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Vienna Calling, Vienna Controlling: Crowd Management Dealing with Visitor Growth

Bachelor Thesis for Obtaining the Degree

Bachelor of Business Administration in

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Affidavit

I hereby affirm that this Bachelor'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.

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Abstract

As city tourism is increasing in popularity and cities are becoming denser, crowd management has become a huge challenge and a global concern. This thesis aims to enrich the existing knowledge of crowd management and points out the importance of the increasing risks of crowds in Vienna. The paper starts with an overview of the topic of crowds and then explores the related research. It further attempts to rethink current crowd management methods, which involve planning and monitoring, and demonstrates its current limitations. The focal point of the second part of the thesis is the city of Vienna and an analysis of its crowd situation at the moment. First the current views on crowds by Vienna's residents are examined, which are largely positive, then the situation is objectivized by calculating the ratio of guests per inhabitants of a given district. The thesis identifies that certain districts and areas, such as the first district, already present a high risk of crowd issues, which hints at potential concerns. Current measures of Vienna Tourist Board are analyzed and best practices of other cities facing the same issues are presented. Furthermore, personal recommendations are given to contribute to the topic of crowd management.

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EU- European Union
GDP- Gross Domestic Product

1   Introduction

Austria is a very popular tourist destination. In 2015, it ranked 12th worldwide in terms of tourists' arrivals, ahead of Hong Kong (Österreichischer ReiseVerband, 2016). Hence, it is no surprise that tourism is one of the most important economic sectors in Austria. The total direct value added by the tourism industry in 2014 was €17.59 billion, which represents 5.3% of the Gross Domestic Product (GDP) ("A tourism satellite account for Austria", 2016).

City tourism, which is primary focused in Vienna, is also increasing and brings new records every year. It reached a new record of more than 14.3 million overnight stays in 2015 and the aim for 2020 will be to reach 19 million visitors (Vienna City Administration, n.d. – a).

At the same time, Vienna is one of the cities with the fastest growing population. Combined with the growth of city visitors, it means there is no doubt that there will be a risk of overcrowding. In fact, the issues with crowds exist already. The Schönbrunn complex, according to Kreutzer (2017), is the most popular attraction in Vienna and accounts for over 5 million visitors per year. It is becoming a greater challenge to manage these crowds and an important subject for the Austrian government. The Vienna Tourist Board Strategy 2020 states that for city development it is necessary to disperse people to avoid overcrowding. Therefore, in order to ensure a high-quality of life for inhabitants as well as for tourists, it is crucial to develop new attractive urban places (Vienna Tourist Board, 2014).

Vienna is not the only city affected by this problem. City tourism is growing and becoming more popular, due to several reasons. Cities are the economic center, the location of science and research centers, service providers, the primary scene of creative and cultural trends, and event highlights. The overnight stays of city tourism in Europe increased since 2000 by about 3.5% on average yearly (Ibid, 2014). With the increase of the population worldwide and the increase in tourism, crowds have an important subject for virtually every metropolitan city. In major urban areas, people encounter crowd situations daily, which results in both negative and positive experiences. Not only is the experience affected, but also the well-being of the people. Crowds are very risky, since many people in the same place and time represent a big

safety hazard (Kopp, 2014). One of the reasons to evaluate crowds is to allow governments to plan for potential safety issues beforehand and hence prevent saturation issues in the future. They can also conquer the saturation problems that already exist or are soon to come. Moreover, the ultimate goal is to achieve a certain number of visitors in one area without destructive effects on the resources (World Tourism Organisation, 1983).

Crowd management can support this, but in order to manage crowds, it is important to understand relevant human behaviors and the way these behaviors are formed. This means that by considering how individual patterns impact crowds, it will be possible to predict crowd behavior from individual interactions (Appert-Rolland, Cividini, Hilhorst, & Degond, 2014). Back in 1975, Altman (as cited in Filingeri, Eason, Waterson, & Haslam, 2017) mentioned that because of rapid world population growth and interpersonal stressors that arise due to too much exposure to too many people, research on crowds would become more important over the next few years. Considering that it is now 2017, research on the subject of crowds remains underdeveloped and therefore further research should be conducted in this field. (Filingeri, Eason, Waterson, & Haslam, 2017).

This thesis will try to contribute to filling this gap by focusing on the meaning, the evolution, and the challenges that crowds create in Vienna. Furthermore, it will try to find solutions to optimize the flows of crowds and avoid overcrowding in specific areas, such as Schönbrunn, hence answering the question: how can Vienna manage and steer the flow of crowds?

This study focuses on both of the terms "manage" and "steer". Martella, Li, Conrado, & Vermeeren (2017) argued that crowd management is very important. It helps to avoid the risks that crowds bring - such as accidents, stampedes, and mass panic-through careful planning and implementation. Hence, crowd management is needed and involves several phases. The first phase is the event preparation phase and the second one is the event execution phase. The second phase involves monitoring, which is one of the main approaches to security (Kopp,2014). However there exist some limitations to crowd management, which will also be discussed. Finally, the study will consider the different meanings and practices of steering, which is on one

hand how crowds can be avoided and on the other hand how they can be effectively distributed.

After introducing the background research, the subsequent chapters will: first (1) discuss the concept of crowds, which involves defining the term crowd in general and where they are; then focus on crowds in tourism and explain the different sources that exist; followed by an identification of the factors that form them. The study will continue by (2) discussing crowd management and its practices such as planning, monitoring, and steering as well as their limitations. The methodology chapter provides a detailed description of the data collection and data analysis method. The findings chapter consists of a case study presenting, combining, and discussing the results of various forms of data collection, which are: (1) an interview with an expert of Vienna Tourist Board as well as; (2) secondary data presenting travel behaviors and profiles of tourists and finally; (3) approaches of other cities and their best practices. After that, recommendations based on the findings are given, which could be helpful for Destination Management Organizations, especially for Vienna Tourist Board since they point out who constitutes the crowds in Vienna and where there is a need for management and steering. The concluding chapter summarizes the combined findings and connects the primary research to the literature review.

2   Literature Review

2.1 The Concept of Crowds

2.1.1   Definition and Flows of Crowds

The word "crowd" can have several meanings and can be used as a verb, an adjective (crowded) or a noun. The *Macmillan English Dictionary for Advanced Learners* (2007) defines "crowd" as follows:

Noun: *1. large number of people in the same place.*
1a. a large group of people at an event
2. a group of friends.
Adjective: *containing a lot of people, especially too many*
Verb: 1. to move to a particular place at the same time as a lot of other people
2. If a group of people crowd a place, they make it full by being in it

According to Filingeri et al. (2017), crowds form part of our daily life and are a gathering of people who appear in crowd environments. These environments are commonplace activities like people going to work via public transportation, buying groceries or other products, as well as social occasions such as meeting friends in restaurants and bars or at entertainment situations like museums or events. They also appear in all occasions, for example a demonstration on the street, where many individuals are together in a small place for a specific reason (Kingshott, 2014).

Two kinds of crowds can be identified - active and passive crowds. The passive ones can be manipulated for their own benefit and interest, like people taking the overcrowded underground.

Active crowds can be one of four types - escapist, expressive, aggressive, and acquisitive. The first one defines a crowd that is originally a passive one, but is overcome by panic due to a dangerous situation like a gas leak where people then want to escape. Expressive crowds are defined by feelings or emotions that people share within the crowd and demonstrate them. An example of an expressive crowd is a football game or a music festival. An aggressive crowd wants to reach a collective

goal by being violent or vandalizing. An acquisitive one takes the occasion of civil unrest to plunder either in or outside of the crowd (Kingshott, 2014).

As mentioned before, the term "crowd" can also be used as an adjective - "crowded"- and has a negative connotation since it means "too many". It refers to an area that is so dense that it prevents people from obtaining or satisfying their intentions (Sundstorm, 1978, as cited in Filingeri et al., 2017). This presents risks and threats to these commonplace activities, since people in the crowd can become violent and degenerated (Kingshott, 2014).

Using the term as a verb also brings negative connotation. Neuts and Nijkamp (2012) talk about crowding and point out that it is related to the wider concepts of carrying capacity and sustainability, hence tourism. From this part onward, the thesis will only focus on crowds in relation to tourism.

Neuts and Nijkamp (2012) cited a definition of the World Tourism Organization (Ibid, p. 2135) of carrying capacity as: "the maximum number of people that may visit a tourist destination at the same time, without causing destruction of the physical, economic, and socio-cultural environment and an unacceptable decrease in the quality of visitors' satisfaction". This means that crowding is linked with saturation, since too many visitors in one place implicate saturation and diminish the quality of the environment for both tourists and citizens. But where and when do these visitors appear?

These crowds of visitors arise in three different zones, which are the tourist generating zone, the transit zone and the receiving or destination zone.
The first one develops because there is a high demand, which leads people to travel at the same time to the same location, for reasons like school holidays, or attractive weather. High demand appears in developed tourist areas which are "countries, regions or locations where tourism has reached or is expected to reach overcapacity and saturation" as mentioned by the World Tourism Organization (World Tourism Organization p.4, *1983)*. Butler (2001) explains that traditional holiday areas such as

those with lakes, beaches, and mountains also draw the attention of visitors in the summer.

The second one, which are the transit zones, can become crowded since tourists are taking transportation like airplane, train or ship to travel from their country of origin to their desired destination.

Finally, the receiving or destination zone gets crowded at tourist attractions. These attractions can become overcrowded and cause the saturation of the destination, which means this point of interest may be ruined and the destination loses quality and admiration (*WTO*, 1983).

Neuts and Nijkamp (2012) argue that two kinds of overcrowding exist. One is among tourists and the other one is between tourists and residents. The next section will examine the different kinds of crowds, which are comprised of tourists, residents, as well as commuters and the reasons why they are involved in crowds.

2.1.2   Sources of Crowds

2.1.2.1   Tourists and Same Day Visitors

People visiting a destination can be defined as in one of two categories: either tourists/ overnight visitors or same-day visitors, also known as excursionists. The difference between the two is that a tourist - domestic, inbound, or outbound - stays at least one night during his or her trip, otherwise he or she is a same day visitor (World Tourism Organization ,2014).

The reasons for tourists to visit a destination are the natural and cultural resources of the location. Thus, the destination can be called a tourist destination. Every tourist destination offers a tourist product, that visitors want to experience, which can be divided into four components: physical product, people, packages, and programs (Morrison, 2013). In the section on how crowds form and what they consist of, this study will go more into depth on the subject of the four components.

If a tourist destination is very popular, in terms of its cultural resources, like heritage attractions, not only tourists and excursionists will visit the place and its products, but also residents. Often the motivational and behavioral factors cannot be distinguished and involve a tourist being a resident only on vacation. The consumption between

tourists and residents hence converges (Ashworth, 2010). A product being this popular and attracting locals and tourists might create crowds. Studies show that the three most visited attractions and popular products in 2014 were: the Las Vegas Strip with over 39.5 million visitors; Time Square in New York having 39.2 million visitors; and Central Park in New York City with 37.5 million visitors (Driver, 2014).

This is also problematic for the residents near this destination and can affect their perception of tourism development, which introduces the next section: the interaction between tourists and residents, as well as commuters.

2.1.2.2   Residents and Commuters

A resident is someone who lives in a particular place, which is either in an urban or rural area. Nowadays almost half of the world's population lives in urban settlements and this number is growing over time. This growth creates problems for the citizens since it exceeds the city's capacity. The high population density in cities implies that residents are more often faced with overcrowding (Cohen, 2006).

This could be further broken down since in the city or rural area itself, residents can live in neighborhoods with commercial establishments or in neighborhoods with no commercial establishments. Fleming, Baum, and Weiss (1987) argued that in places with stores more crowds appear than in ones without. Crowding can be expected in high-density urban residential areas, since more residents will be on the streets to do their shopping. Commercial areas do not only attract residents, but also tourists. Therefore, tourists consider the residents, of this destination as their host society. Residents are part of the local community, which means that they have a certain lifestyle, culture, and language that the tourist encounters when visiting the destination. Interaction between locals and tourists is unavoidable, especially in areas offering a tourist product (Armenski, 2011).

Tourists and especially same day visitors encounter commuters. A commuter is "someone who travels regularly to and from work" (Macmillan English Dictionary for advanced learners, 2007). The region where the person has his occupation differs from his prime place of residence. Through the development of technology, and the increase of efficient transportation infrastructure, it is easier for people to commute to their workplace. Commuter rates are often higher in regions with a limited surface,

a dense population and adjacent to a big cluster. One example is London, which also has the highest share of commuters in the EU, with nearly 50% of the labor force going to another region. In the 28 Member States of the European Union (EU), approximately 8% of the population commutes to their place of employment in a different region. Noticeable characteristics of commuters are that men, as well as younger individuals, commute more often and further distances than women and elderly people ("Statistics on commuting patterns at regional level", 2016).

As previously mentioned, commuters are part of the passive crowds, especially during rush hour where they are purposely pressed against other people to still fit in the means of transportation. This is one of several occasions when crowds are formed, which will be explained in more detail in the next section on how crowds form and what they consist of.

2.1.3 How Do Crowds Form and What Do They Consist of?

2.1.3.1 On a Micro-Level

Tourists as well as residents can both be considered as individual pedestrians. These individuals often join into crowds through pedestrian flows and develop a general behavior. Helbing & Molnar (1998) mention the examples of tourist parties, and friends and families walking in groups. Le Bon (1996, as cited in Kingshott) argues that a shared mindset between the agglomerated people in a common area is formed and the personal characteristics of everyone vanish. This means that individuals in a crowd will begin having feelings and opinions that are similar and behave accordingly. Several observations regarding pedestrians can be made.

Usually people decide to take the shortest way to reach their destination and if they have several choices they take the one that is the simplest, taking into consideration that the route is not less appealing (loud streets, more traffic lights, bad atmosphere). Streets with crowds are still more desired than the ones without if they lead directly to the goal. In order to reach this goal, pedestrians move at a comfortable rhythm. The faster they go the more distance is between them, but if they are more crowded, due to attractive areas, the closer the pedestrians get (Helbing & Molnar,1998).

In crowded pedestrians flows, certain patterns are created which will now be analyzed. Crowded streets often show people forming certain structures. For instance, they develop lanes, one in each direction, or even more depending on the size of the pedestrian or corridor and the degree of crowds. Another pattern that could be identified is the creation of stop-and-go waves because of two perpendicular pedestrians flows. Moving on to a more general perspective, pedestrians might have distinctive goals. They will thus move in different ways, which could provoke collisions. The agents-based model for pedestrians explains how they can avoid collisions. There exist two phases in the agents-based model, which are the perception stage and the decision-making process. The first stage requires pedestrians to analyze the speed of others and calculate their further movement to see if collisions could be a risk. The latter one brings pedestrians to determine their future procedure to avoid collusion. She/he then has two options, which are either reducing speed or changing direction (Appert-Rolland et al., 2014). This affects the crowd movement and hence the experience of crowds. How this could be managed will be explained in the next section.

