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Sustainable tourism in Rotterdam: an indicator-based review

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Content

Summary

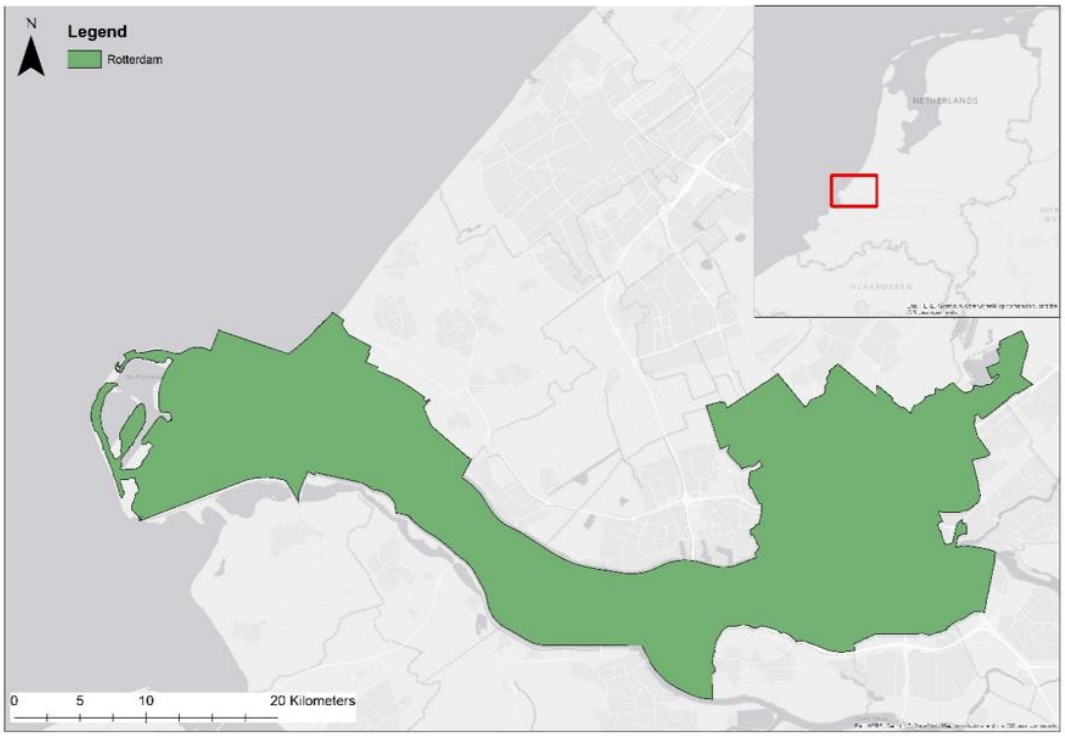
Sustainable tourism is an approach to tourism aimed at making it more beneficial to the tourists, host community and environment. The subject is often examined with the use of indicators. In this research project, indicators were used in multi-criteria analysis of the social and economic sustainability of a tourist destination on the rise: the Dutch city of Rotterdam. Both primary and secondary data were collected to calculate sustainability indicators. The general conclusion is that the current level of tourism in Rotterdam is relatively economically and socially sustainable though the longevity of this sustainability is questionable and a prime topic for future research.

1. Introduction

1.1 Background

Rotterdam is the second largest city in the Netherlands, with a population of 639.000 (CBS, 2018) located in the province of South-Holland (Figure 1). Rotterdam hosts the largest port in Europe (World Shipping Council, 2016) and is characterized by its multi-culturalism and straightforward modern appearance (Russo & Borg, 2002). Modern architecture can often be found in places where the historic city centre used to be, Rotterdam was bombed in the Second World War and only a few buildings from before the war remain standing today. According to Hitters (2000), the absence of a historic centre paired with the modern "American" looking architecture gives the city an almost aggressive modernity. When comparing Rotterdam to Amsterdam, the largest city and tourist destination in the Netherlands, it is evident that Rotterdam offers potential visitors something completely different. Rotterdam offers no historic buildings located next to iconic canals. Russo and Borg (2002) argue that the city lacks such a unique "selling-point" but does offer attractive modern landscape and quite a few assets which could easily be used to attract tourists. These qualities seem to have struck a note with the international tourist audience over the past years.

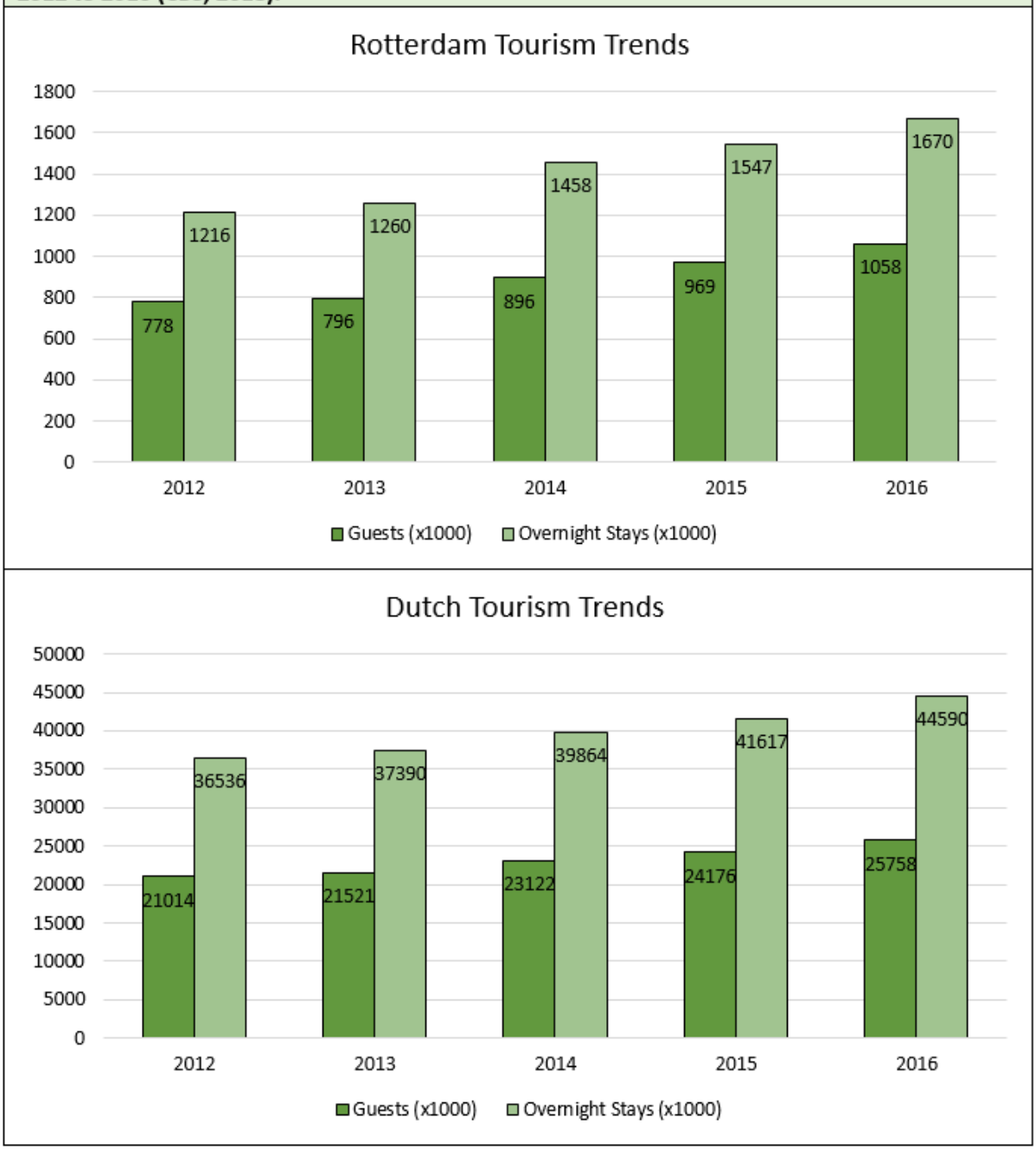
Figure 1, A map of the municipality of Rotterdam



Tourism is a growing industry in the Netherlands and especially in Rotterdam (Figure 2 and 3). There is a clearly visible upward trend in the levels of tourism in Rotterdam that can be seen in the amount of tourists attracted to the city and the amount of overnight stays. In 2016 Rotterdam hosted over a million tourists for the first time in its history. Its tourism industry is growing faster than the national

average; in 2012 Rotterdam accounted for 3,7% of the total amount of tourists in the Netherlands, in 2016 that number is up to 4,1% (CBS, 2018).

Figure 2 & 3: The amounts of guests and overnight stays in Rotterdam and the Netherlands from 2012 to 2016 (CBS, 2018).



The increase in the capacity of accommodations in Rotterdam further illustrates the transformation of Rotterdam into a tourist city. The total amount of beds in such accommodations has increased with 24% between 2012 and 2017 (CBS, 2018).

The growing popularity of Rotterdam as a tourist destination came after several news outlets positively recommended the city as a tourist destination. In early 2016, the largest travel guidebook publisher in the world, The Lonely Planet, placed Rotterdam on number 5 in its top 10 Cities in “Lonely Planet’s Best in Travel 2016” (Lonely Planet, 2016). In 2017 more favourable publicity followed, with the Huffington Post calling Rotterdam “the coolest city in the Netherlands” (Ceasar, 2017) and CNN calling

it “the capital of cool” (Foster, 2017). These three major publications all recommending Rotterdam to their audiences seems to have impacted the image of the city in the international tourists mind.

The cities’ growing popularity among tourists hasn’t gone unnoticed by Rotterdam’s governing body. In the most recent annual “economic outlook” published by the municipality, the document starts with (translated from Dutch to English): “*Rotterdam as a tourist destination is strongly on the rise. In this, Rotterdam grows faster than the Dutch average and the fastest out of the 5 largest tourist cities in the country.”* (*Gemeente Rotterdam*, 2018). The document outlines the municipalities’ strategy in dealing with, sustaining and expanding this recent tourism boom.

But how beneficial are large tourist arrivals for the local population? There are plenty of examples of cities with large tourist arrivals each year, where the local population is increasingly unhappy with the side effects. The cities become too crowded, life has become too expensive and people feel like the cities identity is being sold by the wayside. An example of a major European city where this is happening is Barcelona (Plummer, 2017). The media predict that popular tourist cities in the Netherlands will soon be confronted with many of the same problems of social tension and crowdedness (Bakker, 2018).

Many of these problems are addressed through the sustainable tourism approach. The concept of sustainable tourism is an often used but ill-defined term, experts in the field often disagree about the precise definition and associated terms (Miller, 2001). The WTO defines sustainable tourism as: *“Tourism that takes full account of its current and future economic, social and environmental impacts, addressing the needs of visitors, the industry, the environment and host communities”* (UNEP & UNWTO, 2005). Sustainable tourism is not a specific type of tourism, it is an approach used to make tourism more economically, socially and environmentally beneficial (Lozano-Oyola, Blancas, González, & Caballero, 2012).

1.2 Research Problem

If the city truly wants to become a primary tourist destination and keep that status, the sustainability of the recent influx needs to be examined. Questions need to be answered in order to better understand the sustainability of Rotterdam’s tourism industry. The core dimensions of sustainable tourism are economic, social and environmental sustainability (Agyeiwaah, Mckercher, & Suntikul, 2017); Lozano et al., 2012). However, because tourism has a very low impact on the environmental sustainability of Rotterdam when compared to the enormous port the city hosts and the heavy industry associated with it, this research will focus on the social and economic dimensions.

The main research question is: *To what extent are the current levels of tourism in Rotterdam socially and economically sustainable?*

The sub questions used to answer the main research question are:

- *What indicators can be used to determine the sustainability of Rotterdam’s tourism?*
- *To what extent are the current levels of tourism in Rotterdam socially sustainable?*
- *To what extent are the current levels of tourism in Rotterdam economically sustainable?*

1.3 Hypotheses

On the basis of these questions three hypotheses are stated. The first hypothesis relates to the main question. The latter two hypotheses relate to two of the three sub questions:

1. The current levels of tourism in Rotterdam are not economically and socially sustainable.
2. The current levels of tourism in Rotterdam are not socially sustainable.
3. The current levels of tourism in Rotterdam are not economically sustainable.

1.4 Relevance

Although the impacts of tourism are global (Gössling, 2002), research has predominantly focussed on the local scale (Saarinen, 2006), as will this research project. It contributes to existing literature by applying an existing methodology (Blancas, Caballero, González, Lozano-Oyola, & Pérez, 2010; Navarro Jurado et al., 2012) on a new (type of) destination: a Dutch city. Research like this has not been focussed on the Netherlands before (Agyeiwaah et al., 2017). Another contribution of this research project is the gathering of primary data regarding the population's attitude towards tourism. The collection of this empirical data, linked to literature dealing with a fuzzy concept like sustainable tourism (Butler, 1999; Miller, 2001), can help in the clarification of that concept.

Besides this academic relevance, Lozano-Oyola et al. (2012) identify three functions of sustainable tourism indicators that provide an inherent societal and academic value. Indicators can be used to:

1. formalize regional strategies;
2. create short-term local strategies;
3. establish benchmarking practices.

