

Mobile Application Development in the Tourism Industry and its Impact on On-Site Travel Behavior

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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.

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Abstract

Mobile devices are more present in our everyday lives than ever before and as such have also become an important factor in modern travel behavior. This paper argues that in particular the on-site travel experience is influenced by smartphones at large. The aim of this study is to identify how users can benefit from an enhanced on the go travel experience and how companies can explore yet widely untapped opportunities by examining current travel patterns of international travelers and challenging industry experts with the findings. As such, the results reveal that travelers are increasingly shifting travel-related activities that were usually conducted before or after the trip towards the experience stage, happening during the trip. The behavioral change of travelers being empowered to acquire information on the spot due to increased connectivity implies huge potential for a greater travel experience and new business models alike.

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List of Abbreviations

App	Application
EXPE	Expedia
IAP	In-App Purchase
TRIP	TripAdvisor
PCLN	Priceline
POIs	Points of interests
Wearable(s)	Wearable device(s)

Introduction

The development of mobile applications has been on the rise for more than half a decade, ever since the first appearance of the very first app store in July 2008 (Apple, 2008). While overall the mobile evolution has contributed to enhancing the travel factor at large, only little is known about how it has affected the on the go travel experience. This lack of intelligence is critical because gaining deeper knowledge in the field of how travellers are using travel-related applications during their trip could provide meaningful insights to fill untapped opportunities for tourism companies and solve problems of travelers having insufficient access to resources enhancing their travel experience on the go. In order to address this problem, the author aims to uncover unfulfilled needs of travellers during their journey and present suggestions of how travel-related companies could respond.

The mobile trend in the tourism industry is massive, as research by the full service online travel site Expedia (2014) suggests. The online booking agent refers to an overwhelming majority of 76 % of travellers saying that smartphones play a crucial role in today's lives, furthermore implying that mobile devices critically support travellers at every stage in the travel process. Three years prior to this statement, Google's information and resource hub for marketers, Think with Google (2011), elaborated the five stages of travel: dreaming, planning, booking, experiencing and sharing as visualized in figure 1 below.

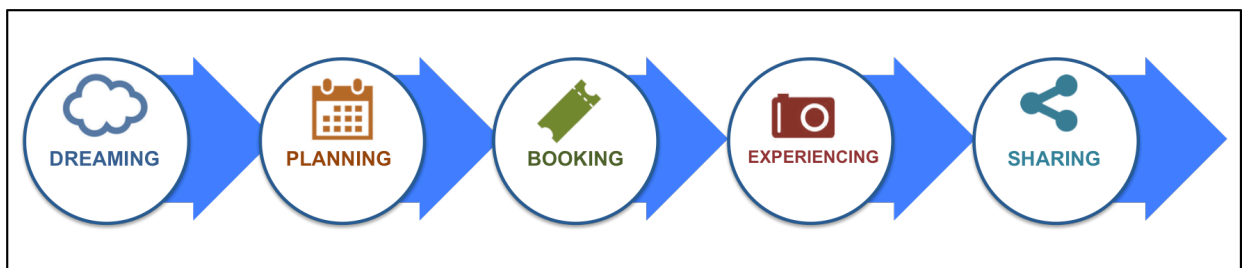


Figure 1: The Five Stages of Travel (Google, 2011)

The fourth stage, experiencing – in this paper also referred to as on-site travel – covers the actual journey. Unique characteristics of mobile devices and their forthcoming ability to assist travellers anywhere and at anytime (Rasinger, Fuchs and Hopken, 2007 cited in Wang, Park and Fesenmaier, 2012) on the go indicate that the

role of smartphones in the travel process is especially beneficial in the experiencing stage, given the ongoing connectivity to smart devices for travellers, whereas in the past they were often isolated from much needed information sources and limited to printed travel guides and paper maps.

This stage, however, seems to as of today only partially penetrated by rather old-fashioned travel book publishers like National Geographic, Lonely Planet, Marco Polo that semi-successfully tapped into the mobile market and early to mid-stage startups in the world of mobile travel guide apps such as tripwolf, Triposo and Gogobot. In contrast, travel stages such as booking and sharing have seen much more investment in recent years in both scientific and financial terms, as the monetization possibilities seem to have proven to be much more profitable in these areas. A few big players from the booking stage such as Expedia and Booking.com (Priceline) expanded their services from the web only to also provide mobile services that almost identically represent their website features but allowed them to exponentially grow in the mobile ecosystem. At the same time, TripAdvisor, the world's largest travel site and the local user review-generating platform Yelp heavily expanded into the mobile sector, too. Each of which have seen some of the industry's fastest growth as can be seen in figure 2, representing their Nasdaq stock value on a four-year scale.