This is how crowds are created in general and on a micro-level, but this study is interested on a macro perspective, which focuses on tourism, leading to the question: what attracts people to go to the same place and form crowds?

2.1.3.2 On a Macro-level

Kingshott (2014) points out that several occasions may form crowds. These could be celebrating New Year's Eve, going to a local sports game, or any other social event. However as already mentioned, this study will focus on what forms tourism crowds. When tourists are considering traveling to a certain destination, they expect certain criteria from the destination product, which can be categorized into four components (Figure 1).

Morrison (2013) argues that one component is the *physical product* which includes several items. The first item and the most important one is an attraction which interests the tourists and is provided at a destination. They can vary from historic and cultural assets which can be towns, areas, and monuments of historical importance to nature-related assets like wildlife, ecological, and marine areas draw crowd's

attention as well. Another one is the man-made facilities like restaurants, retail, convention centers and hotels which accommodate tourists. Transportation is also part of the physical component, which provides connectivity to and within the destination. Moreover, an adequate infrastructure should be implemented.

Another component is the *people*. Locals are the hosts and are responsible for providing the required resources, as well as offering services. Tourists also want to experience local cultures and the local way of life.

Arranging *programs* such as events, activities, and festivals is also one component. Similar to attractions they raise the interest level of tourists.

Last but not least are *packages* that can be bought and consumed by tourists. Tour operators, travel agencies, and others offer them and enhance the holiday experience by putting several elements together. The economic conditions are also one criteria and listed by the World Tourism Organization (1983). They imply that the cost and price of holidays influences crowds.
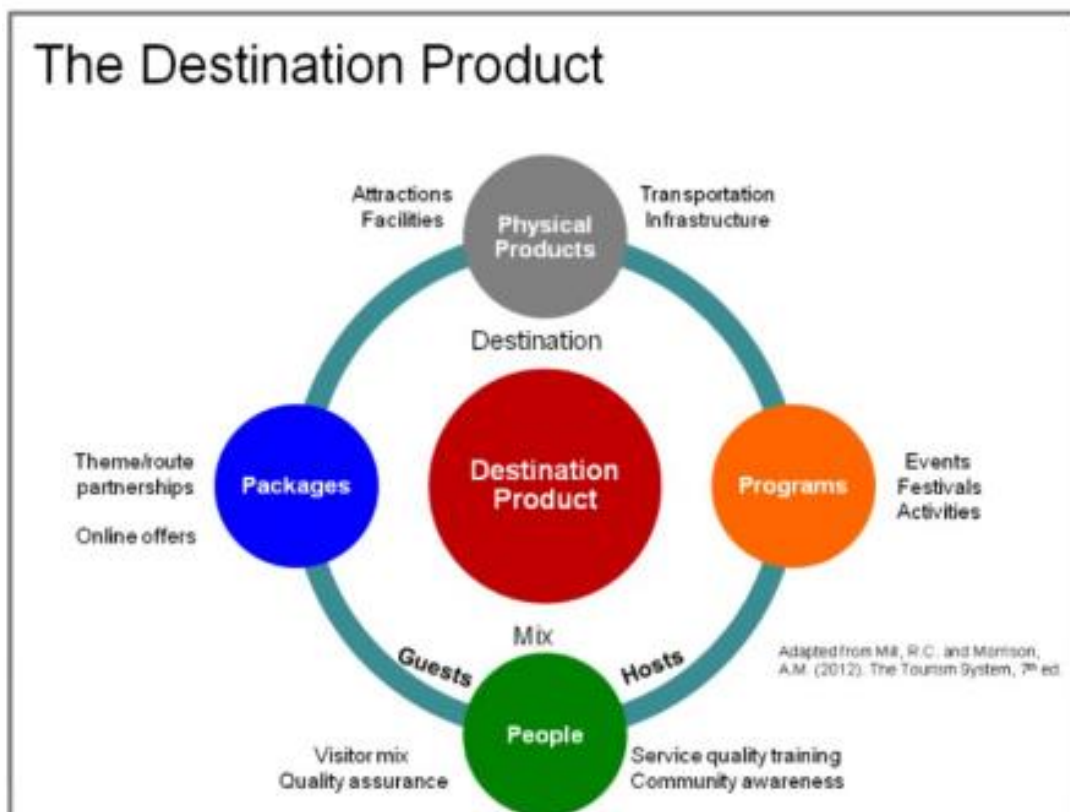

Figure 1: The Destination Product and Destination Mix (Morrison, 2013)

Another criterion that tourists are considering when travelling to a destination is the climate which is one of the reason of seasonality, hence triggering crowds (Ibid, p. 14). Seasonality in tourism means that there is an imbalance in demand at a destination - a peak in one season followed by a low throughout the rest of the year. The peaks can vary from a single peak, two-peaks, and no-peak and are reflect the attractiveness of the destination in the respective season. The causes of seasonality can be either natural factors, institutionalized factors, calendar effects, business customs factors, or social/cultural factors.

The natural factor is linked to the weather and the real seasons that are constant: summer, fall, winter, and spring. They all have distinctive weather conditions and variables such as rain, snow, or sunshine (Butler, 2001). Tourists plan and decide on their vacations partially based upon the climate and the climate even impacts their happiness and consumption at a tourist destination. The trend of outdoor activities increases the importance of the weather (Curtis, Long, & Arrigo, 2011).

Institutionalized factors are, contrary to the natural ones, less regular. Policies, such as public holidays, and society's behavior regarding religion, culture, and ethics are considered institutionalized factors. School and industrial holidays, especially extensive summer vacations, have the biggest impact on seasonality. It is the only period when families can travel for longer periods of time without pupils missing school. Even when children grow up, individuals will still take their holidays during the same period out of habits and convenience (Butler, 2001).

Moreover, Croce and Wöber (2009) argue that calendar effects also have an important impact on seasonality. Leap years, months with different lengths or public holidays that change yearly can create regular growth in demand for a destination.

Business customs, factors which involve conventions like the ITB Berlin, trade shows and government assemblies produce more demand and increase seasonality (Gunter, 2017).

Social and cultural factors, such as religious and cultural tourism, are connected to people's personal interests and their motivations to travel. Special events and festivals lead to seasonal visits and include pilgrims traveling to religious celebrations, or music festivals (Croce and Wöber, 2009).

Issues with seasonality include the appearance of crowds in the high season, which leads to further consequences. The most significant one is the saturation that is created at a destination due to the overuse of facilities and infrastructure and the environment (World Tourism Organization, *1983)*.

This can affect the crowd's experience and its satisfaction. Filingeri et al. (2017) claim that once a destination is crowded and dense, it can lead to an unpleasant experience in some situations, but to pleasant ones in others. There exists a link between density and positive or negative experiences. Crowds can improve or even create a great experience when associated with events such as sport matches or festivals (few people participating makes them appear to be poor and unsuccessful). To ensure a positive experience and safety within crowds, they have to be managed and facilities need to be planed. This will now be discussed.

So far, this study has reviewed the topic of what crowds are, as well as what sources exist and how they are formed. Now the study will continue to explain how they can be managed and what the different steps and practices are.

2.2 Management of Crowds

Whenever many individuals are in the same place at the same time, a high risk of stampede occurs. Due to poor facilities and inadequate crowd management, people can get hurt or die (Kopp, 2014). One famous example is the Love Parade Festival in Duisburg in 2010, where due to overcrowding and bad management, 21 people died and over 500 were injured (Diehl, Gathmann, Hans, & Jüttner, 2010). To prevent such disasters, effective crowd management is needed.

Crowd management refers to the preparation and assurance of the secure and safe occurrence of events or situations where many individuals are assembled. Assisting the progress of movement and the enjoyment of individuals is also one part of it. It is a collaboration that involves effective communicating, handling and sharing between the people in the crowd management team (local authorities, event managers, planners, and stewards) and the crowd itself. The management team has different

tasks and roles. These include taking care of the transportation to the event location, securing the location, undertaking measures to steer crowds such as building barriers and so on (Martella et al, 2017).

Understanding the situation is crucial to taking any course of action, which crowd experts will deem appropriate. Crowd experts need to monitor, analyze, predict, decide, and act swiftly. One of the tools used for crowd management is InCrowd (Wijermans et al., 2016).

InCrowd is a framework that helps crowd management to arrange their decision-support systems and use human expertise. It exposes important connections to crowd management that provide significant knowledge and methods in different fields and is furthermore problem-driven. Four main subsystems are included in InCrowd and assure the foundation of a crowd management support system. These are: a crowd-interaction subsystem, a mining subsystem, a predicting subsystem, and last but not least a decision-making subsystem. These systems can use computational or non-computational instruments. Figure 2 shows the four components of InCrowd and the overall flows linked with the continuous process of crowd management, as well as different instruments marked in black and gray. It therefore demonstrates how a crowd manager is able to implement InCrowd to manage crowds (Wijermans et al., 2016). To get more insights into InCrowd Wijermans et al. (2016) provide a detailed explanation.
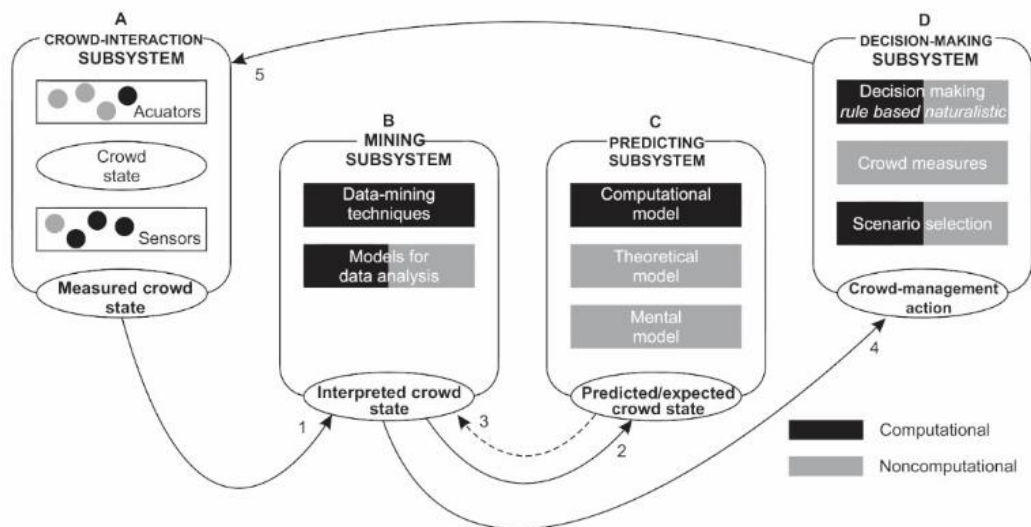
Figure 2: The overall flow associated with the iterative process of crowd management (Wijermans, Conrado, van Steen, Martella, & Li, 2016)

Several crowd management practices exist which vary from "event preparation" - the planning of a situation or event to "event execution" focusing on crowd monitoring. The first one is often mentioned to be the key in crowd management but the latter, especially the real-time situation awareness is just as crucial. The next sections will go into depth in both practices.

2.2.1   Planning

Wijermans et al., (2016) argue that planning should receive the most attention in crowd management, including focusing a lot on what could occur during an event and how it can be anticipated. A minimum of six months before the event takes place, planning already starts and it makes up approximately 90% of all the work. Individuals getting in and out of the site and being part of the event are all aspects involved in planning. Understanding the participant's profile, choosing the location, managing the clients, cooperating with the institution, selecting the employees, accounting for the type of event, and preparing for the weather, are all factors that must be considered. To ensure effective proceedings, different kinds of knowledge like common-sense knowledge or experts' experience from guidelines in previous situations and their errors, are needed (Martella et al., 2017).

Risk assessment plays a large part in the preparation process and contains the development of potential "what-if" scenarios concerning dangerous situations. A new algorithm was created which chooses interferences for a specific scenario and can help to avoid them. However, only expert knowledge is used to formulate a course of action for dealing with these scenarios. Furthermore, contingency and emergency plans need to be invented. To do so, a specific number of employees is required as well as an expert team that has an overview of everything. This involves the collaboration of crowd managers with experts of crowd simulation, police, paramedics and so forth (Wijermans et al.,2016).

When planning for crowds, five key themes are important to focus on, which also affect crowds' experiences as Filingeri et al. (2017) mentions.

1- Physical design of crowd spaces and facilities: It focuses on the venue layout and the design of the location, which includes the building's shape and arrangements of the entrance, exits, stairs, rooms, hallways etc. and the agenda and purpose of the space utilization (Helbing et al., 1998). Furthermore, to help in the planning process, advanced 3D simulations are applied (Wijermans et al.,2016). The physical space should neither hinder nor create blockage in pathways and should provide sufficient space within crowds, by dividing areas. The location should also provide seating possibilities and toilets should be spread out. Furthermore, line problems should be thought of for things such as for restrooms, and food and beverage facilities. Hence a focus on line management strategies should be employed. These can involve lines being simply separated by barriers to clearly mark the line, as well as hiring security employees that are placed at the end of a lines (Filingeri et al.,2017).

2- Crowd movement: First the capacity for crowds in a location must be determined (shopping center, train station etc.) to ensure safety and well-being of crowds (Ibid, 435). Crowd movement and pedestrian flows, such as when coming and going from the place, also need to be thought of and improved so that critical situations and disasters can be avoided. Improvement of crowd flows involve a line system, like putting barriers up to support the creation of lanes and ensure that ingress and egress points are sufficiently large for crowds to pass through (Wijermans et al.,2016). Moreover, the entrance and exits should be separated to avoid collisions and violence, as Kingshott (2014) mentions, giving the example of New York City's subway.

3- Communication of information: Because of poor signage, people are often lost in crowds and cannot find their way around the crowd. The problem in signage is frequently that the signs are inadequately placed or simply not provided at all. They can also be not clear and difficult to comprehend or not readable because of a small font size. Consequences are that the space is not used efficiently and congestion is created a location. This can easily be solved when planning the signs, by making them noticeable, simple, and clear. An example for line signage could be signs with information like "begin line here". Already on the path to the venue, signage should be placed and effectively hung so as many individuals as possible can see it (Filingeri et al.,2017).

4- Comfort and welfare of crowds: This, involves the supply of facilities and preparation for weather conditions. As already mentioned, seating possibilities, food and beverage options and restrooms are all part of welfare facilities. However, these should be provided in relation to the location's capacity and crowd size. Certain weather conditions such as snow, wind, rain, cold, or sunshine and extreme heat can affect the crowd's well-being and experience. To handle such conditions sheltered areas or outdoor heaters could be offered. Moreover, the purchase or provision of umbrellas, ponchos, blankets, sunscreen, and free water facilities could be offered. To reduce the stress factor of crowds or their boredom in lines, distractions such as music and posters could be provided (Ibid, 437).

