

# A Managerial Framework for Measuring (near) Real-time Destination Usage

Master Thesis submitted in fulfillment of the Degree

Master of Business Administration

in Public Governance and Sustainable Development

Submitted to Dr. Marta Sabou

Boudewijn Bokdam

1502005

Amsterdam, 26 May 2017

# AFFIDAVIT

I hereby affirm that this Master's Thesis represents my own written work and that I have used no sources and aids other than those indicated. All passages quoted from publications or paraphrased from these sources are properly cited and attributed.

The thesis was not submitted in the same or in a substantially similar version, not even partially, to another examination board and was not published elsewhere.

Date

Signature

## ABSTRACT

Over the past decades, tourism has experienced continued growth. The United Nations World Tourism Organization (UNWTO) expects the number of international tourist arrivals to continue to grow and reach 1.8 billion in 2030 as compared to 1.2 billion in 2015. The increase in visitor numbers is already causing difficulties in different destinations: cities like Venice, Barcelona and Amsterdam are all trying to manage the increasing visitor flows. As destinations struggle to manage this, it is necessary to have access to (near) real-time data about how destinations are used. This enables destination managers to make better decisions regarding the sustainable management of the destinations and thereby contributing to their success. However, this is still weakly covered by available data sets and data collection methods. To advance knowledge on this topic, this master thesis developed a managerial framework for measuring (near) real-time usage of a destination.

The developed framework provides destinations with the possibility to identify issues facing the destination from a sustainable point of view. Based on the identified issues, related indicators are selected which measure the status of the issue. For each indicator, limits to acceptable change are determined. This is followed by defining managerial actions for different stakeholder groups when a limit is reached. Finally, interviews are conducted with knowledgeable parties to identify ways how each indicator can be measured in (near) real-time.

The process for developing a managerial framework was tested on the destination of Amsterdam by conducting interviews with tourism stakeholder groups and knowledgeable parties and the organization of a focus group session. Results show that the developed process could work. As a result, further refinements have been made to the process to make it more easily usable.

As a prerequisite of measuring the status of different indicators in (near) real-time, a digital infrastructure should be put in place in the destination to make it a so-called Smart Destination.

# ACKNOWLEDGEMENTS

This master thesis could not have been realized with the help and support of the many persons and organizations.

First, I would like to thank my thesis supervisor, Dr. Marta Sabou, who encouraged me during the whole process and challenged my critical thinking. Without her positive support, I would not have been able to realize this thesis.

Next, I would like to thank my colleagues at Amsterdam Marketing for supporting me during my MBA studies at MODUL University, with a special word of thanks to Olivier Ponti, Eduard Pieter Oud, Wendy Sieger and Anne Marie Dees. They were always willing to provide me with their advice during my work on this thesis.

Of course, I would also like to thank all the interviewees. Without them I would not have been able to validate my findings. These interviewees are:

- Walther Ploos van Amstel, senior lecturer at the Amsterdam University of Applied Sciences and member of the 'inhabitants advisory board' of Amsterdam Marketing;
- Marjan Schrama, account manager at the Amsterdam Economic Board;
- Charlotte Naezer and Adri Doorneveld, tourism policy officers at the Municipality of Amsterdam;
- Ger Baron, Chief Technology Officer at the Municipality of Amsterdam;
- Minouche Cramer, Startup Officer at Startup in Residence;
- Winnie Daamen and Dorine Duives, Associate Professor and post-doctoral researcher at Technical University Delft;
- And again, my colleagues at Amsterdam Marketing.

Finally, I would like to thank European Cities Marketing and MODUL University for providing me with the opportunity to follow an MBA studies in Vienna. It was an amazing time.

# TABLE OF CONTENTS

Affida	ıvit	I
Abstr	act	
Ackno	owledgements	V
List o	f Tables	x
List o	f Figures	XI
List o	f Abbreviations	XII
1	Introduction	1
1.1	Presentation of the problem	1
1.1.1	Measuring destination usage: an actual overview	2
1.1.2	A destination coping with increasing visitor numbers: Amsterdam	3
1.2	Aims and objectives	4
1.3	Research questions	5
1.4	Methodological Approach	5
1.5	Structure of the Master Thesis	6
2	Literature Review	8
2.1	Introduction	8
2.2	Key concepts	8
2.3	Sustainable Tourism	9
2.3.1	Sustainable tourism development indicators	10
2.4	Carrying Capacity	12
2.5	Limits of Acceptable Change (LAC)	
2.5.1	The LAC-process	14
2.6	Smart Tourism Destinations	15
2.6.1	Infrastructure of a Smart Tourism Destination	15
2.6.2	Key enabling technologies in Smart Tourism Destinations	
2.7	Conclusion	
3	Methodology	20
3.1	Introduction	20
3.2	Selection of methodology	20
3.3	Process Development	
3.3.1	Literature Review	21
3.4	Process testing	22
3.4.1	Desk research	22
3.4.2	Qualitative data: Interviews with stakeholder groups	22

3.4.3	Qualitative data: Interviews with knowledgeable parties	24
3.4.4	Qualitative data: Focus group session	25
3.5	Conclusion	26
4 4.1	Introducing the managerial framework and process to measure destination usage Introduction	27 27
4.2	Introducing the managerial framework elements	27
4.3	Introducing the process	27
4.3.1	Step 1: Identify whether the destination has a vision on tourism / tourism master plan	28
4.3.2	Step 3: Identify which indicator can be used to measure the issues/opportunities	29 29
4.3.4	Step 4: Identify minimum acceptable conditions for each indicator	29
4.3.5	Step 5: Identify possible managerial actions for each indicator	30
4.3.6	Step 6: Identify ways how each indicator can be measured in (near) real-time	30
4.4	Conclusion	31
5	Validating the process on Amsterdam	32
5.1	Introduction	32
5.2	Issues facing Amsterdam according to desk research	32
5.2.1	Pressures facing the destination of Amsterdam according to visitors	32
5.2.2	Pressures facing the destination of Amsterdam according to inhabitants	33
5.2.3	Conclusion from desk research	33
5.3	Testing the developed process	34
5.3.1	Step 1: Identify whether a destination has a tourism vision/master plan	34
5.3.2	Step 2: Identify specific issues in the destination	35
5.3.3	Step 3: Identify which indicators can be used to measure the issues/opportunities	37
5.3.4	Step 4: Identify minimum acceptable conditions for each indicator	38 
536	Step 5: Identify ways how each indicator can be measured in (near) real-time	30 40
5.4	Conclusion	40 40
-		-
6	Conclusion	42
6.1	Key results	42
6.2	Contribution to knowledge	44
6.3	Future research	45
7	Bibliography	46
Арреі	ndices	52
Арреі	ndix 1: Possible issues facing a destination	53
Арреі	ndix 2: Interview questions and code book for interviews with tourism stakeholders	56
Appei	ndix 3: list with issues shown during the interviews	60
Appei	ndix 4: List of indicators shown during the interviews	61

Appendix 5: Interview schedule	63
Appendix 6: Summary of Coded interviews	64
Appendix 7: Mentioned issued during the interviews	66
Appendix 8: Interview guide – interviews with knowledgeable parties	67
Appendix 9: Summary of interview with TU Delft	68
Appendix 10: Summary of interview with Startup in Residence	70
Appendix 11: Summary of interview with the Chief Technology Officer of Amsterdam	71
Appendix 12: Summary of focus group session with management Amsterdam Marketing	72
Appendix 13: The developed process for measuring (near) real-time destination usage	74

# LIST OF TABLES

Table 1 The relation between the research questions and the used research methodology 6
Table 2 The Indicator Development Process as developed by UNWTO
Table 3 12 baseline issues
Table 4 The 9 steps of the LAC-model14
Table 5 First concept of the developed process
Table 6 Example of the coding agenda used in analysing the interviews
Table 7 Overview on how each step of the process is related to the different key concepts 28
Table 8 Negative aspects of Amsterdam according to the visitors of the city
Table 9 Pressures facing Amsterdam according to the inhabitants of the city    33
Table 10 Issues facing Amsterdam according to the desk research
Table 11 Top 10 issues mentioned by the interviewees 35
Table 12 Linking the mentioned issues during the interviews to the issues found during theliterature review
Table 13 Indicators mentioned by the interviewees for the issue 'Effects of tourism on host communities'
Table 14 Defined limits and managerial actions for measuring 'the number of persons in an area'
IIIUICalui

# LIST OF FIGURES

Figure 1 Development of the number of hotel overnights in Amsterdam between 1987 and 2016
Figure 2 The order in which the process was developed6
Figure 3 The order in which the process was tested on Amsterdam6
Figure 4 Illustration of key concepts9
Figure 5 Illustration of the limits of acceptable change for an indicator
Figure 6 Digital Infrastructure in a Smart Tourism Destination
Figure 7 The order in which the process was developed
Figure 8 The order in which the developed process was tested
Figure 9 The process of developing a managerial framework 27

# LIST OF ABBREVIATIONS

DMO	Destination Management Organization
юТ	Internet of Things
LAC	Limits to Acceptable Change-model
UNEP	United Nations Environmental Programme
UNWTO	United Nations World Tourism Organization

## **1** INTRODUCTION

This chapter introduces the master thesis. It presents the problem (Section 1.1), identifies the aims and objectives of the thesis (Section 1.2), introduces the research questions (Section 1.3) and the methodological approach for answering them (Section 1.4). Lastly, it provides a reading guide for the rest of the thesis (Section 1.5)

## **1.1** Presentation of the problem

Over the past decades, tourism has experienced continued growth. The United Nations World Tourism Organization (UNWTO) expects the number of international tourist arrivals to continue to grow and reach 1.8 billion in 2030 as compared to 1.2 billion in 2015 (UNWTO, 2011). This growth can also be seen in Europe. According to European Cities Marketing (2016), city tourism has become the dominant growth factor in Europe, which *"for years has continued to grow twice as fast as national tourism"*.

Not only has the number of global international arrivals been increasing for many years, also from an economic point of view tourism is becoming more and more important. The World Tourism & Travel Council (2017) estimates that in 2016, tourism contributed 10.2% to the world GDP, growing faster than the world economy for the sixth year in a row and employing 292 million people worldwide. This is not the only benefit tourism has. Cooper et al. (2005) adds that international organisations also support tourism for *"its contribution to world peace, poverty alleviation, the benefits of the intermingling of peoples and cultures, the economic advantages that can ensue, and the fact that tourism is a relatively 'clean' industry."* 

There are however also downsides. The increase in visitor numbers is already causing difficulties in different destinations: cities like Venice, Barcelona and Amsterdam are all trying to manage the increasing visitor flows (European Tourism Futures Institute, 2016). As a result, these destinations are among others getting more crowded, neighbourhoods are changing and housing prices are increasing.

The impact visitors have on destinations has started to lead to complaints from inhabitants and gives rise to intense political debates. To combat the negative aspects of tourism on their destinations, tourism officials have started to introduce new rules and regulations. Barcelona, for example, passed a law that would curb hotel construction in the city (CNN, 2017). And Berlin banned landlords to rent their apartments to short-term visitors (Citylab, 2016).

As destinations struggle to manage the increasing visitor flows and be sustainable destinations in the future, it is necessary to have access to (near) real-time data about how destinations are used. This enables them to make better decisions regarding the sustainable management of the destinations and thereby contributing to their success (SFG Network, 2016). However, this is still weakly covered by available data sets and data collection methods. One of the destinations facing this challenge is Amsterdam.

This master thesis aims to develop a managerial framework for measuring (near) real-time usage of a destination, as a first step to better managing visitors flows in destinations. It uses Amsterdam as an example destination to validate this framework. This framework is linked to the concept of sustainability.

### 1.1.1 Measuring destination usage: an actual overview

The way destination usage is measured nowadays differs from destination to destination. Many destinations have a statistics or research department which collects data about the destination which is helpful for designing and evaluating policies. The way each destination has organized this and what and how often data is collected is however different.

In Amsterdam, for example, the municipal *Department for Research, Information and Statistics* collects data on the fields of living, liveability of the city, population, labour market, the economy, customer satisfaction and employee satisfaction. Often data is collected by conducting surveys (Department for Research, Information and Statistics, 2016). Besides the data collected by this department, the Dutch statistics office, *Statistics Netherlands*, collects data as well about Amsterdam, including tourism related data (Statistics Netherlands, 2016a).

In Brussels however, the *Brussels Institute of Statistics and Analysis* collects data for the Brussels-Capital region on other themes than Amsterdam does. These themes include the population, economy, health, education, labour market, mobility & transport, safety and tourism (Brussels Institute for Statistics and Analysis, 2016).

Besides official statistics agencies, many Destination Management Organizations (DMO's) measure certain tourism elements. Amsterdam Marketing, the city marketing organization of Amsterdam, for example collects data on the type of visitors to Amsterdam and shares the analysis of the data with the tourism sector (Amsterdam Marketing, 2016). Many other bigger DMO's are doing the same (Ponti, 2016).

One of the most used indicators by DMO's is the number of hotel overnights in the destination. According to Ponti (2016), this is one of the most available tourism indicators in destinations and a common indicator of social and environmental pressure, although this data is most often not available in (near) real-time. Dupeyras & MacCallum (2013) argue that measuring overnights *"better reflect the impact of tourism on the economy than other indicators such as visitors' arrivals"*. They also acknowledge that *"unregistered commercial accommodation and private accommodation are usually not covered"* in the measurements.

To address the need for harmonized tourism data in Europe, the European Union issued in 2011 a Regulation, a European law, to harmonise certain tourism statistics to make sure that a basic level of data on tourism on a national and regional level is available, at the same time making it easier to compare the performance of different destinations. According to the European Commission (European Commission, 2016) the Regulation *"covers, on the one hand, data on capacity and occupancy of EU tourist accommodation establishments and, on the other, data on trips made by EU residents."* The required data needs to be collected on a monthly or annual level (European Union, 2011).

The conclusion can be made, that although certain data is collected in destinations, the level of detail of data being collected and the frequency of the data collection differs from one destination to the other.

## 1.1.2 A destination coping with increasing visitor numbers: Amsterdam

Amsterdam has been for centuries a popular destination among travellers. Already since the 17<sup>th</sup> century, the Dutch Golden Age, visitors from all over the world came to see the city as part of their 'Grand Tour' or because of their trading professions (Hell & Los, 2011). Since then the city only became more and more popular. During the last couple of years, the popularity of the city has been rising to new record numbers: in 2015 Amsterdam attracted a record of 17.6 million visitors on a yearly basis (Amsterdam Marketing, 2016). The hotel industry is booming (Municipality of Amsterdam, 2015b). Figure 1 shows the development of the number of hotel overnights in Amsterdam in the period between 1987 and 2016 as an illustration of the increasing popularity of the city among visitors. Not only does the city attract more visitors, the number of inhabitants and businesses are increasing as well (Municipality of Amsterdam, 2015b).



FIGURE 1 DEVELOPMENT OF THE NUMBER OF HOTEL OVERNIGHTS IN AMSTERDAM BETWEEN 1987 AND 2016 Source: Amsterdam Marketing (2017)

#### The day tourism became an issue in Amsterdam

In the period between 2003 and 2013 some of the biggest museums of Amsterdam were (partly) closed to the public. The *Rijksmuseum* was being renovated and the *Stedelijk Museum* was expanded. In 2013, they reopened to the public. The reopening of this must-see museums caused an increase in visitor's numbers to the city. Although it was crowded in the city centre, the inhabitants did not yet consider this as problem. According to research carried out by the municipality of Amsterdam, most of the inhabitants considered the crowdedness in city centre as 'cosy' (Municipality of Amsterdam, 2012).

But according to local newspaper *Het Parool* (2015) the 3<sup>rd</sup> of May 2014 became the day this changed. Due to different circumstances, such as the nice weather, the organization of major events, the May holidays and traffic construction projects in Amsterdam, all visitor flows came together in the city centre: it was very crowded. As a result, inhabitants started to complain about the number of visitors. *"We don't want to become a second Venice"*, they say (von der Dunk, 2016), in a reference to a destination where inhabitants are leaving the city to escape the negative side-effects of intense tourism activity.

Since then a heated political debate started about the balance between the interests of inhabitants and visitors and what should be done to give direction to the expected future increase in visitor numbers. *Het Parool* used the provocative headline *'Do people really live here?'* to introduce the problem in Amsterdam (Het Parool, 2014). This debate is still ongoing.

Due to the increasing visitor numbers, Amsterdam is facing a set of challenges: according to the visitor survey of Amsterdam Marketing (2016), most visitors to Amsterdam are visiting the historic canal district. This UNESCO World Heritage site is very compact in size. As a result, most tourism activity is concentrated as well in this area. Currently, city officials have taken a few steps to address the concerns of the inhabitants. A stricter hotel policy has been introduced, so called 'beer bicycles' have been banned from parts of the city centre and different projects are in place to spread visitors over a bigger area of the city and the surrounding region (Municipality of Amsterdam, 2015).

## 1.2 Aims and objectives

The goal of this master thesis is twofold:

1. <u>To develop a managerial framework which can provide a (near) real-time overview of how destinations are being used</u>

The development of a managerial framework not only helps tourism officials to get a current overview of the destination usage, but also provides them with management tools to take appropriate actions in order to become a more sustainable destination. By describing the process on how a managerial framework can be developed, this further

stimulates the dissemination of knowledge to other destinations which want to develop a framework for measuring (near) real-time usage.

2. Validate the process on Amsterdam

By using Amsterdam as a test case, the developed process for establishing such a managerial framework can be validated and further refined.

## **1.3** Research questions

To develop the managerial framework, the following research questions have been formulated.

## Main question:

In what way can (near) real-time usage of a tourism destination be measured for managerial purposes?

## Sub-questions

To answer the main research question, the following sub-questions have been formulated:

- 1. How is usage measurement of a tourism destination achieved nowadays? What are existing solutions/approaches to usage measurement?
- 2. What are the main elements of a managerial framework to measure destination usage?
- 3. How can the developed process be applied in Amsterdam?

## 1.4 Methodological Approach

The following methodological approach was used to answer the research questions. First, a process was developed which creates the managerial framework. For this, an in-depth literature review was carried out to define the topic of measuring (near) real-time usage of a destination. The literature review formed the basis for a first concept of the process on how a managerial framework could be developed.