Figure 2: Nasdaq Stock Value Comparison - PCLN, TRIP, YELP, EXPE (Nasdaq, 2014)

The recent developments in the mobile travel app industry have shown that there is yet a big gap between the different travel stages, which needs to be closely investigated in order to uncover potential needs of travellers and to resolve the problem of not comprehensively covering today's travel cycle.

This thesis aims to resolve the tourism industry's problem of lacking profitable products and services that add value to travellers' experience during their trip by identifying their greatest needs and new technological developments that will affect the on-site travel behavior heavily and that serve as a basis for future enhancements during the journey. This is done by analyzing how travellers are using mobile applications during their trip, and how major stakeholders can add value to the on-site travel experience. Furthermore, it is the goal of this thesis to reveal the potential financial value of said stage in the tourism travel cycle to better understand the uncovered possibilities and to accelerate future developments.

In order to further solve these questions, this research examines the expectations of travellers towards mobile developers and the collaborative input of business representatives of the travel and technology industry responding to this input. The rest of this study is separated into five divisions. The next division outlines the developments in the mobile industry to further understand the role of mobile

applications in today's ecosystem. In addition, in the third section, the appearance of applications in the five travel stages – in specific the experience stage – will be evaluated to showcase the current situation of mobile travel applications in the travel process. The research method and data analysis are described in the section afterwards, followed by the discussion, elaborating the results of the survey questioning travellers about their ideal (mobile) on-site travel experience while focusing on how the travel industry can react to this with the help of mobile tech experts.

Literature Review

1.1 Mobile Development and Trends

Mobile applications, frequently referred to as apps, are a type of software application explicitly developed to run on a mobile device such as smartphones or tablets (Technopedia, n.d.). Traditionally, mobile apps often reflect similar services as the ones provided on a PC. However, some of the most successful apps are rather built on the concept of making use of the unique features of mobile devices. Today, mobile devices share a number of powerful characteristics such as big displays, Internet access, context-relevant push notifications, location tracking functionality (Want, 2009) and health tracking that enable consumers to enhance their every day activities. Outstanding examples of such companies range from mobile messaging apps such as What's App to last-minute booking apps like HotelTonight and location-based services like Google Maps, all of which share the concept of "mobile first" meaning that the product was specifically designed for mobile usage.

Mobile applications have been first popularized by Apple with the introduction of its App Store soon followed by Google's Play Store which both offer a storefront for developers to distribute their software to consumers since 2008. As of today, both Apple and Google feature some 1.2 to 1.3 million applications (Statista, 2013) in their respective app stores accumulating for total revenue of \$ 26 billion in 2013 (Statista, 2013), a number which can be expected to rapidly grow within the next five years, according to Statista (2013), the world's leading statistics company on the Internet, which further forecasts mobile generated revenue to surpass the \$ 75 billion mark by 2017.

Other notable tech companies, who have recently followed up on the idea of creating an app ecosystem on its devices for their users, include Blackberry, Amazon, Samsung, which are led by Windows with 300.000 apps as illustrated in figure 3 below. Thus indicating that the mobile world is far from being saturated and still sees vast potential for growth in the near future.

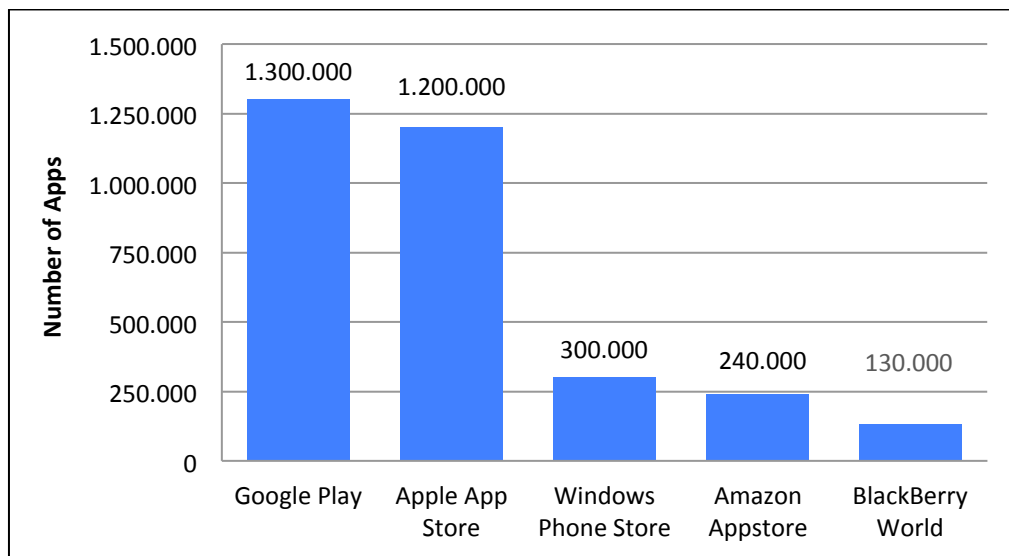


Figure 3: Number of Apps Available in Leading App Stores 2014 (Statista, 2014)

While mobile applications in its original form were designed to run on traditional mobile devices such as smartphones and tablets, recent developments in consumer electronics have foreshown the evolution of wearable technology, an industry believed to become a \$ 1.6 trillion business in the near future, analysts at Morgan Stanley report, according to Derrick (2014).