The first two functions illustrate the societal relevance and the direct link to planning and policymaking. Indicator research excels in highlighting strong and weak points, this is useful as focussing on the weak points while being conscious of the strong points is an effective way of improving the sustainability of a destination (Lozano-Oyola et al., 2012). The societal relevance of this research project is underlined by the policy recommendations made in the conclusion.

The third function has both academic and societal relevance. Lozano-Oyola et al. (2012) define benchmarking as a process of continues identification, learning and implementation of the most effective practices and capacities of other destinations. Future researchers wanting to use a similar indicator-system, can use the findings of this research project as a comparison. Likewise, planners and policymakers, can look at the findings of this research project and identify performance-gaps between Rotterdam and their own destination. These performance-gaps can then be linked to certain actions or policies to identify their success (Lozano-Oyola et al., 2012).

1.5 Structure

This report starts with the theoretical framework of sustainable tourism in relation to this research project. In the next chapter the methodology is explained on the basis of the indicator selection, data collection and indicator calculation. The results of the individual indicators and the aggregated indicators are discussed in the next chapter. The conclusion gives an answer to the research question, followed by the reflection on the entire research project and recommendation for future research.

2. Theoretical Framework

This theoretical framework explains the used theory of sustainable tourism, its dimensions, carrying capacity, (composite) indicators and the two sustainability paradigms. This chapter ends with a visual representation of the conceptual model which is the basis of this research project.

2.1 Carrying Capacity

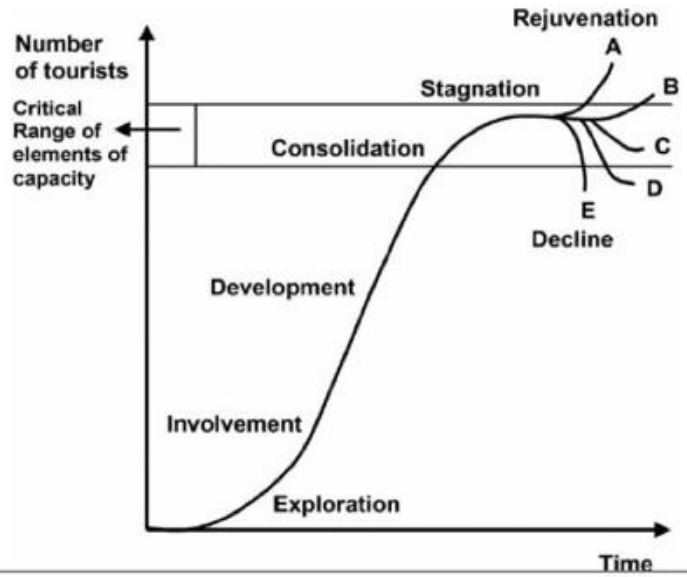
In the case of tourism, sustainability implies a carrying capacity (Navarro Jurado et al., 2012), a number of tourists which if it was ever to be exceeded would lead to an unacceptable deterioration of the environment of the location or a decline in the tourist experience (Saarinen, 2006). This theoretical line separates sustainable from unsustainable tourism. In reality there is no clear border which separates perfect indefinite sustainability from inevitable degradation, the concept of a carrying capacity is fuzzy and immeasurable to a degree. The carrying capacity according to the host community, might differ to the carrying capacity from the tourist's perspective, which might again differ from a limit based on available resources (Navarro Jurado et al., 2012).

2.2 Economic and Social Sustainability

Economic and social sustainability are different topics, stemming from two different traditions within the field of sustainable tourism.

Economic sustainability deals with the economic viability of tourism and stems from the activity-based tradition (Saarinen, 2006). This tradition represents the tourist-centric view of sustainability and deals with the needs of tourism as an economic activity. The carrying capacity here is not so much influenced by any physical limits of the location or attitudes of the host community, but by tourism demand. This is illustrated by Butler (1980) in his tourism area cycle of evolution (Figure 4). The figure shows the existence of a limit, but this is a cyclical model. If the location manages to reinvent itself, rejuvenation will take place, attracting even greater numbers of tourists. This limit is not based on a destination's carrying capacity based on the existing resources or the satisfaction of the local community. The limit can be set ever higher through marketing or the building of new infrastructure, it is based on tourist demand for the location (Saarinen, 2006).

Figure 4, Tourism area cycle of evolution (Butler, 1980).



Social sustainability finds its roots in the community-based tradition of sustainable tourism. Central to this tradition is the host community and the benefits that it may gain from tourism (Saarinen, 2006). The carrying capacity for a destination is informally set through a process of negotiation with the community, implying it's a social construct. In this tradition, carrying capacity is defined as the maximum level of perceived impact tourism can have before the negative impacts are considered too disturbing. This doesn't necessarily imply a hard limit, this capacity is dynamic and can be renegotiated.

Though the economic and social sustainability will largely be handled as separate concepts, stemming from two different traditions and relating to two separate sub questions, it is important to keep in mind that these concepts are inseparably linked and greatly impact each other (WTO, 2004).

2.3 Indicators

Many researchers in the field of sustainable tourism use indicators to test different aspects of sustainability (Agyeiwaah et al., 2017; Choi & Sirakaya, 2006; Lozano-Oyola et al., 2012; Miller, 2001; Navarro Jurado et al., 2012; Russo & Borg, 2002). An indicator can be defined as: *"something that helps you to understand where you are, which way you are going and how far you are from where you want to be"* (Hart, 1997). It can be seen as a measurement tool which can help in quantifying a qualitative concept. Indicators can often serve as practical diagnostic tools for policy makers and planners, when attempting to improve the level of sustainability of tourism activities (Lozano-Oyola et al., 2012), they can be used to assess the overall situation and identify strong and weak points.

Indicators can be aggregated to come to a general conclusion on sustainability, these aggregated indicators are called composite indicators (OECD, 2008). In this research project, a method was chosen created by Blancas et al. (2010) and refined by Navarro Jurado et al. (2012) which is used to calculate and aggregate indicators (see Methodology).

2.4 Sustainability Paradigms

The methodology used (Navarro Jurado et al., 2012) creates two different composite indicators for each aggregation, one for the Weak Sustainability Paradigm (WSP) and one for the Strong Sustainability Paradigm (SSP). These paradigms represent two opposing sides of a fundamental debate in sustainable development. The two sides have opposing views on the substitutability of natural capital and non-renewable resources. Proponents of the WSP regard all natural capital as substitutable by manmade capital. Effectively a value is assigned to the natural capital or non-renewable resource in question, from which logically follows that it can be replaced by something of equal value. The SSP dictates that some functions of natural capital can impossibly be filled by man-made capital, and thus the former should not be replaced by the latter. Navarro Jurado et al. (2012) did not choose between these two paradigms but incorporated both in their methodology.

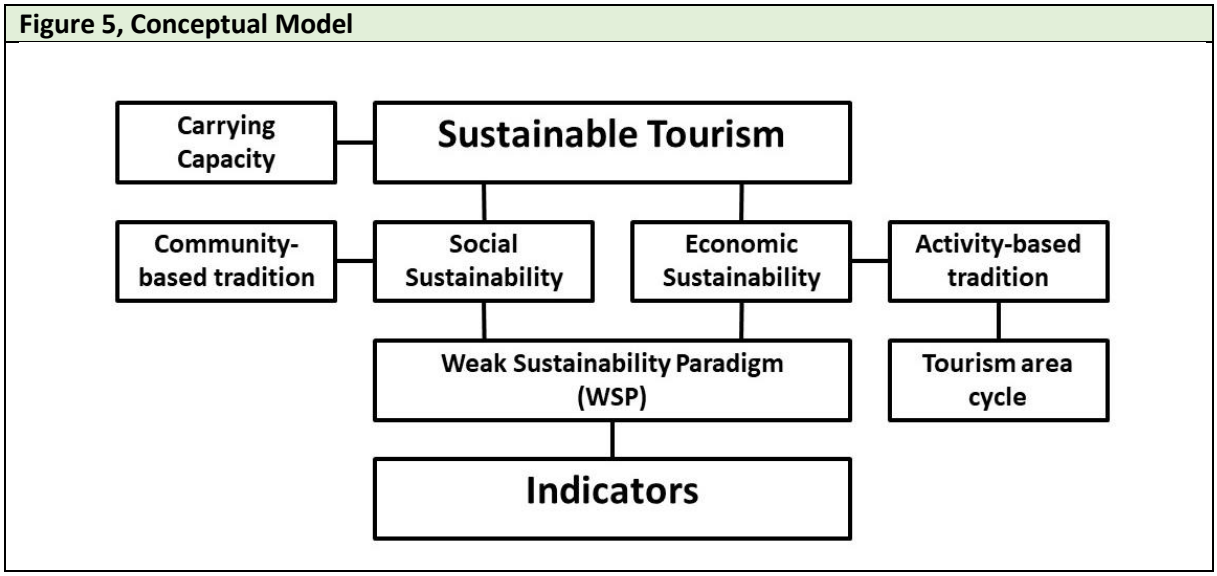
For the WSP, composite indicators were constructed by taking the mean of all indicator values (see 4.3, Indicator Creation); the substitutability of all capital translates to compensability between indicators. For the SSP, composite indicators were constructed by taking the lowest indicator value of all indicators aggregated. In this aggregation method, the chain (the composite indicator) is only as strong as its weakest link; when one factor of sustainability underperforms, the entire situation is deemed unsustainable, no matter how positive all other factors perform. The approach used by Navarro Jurado et al. (2012) made sense for the case study of southern Spain, where tourists have a real impact on the environment (beach degradation and water depletion for instance), though the decision to also apply the SSP to the social and economic dimension is questionable. As established earlier, this research project does not look at tourism's impact on environmental sustainability. Non-renewable resources and natural capital are therefore not a factor. Within the economic and social dimension of sustainability, the SSP viewpoint does not apply; nothing is irreplaceable. Looking

through an economic lens, everything has a market value and can be replaced by something of equal market value, even non-renewable resources; these are the basic principles of the neoclassical economy (Navarro Jurado et al., 2012). Within the social dimension the carrying capacity is assessed by a process of negotiation (Saarinen, 2006), which inherently compensates among different impacts, for instance, if the community earns a certain amount of money from the tourist industry, it might overlook the overcrowding of the local market which occurs during the high season. Because compensation is possible within the dimensions of sustainability relevant to this research project, the WSP approach to sustainability will be used while the SSP approach will be discarded.

2.5 Conceptual Model

The conceptual model (Figure 5) is a visual representation of the relationships between the different theories and concepts outlined throughout the theoretical framework.

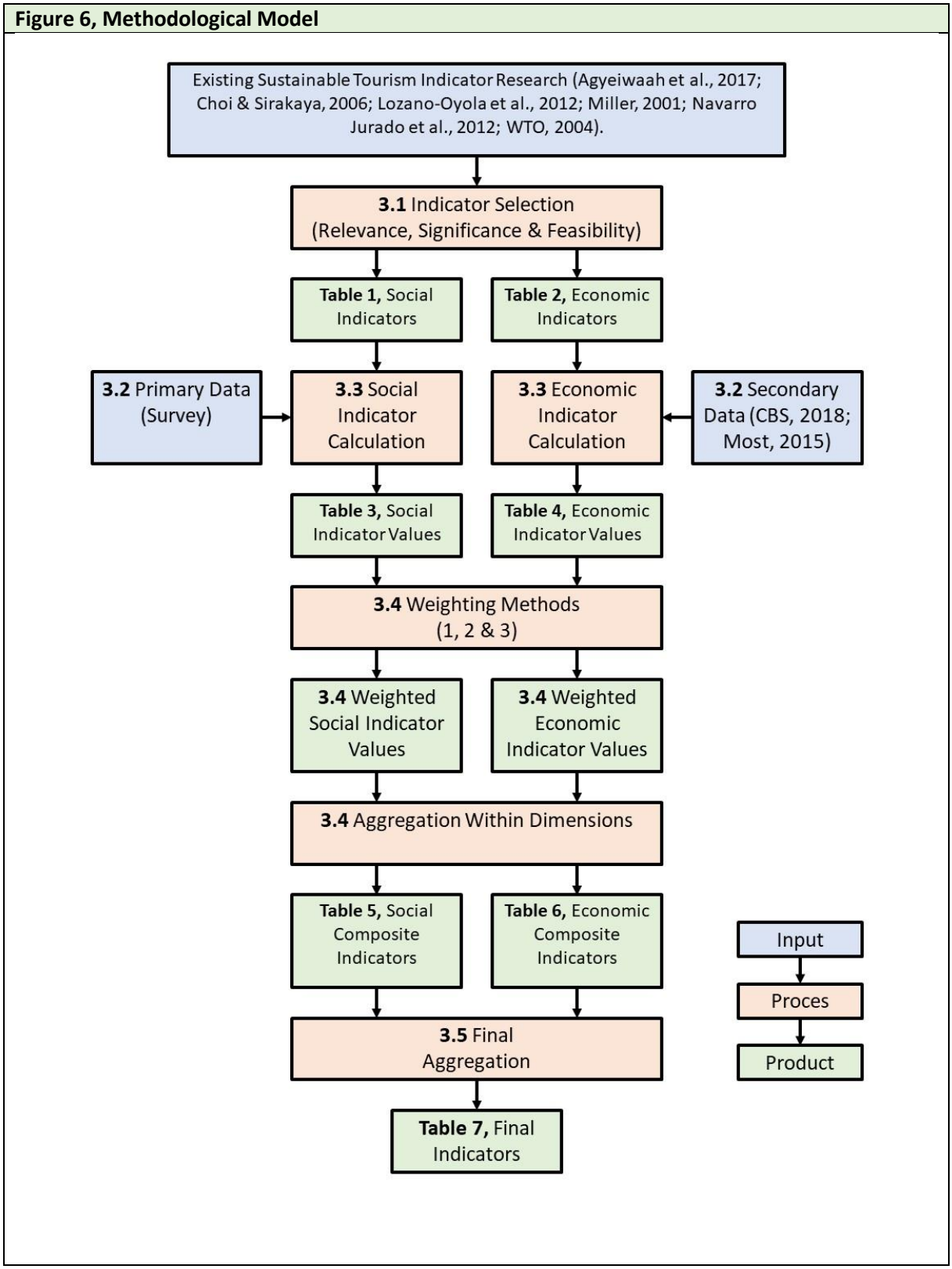
Figure 5, Conceptual Model



3. Methodology

This chapter explains the methodology used in this research project. The methodology is visually represented in the Methodological Model (Figure 6).