Next, this process was tested on Amsterdam. Desk research was carried out to identify the issues facing Amsterdam. This was followed by interviews with tourism stakeholders to validate the results from the interviews with the findings of the desk research. The interviews were also used to identify indicators which measure these issues and determine possible managerial actions.

As proof of concept of the developed methodology, for one of the identified indicators, follow up interviews were held with knowledgeable parties to explore how this indicator can be measured in (near) real-time. Lastly, a focus group session was organized with the management of Amsterdam Marketing to present the findings of the interviews, receive feedback and gather extra information on open questions.

The lessons learned from testing the process were implemented into the final version of the process. Figure 2 provides an overview of the used research methodology for the development of the process, figure 3 shows how the testing of the process looked like. An in-depth description of the used methodology can be found in chapter 3.





FIGURE 3 THE ORDER IN WHICH THE PROCESS WAS TESTED ON AMSTERDAM

The relation between the research questions and the used research methodology can be found in table 1.

Research question	Research method
RQ1: How is usage measurement of a tourism destina-	Literature review and interviews with tourism stake-
tion achieved nowadays? What are existing solu-	holders
tions/approaches to usage measurement?	
RQ2: What are the main elements of a managerial	Literature review
framework to measure destination usage?	
RQ3: How can the developed process be applied in Am-	Desk research, interviews with tourism stakeholders,
sterdam?	interviews with knowledgeable parties and a focus
	group session

TABLE 1 THE RELATION BETWEEN THE RESEARCH QUESTIONS AND THE USED RESEARCH METHODOLOGY

## **1.5** Structure of the Master Thesis

The master thesis commences with a literature review of the topic of destination usage measurement and an introduction to key theories and concepts in chapter 2. This is followed in chapter 3 by an explanation of the used research methodology for answering the research questions.

Based on the literature review, a first concept of the managerial framework could be developed, which is described in chapter 4. Chapter 5 then describes the results of validating this framework

on the destination of Amsterdam. Lastly, chapter 6 concludes the thesis by answering the research questions, describing how the results of the thesis contribute to the advancement of our knowledge and identifies possible further research.

# 2 LITERATURE REVIEW

## 2.1 Introduction

In this chapter, the different concepts and theories used in this master thesis will be discussed in more detail. The chapter starts with an overview of the key concepts, discussing how all the concepts relate to each other (Section 2.2). In the sections 2.3 to 2.6 these concepts are discussed in more detail.

The literature review will conclude in section 2.7 that currently only partial solutions exist to measuring (near) real-time destination usage, but that different key concepts can be combined to create a new process that is able to measure (near) real-time destination usage.

## 2.2 Key concepts

As the goal of this master thesis is to develop a managerial framework which helps destinations to be sustainable destinations in the future as well, the concept of **sustainable tourism** is one of the key pillars of this thesis. This concept, which consists of social, economic and environmental sustainability, will be discussed in detail in section 2.3.

The concept of sustainable tourism is also used in the "Guidebook on indicators of sustainable development for tourism destinations", developed by UNWTO (2004) in which a process is described of how a destination can determine which sustainable issues it is facing and enables it to select appropriate indicators to measure these issues. This process is described in section 2.3.1. As this master thesis tries to measure destination usage from a sustainable point of view, it is necessary to develop a process in which the process as developed by UNWTO is included. This helps a destination to select the right indicators that can be included in a managerial framework.

The UNWTO process does however not include suggestions for managerial actions and at what time these actions need to be implemented. This is unsatisfactory, as this master thesis tries to develop a framework which can be used by destination managers to manage the destination. Often the concept of **Carrying Capacity** is mentioned to determine when actions need to be implemented, but this model has its own limitations and cannot be used in relation to all possible issues facing a destination. A description of the concept of Carrying Capacity and its limitations can be found in section 2.4.

A model which does not have these problems and is able to define managerial actions is the **Limits to Acceptable Change**-model or LAC-model developed by Stankey et al. (1985). This model, which is described in section 2.5, explains that not only issues and appropriate indicators

should be identified, but that also minimum acceptable limits for an indicator should be selected. This is followed by identification of managerial actions which need to be implemented when the limit of an indicator is reached. By defining acceptable limits for an indicator and by identifying managerial actions when the limit of an indicator is reached, the LAC-model builds up the foundation of the UNWTO-process.

The last challenge is that this master thesis tries to measure destination usage in (near) realtime. Both the UNWTO-process as the LAC-model do not have any real-time elements embedded in their processes as these processes have been developed some time ago. A concept which is however helpful in realizing the (near) real-time measurement of a destination, is the concept of **Smart Tourism Destinations**. This concept describes that a digital infrastructure should be in place within a destination to measure certain aspects of a destination in (near) real-time. This infrastructure consists of data collection, data storage and data processing elements (Buhalis & Amaranggana, 2014). Section 2.6 explores the concept of Smart Tourism Destinations in more detail.

By combining the UNWTO process and the LAC-model and using these within the context of sustainable tourism and Smart Tourism Destinations, a new process can be developed which is able to develop a managerial framework for measuring (near) real-time destination usage. This process is described in detail in chapter 4.

Figure 4 shows an illustration on how the different elements are linked to each other. The arrows show the introduction of new key concepts to enrich the framework, the boxes indicate how each addition influences the framework.



FIGURE 4 ILLUSTRATION OF KEY CONCEPTS

In the following sections, the key concepts will be explored in more detail. It starts by describing the concept of sustainable tourism.

## 2.3 Sustainable Tourism

The focus on the economic aspects of tourism is still in place in many DMO's (and governments) around the world when measuring the performance of their destination, as often the main goal of a DMO is to increase the economic prosperity of a destination (Ponti, 2016).

During the last decades, however, sustainability has become a more important issue in discussions surrounding the topic of tourism. Cooper et al. (2005) argues that tourism is also seen *"as a despoiler of destinations, a harbinger of adverse social change and even the employment and* 

monetary gains of tourism are seen to be illusory in many destinations" and that the tourism sector needs to demonstrate that is a responsible sector. According to the United Nations Environment Programme (UNEP) and the UNWTO (2005) the topic of sustainable tourism is being discussed since the early 1990s and has since then developed significantly. Whereas the term sustainability was first mainly linked to environmental issues, the current definition of sustainable tourism ble tourism covers other elements as well.

The UNWTO uses the following definition for sustainable tourism: "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" (UNWTO, 2017). Three themes related to sustainability can be identified within the definition: economical sustainability, environmental sustainability and social sustainability. According to the UNWTO (2017) "a suitable balance must be established between these three dimensions to guarantee its long-term sustainability."

UNWTO further describes the three elements of sustainable development as follows (UNWTO, 2017):

- Environmental: "Make optimal use of environmental resources that constitute a key element in tourism development, maintaining essential ecological processes and helping to conserve natural heritage and biodiversity".
- Economical: "Ensure viable, long-term economic operations, providing socio-economic benefits to all stakeholders that are fairly distributed, including stable employment and income-earning opportunities and social services to host communities, and contributing to poverty alleviation".
- Social: "Respect the socio-cultural authenticity of host communities, conserve their built and living cultural heritage and traditional values, and contribute to inter-cultural understanding and tolerance".

In essence, UNWTO states that in order for a destination to foster sustainable tourism development, one should not only focus on the economic aspects of the destination, but also on environmental and social aspects.

## 2.3.1 Sustainable tourism development indicators

How can sustainability be measured, as discussed above? To respond to policy needs the UN-WTO in 2004 published the 'Guidebook on indicators of sustainable development for tourism destinations' (UNWTO, 2004). This guidebook describes the process on how destinations can select the right indicators for measuring the sustainable development of their destination. This process is shown in table 2. Although it could take months to fully complete all steps, UNWTO admits a more condensed process could take place as an 'exercise' in which stakeholders in a destination mainly focus on steps 5 - 8, while recognizing and reviewing all the 12 steps (UNWTO, 2007).

As this master thesis tries to develop a managerial framework, two elements of the UNWTO process are especially relevant, namely the selection of issues and the identification of corresponding indicators, all within the context of sustainability. The framework should focus on measuring aspects of destination usage which are relevant for destination managers and could be improved. The introduction of the two elements does exactly that.

Research and Organization	Description
Step 1	Definition/delineation of the destination.
Step 2	Use of participatory processes.
Step 3	Identification of tourism assets and risks.
Step 4	Long-term vision for a destination.
Indicators Development	
Step 5	Selection of priority issues.
Step 6	Identification of desired indicators.
Step 7	Inventory of data sources.
Step 8	Selection procedures.
Implementation	
Step 9	Evaluation of feasibility/implementation.
Step 10	Data collection and analysis.
Step 11	Accountability, communication and reporting.
Step 12	Monitoring and evaluation of indicators
	Application.

TABLE 2 THE INDICATOR DEVELOPMENT PROCESS AS DEVELOPED BY UNWTO

Source: UNWTO (2004)

#### **Issues and indicators**

The UNWTO guidebook identified a set of over 700 possible indicators across 42 issues which can arise in many destinations, "covering a range of social, economic, environmental and management issues related to sustainability of tourism (UNWTO, 2004)". From these issues, 12 issues were identified by UNWTO "as a suggested minimal set to be considered by destinations and which can allow comparisons with other destinations. (UNWTO, 2004)". These issues can be found in table 3. A list of all the issues can be found in Appendix 1.

Issues	Issues (continuing)
Local satisfaction with tourism	Water availability and conservation
Effects of tourism on communities	Drinking water equality
Sustaining tourist satisfaction	Sewage treatment (waste water management)
Tourism seasonality	Solid waste management (garbage)
Economic benefits of tourism	Development control
Energy management	Controlling use intensity

TABLE 3 12 BASELINE ISSUES

Source: UNWTO (2004)

The author of the thesis also classified in Appendix 1 all the issues into the three previous identified sustainability categories to determine whether the issues cover these categories and to verify that the list with issues can be used in this thesis. The classification was done using the detailed UNWTO definition of sustainable tourism. The classification showed that the list with issues could indeed be used.

#### Benefits and risks of using indicators

Using the right indicators can help decision makers in different ways. According to UNWTO (2004), some of the benefits of using indicators include better decision making, identification of emerging issues, identification of impacts, performance measurement of the implementation of plans and management actions, reduced risk of planning mistakes, greater accountability and constant monitoring which can lead to continuous improvement.

There are also risks associated by using indicators. The UNEP (as cited in Regions for Sustainable Change, 2017) identifies the following: oversimplification, over-aggregation, misuse of indicators as a delaying tactic, misinterpretation of indicators, unreliability, insufficient use of indicators when the messages conveyed are not captured by decision makers, insufficient flexibility when indicators cannot respond to new problems or changes.

This knowledge is taken into account in this master thesis by only using the indicators which were developed by the UNWTO, as these indicators were critically assessed by tourism experts when they were developed.

## 2.4 Carrying Capacity

Although the concept of Carrying Capacity is not further used in the managerial framework, it is however necessary to address it as it creates an understanding why another concept, Limits to Acceptable, was chosen to be used in this thesis. This concept will be discussed in section 2.5.

When trying to measure the scale and impact of tourism, the concept of Carrying Capacity is often mentioned in the literature. The UNWTO (as cited in Castellani & Serenella, 2012) defines tourism carrying capacity as *"the maximum number of persons which could visit a location within a given period, such that local environmental, physical, economic, and socio-cultural characteristics are not compromised, and without reducing tourist satisfaction"*.

Jovicic and Dragin (2008) argue that when the Carrying Capacity in a certain area is exceeded, this mainly results in negative effects in tourism. Weaver (2006) mentions that the capacity levels of a destination are mainly dependent upon two factors: the characteristics of the tourists and the characteristics of the tourist destination and its population.

There are however issues with the concept of Carrying Capacity. The first one being that the Carrying Capacity of a destination is not something static. The University of the Aegean (2001) argues that when measuring Carrying Capacity, *"this does not have to lead to a single number* 

(threshold), like the number of visitors. Even when this is achieved this limit does not necessarily obey to objectively, unchangeable, everlasting criteria." This is supported by Saveriades (2000) who explains that "carrying capacity is not fixed. It develops with time and the growth of tourism and can be affected by management techniques and controls." The University of the Aegean (2001) argues that when defining capacity levels, these levels should be discussed with the main stakeholders in the destination: "Setting capacity limits for sustaining tourism activity in a place involves a vision about local development and decisions about managing tourism."

Another issue is the way how Carrying Capacity is calculated. According to Jovicic and Dragin (2008) *"there is still no reliable and scientifically validated method for the calculation of carrying capacity"*.

It would therefore be challenging to use the concept of Carrying Capacity in a managerial framework. Carrying capacity is static, but a destination is not static. Numerical tourism capacity is therefore inadequate to use. And given the broad spectrum of the topic of sustainability, which is not limited to defining capacity limits, the concept of Carrying Capacity cannot be used in a framework, as a framework consists of many different issues facing a destination.

## 2.5 Limits of Acceptable Change (LAC)

A model that does not use the concept of Carrying Capacity is the *Limits of Acceptable Change* - model or *LAC*-model. This model, originally called the '*Limits of Acceptable Change-model for* Wilderness Planning', was developed by the United States Department of Agriculture in 1985 "in response to the need of managers for a means of coping with increasing demands on recreational areas in a visible, logical fashion (Stankey et al, 1985)". It was first used in the management of US National Parks in response to increasing visitor numbers.

Stankey et al. (1985) argued that in the US National Parks "the challenge is not one of how to prevent any human-induced change, but rather one of deciding how much change will be allowed to occur, where, and the actions needed to control it." Cole & Stankey (1997) added that "the LAC process sought to explicitly define a compromise between resource/visitor experience protection and recreation use goals."

According to Nasha and Xilai (2013) the LAC-model shifts the focus from *"how much use is too much"* to *"how much change is acceptable"* and thereby to the management of the impact visitors have on a destination. The LAC-model identifies an acceptable bandwidth for each indicator, followed by the selection of corresponding managerial actions in case an indicator reaches these limits.

Figure 5 shows an illustration of the acceptable limits of an indicator and the change over time in the value of the indicator.



FIGURE 5 ILLUSTRATION OF THE LIMITS OF ACCEPTABLE CHANGE FOR AN INDICATOR

#### 2.5.1 The LAC-process

The LAC-model was introduced in a US National Park following a process involving nine steps in which areas of concerns and issues are identified, indicators are selected and managerial actions are defined. To be called LAC, Cole & Stankey (1997) argue that a process in essence must "(1) contain standards that express minimally acceptable conditions, (2) require monitoring capable of determining whether or not standards have been met, and (3) base management prescriptions on evaluations of whether or not standards have been met."

The whole process of implementing the LAC-model contains nine steps. These steps are mentioned in table 4.

Step	Description
1	Identify area concerns and issues
2	Define and describe opportunity classes (based on the concept of ROS)
3	Select indicators of resource and social conditions
4	Inventory existing resource and social conditions
5	Specify standards for resource and social indicators for each opportunity class
6	Identify alternative opportunity class allocations
7	Identify management actions for each alternative
8	Evaluate and select preferred alternatives
9	Implement actions and monitor conditions

TABLE 4 THE 9 STEPS OF THE LAC-MODEL

Source: Stankey et al (1985)

Some of the steps in the LAC-model have similarities with the indicator development process as created by UNWTO, which was described in section 2.3, such as the identification of issues and indicators. However, the LAC-model also introduces two new elements that can be used in the managerial framework, namely specifying acceptable limits for each indicator and selecting appropriate managerial actions when an indicator reaches a specified limit. By using these elements, the framework will not only consist of indicators which measure sustainability issues, it also adds a managerial part to the framework. This provides destination managers with tools to manage the different sustainability issues.

However, both the UNWTO-process and the LAC-model do not offer any suggestions for (near) real-time measurement. Here comes the concept of Smart Tourism Destinations into play.

## 2.6 Smart Tourism Destinations

Krisp (2013) states that analysing our surroundings in real-time is *"still a major challenge due to the sparsely available data sources for real-time monitoring"*. There are however concepts and technologies that are beneficial in realizing this, the concept of Smart Tourism Destinations being an important one as it describes the digital infrastructure in a destination which makes it possible to measure destination usage in (near) real-time.

### **Smart Cities and Smart Tourism Destinations**

As the trend of urbanisation continues, cities are looking for ways how to handle the pressure this is causing. The concept of Smart Cities helps cities to improve the quality of life of its citizens and improve the visitor experience. Buhalis & Amaranggana (2014) describe that Smart Cities technologies are embedded in a city and will synergise with the city's social components. An example is better traffic monitoring. Lamsfus and Alzua-Sorzabal (2013) however argue that the Smart Cities concept is not specific enough for use in the tourism sector, arguing that visitors have different needs and requirements than other local citizens and, that although *"Destination Management Organisations and other interested parties may benefit from the Smart City infrastructure, they also provide different services to those provided to local citizens and have other information requirements and needs in order."* 

The use of ICT in cities however opens up a world of opportunities for tourism destinations. Buhalis & Amaranggana (2014) suggest that *"the development of Smart Cities could encourage the formation of Smart Tourism Destinations."* Lopez de Avila (2015) describes Smart Tourism Destinations as *"an innovative tourist destination, built on an infrastructure of state-of-the-art technology guaranteeing the sustainable development of tourist areas, accessible to everyone, which facilitates the visitor's interaction with and integration into his or her surroundings, increases the quality of the experience at the destination, and improves residents' quality of life."* 

Smart Tourism Destinations use ICT services to improve the visitor experience of the destination, providing tailor made information based upon the visitor's needs (Lamsfus, Martín, Alzua-Sorzabal, & Torres-Manzanera, 2014). Gretzel *et al.* (2015) state that in a Smart Tourism Destination these ICT services are integrated into the physical infrastructure of the destination. They argue that *"smart tourism also clearly rests on the ability to not only collect enormous amounts of data but to intelligently store, process, combine, analyze and use big data to inform business innovation, operations and services."* 

## 2.6.1 Infrastructure of a Smart Tourism Destination

To monitor a destination in (near) real-time, a destination needs to become a Smart Tourism Destination and a digital infrastructure should be in place. According to Buhalis & Amaranggana (2014) the elements of this infrastructure include data collection, data storage and analysing

and presenting the data. Tu and Liu (2014) call these elements a smart information layer that collects data, a smart exchange layer that supports interconnectivity and a smart processing layer that analyses and visualizes the available data. These will be discussed in the next part.