The main characteristic of so-called wearables is that they are worn on a user's body or are directly attached to their body, Derrick further explains. And while wearable devices are still at an early stage, we have already seen quite a diverse range of different wearable products. The most notable ideas include smart watches, fitness tracking wristbands and intelligent glasses.



Figure 4: Apple Watch Sport with Displayed Apps (Apple, 2015)

Such devices, as seen in figure 4 (Apple, 2015) displaying the upcoming Apple Watch, share the same fundamental idea as smartphones and tablets, meaning that they run mobile applications, often however in limited functionality, to enhance every day habits and challenges of its users.

All in all, mobile devices with their inextricable apps have become a very integrated part of our every day lives and habits – with the average US smartphone owner spending more than 30 hours each month on mobile devices (Nielson, 2014) – ranging from reading the news and interacting with social media to booking a flight.

1.2 Relation to Hospitality and Tourism

Taking this thought further, a recent tourism study argues that smartphones play a significant role in mediating the touristic experience (Wang, Park and Fesenmaier, 2012). This results in a less distinct differentiation between travel and everyday life as travel-related activities, ranging from getting inspired on a social media page to checking flight rates on the go, have become directly available without any physical barriers to end-consumers. As such it is argued that the integration of smartphones into daily habits produced spillover effects and consequently influenced modern travel behavior (Wang, Xiang and Fesenmaier, 2014), thus making travel-related

activities a more integrated part of everyday habits and therefore setting the basis for users actively using travel apps during the staged travel process.

The very reasoning that travelling can no longer be seen as a completely separate entity to everyday life, thanks to smartphone usage leading to blur the barriers, can also be applied to different non-travel-related stages of a person's life. The Oxford Dictionary (n.d.) defines daily life as "The activities and experiences that constitute a person's normal existence" and while routines may differ from person to person they often involve similar activities such as getting up from bed, having breakfast and leaving for work or school (and many more). In the mobile world, applications are traditionally clustered into different categories making it easier for users to identify their broader use and determining for which of a person's activity the app might be a good enhancement (i.e. alarm app for getting up, food recipe app for a healthy breakfast, checking bus arrival times via app). While the names of these categories slightly differ from platform (Apple) to platform (Android), the general idea stays the same.

Logically, a person's day can only allow paying attention and actively using a certain limited number of apps during the day. Given the wide range of different applications in the mobile app industry, towards which travel apps are competing against in terms of time consumption, it is crucial to identify the relevance of travel-related apps in relation to the global app industry to get a better understanding of how important apps are to the mobile ecosystem and consequently to the end-consumers. In order to do so, the number of available apps per category can be broken down. Figure 5 (Statista, 2015) shows the current ranking of app store categories based on the share of available active apps.