Figure 6, Methodological Model



3.1 Indicator Selection

A list of indicators for sustainable tourism was created through literature research (Agyeiwaah et al., 2017; Choi & Sirakaya, 2006; Lozano-Oyola et al., 2012; Miller, 2001; Navarro Jurado et al., 2012; WTO, 2004). Two lists of indicators were formed, one focussing on social sustainability, the other on economic sustainability. The indicators were selected on three criteria:

1. The indicators should be **relevant** to the case of Rotterdam.

2. The indicators should be **significant** to the concept of sustainable tourism, so it's important that each indicator shows a significant aspect of sustainable tourism and contributes to painting a clear picture of sustainability.

3. The complete list of indicators should be **feasible** to research in the given timeframe. For each indicator a consideration has to be made between the expected time and effort to attain the necessary information and the benefit it provides to the overall research.

The final list of indicators consists of 15 indicators, 7 of which are in the social sustainability dimension, and 8 in the economic sustainability dimension (Table 1 & 2). An overview of the sources each indicator was selected from, can be found in Appendix E.

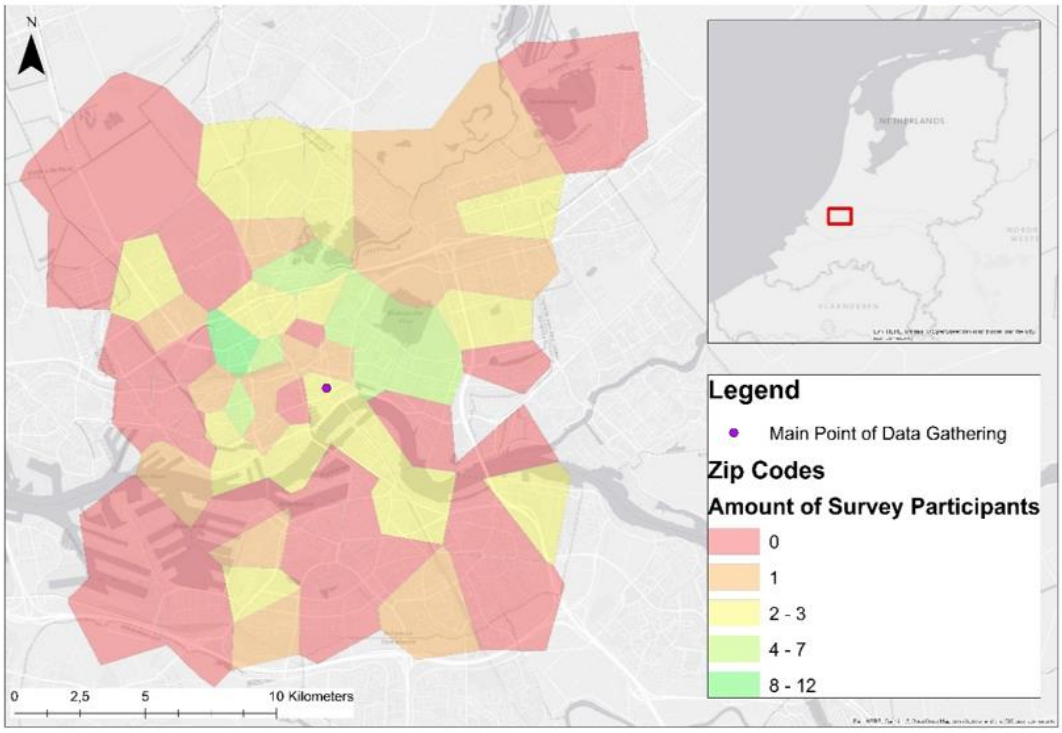
3.2 Data Collection

The data needed for some indicators could not be found in any reliable secondary source, for these indicators primary data was collected through a questionnaire. Questionnaires or surveys are very useful when one needs to collect information about people's attitude to social issues (Clifford, French, & Valentine, 2010). Social sustainability deals largely with the population's attitude to tourists and the local tourism industry. For this reason, the survey served to test the social sustainability of tourism in Rotterdam. Since the case study of this research project is the city of Rotterdam, the target group for the survey is the population of Rotterdam. The questionnaire was designed with the help of chapter six of *Key Methods in Geography* (Clifford et al., 2010) and inspired by a questionnaire which is also designed to test social sustainability regarding tourism (WTO, 2004). All questions related to indicators are made with a five point Likert scale ranging from "totally agree" to "totally disagree". The questionnaire can be found in Appendix A, the translated questions can be found in Appendix B.

The city of Rotterdam is too big for a door-to-door survey across the entire city, at least for this research project. Therefore, the surveys were conducted in the city centre, a place which most inhabitants of Rotterdam visit from time to time. The exact location can be seen in Figure 7. In total, 127 surveys were conducted, on a population of 640.220 (CBS, 2018), that leads to a confidence level of 95% with a confidence interval of 9 (Surveysystem.com, 2018). The raw data gathered by this survey can be found in Appendix C, quantity tables for each question can be found in Appendix B.

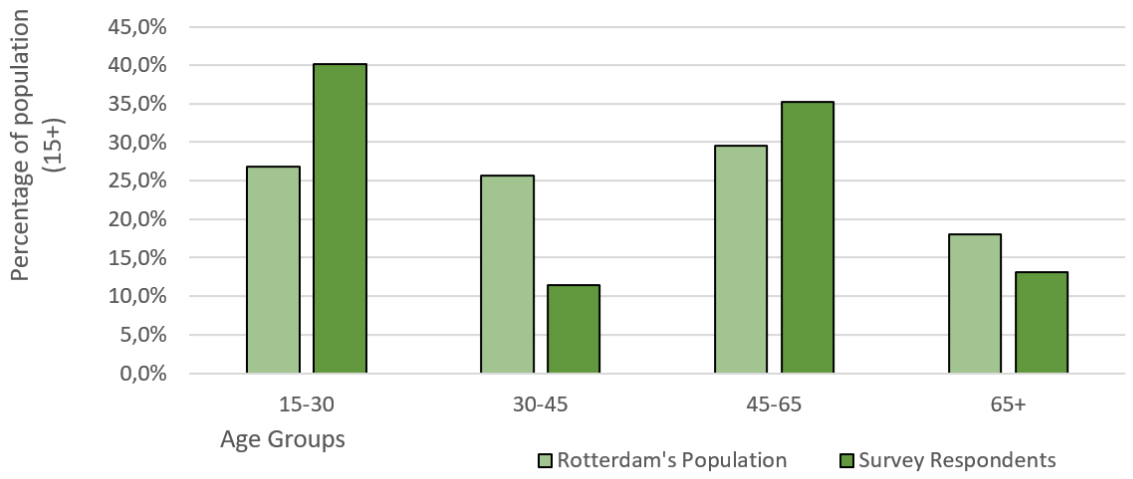
The data needed for the indicators of economic sustainability is gathered as secondary data from two sources (CBS, 2018; Most, 2015), this data can be found in Appendix D.

Figure 7, a map showing in which zip code areas in Rotterdam the respondents of the survey lived and the location where most primary data collection took place.



To test the representatively of the respondents, a few check questions have been asked: gender, age and postal code. The respondents are not entirely representative for the population of Rotterdam in all three of these categories. There were more male respondents (59,2%) than female (40,8%), while the population of Rotterdam has 49,3% males and 50,7% females (CBS, 2018). Geographically speaking, the areas just north of the city centre are overrepresented while peripheral areas and almost all areas in the south are underrepresented (Figure 7). This might be because the main point of data gathering was north of the river Maas, which acts as a natural barrier between North and South. Not all the age groups are equally represented: the group 15-30 years is overrepresented while the group 30-45 years is underrepresented (Figure 8).

Figure 8, A bar chart showing a comparison between the age group breakdown of the population of Rotterdam and of the respondents of the survey.



3.3 Indicator Calculation

The indicator values are calculated from the gathered primary (social) and secondary (economic) data. The method used uses a double reference point system (Blancas et al., 2010; Navarro Jurado et al., 2012), in which the value gathered in the data is tested against two reference points (Figure 9).

> The **Reservation Level (RL)** is the lowest acceptable level of the indicator. If the indicator is below the reservation level it means the carrying capacity has been exceeded and the indicator will have a negative value (between -1 and 0).
>
> The **Aspiration Level (AL)** is the level which decision makers should aim for. Any value between the reservation level and the aspiration level (between 0 and 1) exists in a grey area, as Navarro Jurado et al. (2012) are not clear on what this area exactly entails and thus leaves it open for interpretation. The indicator neither exceeds carrying capacity, because it is above the reservation level, nor is it truly sustainable, because it is under the aspiration level. This grey area essentially demonstrates the fuzziness of the concepts carrying capacity (Saarinen, 2006) and sustainable tourism (Gössling, 2002; Miller, 2001). In this research project, this grey area is interpreted as sustainable in the short term: moderate sustainability. The carrying capacity has not been surpassed and thus one cannot speak of an unsustainable situation presently. There is however room to improve the sustainability of the destination, which inherently means that at some point in the future, this level is no longer sustainable. A value above the aspiration level (between 1 and 2) represents long term *true* sustainability and marks a major strength of the destination.

This method doesn't just answer the question: "*is this particular aspect sustainable?"* but assesses the extent of sustainability which makes it possible to identify strong and weak points.

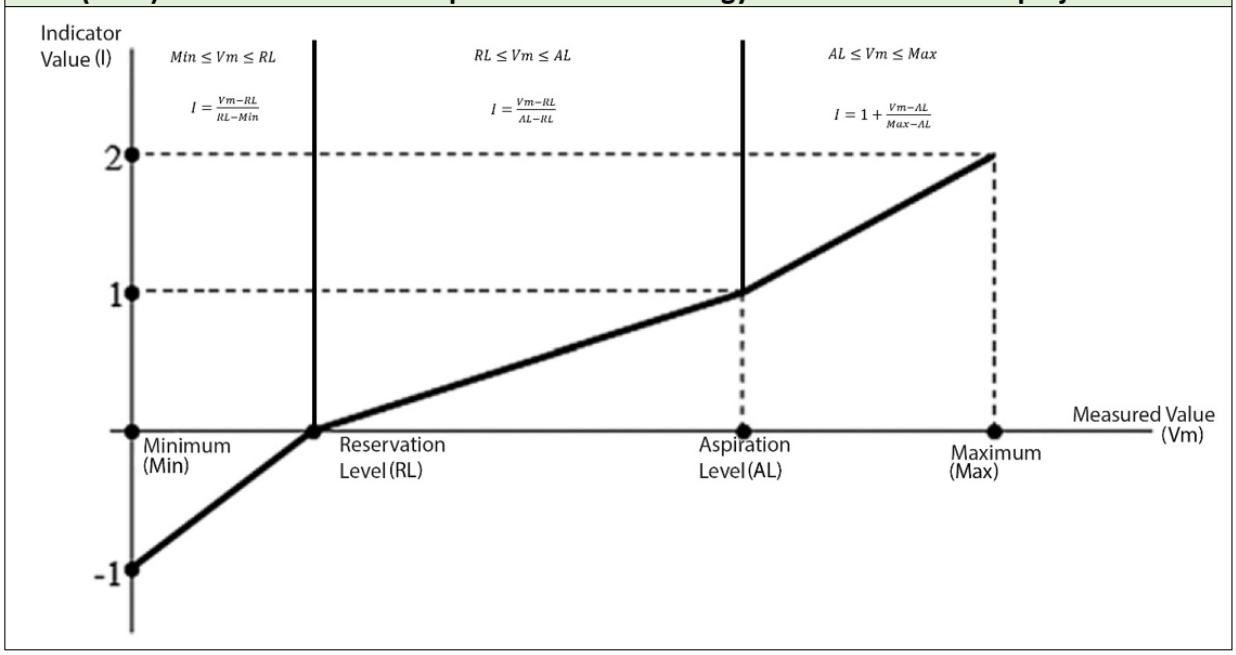
The primary data was gathered with specifically this format of indicators in mind. The gathered data is therefore easily transformed into the chosen indicators. All answers to the questionnaire were given on a Likert scale from 1 to 5, from completely disagree to completely agree. For a positive indicator, that means 5 is the best possible value and 1 the worst possible value. With a negative indicator, it is the other way around, the data has been transformed accordingly so that all values of 1 are the most negative value and all values of 5 are the most positive value. The reservation level for all indicators of

social sustainability is set at this neutral value of 3, while the aspiration level is set at the moderately positive value of 4 (Navarro Jurado et al., 2012).