#### Smart information layer

In order to measure the status of a destination, it is necessary to collect data. According to Buhalis & Amaranggana (2014) the most important data sources in a Smart Tourism Destination are:

- Information coming from the destination resulting from sensors, destination elements and open data. The presence of Internet of Things-technologies (IoT) is seen as one of three vital ICT elements in a Smart Tourism Destination;
- 2. Information coming from the social media activities of citizens and visitors.

#### Smart exchange layer

Next, the data from all these data sources needs to be brought together and stored. Buhalis & Amaranggana (2014) suggest that cloud computing can help to realize this by enabling data storage and giving users an easy way to access the data via the web. This is the second vital ICT element in a Smart Tourism Destination.

#### Smart processing layer

Lastly, the collected data needs to be analysed and presented in a way that it provides the enduser, the destination manager, with information on which he or she can make management decisions. Buhalis & Amaranggana (2014) call this an End User Internet Service System.

Figure 6 shows schematically the digital infrastructure of a Smart Tourism Destination.

#### Information layer

Data from sensors, destination elements and open data.

Information from citizens and visitors.

#### Exchange layer

Cloud computing provides central storage and easy acces via the web.

#### **Processing layer**

Analysing the collected data and presenting this via and End User Internet Service System.

FIGURE 6 DIGITAL INFRASTRUCTURE IN A SMART TOURISM DESTINATION

Source: Buhalis & Amaranggana (2014)

### 2.6.2 Key enabling technologies in Smart Tourism Destinations

As the concept of Smart Tourism Destinations is relatively new, few practical applications of key enabling technologies used in Smart Tourism Destinations can be found surrounding, most of them surrounding the concept of Internet of Things.

## **Internet of Things**

According to Xia et al. (2012) 'Internet of Things' (IoT) generally refers "to the networked interconnection of everyday objects, which are often equipped with ubiquitous intelligence." Or, as Kopetz (2011) argues: "the connection of physical things to the Internet makes it possible to access remote sensor data and to control the physical world from a distance". These 'physical things' could be anything, from vehicles to buildings, as long as these are able to exchange data via the internet. According to AIG (2016) IoT could among others lead to improvements in areas such as "safety, efficiency, data driven decision making and infrastructure."

There are few examples of how IoT technology can be used for measuring the usage of a destination. Gu et al. (2014) discuss a research project that *"attempted to design a real-time positioning system based on "received signal strength indication" (RSSI) ranging and the IoT technology. Test results showed that this design could identify real-time positioning of visitors and automatically mark them on the resort map, which could facilitate an exchange of information (e.g., alarm messages)."* 

Another example is the '*smart scenic spot*' project whereby scenic spots in China are equipped with IoT technology, including RFID entrance tickets and an LED information publishing system, in order to sense geographical information, tourist behaviours and community residents. This is complemented by the use of data warehouses and cloud computing technology (Gu, Liu, & Chai, 2014).

A slightly different example can be found in Barcelona. Microsoft and the Barcelona City Council worked together to create the 'Smart Destination' app. The app provides users with information on the latest weather and interesting tourist sights, it also gives information on how long the lines are to get into the Sagrada Familia. According to Microsoft (2015) *"the app analyzes the massive amounts of real-time data generated from Barcelona's IoT sensors—placed on every-thing from city streets to subways."* It also uses the app to collect data: feedback from the users and social media channels is analysed to provide them with a better and more tailor-made experience.

## Citizen sensing

Not only can real-time measurements be taken by using sophisticated hardware, Resch (2013) describes that *"humans can contribute their individual 'measurements' such as their subjective* 

sensations, current perceptions or personal observations", thereby becoming 'sensors' themselves for the destination and offering a cheaper alternative instead of using expensive sensor networks. Through the internet and mobile devices citizens can "upload lots of data, this fact gives to such devices the ability to act as sensors. Thus, the term citizen-sensor network refers to an interconnected network of people who actively observe, report, collect, analyze, and disseminate information via text, audio or video messages (Villatoro & Nin, 2013)." According to Khan (2017) "citizens increasingly use social media and web 2.0 technology to report issues of urgent attention to the government". In the tourism sector, some citizen-sensing network have emerged as well. In Milan and Como, Italy, tests have been carried out among wheelchair users to function as a citizen-sensor network regarding the accessibility of the cities (Sik-Lányi, Hoogerwerf, Miesenberger, & Cudd, 2015).

Other, more general applications of citizen-sensing networks include the use of social media to report problems to local governments. Khan (2017), for example, describes an initiative called *Fixmystreet* in which citizens can report problems in their own neighbourhood, such as broken paving slabs and street lighting. These reports are then forwarded to the council to solve these problems.

#### Geo-referenced data

In order to get a more actual overview of tourists' movements, in recent years' initiatives have been started by the sector in which mobile phone data is used, with the idea that almost every person carries a mobile phone. In Estonia, the *Positium Barometer* tries to show the space-time movements of tourists where it is using positioning data from mobile phone operators to analyse in which areas tourists are. Ahas *et al.* (2008) identify some issues with the Positium Barometer and mobile phone data in general: *"Data is hard to get, privacy concerns have to be addressed and a special knowledge about Location Based Services data is required. These are also reasons why mobile positioning is not widespread."* 

## 2.7 Conclusion

The aim of this chapter was to provide an overview of the different key concepts used in this master thesis. It showed that currently no complete solutions exist to the topic of measuring (near) real-time destination usage, but that existing concepts could be brought together to develop a process which is able to develop this framework.

Some steps as described in the LAC and UNWTO processes are overlapping, including the need to identify issues, relate these issues to indicators and define ways to measure them. At the same time, the LAC-process can also be seen as an addition to the steps as described by UNWTO. Whereas the UNWTO process stops when indicators have been developed, extends the LAC-model this process and let destination managers also think about what minimum acceptable

conditions are for an indicator and what managerial actions should be taken to not let an indicator exceed a certain limit.

In order to develop a managerial framework for measuring (near) real-time destination usage, it is therefore necessary to use elements from the process developed by UNWTO for measuring sustainable tourism development, as well as using elements from the LAC-process to define acceptable limits per indicators and identify managerial actions. In addition, it will be necessary to identify ways how each indicator can be measured in (near) real-time.

When combining all the different elements and condensing the process, the process as summarized in table 5 can be used to develop a managerial framework for measuring (near) real-time destination usage. This process will be further explained in chapter 4. First, however, the used research methodology will be explained in more detail in chapter 3.

Step	Description
1	Identify whether a destination has a vision/tourism master plan
2	Identify specific issues in the destination (using the list of 42 issues identified by UNWTO)
3	Identify which indicator(s) as suggested by UNWTO can be used to measure the issues/opportunities
4	Per indicator identify minimum acceptable conditions
5	Per indicator identify possible managerial actions
6	Per indicator identify ways how this can be measured in (near) real-time

TABLE 5 FIRST CONCEPT OF THE DEVELOPED PROCESS

# **3** METHODOLOGY

## 3.1 Introduction

The different research instruments used in this master thesis and the rationale of using them are explained in this chapter. The research methodology could be divided into two parts: a process development part and a process testing part. Section 3.2 provides an overview of both parts and explains the rationale of choosing the different research instruments. In sections 3.3 and 3.4 the used research elements for each part are discussed in more detail. These research instruments include a literature review, two sets of interviews and a focus group session.

## 3.2 Selection of methodology

#### **Process development**

The development of a process for creating the managerial framework is important as it helps to answer the main research question on how a destination usage could be measured in (near) real-time. The literature review formed the basis for a first concept of this process, by combining the different key concepts. The process was then tested on Amsterdam, which in return provided valuable lessons on how to make the process more easily usable. After implementation of these lessons a final version of the process was created. Figure 7 shows schematically the order in which the process was developed. Section 3.3 explains the process development in detail.



FIGURE 7 THE ORDER IN WHICH THE PROCESS WAS DEVELOPED

#### **Process testing**

The testing of the process consisted of different steps, of which an overview can be found in figure 8.



FIGURE 8 THE ORDER IN WHICH THE DEVELOPED PROCESS WAS TESTED

First, desk research was carried out on Amsterdam to create a list with sustainability issues facing the destination, which could be used to validate the findings from the interviews with tourism stakeholders (Section 3.4.1). For these structured interviews, interview questions and a code
book were prepared and tested before the actual interviews took place. After conducting the interviews, a qualitative content analysis took place. Section 3.4.2 explains this in more detail.

As the interviewed stakeholders had less knowledge on how a specific indicator could be measured in (near) real-time, it was necessary to conduct a second series of interviews with parties who have more knowledge on this topic. For the interviews with knowledgeable parties an interview guide was developed and after conducting the interviews an analysis took place. Section 3.4.3 explains this in more detail.

Lastly, the author decided to organize a focus group meeting with the management of Amsterdam Marketing to try and determine the acceptable limits of an indicator and identify managerial actions, as the answers given during the interviews were too different from each other. At the same time the focus group was used to validate other findings from the interviews and to test the most efficient way of collecting useful information. Section 3.4.4 provides more details on the focus group session.

The two series of interviews and the focus group session resulted in the creation of a managerial framework for Amsterdam, at the same time providing valuable lessons on improving the process. These lessons were implemented into the final version of the process.

In the next sections, the different research instruments used in the process development and process testing parts will be discussed in more detail.

## 3.3 Process Development

The process development consisted of different research elements. These elements are a literature review, testing of the process and implementing the lessons learned into the final version of the process.

## 3.3.1 Literature Review

To get a better understanding of the key concepts and developments of (near) real-time destination usage, first a literature review was held. The used approach was to focus on gathering information on the first two sub-questions as described in chapter 1.

In order to get a coherent literature review, the following scientific sources were used: Google Scholar, ResearchGate and Academia.eu. All searches were limited to identify articles that were published in English. Besides that, recommendations for sources gathered during the interviews and focus group session enriched the literature review and brought more focus to it.

In addition to literature found via the academic search engines, different websites were reviewed which were or recommended by the interviewees or were known to the author of the thesis to contain practical information regarding relevant topics. These websites include, but are not limited to: unwto.org, europeancitiesmarketing.com, amsterdam.nl and websites from news media.

#### **First concept of process**

Using a deductive approach, the literature review formed the basis for the managerial framework. By combining the different concepts, theories and processes found during the literature review, a new process could be formed which guides a destination through all necessary steps to develop a managerial framework for measuring (near) real-time destination usage. This process will be further explained in chapter 4.

#### Testing the process and implementing lessons learned

Next, the process was tested on Amsterdam. Section 3.4 explains the testing in detail. After completion of the testing, the developed process was updated with the lessons learned. Appendix 13 contains the final version of the process.

### 3.4 Process testing

To validate the developed process, it was necessary to test this on a destination. The author chose Amsterdam as a destination to validate the process, due to easy access to contacts. To test the developed process on Amsterdam, first desk research was carried out (Section 3.4.1). This was followed by two sets of interviews: (1) structured interviews with stakeholder groups (Section 3.4.2) and; (2) semi-structured interviews with knowledgeable parties in order to identify ways on how a specific indicator could be measured in (near) real-time (Section 3.4.3). Lastly, a focus group session was organized (Section 3.4.4).

#### 3.4.1 Desk research

Specific desk research was carried out to identify issues facing Amsterdam from the perspective of its inhabitants and visitors. This was followed by identifying all possible indicators to measure these issues. The desk research enabled the author to test whether the interviews would provide valuable results. Results from the desk research will be discussed chapter 5.

#### 3.4.2 Qualitative data: Interviews with stakeholder groups

Structured interviews with stakeholder groups were held to test the developed process and to bring more focus in the issues found during the desk research. A list with interview questions was prepared which focussed on identifying issues and opportunities facing Amsterdam, prioritizing these issues, determining which indicator(s) make sense to measure specific issues, identifying possible managerial actions and identifying knowledgeable parties to talk too regarding measuring specific indicators in (near) real-time.

#### Selection of the interviewees

The interviewees were selected based upon two criteria:

- 1. The interviewees should fit in one of the five stakeholder groups identified by Buhalis and Ammarangana (2015), which make up a Smart Tourism Destination. These stakeholder groups include Tourism Organizations, Governments, Local residents/communities, Tourists and Environments.
- 2. For each of the stakeholder groups one or more interviewees were selected based upon their reputation in terms of knowledge about the destination and their experience.

Appendix 5 provides an overview of all interviewees, their function, their stakeholder group and when they were interviewed. In total five interviews were conducted. For each of the interviewees face-to-face meetings were set up. Interviews took place at the various organizations. One of the stakeholder groups, tourists, were not interviewed as part of this thesis as Amsterdam Marketing already had useful data available for this research.

#### **Contents of the interviews**

The interview format consisted of 11 questions covering the different steps of the developed process. For each interview question, first an objective was defined before the actual question was developed. This helped the author of the thesis not only to create focussed questions, it also helped to validate the developed process. The main topics of the interviews were the identification of issues and opportunities, selection of indicator and managerial actions, followed by identifying persons and organizations who have more knowledge on measuring an indicator in (near) real-time.

Appendix 2 contains the final interview format used during the interviews, while Appendix 3 and 4 were shown to the interviewees during the interviews.

#### Testing the interview

The interview was tested on a colleague from Amsterdam Marketing. The test showed that most of the interview questions worked as hoped, but that due to time constraints more focus was needed when identifying possible managerial actions and determining acceptable limits of change, as this step would have to be repeated for each indicator.

Therefore, the author decided to only work out one issue in this master thesis, *Effects of tourism* on host communities, and focus on one indicator, the number of persons per day, week, etc., to prove that the developed process could work. The selection of this indicator was based on the desk research: according to both inhabitants and visitor's, crowdedness is considered as one of the biggest pressures facing Amsterdam. More on this can be found in section 5.2. An indicator

which, according to UNWTO (2004), measures this pressure is *the number of persons per day*, week, etc; number per sq km.

#### Analysis of the interviews: Qualitative Content Analysis

All interviews were recorded with an audio recorder to simplify analysing the interviews. Interviewees were asked beforehand whether they would object recording of the interviews.

For the analysis of the interviews the *qualitative content analysis*-approach developed by Mayring (2000) was used. Mayring argues that the advantages of qualitative content analysis are: fitting the material into a model of communication, rules of analysis, categories in the centre of analysis and criteria of reliability and validity. Mayring developed both an inductive and deductive approach to qualitative content analysis. For analysis of the interviews, the deductive approach was used as the goal of the interviews was to validate the developed process and the concepts enclosed in it. Mayring (2000) describes the deductive approach as follows: *"The main idea here is to give explicit definitions, examples and coding rules for each deductive category, determining exactly under what circumstances a text passage can be coded with a category. Those category definitions are put together within a coding agenda."* 

#### **Coding Agenda**

As suggested by Mayring, a coding agenda was developed to classify the answers of the interviewees. An example of the coding agenda can be found in table 6. The full coding agenda can be found in Appendix 2. As a general coding rule, it was decided that if the given answer of an interviewee did not fit into the first category, then the answer should be checked with the second category, etc.

Category	Definition	Example
1A: YES	High conviction that there is a vision and what it is about	Yes, and this is the vision: ""
1B: YES, but	Moderate conviction that there is a vision, but can't detail the contents or isn't sure that what the person explains is indeed the vision	Yes, but I don't the know the content of the vision.
1C: NO	High conviction that there is no vision	There is no vision
1D: DON'T KNOW	Doesn't know whether a vision is in place	I don't know whether there is a vision

TABLE 6 EXAMPLE OF THE CODING AGENDA USED IN ANALYSING THE INTERVIEWS

The interviews were first transcribed, then coded according to the coding agenda, followed by interpreting the data. The results of coding of the interviews can be found in Appendix 6.

#### 3.4.3 Qualitative data: Interviews with knowledgeable parties

During the interviews, the interviewees were asked to identify other persons and organizations who might have more knowledge on measuring one specific indicator in (near) real-time: *the* 

number of persons per day, week, etc. After a preliminary check on the internet to gain more knowledge on the suggested persons, interviews were set up with three persons. A list of these interviewees can be found in Appendix 5.

#### Semi-structured interviews

Whereas the first set of interviews were used to validate the findings from the literature review and were structured interviews in nature, this second series of interviews were more exploratory. As a result, a semi-structured interview format was chosen. According to Cohen & Crabtree (2006) in a semi-structured interview *"the interviewer follows the guide, but is able to follow topical trajectories in the conversation that may stray from the guide when he or she feels this is appropriate"*.

An interview guide was developed with questions focussing on the following topics:

- What is currently done regarding the measurement of this indicator?
- How could the (near) real-time measurement of this indicator be adopted in Amsterdam?
   What tools and technologies are needed?
- How can limits of acceptable change be defined for this indicator?
- What managerial actions should be taken when an indicator reaches an acceptable limit?

The interview guide can be found in Appendix 8. All interviews were recorded with an audio recorder. According to Stewart et al. (as cited in Koczanski, 2014) *"exploratory research generally only requires a descriptive narrative be created from these discussions, rather than an exact transcript."* 

A summary of each interview can be found in Appendix 9, 10 and 11.

#### 3.4.4 Qualitative data: Focus group session

Lastly, a focus group session with the management of Amsterdam Marketing was organized at the headquarters of Amsterdam Marketing. During the first set of interviews it became clear that, although many of the interviewees identified the same issues facing Amsterdam, there were also differences in prioritizing them. Also, the interviewees found it difficult to define acceptable limits for an indicator and which managerial actions should be taken when an indicator reaches a limit. The focus group session was used to try to answer these outstanding questions.

The advantages of using a focus group are according to Miller (as cited in Villard, 2003) "the flexibility in questioning, the encouragement of dialogue and exchange of ideas, the generation of hypotheses, being relatively fast and inexpensive and producing findings in a form that most users fully understand". A secondary objective of the author was therefore to check whether a focus group would provide the same results as the interviews in order to make the whole process less time consuming.

