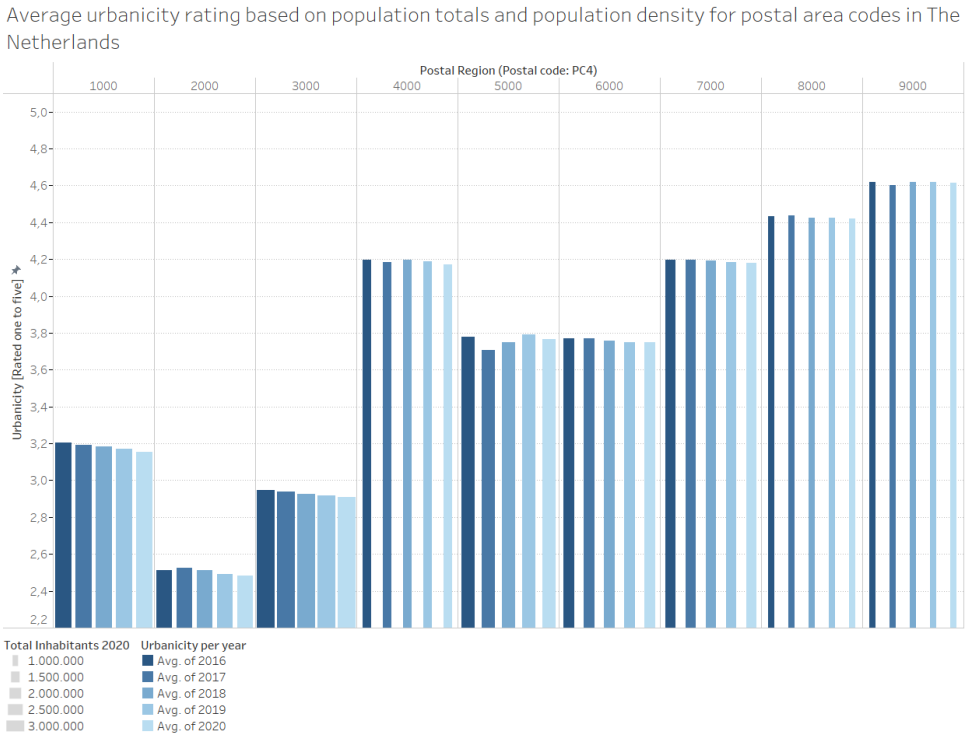

FIgure 5.2a: Bar chart showcasing the average urbanicity rating from one to five for postal area codes in The Netherlands per year from 2016 until 2020

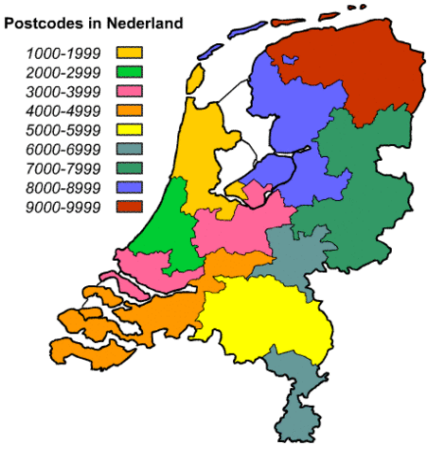

FIgure 5.2b: Postal area codes as reference for figure 3.2a, retrieved from: https://nl.wikipedia.org/wiki/Postcodes_in_Nederland

6. Construction and planning of housing districts

After the research and discussion about the migration trends and the availability of housing within the Netherlands, we were really interested in finding a correlation between these subtopics and the new subtopic ‘construction & planning of housing’. We created two visualizations allowing us to declare (predict) the behaviour of the construction plannings, based on migration trends and availability of housing. For the first visualisation, we created 2D-map showcasing the development of different types of construction and demolition over time. The inside provided by this visualization allowed us to correlate it with the behaviour observed at the availability of housing. For the second visualisation, ranking diagram, highlighting the relative housing balance development over the years. In paragraph 6.2, we will provide a more elaborated and detailed description and discussion of the visualisation.

6.1 Housing construction & Demolition

As mentioned in the introduction of this chapter, the first visualisation for this subtopic showcased an 2D-map animation, showcasing the development of the different types of construction and demolition within the netherlands. In figure 6.1 some fragments of the visualisation are given. We can see that the visualisation also contains a graph, allowing for easy comparisons between the different ‘elements’ and time sectors. The visualisation contains four different categories, which can be divided into either construction or demolition. ‘New construction’ and ‘Other addition’ belong to the construction. ‘Demolition’ and ‘Other withdraw’ belong to demolition. The size, representing the number of houses, is given in pulse size and length. Meaning that a large and long pulse represents a high number of houses in the highlighted area.