The data needed for determining the values of the economic sustainability indicators were gathered from secondary data sources (CBS, 2018; Most, 2015). This data does not have the same 1-5 scale as the primary data gathered for the social sustainability indicators. Determining the double reference points therefore works slightly different. Ideally one would consult a panel of experts to determine the reservation and aspiration level (Lozano-Oyola et al., 2012), but a different route was chosen in this research project. The initial authors of this form of indicator construction proposed basing the reference levels on the mean of all measured values (Blancas et al., 2010). The system proposed by Blancas et al. (2010) only uses one reference value at 80% of the mean. This research project will also use a reservation level set at 80% of the mean and an aspiration level at 120% of the mean. The mean in this case is the Dutch National average of the specific value. This aspect is one of the drawbacks of this methodology; when all reference values are based on averages, the conclusions (from the economic indicators) can only be drawn in a Dutch context.

For some indicators there is no fair and clear maximum value. The unemployment rate for instance, logically has a maximum value of 100% but that is not a fair representation of reality. Another example is the average amount of money a tourist spends or the length of the average stay. These could in practice be infinite. For these situations a rule, similar to the setting of reference values in Blancas et al. (2010), is used: the maximum value is double the mean.

Figure 9, a visual representation of the double reference point system, taken from Navarro Jurado et al (2012) and edited to better represent the terminology used in this research project.



After determining the Minimum (*Min*), Maximum (*Max*), Reservation Level (*RL*) and Aspiration Level (*AL*) for each indicator, the indicators can be calculated through the following formulas (Navarro Jurado et al., 2012). In these formulas *I* is the indicator value and *Vm* is the measured value, the raw data (The ranges each formula applies to are visually represented in Figure 9).

If $AL \leq Vm \leq Max$ $\qquad I = 1 + \frac{Vm-AL}{Max-AL}$

If $RL \leq Vm \leq AL$ $\quad I = \frac{Vm-RL}{AL-RL}$

If $Min \leq Vm \leq RL$ $\quad I = \frac{Vm-RL}{RL-Min}$

The indicator will be between -1 and 0 when the measured value is beneath the Reservation Level, between 0 and 1 when the measured value is between the Reservation and Aspiration Level, and between 1 and 2 when the measured value is above the Aspiration Level. Identifying strong and weak points is one of the core strengths of this methodology because all indicators fall between these values and so are instantly comparable.

3.4 Aggregation within Dimensions

To draw a conclusion about social and economic sustainability, the different indicators within these dimensions were aggregated to a single value through multicriteria analysis (Navarro Jurado et al., 2012). A composite indicator (OECD, 2008) was calculated for each of the two dimensions. Before aggregation takes place, an important step in constructing composite indicators is assigning weights to the individual indicators. One has to be cautious when choosing to assign different weights to different indicators, because weights greatly affect the results of the research project (Mikulic, Kožic, & Krešić, 2015; WTO, 2004). Assigning weights can serve multiple purposes, it can serve to correct for overlapping data or it can serve to give some indicators more importance than others when there is a theoretical rationale for that (OECD, 2008). Because this research project is deep rather than wide, focussing on one single municipality as its case study, three different weighting methods were chosen in order to show three different possible results from which to draw conclusions.

The three weighting methods are:

Weighting Method 1

Each indicator has the same weight. This is a better option than potentially distorting true indicator importance without any profound knowledge of both sustainable tourism and the destination (Mikulic et al., 2015).

Weighting Method 2

Weighting corrects for overlapping data (OECD, 2008). If two indicators are very close together, they are placed into the same "Weight Method 2 Category" (Table 2 & 3). These categories effectively count as 1 indicator in this method with both indicators carrying half the weight of regular indicators.

Weighting Method 3

Existing literature was used to assign weights to different indicators according to theoretical importance. Ideally one would consult a panel of experts to assign such weights (Lozano-Oyola et al., 2012) or an interview with a single expert, but in this research project the decision was made to use scientific literature as a surrogate expert panel to determine the weights. The study used for this was a meta-analysis of studies using indicators to determine sustainability in tourism (Agyeiwaah et al., 2017), the authors counted among 27 studies how often a particular theme of indicators was used. The frequency of mentioning in the scientific literature was used as the weight for each indicator. This is the only way to assign weights according to theoretical importance without consulting or being an expert.

The assigned weights for each indicator can be found in Table 1 and 2, along with the Minimum, Maximum, Reservation and Aspiration Level.

Table 1, Indicators of Social Sustainability, Minimum, Maximum, Reservation, Aspiration and Weights								
Indicator Number. Indicator (Survey Question)	**Minimum (Min)**	**Maximum (Max)**	**Reservation Level (RL)**	**Aspiration Level (AL)**	**Weight Method 1**	**Weight Method 2**	**Weight Method 2 Category**	**Weight Method 3**
1. Personal Investment in Tourism Industry (Perceived Benefit from Tourism) (Q3)	1	5	3	4	1,00	0,50	Investment in Tourism	0,35
2. Will to Invest in Tourism (Q8)	1	5	3	4	1,00	0,50		0,19
3. Experiencing Higher Prices due to Tourism (Q5)	1	5	3	4	1,00	1,00	-	0,19
4. Nuisance Caused by Tourists (Q4)	1	5	3	4	1,00	0,50	Direct Nuisance	0,31
5. Crowdedness Caused by Tourists (Q6)	1	5	3	4	1,00	0,50		0,35
6. Overall Feeling Towards Tourism (Q7)	1	5	3	4	1,00	1,00	-	0,31
7. Assessment of Tourism Carrying Capacity (Q9)	1	5	3	4	1,00	1,00	-	0,19

Table 2, Indicators of Economic Sustainability, Minimum, Maximum, Reservation, Aspiration and Weights									
Indicator Number. Indicator	**Calculation**	**Minimum (Min)**	**Maximum (Max)**	**Reservation Level (RL)**	**Aspiration Level (AL)**	**Weight Method 1**	**Weight Method 2**	**Weight Method 2 Cattegory**	**Weight Method 3**
8. Length of stay	(Amount of Visitors) / (Overnight Stays)	*Not Applicable*	*Not Applicable*	1,38	2,08	1,00	1,00	-	0,07
9. Average expenditure per tourist per day	*Not Applicable*	€ 0	€ 1.452	€ 581	€ 871	1,00	1,00	-	0,78
10. Unemployment Rate	*Not Applicable*	8,80%	0,00%	0,04	0,05	1,00	0,50	General Economic Issues	0,09
11. Average Income	*Not Applicable*	€ 12.950	€ 51.800	€ 20.720	€ 31.080	1,00	0,50		0,09
12. Percentage of total jobs in "Hospitality Industry"	(Amount of Jobs in Hospitality Industry) / (Total Amount of Jobs) * 100%	0,00%	9,80%	3,90%	5,90%	1,00	1,00	-	0,74
13. Official tourism accommodation on offer	*(Total Amount of Tourist Accommodations) / (Total Population)*	0	0,1	0,04	0,06	1,00	1,00	-	0,30
14. Seasonality of Accommodations	*(Amount of Accommodations open in Low Season) / (Total Amount of Accommodations) * 100%*	0%	100%	50,90%	76,30%	1,00	0,50	Seasonality	0,30
15. Seasonality of Tourism Demand	*(Amount of Tourists in Worst Month) / (Amount of Tourists in Best Month) * 100%*	0%	100%	48,70%	73,10%	1,00	0,50		0,30

With the weights assigned, the aggregation within the two dimensions can take place. The composite indicators resulting from this aggregation represent the overall sustainability level of the economic and social dimension separately.

The symbol *Ci* is the composite indicator within each dimension, *Ix* is the Indicator number *x*, *Xtotal* is the total amount of indicators used in the calculation *w* is the weight assigned to each indicator. Because of the three different weighting methods, the aggregations within the dimensions are carried out three different times. The three different outcomes were transformed to operate on the same scale (from -1 to 2, see Figure 9).

$$Ci = \frac{\sum(wI1, wI2, \dots, wIx))}{Xtotal}$$

3.5 Final Aggregation

The final aggregation brings together the social and economic dimensions in one final composite indicator.

In this final aggregation, *Cf* is the ultimate composite indicator, the number which effectively shows the overall sustainability. *Cs* and *Ce* are the *Ci* value for the social and economic dimension respectively.

$$Cf = \frac{1}{2}\sum(Cs, Ce)$$

One could argue that the economic or social dimension is more important than the other and should be weighted accordingly. In order to not distort true indicator importance In this research project the decision was made to treat them as equally important and therefore not to assign weights to each dimension.

4. Results & Discussion

The results of the individual indicators are discussed in this chapter, followed by the different outcomes of the three weighting methods of the aggregated indicators of social and economic sustainability. The final section discusses the overall sustainability.

The results of the indicators of social sustainability are shown in Table 3, with a visual representation in Figure 10; the economic indicators can be found in Table 4 and Figure 11.

4.1 Individual Indicators

The people of Rotterdam seem to have a generally positive opinion of the tourists visiting their city. This is underlined by the high value in arguably the most important social indicator: the overall feeling towards tourism. The population does not seem to experience a lot of nuisance from the tourists at all and are generally fine with more tourists coming in the future, though there does seem to be a general consensus that reaching the levels of a city like Amsterdam, would not be desirable (as illustrated by the eleven survey comments stating exactly that). Furthermore, the population is fine with the municipality investing to attract more tourists and does not really hold the tourist responsible for any increases in living expenses. The one problem the tourists seem to be really causing according to the population, is overcrowding. This might also have something to do with the main location of survey collection, which was in front of the central library, right across one of the city's most popular and crowded tourist destinations (Gemeente Rotterdam, 2018a): the Markthal.

Despite their positive attitude, the population at large does not feel like the tourism boom serves them personally, they do not really feel like they have a stake in the city's tourism industry. This lack of involvement of a large portion of the population makes sense; Rotterdam is not strictly a tourist city, though it has the potential to become one (Russo & Borg, 2002).

The economic indicators bring to light both high positives and low negatives. The amount of official tourism accommodations is far below the national average, which, combined with the steadily rising amounts of tourists visiting Rotterdam each year, might lead to a shift towards unofficial accommodations like Airbnb, which have been reported to cause tension between tourists and residents in Amsterdam (Heerde, 2017; Welles, 2018). Cognisant of this trend, Rotterdam's municipality seems to have taken a precautionary approach in restricting Airbnb owners (ANP, 2018; Gemeente Rotterdam, 2018b) to avoid a situation comparable to Amsterdam (Heerde, 2017; Welles, 2018), despite the population presently not calling for such restrictions (Liukku, 2018).

Rotterdam's unemployment rate is currently the highest of any municipality in the Netherlands. This isn't the only economic issue troubling the population of Rotterdam, as the average wages barely reach the reservation level. Given the tourism industry's job creation capabilities (Lozano-Oyola et al., 2012) these problems might be resolves if the upwards trend of tourism arrivals continues and leads to an expansion of the tourism industry.

The biggest positive points are the average expenditure per day, which sits well above the aspiration level and the (lack of) seasonality of both tourism demand and supply of accommodations. One might argue however, that these numbers are unremarkable for an urban destination like Rotterdam. Cities are more expensive than rural areas and a city like Rotterdam shouldn't expect the same seasonality as for instance a coastal destination.