During the focus group meeting, which lasted one hour in total, the group consisting of four persons was asked to discuss different topics:

- What are according to the group the main issues and opportunities facing Amsterdam?
- What are acceptable limits for a 'the number of persons per day, week, etc.'?
- What managerial actions should be taken when the indicator reaches a limit?
- The process on developing a managerial framework: does it make sense?

For each of the topics, the author introduced the group to the topic and some of the findings from the interviews.

The focus group session was recorded with an audio recorder. Key findings were written down during listening to the audio tape. A summary of the focus group session can be found in Appendix 12. A list of participants and their functions can be found in Appendix 5.

## 3.5 Conclusion

The research methodology used in this master thesis was focused around two topics: process development and the testing of the process. Both elements used different research instruments to obtain answers to the investigated research questions. The results of the literature review, the interviews and the focus group session provided insights for answering the research questions, thereby enabling to answer the main research question.

In the next chapter, the first concept of the developed process will be presented.

# 4 INTRODUCING THE MANAGERIAL FRAMEWORK AND PROCESS TO MEASURE DESTINATION USAGE

## 4.1 Introduction

The literature review concluded that the different theoretical concepts could be linked to each other in order to create a process that could be used by destination managers, such as DMO's and the government. This process results in the creation of a managerial framework which can measure in (near) real-time how a destination is used from a sustainable point of view. The main elements of a managerial framework (Section 4.2) and the new process (Section 4.3) will be introduced in this chapter.

## 4.2 Introducing the managerial framework elements

By combining the key concept of the literature review (Chapter 2), five main elements of the managerial framework can be defined. A managerial framework for measuring (near) real-time destination usage will consist of the following elements:

- 1. A list with sustainability issues facing the destination;
- 2. Related indicators which measure the status of the issues;
- 3. A defined bandwidth in which the value of an indicator can change;
- 4. Selected managerial actions which are put in place when an indicator reaches a limit;
- 5. A description on how an indicator could be measured in (near) real-time.

To determine the contents of each element for a destination, is it is necessary to use the developed process, which will be presented in the next section.

## 4.3 Introducing the process

The process of developing a managerial framework contains six steps. An overview of these steps can be found in figure 9.



FIGURE 9 THE PROCESS OF DEVELOPING A MANAGERIAL FRAMEWORK

The six steps have been formulated by combining elements from the UNWTO indicator development process, the LAC-model and by using the Smart Tourism Destinations concept. A discussion of these models can be found in chapter 2. Not all the steps as suggested in the models have been selected for use in this new process. This was done for several reasons:

- 1. Some of the models suggested the same steps, such as the identification of issues and indicators;
- 2. Some of the suggested steps are very theoretical in nature. This limit the adoption of the process in 'real world' situations;
- 3. By combining all concepts, a more densified version is created. If this is not done, the process of completing all steps, could take a long time which in turn would again limit the adoption of the process.

Table 7 provides an overview on how each step is related to the different models as discussed in chapter 2.

Step	Description of step	Related to theoretical concept
1	Identify whether the destination has a vision on tourism / tourism master plan	UNWTO indicator development process
2	Identify issues in the destination	UNWTO indicator development process
3	Identify which indicator can be used to measure the	UNWTO indicator development process
	issues/opportunities	
4	Identify minimum acceptable conditions for each	LAC-model
	indicator	
5	Identify possible managerial actions for each indicator	LAC-model
6	Identify ways how each indicator can be measured in	Smart Tourism Destinations
	(near) real-time	

TABLE 7 OVERVIEW ON HOW EACH STEP OF THE PROCESS IS RELATED TO THE DIFFERENT KEY CONCEPTS

Each of the six process steps and the rationale of using them will now be discussed in more detail.

## 4.3.1 Step 1: Identify whether the destination has a vision on tourism / tourism master plan

<u>Objective:</u> Identify long-term goals and objectives of the destination.

- <u>Description:</u> To measure the performance of the destination, it is helpful that indicators used in the managerial framework are linked to existing plans and policies. In that way, evaluation of these plans can be measured, at the same time allowing destinations to take corrective actions if necessary. During this step, the long-term goals and objectives of the destination will be identified. It is important to learn why exactly these goals and objectives were defined as this will be helpful during the next step of the process.
- <u>Tool:</u> Desk research and interviews with important tourism stakeholders in a destination, at least with the government and the promotional organization(s).

<u>Outcome:</u> A list containing all the goals and objectives of the destination.

#### 4.3.2 Step 2: Identify issues in the destination

<u>Objective:</u> Identify issues currently facing the destination.

<u>Description:</u> Besides long-term goals and objectives, the destination might also currently face issues which are related to sustainable development. Therefore, it is necessary to identify these issues. A helpful tool to use during this step is the list developed by UNWTO which contains all the possible issues a destination could face from a sustainable development point of view. This list can be found in Appendix 3.

As probably not all the identified issues are even important to the destination, the list of identified issues should be prioritised as well during this step.

- <u>Tool:</u> Desk research and interviews with important tourism stakeholders in the destination.
- <u>Outcome:</u> The list with goals and objectives will be expanded with the issues currently facing the destination. After completing this step, all mentioned pressures/issues/goals/objectives need to be linked to the list of issues developed by UN-WTO.

## 4.3.3 Step 3: Identify which indicator can be used to measure the issues/opportunities

- <u>Objective:</u> Identify indicator(s) which can be used to measure the issues identified during the previous step.
- <u>Description:</u> To measure each issue, indicators should be selected which are relevant for the specific destination. As UNWTO suggests over 700 indicators for all the issues, it is necessary to only select the indicators which are relevant to the destination.
- Tool:Interviews with tourism stakeholders and the use UNWTO 'Guidebook on indi-<br/>cators of sustainable development for tourism destinations' with all available in-<br/>dicators for each of the issues.
- <u>Outcome:</u> For each issue, one or more specific indicators are identified by the stakeholders.

#### 4.3.4 Step 4: Identify minimum acceptable conditions for each indicator

<u>Objective:</u> Identify the limits to acceptable change for each indicator.

- <u>Description:</u> As the value of an indicator changes over time, from a managerial point of view, it is necessary to determine at what point an indicator reaches a certain level as to which managerial action(s) should be taken in order to bring back the indicator within acceptable limits. For each indicator, these limits must be identified by the stakeholders: when do we consider as a destination a value as too high or too low?
- Tool: Interviews with tourism stakeholders.
- <u>Outcome:</u> For each indicator, a bandwidth has been determined in which the indicator can change without the need for managerial action to be taken.

#### 4.3.5 Step 5: Identify possible managerial actions for each indicator

- <u>Objective:</u> Identify managerial actions in case the limit of an indicator is reached.
- <u>Description:</u> As the value of an indicator changes over time, from a managerial point of view, it is necessary to determine which managerial action(s) should be taken when a limit is reached to bring back the indicator within acceptable limits.
- Tool: Interviews with tourism stakeholders.
- <u>Outcome:</u> For each indicator, managerial actions have been identified from the perspective of the different stakeholder groups.

#### 4.3.6 Step 6: Identify ways how each indicator can be measured in (near) real-time

- <u>Objective:</u> Identify ways how each indicator can be measured in (near) real-time.
- <u>Description:</u> This last step explores how an indicator can be measured in (near) real-time. As most tourism stakeholders probably will not have enough knowledge on the technicalities of measuring an indicator, parties should be identified who have more knowledge on ways to measure a specific indicator. During the interviews, an interview guide is used in order to determine all aspects of the development of the indicator.
- <u>Tool:</u>
  1. Interviews with tourism stakeholders to identify knowledgeable parties;
  2. Interviews with knowledgeable parties in order to identify how an indicator can be measured or is already measured.
- <u>Outcome:</u> For each indicator, a method has been found to measure this indicator in (near) real-time.

## 4.4 Conclusion

When completing the described process, the theoretical exercise of developing a managerial framework for a destination has been finished. The developed managerial framework provides destination managers with a current overview of the performance of the destination, related to identified issues. The process results in the following elements to be included in a managerial framework of a destination:

- 1. A list of issues facing a destination;
- 2. Relevant indicators to measure each issue;
- 3. Defined acceptable limits for each indicator;
- 4. A defined set of managerial actions when a limit of an indicator is reached;
- 5. A solution to measure the selected indicators in (near) real-time.

The next step was to validate the process in a destination, in the case of this master thesis: on Amsterdam.

# 5 VALIDATING THE PROCESS ON AMSTERDAM

## 5.1 Introduction

The process for building a managerial framework to measure destination usage, as described in chapter 4, was tested on the destination of Amsterdam. To validate the process, first desk research was carried out to identify the issues facing Amsterdam from a sustainable point of view (Section 5.2). Next, in section 5.3 the results of testing the six process steps are discussed. During the testing interviews with stakeholder groups were conducted, followed by interviews with knowledgeable parties to explore how one indicator can be measured in (near) real-time and the organization of a focus group session. The chapter concludes in section 5.4 with an evaluation of the process.

## 5.2 Issues facing Amsterdam according to desk research

Within Amsterdam, different reports have been published which identify issues facing the destination from the perspective of inhabitants and visitors (Amsterdam Marketing, 2016; Municipality of Amsterdam, 2016). These reports are helpful to validate the process steps as they can be considered as a baseline to which the findings from the process can be compared. The reports and their key results will be discussed in some more detail.

#### 5.2.1 Pressures facing the destination of Amsterdam according to visitors

Amsterdam Marketing, the city marketing organization of Amsterdam, conducts every four years a face-to-face survey among 10.000 visitors to Amsterdam and the region surrounding the city. The last survey was conducted in 2015 with the results published in 2016 (Amsterdam Marketing, 2016). One of the questions being asked in the survey is whether the interviewee can name any positive or negative aspects of the destination. As can be seen in table 8, the most important negative aspects in Amsterdam named by visitors are, among others, the dense traffic, the prices and crowdedness.

	Negative aspect of Amsterdam	% of interviewees who identify this as a negative aspect
1	Dense traffic, bicycles	24%
2	Expensive	20%
3	Crowded, too many people	18%
4	The weather	15.3%
5	Filth	12%
6	Parking expensive, difficult	10%

TABLE 8 NEGATIVE ASPECTS OF AMSTERDAM ACCORDING TO THE VISITORS OF THE CITY

Source: Amsterdam Marketing (2016)

#### 5.2.2 Pressures facing the destination of Amsterdam according to inhabitants

In 2016, the municipality of Amsterdam conducted a survey among the inhabitants of the city on how they perceive the city. This survey, *Stand van de Balans*, was conducted in response to the ongoing political debate regarding the increasing number of visitors. In relation to tourism, different pressures were identified by the inhabitants. These pressures can be found in table 9 and include crowdedness, filth, noise and holiday rental.

	Pressure	Additional information
1	Crowdedness	Crowdedness is mainly experienced in the city centre of Am-
		sterdam: 47% of inhabitants living in this area consider the
		city centre as being too crowded. Besides that, 28% of all in-
		habitants living in Amsterdam say they are avoiding crowded
		areas.
2	Filth	'Filth' is especially named as an issue in the city centre and
		five other neighbourhoods.
3	Too much noise	'Too much noise' is especially named as an issue in the city
		centre and four other neighbourhoods.
4	Too much holiday rentals	This is an issue in the city centre. According to the report it re-
		duces the social cohesion in a neighbourhood.
5	Walking ways are too crowded	According to the inhabitants some walking ways are too
		crowded, which make them difficult to walk on.
6	Too many hotels	In the city centre, inhabitants are complaining about the high
		number of hotels.
7	Lack of diversity in shops	In the city centre, 43% of its inhabitants complain about the
		lack of diversity in shops. As an example, the rise in the num-
		ber of ice-shops is given.
8	Too many events	29% of the inhabitants argue that there are too many events
		being organized in the city centre.

TABLE 9 PRESSURES FACING AMSTERDAM ACCORDING TO THE INHABITANTS OF THE CITY

Source: Municipality of Amsterdam (2016)

#### 5.2.3 Conclusion from desk research

Based upon the findings from the desk research, the conclusion can be made that both inhabitants and visitors are facing some of the same pressures, such as crowdedness and filth. However, as inhabitants are more aware of changes in the city, they experience additional pressures which might not be visible to visitors who are in Amsterdam for a shorter period. It is also observed that many of the pressures are experienced in parts of the destination and not in the whole destination.

By matching the pressures with the set of issues identified by UNWTO, as can be found in Appendix 1, a first list of issues could be identified for Amsterdam. This list is shown in table 10. As some of the pressures could be linked to more than one issue, the interviews with stakeholders were needed to try and pinpoint the exact issues. The author decided to not include 'weather' in the managerial framework as, from a managerial perspective, it would be impossible to influence the weather.

	Mentioned pressure(s) in desk research	Related issue(s) according to UNWTO
1	Dense traffic, bicycles / pedestrians / Parking	- Tourism related transport
		- creating trip circuits and routes
2	Expensive	- Competitiveness of tourism business
3	Crowded, too many people / Locals are avoiding	- Access by local residents to key assets
	some crowded areas / Too many hotels in the	- Controlling use intensity
	city centre	- Local Satisfaction with tourism
		- Effects of tourism on communities
4	Filth	- Solid Waste Management
5	Noise	- Controlling Noise Levels
6	Too much holiday rental in neighbourhoods /	- Effects of tourism on communities
	Too many hotels in the city centre	
7	Lack of diversity in shops in the city centre	- Providing variety of experiences
8	Too many events are organized in the city centre	- Managing events

TABLE 10 ISSUES FACING AMSTERDAM ACCORDING TO THE DESK RESEARCH

## 5.3 Testing the developed process

After having identified the most pressing issues found during the desk research, interviews were conducted and a focus group session was organized. This was done to validate the process and match the results of these with the findings from the desk research. The results will be described for each of the six process steps.

#### 5.3.1 Step 1: Identify whether a destination has a tourism vision/master plan

Findings from the interviews with stakeholder groups were inconclusive regarding whether Amsterdam has a vision or master plan on tourism. Some of the interviewees (Naezer & Doorneveld, 2017) were highly convinced Amsterdam has a vision on tourism, others (Schrama, 2017; Oud, 2017; Ponti, 2017) were less convinced and some (Ploos van Amstel, 2017) were sure Amsterdam has no vision on tourism. The focus group session agreed with the notion that there is no vision or master plan.

#### **Discussion**

Different interviewees (Oud, 2017; Ploos van Amstel, 2017) argue that for some tourism elements a vision is in place, such as one for the hotel sector, but that questions can be asked whether a specific vision on tourism is necessary. They argue that Amsterdam should develop an integral vision. The idea of having an integral vision on the destination was also supported by the focus group.

The interviewees were also doubtful regarding the presence of a master plan. Ponti (2017) argues this is due to the lack of focus on the long term: *"The destination is experimenting with its tourism policy* [...] Amsterdam is still searching for solutions for problems we encounter right *now."*  Naezer & Doorneveld (2017) mentioned the 'Amsterdams Ondernemers Programma' as a master plan for the period 2015-2018. The tourism section of this program discusses that the spreading of visitors over a bigger part of the city and the region is necessary to cope with the ongoing growth in tourism and create the right balance between inhabitants, visitors and businesses (Municipality of Amsterdam, 2015).

#### Outcome of step 1

Based on the outcomes of the interviews with the stakeholder groups and the focus group session, it can be concluded that Amsterdam has no integral vision on tourism. And although there is no official master plan in place, the spreading of visitors over a bigger area of the city and the region can be seen as a means to limit crowdedness and to cope with dissatisfaction of the different groups using the city.

#### 5.3.2 Step 2: Identify specific issues in the destination

The interviewees were asked to identify issues facing Amsterdam from a sustainable development point of view, both spontaneously as well as by using the list with all UNWTO issues (see Appendix 3). Where interviewees first named pressures, they were later asked to identify the corresponding issues using the UNWTO list. Table 11 shows the ten most mentioned pressures and their corresponding issues. *Effects of tourism on host communities* was mentioned most often as being an issue for Amsterdam. Appendix 7 contains a list of all mentioned issues and the frequency each issue was mentioned.

	Mentioned pressure	Issue	Number of mentions
1	Crowdedness, Airbnb, changes in neighbour-	Effects of Tourism on Commu-	5
	hoods, safety, housing prices	nities	
2	Lack of acceptance of tourism, complaints	Local satisfaction with tourism	4
3	Inhabitants don't notice the economic benefits of	Community and destination	4
	tourism	economic benefits	
4	Garbage in the streets/smell	Solid Waste Management	3
5	People are sleeping less time due to noise at	Controlling Noise Levels	3
	nights		
6	Many events are organized in the city centre	Managing events	3
7	Many touring car busses in the old city centre,	Tourism related transport	3
	Many different transport modes in the city		
8	Hotel prices are increasing	Competiveness of tourism	2
		business	
9	Some areas are too crowded	Controlling use intensity	2
10	Lack of diversity in shops	Providing variety of experi-	2
		ences	

TABLE 11 TOP 10 ISSUES MENTIONED BY THE INTERVIEWEES

When linking the issues found during the interviews to the findings from the desk research as described in section 5.2, many issues could be matched with each other. The results of this can be found in table 12. The issues *Access from local residents to key assets* and *creating trip circuits and routes*, which were identified during the desk research as being potential issues facing the destination, were not mentioned by the interviewees. The other way around, *Community and destination economic benefits*, which according to the interviewees was an issue, could not be identified as an issue during the desk research.

	Issue	Issue according to desk research?	Type of sustainability
1	Effects of Tourism on Communities	Yes	Social
2	Local satisfaction with tourism	Yes	Social
3	Community and destination economic bene- fits	No	Economic
4	Solid Waste Management	Yes	Environmental
5	Controlling Noise Levels	Yes	Environmental
6	Managing events	Yes	Environmental
7	Tourism related transport	Yes	Economic
8	Competiveness of tourism business	Yes	Economic
9	Controlling use intensity	Yes	Environmental
10	Providing variety of experiences	Yes	Economic

TABLE 12 LINKING THE MENTIONED ISSUES DURING THE INTERVIEWS TO THE ISSUES FOUND DURING THE LITERATURE REVIEW

When asked to prioritize all the mentioned issues, two issues firmly stand out in importance for the interviewees. All interviewees considered *Effects of tourism on host communities* as belonging to the most important ones, *local satisfaction with tourism* became second with three mentions.