5-Public order: One can foresee that in situations involving a large crowd, disorder might appear. Certain crowd members want to confront a rival group, which is often the case at sport events. Hence to keep public order, security and police are necessary. These can vary between either public security or private security which are apart from the national police service. Combination and coordination of the two can also be possible. However, the sensitivity of security and police should be in a proportionate relationship with the crowd's behavior. If it is not proportionate and too high, crowd members think that there is danger, and hence feel unsafe. This increases the significance, of authority and employees being friendly. A courteous staff member, who provides help and answers questions, can influence the behavior and mood of participants and reassure them (Ibid, 438).

However, planning alone is not sufficient and needs additional crowd monitoring to help analyze situations and anticipate interventions.

2.2.2 Crowd Monitoring

As already mentioned event execution, which is everything that happens during the event, involves crowd monitoring. It helps to evaluate the state of the crowd, analyzes the active situations and tries to predict the development of future situations (Martella, 2017). The aim is to ensure safety and prevent areas from getting critical due to high density, but simultaneously not to invade people's privacy (Kopp,2014). Ensuring safety involves assessing the crowd situation by looking at several factors: the distance and distribution between individuals and the number of them in a specific area, the ratio of people going in and out of a location, and the overall crowd mood (signs of stress, excitement, and other concerns). It helps to notice any problems and therefore choose as well as implement suitable actions (Wijermans et al.,2016). Communication and information exchange helps to identify such problems and is therefore very important. Information is collected from multiple agencies like the police or national railways and can be valuable for other crowd management members. One example is the police collecting data about flows of people moving to the train station, which would be very useful for the crowd managers at the station (Martella,2017). However, this information is not only important for the crowd management team, but also for the crowd itself (Wijermans et al.,2016).

Two ways of monitoring big crowds exist, which help to create situational awareness. On the one hand people monitor crowds by being directly involved. This means that stewards and officers are employed on the floor or within crowds. On the other hand, people monitor crowds with technological devices (Kopp, 2014). Contrary to the first way, people are not actively taking part in a crowd, but observe them for example via a control room by looking at surveillance cameras (Wijermans et al.,2016).
Technological monitoring is very important and will now be further described. The most common techniques applied are: video monitoring and crowd sensing (Kopp, 2014).

Video monitoring is one of the most effective techniques in crowd monitoring. An implemented crowd monitoring approach which provides the basics, is "CCTV" or Closed Circuit Television. Video cameras are used to monitor public or private areas, as well as traffic, supermarkets, etc. Crucial data can be captured and analyzed through the CCTV cameras (Kopp, 2014). Nevertheless, it is difficult to count the number of people, especially when a crowd is dense, therefore innovative technologies are necessary, such as infrared thermal videos. Heat, generated by individuals and crowds, in either cold or hot environments, can be measured, which can be seen in figure 3. Advanced cameras can capture this heat and a special computer algorithm can then analyze the information. However, this method also has downsides, like the necessity of a larger gap between the temperatures of crowds and the environment.

Figure 3: A thermal image of some people moving in Haram Area (Abuarafah, Khozium, AbdRabou,2012 as cited in Kopp,2014)

Image processing is also a method of video monitoring. It can detect the distinction of an empty ground or one with individuals on it and count the number of individuals in a certain area at a specific time. A disadvantage of this technique is that individuals cannot be recognized as people when they carry umbrellas, so if it is raining this technique is almost useless (Ibid,2014).

Video cameras are also integrated into helicopters and "Unmanned Aerial Vehicles", and are also provided with a counting system and the ability to find specific keywords that were written in social media, however they are not often employed (Wijermans et al.,2016). Social media, like Twitter or Facebook, are becoming more important in crowd monitoring. By following specific keywords, feedback and emergencies can be detected (Martella,2017).

To diminish the downsides stated above, the technique of *crowd sensing* can be implemented via smart-phones. It involves a "sensor-enabled mobile system to assist organizers and participants of public events in emergencies and evacuation situations using human computing principles" pointed out by Roggen and Troster (2011, as cited in Kopp, p.27, 2014). In order for it to work, people in crowds would need to download a special application. Data can be captured and processed by all mobile phones sending information in, in order to monitor crowds. Key facts such as danger zones, blocked zones and zones to avoid or go to are illustrated by this application. A similar application already exists which is called "City Police" (Kopp,2014).

This application was developed in 2012 for the Olympic games in London. Real-time crowd flows can be trailed through an integrated crowd monitoring technique. It enables the London police and participants to exchange information as well as stay up to date on the latest news and receive advice. Some additional features are local crime statistics, and maps which show directions to specific places ("Smartphone App", 2017).

Crowd sensing can also be used as a method that scans an area for discoverable Bluetooth devices, in order to estimate crowd density. Most of the individuals have Bluetooth on their mobile devices turned on. This enables one to count the Bluetooth devices in a specific area at a given time, which can identify crowd density with few data (Ibid,2014).

These strategies, combined with the help of crowd experts, can create real-time situational awareness. Situations can be classified in various categories such as emergency, hazardous, usual, and unusual. Knowing and understanding the situation helps crowd experts to select a scenario that fits and a suitable approach. However, the technique with a technological component as well as the involvement of people,

has some constraints, which will now be elaborated on in the next section of limitations and challenges.

2.2.3 Limitations and Challenges of Crowd Management

Technological monitoring helps to provide information like density and the number of people in a crowd, but says nothing about the emotional and psychological state of the people. In addition, they can identify real-time understandings of situations, yet cannot predict what will happen (Wijermans et al.,2016). More technical challenges arise such as big data and data mining.

Monitoring crowds involves using an immense amount of data, hence the term "Big Data". Dealing with big data can be challenging and requires supercomputers. This data needs to be analyzed, which introduces data mining.

Data mining refers to the management of data collection, which involves first the capturing and extraction of the most relevant facts and second the evaluation of the data. Problems that arise in the first part are usually linked with statistical issues such as incomplete and broken data. Filtering useless data and interpreting them adequately are issues that emerge in the second part (Kopp, 2014).

Human-induced challenges include instructions and incentives for people. Taking the example of crowd monitoring via smart-phone applications mentioned above, both of them are required. Users need to understand how it works and in what way they can contribute to it, and therefore need instructions. But why would they want to support crowd monitoring and how can they be motivated to download the application? For this, incentives should be clearly stated. The positive aspects should be mentioned, a clear design and ease of use should also be attributes. Furthermore, a combination of voluntary crowd monitoring with gamification could be also an option (Ibid, 2014). However, people might not feel comfortable supporting it because of privacy issues, which introduces the next section on crowd management limitations.

Crowd monitoring, particularly surveillance, can interfere with privacy. With the increasing surveillance in cities, which helps to capture and to collect information about the crowd's activities and the individuals who are part of it, comes more and

more privacy concerns (Longo, & Cheng, 2015). Visual records of individual's actions compromise their privacy and methods that try to track silhouettes could lead to the identification of single persons are two reasons why people are skeptical of data mining, especially for computer vision (Chan, Liang, & Vasconcelos, 2008). However, that concern has been taken under consideration and new methods aim to collect information that does not recognize specific people (Longo, & Cheng, 2015). Chan et al. also presented a privacy preserving system that protects people's identities. It focuses on building a model for the patterns of the crowd's behavior where situations could then be recognized as variations in these patterns, and actions of people that see abnormal could be detected as outliers regarding the crowd behavior. To receive more insights about privacy preserving crowd monitoring a detailed study by Chan et al. can be examined.

Further limitations arise in the situation's awareness and decision-making support, in the reliability of real-time monitoring and communication, as well as in the intervention methods which, can be summarized in Table 1 below.

Requirement	Current limitations
Increased situation awareness and decision-making support	• limited, biased, and over-simplified what-if scenarios • inability to generate unforeseen conditions • unvalidated and unrealistic computer simulations • inaccurate estimation of crowd future states • poor overview of the crowd (density, movement, flows) • limited support of decision-making support systems
Reliable real-time monitoring and communication	• human-dependent and limited monitoring (e.g., on-the field stewards) • surveillance cameras are not ubiquitous and mostly human-operated • data is collected not in real-time • coarse-grained and unreliable data with high densities • communication happens verbally and through few shared channels • little sharing of collected data between actors
Enabling intervention without use of force	• few non-pervasive means to communicate with the crowd • inability to provide timely preventive feedback to the crowd • only fixed screens and loudspeakers are available • infrastructure such as barriers and gates are passive with little control

Table 1: Current practices' limitations and requirements for the future (Martella et al., 2017)

The first requirement involves limitations in the planning phase as well as the implementation phase (monitoring). Predicting situations in the planning phase is crucial, however it is still difficult to achieve due to biases towards certain situations and situations never previously experienced. Moreover, the computer simulations do not completely catch all important mechanisms that are crucial in a given situation. Issues in the second phase are related to situational awareness and create certain needs for crowd managers. One requirement for them is to know how the situation

will develop, when it will get overcrowded, and how to handle it. Another one is the need to get a spatial overview of the crowd that would enable them to create a dynamic map showing areas and their statues.

The second requirement focuses on the need to measure the crowd's condition. Limitations lie in the current instruments and practices used that induce information losses. These include: surveys excluding valuable personnel information, and people monitoring surveillance cameras who cannot watch all the videos at all times. It was also mentioned that there is a need for more efficient communication within the team and with the crowd.

The last requirement, which refers to interventions without using force, expresses the need to control the movements of crowds more effectively. Instruments such as "traffic lights" for crowds could be an option for this issue. The need to solve the problem of long lines is also addressed (Martella, 2017). Distributing the crowds evenly in a particular area and in time is also another need, which can be done through crowd steering and introduces the next section.

2.2.4 Approaches to Steering Crowds

Steering can mean on the one hand "to keep entirely away" and on the other hand to "direct the course" (steering, n.d.). In relation to crowds, the first definition means trying to avoid and prevent crowds completely and act preemptively, hence in this study it will be called preemptive steering. The latter means to act in anticipation of crowds and try to direct the movements of people (suggesting where they should move), hence it will be called proactive steering.

Preemptive steering may focus on de-seasonalizing tourism flows, since seasonality may form crowds, as it was explained previously in this study. Butler (2001) argues that several ways exist to overcome seasonality: destinations may temporarily apply tax incentives and differential pricing, attempt to have a longer peak season, to develop additional ones, emphasize tourists to stagger their holidays, try to diversify their markets, encourage domestic visitors in low-seasons, as well as create off-season attractions like festivals and conferences which focuses on creative tourism.

Creative tourism is defined as, "tourism which offers visitors the opportunity to develop their creative potential through active participation in courses and learning experiences which are characteristic of the holiday destination where they are undertaken" (Richards & Raymond, 2000, as cited in Matteucci, 2017). Implementing it brings several advantages not only for the destination itself but also for the tourists. Matteucci (2017) argues that it helps to bring authenticity and sustainably to a destination, empowering local people and inter alia de-seasonalizing tourism flows.

Chen, & Teng (2016) claim that in order to avoid overcrowding, entrance fees could be imposed during the peak season and adjusted in relation to the size of the crowd. Furthermore, a limit to the number of visitors regarding the carrying capacity of the attraction or place, could be set.

The attempt to diversify, e.g. through lowering prices, the appeal, and attractions of a destination, helps make the off-season more attractive for tourists to come at that time instead of the high season (Butler,2001). There are already destinations implementing these approaches but nevertheless they cannot fully avoid crowds.

Therefore, *proactive steering* focusing on crowd distribution is necessary. It helps to manipulate crowds in the sense of leading their directions.

Several reasons exist for steering and these can be classified as supporting individual needs and supporting individual goals. The first one focuses on helping people with where to go and how, such as how to visit exhibitions in the most efficient way. The second one focuses more on promoting a safer exploitation of the space, which includes load balancing, planning for evacuation, and enforcing other strategies like prioritizing the movement of specific people (Sassi, Borean, Giannantonio, Mamei, Mana, & Zambonelli, 2015).

To attain an effective crowd distribution, several strategies can be implemented and modern technologies can be applied, as will now be explained.

Through technological advances, such as pervasive computing and the use of smart devices (smartphone, tablets, smartwatch) by almost everyone, it is now possible for these devices to intercommunicate and for sensors to detect the contingencies in an area. The result is that a crowd steering application can be developed which shows the way to the pedestrian's goal destination taking into consideration the actual state of the streets (e.g. crowded streets causing delay). This application could sense the

number of people on the streets and consider contingencies by actively re-computing the most efficient way towards the destination's goal. Pedestrians will therefore be provided with information about new optimal ways that avoid crowded areas, reduce the time of the trip, and increase the level of security. More details can be found in Pianini, Viroli, Zambonelli, and Ferscha (2014). Sassi et al. (2015) argue that crowd steering even goes beyond applications. Additional technologies could be a public sound system or public displays that suggest to people how to move in a certain location.

Moreover Sassi et al. (2015) discuss also possible strategies and summarize them into a taxonomy, which is represented in Figure 4. To do so they identified three main axes where the strategy applied should be different and these are "(1) strategies with a local vs. global goal, (2) strategies using local vs. global information and (3) strategies giving personalized recommendations to individual users or multicasting recommendations to a group of users" (p.2100). The first one refers to the goal to disperse people in the environment and can be classified under local and global. The second one considers the available information in order to steer the crowds locally (nearby crowds in neighborhood) or globally (distribution of crowds in the whole environment). Finally, the third one provides personalized recommendations to participants through their smartphones or general recommendations to a big group through a public display. After considering these axes the, authors found seven different systems, which are explained in detail in their study.

Local Info / Global Info	Personalized Unicast	Multicast
Local Goal	Recommend detours	Greedy steering
Global Goal	Emergent Planning / Navigator	Swarm Intelligent Mechanisms / Traffic control

Figure 4: Taxonomy of steering strategies (Sassi, Borean, Giannantonio, Mamei, Mana, & Zambonelli, 2015)

3 Methodology

The purpose of this study is to find appropriate measures and solutions for crowd management in Vienna. Since the problem of crowds in cities is becoming a global issue, it would be interesting to focus on one city that could then represent others, hence a case study seems to be an appropriate method to support this study. In the next paragraph, a description about case studies will be given as well as the reasons for choosing it as a method.

3.1 Research design

A case study analyzes an example which is a case of the researched phenomenon. Since it is only one case or few cases, it is not an overall representative. The goal is to understand the phenomenon by looking at single examples (Veal, p.108, 2006).

Reasons for choosing this method are that (1) it helps to examine real-life context of a current phenomenon, (2) by using multiple sources of evidence it is reliable and (3) one can benefit from the previous development of theoretical statements to guide analysis and data collection (Yin, 2003 as cited by Veal, 2006). Furthermore, the case study offers a rich description of the phenomenon by taking a variety of data analysis and data sources such as in-depth interviews, secondary research, documentary evidence, questionnaire surveys etc. into account (Veal, 2006).

In this case study, the case is Vienna and the current phenomenon is its issues with crowds. By having multiple sources and collecting various data, which will then be combined as well as analyzed, the information found will provide the basis to provide recommendations and solutions.

The diverse types of data collected will now be explained.