Table 3, Indicators of Social Sustainability in Tourism			
Indicator Number. Indicator	**Indicator Value**	**Source**	**Survey Question**
1. Personal Investment in Tourism Industry	-0,34	Primary Data (Survey)	Question 3
2. Will to Invest in Tourism	0,46	Primary Data	Question 8
3. Experiencing Higher Prices due to Tourism	0,19	Primary Data	Question 5
4. Nuisance Caused by Tourists	0,81	Primary Data	Question 4
5. Crowdedness Caused by Tourists	-0,15	Primary Data	Question 6
6. Overall Feeling Towards Tourism	1,20	Primary Data	Question 7
7. Assesment of Tourism Carrying Capacity	0,39	Primary Data	Question 9

Figure 10, A visual representation of social indicator values. The numbers correspond with the Indicator Numbers (Table 3)

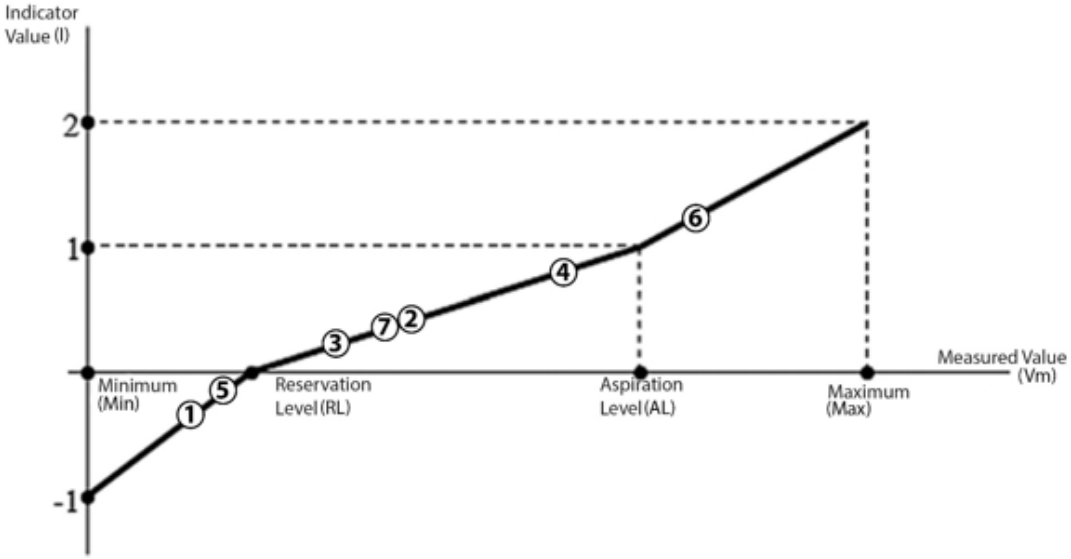
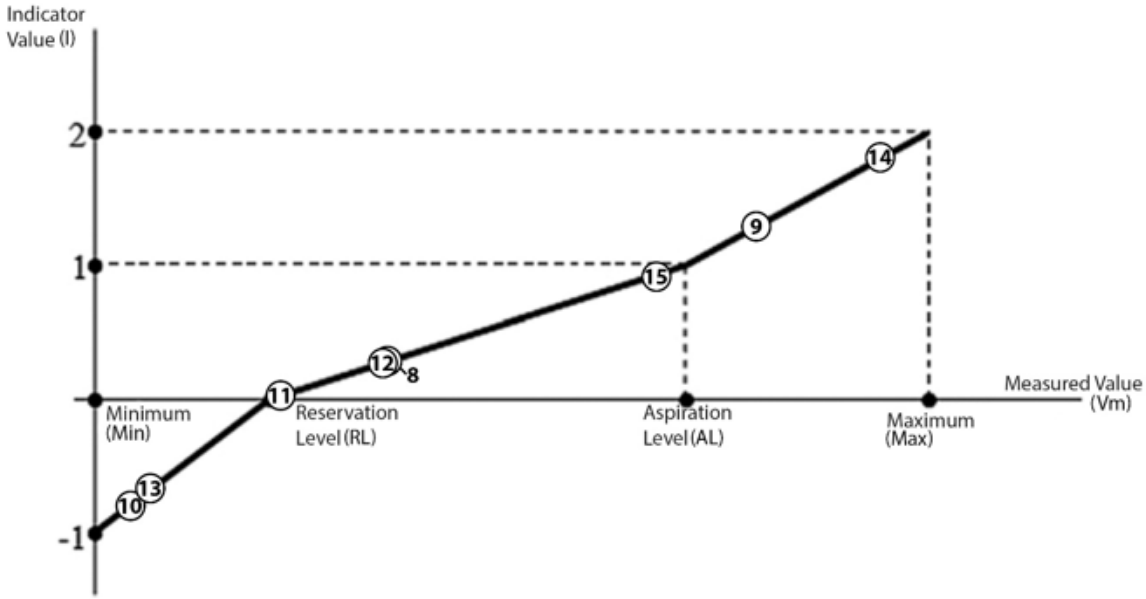


Table 4, Indicators of Economic Sustainability in Tourism		
Indicator Number. Indicator	**Indicator Value**	**Source**
8. Length of stay	0,30	CBS
9. Average expenditure per tourist per day	1,32	Van der Most, 2015
10. Unemployment Rate	-0,80	CBS
11. Average Income	0,03	CBS
12. Percentage of total jobs in "Hospitality Industry"	0,29	CBS
13. Oficial tourism accommodation on offer	-0,69	CBS
14. Seasonality of Accomodations	1,81	CBS
15. Seasonality of Tourism Demand	0,96	CBS

Figure 11, A visual representation of economic indicator values. The numbers correspond with the Indicator Numbers (Table 4)



4.2 Aggregation of Social Indicators

Table 5 shows the composite indicators of social sustainability in. There is a composite for each of the three weighting methods and an average of the three to show the general sustainability within the dimension. This section directly answers the second sub question: "*To what extent are the current levels of tourism in Rotterdam socially sustainable?"*.

Table 5, Composite Indicators of Social Sustainability in Tourism

Weighting Method	Composite Indicator
Method 1	0,37
Method 2	0,43
Method 3	0,34
Average	0,38

These composite indicators fall between the reservation and the aspiration level, slightly closer to the former than the latter. This means there is certainly room for improvement, something to *aspire* to, but the current situation is, according to these numbers, socially sustainable in the short term.

4.3 Aggregation of Economic Indicators

Table 6 shows the composite indicators for economic sustainability. The same aggregation methods were used for these composite indicators as with the social composite indicators in the previous section. This section directly answers the third sub question: "*To what extent are the current levels of tourism in Rotterdam economically sustainable?*".

Table 6, Composite Indicators of Economic Sustainability in Tourism

Weighting Method	Composite Indicator
Method 1	0,4
Method 2	0,37
Method 3	0,69
Average	0,49

The economic sustainability of Rotterdam's tourism is comparable to its social sustainability; moderately sustainable with plenty of room for improvement. Depending on which weighting method one uses, the overall level can be slightly closer to the reservation or aspiration level, but it does stay between those points.

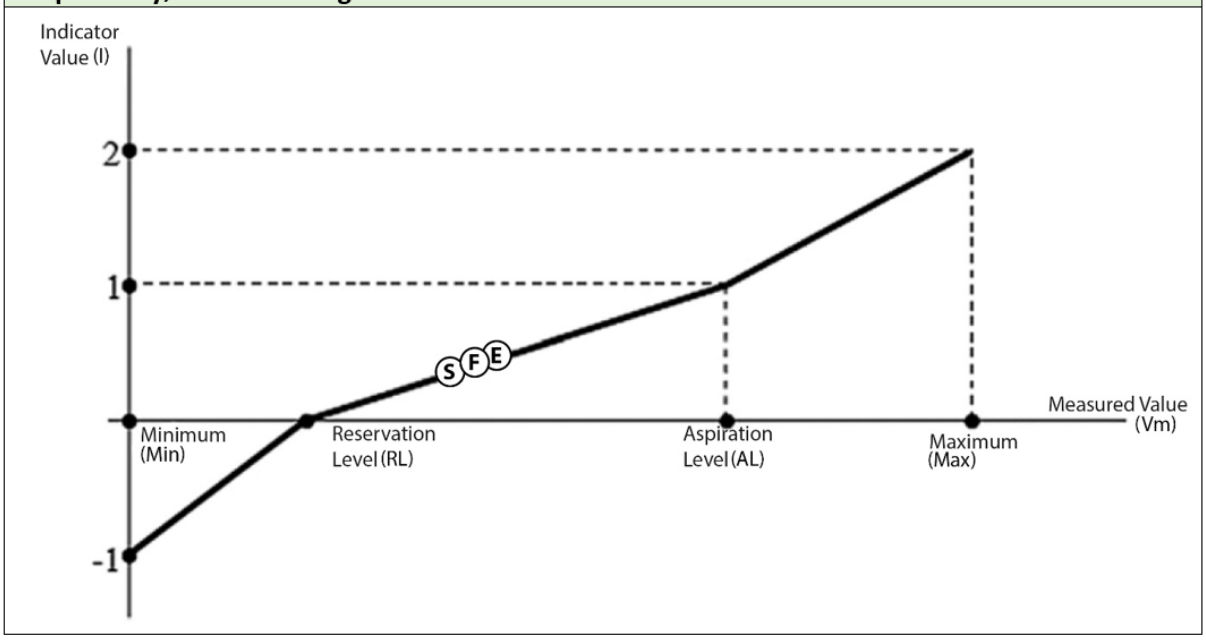
4.4 Final Aggregation

In this final section of the results, the economic and social dimension of sustainability are brought together in one composite indicator per weighting method (Table 7), and again an average of the three weighting methods. This section directly answers the main research question: "*To what extent are the current levels of tourism in Rotterdam socially and economically sustainable?".*

Table 7, Composite Indicators of Sustainable Tourism	
Weighting Method	**Final Indicator**
Method 1	0,38
Method 2	0,4
Method 3	0,52
Average	0,43

All composite indicators for sustainable tourism are between the reservation and aspiration level (Figure 12), overall slightly closer to the reservation level. This shows that the current level of tourism is moderately sustainable, the carrying capacity has not been surpassed.

Figure 12, Visual Representation of Average Indicator Values of the Composite and Final Indicators. S and E are the average composite indicators for the social and economic dimension respectively, F is the average final indicator.



5. Conclusion

The goal of this research project was to investigate the extent of social and economic sustainability of tourism in Rotterdam.

The recent influx in tourism has, according to this research project, not lead to an unsustainable situation. The hypothesis associated with the main question: "*The current levels of tourism in Rotterdam are not economically and socially sustainable.*" can therefore be rejected.

Looking at the economic and social dimension of sustainability separately, both show a situation which is sustainable, but with plenty of room for improvement. The hypotheses associated with the second and third sub questions: *"The current levels of tourism in Rotterdam are not socially sustainable."* and *"The current level of tourism in Rotterdam is not economically sustainable."* can also both be rejected.

The economic and social carrying capacities are not surpassed and so one can speak of a sustainable situation at this moment. However, the extent of this sustainability is up for discussion. All aggregate indicator values float between the reservation and aspiration level. This points to a situation which is sustainable in the short term, but not indefinitely. The situation is best described as moderately sustainable.

The opinion of the municipality that the population also benefits from investments in tourism (Gemeente Rotterdam, 2018a), is not echoed by the population. Despite this fact, the population is generally fine with such investments, which seem to mostly entail expanding the quantity and diversity of restaurants, festivals and hotels. Focussing on the weak points is a good way to improve the sustainability of a tourist situation (Lozano-Oyola et al., 2012). With that in mind, these investments seem a good strategy to deal with many underperforming economic indicators. New restaurants and hotels will create jobs, which will raise the percentage of people working in the hospitality industry and lower the unemployment rate. Naturally the official tourism accommodation on offer will also improve with these investments.

The municipality seems to be aware that there are limits to the growth of tourism in Rotterdam. They base this limit on tourism demand (Gemeente Rotterdam, 2018a), taking the approach of the activity-based tradition (Saarinen, 2006), using Butler's (1980) cycle in their report. The assessment that Rotterdam is currently in the development phase of Butler's model seems to be affirmed in this research project, as most variables have not reached or exceeded their carrying capacity. The municipality's attitude is further evidenced by their assertion that methods of minimalizing discomfort for the population shouldn't hinder the tourism industry's organic growth (Gemeente Rotterdam, 2018a). As established earlier, the activity-based tradition mostly disregards the social dimension of sustainability. This could lead to problems in the future. The municipality needs to become aware of the fact that carrying capacity isn't just defined by tourism demand (Navarro Jurado et al., 2012). As tourism keeps growing, indicating that within the activity-based tradition carrying capacity has not been surpassed, development may and often does overstep the community-based carrying capacity (Saarinen, 2006). While the levels of social and economic sustainability are currently positive, they are not so far from the reservation level as to warrant reckless growth.

6. Reflection & Further Research

This research project could have been improved with the inclusion of an interview with either an expert in the field of sustainable tourism or a panel of such experts. This could have helped significantly in defining more and better indicators and ascribing weights to the indicators according to theoretical importance. It could also have helped in setting reservation and aspiration levels for the economic indicators based on expert knowledge instead of national averages.

The indicators of social sustainability are very useful for comparison or benchmarking (see 1.4 Relevance) practices as the population satisfaction factors are measured on a universal five-point Likert scale, from “totally agree” to “totally disagree”. The economic indicators are less universally useful in this regard, as the reference values used to calculate their indicator values, are based on Dutch national averages and therefore only useful for comparison in a Dutch context.

Further research could take the route of expanding the list of indicators by adding more indicators of social and economic sustainability, or by including more dimensions of sustainability (environmental, cultural, political, institutional and technological) (Agyeiwaah et al., 2017). With the environmental dimension added, the scope of the research can be expanded to include the other discussed paradigm, the Strong Sustainability Paradigm (SSP).

Furthermore, this research project explicitly focused on one case study, the municipality of Rotterdam, but further research can expand that scope to include and compare more municipalities, regions or provinces.

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8. Appendix

8.1 Appendix A – Questionnaire

rijksuniversiteit groningen

Enquête Toerisme in Rotterdam

1. Leeftijd; _____ |◯ man ◯ vrouw | Postcode 30....
2. Ik merk dat er meer toeristen naar Rotterdam komen de laatste jaren.

   ◯ Volledig Mee Eens, ◯ Mee Eens, ◯ Neutraal, ◯ Mee Oneens, ◯ Volledig Mee Oneens
3. Ik profiteer persoonlijk van de toerisme industrie.