The focus group was asked to discuss the findings from the interviews to check whether the discussion would result in identifying the same top issues. Results showed that there were many questions regarding the top issues and what elements are part of each issue. Although the group were initially less sure about the top issues, during the following discussion many of the same underlying pressures were mentioned.

#### Outcome of step 2

The interviewees mentioned many issues which were also found during the desk research, thereby validating this step of the process. Although the focus group were initially less sure about the shown issues, the discussion that followed helped to identify many of the same underlying pressures.

The next step was to identify indicators to measure the different issues.

## 5.3.3 Step 3: Identify which indicators can be used to measure the issues/opportunities

As it proved to be time-consuming to identify indicators for each issue, the author decided to only focus on working out one issue. This is supported by the idea that Amsterdam is used in this master thesis as a test case to check whether the developed process could work. As the interviewees considered the issue *'Effects of tourism on host communities'* as being the most important issue facing Amsterdam, and this was supported by the findings from the desk research, the decision was made by the author to identify possible indicators for this specific issue.

Based on the indicators proposed by UNWTO to measure this issue, which can be found in Appendix 4, the interviewees named '*Number of tourists per day, week, etc; number per sq km*' and '*ratio of tourists to locals*' as being the most interesting ones. A list of all indicators mentioned by the interviewees can be found in table 13.

Deserves diadiastes hullINN/TO	
Proposed indicator by UNWIO	Number of mentions
Number of tourists per day, per week etc; number per sq km	3
Ratio of tourists to locals (average and peak day)	3
% locals participating in community events;	2
Ratio of tourists to locals at events or ceremonies	2
Perception of impact on the community using the resident questionnaire – with refer-	2
ence to specific events or ceremonies	
Existence of a community tourism plan;	1
Number of social services available to the community (% which are attributable to tour-	1
ism)	
% who believes that tourism has helped bring new services or infrastructure.	1
% of vernacular architecture preserved.	1
% of local community who agree that their local culture, its integrity and authenticity	1
are being retained.	

TABLE 13 INDICATORS MENTIONED BY THE INTERVIEWEES FOR THE ISSUE 'EFFECTS OF TOURISM ON HOST COMMUNITIES'

Some interviewees (Oud, 2017; Ploos van Amstel, 2017) argued that instead of measuring the number of visitors in an area, it could be more interesting to measure the number of persons in an area as both inhabitants and visitors make use of a destination.

The focus group members did not have additional comments on the selection of the indicators.

#### Outcome of step 3

As two indicators were considered as evenly important by the interviewees, the author decided to focus in the next steps on only one indicator, as the main goal is to validate the process. Based on the outcomes of the interviews, *'Number of tourists per day, week, etc; number per sq km'* was used. As this thesis focusses on (near) real-time measurement of a destination, the indicator was transformed by the author to the most generic version of *'Number of persons in a certain area'*.

#### 5.3.4 Step 4: Identify minimum acceptable conditions for each indicator

Knowledgeable parties were asked when they consider an area as having too many people, thereby trying to determine the upper limit of the indicator. Both Cramer (2017) and Daamen & Duives (2017) argue that signals should be used to determine this threshold and that 'Danger' or 'Safety' could be used to determine the upper threshold, whereby the police determines when this limit is reached. The use of signals was also mentioned during the interviews with tourism stakeholders. Both Ponti (2017) and Ploos van Amstel (2017) mentioned this idea. Ploos van Amstel (2017) argued that there should be a second upper threshold, which is lower than danger or safety, namely 'liveability', arguing that complaints from inhabitants should be used to determine this limit. Oud (2017) confirms this: *"In the end it's not about quantity, but quality [of the persons being in an area]. Crowdedness is a perception."* The focus group agreed with the two upper thresholds.

Determining the lower limit for the indicator proved to be more difficult for the knowledgeable parties as no one had any ideas. Therefor the focus group was asked to discuss this: this resulted in the group determining that 'Danger' or 'Safety' could also be used as a lower limit: if there are too less people in an area, this can cause a feeling of insecurity.

#### Outcome of step 4

Both the upper and lower acceptable limits of the indicator could be defined by using signals. The upper limit is determined by using two signals: liveability (complaints from inhabitants) and 'Danger/Safety' (Police input). As soon as one of these limits is reached, managerial actions are required. The lower limit is determined by 'Danger/Safety' (feeling of insecurity).

#### 5.3.5 Step 5: Identify possible managerial actions for each indicator

The interviewees argued there are different types of managerial actions possible to influence the number of persons in an area. However, the suggested actions differ per interviewee. Ploos van Amstel (2017) argues the selection of appropriate actions depends on two elements:

- The type of organization: a government has other tools to influence an indicator, such as introducing legislation and regulation, than a promotional organization which focusses on providing information and marketing;
- The types of decisions: there are long term decisions, strategic decisions, tactical decisions and operational decisions. Ploos van Amstel argues that especially operational decisions are quickly influencing indicators as these decisions are focussed on what is happening now.

Ponti (2017) on the other hand, suggests concrete actions: when the indicator is too high, crowd management techniques should be put in place such as providing persons with alternative

routes and when the indicator is too low, one should focus more on promoting this area. The idea of promoting areas is also supported by Naezer & Doorneveld (2017).

As each interviewee suggested different actions, the focus group was asked to discuss possible managerial actions for different tourism stakeholders in the destination: the promotional organization, the government and the sector. For the government, two actions were identified: (law) enforcement during crowded moments and changing routes for pedestrians, cyclists and cars. For the promotional organization, the group also identified two activities: providing information about crowded locations via its communication channels, at the same time suggesting alternative locations to visit. The tourism sector itself can change its prices or opening times to respond to peak-load periods or quieter periods, although the focus group was not sure whether the sector would be willing to do this.

#### Outcome of step 5

Although the interviewees provided suggestions for managerial actions, there was a lack of commonality between the answers. The focus group helped to create a common understanding of the problem and identify possible managerial actions.

	Limit is defined by	Managerial actions when limit is reached
Lower	Safety (feeling of insecurity	Promotional organization:
threshold	due to lack of people)	Marketing (trying to stimulate persons to visit the area)
		Government:
		No actions identified
		Tourism sector:
		Zoning (changes in pricing of sights and attractions; changes in
		opening times)
Upper	<u>Limit 1 – Liveability</u>	Promotional organization:
threshold	Complaints from	<ul> <li>Informing about the crowdedness in the area;</li> </ul>
	inhabitants	<ul> <li>Promoting other areas that are not crowded at that</li> </ul>
		moment.
	<u>Limit 2 – Safety</u>	
	Signal from police	<u>Government:</u>
		<ul> <li>Let pedestrians, cyclists and car use different routes,</li> </ul>
		thereby limiting the number of persons in an area;
		- (law) enforcement.
		Tourism sector:
		Zoning (changes in pricing of sights and attractions; changes in opening times)

Table 14 shows a summary of the suggested limits and managerial actions to be used in the measurement of this indicator.

TABLE 14 DEFINED LIMITS AND MANAGERIAL ACTIONS FOR MEASURING 'THE NUMBER OF PERSONS IN AN AREA' INDICATOR

#### 5.3.6 Step 6: Identify ways how each indicator can be measured in (near) real-time

Interviews with knowledgeable parties were used to identify ways to measure the number of persons in an area in (near) real-time. Daamen & Duives (2017) argue that this could be measured by using a system that combines different techniques, including Wi-Fi-sensors, GPS trackers and count camera's. This system was tested and validated during major events in Amsterdam (AMS Institute, 2015) in the last two years and is almost finished for adoption by the sector. Results show an accuracy of 98% to 99%. All collected data is centrally stored and presented in a dashboard for use by the police of Amsterdam. Although this data is collected during major events, the system is not yet permanently used in Amsterdam. Baron (2017) adds that a digital infrastructure should be put in place to realize this and that decisions should be made on how geographically specific one wants to measure the number of persons in Amsterdam.

The idea of combining count camera's, Wi-Fi-sensors and GPS trackers was presented to the focus group. The group concluded that not the same level of real-time detail is required for all parts of the destination. Especially in the more crowded areas, mostly the tourism hotspots, one wants to know this as specifically as possible, ideally at street level; in other areas, the group was satisfied with real-time information on neighbourhood level.

## 5.4 Conclusion

In general, the developed process worked well on the destination of Amsterdam: issues have been identified and for one indicator the acceptable limits and managerial actions have been established. It also proves to be possible to measure the number of persons in an area in realtime. Therefore, the process could be validated. However, to realize a working framework a digital infrastructure should be put in place. This infrastructure is not yet available.

Validation of the process also provided valuable feedback on the process itself, which can make the process more easily usable. These findings will now be discussed.

#### Interviews versus focus group

Both interviews and a focus group can be used to identify the issues facing a destination. The benefits of using a focus group are that it is less time consuming than conducting individual interviews and it stimulates discussion between the stakeholders, thereby creating a common understanding of the issues facing the destination. Therefore, the focus group would be the preferred option to use in the development of a managerial framework.

#### **Issues and opportunities**

Some of the interviewees mentioned that a destination cannot only face issues, but there are also opportunities which need to be identified, so that progress can be measured. The 'guidebook on the development of Sustainable indicators for tourism destinations' (UNWTO, 2004) focusses in contrary mainly on the identification of issues. By adding a process step which explicitly focusses on identifying the existence of a tourism vision/master plan, it was the idea that these opportunities would be identified. However, when there is no tourism vision or master plan in place, it will be necessary to modify this step, to make sure that opportunities will be identified as well.

#### Indicators for each of the sustainability categories

As the process focusses on identifying issues and opportunities, there is a possibility that the identified issues and opportunities not cover all three sustainability categories. From a sustainability point of view, it might be wise to monitor other aspects of the destination as well, even if these aspects are not yet seen as issues or opportunities. The 12 baseline issues defined by UNWTO, as described in table 3, can help to realize this. Although, these 12 issues do not have to be included in a final managerial framework, extra consideration should be given to them during the process.

# 6 CONCLUSION

First, the key-results of this master thesis will be described in section 6.1, by answering the research questions as introduced in chapter 1. Next, its contribution to knowledge will be discussed in section 6.2. The chapter concludes in section 6.3 with recommendations for future research.

## 6.1 Key results

## Sub question 1: How is usage measurement of a tourism destination achieved nowadays? What are existing solutions/approaches to usage measurement?

Different organizations are measuring elements of the performance of a destination. Most destinations have a (governmental) statistics office in place which collects data on different themes, including some data related to the topic of sustainability. Quite often data are collected by using surveys, which are then analysed. However, the collected data varies with every destination and is most often not collected in real-time, but on a monthly or annual basis. To address some of the challenges, the European Union is trying to harmonise some general tourism statistics on a national and regional level, but as the topic of sustainability is broader than these statistics, many differences still exist between destinations in the amount and type of data that is collected and the level of detail.

Besides the government, Destination Management Organizations also collect data, most often on the type of visitors coming to the destination and the activities they are doing. Again, a common issue is the lack of real-time data.

As the tourism sector consists of many different types of organizations, other organizations such as public transport companies, attractions and museums and knowledge institutions also collect data on topics which are relevant to them. However, most data available in a destination is often not shared with other parties, which in turn limits the dissemination of knowledge about the status of the destination. This could be solved by a destination to become a so-called *Smart Destination*. Smart Destinations have a digital infrastructure in place that not only collects data from different sources, it also analyses it and feeds it to the different users.

### Sub question 2: What are the main elements of a managerial framework to measure destination usage?

The main elements of a managerial framework to measure destination usage are:

- <u>A list with sustainability issues facing the destination</u> These issues are related to issues as defined in the "Guidebook on indicators of sustainable development for tourism destinations" (UNWTO, 2004);
- <u>Relevant indicators which measure the status of the issues</u>
   The selection of indicators is done using the "Guidebook on indicators of sustainable development for tourism destinations" (UNWTO, 2004) as well;
- A defined bandwidth in which the value of an indicator can change The bandwidth is defined by identification of the acceptable limits of an indicator;
- A defined set of managerial actions which are put in place when an indicator reaches a limit Appropriate managerial actions should be selected for the government, the DMO and the sector;
- A solution on how an indicator could be measured in (near) real-time
   By conducting interviews with knowledgeable parties, methods can be identified which are able to measure the specific indicator in (near) real-time.

The selection of the five elements was based upon the literature review (Chapter 2), which showed that by combining different key concepts, a process could be developed that leads to the creation of a managerial framework. This framework is then able to provide a (near) real-time overview of the usage of the destination.

#### Sub question 3: How can the developed process be applied in Amsterdam?

The developed process was tested in Amsterdam by first conducting desk research on the issues facing the city (Section 5.2). These findings were used as an input to validate the developed process. Interviews with tourism stakeholder groups and the organization of focus group session resulted in the identification of issues (Section 5.3.2), after which for one of the issues -as a proof of concept- indicators were selected (Section 5.3.3). This was followed by defining acceptable limits for the indicator (Section 5.3.4) and the selection of appropriate managerial actions (Section 5.3.5). Interviews with knowledgeable parties helped to define ways how one indicator could be measured in (near) real-time (Section 5.3.6). All elements for the managerial framework for Amsterdam can be found in chapter 5.

By applying the developed process in Amsterdam, it was possible to validate the process. Lessons learned during the process, were implemented into the final version of the process. This final version can be found in Appendix 13.

# Main question: In what way can (near) real-time usage of a tourism destination be measured for managerial purposes?

Based upon validating the developed process in Amsterdam and addressing the lessons learned from the test, an improved version of the process could be developed. This process can be used to (1) identify ways how sustainability issues can be measured in a destination, (2) comes up with managerial actions which will we be implemented when the limit of an indicator is reached and (3) defines ways how each indicator needs to be measured in (near) real-time. The process consists of six steps and the final version can be found in Appendix 13.

## 6.2 Contribution to knowledge

This master thesis contributed in different ways to expending current knowledge on the topic of measuring (near) real-time destination usage. These main contributions are the following.

#### A new and powerful process for measuring (near) real-time destination usage

This master thesis developed a process which can be used in each destination to measure the sustainable development of the destination in (near) real-time and take corrective action when needed. It thereby builds upon previous work from the UNWTO and the LAC-model, but also tried to show how the concept of *Smart Destinations* could be used in practise. By combining the different concepts, it created a new innovative way for measuring (near) real-time destination usage. For a sector which is not being known as a sector of innovation, this is helpful.

Although the architecture for a *Smart Destination* has been outlined in this master thesis, the actual implementation of this managerial framework requires significant financial investments as a digital infrastructure should be put in place. In times of budget constraints, destinations with smaller budgets are probably not the early adopters of such a system. Bigger destinations, especially destinations facing (intense) political discussions about tourism, will probably need to take the lead in the implementation process.

# Defining the elements of a managerial framework for measuring (near) real-time destination usage

By defining the five main elements of which a managerial framework for measuring (near) realtime destination usage consists, this helps destination managers to get a better idea of how a managerial framework could like. This in turn stimulates the adaption process.

#### A managerial framework for Amsterdam

For Amsterdam, the master thesis provided valuable insights in the sustainable issues of the destination and thereby created a more common understanding among stakeholders of the problems facing the destination.

As a destination is made up by many different stakeholder groups, it became clear that a DMO or government cannot alone realise a sustainable destination. All stakeholders should cooperate to realize this and a common understanding of the problems facing a destination is therefore essential. Cross-sector collaboration should be promoted within the destination as it feeds new ideas and solutions for measuring destination usage and managerial actions into the tourism sector, thereby stimulating innovation.

## 6.3 Future research

Different areas for future research can be identified to make real-time destination usage measurement more powerful and easy to use. These include the development of an easy to use digital infrastructure, predictive analytics in order to determine future states of indicators and updating the UNWTO guidebook on sustainable indicators for sustainable destinations.

#### Development of an easy to use smart digital infrastructure

The development of the managerial framework has been a theoretical exercise. No working framework has been built which collects, analyses and presents the data. It would be most help-ful to develop a cost-effective digital architecture that is able to collect, analyse and present different types of data from different sources in a dashboard, is scalable upon the needs from the stakeholders and is easy to use. This smart system could then be used by the destination.

#### Predictive analytics in order to determine future states of indicators

As it is already a challenge to monitor the usage of a destination in real-time, the more a challenge it will be to try and predict future situations. Predictive analytics should however be the end goal, as a destination should be able to take proactive actions which help to prevent issues to arise in the first place.

#### Update the UNWTO guidebook on sustainable indicators for sustainable destinations

Lastly, the UNWTO *Guidebook on sustainable indicators for sustainable destinations* proved to be a very important source of information for this master thesis. As the book was written in 2004, some questions can be asked whether all the proposed indicators can be adopted in a real-time measurement model. Although the UNWTO has no plans to bring out new updates of the guidebook, it would be very beneficial to the sector if this does happen.