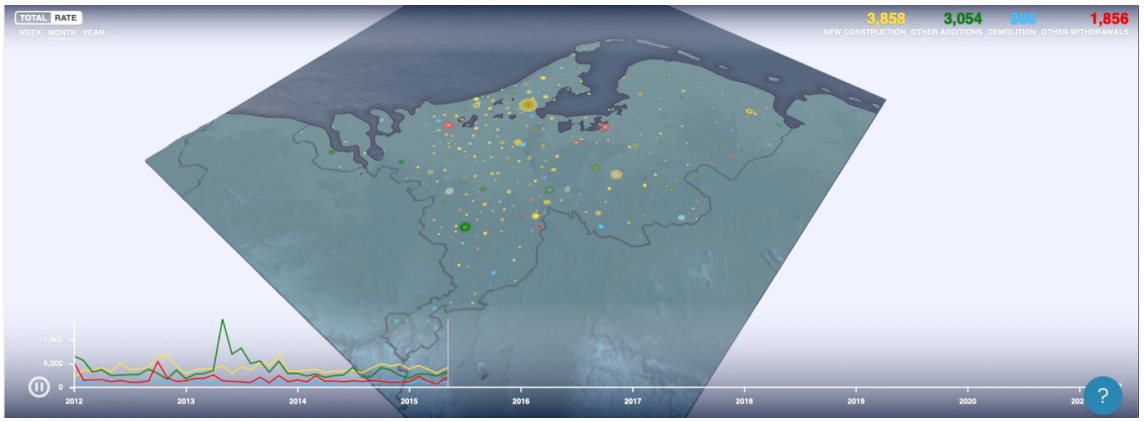

FIgure 6.1a Frame in the animation (2015-2016) showcasing the development of construction and demolition within the netherlands over the years 2012-2021[11][12]

From figure 6.1, we can see a standard snapshot of the animation, where we can see that especially in the western part of the Netherlands, the most construction and ‘housing’-traffic (construction or demolition) is present. This correlates with the findings we had, when we analyzed the availability of housing, where we saw that especially in ‘Noord-Holland’ and ‘Zuid-holland’ there were a lot of available houses.

Another interesting thing we can get out of this timeline, is that for example around 2017 there was a significant market crash within the Netherlands, where many housing prices changed enormously. If we compare this with a snapshot of the housing traffic at that point in time, see figure 6.1b, we see that the traffic was also peaking around that time. For the full animation, see the project folder containing all the ‘code’-files.

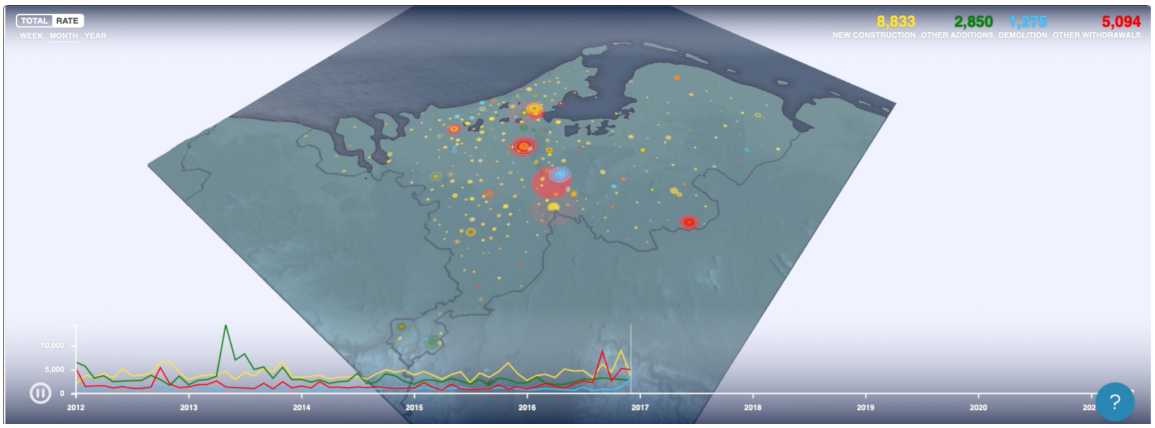

FIgure 6.1b Frame in the animation (2016-2017) showcasing the development of construction and demolition within the netherlands over the years 2012-2021

The problem we had for this visualization is, it still doesn’t allow for creating a link with the migration trends within the netherlands. This is caused by the fact that we haven’t normalised the data, based on the amount of residents or existing housing within each of the cities. For this reason, we will show the relative increasement in the housing balance of the different provinces, taking into account the already existing

6.2 Ranking of provinces (development housing balance)

In figure 6.2, the ranking diagram is presented, highlighting the relative housing balance development within the Netherlands, distinguishing the different provinces. The advantage of taking the initial housing stock into account, is that we can compare the results of the different provinces, while considering the amount of inhabitants in that specific area.