   ◯ Volledig Mee Eens, ◯ Mee Eens, ◯ Neutraal, ◯ Mee Oneens, ◯ Volledig Mee Oneens
4. Ik ervaar overlast van toeristen.

   ◯ Volledig Mee Eens, ◯ Mee Eens, ◯ Neutraal, ◯ Mee Oneens, ◯ Volledig Mee Oneens
5. Ik denk dat het leven in Rotterdam duurder is geworden door toeristen.

   ◯ Volledig Mee Eens, ◯ Mee Eens, ◯ Neutraal, ◯ Mee Oneens, ◯ Volledig Mee Oneens
6. Toeristen zorgen voor drukte in Rotterdam.

   ◯ Volledig Mee Eens, ◯ Mee Eens, ◯ Neutraal, ◯ Mee Oneens, ◯ Volledig Mee Oneens
7. Toerisme is goed voor Rotterdam.

   ◯ Volledig Mee Eens, ◯ Mee Eens, ◯ Neutraal, ◯ Mee Oneens, ◯ Volledig Mee Oneens
8. Ik vind dat de gemeente moet investeren in Rotterdamse toerisme.

   ◯ Volledig Mee Eens, ◯ Mee Eens, ◯ Neutraal, ◯ Mee Oneens, ◯ Volledig Mee Oneens
9. Ziet u liever minder of meer toeristen naar Rotterdam komen in de toekomst?

   ◯ Veel Meer, ◯ Meer, ◯ Neutraal, ◯ Minder, ◯ Veel Minder
10. Heeft u nog opmerkingen of zorgen over het onderwerp die niet in één van de vorige vragen aan bod kwamen?

    _____
    _____
    _____
    _____

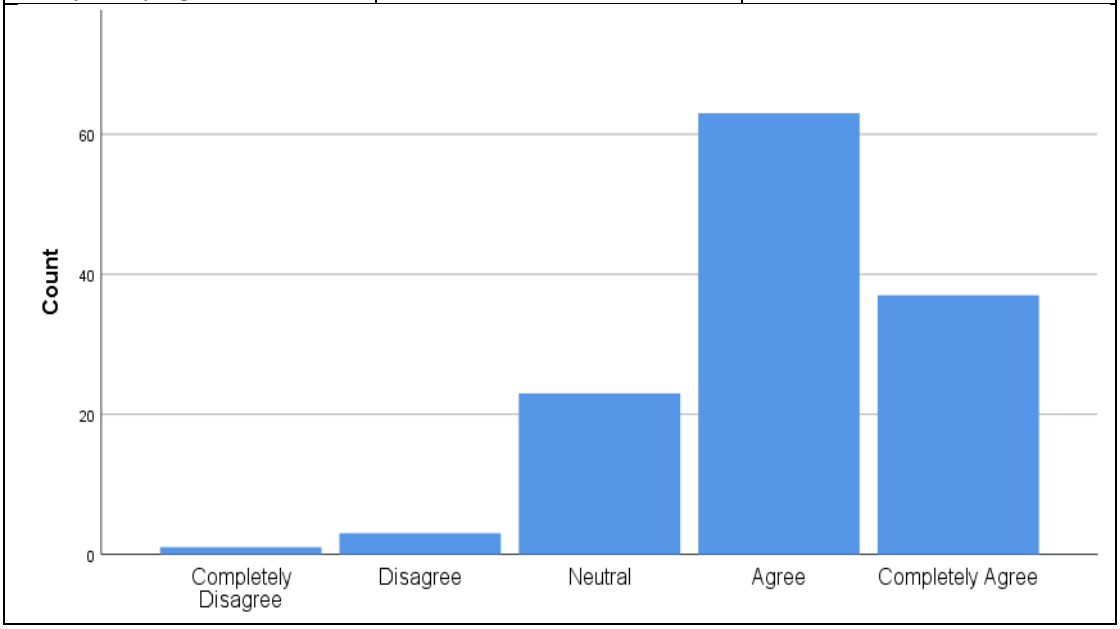
8.2 Appendix B – Questionnaire Translated, Explanation, Frequencies & Percentages

The numbers in front of the answers are used in constructing the indicators, 1 is the number which denotes the most negative value the indicators can take, the number that would mean the least sustainability, 5 is the most positive value. The average is the Frequency times the numbers in front of the answers divided by the total number of valid answers.

1. **Age, Male/Female, Zip Code.**
   Representation Data

2. **I notice that more tourists are visiting Rotterdam over the last couple of years.**
   1 - 5, Completely Disagree - Completely Agree.
   General Knowledge About Tourism Boom.

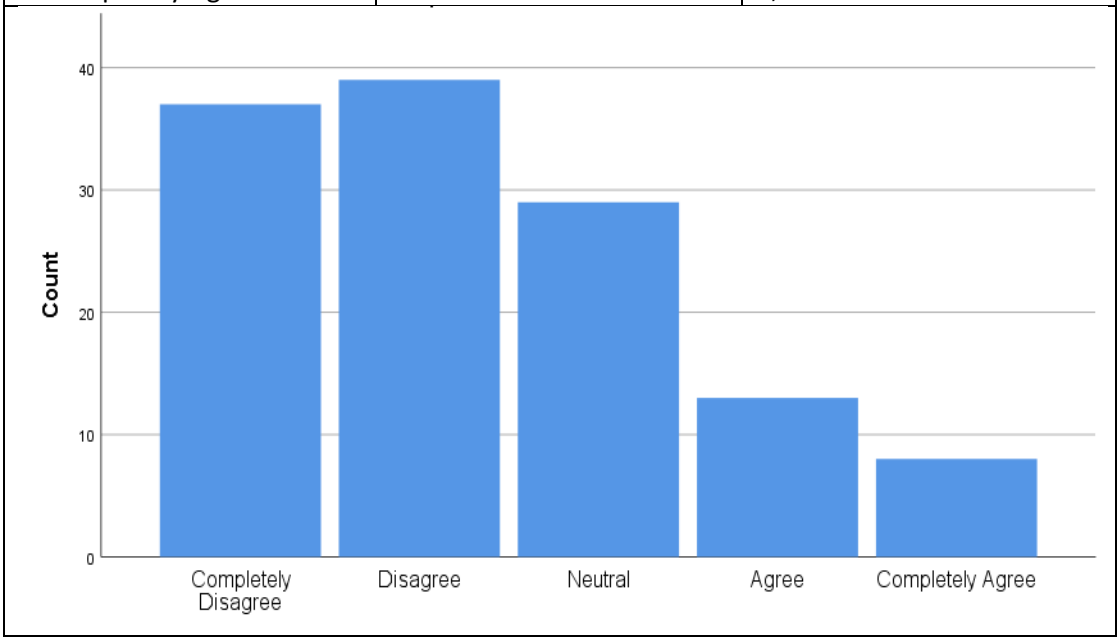
General Knowledge About Tourism Boom		
Valid Answers; 127	**Average;** 4,0	
Answer	**Frequency**	**Percentage**
Completely Disagree	1	0,8%
Disagree	3	2,4%
Neutral	23	18,1%
Agree	63	49,6%
Completely Agree	37	29,1%



3. **I personally profit from the tourism industry.**
   1 - 5, Completely Disagree - Completely Agree.
   Social Indicator; Personal Investment in Tourism Industry.

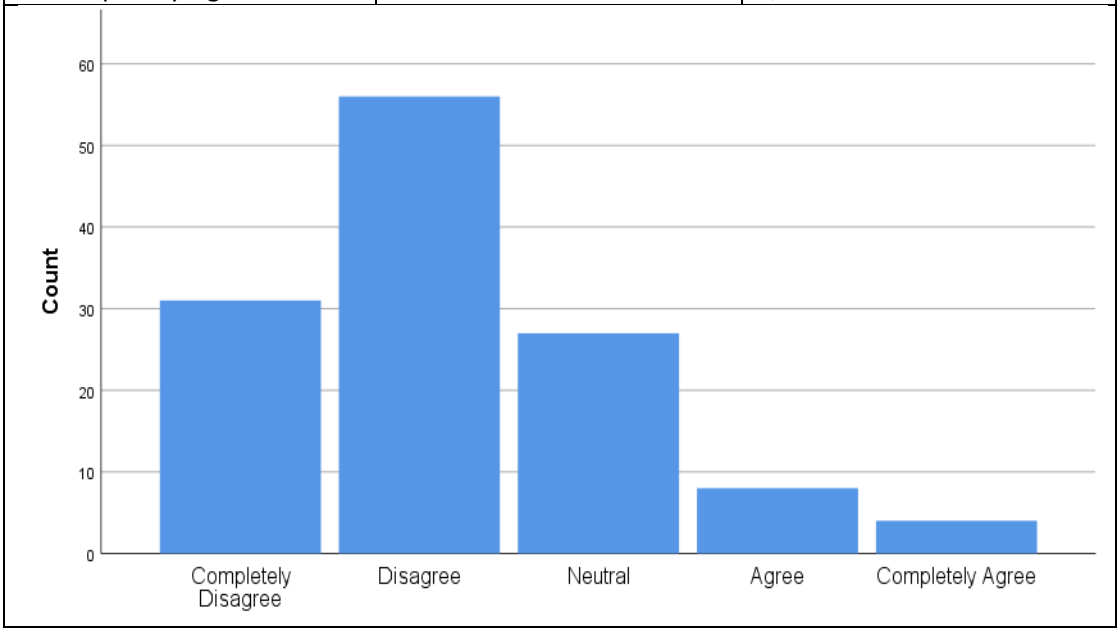
Personal Investment in tourism Industry		
Valid Answers; 126	**Average;** 2,3	
Answer	**Frequency**	**Percentage**
1. Completely Disagree	37	19,4%
2. Disagree	39	31,0%
3. Neutral	29	23,0%

4. Agree	13	10,3%
5. Completely Agree	8	6,3%



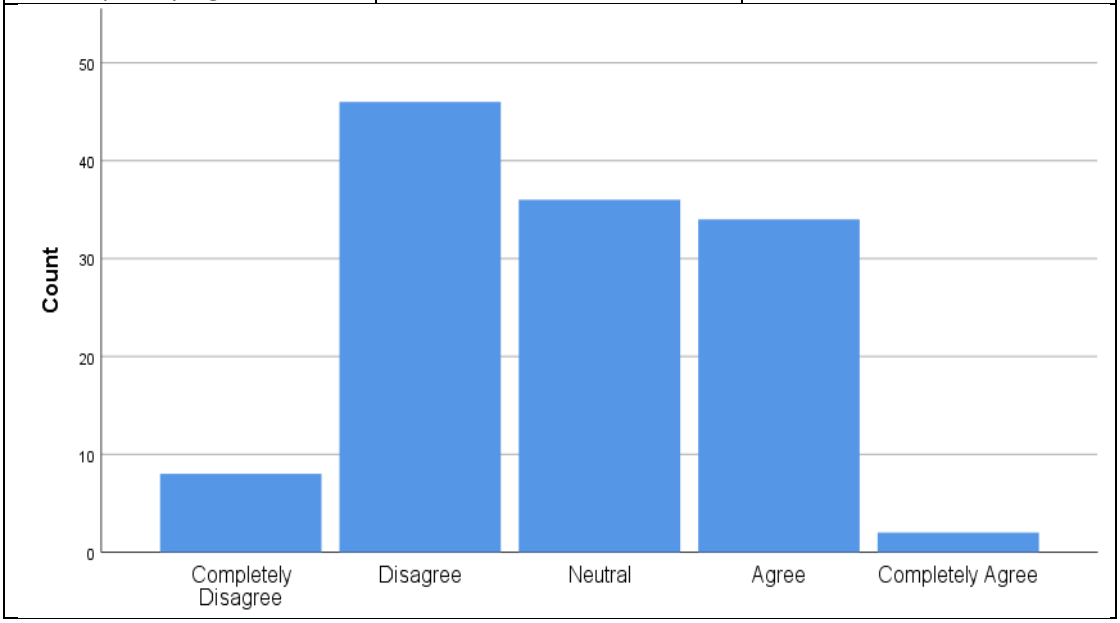
4. I experience nuisance from tourists.
1 - 5, Completely Disagree - Completely Agree.
Social Indicator; Nuisance Caused by Tourists

Nuisance Caused by Tourists		
Valid Answers; 126	**Average;** 3,8	
Answer	**Frequency**	**Percentage**
5. Completely Disagree	31	24,6%
4. Disagree	56	44,4%
3. Neutral	27	21,4%
2. Agree	8	6,3%
1. Completely Agree	4	3,2%



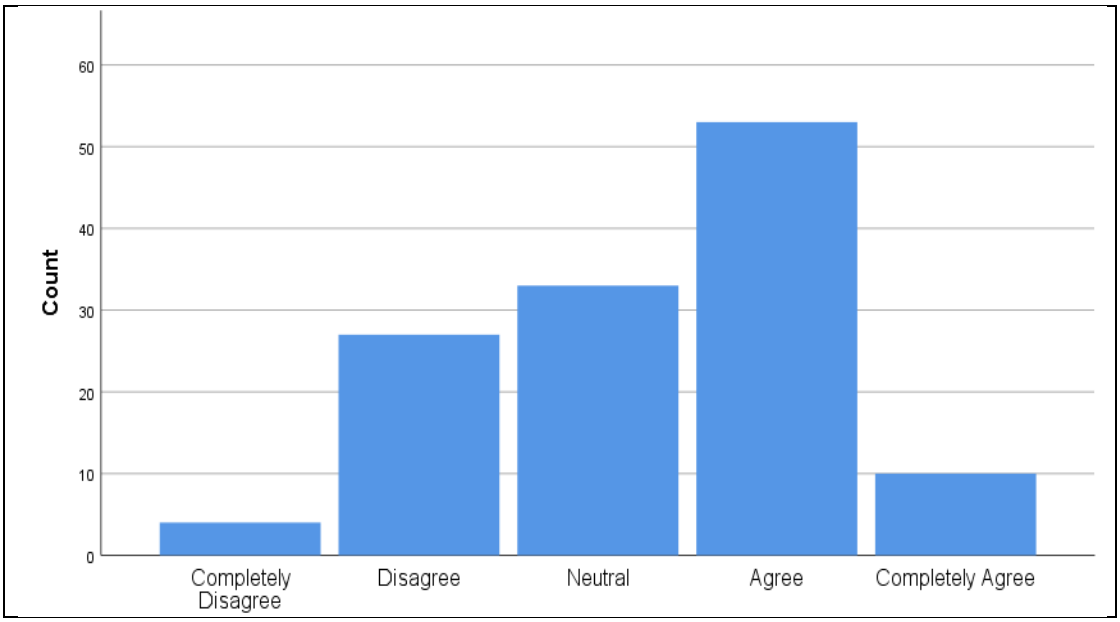
5. **I think life in Rotterdam has become more expensive because of tourists.**
   1 - 5, Completely Disagree - Completely Agree.
   Social Indicator; Experiencing Higher Prices due to Tourism.