# 7 **BIBLIOGRAPHY**

- Ahas, R., Saluveer, E., Tiru, M., & Silm, S. (2008). Mobile Positioning Based Tourism Monitoring System: Positium Barometer. *Information and Communication Technologies in Tourism* 2008 (pp. 475-485). Vienna: Springer Vienna.
- AIG. (2016, August 1). The Internet of Things: Benefits and Risks. Retrieved from AIG.com: https://www.aig.com/knowledge-and-insights/the-rise-ramifications-and-risks-of-theinternet-of-things
- AMS Institute. (2015, July 7). *Crowd Management at SAIL*. Retrieved from Ams-institute.org: http://www.ams-institute.org/news/crowd-management-at-sail/
- Amsterdam Marketing. (2016, July). *BOMA*. Retrieved April 23, 2017, from iamsterdam.com: http://www.iamsterdam.com/en/amsterdammarketing/dienstverlening/research/boma
- Amsterdam Marketing. (2017). *SMART Update Amsterdam*. Amsterdam: Amsterdam Marketing.
- Baron, G. (2017, May 9). Interview with the Chief Technology Officer of Amsterdam. (B. Bokdam, Interviewer)
- Brussels Institute for Statistics and Analysis. (2016). *Themes*. Retrieved from Brussels Institute of Statistics and Analysis: http://statistics.brussels/themes?set\_language=en#.WChSxIVFw2w
- Buhalis, D., & Amaranggana, A. (2014). Smart Tourism Destinations. Information and Communication Technologies in Tourism 2014 (pp. 553-564). Dublin: Springer International Publishing.
- Buhalis, D., & Amaranggana, A. (2015). *Smart Tourism Destinations: Enhancing Tourism Experience Through Personalisation of Services.* Heidelberg: Springer.
- Citylab. (2016, April 28). *Berlin Is Banning Most Vacation Apartment Rentals*. Retrieved from Citylab: http://www.citylab.com/housing/2016/04/airbnb-rentals-berlin-vacationapartment-law/480381/
- CNN. (2017, January 30). *Barcelona trying to tame tourism crunch*. Retrieved from CNN.com: http://money.cnn.com/2017/01/27/news/barcelona-spain-tourism-hotels-airbnb/
- Cohen, D., & Crabtree, B. (2006, July). *Semi-structured Interviews*. Retrieved from Qualitative Research Guidelines Project: http://www.qualres.org/HomeSemi-3629.html

- Cole, D. N., & Stankey, G. H. (1997). Historical Development of Limits of Acceptable Change: Conceptual Clarifications and Possible Extensions. *Proceedings—Limits of Acceptable Change and Related Planning Processes: Progress and Future Directions*, 84.
- Cooper, C., Fletcher, J., Fyall, A., Gilbert, D., & Wanhill, S. (2005). *Tourism Principle and Practise*. Harlow: Pearson Education Limited.
- Cramer, M. (2017, April 20). Interview with Startup in Residence. (B. Bokdam, Interviewer)
- Daamen, W., & Duives, D. (2017, April 26). Interview with Technical University Delft. (B. Bokdam, Interviewer)
- Department for Research, Information and Statistics. (2016). Onderzoek, Informatie en Statistiek. Retrieved from Gemeente Amsterdam: http://www.ois.amsterdam.nl/english/#
- Dupeyras, A., & MacCallum, N. (2013). *Indicators for Measuring Competitiveness in Tourism: a guidance document*. OECD Tourism Papers: OECD Publishing.

 European Cities Marketing. (2016, March 7). European cities continued to attract growing numbers of tourists despite a troubled year in Europe: bednights up 4.2% in 2015.
 Retrieved from European Cities Marketing: http://www.europeancitiesmarketing.com/european-cities-continued-to-attractgrowing-numbers-of-tourists-despite-a-troubled-year-in-europe-bednights-up-4-2-in-2015/

- European Commission. (2016, June 29). *REPORT FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT AND THE COUNCIL on the implementation of Regulation (EU) No 692/2011 of the European Parliament and of the Council concerning European statistics on tourism*. Retrieved from EUR-lex: http://eur-lex.europa.eu/legalcontent/en/TXT/?uri=CELEX:52016DC0489
- European Tourism Futures Institute. (2016, September 25). *Visitor pressure in Cities Europe*. Retrieved from European Tourism Futures Institute: http://www.etfi.eu/blog/2015/09/297248-visitor-pressure-in-cities-europe
- European Union. (2011). Regulation (EU) No 692/2011 of the European Parliament and of the Council of 6 July 2011 concerning European statistics on tourism and repealing Council Directive 95/57/EC. Official Journal of the European Union, 17-32.
- Gretzel, U., Sigala, M., Xiang, Z., & Koo, C. (2015, September). Smart tourism: foundations and developments. *Electronic Markets*, pp. 179-188.

- Gu, Y., Liu, H., & Chai, Y. (2014). The embedding convergence of Smart Cities and Tourism Internet of Things in China: an advance perspective. *Advances in Hospitality and Tourism Research*, 54-69.
- Hashem, I., Yaqoob, I., Anuar, N., Mokhtar, S., Gani, A., & Khan, S. (2014). The rise of "Big Data" on cloud computing: Review and open research issues. *Information Systems*, 98-115.
- Hell, M., & Los, E. (2011). *Amsterdam voor vijf duiten per dag.* Amsterdam: Athenaeum-Polak & Van Gennep.
- Het Parool. (2014, May 31). Wonen hier echt mensen? Het Parool, p. PS4.
- Het Parool. (2015, June 2). *De dag dat de drukte in Amsterdam een probleem werd*. Retrieved from Het Parool: http://www.parool.nl/parool/nl/4/AMSTERDAM/article/detail/4049447/2015/06/02/ De-dag-dat-de-drukte-in-Amsterdam-een-probleem-werd.dhtml
- IBM. (2016, December 27). *The Four V's of Big Data*. Retrieved from IBM Big Data & Analytics Hub: http://www.ibmbigdatahub.com/infographic/four-vs-big-data
- Jovicic, D., & Dragin, A. (2008). The Assessment of Carrying Capacity A Crucial Tool for Managing Tourism Effects in Tourist Destinations. *Turizam*, 4-11.
- Khan, G. (2017). Social Media for Government: a practical guide to understanding, implementing and managing social media tools in the public sphere. Singapore: Springer Nature.
- Koczanski, A. (2014). Open Government Data: Applications for Sustainability. Vienna.
- Kopetz, H. (2011). Internet of Things. In H. Kopetz, *Real-time systems* (pp. 307-323). Vienna: Springer US.
- Krisp, J. (2013). Progress in Location-Based Services. Munich: Springer.
- Lamsfus, C., & Alzua-Sorzabal, A. (2013). Theoretical Framework for a Tourism Internet of Things: Smart Destinations. *tourGUNE Journal of Tourism and Human Mobility*, 15-21.
- Lamsfus, C., Martín, D., Alzua-Sorzabal, A., & Torres-Manzanera, E. (2014). Smart Tourism
   Destinations: An Extended Conception of Smart Cities Focusing on Human Mobility.
   *Information and Communication Technologies in Tourism 2015* (pp. 363-475). Lugano:
   Springer International Publishing.

- Lopez de Avila, A. (2015, February 4-6). Smart Destinations: XXI Century Tourism. ENTER2015 Conference on Information and Communication Technologies in Tourism. Lugano, Switzerland.
- Mayring, P. (2000). Qualitative Content Analysis. *Forum Qualitative Sozialforschung / Forum: Qualitative Social Research*, 28 paragraphs.
- Microsoft. (2015, November 15). *Transforming the Visitor Experience in the World's Leading Smart City*. Retrieved from Microsoft.com: https://www.microsoft.com/enus/citynext/blogs/transforming-the-visitor-experience-in-the-world-s-leading-smartcity/default.aspx
- Municipality of Amsterdam. (2012). *Drukte in de binnenstad 2012*. Amsterdam: Municipality of Amsterdam.
- Municipality of Amsterdam. (2015). *Amsterdams Ondernemers Programma 2015-2018.* Amsterdam: Municipality of Amsterdam.
- Municipality of Amsterdam. (2015b). *Amsterdam in cijfers, Jaarboek 2015.* Amsterdam: OIS Amsterdam.
- Municipality of Amsterdam. (2016). *Stand van de Balans.* Amsterdam: Municipality of Amsterdam.
- Naezer, C., & Doorneveld, A. (2017, March 29). Interview with the Municipality of Amsterdam. (B. Bokdam, Interviewer)
- Nasha, Z., & Xilai, Z. (2013). Conceptual Framework of Tourism Carrying Capacity for a Tourism City: Experiences from National Parks in the United States. *Chinese Journal of Population Resources and Environment*, 88-92.
- New York Times. (2013, February 1). *The Origins of 'Big Data': An Etymological Detective Story*. Retrieved from New York Times: http://bits.blogs.nytimes.com/2013/02/01/theorigins-of-big-data-an-etymological-detective-story/
- Oud, E. (2017, March 31). Interview with the COO of Amsterdam Marketing. (B. Bokdam, Interviewer)
- Ploos van Amstel, W. (2017, April 20). Interview with Walther Ploos van Amstel. (B. Bokdam, Interviewer)
- Ponti, O. (2016, November 22). An introduction in measuring visitors in Amsterdam. (B. Bokdam, Interviewer)

Ponti, O. (2017, March 31). Interview with Olivier Ponti. (B. Bokdam, Interviewer)

- Resch, B. (2013). People as Sensors and Collective Sensing-Contextual Observations Complementing Geo-Sensor Network Measurements. In J. Krisp, *Progress in Location-Based Services* (pp. 391-406). Berlin: Springer Berlin Heidelberg.
- Saveriades, A. (2000). Establishing the social tourism carrying capacity for the tourist resorts of the east coast of the Republic of Cyprus. *Tourism Management*, 147-156.
- SFG Network. (2016, August 19). The importance of real-time data . Retrieved from SFG Network: https://www.sfgnetwork.com/blog/data-services/the-importance-of-realtime-data/
- Sik-Lányi, C., Hoogerwerf, E.-J., Miesenberger, K., & Cudd, P. (2015). *Assistive Technology: Building Bridges.* Amsterdam: IOS Press.
- Stankey, G. H., Cole, D. N., Lucas, R. C., Petersen, M. E., & Frissell, S. S. (1985). The Limits of Acceptable Change (LAC) System for Wilderness Planning . Ogden, Utah: U.S. Department of Agriculture, Forest Service.
- Statistics Netherlands. (2016a, November 8). Hotels; guests, overnight stays, country of residence, region. Retrieved from CBS Statline: http://statline.cbs.nl/Statweb/publication/?DM=SLEN&PA=82061eng&D1=a&D2=0-2,5,13-14,19,37,42&D3=23&D4=I&LA=EN&HDR=G3,G2&STB=T,G1&VW=T
- Tu, Q., & Liu, A. (2014). Framework of Smart Tourism Research and Related Progress in China. International Conference on Management and Engineering, 140-146.
- University of the Aegean. (2001). *Defining, measuring and evluating carrying capacity in European tourism destinations.* Athens: University of the Aegean.
- UNWTO. (2004). *Guidebook on indicators of sustainable development for tourism destinations.* Madrid: UNWTO.
- UNWTO. (2007). Sustainable Tourism Indicators and Destination Management National Workshop - Tagbilaran City Bohol Philippines - Final Report. Tagbilaran City, Bohol, Philippines: UNWTO.
- UNWTO. (2011, October 11). *International tourists to hit 1.8 billion by 2030*. Retrieved from UNWTO.org: http://media.unwto.org/en/press-release/2011-10-11/international-tourists-hit-18-billion-2030
- UNWTO. (2017, March 26). *Definition | Sustainable tourism*. Retrieved from UNWTO.org: http://sdt.unwto.org/content/about-us-5

- UNWTO/UNEP. (2005). *Making Tourism more sustainable A guide for policy makers*. Madrid and Paris: UNWTO/UNEP.
- Villatoro, D., & Nin, J. (2013). Citizens Sensor Networks. Barcelona: Springer Berlin Heidelberg.
- von der Dunk, T. (2016, February 25). *De angst dat Amsterdam het nieuwe Venetië wordt, is terecht*. Retrieved from De Volkskrant: http://www.volkskrant.nl/opinie/de-angst-datamsterdam-het-nieuwe-venetie-wordt-is-terecht~a4125475/
- Weaver, D. (2006). *Sustainable Tourism: Theory and Practice*. Oxford: Elsevier Butterworth-Heinemann.
- World Tourism & Travel Council. (2017). *Travel & Tourism Global Economic Impact & Issues* 2017. London: World Tourism & Travel Council.
- Xia, F., Yang, L. T., Wang, L., & Vinel, A. (2012). Internet of things. *International Journal of Communication Systems*, 25-34.

# **APPENDICES**

# **APPENDIX 1: POSSIBLE ISSUES FACING A DESTINATION**

Source: UNWTO (2004)

Although the table is derived from the UNWTO guidebook on sustainable indicators for sustainable destinations, the 'classification' column is a result of the work of the author.

#	Issue	Baseline issue?	Classification	Issue is covering
1	Local satisfaction with tour- ism	YES	SOCIAL	Attitudes, Dissatisfaction, Commu- nity Reaction
2	Effects of Tourism on Commu- nities	YES	SOCIAL	Community Attitudes, Social Bene- fits, Changes in Lifestyles, Housing, Demographics
3	Access by Local Residents to Key Assets	NO	SOCIAL	Access to Important Sites, Eco- nomic Barriers, Satisfaction with Access Levels
4	Gender Equity	NO	SOCIAL	Family Wellbeing, Equal Opportu- nities in Employment, Traditional Gender Roles, Access to Land and Credit
5	Sex tourism	NO	SOCIAL	Child Sex Tourism, Education, Pre- vention Strategies, Control Strate- gies
6	Conserving built heritage	NO	SOCIAL	Cultural Sites, Monuments, Dam- age, Maintenance, Designation, Preservation
7	Community involvement and awareness	NO	SOCIAL	Information, Empowerment, Par- ticipation, Community action
8	Sustaining tourist satisfaction	YES	SOCIAL, ECONOMICAL, ENVIRONMENTAL	Expectations, Complaints, Prob- lems, Perceptions
9	Accessibility	NO	SOCIAL	Mobility, Older Tourists, Persons with Disabilities
10	Health	NO	SOCIAL	Public Health, Community Health, Food Safety, Worker Health and Safety
11	Coping with epidemics and in- ternational transmission of disease	NO	SOCIAL	Risk, Safety, Civil Strife, Terrorism, Natural Disasters, Impacts, Man- agement Response, Contingency Planning, Facilitation
12	Tourist security	NO	SOCIAL	Risk, Safety, Civil Strife, Terrorism, Natural Disasters, Impacts, Man- agement Response, Contingency Planning, Facilitation
13	Local Public Safety	NO	SOCIAL	Crime, Risk, Harassment, Public Se- curity, Tourist Anxiety
14	Tourism seasonality	YES	ECONOMIC	Occupancy, Peak Season, Shoulder Season, Infrastructure, Product Diversity, Employment
15	Leakages	NO	ECONOMIC	Imported Goods, Foreign Ex- change, Internal Leakage, External Leakage, Invisible Leakage

16	Employment	NO	ECONOMIC	Training, Quality, Skills, Turnover, Seasonality, Pay Levels
17	Tourism as a contributor to nature conservation	NO	ECONOMIC	Financing for Conservation, Local Economic Alternatives, Constitu- ency Building, Tourist Participation in
- 10		VEC	FCONOMIC	Conservation
18	community and destination economic benefits	YES	ECONOMIC	Capturing Benefits, Tourism Reve- nues, Tourism Contribution to the Local Economy, Business Investment, Community Investment, Taxes, Satellite Account
19	Tourism and Poverty Allevia- tion	NO	ECONOMIC	Equity, Micro Enterprises, Employ- ment and Income Opportunities, SMEs
20	Competiveness of tourism business	NO	ECONOMIC	Price and Value, Quality, Differen- tiation, Specialization, Vitality, Business Cooperation, Long-term Profitabil- ity
21	Protecting critical ecosystems	NO	ENVIRONMENTAL	Fragile Sites, Endangered Species
22	Sea Water Quality	NO	ENVIRONMENTAL	Contamination, Perception of Wa- ter Quality
23	Energy Management	YES	ENVIRONMENTAL	Energy Saving, Efficiency, Renewa- bles
24	Climate Change and Tourism	NO	ENVIRONMENTAL	Mitigation, Adaptation, Extreme Climatic Events, Risks, Impacts on Destinations, Greenhouse Gas Emissions, Transport, Energy Use
25	Water Availability and Conser- vation	YES	ENVIRONMENTAL	Water Supply, Water Pricing, Recy- cling, Shortages
26	Drinking water quality	YES	ENVIRONMENTAL	Purity of Supply, Contamination Impact on Tourist Health and Des- tination Image
27	Sewage Treatment	YES	ENVIRONMENTAL	Wastewater Management, Extent of System, Effectiveness, Reducing Contamination
28	Solid Waste Management	YES	ENVIRONMENTAL	Garbage, Reduction, Reuse, Recy- cling, Deposit, Collection, Hazard- ous Substances
29	Air pollution	NO	ENVIRONMENTAL	Air Quality, Health, Pollution from Tourism, Perception by Tourists
30	Controlling Noise Levels	NO	ENVIRONMENTAL	Measuring Noise Levels, Percep- tion of Noise
31	Managing Visual Impacts of Tourism Facilities and Infra- structure	NO	ENVIRONMENTAL	Siting, Construction, Design, Land- scaping
32	Controlling use intensity	YES	ENVIRONMENTAL	Stress on Sites and Systems, Tour- ist Numbers, Crowding
33	Managing events	NO	ENVIRONMENTAL	Sport Events, Fairs, Festivities, Crowd Control
34	Integration of Tourism Into Local/Regional Planning	NO	PLANNING	Information for Planners, Plan Evaluation, Results of Plan Imple- mentation
35	Development control	YES	PLANNING	Control Procedures, Land Use, Property Management, Enforce- ment

36	Tourism related transport	NO	ENVIRONMENTAL	Mobility Patterns, Safety,
				Transport Systems, Efficiency, In-
				Destination
				Transport, Transport to/from Des-
				tination
37	Air transport - responding to	NO	ENVIRONMENTAL	Environmental Impacts, Planning
	changes in patterns and ac-			and Security
	cess			
38	Creating trip circuits and	NO	ENVIRONMENTAL, ECO-	Corridors, Links, Cooperation
	routes		NOMICAL, SOCIAL	
39	Providing variety of experi-	NO	ENVIRONMENTAL	Product Diversification, Range of
	ences			Services
40	Marketing for sustainable	NO	MARKETING	Green" Marketing, Products and
	tourism			Experiences Emphasizing Sustaina-
				bility,
				Market Penetration, Tourist Re-
				sponse, Marketing Effectiveness
41	Protection of the Image of a	NO	MARKETING	Branding, Vision, Strategic Market-
	Destination			ing
42	Sustainability and Environ-	NO	ENVIRONMENTAL, SO-	Environmental Management, So-
	mental Management Policies		CIAL	cial Responsibility
	and Practices			
	at Tourism Businesses			

## APPENDIX 2: INTERVIEW QUESTIONS AND CODE BOOK FOR INTER-

## VIEWS WITH TOURISM STAKEHOLDERS

Introduction by the interviewer, which include:

- Goal of this interview
- Structure of the interview; topics to discuss
- Length of this interview
- Explaining that for the purpose of the analysis the interview will be recorded;

#1			
Goal	Determining the vision of the tourism destination. This could have consequences on which sustainable indicators need to be measured		
Question	Do you know whether the destination Amsterdam has a vision on tourism? If so, could you tell me what this vision is about?		
Possible answers			
1A: YES	High conviction that there is a vision and what it is about	Yes, and this is the vision: ""	
1B: YES, but	Moderate conviction that there is a vi- sion, but can't detail the contents or isn't sure that what the person explains is in- deed the vision	Yes, but I don't the know the content of the vi- sion.	
1C: NO	High conviction that there is no vision	There is no vision	
1D: DON'T KNOW	Doesn't know whether a vision is in place	I don't know whether there is a vision	

#2			
Goal	Determining whether a tourism master plan is in place in Amsterdam (which gives direction		
	to the development of the destination)		
Question	Do you know whether a tourism master plan in place? If so, what are according to you the		
	main aspects of this master plan?		
Possible answers			
2A: YES	High conviction that there is a master	Yes, and these are the main aspects: ""	
	plan and what it is about		
2B:	Moderate conviction that there is a mas-	Yes, but I don't the know the content of the	
YES, but	ter plan, but can't detail the contents or	master plan.	
	isn't sure that what the person explains is		
	indeed the master plan		
2C: NO	High conviction that there is no master	There is no master plan	
	plan		
2D:	Doesn't know whether a master plan is in	I don't know whether there is a master plan	
DON'T KNOW	place		

#### Topic: Creating the right understanding about the topic of sustainable tourism

#3			
Goal	Determining the expertise of the interviewee on the topic of sustainable tourism		
Question	Currently tourism is a hot topic in Amsterdam, sometimes it is argued that Amsterdam is not sus- tainable destination anymore. What are according to you the characteristics of a sustainable des- tination?		
Possible answers			
3A: UN- WTO defi- nition	An answer that mentions one or more of the sustainable tourism characteristics of a destina- tion: economic, social and environmental sus- tainability. Linked to target groups	As a destination where attention is given to economic, social and environmental sustaina- bility for each group making use of the destina- tion	
3B: Target groups	An answer that mentions the different target groups of a destination	A sustainable destination is a destination that keeps the right balance between the needs of the visitors, inhabitants and business	
----------------------	--	---	--
3C: Other	The interviewee has an answer, but the answer doesn't fit in the first two categories.	As a destination that has the following charac- teristics: [list of characteristics]	
3D: Don't know	The interviewee doesn't know the answer	I don't know	

This is followed by an explanatory text by the researcher in order to create the same understanding of the topic with all the interviewees, for the 2<sup>nd</sup> part of the interview:

UNWTO describes sustainable tourism as the following: 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.