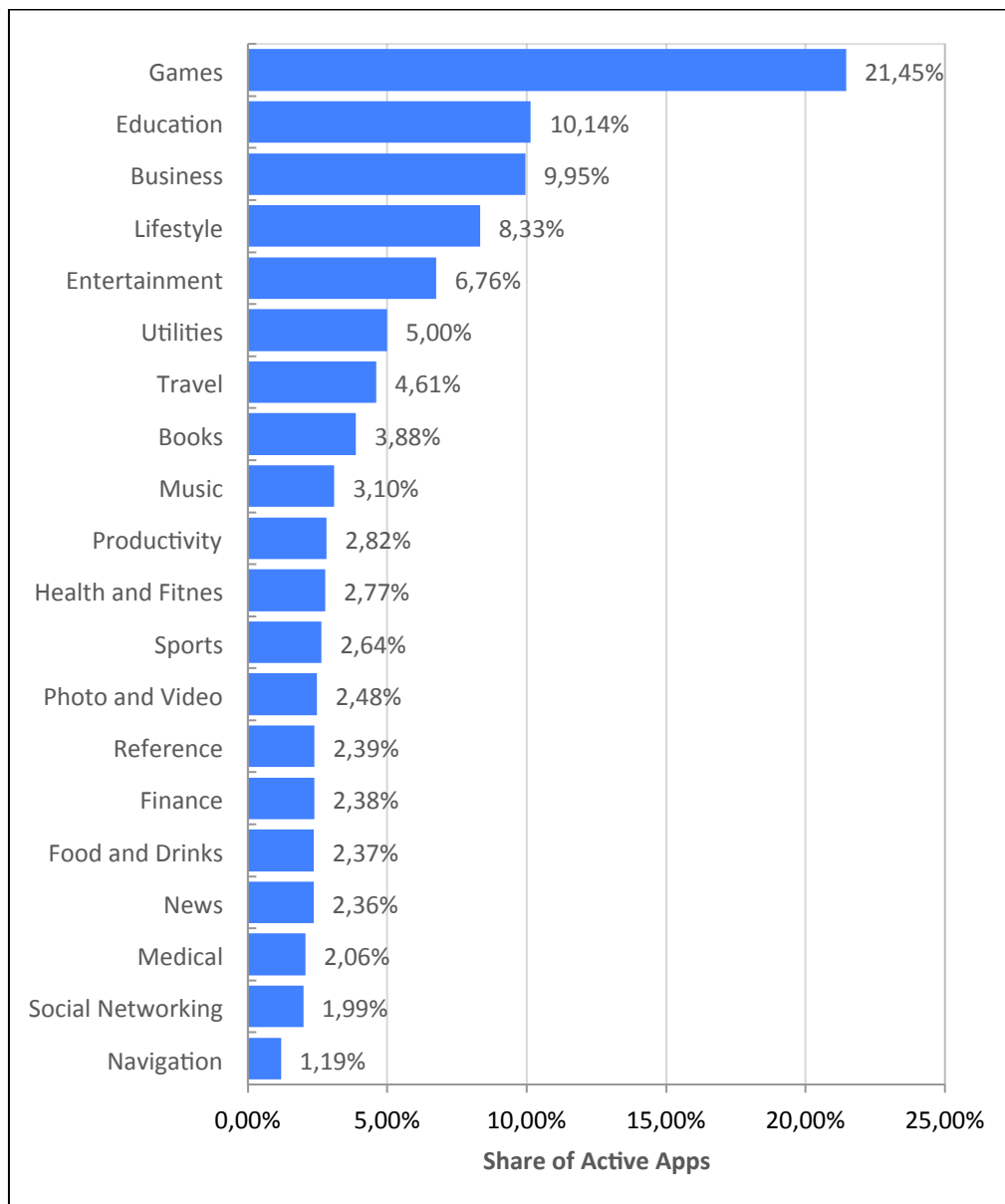


Figure 5: Most Popular App Store Categories 2015 by Share of Available Apps (Statista, 2015)

Given that the total number of available apps per platform has been identified, one can therefore conclude that an approximate 60.000 travel-related apps are currently active in each of the respective app stores, accounting for 4.61 % of all categories and making travel the seventh most relevant app store division.

The mobile travel industry is, just as much as outside of the app ecosystem, home to a very diverse range of specialized players ranging from apps for booking a flight or hotel room, to planning a trip or using GPS-based navigation and much more to

assist travellers in very different aspects. At this point, the earlier thought of travel apps competing against other app categories in terms of app usage will be picked up again in the context of further breaking down the app category of travel into five different stages to eventually identify the mobile travel apps in the respective divisions and how these influence the travel behavior of users.

Figure 6 represents an overview of the sub-categories of the travel cycle to show in which of the five travel stages, adapted from Google (2011), mobile applications are mostly being used. To identify the most important (mobile) parties involved in the various stages of travel is crucial to further evaluate the role of apps during the on-site travel experience and how companies that originally had their focus on a different stage may expand their feature line to also extend to untapped opportunities.

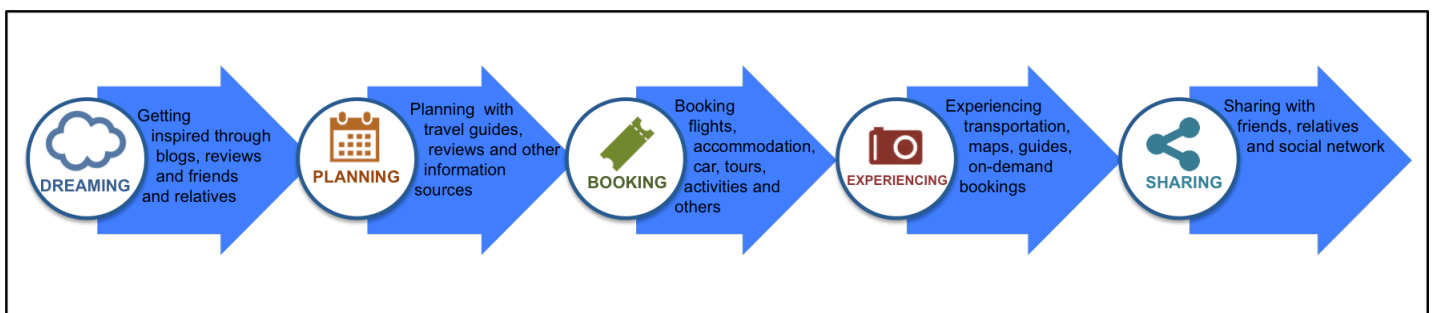


Figure 6: Actions through Apps in the Five Stages of Travel (Adapted from Google, 2011)

Taking this thought further by looking at the first stage, the dreaming stage, travellers used different sources to inspire themselves before the era of mobile and today only shifted that behavior – often in the form of browsing through blogs, reviews and seeking advice from friends and relatives through social media or messaging services – towards accessing this information on handheld devices.