3.2 Data Collection

3.2.1 Qualitative interview

The case study was supported by the opinion of an expert on the issue of crowds. Considering that crowds are already an important subject for the Vienna Tourist Board Board, this study used a qualitative approach, specifically in-depth interviews to

collect primary data from an expert of the Vienna Tourist Board. The interview was semi-structured, since it gives the interviewer some degree of flexibility during the conversation to gain a maximum amount of information. It helped to collect data on the Vienna Tourist Board's management's perspectives and views. At the beginning of the Interview, the purpose, and the reasons for conducting it, were explained. The interview was conducted in German and was recorded. Its transcript can be found in Appendix 1. The following questions presented in Table 2 provide a guideline for the interviewer.

Purpose of Question	Interview Question
Gain information about Vienna's Tourism	1- Who are the tourists in Vienna?
	2- What are reasons for visiting Vienna?
	3- How did Vienna's tourism develop over the course of the last 50 years?
	4- What were the main drivers?
	5- What do you expect for the future in the sense of tourist's attractions and number of visitors?
Gain information on the issue of crowds in Vienna	6- When did you become aware of the issue of crowds (when did it start)?
	7- Where does Vienna Tourist Board see a problem? (which districts and which attractions)
	8- Where could crowds be steered (distributed elsewhere)? What other attractions or places?
Gain information on their future procedures and plans	9- How do you approach the problem: what is the plan and how do you want to implement it?
	10- When will you start and where?
	11- Who will work on it and who has influence?
	12- How will you communicate your ideas and suggestions?

Table 2: In-depth interview questions and purpose

3.2.2 Secondary Data

In order to get an overview of Vienna's tourism and to characterize tourists' travel behavior and their profiles, secondary data will be used. Therefore, sources such as Statistic Austria, Wien.gv.at (which is a regional Website maintained by the city administration providing information on Vienna), TourMIS and Vienna Tourist Board will be used. It will help to provide statistical information about the supply and demand like the number of visitors, the average length of stay, their origin, the number of hotels, and their distribution per district etc. To get an overview of crowded areas, statistics on the distribution of overnight stays per district and the number of visitors of main attractions will be analyzed. Ratios of guests to inhabitants and the density of people staying in a district will be calculated. Furthermore, correlations of the results will be calculated using the function PEARSON in Microsoft Excel.

3.2.3 Best Practices from Other Destinations

To produce recommendations for Vienna, research of the best practices from other destinations on the topic of crowd management will be conducted. Several cities will be analyzed by looking at reports as well as conference proceedings and newspapers.

4 Case Study

4.1 Travel Behavior and the Profile of Tourists in Vienna

4.1.1 Overview of Tourism in Vienna

Tourism in Vienna can be characterized as being a success story on two dimensions: stimulating local tourism and attracting international tourists. Despite the economic difficulties that the world faced and is still facing after the financial crises, Vienna's tourism is setting new records in terms of overnight stays for the seventh year in a row as shown in Figure 5. In 2015, the new record reached over 14 million overnight stays, which is five times higher than the second most visited city in Austria, i.e. Salzburg. (Statistik Austria, 2016).
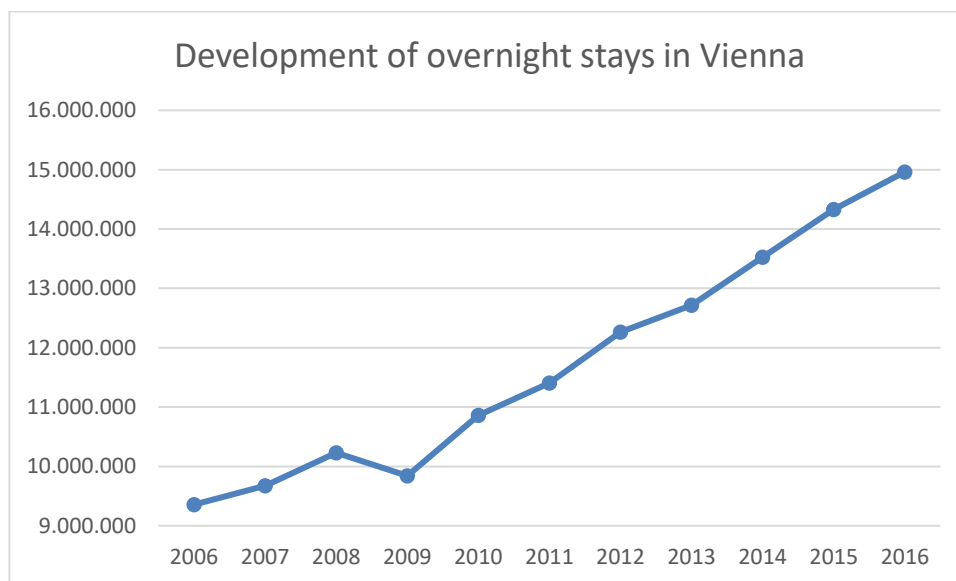
Figure 5 :Development of overnight stays in Vienna (Vienna City Administration, n.d. – a)

Not only is it the most popular destination in Austria, but it is also a very popular destination city internationally. It is ranked as the 18th location worldwide and the 8th location in Europe in terms of international overnight stays. Between 2015 and 2016, it had the highest growth compared to all other European cities, ahead of London (Mastercard Worldwide, 2016).

This performance is supported by the cooperation of the Vienna Tourist Board Sector, the Vienna Tourist Board Association, actors from political establishments and

administration, economy and culture, city development and architecture, logistics and mobility, and so forth (Vienna Tourist Board, 2014).

This growth can be explained in general based on two trends such as globalization and urbanization. Through urbanization an increasing number of people live in cities. The population in Vienna grew by 200,000 people compared to the year 2000 and will reach over 2 million inhabitants by the year 2030 (Vienna Tourist Board, 2014). Moreover, people are seeking new experiences in other cities, hence city tourism is growing. Visitors want "multi-optionality"- meaning a wide range of offers that they can select from, put together on their own, and consume in a short period of time. The second trend, globalization, permits easy and cheaper access to other cities. One driver is the increase in flight connections and the expansion of Vienna's airport, which does not only attract more tourists, but also increases its popularity in the eyes of international companies (personal communication, May 21, 2017).

When there is growth in demand, supply will generally soon follow. Over the last 10 years, the number of beds has increased by about 50%. Vienna provides 435 hotels and similar accommodations with a total of 64,973 beds with an average of 149.4 beds per accommodation (TourMIS, n.d. -a). With 10,787 beds, the first district has the highest number of beds in Vienna, followed by the third district with 7,856 beds. The district with the fewest number is the twentieth with only 218 beds (Vienna City Administration, 2016). The majority of hotels lie in the three stars category with 172 hotels, followed by four stars, then five stars and finally 2 and 1 stars (Vienna City Administration, n.d.-b).

A strong and growing tourism industry helps Vienna's global competitiveness and the results can already be seen. The economy and labor market benefit strongly from this growth: the revenue of the hotels and other types of accommodation in terms of overnight stays was almost 609 million euros and over 84,000 jobs were secured in 2013. Looking at the total distribution of tourist expenditures in Vienna, it can be seen that over 40% of expenditures are attributed to accommodation and living costs. However only 10% of the expenditures are spend on shopping, which shows that it is not an important activity for international visitors (Mastercard Worldwide, 2016).

The expectations and goals for the year 2020 are attracting 5 million more overnight stays, generating 400 million euros more in overnight stay revenue, and getting 20 more direct flights from metropoles worldwide. This will be achieved with a new instrument called "Global.Smart.Premium" - three strategic orientations that strengthen Vienna's qualities as a city and a tourist destination. "Global" means that Vienna will develop and intensify its significance as a location and headquarters for international organizations, and as a worldwide cultural and congress metropolis. This will increase its demand as tourist destination even more. An emphasis will be put on "Smart" city development, combining the quality of Vienna as a city, its sustainable culture, with intelligent mobility management and modern technologies. "Premium" implies providing an exclusive destination with offers at the highest level in order to ensure a luxurious experience for every guest. The three strategic insights will be further explained in chapter 4.2.3 on current measures and strategies, since they are part of actual measures and solutions for crowd management. (Vienna Tourist Board, 2014).

4.1.2   Reasons for Visiting Vienna

Vienna is not only a city in which it is great to live, as was discovered by the Mercer Study where it was nominated as the best city worldwide with the highest quality of life, but also a great city to visit either for leisure or business (Vienna Tourist Board, 2017). Looking at the reasons to travel to Vienna, it can be identified that 17.9% of tourists are traveling for business purposes, while the remaining 82.1% are traveling for leisure purposes (Mastercard Worldwide, 2016). The two reasons will now be further analyzed.

4.1.2.1   Business Purpose

"Vienna is a business center": One business purpose for visiting Vienna is the attending conventions. It is the city with the most conventions worldwide after Paris with 186 in the past year, according to the International Congress and Convention Association (Vienna Tourist Board, 2017). Hence, conventions are the main driver of increasing tourist arrivals and expenditures. They have also stimulated the off-season to have more business. The importance of a convention location is that it provides adequate infrastructure, as well as efficient transport connections, which Vienna provides and

develops continuously. One example is the construction of several new train stations in the city and the new airport terminal (Hoepke, 2017).

"Vienna is a transport hub": The airport is the central element of the transportation hub. In the year 2015, a new record of 22.8 million passengers was achieved. Currently 66 airlines fly to 165 different destinations (Vienna International Airport, 2016). It is the crossing point of three trans-European railway transport corridors, which are Gdansk-Vienna-Venice, Frankfurt-Vienna-Bucharest, and Hamburg-Vienna-Athens. Moreover, it serves as an intersection of central European railroads. With 3,500 boats carrying 350,000 passengers, it counts as a relevant Danube harbor.

"Vienna is a headquarter city and a center of decision-making of international institutions": One of the four official seats of the UN is located in Vienna. Furthermore, it hosts fifteen UNO organizations, 18 other international organizations as well as the OSCE and OPEC. Over 200 international corporations such as Siemens have their head offices in Vienna. 190,000 students also live and study in the city, with nine universities, five universities of applied sciences, and four private universities. This makes Vienna the biggest city for universities in the German speaking world (Vienna Tourist Board, 2014).

4.1.2.2 Leisure Purpose

"Vienna is a global cultural tankship": As mentioned in the interview, Vienna is very visible on the cultural geographical map and can ensure its place: for example the Museumsquartier is one of the ten biggest cultural complexes worldwide with 90,000m² in surface area. Theater and music are very popular in Vienna and are widely offered. 120 stages exist, one of them in the Vienna Opera House (Staatsoper) having over 300 performances per year. One of the most famous theaters is the Burgtheater. The music market attracts all kinds of music fans: first of all there is the offer of classical music performances like at the Konzerthaus, Musikverein or the Opera House (Staatsoper). Furthermore, the electronic music market, which is internationally known, is often present in clubs such as Pratersauna and Grelle Forelle. With over 100 museums, Vienna has something for the cultural enthusiast, which is also an important driver for leisure tourists. A strong image, as well as the worldwide awareness and popularity of Vienna, is being improved through prestigious events such as various Viennese Balls (Opernball, Life Ball), the Eurovision Song Contest in 2015, and the increase in international film productions.

"Vienna is an architectural phenomenon": A wide range of styles can be seen all over the city which vary from baroque, to art nouveau, to very modern architecture such as the new economic university. Vienna's imperial heritage can be appreciated by visiting one of the 27 castles, the 163 palaces, and the 280 imperial gardens and parks.

"Vienna goes through the stomach": In terms of culinary arts, guests can enjoy over 7,400 venues varying from coffeehouses to taverns and restaurants. Residents and tourists are tempted by famous dishes like *Tafelspitz* or *Ka*iserschmarrn.

"Vienna is an exclusive package trip": Being part of the "Golden Triangle"- which consists of Budapest, Prague, and Vienna- attracts a lot of tourist who want to see this combination, even if the price levels are different in the two other cities (personal communication, May 21, 2017).

4.1.3 Identifying Vienna's Tourists

This section will look at the characteristics of Vienna's tourists, referencing their nationalities, the length of their stays, and their distribution in the city.

Vienna's tourism can be characterized as very international. 80% of guests come from abroad, which can be seen in the overnight stays in 2015, since 12,239,526 were international guests and 2,899,144 were national guests (TourMIS, n.d.-b).

Figure 5 shows the breakdown of overnight stays per origin of guests in Vienna in 2015. From the pie chart, it is clear that the majority came from the nine neighbor countries at 31% in total, shortly followed by the rest of the European countries with 29%. Austria is in third place, before Asian and American. Only a small minority came from Africa, Australia, and New Zealand.

Overnight Stays in Vienna by Origin

Legend:
- Neighboring Countries
- European Countries
- Austrian
- Asian Countries
- American Countries
- Australia and New Zealand
- African Countries
- Rest

31%, 27%, 18%, 12%, 9%, 1%, 1%, 1%
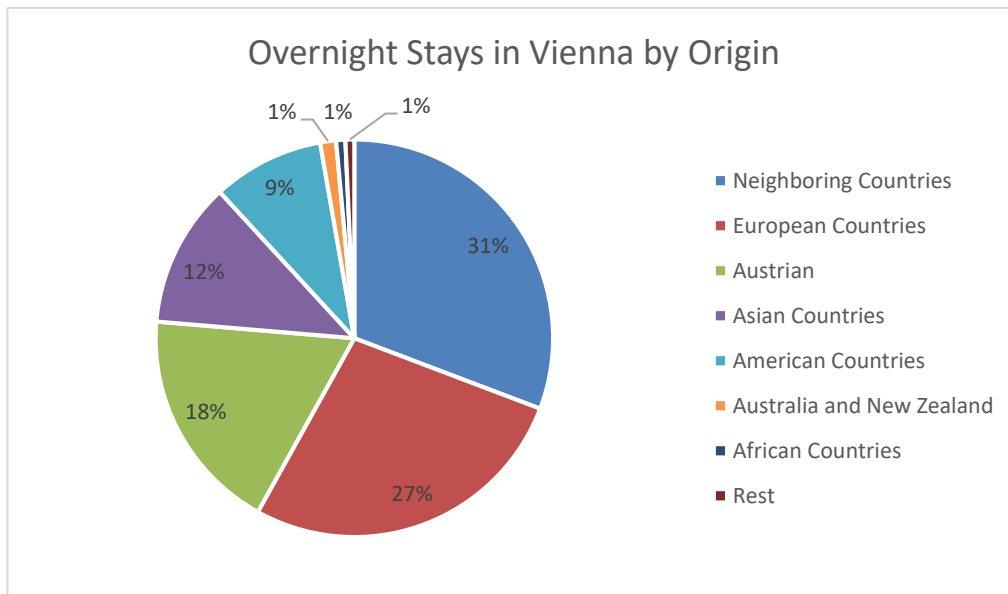
Figure 6: Overnight stays per origin (Vienna City Administration, n.d.-c)

Table 3 breaks it down even further by comparing and ranking the international guest mix per country of origin. Most guests in Vienna are coming from the neighboring country of Germany, followed by the United States of America, and Italy. The top three international tourist arrivals in Vienna differ from the top three international arrivals worldwide, which are France, the U.S. and Spain (World Tourism Organization, 2016).