Topic: Zooming in on the issues facing the destination of Amsterdam

#4				
Goal(s)	Determining the issues facing the destination [issues that pop up in the mind of the interviewee] and what the impact/pressure is on the sustainability of the destination (in order to understand the specific aspects of the issue) Validate the issues found during the desk research			
Question	Having read the UNWTO definition of sustainable tourism, what are according to you the issues facing the city of Amsterdam? <i>Per issue:</i> Could you give an example of how this issue can be experienced in Amsterdam?			
Possible answ	Possible answers			
4A: List of issues	The interviewee mentions issues which are also identified by UNWTO in its guidebook. Classifi- cation of the mentioned issues will be done by using the UNTWO guidebook	The impact of tourism on the host community is significant [UNWTO list: impact on host com- munities]: inhabitants are starting to migrate out of the city centre due to a lack of social co- hesion in the neighbourhoods [example of a pressure].		
4B:	The interviewee mentions issues which are not identified by UNWTO, but can be considered as sustainable tourism issues.	An answer that can't be categorised with the help of the UNWTO guidebook listing.		
4C: Don't know	The interviewee can't mention any issues	I don't know		

#5					
Goal(s)	Determine which other issues are present in Amsterdam, based on the UNWTO guidebook				
	listing;				
	Validate the issues found during the desk resea	rch			
Question	The UNWTO compiled a list of sustainable issue	es a destination could face. Could you identify			
	from this list [which will be shown] the issues that are according to you are relevant for Am-				
	sterdam?				
Possible answers					
5A: Identifies	The interviewee only identifies issues from These are the issues that are relevant				
issues	the list shown to the interviewee sterdam				
5B: new issues	The interviewee identifies some issues on the	This list is not complete. I would suggest add-			
	list, but also introduces new issues which ing the following issue to it: [issue]				
aren't mentioned in the list					
5C: no identifi-	The interviewee doesn't identify an issue I don't think any of these issues are relevant				
cation	which is relevant for Amsterdam for Amsterdam				
5D: don't know	The interviewee can't identify any issues	I don't know			

#6	

Goal(s)	Based on the identified issues, determine which ones are most important Validate the most pressing issues				
Question	Of the identified sustainable issues, which are according to you the most important issues facing Amsterdam?				
Possible answers					
6A: Order	The interviewee orders the identified issues The interviewee orders the mentioned issues				
	from most important to least important from most important to least important				
6B: No or-	The interviewee considers all identified issues <i>I can't choose. They are all even important</i>				
der	as even important				

#### **Topic: Determining indicators**

Explanatory text: As we now have identified the most pressing issues facing the destination of Amsterdam, the next task is to identify ways how these issues could be measures by using indicators.

I would like to explore with you in which some of these issues can be measured best. As it would require quite some time to explore all issues in more detail, I'd like to focus on the most pressing issue according to the reports: the effects of tourism on host communities.

#/				
Goal(s)	Identify ways how the identified issues could be measured (indicators).			
	Validate the indicators			
	Determine which of the proposed indicators wou	uld make most sense to measure the issue		
Question	he UNWTO proposes different indicators that ca	n be used in order to measure Effects of tourism		
	on host communities. [shows list of possible indic	cators]. According to you, what indicator or indi-		
	cators makes most sense to use in Amsterdam in	order to measure this issue? And why?		
Possible answe	ers			
7A: Sugges-	The interviewee suggests one or more indica-	I would use the following indicator: [indicator]		
tion	tors from the list provided by UNWTO			
7B: New ad-	The interviewee suggests one or more indica-	I would propose to use another indicator and		
ditions	tors that are not proposed by UNWTO that is the following: [indicator]			
7C: Don't	The interviewee can't choose an indicator or <i>I don't know; I can't choose.</i>			
know	doesn't know			

#8					
Goal	Identify managerial actions when the limits are reached				
Question	If the value of the proposed indicator for <i>Effects of tourism on host communities</i> changes a lot, what managerial action should be taken by tourism managers in order to bring the indicator back within an acceptable range?				
Possible answers					
8A: Convinced Suggested ac- tions	The interviewee is convinced that specific managerial actions need to be taken for both the minimum and maximum thresholds.	I would definitely suggest the following ac- tions: [actions]			
8B: Suggested actions, but not sure	The interviewee sounds less convinced, but still suggests actions	It is not in my field of expertise, but I could im- agine that the following actions should be taken: [actions]			
8C: don't know	The interviewee doesn't know to name any suggested actions	I don't know			

#9	
Goal	Identify whether data is available and who has data available to measure this. The goal would
	be to talk to this persons about the possibilities of the (near) real-time aspect of it.

Question	In order to use this indicator, it is necessary to have data available which measures this indi- cator. Do you know whether this data is already available and which organizations are collect- ing this data?				
Possible answers					
9A: Available + Organizations	The interviewee has a high conviction that both the data is available and which organi- zations are measuring thisYes, this data is collected by [organiza- tion/person]				
9B: Available OR organizations	This interviewee isn't sure whether the data is available, but would suggest talking to other organizations;	I'm not sure whether this is already being measured, but [organization/person] might know more.			
	The interview is sure that the data is availa- ble, but isn't sure who collects this data	I would suggest you to talk to [organiza- tion/person] in order to know more about this.			
9C: don't know	The interviewee doesn't know whether the data is available and which organizations can help	I don't know. I can't help you with that			

#10					
Goal	Identify other parties that need to be talked to (snowball approach)				
Question	I have spoken today to you, but you might have suggestions for me to talk to other persons/or- ganizations as well, regarding the measuring of sustainable tourism or the (near) real-time moni- toring. Are there any people or organizations you would recommend me to talk to?				
Possible answers					
10A: Yes	The interviewee suggests persons and/or or- ganizationsYes, [mentions persons/organizations]				
10B: No	The interviewee hasn't any suggestions No				

#11				
Goal	Determine whether the interviewee has any other things which he/she wants to mention, but ha- ven't yet been covered			
Question	The final question of the interview. Are there any topics which we haven't covered but you want to share with me?			
Possible answ	Possible answers			
11A: Yes	The interviewee shares extra information Yes, [makes some extra comments]			
11B: No	The interviewee has the feeling that all topics have been covered	No		

Thanks for your cooperation.

### **APPENDIX 3: LIST WITH ISSUES SHOWN DURING THE INTERVIEWS**

The following list with the UWNTO issues was shown to the interviewees. This list is written in Dutch.

- 1 Lokale satisfactie met toerisme
- 2 Effecten van toerisme op gemeenschappen
- 3 Toegang van bewoners tot belangrijke plekken
- 4 Gelijkheid tussen geslacht
- 5 Sekstoerisme
- 6 Het bewaren van erfgoed (gebouwen, monumenten)
- 7 Betrokkenheid en awareness van de gemeenschap
- 8 Het behouden van tevredenheid van bezoekers
- 9 Toegankelijkheid (mindervaliden, oudere personen)
- 10 Gezondheid
- 11 Het omgaan met epidemieën en het overdragen van (internationale) ziekten
- 12 Veiligheid van bezoekers
- 13 Lokale openbare veiligheid
- 14 Seizoen patronen in toerisme
- 15 Weglekken (leakages) van geld
- 16 Werkgelegenheid (binnen het toerisme)
- 17 De bijdrage van toerisme aan de bescherming van natuur
- 18 Economische voordelen voor de gemeenschap en de destinatie
- 19 Toerisme en de vermindering van armoede
- 20 Concurrentiekracht van toeristische bedrijven
- 21 De bescherming van kritische ecosystemen
- 22 Zeewater kwaliteit
- 23 Energiemanagement
- 24 Klimaatverandering en toerisme
- 25 De beschikbaarheid en behoud van water
- 26 Drinkwater kwaliteit
- 27 Afhandeling van riolering
- 28 Management van vast afval
- 29 Luchtvervuiling
- 30 Geluidsniveau controleren
- 31 Managen van hoe toeristische faciliteiten en infrastructuur eruitziet
- 32 Controleren van de gebruiksintensiteit (van plekken/gebouwen)
- 33 Managen van evenementen
- 34 Het integreren van toerisme in lokale plannen
- 35 Ontwikkelingscontrole
- 36 Toerisme gerelateerd vervoer
- 37 Luchtvervoer antwoorden naar verandering in patronen en toegang
- 38 Het creëren van routes
- 39 Het aanbieden van een verscheidenheid aan belevenissen
- 40 Marketing voor duurzaam toerisme
- 41 Bescherming van het imago van de destinatie
- 42 Duurzaamheid en Environmental management beleid en uitvoering bij toeristische bedrijven

### **APPENDIX 4: LIST OF INDICATORS SHOWN DURING THE INTERVIEWS**

#### Indicators proposed by UNWTO to measure 'Effects of tourism on communities'

<u>Community attitudes to tourism (including community agreement and coherence on tourism,</u> perceptions and acceptance of tourism):

- Existence of a community tourism plan;
- Frequency of community meetings and attendance rates (% of eligible who participate);
- Frequency of tourism plan updates
- Level of awareness of local values (% aware, %supporting);
- % who are proud of their community and culture.

#### Social benefits associated with tourism:

- Number of social services available to the community (% which are attributable to tourism)
- % who believes that tourism has helped bring new services or infrastructure.
- Number (%) participating in community traditional crafts, skills, customs;
- % of vernacular architecture preserved.

#### General impacts on community life:

- Number of tourists per day, per week etc; number per sq km
- Ratio of tourists to locals (average and peak day)
- % locals participating in community events;
- Ratio of tourists to locals at events or ceremonies;
- Perception of impact on the community using the resident questionnaire with reference to specific events or ceremonies
- % of local community who agree that their local culture, its integrity and authenticity are being retained.

Change to resident's lifestyles, (cultural impact, cultural change, community lifestyle, values and customs, traditional occupations):

- % of residents changing from traditional occupation to tourism over previous years; men and woman;
- Number or % of residents continuing with local dress, customs, language, music, cuisine, religion and cultural practices. (e.g. change in number of local residents participating in traditional events);
- Increase/decrease in cultural activities or traditional events (e.g. % of locals attending ceremonies).
- Number of tourists attending events and % of total;
- Value of tourist contribution to local culture (amount obtained from gate, amount of donations);
- % of locals who find new recreational opportunities associated with tourism.

#### Housing issues

- % of housing affordable for residents;
- Mode and average distance of travel to work or school;
- Number of new housing starts and % for local residents

#### Community demographics

- Number of residents who have left the community in the past year;
- Number of immigrants (temporary or new residents) taking tourism jobs in the past year;
- Net migration into/out of community (sort by age of immigrants and out-migrants)

## **APPENDIX 5: INTERVIEW SCHEDULE**

Name	Organization	Stakeholder group	Location	Position	Date of in- terview
Charlotte Naezer and Adri Doorne-	Municipality of Amsterdam	Governments	Amsterdam	Tourism Project manager and Tourism coordinator	March 29, 2017
veld Olivier Ponti	Amsterdam Marketing	Tourism Or- ganization	Amsterdam	Manager Research	March 31, 2017
Eduard Pieter Oud	Amsterdam Marketing	Tourism Or- ganization	Amsterdam	Chief Operating Officer	March 31, 2017
Marjan Schrama	Amsterdam Eco- nomic Board	Environ- ments	Amsterdam	Account manager	April 10, 2017
Walther Ploos van Amstel	Amsterdam Uni- versity of Ap- plied Sciences	Local Resi- dents / com- munities	Amsterdam	Member of the advisory board of inhabitants to Amsterdam Marketing and lector City Logistics	April 20, 2017

#### Interviews with stakeholder groups

#### Interviews with knowledgeable parties

Name	Organization	Location	Position	Date of interview	Summary of interview
Winnie Daamen	Delft Technical Uni-	Delft	Lecturer and	April 26, 2017	Appendix 9
Minouche Cramer	Startup in Residence	Amsterdam	Startup Officer	April 20, 2017	Appendix 10
Ger Baron	Municipality of Am- sterdam	Amsterdam	Chief Technology Officer	May 9, 2017	Appendix 11

#### Focus group session participants

Name	Position
Eduard Pieter Oud	Chief Operating Officer
Olivier Ponti	Manager Research
Nico Mulder	Marketing Strategist
Anne Marie Dees	Account manager

A summary of the focus group session can be found in Appendix 12.

## **APPENDIX 6: SUMMARY OF CODED INTERVIEWS**

Question	Charlotte / Adri	Olivier	Eduard Pieter	Marjan	Walther
1	1A: YES	1D: DON'T KNOW	1B: YES, BUT	1B: YES, BUT	1C: NO
2	2B: YES, BUT	2D: DON'T KNOW	2D: DON'T KNOW	2D: DON'T KNOW	2B: YES, BUT
3	3C: OTHER	3A: UNWTO DEFINITION	3B: BALANCE	3C: OTHER	3A: UNWTO DEFINITION
4	4A: LIST OF ISSUES	4A: LIST OF ISSUES	4A: LIST OF ISSUES	4A: LIST OF ISSUES	4A: LIST OF ISSUES
5	5A: IDENTIFIES ISSUES	5A: IDENTIFIES ISSUES	5A: IDENTIFIES ISSUES	5A: IDENTIFIES ISSUES	5A: IDENTIFIES ISSUES
6	6A: ORDER	6A: ORDER	6A: ORDER	6A: ORDER	6A: ORDER
7	7A: SUG- GESTS: - Number of tourists per day, week, etc. (per neighbour- hood) - Ratio of tourists to lo- cals (average and peak day) - Perception of impact on the commu- nity using the resident ques- tionnaire	7A: SUGGESTS: - Existence of a community tour- ism plan. - number of tour- ists per day, week, etc. (per neigh- bourhood) - Ratio of tourists to locals (average and peak day) - % locals partici- pating in commu- nity events	7A: SUGGESTS: - Number of so- cial services available to the community (% which are at- tributable to tourism); - % who believes that tourism has helped bring new services or infra- structure; - % of vernacular architecture pre- served.	7A: SUGGESTS: All indicators which are con- sidered as part of the class 'Gen- eral impacts on Community Life'	7A: SUGGESTS: - The ratio be- tween the number of visitors & inhab- itants - the satisfaction among the differ- ent target groups using the city.
8	8B: SUG- GESTED AC- TIONS, BUT NOT SURE - Better coop- eration within the destina- tion. - More local promotion to stimulate visi- tors to ex- plore other areas.	8B: SUGGESTED ACTIONS, BUT NOT SURE If indicator is too low: - Marketing If indicator is too high: - Crowd manage- ment –providing alternative routes which are less crowded, just as car navigation is doing.	8C: DON'T KNOW	8B: SUGGESTED ACTIONS, BUT NOT SURE - Providing visi- tors with sugges- tions to visit al- ternative loca- tions within Am- sterdam when a certain area is getting too crowded. - Pricing: make attractions and sights more ex- pensive during peak periods - Provide visitors with alternative routes when a certain route or area is too crowded	<ul> <li>8A: CONVINCED,</li> <li>SUGGESTS AC-</li> <li>TIONS</li> <li>The government</li> <li>and promotional</li> <li>organizations have</li> <li>different tools in</li> <li>hand: <ul> <li>Functions: what</li> <li>type of functions</li> <li>are allowed in an</li> <li>area</li> <li>Regulating an</li> <li>area and control-</li> <li>ling this</li> <li>Mobility: the gov-</li> <li>ernment has the</li> <li>option to make</li> <li>some areas more</li> <li>or less accessible</li> <li>to be reached.</li> <li>Information:</li> <li>when a certain</li> <li>area is crowded,</li> <li>visitors should be</li> <li>informed that</li> <li>other areas are in-</li> <li>teresting as well</li> </ul> </li> </ul>