Drew Meyers (2013), founder of OhHeyWorld, a website dedicated to connecting people with friends while travelling, outlines in a guest blog post on Tnooz how travel inspiration is majorly coming from conversations with trusted personal travel companions, often on messaging platforms like Skype or What's App. And while Meyers' article is mainly a subjective piece, these observations are being enhanced on a Quora thread titled: Where do you get your travel inspiration from? by the collective input from Joss, Choudary and Shumaker (2012), which indicates that

inspirational content by real travellers can be accessed through many more channels than just messaging apps. These could be social media platforms like Facebook, Pinterest or travel-dedicated levels like reviews on TripAdvisor or personal stories on travel blogs. By classifying the most inspirational apps into different categories based on publically available data on the mobile analytics platform App Annie (2015) as represented below in table 1, it can be clearly seen that the most crucial platforms are not necessarily focused on travel. Apps represented in this and any of the following tables representing App Annie data are not displayed in a specific order.

Table 1: Apps in the Dreaming Stage (Table Created Based on App Annie Store Stats Data, 2015, Using Custom Categories of Inspirational Travel and Social Apps)

Purpose	App Typ	App Name
Reviews	Travel	TripAdvisor
Experiences	Travel	Blog
Experiences	Social	Facebook
Pictures	Social	Instagram
Pictures	Social	Pinterest
Messaging	Social	WhatsApp
Messaging	Social	Skype

It can therefore be concluded that the inspirational stage is yet quite fragmented, mainly subject to social interactions and only very limitedly owned by travel brands.

Planning, the second stage, is closely interlinked with both the dreaming (first) and the booking stage (third) as it is based on the inspiration that was initially found in the stage before and furthermore sets the foundation for the actual actions, most importantly the booking of transport and accommodation, which happens in the booking stage afterwards.

In its original form, holidays have often been planned with the help of printed travel books and travel agencies, which consulted potential travellers on where to go and what to do. Today, the interest that was earlier picked up from personally written reviews like TripAdvisor or Yelp also serves as a solid basis for decisions being made in terms of planning. This is especially the case when considering accommodation,

restaurants, tours and activities, according to a survey carried out with TripAdvisor users (Gretzel, Yoo and Purifoy, 2007). Additionally, the branch of digital travel guides substitutes the old-fashioned print version of guidebooks from brands like Lonely Planet, Fodor's, Marco Polo and many more that have shaped the travel experience in the past. Wang, Xiang and Fesenmaier (2014) argue that the smartphone and tablet usage has become such an integrated part of our everyday life that it is only natural that travel planning also shifted towards mobile and in fact developed to be much more incorporated into daily habits like researching things to do on a tablet on a Sunday afternoon at home or checking flight rates while waiting for the bus.

Contrary to the first stage, the planning phase is being dominated by explicitly travel-categorized apps. By further examining the most relevant developers in said field by analyzing travel-planning apps from the travel app store category (App Annie, 2015), reveals a selection of quite homogenous applications. The list of relevant travel applications, as seen in detail in table 2, can be divided into three major divisions and functions: user reviews for restaurants, hotels and others, itinerary planning with travel content from publishers and other sources and lastly intelligent to-do list applications used for luggage packing.

Table 2: Apps in the Planning Stage (Table Created Based on App Annie Store Stats Data, 2015, Using a Custom Category of Travel Planning Apps)

Purpose	App Typ	App Name
Reviews	Travel	TripAdvisor
Reviews	Travel	Yelp
Content	Travel	Triposo
Content	Travel	Gogobot
Content	Travel	tripwolf
Content	Travel	Fodor's
List Planning	Travel	PackTheBag
Itinerary	Travel	Triplt

The planning stage is followed by the booking phase, which is essential when it comes to evaluating how the major stake of revenue is generated in the digital travel industry. In fact, most of what we see today in the online booking industry dates

back to the late 1990s and early 2000s when Internet giants such as Expedia and Priceline evolved in the sales and distribution stage of online travel (Joyce, 2012).

The online booking stage today consists mostly of four major brands, Expedia, Priceline, Orbitz Worldwide and Travelocity, which account for 95 % of the online bookings in the US, the biggest global online market, according to a Forbes article (Trevis, 2014). European rivals like Booking.com and big travel search companies such as Kayak extend the list of global players. Additionally, direct bookings from hotel chains and major airlines contribute to the overall revenue generation from online travel companies. The one homogenous characteristic all of the above mentioned companies share is that their mobile applications do not show off any new nor revolutionary element but rather are replicates of their existing web presence without necessarily making use of the unique features of mobile devices. Travel start-ups, however, have successfully managed to significantly grow in a highly competitive market making use of a mobile first experience and building their product solely on the very purpose of users accessing it via mobile devices.