Looking at the characteristics of the top three guests in Vienna, similarities appear: The average German guest is 44.9 years old and generally travels with their partner, children, and friends. They often in the months of May, August, September, October, and December to experience Vienna's imperial heritage and profit from the cultural and musical offers, as well as experience the culinary arts and the "green" aspects of the city. The majority travels by car followed by the bus. One third of German tourists gets his information from the internet (websites about the cities, search engines) and recommendations by friends and family. The profile of Italian guests is similar. They have the same sources of information and are interested in the same Viennese assets. However, they differ in the mode of transportation, since they prefer to travel by airplane. They travel with their partners and less often with their children and come in the months of April, August, and December. Guests from the U.S. are a little bit

younger, and are on average 43 years old. They are interested in the same assets as Germans and Italians with the exception of the green aspects of the city. Their source of information is also the internet. The majority comes in July and December, and 70% travel individually and 20% travel with groups (Österreich Werbung, 2017).

Ranking	Market	absolute	Ranking	Market	absolute
1	Germany	1239903	25	Sweden	49427
2	United States	386276	26	Ukraine	48007
3	Italy	308339	27	Croatia	46069
4	United Kingdom	269812	28	India	42088
5	Spain	210333	29	Greece	40399
6	Russia	198108	30	Slovakia	40014
7	China	197524	31	Bulgaria	40001
8	Switzerland	184176	32	United Arab Emirates	36220
9	France	157 878	33	Slovenia	35511
10	Japan	147287	34	Finland	32274
11	Romania	136213	35	Denmark	29329
12	Korea Rep.	112959	36	Ireland Rep	26876
13	Poland	108387	37	Norway	25999
14	Netherlands	101706	38	Portugal	23016
15	Hungary	97360	39	Luxembourg	10775
16	Czech Rep.	96156	40	New Zealand	8946
17	Serbia	86403	41	South Africa Rep.	8175
18	Turkey	75393	42	Lithuania	7615
19	Australia	69890	43	Estonia	7508
20	Israel	60665	44	Latvia	6914
21	Saudi Arabia	57241	45	Cyprus	5652
22	Canada	55879	46	Malta	4856
23	Brazil	55460	47	Iceland	4172
24	Belgium	51831		**Subtotal**	**5045022**

Table 3: Comparison of the diversity of the international guest mix (TourMIS, n.d.-c)

The average length of stay in Vienna is decreasing over time. In the year 2000, it was 2.3 days, and in 2015 only 2.1 days, which is also a global trend for city tourism (TourMIS, n.d.-d).

The peak season is in summer rather than in winter. More specifically, visitors come in the months of June and July. (Mastercard Worldwide, 2016).

Looking at the overnight stays of the tourists by district, which can be seen in Table 3, one can clearly see that the first district, Innere Stadt, is the most popular one with a new record of 2.5 million. This is 1.4 times more than in Leopoldstadt, which is the second district for overnight stays, followed by the districts Landstraße, Favoriten, and Neubau. Many districts in overnight stays increased, especially Simmering which had a growth rate of 1,351% from 2006 to 2016. However, the districts Alsergrund, Liesing and Währing (which is also the one with the least overnight stays) and Hietzing decreased in number of overnight stays (see appendix 2 for calculations).

Bezirk	Berichtsjahr										
	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Wien	**9.356.044**	**9.675.208**	**10.232.472**	**9.842.827**	**10.860.126**	**11.405.048**	**12.262.828**	**12.719.289**	**13.524.266**	**14.328.261**	**14.962.438**
1. Innere Stadt	1.842.739	1.886.813	1.824.962	1.774.470	1.978.827	2.047.280	2.137.689	2.193.825	2.201.172	2.467.265	2.566.709
2. Leopoldstadt	874.211	933.578	1.025.951	1.016.966	1.150.389	1.302.447	1.491.456	1.511.506	1.689.960	1.774.685	1.836.293
3. Landstraße	1.087.388	1.090.125	1.132.139	1.084.001	1.180.504	1.178.340	1.328.440	1.334.574	1.441.047	1.541.620	1.617.513
4. Wieden	424.922	419.082	426.300	400.129	466.373	583.575	604.494	599.639	645.860	662.802	693.377
5. Margareten	446.143	438.727	419.127	311.030	415.383	392.326	410.497	436.568	518.956	541.035	559.828
6. Mariahilf	562.058	587.184	627.733	570.565	649.583	632.651	581.200	650.169	652.690	678.936	685.431
7. Neubau	657.100	681.896	698.355	651.923	726.925	763.228	738.302	837.124	869.363	904.399	1.061.004
8. Josefstadt	298.002	310.648	320.165	316.073	342.492	383.484	426.356	413.065	434.365	483.688	487.699
9. Alsergrund	474.296	482.822	499.049	443.443	454.750	454.227	452.029	429.091	443.156	454.027	397.787
10. Favoriten	525.602	535.323	650.482	633.758	712.827	737.000	766.900	902.687	971.709	1.162.143	1.303.049
11. Simmering	18.717	19.829	82.768	90.817	102.777	109.124	133.917	203.920	243.917	235.048	271.649
12. Meidling	197.273	222.366	228.017	211.988	225.813	234.668	249.933	250.187	253.883	219.209	240.624
13. Hietzing	284.964	277.372	264.889	231.216	140.465	140.898	243.744	238.021	265.369	275.706	273.863
14. Penzing	310.759	298.206	290.188	236.046	217.106	298.429	392.250	386.574	405.218	463.358	484.142
15. Rudolfsheim–F.	459.588	515.402	570.989	639.654	723.053	684.508	869.802	920.569	927.511	896.411	913.893
16. Ottakring	102.117	97.294	106.343	150.384	163.770	172.767	152.243	145.210	167.978	164.040	170.454
17. Hernals	86.999	118.150	208.806	272.603	298.081	323.966	345.243	332.870	333.381	336.399	348.659
18. Währing	43.745	47.046	42.181	38.436	38.212	43.345	7.419	38.995	46.507	57.051	12.606
19. Döbling	140.786	159.744	173.677	151.899	153.781	159.221	144.047	115.137	159.846	169.506	194.260
20. Brigittenau	106.179	112.315	116.093	96.509	105.453	114.831	110.105	123.474	131.994	132.855	152.070
21. Floridsdorf	28.471	32.534	34.233	27.038	29.955	36.821	55.559	49.581	46.146	40.623	43.154
22. Donaustadt	294.690	339.810	416.284	424.248	512.065	534.221	551.287	546.056	608.947	612.237	590.838
23. Liesing	89.295	68.942	73.741	69.631	71.542	77.691	69.916	60.447	65.291	55.218	57.536

Table 4: Overnight stays by district from 2006 to 2016 (Vienna City Administration, n.d. - a)

But what does this say about the current crowd situation? This will be analyzed in the next section.

4.2   Current Crowd Situations and Measures

4.2.1   Current Views on Crowds in Vienna

It is important to point out that Vienna is not only attractive for tourists, but also for residents and entrepreneurs. As was mentioned in the interview, tourism is only one fraction of what is important in a city and is only one part of crowd issues and crowd management. In order to identify crowd issues, the interplay of residents and tourists has to be analyzed and objectivized, which was done by Vienna Tourist Board. The crowd issue was objectivized by two approaches. First the distribution throughout the year was examined, which was not constant, and second the population's perception of the economic contribution of tourism as outweighing the influence on the quality

of life was examined, which 96 % of the population agreed upon, hence suggesting that crowds represent no issues yet (Bundesministerium für Wirtschaft, Familie und Jugend, 2012). Vienna Tourist Board also analyzed the tourism density to identify if there was a sound balance between tourists and residents. The findings, represented in Figure 7, show that Vienna has a healthy tourism density laying in the average of the European benchmark. One can therefore assume that the population is very satisfied with tourism, contrary to cities such as Venice and Salzburg, which have the highest tourism density. This means that at the moment one cannot speak of crowd "problems" in Vienna, as was mentioned in the interview. However, due to growing tourism and the growing population, it has been an important subject for Vienna Tourist Board since 2006. Furthermore, there are already certain critical areas that are closely monitored and solutions need to be found. Attempts to improve and distribute tourism flows have failed so far (personal communication, May 21, 2017). These areas will now be elaborated on.
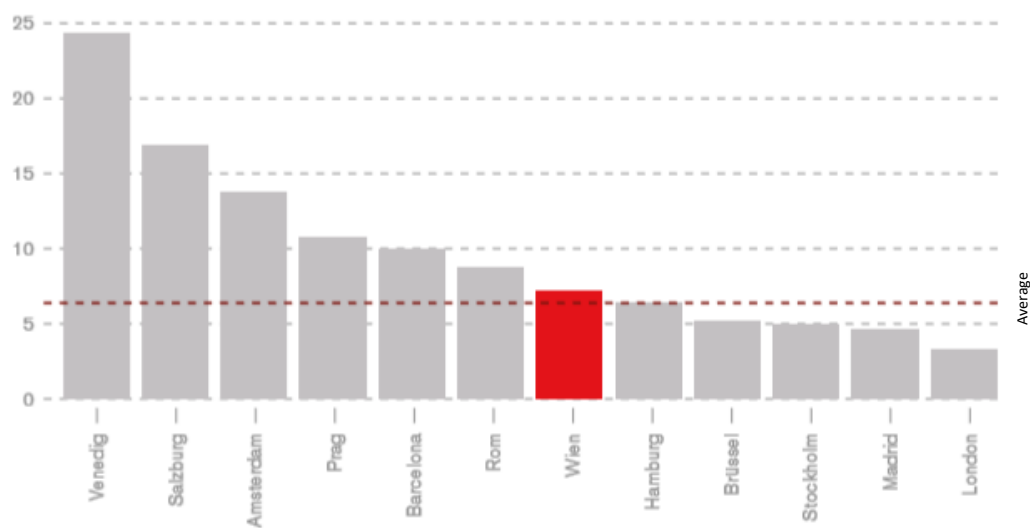

Figure 7: Tourism density as an indicator for a healthy relationship between residents and tourists (Vienna Tourist Board, 2014)

4.2.2   Crowd Issues and Limitations to Crowd Management

4.2.2.1   Emerging Crowd Problems

Despite the positive position of Vienna with regards to the number of tourists per inhabitants in the European benchmark, if one dives deeper into certain districts or locations, one can see that crowd issues are emerging. For instance, at the moment, there is a clear capacity problem in the complex of Schönbrunn, which is also one of the most visited attractions in Europe. Furthermore, the shipping pier such as that in Nußdorf and the entrance and exits stops of buses like at the Hundertwasser House also represent issues where the circumstances are not properly solved yet. Similar problems of capacity are the Christmas markets, especially at the most popular one that is located at the city hall.

These problems have been already addressed. Due to smart connected products and sensors installed all over the city it is no problem to know where the tourists are and how many there are. However, this information is not currently provided in real time, which presents a bigger issue since measures cannot be taken in a dynamic manner. It is difficult to connect all the sensors and system and then summarize them. Then reaching the guest with this information and persuading him to change his behavior is even more difficult. For that an algorithm has to be developed, which will provide real time recommendations and information and furthermore also reach the guests. One option to reach the guests would be via a smartphone application, but the difficulty is convincing the guests to install it. Another option is to disperse the information in public spaces with billboards, but the right approaches are still missing. Signage for directions and attractions are simply too often overlooked and missed and that in turn creates congestions (personal communication, May 21, 2017).

4.2.2.2   Identification of Areas with the Highest Crowd Risks

One characteristic of Vienna is that it has a compact city structure and short distances. This can be an advantage since the majority of attractions can be visited in walking distance, but on the other hand it is also a disadvantage since it increases the density and concentrates tourist flows to only few areas.

Figure 7 shows the ratio of guests per inhabitants per district. Districts that are marked with a dark red circle have an extremely high ratio of guests per inhabitants. In this case, it is only the first district, Innere Stadt, with a ratio of 401. It is followed by the

7th district, Neubau, that is marked with a light red and has a high ratio of 13. The districts 3, Landtraße 6, Mariahilf and 8, Josefstadt have a medium ratio and are represented with an orange color. Districts with a low ratio between 5 and 3 are marked with a dark green circle. Light green represents a ratio that is close to 0 such as in the districts Währing, Liesing, and Floridsdorf.

To recap we can see that the Innere Stadt, Neubau, Landstraße, Marialhilf, Josefstadt, and Wieden are the six districts with the highest ratios, hence representing the biggest risk of crowds.
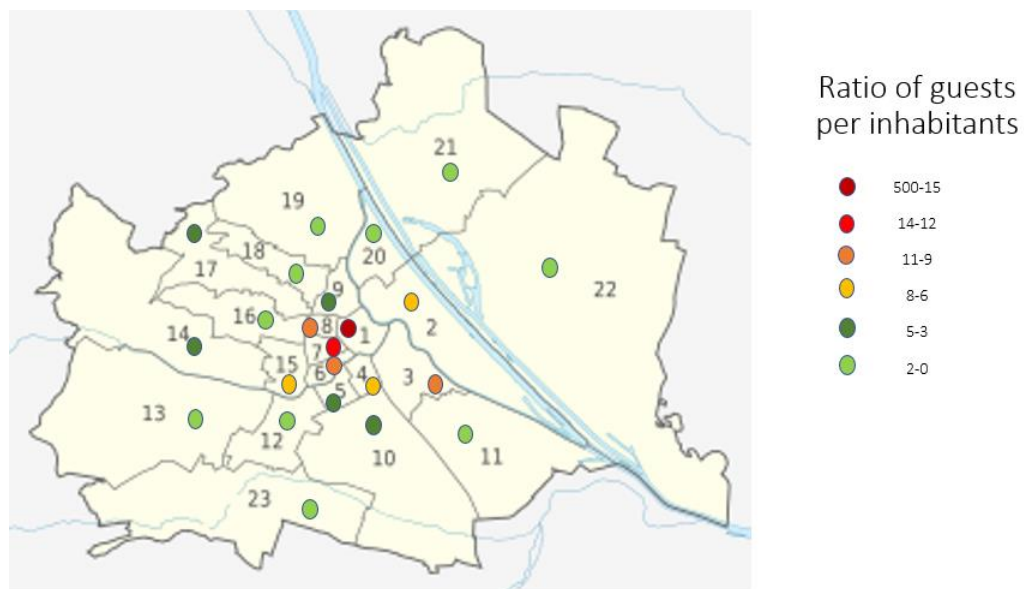
Figure 8: Ratio of guests per inhabitants

It will now be interesting to identify the main attractions and their locations and compare it to that ratio. The number of visitors in 2013 will be used as a measurement for this. The data were retrieved from TourMIS, however not all attractions in Vienna are mentioned, only those which published their visitor numbers.