Experiencing Higher Prices due to Tourism		
Valid Answers; 126	**Average;** 3,2	
Answer	**Frequency**	**Percentage**
1. Completely Disagree	8	6,3%
2. Disagree	46	36,5%
3. Neutral	36	28,6%
4. Agree	34	27,0%
5. Completely Agree	2	1,6%



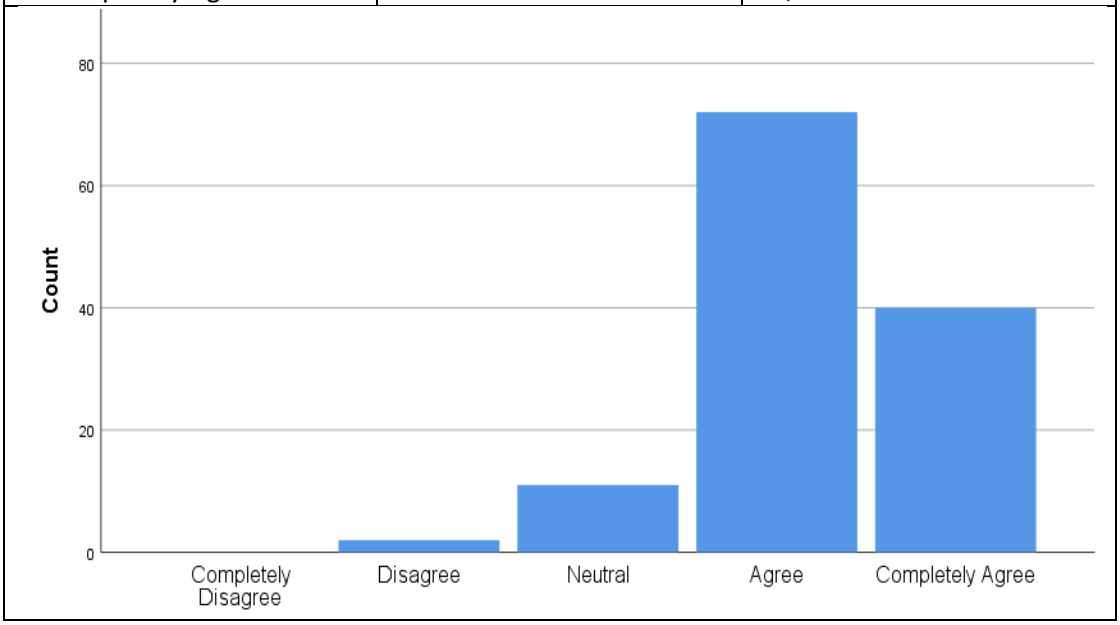
6. **Tourists cause crowdedness in Rotterdam.**
   1 - 5, Completely Disagree - Completely Agree.
   Social Indicator; Crowdedness caused by Tourists.

Crowdedness caused by Tourists		
Valid Answers; 127	**Average;** 2,7	
Answer	**Frequency**	**Percentage**
5. Completely Disagree	4	3,1%
4. Disagree	27	21,3%
3. Neutral	33	26,0%
2. Agree	53	41,7%
1. Completely Agree	10	7,9%



7. Tourism is good for Rotterdam.
1 - 5, Completely Disagree - Completely Agree.
Social Indicator; Overall Feeling Towards Tourism.

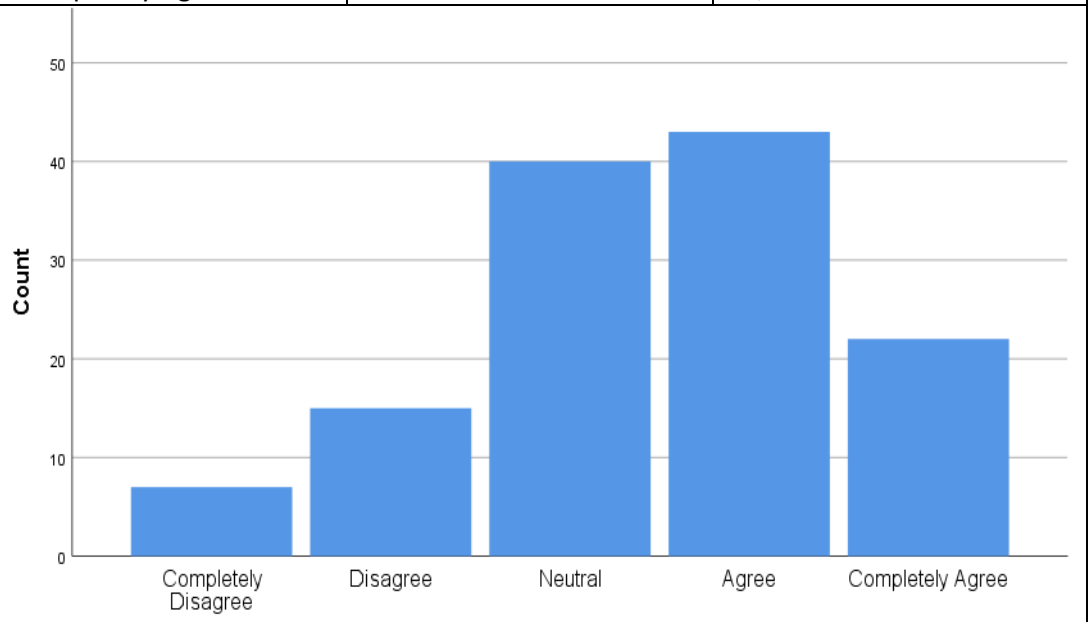
Overall feeling Towards Tourism		
Valid Answers; 125	**Average;** 4,2	
Answer	**Frequency**	**Percentage**
1. Completely Disagree	0	0,0%
2. Disagree	2	1,6%
3. Neutral	11	8,8%
4. Agree	72	57,6%
5. Completely Agree	40	32,0%



8. I think the municipality should invest in Rotterdam's tourism.
1 - 5, Completely Disagree - Completely Agree.

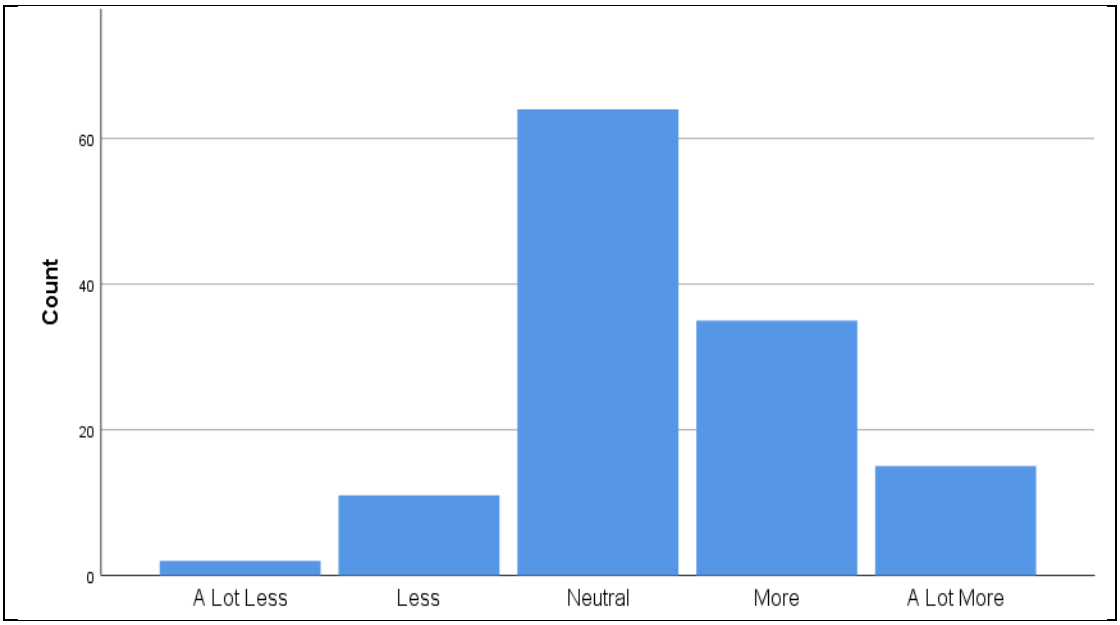
Social Indicator; Will to invest in Tourism.

Will to invest in Tourism		
Valid Answers; 127	**Average;** 3,5	
Answer	**Frequency**	**Percentage**
1. Completely Disagree	7	5,5%
2. Disagree	15	11,8%
3. Neutral	40	31,5%
4. Agree	43	33,9%
5. Completely Agree	22	17,3%



9. **Would you rather see less or more tourists visiting Rotterdam in the Future?**
   1 - 5, Much Less – Much More
   Social Indicator; Assessment of Tourism Carrying Capacity

Assessment of Tourism Carrying capacity		
Valid Answers; 127	**Average;** 3,4	
Answer	**Frequency**	**Percentage**
1. Much Less	2	1,6%
2. Less	11	8,7%
3. Neutral	64	50,4%
4. More	35	27,6%
5. Much More	15	11,8%


Count
60
40
20
0
A Lot Less
Less
Neutral
More
A Lot More

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8.3 Appendix C – Survey Data

Respondent	1a	1b	1c	2	3	4	5	6	7	8	9	Comment
1	21	0	3039	1	1	1	1	3	3	3	3	
2	29	1	3062	5	3	3	3	4	5	4	3	
3	32	0	3061	4	2	3	3	4	4	4	3	
4	18	1		4		2	3	3	4	4	3	
5	41	0	3021	4	1	1	4	2	5	4	5	
6	18	1	3071	3	2	2	4	4	3	3	2	
7	18	0	3037	4	1	2	2	3	4	2	3	
8	21	1	3061	4	3	3	4	4	4	3	3	
9	71	1		4	2	2	1	4	4	3	3	
10	51	1	3071	4	2	1	2	2	5	5	4	
11	53	0	3054	3	1	2	2	2	4	3	3	Laat 't geen tweede Amsterdam worden
12	23	0		5	4	2	2	3	4	3	3	
13	39	1	3062	5	1	2	4	4	5	5	4	
14	24	1	3052	4	1	2	2	1	4	2	4	
15	64	1	3066	4	1	4	4	2	4	5	3	
16	69	0	3066	4	1	4	4	2	4	5	3	
17	42	1		4	1	3	2	4	4	5	3	
18	69	1	3024	4	2	2	2	2	4	4	4	
19	67	0	3077	3	2	2	4	2	4	3	3	
20	59	1	3033	5	3	2	4	3	5	5	3	
21	76	1	3039	4	3	2	3	2	5	5	5	
22	36	1	3061	4	2	3	4	4	4	3	3	Ik weet niet of Rotterdam zo zeer meer toeristen trekt als wel investeerders. De stad is sowieso wel internationaler geworden.
23	62	1	3039	4	1	3	1	4	3	3	3	Kijken naar andere toeristische steden voor of nadelen.
24	68	1	3038	5	4	2	3	4	4	4	3	

25	72	1	3036	4	1	1	1	3	5	5	4	
26	74	1	3038	5	3	3	4	4	5	5	5	
27	77	1	3024	4	2	3	2	4	4	3	3	Amsterdam toestanden
28	76			4	3	1	2	4	4	4	4	OV kaart is (soms) een probleem voor toeristen. Eventueel koop OV kaart al in het buitenland kan plaatsvinden (zoals in Japan).
29	58	1	3061	4	3	2	2	3	4	4	2	
30	58	1	3062	4	5	3	2	3	4	4	2	
31	73	1	3066	4	3	3	3	5	4	2	2	Als het maar niet zo wordt als in Amsterdam, zodat de Rotterdammers zich niet meer thuis voelen in eigen stad. Het is al druk genoeg.
32	49	0	3034	4	1	3	3	4	2	1	2	Kijk naar Amsterdam, veel te veel toeristen. De kwaliteit van leven gaat acl
33	55	0	3039	5	2	3	2	4	4	4	3	
34	24	1	3034	4	2	3	3	5	4	5	4	
35	22	0	3062	5	2	2	3	5	5	4	4	
36	62	1	3062	3	2	4	3	4	3	3	2	
37	56	1	3011	5	5	3	2	4	5	5	5	Denk ook aan ? op de mooie deelgemeente.
38	22	0	3051	4	2	3	4	3	4	3	3	Laat het niet uit de hand lopen.
39	19	1	3095	4	3	2	2	4	4	4	4	
40	49	0	3043	3	3	2	2	4	5	4	3	
41	23	1	3074	4	2	1	2	2	3	3	2	
42	24	1	3062	3	2	2	4	4	4	3	4	Ik vind het over het algemeen mee vallen in Rotterdam qua toerisme.
43	25	1		3	2	1	1	4	5	5	3	
44		0		5	3	2	4	4	5	4	5	
45	52	0	3054	5	5	1	3	5	5	5	5	Gemeente moet investeren in bijzondere plekken. Kabelbaan over de Maas en andere gekke dingen.