An exceptional example is HotelTonight, the last minute hotel booking app that is being handled as the next billion dollar online booking company (O'Neill, 2014) which built its foundation on a 30 % share of mobile travel bookings forecasted by 2017 (The Economist, 2014). The app, for example, makes use of the smartphone's GPS function by offering highly discounted same-day room rates by analyzing one's phone location and providing best price hotel rooms in a certain proximity enabling end-consumers to access high class establishments at affordable prices and hotels to sell inventory that otherwise would not have been sold.

Seeing that hotel booking platforms such as HotelTonight are targeting users who already are at the destination, the booking stage is already conflating with the fourth stage, experience, thus indicating that the modern travelling experience can be less viewed in firm separated stages but is subject to increasingly blurred transitions between the travel stages.

This, however, only represents a minority as can be seen by looking at the top ranked booking apps in the app stores (App Annie, 2015) as seen in table 3 below.

Table 3: Apps in the Booking Stage (Table Created Based on App Annie Store Stats Data, 2015, Using a Custom Category of Travel Booking Apps)

Purpose	App Typ	App Name
Online Travel Agency	Travel	Expedia
Online Travel Agency	Travel	Priceline
Online Travel Agency	Travel	Travelocity
Online Travel Agency	Travel	Orbitz
Online Travel Agency	Travel	Hotwire
Online Travel Agency	Travel	Hotels.com
Online Travel Agency	Travel	Booking.com
Travel Search	Travel	Kayak
Travel Search	Travel	Trivago
Car Rental	Travel	Hertz
Tours & Activities Booking	Travel	Viator
Direct Flight Booking	Travel	United Airlines
Direct Hotel Booking	Travel	IHG Hotels
Direct Hotel Booking	Travel	Marriott International
Last Minute Hotel Booking	Travel	HotelTonight
Accommodation Booking	Travel	Airbnb
Accommodation Booking	Travel	HomeAway

It is worth noting that the number of booking related apps represent an overwhelming majority in the top ranked travel app store category, indicating a dominance in terms of gross revenue and profitability compared to the other travel stages as mentioned in the problem statement of this paper before. Furthermore, similar to stage 2, all listed companies are solely classified as travel apps, unlike the first stage where social applications were the primary cluster.

The experience stage, here also referred to as on-site travel, represents the point in the travel cycle after the traveller has undertaken all actions in the first three stages and actually finished all of his preparation, meaning he was inspired to travel, having planned on how to actively spend time during the journey and eventually sealing the deal by booking his preferred means of transport and accommodation. At this point, the traveller is actually ready to travel. The travel experience indeed consists of more than this, apparently everything from dreaming to sharing. In this phase, the very core element of the travel experience is happening. The experience may occur in different shapes starting from leaving the apartment, using transportation, for

example in the form of taking a flight, up until checking in at the booked hotel. On-site in this very context is defined as being at the destined travel destination. For a city trip this could mean that the on-site experience starts the moment the traveller steps outside his apartment and starts his journey.

At this point of the travel process, the unique feature set of mobile devices has a significantly higher impact on the experience than during the other travel stages where often the strongest characteristic of mobile app usage versus non-mobile is mobility. Mobility means that inspiration can be sought while sitting in the bus rather than sitting at home in front of the laptop or travel planning with the help of a tablet on the couch on a Sunday afternoon instead of going to a travel agency. This makes use of the fact that a user is no longer limited to physical limitations such as location. In the experience phase, however, two additional factors come into play, which advance the travel experience: connectivity and location aware functions.

The argument of ongoing connection to information technologies through Internet access is in fact true for both, every day life and travelling. And while people are generally well connected with their friends, families and familiar surroundings in their daily lives, in the past going abroad often meant having very limited access to news, communication and other social interactions. Tourism studies have shown that a large part of modern travel behavior includes that daily habits are being continued during travelling (Wang, Xiang and Fesenmaier, 2014). Apps used in this context often share only few characteristics with travel apps and are rather classified into every day app categories such as communication (messages), social media (Facebook) and games. Wang, Xiang and Fesenmaier (2014) further argue in their study that information acquisition through mobile devices is being used in a more travel context-relevant purpose such as checking the flight status and researching restaurants in the city, which eventually results in travellers feeling more flexible during their journey, requiring less prior planning time and overall enjoying a more informative travel experience. The driver of connectivity that enables these activities is having access to the Internet. Mobile devices are widely equipped with 3G telecommunication networks, as illustrated in figure 7, which provide end-consumers with Internet access.