First, the top five main attractions will be identified. Then the number of all attractions located in the six districts which the highest ratios of guests per inhabitants will be described. Finally, the correlation between the number of attractions and the number of guests staying in this district will be analyzed.

The most visited attraction in 2013 in Vienna was the St. Stephan's Cathedral, which is located in the first district, with over 5,300,000 visitors. It is followed by Schönbrunn

Palace and zoo that both had over two million visitors and are located in the thirteenth district. In fourth place as the most visited attraction, is the Hundertwasser Village, with 1.2 million visitors, followed by the Belvedere with almost 900,000 visitors. Both the Hundertwasser Village and Belvedere are in the third district.

Table 5 shows the total number of visitors of attractions, the total number of attractions, the total number of guests staying per district, and they are ranked by the highest ratio of guests per inhabitant per district. It is clear that the first district has the most attractions, 18, and the highest number of visitors, 839,103 as well as the highest number of guests staying, 6,589,031. Furthermore, looking at this table one can draw the following correlations: There is a high correlation of 0.97, between the number of attractions and the number of guests staying in a district. There is a high correlation of 0.95 between the total number of attractions and the ratio of guests to inhabitants.

Therefore, it would be plausible to draw the conclusion, that attractions are a key driver for attracting tourists. This might increase the ratio of guests per inhabitants, as well as the number of guests staying in a district, which hence increases the risks of crowds, such as in the first district.

District	Total number of attraction's visitors	Total Number of attractions	Guests staying	Ratio of guests to inhabitant
1	839 103	18	6589031	402
7	782 310	5	406184	13
3	727 163	5	918055	144
6	511641	1	302878	10
8	0	0	216044	9
4	135992	1	277954	8

Table 5: Attractions and guests per district (TourMIS, n.d.-e)

4.2.3   Current Measures for Crowd Management

As already mentioned earlier "Global.Smart.Premium" is an instrument that will emphasize the quality of the city and cope with the different requirements of visitors, residents, and entrepreneurs in order to keep them in balance. Moreover, it involves

several measures that improve crowd management and crowd distribution in Vienna, which will now be explained.

4.2.3.1 Measures in "Global" Vienna

The goals of global strategic orientation are the improvement of connectivity, the quality of services and of shopping. As pointed out before, crowd issues appear at shipping piers and bus stops, which harms connectivity. Therefore, an upgrade of both types of locations is planned. When tourists do not know where to go and look for information, for example when stepping out of a metro station, it can create congestion and therefore crowds. Hence, to provide at least bilingual services and InfoPoints in public spaces, like public transportation, is crucial and is on the list of the Tourism Strategy 2020.

Furthermore, the current opening hours of retail shops have an influence on the crowd distribution. By adapting to the international trend of flexible shopping opening hours, the distribution of people can be improved (Vienna Tourist Board, 2014).

4.2.3.2 Measures in "Smart" Vienna

"Smart" is all about mobility management and modern technologies which will be continuously developed. It focuses on several aspects which, will now be explained.

First it focuses on improving mobility and quality of public transportation. One objective is to simplify and promote the access of City-Bikes to tourists, which will give tourists an alternative to public transportation and can help to have fewer people in metro stations or trams. Furthermore, a continuous partnership with "Wiener Linien" and the executive authority will be intensified. This enables the efficient management of crowds, for example when there are large-scale conventions, by closing certain stations or reducing the intervals.

Secondly it focuses on ensuring a positive view of the residents on tourism. In order to do so, the importance of tourism will be more intensively communicated and there will be periodical monitoring of the residents' attitudes towards tourism via a direct feedback system that permits them to express their concerns and problems (personal communication, May 21, 2017).

Last but not least it focuses on creating new attraction poles for visitors and interplays with the "Premium" offer. In order to avoid overcrowding in certain areas, that were mentioned previously, new areas or promotion of existing areas in Vienna will be

brought to the attention of tourists. The creation of new attractions through new design, architecture, and cultural highlights will not only be appealing for tourists, but also for residents. Examples of new attractions are the restructuring of Mariahilferstraße, which is now partly exclusively for pedestrians, the new Vienna University of Economics and Business which is becoming a hotspot for students, the redesigned area of Seestadt Aspern and soon the new Belvedere quarter next to the main train station. Existing areas that are outside of the city center, such as Brunnenquarter, Karmeliterquarter, Freihausquarter, Yppenquarter and Ankerbrot-Gründe but which are still attractive, will be stronger promoted. Moreover, Vienna will be additionally promoted as a point of departure for excursions in nearby regions and increase its partnerships with other regional management organizations. As was also mentioned in the interview, cooperation with other European cities exists as well, to distribute the tourists.

4.2.3.3 Measures in "Premium" Vienna

Premium Vienna is built on providing high quality experiences and exploring Vienna's full potential and offers. Measures taken for this are similar to the ideas of smart city and help to distribute the flows of tourists. One of them is to present art and culture in experimental spaces such as former industrial halls. Tourists will then go there instead of going to the museums in the inner city as they usually do. Another measure is to offer cultural experiences throughout the year to cope with seasonality, which is one of the main issues with crowds. Increasing the potential of shopping streets outside the city center, such as Neubaugasse or development of Pop-Up Stores, is also one measure and will help to disperse tourists. "Placemaking" is an important role of premium and it involves the redesigning of public spaces such as a more pedestrian friendly zone and putting an emphasis on cleanliness e.g. Schwedenplatz.

Vienna is not the only city facing the issue of crowds and mass tourism. Other popular city destinations, such as Venice, and their measures will now be presented in the next section.

4.3 Approach of Other Cities and Their Best Practices

Amsterdam has over 8.5 million overnights visitors and 49 million same-day visitors, but only 700 thousand inhabitants. This represents a risk of overcrowding; hence measures have to be taken. Their approach is to attract more individuals outside the city center and improve the distribution. In order to do so, they developed several subcenters with their own identities, each having five key factors to attract visitor flows:

1- Distinctive image and authenticity
2- Availability of attractions
3- Availability of accommodations
4- Basic amenities (shops, restaurants)
5- Good connectivity (to and between the subcenters)

The most important actions to consider in such a project are the conceptual, promotional, and infrastructural components. These involve characterizing new areas and profiling them with entrepreneurs and guides. Another one is to promote the construction of hotels outside the city center and to increase the signposting and panels at buildings. Increasing the public transportation connections and franchising new tourist information offices are also actions to be taken.

So far, the measures are effective and people are already spreading, out as the following example shows: the promotion on the official Amsterdam Website of a bridge recently built in one of the new subcenters, eventually led to the attention and attraction of tourists (Dominicus, 2012).

Bruges approaches this topic differently than Amsterdam. With 1.6 million overnight stays and a population of 120 thousand inhabitants, Bruges faces challenges for tourist crowds. Their aim is to render the tourist's experience more enjoyable and less stressful by redistributing tourist flows and using a slowdown concept. They try to provide alternatives to the fast-paced society in the field of urban design. Several old landscape solutions and structures can be used to fully enjoy the place and can also be at the main attractions. To influence the tourist flows the reconstruction of bridges, quays or passages can be a solution as well. One example is the "Minnewater Park" where the attractions are the "Begina Cloister" and the lake. The following slow design elements are used: green spaces, water, bridges, flora and fauna (Pécsek, 2015).

One of Singapore's approaches is crowd monitoring via big data. Their focus lies on the mobility of the city. Mobile operators are used as key partners to deploy crowd management solutions that are sustainable. Singapore therefore uses, among others, a new service called "Grid 360" developed by StarHub. This enables both the government and public transport operators to understand how crowds move. Furthermore, it is able to combine the data with additional datasets and different layers. Therefore, different insights into crowd movements through the city can be derived. One example is the university campus where flows of people can be improved in order to ensure the most efficient way to get to and from the site (GSMA, 2016).

Barcelona is seen as a top tourist destination in Europe and attracted many cruise ships in the past years which brought over 32 million visitors. Contrary to what could be expected, it leads to unsatisfied residents and negative consequences such as high rent prices, low wages, environmental problems, etc. A potential countermeasure discussed by the city government of Barcelona is to limit the number of guest beds offered and to put further construction and operation of new accommodations on hold. However, this is strongly criticized by the hotel association, arguing that it weakens the economy (Thierjung, 2017).

Venice is also affected by overwhelming guest arrivals. Similar to Barcelona, cruise ships bring too many tourists, leading to over 25 million visitors, but only one-third stay overnight. The city of Santorin managed to do what Venice has been trying to do: creating limit of 8,000 same day tourists (Thierjung, 2017). This approach is, however, not suitable for Vienna, since it does not face such an extreme problem.

In the next section I will provide personal recommendations regarding the measures that Vienna can take in response to the increasing risk of crowds.

5 Recommendations

I will start by sharing my primary recommendations and then moving to the least impactful.

In my opinion, the most important measure is to improve the monitoring system to get better visibility and be able to take action. Real-time situation information is very important in crowd management, since it allows one to detect where crowds are located. For the future, it is important to create and adapt an algorithm that collects the data and processes it accordingly in real time to be able to anticipate and solve crowd problems on the spot, as Wijermans et al. (2016) also discussed. It could even be used more effectively to predict a crowd and displace people ahead of time. The use of emerging technologies like big data and artificial intelligence could be effective tools to anticipate and predict certain crowd scenarios.

The second recommendation, is to develop a governance model that coordinates Vienna's districts and looks at the "Big Picture", similar to what Amsterdam did, in order to attract tourists away from the city center. The aim is to create alternative attractive centers to distribute the tourist flows, as well as integrate tourism into the urban design of all new projects. Therefore, investments in attractions, public transportation, and hotels outside the city center, should be the main focus. Furthermore, alternative subcenters, such as the Karmelitermarkt or event locations such as St. Marx Hall, should be promoted.

My third recommendation, is to improve the information and communication system to better interact with tourists, i.e. advising and guiding tourists, and collecting feedback. This can be done by increasing the amount of signage and billboards, as well as translating them into the languages of the largest groups of tourists, as also mentioned by Filingeri et al. (2017), in the five key elements for planning. Furthermore, a smart phone application that re-routes tourists and guides them to other areas could be an effective way of handling crowds in the future. The application could have features like information on public transportation (how to get around) and attractions (waiting time and alternatives). It is important that this application would

also be promoted in order to ensure its download and usage, which can be supported by incentives or gamification, as proposed by Kopp (2014).

My next personal recommendation is developing partnerships with companies such as Big Bus and Vienna Sightseeing Bus. At the moment, they drive around the main attractions and areas that have an elevated risk of crowds, especially Big Bus. One could found a commercial agreement with them (business model based on advertisement or revenue share e.g. by selling tickets) in order to extend their tours and make them promote new alternative areas, already mentioned above. Furthermore, they could be used as information and communication channels, showing tourists on the bus where to go and informing them live about the current crowd situation.

Last but not least, I would recommend taking measures concerning the opening hours of Vienna's shops and supermarket. They should adapt to international standards, which means extending their opening hours during the week and on Saturday. Furthermore, I would suggest having shops be open on Sundays, since it will more evenly distribute the tourism flows.

6 Conclusion

This thesis looked into the topic of crowd management in Vienna focusing on visitors' growth in the context of a rising population. Crowd management in cities is an important societal theme, mainly driven by the megatrends of urbanization, as well as global trends of affordability and accessibility to cities for short-term trips. Research has shown that up to now, the study of this field has been limited. Since this topic is becoming more pressing, there is still the potential to research it. This thesis attempted to contribute to this research, by trying to answer the question of: How can Vienna manage and steer the flows of crowds?

Therefore, the concept of crowds was defined and its negative connotation was discussed. It focused on the fact that not only tourists were source of crowds, but also residents and commuters and mentioned the importance of their positive cohabitation. Furthermore, the formation of crowds was explained on a micro- and macro-level by factors attracting crowds. It is important to understand these factors in order to manage crowds. One of them is the destination product explained by Morrison (2013). As discussed in the case study, Vienna's destination product is very strong and attracts business guests, as well as leisure guests.

The chapter Crowd Management highlighted the steps and practices applied. Planning is the first step and needs the most attention, as argued by Wijermans et al., (2016). Vienna should therefore focus on the five important themes (physical design of crowd spaces and facilities, crowd movement, communication of information, comfort and welfare, public order) mentioned by Filingeri et al. (2017).

The next step in crowd management is event execution, which involves crowd monitoring. Several techniques such as the employment of stewards and officers on the floor, video monitoring and crowd sensing can be implemented. The study also provided some examples of the current realization of crowd monitoring techniques. All these techniques have limitations and challenges. The most crucial one is that in general the information is not provided in real time to anticipate and manage crowd. Another critical issue of crowd monitoring is the interference into people's privacy, which raises more and more concerns (Longo & Cheng, 2015). There are still some

limitations to distributing crowds evenly in a particular area and in a timely fashion, which Vienna also faces, leading this study to analyze Vienna's current situation.

Vienna is proud of its tourism success story and how it has attained new records of overnights stays for the last seven years. With the increasing number of tourists and inhabitants in Vienna, the topic of crowd management becomes even more critically important. So far, the city is still benefiting from tourism (economically, but also as a representation of Austrian values in the global context) and current studies have shown that residents' perceptions are (still) positive. One indicator to measure this is to look at the ratio of guests per inhabitants, which is very reasonable in Vienna as compared to the European benchmark (i.e. second tier). However, when taking a closer look and examining the ratios in the individual districts, one can see that certain districts and areas (such as the first) have a very high proportion, which represents a high risk of crowd issues and hint at potential concerns.

Crowd steering offers some solutions for these issues. There are two ways of steering which are preemptive steering and proactive steering. Steering, especially distribution is also an important subject for the city of Vienna. In order to attain an effective crowd distribution and anticipate potential crowd issues, several steering strategies could be applied in Vienna, such as a crowd steering application. Current measures of the Vienna Tourist Board are for example the active promotion of attractive alternative areas outside the city center.

To recap, one can say that crowd management is becoming a huge challenge for cities and a global concern as far as keeping the right balance between quality of life for residents and economic values with regards to attracting tourism. It is important to find the most efficient model, and to create a balance that works, in addition to creating value for the city. Tourism provides a sound foundation for investing in attractions and infrastructure in the city that can also be enjoyed by the residents themselves later. Cities that have a sense of urgency to address the issues of crowd management can be inspired by and collaborate with cities that are already coping with this problem, such as Amsterdam as best practice.

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Appendices

Appendix 1

Transcript of the interview with an expert of Vienna Tourist Board, May 19th, 2017

Was macht Wien so attraktiv und warum kommen immer mehr Touristen?

Es gibt grundsätzlich zwei globale Trends, die Städtetourismus im Allgemeinen relevant machen: Urbanisierung und Globalisierung

Mit Urbanisierung ist gemeint, dass immer mehr Menschen in Städten leben und nach Erlebnissen suchen.