46	78	1	3054	4	5	5	3	2	5	1	3	
47	64	0	3033	4	2	2	2	3	4	4	4	
48	59	1	3033	4	2	2	2	3	4	4	4	
49	60	1	3011	3	4	2	3	4	4	3	3	Zolang de overlast niet zo is als in Amsterdam zou ik zeggen; laat ze maar komen.
50	35	1	3031	5	1	4	4	5	3	2	2	Toerisme in goede banen leiden kan voor minder overlast voor bewoners zorgen en toch inkomsten voor de stad.
51	64	1	3039	4	3	2	2	3	4	3	3	
52	18	1	3082	3	2	1	3	1	4	1	3	
53		0		5	5	5	1	5	5	1	4	
54	55	0	3022	4	1	2	2	4	4	2	3	
55	53	1	3033	5	2	2	4	4	4	3	3	Toeristen is erg algemeen gesteld, er zijn veel verschillende soorten toeriste
56	66	0	3051	4	2	2	3	3	4	4	4	
57	60	0	3037	4	3	1	3	2	5	5	4	
58	24	1		4	2	3	4	2	4	3	3	
59	26	0	3033	3	1	1	2	3	5	5	5	Meer festivallen nodig.
60	28	1	3021	5	2		4	4	4	3	2	Als het maar niet zo wordt als in Amsterdam.
61	21	0	3015	3	4	1	2	2	5	4	3	
62	54	1		5	1	2	4	2	5	5	5	
63	56	0		5	1	2	4	2	5	5	5	
64	62	0	3086	5	3	2	4	2	5	5	5	
65	87	1	3053	3	1	2	2	3	3	4	4	
66	22	0	3053	4	5	3	4	4	5	3	3	
67	22	0	3051	3	1	2	3	3	3	2	3	
68	31	0	3016	4	1	3	2	4	5	2	3	
69	31	1	3016	4	1	3	2	4	5	2	3	
70	19	1	3067	3	1	2	2	2	4	2	2	Ik heb persoonlijk gewoon

												een hekel aan toeristen.
71	23	1	3021	5	5	3	3	4	4	3	3	
72	41		3061	5	5	1	4	1	5	5	5	
73	14	0	3034	3	4	1	3	5	5	4	4	
74	21	1		4	4	2	5	3	4	4	3	
75	82	0		2	1	1	3	2	4	2	3	
76	25	1	3051	4	3	2	2	3	4	3	3	
77	15	0	3034	4	2	2		4	4	4	4	
78	56	1	3039	4	3	1	2	3	5	4	4	
79	63	1	3039	4	1	1	3	4		3	3	
80	62	1	3039	4	2	2	3	2	4	4	3	
81	29	1		3	3	2	3	5	4	4	4	
82	20	1	3030	4	2	1	3	3	4	3	4	
83	20	0	3030	4	2	1	3	3	4	3	4	
84	28	0	3061	5	4	4	5	4	5	4	5	
85	17	1	3040	5	1	1	4	3	5	4	5	
86	61	0	3084	2	3	5	2	4	4	1	3	
87	54	1	3084	2	3	5	2	4	4	1	3	
88	49	1	3055	3	1	2	2	4	3	2	3	
89	25	1	3029	5	3	4	4	5	3	3	4	
90	39	0	3039	4	4	2	3	3	4	4	4	
91	55	0	3039	4	1	3	2	3	4	2	3	
92	35	1	3039	4	1	2	2	2	4	3	3	Nu is het prima qua toerisme.
93	29	0	3034	4	2	2	2	4	4	2	4	
94	19	0	3032	5	2	4	4	5	4	3	2	
95	37	1	3016	3	3	2	2	4	5	3	4	
96		0		4	1	1	3	1	5	5	5	
97	21	0	3076	3	3	3	3	3		2	1	Minder toeristen.
98	19	0		3	4	3	4	4	4	4	3	
99	34	1	3042	5	2	3	4	4	3	3	3	
100	19	0	3077	5	4	2	4	3	5	4	3	

101	78	0	3051	5	2	2	2	2	5	2	4	
102	14	0		4	1	1	3	3	4	3	4	
103	23	1	3011	4	1	1	2	2	4	3	3	
104	56	0	3013	4	3	2	2	2	5	3	4	
105	19	1	3074	4	4	1	2	3	4	3	4	
106	18	1	3061	4	3	2	3	3	4	3	4	
107	31	0		5	2	3	4	3	5	5	5	
108	18	1	3021	4	2	2	2	4	4	3	3	
109	17	0		3	4	1	3	2	4	4	3	
110	64	1		5	3	1	4	4	4	4	3	
111	64	0		5	3	1	4	4	4	4	3	
112	54	0	3043	3	2	2	2	2	4	3	3	
113	23	0	3056	4	1	1	1	4	4	3	4	
114	22	0	3071	4	2	2	4	3	4	3	3	
115	52	1	3036	5	1	1	3	2	4	4	3	
116	27	0	3014	5	1	4	4	4	2	1	1	
117	54	1	3053	5	2	2	2	4	4	4	3	
118	54	1	3039	4	1	3	4	4	5	5	4	
119	58	1	3023	5	3	2	2	2	4	4	3	
120	52	1	3043	5	4	2	3	4	5	4	3	
121	22	1	3068	4	3	2	2	4	4	3	3	
122	18	1	3068	4	2	2	2	4	4	4	3	
123	51	1		4	2	2	3	4	5	4	4	
124	51	1		4	2	2	2	4	4	4	4	
125	56	1	3069	3	1	1	3	3	4	4	3	
126	63	1	3021	5	3	1	1	3	5	4	3	De gemeente moet zorgen dat het leven voor de Rotterdammer en het toerisme met elkaar in balans zijn en dat er geen tweede Amsterdam ontstaat.
127	24	1	3023	5	1	3	3	4	4	4	3	

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8.4 Appendix D – CBS Data

Seasonality of Tourism Demand – Amount of tourists visiting each month from 2012 to 2016, Rotterdam & Netherlands, x1000

	Regio's	Jan	Feb	Mar	Apr	Mei	Jun	Jul	Aug	Sep	Okt	Nov	Dec
2012	Nederland	1299	1332	1624	1943	2013	1934	1958	2090	1955	1866	1602	1397
	Rotterdam	58	56	66	73	74	67	60	57	71	70	66	60
2013	Nederland	1274	1311	1666	1878	2091	2010	2056	2179	1970	1936	1672	1478
	Rotterdam	60	56	66	75	76	72	64	62	72	69	70	54
2014	Nederland	1376	1433	1810	2029	2202	2136	2177	2337	2130	2100	1784	1609
	Rotterdam	68	62	68	79	84	74	76	78	92	78	73	63
2015	Nederland	1436	1549	1777	2152	2299	2199	2335	2445	2182	2200	1884	1718
	Rotterdam	74	68	70	92	88	85	81	85	91	87	77	70
2016	Nederland	1609	1741	2038	2229	2436	2276	2420	2506	2314	2348	1987	1853
	Rotterdam	84	74	81	97	99	85	82	90	91	96	92	88

Seasonality of Accomodations – Total and open accommodations, low season from 2012 to 2016, Rotterdam & Netherlands

			Jan	Feb	Mar	Nov	Dec
2012	Nederland	Accomodaties	8919	8919	8919	8919	8919
		Open Accommodaties	5477	5571	6438	5937	5497
	Rotterdam	Accomodaties	80	80	80	80	80
		Open Accommodaties	76	77	78	77	76
2013	Nederland	Accomodaties	9126	9126	9126	9126	9126
		Open Accommodaties	5524	5650	6575	5954	5532
	Rotterdam	Accomodaties	76	76	76	76	76
		Open Accommodaties	73	73	73	70	70
2014	Nederland	Accomodaties	9214	9214	9214	9214	9214
		Open Accommodaties	5455	5614	6524	5929	5513
	Rotterdam	Accomodaties	81	81	81	81	81
		Open Accommodaties	76	78	79	74	72
2015	Nederland	Accomodaties	9214	9214	9214	9214	9214
		Open Accommodaties	5344	5496	6335	5767	5450
	Rotterda	Accomodaties	81	81	81	81	81
		Open Accommodaties	75	76	77	75	74
2016	Nederland	Accomodaties	8950	8950	8950	8950	8950
		Open Accommodaties	5369	5522	6369	5760	5481
	Rotterda	Accomodaties	80	80	80	80	80
		Open Accommodaties	77	78	79	78	77

8.5 Appendix E – Indicator Values, Weights and Sources

The two lists of indicators are shown here along with their calculated indicator values, weights for weighting method 2 and 3, the source of the data used in calculating the indicator values and the source(s) in the literature from which the indicator was taken to be included in this research project at all.

Indicators of Social Sustainability in Tourism						
Indicator	**Indicator Value**	**Weight, Method 1**	**Weight, Method 2**	**Weight Method 3**	**Source (Data)**	**Source (Literature)**
Personal Investment in Tourism Industry	-0,34	1,00	0,50	0,35	Primary Data	(Agyeiwaah et al., 2017; Blancas et al., 2010)
Nuisance Caused by Tourists	0,81	1,00	0,50	0,31	Primary Data	(Lozano-Oyola et al., 2012; Miller, 2001; WTO, 2004)
Experiencing Higher Prices due to Tourism	0,19	1,00	1,00	0,192	Primary Data	(WTO, 2004)
Crowdedness Caused by Tourists	-0,15	1,00	0,50	0,35	Primary Data	(Agyeiwaah et al., 2017; WTO, 2004)
Overall Feeling Towards Tourism	1,20	1,00	1,00	0,31	Primary Data	(Agyeiwaah et al., 2017; Lozano-Oyola et al., 2012; Navarro Jurado et al., 2012; WTO, 2004)
Will to Invest in Tourism	0,46	1,00	0,50	0,19	Primary Data	(Agyeiwaah et al., 2017; Lozano-Oyola et al., 2012; Navarro Jurado et al., 2012; WTO, 2004)
Assessment of Tourism Carrying Capacity	0,39	1,00	1,00	0,19	Primary Data	(Agyeiwaah et al., 2017; Navarro Jurado et al., 2012)

Indicators of Economic Sustainability in Tourism						
Indicator	**Indicator Value**	**Weight, Method 1**	**Weight, Method 2**	**Weight Method 3**	**Source (Data)**	**Source (Literature)**
Length of stay	0,30	1,00	1,00	0,07	CBS	(Agyeiwaah et al., 2017; Lozano-Oyola et al., 2012; WTO, 2004)
Average expenditure per tourist per day	1,32	1,00	1,00	0,78	van der Most, 2015	(Agyeiwaah et al., 2017; Choi & Sirakaya, 2006; Lozano-Oyola et al., 2012; WTO, 2004)
Unemployment Rate	-0,80	1,00	0,50	0,09	CBS	(Agyeiwaah et al., 2017; Choi & Sirakaya, 2006; Lozano-Oyola et al., 2012; WTO, 2004)
Percentage of total jobs in "Hospitality Industry"	0,29	1,00	1,00	0,74	CBS	(Blancas et al., 2010; Lozano-Oyola et al., 2012)
Average Income	0,03	1,00	0,50	0,09	CBS	(Blancas et al., 2010; Lozano-Oyola et al., 2012; WTO, 2004)
Official tourism accommodation on offer	-0,69	1,00	1,00	0,30	CBS	(Lozano-Oyola et al., 2012; Navarro Jurado et al., 2012; WTO, 2004)
Seasonality of Accommodations	1,81	1,00	0,50	0,30	CBS	(Agyeiwaah et al., 2017; Choi & Sirakaya, 2006; Lozano-Oyola et al., 2012; Navarro Jurado et al., 2012)
Seasonality of Tourism Demand	0,96	1,00	0,50	0,30	CBS	(Agyeiwaah et al., 2017; Choi & Sirakaya, 2006; Lozano-Oyola et al., 2012; Navarro Jurado et al., 2012)