9	9B: Available OR organiza-	9B: Available OR organizations	9C: DON'T KNOW	9B: Available OR Organizations	9B: Available OR Organizations
	<ul> <li>Mobile phone providers</li> <li>Public transport companies</li> <li>Agency OIS (Office of Research, Information and Statistics) of the municipality of Amster- dam</li> <li>Tax agency</li> <li>Tourist Tickets</li> </ul>	- The military (us- ing satellites): there is much digi- tal surveillance; they might know where people are. - Best way to measure visitors: à Smart camera's (sensors) or Drones. Problem with smart cam- eras is a technical problem in Am- sterdam: it gener- ates so much data, that the capacity isn't yet available for that.		- Decisio, a cooperation together with Mezuro, is collecting mobile phone data of Vodafone clients	Organizations and knowledge institu- tions are experi- menting with data, including AMS (In- stitute for Ad- vanced Metropoli- tan Solutions) which experi- mented with tech- nologies during the SAIL event in 2015.
10	10A: YES - Ger Baron (Chief Tech- nology Of- ficer)	10A: YES - Eric van der Kooij, Project leader Balance in the City - Amster- dam Police - AMS Institute	10B: NO	10A: YES - AMS (Institute for Advanced Metropolitan So- lutions)/TU Delft - Startup in Resi- dence: Minouche Cramer.	10B: NO
11	11A: YES It is difficult to think of possi- ble solutions to solve some of the issues. At the same time, the po- litical reality could limit the implementa- tion of mana- gerial actions.	11A: YES Its not only about real-time meas- urement, but also trying to pre- dict/anticipate fu- ture situations.	11B: NO	11B: NO	11B: NO

## **APPENDIX 7: MENTIONED ISSUED DURING THE INTERVIEWS**

	Issue	Number of mentions
1	Effects of Tourism on Communities	5
2	Local satisfaction with tourism	4
3	Community and destination economic benefits	4
4	Solid Waste Management	3
5	Controlling Noise Levels	3
6	Managing events	3
7	Tourism related transport	3
8	Competiveness of tourism business	2
9	Controlling use intensity	2
10	Providing variety of experiences	2
11	Sex tourism	2
12	Accessibility	2
13	Local Public Safety	2
14	Integration of Tourism Into Local/Regional Planning	2
15	Development control	2
16	Air transport - responding to changes in patterns and access	2
17	Marketing for sustainable tourism	2
18	Sustainability and Environmental Management Policies and Prac- tices at Tourism Businesses	2
10	Access by Local Residents to Key Assats	1
20	Community involvement and awareness	1
20		1
21	l ourist security	1
22	Employment	1
23	Managing Visual Impacts of Tourism Facilities and Infrastructure	1
24	Creating trip circuits and routes	1

### **APPENDIX 8: INTERVIEW GUIDE – INTERVIEWS WITH KNOWLEDGEA-**

### **BLE PARTIES**

#### Introduction:

- Background of interviewee
  - Function
  - o Organization
  - Years of Expertise

#### - Introduction

- My background
- o Current status of this master thesis research
- Purpose and duration of the interview
- Interview is being recorded

#### - Key questions to ask:

- How could the number of visitors/persons in an area be measured in (near) real-time?
- What are acceptable limits to this indicator?
- o What are possible managerial actions when this indicator reaches a limit?

#### 1. How could the number of visitors/persons in an area be measured in (near) realtime?

- a. What is already being done regarding the measurement of this indicator?
- b. Other ways to measure this indicator?
- c. What would be the ideal image of measuring this indicator (no constraints)
   i. Tools, techniques, infrastructure
- d. Data checklist:
  - i. Reliability of data
  - ii. Ownership of the data
  - iii. How location specific
  - iv. How real-time?
  - v. Costs
  - vi. Any other downsides?

#### 2. What are acceptable limits to this indicator?

- a. How could a limit be identified?
- b. Could this limit be tracked in (near) real-time?

#### 3. What are possible managerial actions when this indicator reaches a limit?

- a. Actions for the government
- b. Actions for promotional /citymarketing organization
- c. Actions for others

## APPENDIX 9: SUMMARY OF INTERVIEW WITH TU DELFT

Name: Winnie Daamen en Dorine Duives
Organization: TU Delft (Technical University Delft)
Function: Associate Professor and Postdoc researcher
Years of Experience: 10+ years and 5< years</li>

#### Summary

Introduction

In 2015, TU Delft participated in an experiment from the Institute for Advanced Metropolitan Solution (AMS) which tried to find ways to measure the number of persons in a certain area in real-time. This experiment was organized around the SAIL event, one of the biggest events in the Netherlands. Although the experiment was started as a pilot, since then the techniques used in the experiment have been further tested and finetuned during other events.

#### Measuring the number of persons in an area

TU Delft uses a combination of the following techniques to measure the number of persons in an area:

- Count cameras: at each entrance point of the event location, cameras are counting the number of persons entering and exiting the area each minute. By combining the data from the different cameras, TU Delft is able to estimate the <u>number of persons in the</u> <u>area</u>;
- Wi-Fi sensors: these sensors can track in real-time the <u>number of cell phones in the</u> <u>area surrounding the sensor</u>, based on their MAC-address. By collecting the MAC-addresses from each sensor, TU Delft can track the location of cell phones and thereby estimate the <u>speed of the visitor flow</u>.
- GPS trackers: by providing 100 GPS trackers to visitors of the Sail event, TU Delft was able to track the exact <u>routes and the speed</u> of each of these visitors.

All collected data was validated by using pictures taken from an air balloon. By using these pictures as a baseline, the researchers were able to determine the 'real' visitor numbers to the event site. There was a 98% to 99% match between the 'real' number of visitors and the visitors measured by the different techniques and tools. All data was visualized in a dashboard and provided to the police. The system does not suggest managerial actions to the police. The system is solely focuses on trying to collect and present factual data.

During following events, the system was further tested and refinements were made to the algorithms behind the system to make it more reliable. TU Delft estimates the system is almost mature enough to let the tourism sector use it.

#### Learnings from the experiment

The researchers learned that the police were not looking for the exact number of persons in an area, but were more interested in changes over time: are there more or less visitors compared to previous periods? By combining the data from the dashboard with their own experience, the police could decide what actions should be taken.

Another thing the researchers experienced, is that many different parties have some data about visitors to an area, but that this data is not centrally collected and analysed.

#### Other interesting findings

The researchers suggested that the acceptable limit for an indicator could change as well: the more often a limit is passed, the lower the 'threshold' will be. *"If your neighbours organize a party once a year, you will accept the noise this makes. If they organize a party more often, this will cause frustration and thereby lowers your acceptable limit."* 

## APPENDIX 10: SUMMARY OF INTERVIEW WITH STARTUP IN RESI-DENCE

Name: Minouche Cramer Organization: Startup in Residence Function: Startup Officer Years of Experience: 5-10 years

#### Summary

Startup in Residence is a program developed by the municipality of Amsterdam in order to find ways how the municipality can buy more innovative solutions. The program invites startups to devise innovative solutions to social issues. One of the social issues defined by the government is how visitors can be more spread over the city. If a startup is selected to take part in the program, the municipality has the intention to buy their solution at the conclusion of the program.

One of the startups working on the issue of trying to spread visitors over the city is 'Wander'. This startup has developed an app that shows the user how he or she can find the next attraction where he/she wants to go to, not by using a Google Maps chart, but by only showing them a compass. This stimulates visitors to 'wander' around in the city and also try other directions.

During Kings Day [National Holiday in the Netherlands] this app will be tested in Amsterdam with two goals in mind: 1. can crowdedness be measured in the city? and 2. Can the users of the app be stimulated to use other streets than 'the normal ones used by visitors'. During the test, Wander will work together with the Police in order to determine which areas are too crowded. This data is then loaded into the app, which then is able to provide other routes (and other suggestions for sights) to the users of the app.

During Kings Day, the police monitors via different ways the crowdedness in the city, including via social media channels. Wander is able to provide a new heatmap of its users and how they are moving on an hourly basis [via the GPS function in mobile phones]. This data in turn is shared with the Police as well.

# APPENDIX 11: SUMMARY OF INTERVIEW WITH THE CHIEF TECHNOL-OGY OFFICER OF AMSTERDAM

Name: Ger Baron Organization: Municipality of Amsterdam Function: Chief Technology Officer Years of Experience: Almost five years in this function

#### Summary

In 2014, the Municipality of Amsterdam appointed a Chief Technology Officer to make sure that it knows what innovations take place in the outside world, how these innovations influence the city and how they can be utilized. The ambition of the city is that it uses technologies in a responsible manner: what are the consequences of using new technologies for the inhabitants and the entrepreneurs? Although the technological aspect is important to the city, the ethical side, regulations and policy aspects are even important: does the government, for example, need to develop a policy for a technology which will mature in 10 years from now? Or: do we as a city want to place noise sensors in certain areas if that gives us the technological possibility of hearing what people say to each other, thereby creating privacy issues?

Topics which are currently important for the Chief Technology Officer include (smart) mobility and health, but also the balance between working, recreation and living in the city.

Currently Amsterdam is developing a dashboard in which it can monitor certain aspects of the city from a tourism point of view. It uses a practical approach: what information is currently available and can we include it in a dashboard? Information which will be included are among others the number of arrivals at Amsterdam Airport Schiphol, social media sentiments and some information on mobility. Progress is also being made to measure the number of hotel overnights in real-time.

Presenting the number of persons in an area in the dashboard is not yet possible, as the current solution provided by TU Delft and the AMS institute is being tested. If the tests prove a success, decisions should be made whether to adapt it in the city, including financial discussions.

From a managerial point of view, it makes sense to decide which actions should be taken when an indicator changes too much. Signals should be used to determine the thresholds. For the indicator of measuring the number of persons in an area, it makes sense to use input from the police.

# APPENDIX 12: SUMMARY OF FOCUS GROUP SESSION WITH MANAGE-MENT AMSTERDAM MARKETING

Date: May 1st 2017

#### Summary

The focus group session was organized to 1. Validate the developed process and 2. Identify managerial actions and acceptable limits for the indicator *"the number of persons in a certain area"*.

The author of the thesis presented an outline of the process, the theoretical framework behind the managerial framework, the issues found for Amsterdam, ways to identify managerial actions and define acceptable limits.

#### Vision/Master Plan

The focus group recognized the observation from the author that there is no integral vision/master plan in place in Amsterdam. The group also noted that, without this, it limits the identification of possible sustainable issues and opportunities in Amsterdam.

#### <u>Issues</u>

The list with the 10 most mentioned issues during the interviews was shown to the focus group with the question whether these issues were recognizable. This caused discussion among the focus group members on how each of the issues were related to each other, what elements are part of each issue and the way how each of the issues need to be interpreted. It also gave room for discussion about prioritizing the issues. During the discussion, many underlying pressures for the issues were mentioned.

#### **Indicator**

The focus group discussed on what geographic level one wants to know the number of persons in Amsterdam. Based on the discussion, the group concluded that not the same level of detail is needed for all parts of the city. Especially in the more crowded areas, mostly the tourism hotspots, one wants to know this as specifically as possible (street level), in other areas the group was satisfied with information on neighbourhood level.

#### **Defining limits**

The focus group was asked to identity acceptable limits for the indicator. They agreed with the upper limits *danger* and *liveability*. The group also concluded that a lower limit is also possible

for the indicator and that this should be defined by 'Danger' as well: if there are too less people in an area, this can cause a feeling of insecurity.

The focus group members argued that the limits for this indicator can't be defined by a specific number (quantity), but by 'quality'.

#### Managerial actions

Asked to identify possible managerial actions for this indicator, some group members argued that a master plan should be put in place. Others argued that a master plan focusses on the longer term. Measuring indicators in real-time however asks for operational actions: what do we need to do now to bring the indicator back within acceptable limits?

The group identified actions for the government: enforcement during crowded moments and changing routes. For the DMO the group identified two activities: providing information about crowded locations via its communication channels (such as the waiting times at certain attractions) and suggesting alternative locations to visit (marketing/promotion). The sector itself can change its prices or opening times to respond to peak-load periods.

#### <u>Summarized</u>

The group recognized the process as containing 'logic' steps. They validated different elements, suggested extra managerial actions and defining acceptable limits. Most discussion during the focus group session was focused on the validity of the top 10 issues.

# APPENDIX 13: THE DEVELOPED PROCESS FOR MEASURING (NEAR) REAL-TIME DESTINATION USAGE

This appendix contains the final version of the developed process.

#### Step 1: Identify whether the destination has a vision on tourism / tourism master plan

- <u>Objective:</u> Identify long-term goals and objectives of the destination.
- <u>Description:</u> To measure the performance of the destination, it is helpful that indicators used in the managerial framework are linked to existing plans and policies. In that way, evaluation of these plans can be measured, at the same time allowing destinations to take corrective actions if necessary.

During this step, the (tourism) goals and objectives of the destination will be identified. It is important to learn why exactly these goals and objectives were defined as this will be helpful during the next step of the process.

If there is no tourism vision or master plan in place, it is highly recommendable to discuss with the tourism stakeholders which opportunities or chances they see for the destination.

If there is an integral vision/master plan for the destination, not only focussing on tourism, this will be very beneficial as well.

Tool:There are two options to identify the long-term goals and objectives:<br/>Recommended option: Organization of a focus group session with important<br/>tourism stakeholders in the destination, including the local government, the<br/>promotional organization(s), representatives of the inhabitants and key influ-<br/>encers from the (commercial) sector.

<u>Alternative option</u>: Individual interviews with important tourism stakeholders in the destination. This is however not recommended as it limits a common understanding among all stakeholders.

<u>Outcome:</u> A list containing all the goals and objectives of the destination.

#### Step 2: Identify issues in the destination

<u>Objective:</u> Identify issues currently facing the destination.

<u>Description:</u> Besides long term goals and objectives, the destination might also currently face issues which are related to sustainable development. Therefore, it is necessary to identify these issues. A helpful tool to use during this step is the list developed by UNWTO which contains all the possible issues a destination could face from a sustainable development point of view. This list can be found in Appendix 3. During this step, extra consideration should be given to the 12 baseline issues defined by UNWTO.

As probably not all the identified issues are even important to the destination, the list of identified issues should be prioritised as well.

- Tool: Focus group session. To create the same mindset about sustainability, it is highly recommended to first discuss the topic of sustainability, by showing the UNWTO definition of sustainable tourism. Next, to identify the issues facing the destination, discuss with the focus group which pressures they are seeing. Try and identify the most important pressures. These pressures can then be linked to list of issues as suggested by UNWTO.
- <u>Outcome:</u> The list with goals and objectives will be expanded with pressures currently facing the destination. After completing the focus group session, all mentioned pressures/issues/goals/objectives will be linked to the list of issues developed by UNWTO.

#### Step 3: Identify which indicator(s) can be used to measure the issues/opportunities

- <u>Objective:</u> Identify indicator(s) which can be used to measure the issues.
- <u>Description:</u> To measure each issue, indicators should be selected which are relevant for the specific destination. As UNWTO suggests over 700 indicators for all the issues, it is necessary to only select the indicators which are relevant to the stakeholders in the destination.
- Tool: Focus group session. It is highly recommended to also use the UNWTO Guidebook on *"Indicators of Sustainable Development for Tourism Destinations"* with suggested indicators for the different issues. Let the focus group discuss what they exactly want to know with each issue. It is helpful to show a list of all possible indicators for each issue to focus the discussion.

*Note:* As this step is probably time-consuming as it is necessary to identify indicators for each issue, it is recommended to split the focus group in smaller subgroups. Each sub-group will then work on one or more issues. At the end of the session, the findings from the different groups will be presented shortly.

*Note 2:* It might be wise to combine this step with the next two steps, as the group members are already creating a common understanding of the problem. Beneficial to this is that the group consists of different stakeholders.

<u>Outcome:</u> For each issue, one or more indicators are identified by the stakeholders.

#### Step 4: Identify minimum acceptable conditions for each indicator

- <u>Objective:</u> Identify the limits to acceptable change for each indicator.
- <u>Description:</u> As the value of an indicator changes over time, from a managerial point of view, it is necessary to determine at what point an indicator reaches a certain level as to which managerial action(s) should be taken to bring back the indicator within acceptable limits. For each indicator, the limits of what an acceptable value for a destination is must be identified: when do we consider as a destination a value as too high or too low?

#### Tool: Two actions are recommended:

Focus group session (or a sub-group of the focus group): In combination with the previous step, the focus group members might already have an idea of what acceptable conditions are for each indicator;
 Interviews with knowledgeable parties: if the focus group members do not

have (enough) specific knowledge to determine the limits, ask if they know persons or organizations who might have more ideas about this topic.

<u>Outcome:</u> For each indicator, thresholds have been determined in between the indicator can change without the need for managerial action to be taken.

#### Step 5: Identify possible managerial actions for each indicator

- <u>Objective:</u> Identify managerial actions in case the limit of an indicator is reached.
- <u>Description:</u> As the value of an indicator changes over time, from a managerial point of view, it is necessary to determine which managerial action(s) should be taken when a limit is reached to bring back the indicator within acceptable limits.
- <u>Tool:</u> Focus group session (or a sub-group of the focus group). For each of the different stakeholders (government, DMO, commercial parties) actions should be

identified, for both the lower and upper limits. It is recommended that extra attention should be given to identify operational actions as the indicators are focused on the real-time aspect.

<u>Outcome:</u> For each indicator, managerial actions have been identified from the perspective of the different stakeholders.

#### Step 6: Identify ways how each indicator can be measured in (near) real-time

- <u>Objective:</u> Identify ways how each indicator can be measured in (near) real-time.
- <u>Description:</u> This last step is used to find how an indicator can be measured in (near) realtime. As most tourism stakeholders probably will not have enough knowledge on the technicalities of measuring an indicator, parties should be identified who have more knowledge on ways to measure this indicator.
- Tool: 1. The focus group is used to identify knowledgeable parties;

2. Interviews with knowledgeable parties to identify how an indicator can be measured or is already measured. During the interviews an interview guide is used to determine all aspects of the development of the indicator. This interview guide can be found in Appendix 8.

<u>Outcome:</u> For each indicator, a method has been found on how an indicator can be measured in (near) real-time.