Mit Globalisierung ist die Erreichbarkeit von Städten gemeint: Flugverkehr, Punkt zu Punkt Verbindungen. Immer mehr Leute können sich das Reisen leisten.

Als Stadt bist du entweder bekannt oder nicht und Wien ist auf der kulturellen Landkarte sehr sichtbar und hat viele Angebote.

In den letzten Jahren war das Wachstum sehr international bedingt und heuer (2016) ist der Domestic Tourism wieder stärker gewachsen und wird auch stärker wachsen als internationale Ankünfte. Wien hat ein sensationelles Angebot im Vergleich und ist einfach sehr gut angebunden.

Wie hat sich das Profil der Touristen in den letzten Jahren verändert?

Ist nicht ganz leicht zu beantworten, die bessere Frage wäre, wo kommt das Wachstum her.

Das Profil der Touristen und das Interesse liegen inhaltlich immer noch stark an der Kultur, an den Schwerpunkten, die Wien zu bieten hat.

Touristische Praxis hat erkannt was die Wissenschaft schon viele Jahre gezeichnet hat: die Grundgedanken der Experience Economy und Co-Kreation der Einwohner mit den Touristen gemeinsam und was die Menschen mit der Destination ausmachen, ein wichtiger Bestandteil ist und da entstehen alternativ zwei Zugänge:

Städte, die nur mehr auf lokal Kolorit setzen, da ist die Frage, was die treibende Kraft ist: wenig echtes Angebot was für sich steht, wenige USPs aber dafür mehr Marketing technisch.

Ansonsten, wie ich es auch zur Entwicklung gesagt habe, kommt das Wachstum von internationalen Märkten: „Reiseschwelle" sinkt, Flugreisen sind einfacher. Man sieht

in der Nachfrage ganz starke Veränderung in der Zeit: vor 20 Jahren waren Flugreisen ein absolutes Prestigethema. Es ging fast nur Business zu fliegen. Mittlerweile hat sich das auch durch Korruption extrem geändert: Standardangebot reicht, man braucht nur mehr die Basics eg. Motel One. Da hat sich nachfrageseitig etwas geändert, vor allem im Geschäftsbereich: bei Kongressen dürfen sie nicht mehr 5 Sterne Hotels buchen.

Imageanalysen sind eigentlich sehr stabil. Was sich ändert, sind die sozialen Veränderungen in der Gesellschaft. Thema Küche und Essen sind immer stärker geworden die letzten 10 bis 15 Jahren und das sieht man auch an der Nachfrage. Wenn die Gesellschaft sich in eine Richtung entwickelt, dann entwickelt sich auch die Nachfrage.

Wien ist per Definition keine Destination für Familien. Wien hat die Herausforderung, aus destinationsstrategischer Sicht im Golden Triangle (Prag, Budapest, Wien) zu stehen. Es kommen viele Touristen, die diese Kombination machen und die Angebote dieser 3 Städte und vor allem auch wie sie sich positionieren und welche Touristen da angezogen werden sind sehr unterschiedlich. Wien leidet ein bisschen unter dem Preiskampf und dem Preisniveau, die in Prag und Budapest vorherrschen. Wir versuchen aber ganz bewusst in der Kommunikation nicht solche Dinge herauszustreichen: „komm nach Wien, du bekommst ein Bier für ein Euro, mach Party"

Wir sind uns bewusst, dass gesellschaftlich vorgeworfen wird, wir sind zu wenig hipp, zu wenig jung, aber am Ende des Tages sind wir sehr zufrieden und bedient mit den Gästen, die wir haben, in der Altersschicht, mit dem Einkommen, mit den Ausgaben und dass sie das kulturelle Angebot so konsumieren, wie sie es konsumieren.

Durch die Reiseschwelle kommen natürlich auch andere Segmente. Die Struktur der Stadt hat sich stark verändert. Die Zunahme an Betrieben vor allem wie Budget (Motel One und dergleichen) passiert. Jedes Hotel, jeder Brand zieht auch ihre Kunden an, sagt aber nichts über die Wertigkeit des Gastes aus: man kann ökonomisch wohnen und trotzdem das kulturelle Angebot ausnützen.

Wie hat sich Wien verändert beziehungsweise die Infrastruktur?

Stadtentwicklung, wichtig zu betrachten im Crowd Management. Tourismus soll nicht isoliert betrachtet werden. Place-making oder Raumplanung noch viel aktiver zu arbeiten, denn man muss sich bewusst sein: wo kommt der wahrgenommene Druck her, weil am Ende des Tages siehe Marketing: perception is reality. Es ist was Individuelles, im Crowding spricht man auch von der optimalen Dichte oder optimalen Menge an Personen. Jeder Mensch sieht das anders und es kommt auch auf die Situation an (wenn man gestresst ist, zur Arbeit zu gehen, wirkt es viel mehr und unangenehmer, als entspannt durch die Stadt schlendern).

Wann ist das Thema Crowd Management aufgetreten?

Aus unserer Sicht gibt es keine Probleme mit Crowding in Wien. Es ist wie in jeder Stadt und bei jedem Event, du hast aufgrund der Stadtplanung und aufgrund von Gegebenheiten oder temporären Gegebenheiten natürlich die Situation, wo es zur Ansammlung von Menschen kommt. Wir beobachten die grundsätzliche Lage seit 2006 laufend in Form von Studien und einer der wichtigsten Gradmesser ist, wie die Einheimischen dazu stehen, wie sie es wahrnehmen. Relevante Sensoren sind das Zusammenspiel zwischen Touristen und Einwohnern. Durch unsere Arbeit mit Tourist Info, Call Center und so weiter verstehen wir uns als Anwalt der Gäste. Wenn Beschwerden kommen, kommen sie zu uns und wir versuchen, sie zu lösen. In der Tourismusstrategie 2020 sieht man die Felder, wo man im Bedarf ist, etwas zu verändern oder etwas zu tun. Es gibt natürlich Orte und Zeiten in Wien, wo wir schon seit einigen Jahren ganz bewusst versuchen zu steuern: zu Weihnachten die Christkindlmärkte, Busparkplätze (Hundertwasser Haus), wo Gegebenheiten nicht optimal gelöst sind, in Nußdorf, die Schiffsanlegestelle. Das sind Dinge, wo die Stadt schon seit langem Lösungen sucht und diese vorschlagen, aber auch lösbar ist.

Wenn es zu einer wahrgenommenen Überfüllung kommt oder zu Ärgernissen kommt, dann ist es wichtig, dass es auch wieder eine Entlastung gibt. Das Level ist relativ egal, wie viele sich gestört fühlen (80,90,95 %) wichtig ist, dass es immer nur in Perioden auftritt und dann wieder weggeht. Wenn man konstant das Gefühl hat, dann ist es wirklich ein Problem. Wenn es kurz einmal so ist, dann ist es völlig normal.

Aber wenn Sie sich den 1. Bezirk anschauen? Es wird nicht so wahrgenommen und es ist nicht konstant, Jänner und Februar ist nichts.

Wien ist städtebaulich sehr effizient (verglichen zu Amsterdam): die Breite der Straßen, „walkable city", geringer Anteil von Touristen, die mit dem Auto kommen.

Tatsächliche Herausforderung sind die Tagesgäste (Barcelona, Dubrovnik, Schiffsanlegungen, enorme Tagesgäste)→ in Wien ist es deutlich entspannter.

Als Bewohner weiß man, dass man an gewissen Tagen, gewissen Uhrzeiten, gewisse Plätze meiden sollte (zum Beispiel der Christkindlmarkt am Rathaus).

Tourismus soll einen Mehrwert den Einheimischen stiften. Unsere letzte Untersuchung zeigt einfach, dass wir aktuell den besten Wert haben, der international in unseren Benchmark Studien erreicht worden ist. Wien scheint wirklich sehr gut dazustehen.

Man muss genau hinschauen, denn oft werden die Themen politisch gesteuert. Barcelona hat wirklich Crowding Probleme, aber es hat auch eine politische Partei genutzt (PR falsche Fotos).

Auf der einen Seite bist du als Stadt abhängig vom Tourismus. Es gibt unterschiedliche Probleme derzeit: die einen, die sagen, wir haben zu viele Touristen, was dann für Organisationen wie Vienna Tourist Board bedeutet, warum man sie eigentlich noch braucht und sie Geld bekommen sollten. Auf der anderen Seite sieht man bei Städten wie Paris oder Brüssel, die nach Terrorismus Anschlägen Rückgänge von 30-40% haben und jetzt das erste Mal professionell anfangen Tourismusmarketing zu betreiben und erkennen, dass Tourismus ein wichtiger Wirtschaftsfaktor ist. Nachdem Tourismus ein extrem politisches Umfeld ist, was meine persönliche Meinung ist, ist es auch so, dass es diverse Spindoctors gibt, die Einfluss haben und in den schönsten touristischen Lagen auch wohnen und dort versuchen, es zu verändern und beeinflussen. Berlin ist auch ein Beispiel, die Viertel, die total hipp waren, sind irgendwann auch erwachsen geworden und haben Kinder bekommen und jetzt stören sie sich dran.

Man muss Crowding objektivieren, es gibt Kennzahlen dafür sowie Richtwerte, die man sich anschauen kann, um ein Gefühl zu bekommen, es sich an der Verteilung übers Jahr anzuschauen: ist es konstant oder in einzelnen Monaten sehr hoch. Man muss schauen, was der Gradmesser ist, in unserer Branche ist es, wie die Bevölkerung

es wahrnimmt, wenn sie sagen, der wirtschaftliche Beitrag überwiegt die Einflussnahme auf die Lebensqualität, dann erfüllt Tourismus seinen Zweck.

Das heißt momentan ist es noch nicht als Problem gesehen?

Nein, im Gegenteil, es ist auch so, dass die inneren Bezirke nicht anders antworten als die Außenbezirke. Natürlich gibt es punktuell immer wieder Themen, aber man muss in der Nomenklatur wirklich sehr aufpassen, wovon man spricht und wann Crowding wirklich Crowding ist. Der Tourismus ist nur ein Teil, es geht um gewisse Flows, wie bewegen sich Menschen durch die Stadt, der Tourist ist ja nur ein Teilnehmer, du hast ja auch die Einheimischen. Wie ist eine Stadt geplant, gebaut, damit alle möglichst gut miteinander interagieren können und die Stadt benutzen können. Eine der großen Hürden ist, dass Stadtplanung und Tourismus zu wenig verschränkt sind.

Man redet auch von den „temporary residents", wo wir sehen, welche Herausforderung es sein kann für jemanden, der sich nur für eine kurze Zeit in einer Stadt aufhält und sich bewegen will. Zum Beispiel Quandoo ist eine gute App, aber als Tourist kennt man es nicht und es ist nicht geeignet.

Wenn es zu Problemen kommt bei den aktuellen Busstops, dann ist es kein touristisches Problem, sondern wie die Stadt es schafft es zu managen, kanalisieren und positionieren.

Was für Partnerschaften gehen sie ein?

Man kann schauen, was Barcelona und Venedig machen, aber 90% der Aktivitäten sind rein politisch Marketing getrieben im Gegensatz zu Wien, wo wir glücklich sind aufgrund unserer städtebaulichen Gegebenheiten. Barcelona und Venedig haben dermaßen großen Druck bekommen, dass sie sich verändern mussten und was vorweisen mussten. Die erste Maßnahme war, eine große Kampagne zu machen und sagen, es ist außen rum vom City Bereich auch total attraktiv und alle Leute fahren dorthin, es ist alles nur PR Marketing, aber in Wirklichkeit funktioniert das kaum.

Man muss sich überlegen, wer hat den schwarzen Peter, macht es wirklich den Unterschied aus, dass die Touristen im Vergleich zu anderen Stakeholdern in der Stadt der Auslöser des Crowdings sind? Die Ursache des Problems? Wenn man einem Touristen sagt, nicht nach Schönbrunn zu gehen, sondern eher in die Wachau, wie wahrscheinlich ist es, dass er das macht? Das muss man sich realistisch überlegen, was

hat Chancen, was hat Anziehungskraft genug, um sowas zu ermöglichen. Ich kann das machen, um Leute dazu zu bewegen, länger zu bleiben oder ein zweites Mal zu kommen, wenn man attraktive Spots rundherum schaffe.

Ist ein aktives Umlenken der Touristen, wie zum Beispiel von Schönbrunn in die Wachau eine Option um Crowds besser zu streuen?

Wir haben Regionalpartnerschaften, wo wir sagen, dass ist auch ein Angebot, das du auch nutzen kannst, aber am Ende des Tages ist Tourismus in Österreich Ländersache und es ist Steuergeld, das in Wien generiert wird und das ist noch ein längerer Weg, dass Wiener Steuern bewusst dafür eingesetzt werden, die Wachau zu vermarkten. Auf der anderen Seite gibt es Bestrebung, das Ganze internationaler anzugehen, es gibt Kooperationen mit anderen Städten, um halt als Städte Europas aktiv zu sein und so die Touristen verteilen.

Man muss in all diesen „claims" aufpassen und die Dinge objektivieren. Woran erkennen Sie, dass Barcelona ein Massenproblem hat und Wien nicht? Am Ende des Tages sind es Behauptungen und man muss es beweisen, ansonsten helfen auch die Maßnahmen nicht. Und gerade diese Dichtwerte kann ich mir zwar ausrechnen, wie viel Dichte habe ich pro Einwohner, aber das sagt mir noch lange nichts über die wahrgenommene Geschichte. Daher gibt es sehr viele Studien mit den Einwohnern, was ein wichtiger Indikator ist.

In Salzburg ist es natürlich ein Thema, aber dafür verdienen sie in 2 Monaten so viel wie das ganze Jahr.

Es ist wichtig für eine touristische Marketing Organisation, die Gäste zu steuern und anzusprechen, die Mehrwertschöpfung in der Stadt lassen.

Wenn Sie an die Zukunft denken, können Sie sich vorstellen, dass es zum Problem in Wien werden könnte?

Natürlich, die Steigungsraten in den Städten Europas sind einfach massiv, bei uns genauso und wir haben uns für die Tourismusstrategie genau angeschaut was verträgt die Stadt und wie viel mehr Nächtigungen wollen wir und wie viel halten wir auch aus. Wir haben auch definiert in welchem Segment wir wachsen wollen, wie in der Industrie, es geht um Überproduktion: es ist gescheiter, ich füll ein 5sterne Hotel als

2 Sterne Häuser: ich hab weniger Leute, die gleichen Ausgaben, bin produktiver. Es geht um Fokussierung.

Haben Sie Partnerschaften mit gehoben Hotels? Mit allen, aber natürlich tun wir alles um Wien nicht günstig dastehen zu lassen. Und wir wissen in der Marktforschung, dass ein Gast im Motel One kein Gast der 2. Klasse ist. Wir schauen, wie verschiedene Gruppen die Stadt konsumieren und dann sehen wir, wer ein attraktiver Gast ist und sich integriert oder eher ein Gast ist, der als „alien" gesehen wird.