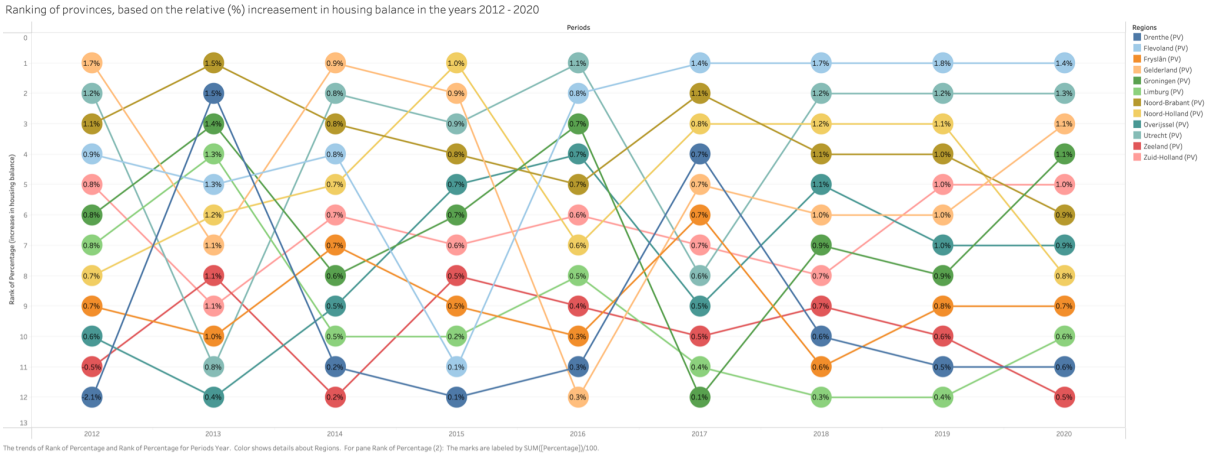

FIgure 6.2 Visualization showing the ranking of the different provinces based on their relative increase (development) in the house stocking (2012 - 2020) [11][12]

When actually analyzing this visualization we do see a shift from western provinces to easter provinces. In 2012 especially the western provinces were increasing rapidly, but if we compare that to the findings of 2020 we see it is completely opposite. The eastern provinces are increasing significantly. This correlates really well with the results of the imigration trends, where we discovered that more and more people are moving to the east hand side of the netherlands.

7. References

[1] Kadaster, Prijs index per regio
https://www.kadaster.nl/zakelijk/vastgoedinformatie/vastgoedcijfers/vastgoeddashboard/prijsindex/prijsindex-per-regio

[2] Statline dataset from CBS, Bestaande koopwoningen; gemiddelde verkoopprijzen, regio
https://opendata.cbs.nl/statline/#/CBS/nl/dataset/83625NED/table?ts=1567154700379
https://nl.wikipedia.org/wiki/AEX#Kritiek_op_de_AEX-index

[3] Wikipedia, AEX
https://nl.wikipedia.org/wiki/AEX#Kritiek_op_de_AEX-index

[4] Rental price decline trends in largest Dutch cities - real estate data(via pararius.nl)
https://www.pararius.com/news/rental-price-decline-trends-in-largest-dutch-cities

[5] Netherlands Rent Properties. (2020, March 4). Kaggle.
https://www.kaggle.com/juangesino/netherlands-rent-properties

[6] Funda.nl [funda]. (2021). funda.
https://www.funda.nl

[7] Voorraad woningen en niet-woningen, mutaties en gebruiksfuncties, 2019 | Compendium voor de Leefomgeving. (2019). CLO.
https://www.clo.nl/indicatoren/nl2167-voorraad-woningen-en-niet-woningen-gebruiksfuncties?ond=20907

[8] DTNL. (2021). Marktcijfers koopwoningen | NVM.
https://www.nvm.nl/wonen/marktinformatie/

[9] Centraal Bureau voor de Statistiek. (2021a, January 19). Verhuizingen op de kaart, 2017.
https://www.cbs.nl/nl-nl/maatwerk/2019/19/verhuizingen-op-de-kaart-2017

[10] Centraal Bureau voor de Statistiek. (2021, March 19). Kerncijfers per postcode.
https://www.cbs.nl/nl-nl/dossier/nederland-regionaal/geografische-data/gegevens-per-postcode

[11] StatLine dataset from CBS, ‘Dwellings and non-residential stock; changes, utility function, regions’
https://opendata.cbs.nl/statline/#/CBS/en/dataset/81955ENG/table

[12] GPS visualizer. Convert multiple addresses to GPS coordinates. Including MapQuest App key.
https://www.gpsvisualizer.com/geocoder/