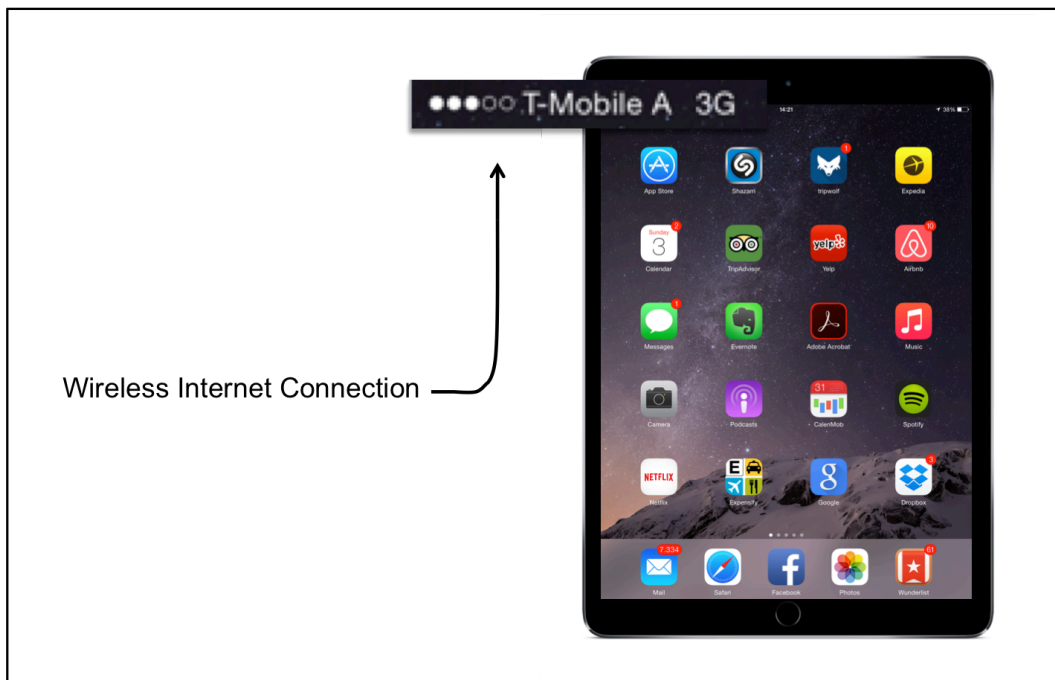


Figure 7: 3G Internet Connection on a Tablet Device (Source: Own Source)

While in the past often discredited for their high costs, today almost every major mobile carrier like T-Mobile and AT&T is offering tailored data roaming packages specifically designed to meet travellers' needs (Nickinson, 2014). This, together with falling data roaming prices (Essers, 2014), is boosting the trend towards unleashing the full capacity of mobile devices during the travel experience.

Indeed, information acquisition goes beyond using the Internet to access available data on-site but makes use of another element: location-based services. The overbearing reasoning of travelling in most cases goes hand in hand with exploring yet unknown territory and consequently poses the challenge of finding one's destined location and at the same time not wanting to miss out on potential interesting events in a new destination. Thanks to the built-in global positioning system (GPS) function in mobile devices like smartphones, tablets and smart watches, apps can identify the location of the user and respond with context-relevant information. Mobile applications can make use of this feature in various ways; a distinct use case is being presented by navigation and mapping services as seen in figure 8. A typical digital map environment consists of the actual (city) map, points of interests (sights, restaurants, etc.) and is often enhanced in mobile apps with the GPS location of the device giving it its real added value. On top of that, services may offer routing, enabling the user to be intelligently navigated towards

the destined location by different means of transport (by foot, public transport and car). Such map features can be found in single purpose apps, an increasingly popular trend in the mobile ecosystem arguing that the very nature of mobile app usage lies in the fast access to its core features without unnecessary features blurring the focus and leading to longer loading times (Constine, 2014). An infamous example of this is Facebook's unbundling of features by having removed the messaging function from the Facebook app and creating a separate messenger app in 2014. Despite the early outcry of Facebook users, the messenger app today is one of the most used worldwide (Frommer, 2014) and users seem to have widely accepted and learned the benefit of a slim core feature focused app. On the other hand, map features are often included in travel-related apps to either help orient oneself or to provide visual guidance. The latter can frequently be seen in hotel booking applications where users are being offered to locate hotels on a map and chose them based on their locational preference. For example, a user would prefer to stay in a hotel next to the water on the east side of the city and therefore use the map to narrow down the choices of hotels that share those characteristics. The other mentioned use case is having map services integrated as navigation-like features into multi-purpose apps, which can often be observed in travel guide applications.

The mobile app itself acts mainly as a provider of travel-related information, similar to printed guidebooks, but enriches these information with dynamic features that help differentiate themselves from their traditional printed counterparts. As such, a mobile travel guide such as tripwolf or Triposo could enable users to create an itinerary consisting of points of interests (POIs) prior to the trip in the planning phase and then displaying them on the map while being at the destination in order to easily navigate to each of the POIs.