Welche Attraktionen oder Bezirke sind besonders gefährdet in das Problem reinzurutschen?
Wir haben ein klassisches Kapazitätsproblem in Schönbrunn, meist besuchte Sehenswürdigkeit Europas. Beim Louvre optimieren sie es, um die Leute in 30 Minuten durchschleusen zu können, Experten helfen diese Zugänge zu optimieren. Schönbrunn ist aber denkmalgeschützt und hat eine Kapazitätsgrenze. Schönbrunn ist eine Sache, die man als Tourist in Wien gemacht haben muss. Was BusZu- und -aussteigemöglichkeiten betrifft, ist es in Schönbrunn eh super und wir investieren auch viel Energie.

Und wenn man jetzt zum Beispiel die Sightseeing Busse nimmt, kommen da Probleme auf oder kann man das optimieren?
Also jetzt sind wir in der Politik (haha). Es ist ein internationales Angebot, was es auch in anderen Städten gibt und was Touristen gerne annehmen. Die Frage ist, ob man es in Wien wirklich braucht, da man viel zu Fuß gehen kann und öffentlich gut angeschlossen ist. Man muss immer schauen, was ein wertvolles touristisches Angebot ist e.g. Souvenir Verkäufer vor dem Stephansplatz brauchen wir nicht. Das schlimmste was uns passieren kann, ist es, wenn Touristen abgezockt werden oder mindere Qualität geboten wird.

Aber das heißt, dass man aktuell nicht wirklich von einem Crowd Problem in Wien sprechen kann?
Nein, aber es gibt natürlich immer einzelne Stimmen dagegen. Wir machen ein laufendes Monitoring seit diesem Jahr und befragen laufend die Wiener, sodass es ein

direktes Feedback gibt, wo wir fragen ob sie ein Problem haben, wo ist das, lebst du in einer Tourismuszone, wie können wir dir helfen, was kann man tun. Es gibt ein direktes Feedbacksystem, wo die Bewohner Gehör finden und aufnehmen kann. Wir haben ein Strategiegruppe, die die wichtigsten Stakeholder und Gatekeeper der Stadt jetzt im touristischen Bereich sind und da werden diese Themen angesprochen.

Und was sind die konkreten Dinge, die es zu tun gibt im Bezug zu Crowd Management?

Schauen Sie sich die Tourismusstrategie 2020 an. Großes Problem ist Beschilderung, du kannst noch so viele Schilder aufhängen, es wird nicht funktionieren, wegen kulturellen Unterschieden, verschiedener Bedürfnisse. Leute zu lenken ist unglaublich schwer und durch Marketing allein wird es auch nicht gehen, wir setzten uns jetzt mit persuasive Technology auseinander, sodass die Touristen mit Hilfe von Technologien und Rekommandation System gesteuert werden. Es kann zum Beispiel mit Gamification, Coupons funktionieren. Wir evaluieren, was es für Sensoren in der Stadt gibt, wir haben eine Wien Karten App, wo wir recht gut wissen, wo sich die Leute bewegen. Wir tun auch sehr viel im forscherischem, um zu schauen, wie man das am besten lenken kannst, aber du wirst halt immer nur ein kleines Teil beeinflussen können.

Was wir aktiv tun, ist bei Großkongressen mit der Exekutive und den öffentlichen Einrichtungen zusammenarbeiten. Zum Beispiel wenn wir wissen, dass wir sowie bei der ECR mit über 50.000 Teilnehmern, dann haben wir eine engste Abstimmung mit den Wiener Linien, dass zum Beispiel Stationen gesperrt werden oder dass sich die Intervalle verändern. Dieser Aufwand zahlt sich auch nur dann aus, wenn man wirklich so eine große Masse hat. Es gibt auch Sicherheitskonzepte, welcher Platz wie viel Personen aushält. Bei jedem Event ist immer ganz klar, wie viele Menschen dürfen da sein und das ist zu regulieren. Aber als Stadt kannst du nicht alles regulieren, was eines der größten Sorgen ist auch der Bevölkerung gegenüber, sodass sie nicht überreguliert werden.

Im Crowd Monitoring gibt es neue Technologien, welche davon setzen sie ein was halten sie von denen?

Wir sind eine der wenigen Tourismus Organisationen in Europa, die ein signifikantes Budget und Ressourcen für Forschung haben und die Verbindung zwischen Wissenschaft und Wirtschaft. Es gibt einen großen Trend zu den smart connected products, und wir werden immer mehr Sensoren in der Stadt haben und wir haben schon sehr viele. Es ist kein Problem zu wissen wo, wie viele Touristen sind, das Problem ist diese Information in Echt Zeit zu nehmen und Algorithmen zu entwickeln, die in Echt Zeit Rekommandation ausspielen und dann zum Gast bringen, die dann überzeugt sind, das Verhalten zu ändern. Eine Option wäre das Smartphone, aber trotzdem braucht man eine App oder irgendwas, wo die Informationen ausgespielt werden können. Im öffentlichen Raum gibt es andere Möglichkeiten, man kann vielleicht über digitale Billboards versuchen, etwas zu tun, aber da fehlt es echt noch an den sinnvollen Zugängen: man muss ja überlegen, es gibt Partner, die das schon perfekt machen. Wenn ich Google bin oder Apple, dann tu ich nichts anderes, als den Kunden dorthin zu locken, wo der „highest bidder" will, dass ich sie hinlocke. Aber im Tourismus ist das anders, man will nicht dorthin gehen, wo man den besten deal hat, sondern die Destination am besten erlebt oder halt nicht in Gefahr kommt, lang anzustehen, eine gute Destinations experience zu haben. Die Frage ist, kann ich, will ich mit den Großen, muss ich mit den Großen kooperieren, was ist der Preis dafür, was für einen Einfluss hab ich, kann ich das selbst lösen, was für eigene Systeme hab ich, die von Touristen auch genutzt werden, sowie die Wien Karten App, dann haben wir ein Projekt, wo wir an jeder Sehenswürdigkeit Sensoren anbringen wollen. Es gibt schon verschiede Zugänge, aber die große Differenzierung ist, dass die meisten Städte, die in den Medien sind, machen es mit Marketing (schau doch auch mal dort hin, jedes Grätzel ist besonders).

Zusammenfassend kann man also sagen, dass das Problem darin besteht, real time Situation zu verbreiten?

Ja genau, ähnlich wie Dynamic Packaging, du musst alle Sensoren, alle Systeme miteinander verbinden, dann kann man überlegen, wie spielt es zusammen: z.B, Sensor sagt, es regnet oder es hat über 30 Grad, dann schickt er den Touristen, der da ist, dort hin. Das ist einfach zu tun, nur die Schwierigkeit liegt darin, die Information zu dem Gast zu bringen und was wirkt auf ihn (hängt psychologisch und mit Persuasive zusammen und jeder Mensch, Kultur ist da anders). Große Frage ist, wie tu ich das.

Die zweite Geschichte ist auf strategisch übergeordneter Ebene, Marketing ist eine Sache, wie ich einzelnen Stadtteile oder Regionen positionier. Die andere ist tatsächliche politische Eingriffe sowie Zugangsbeschränkungen, Visa Reglementierungen. Aber auch hier gesehen gibt es global gesehen verschiedene Auffassungsunterschiede. Wir betrachten das aus einer Luxussicht heraus. Aber nehmen sie das Beispiel Matchu Pitchu, es gibt eine beschränkte Anzahl von Tickets, um dieses kulturelle Erbe zu bewahren, ist es nachvollziehbar, warum der Zugang beschränkt ist, aber das ist für die chinesische Mentalität undenkbar: wie kann man jemanden ausschließen. Das sind auch die Dinge die in Dubrovnik und Venedig diskutiert werden.

Können Sie sich solche Ausschließungen von Touristen, zum Beispiel mit Visa Reglementierungen in Wien vorstellen?

Mit dem Ausschließen liegt man völlig daneben, es gibt halt Gegebenheiten wie in Schönbrunn, die können, dürfen halt niemanden mehr aufnehmen. Ein großer Teil des Tourismus ist von Geschäftsreisenden und das sind auch Gäste, die deutlich mehr ausgeben und wenn man dann anfängt, Reglementierungen zu schaffen, vor allem was Visa, Anreise und solche Dinge betrifft, dann hat man als Wirtschaftsstandort ein Problem, genauso wie die Diskussion von der dritten Piste…

Also Ausschließungen machen wir nicht. Wir haben Zusammenarbeiten mit Arbeitsgruppen und laufend mit allen Parteien, Stakeholdern und zuständigen und Hotspots, die wir kennen, zu entschärfen und das ist der Zugang. Bei jedem neuen Projekt wird versucht, den Tourismus mitzudenken und einzubringen und auf dessen Bedürfnisse zu schauen. Mehr Einfluss auf die Stadtplanung zu nehmen.

Welche Hotspots abgesehen von Schönbrunn müsste man in Wien noch „entschärfen"?

Die Schiffsanlegestellen, die Bus Ein und Ausstiegsstellen und viel mehr ist es eh nicht.

Setzen Sie schon konkrete Maßnahmen ein?

Ja, wir messen und arbeiten mit der Wissenschaft zusammen, um an Strategien zu arbeiten, wir sind im Marketing unterwegs, auch andere Bereiche als die touristisch

höchstrelevanten in Auslage zu stellen und auch die anderen Seiten von Wien zu zeigen.

Aber wir sind gerade sehr entspannt aufgrund der Ergebnisse der aktuellen Studie. Es gibt zwei Dinge, die Wien da ausgezeichnet hat: man ist nicht jeden Trend mitgegangen und konnte so einen kühlen Kopf bewahren und auf der anderen Seite sind wir gut vorbereitet. Es gibt das Bewusstsein der Marktforschung im Allgemeinen.

Was für relevante Daten und Informationen brauchen Sie für Crowd Management?

Die Sensoren, die es in der Stadt gibt gepaart mit der Wahrnehmung der Einwohner und Stakeholder Gruppen wie Unternehmen und Touristen. Mehr kann man erreichen, wenn man Tourismus in der Stadtplanung integriert; z.B. Nutzung der Stadt und Navigation der Touristen und da können Technologien schon einiges verändern.

Wie publizieren Sie die Ergebnisse?

Das ist unterschiedlich, zum Teil auf der Website, durch Publikationen, den Entscheidern direkt vorgezeigt. Die Tourismusstrategie 2020 ist unsere aktuelle Wunschliste, da steht drinnen, was zu tun ist.

Was für Erwartungen haben Sie für Wien in der Zukunft, wie wird es sich entwickeln?

Mit Forecasten sind wir sehr vorsichtig, die letzten 2 Jahre haben uns gezeigt, dass Tourismus von heut auf morgen auf den Kopf gestellt werden kann. Ich geh davon aus, dass Technologie sehr schnell sehr viel mehr Verbreitung bekommt und genau in diesem Bereich. Es ist schwierig, die digitale Welt mit der nicht digitalisierten Welt zu verbinden, da es das aktuell noch immer gibt. Tourist Info ist genau für solche Leute wichtig und diese sind auf das Persönliche angewiesen, auf der anderen Seite brauche ich Lösungen, wie ich die digitale Customer Journey perfekt hinbekomme. Ziel muss sein die Lebensqualität hochzuhalten.

Haben Sie Empfehlungen für passende Literatur zu diesem Thema?

Die Tourismusgesinnungsstudie, die Kurzfassung der Gästebefragung

Appendix 2

Calculation of Growth Rate of the overnights stays in Vienna from 2000 to 2016

Bezirk	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	Growth Rate	X times more than the previous district
Wien	9356044	9675208	10232472	9842827	10860126	11405048	12262828	12719289	13524266	14328261	14962438		
1 Innere Stadt	1842739	1886813	1824962	1774470	1978827	2047280	2137689	2193825	2201172	2467265	2566709	0,39	1,40
2 Leopoldstadt	874211	933578	1025951	1016966	1150389	1302447	1491456	1511506	1689960	1774685	1836293	1,10	1,14
3 Landstraße	1087388	1090125	1132139	1084001	1180504	1178340	1328440	1334574	1441047	1541620	1617513	0,49	1,24
10 Favoriten	525602	535323	650482	633758	712827	737000	766900	902687	971709	1162143	1303049	1,48	1,23
7 Neubau	657100	681896	698355	651923	726925	763228	738302	837124	869363	904399	1061004	0,61	1,16
15 Rudolfsheim-F	459588	515402	570989	639654	723053	684508	869802	920569	927511	913893		0,99	1,32
4 Wieden	424922	419082	426300	400129	466373	583575	604494	599639	645860	662802	693377	0,63	1,01
6 Mariahilf	562058	587184	627733	570565	649583	632651	581200	650169	652690	678936	685431	0,22	1,16
22 Donaustadt	294690	339810	416284	424248	512065	534221	551287	546056	608947	612237	590838	1,00	1,06
5 Margareten	446143	438727	419127	311030	415383	392326	410497	436568	518956	541035	559828	0,25	1,15
8 Josefstadt	298002	310648	310165	316073	342492	383484	426356	413065	434365	483688	487699	0,64	1,01
14 Penzing	310759	298206	290188	236046	217706	298429	392250	386574	405218	463358	484142	0,56	1,22
9 Alsergrund	474296	482822	499049	443443	454750	454227	452029	42909?	443156	454027	397787	0,16	1,14
17 Hernals	86999	118150	208806	272603	298081	323966	345243	332870	333381	336399	348659	3,01	1,27
13 Hietzing	284964	277372	264889	231216	140465	140898	243744	238021	265369	275706	273863	0,04	1,01
11 Simmering	18717	19829	82768	90817	102777	109124	133917	203920	243917	233048	271649	13,51	1,13
12 Meidling	197273	222366	228017	211988	225813	234668	249933	250187	253883	219209	240624	0,22	1,24
19 Döbling	140786	159744	173677	151899	153781	159221	144047	115137	159846	169506	194260	0,38	1,14
16 Ottakring	102117	97294	106343	150384	163770	172767	152243	145210	167978	164040	170454	0,67	1,12
20 Brigittenau	106179	112315	116093	96509	105453	114831	110105	123474	131994	132855	152070	0,43	2,64
23 Liesing	89295	68942	73741	69631	71542	77691	69916	60447	65291	55218	57536	-0,36	1,33
21 Floridsdorf	28471	32534	34233	27038	29955	36821	55559	49581	46146	40623	43154	0,52	3,42
18 Währing	43745	47046	42718	38446	38212	43245	7419	38995	46507	57051	12606	0,71	

The growth rate is calculated by subtracting the past value from the present value and then dividing it by the past value.

Growth Rate = (Present value – Past value) / Past Value

For example, to calculate the growth rate for the first district from 2006 till 2016 the formula is:

(2566709-1842739)/ 1842739 =0,39=39%

The rows in red represent the districts that decreased in overnight stays and the row in green shows the district with the highest growth rate which is Simmering.

To calculate the difference of overnight stays between two district the formula is: Overnights from district 1/Overnights from district 2