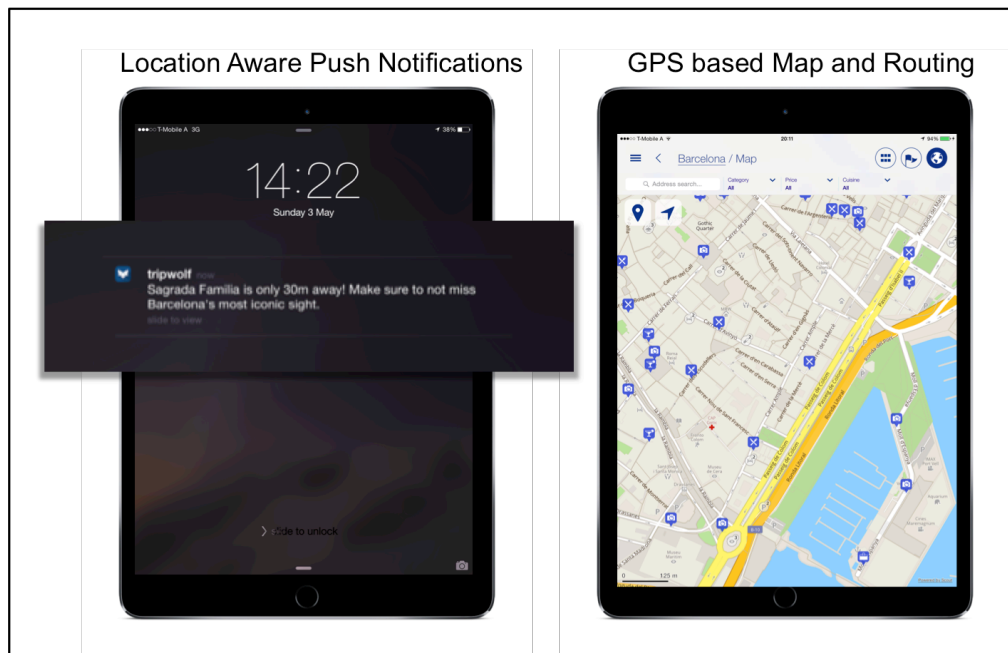


Figure 8: Tablet with Push Notification (left) and Map with Points-Of-Interest (right), tripwolf App. (Source: Own Source)

In addition to visualizing geo coordinates on maps, recent developments in mobile apps emphasize on proactive communication. Indeed, this includes mobile apps that send recommendations in form of push notifications, as illustrated in figure 8, about nearby POIs based on users' location and preferences (Tussyadiah and Wang, 2014). Depending on the system, a user can theoretically be empowered to set when and how he will be notified based on certain parameters, for example "Only notify me about POIs that I added to my itinerary and that are located in an approximate radius of 50 meters around me", so that the user maintains full control over his travel experience. Tussyadiah and Wang (2014) further indicate that the level to which users adopt to push notifications highly depends on the amount of trust users devote in their apps. This factor certainly applies to apps that originated their use in a prior travel stage, such as planning to gain a competitive advantage in terms of usage (as long as the experience was positive), as the user already interacted with the app before the experience stage and therefore had more time to develop a relationship of trust with the application.

At this point, mobile devices are substituting traditional travel tools such as printed maps and guidebooks used for information search and navigation. Additionally, push

recommendations are partially relieving the traveller of carrying out manual tasks (Tussyadiah and Wang, 2014) such as checking the map and the user's location on an ongoing basis by automatically informing the user about relevant information. Also, without the personalized message of the app in certain use cases, the user might have missed out on a certain experience and therefore had his travel experience enriched thanks to the input of the application. Further studies indicate that the improved information search for restaurants, sights, attractions and other POIs on-site leads to a more confident travel experience (Wang, Xiang and Fesenmaier 2012) and therefore an overall well perceived trip. In brief, on-site information acquisition in its various mobile forms proves to provide some very exciting new features, which are yet in an evolving process promising more in the near future.

While benefiting from a more informed and interactive on-site experience certainly adds value to a journey's life cycle, monetization possibilities in its basic form are quite limited. In general, mobile applications' monetization strategy encompasses two main pillars: mobile advertising and in-app purchases (IAP). The latter refers to enabling developers to have certain features or content to be unlocked through an IAP. However, the increasing phenomenon of having free access to public and often community aggregated content like on Wikipedia, Yelp and TripAdvisor, together with the ever-growing expectations of users towards online services to be free (Dredge, 2014), poses severe challenges to travel-related apps focusing on the experience stage. Another possibility would be displaying mobile advertising, often in form of banners, although this is in most cases not seen as a viable long-term business model and often only used in a complimentary way.

In brief, on-site destination guides and map apps add valuable features and content to the travel experience but still lack a sustainable revenue stream on their own.

In contrast to this argument stands the emerging trend of instant on-demand services across all vertical industries, including travel and transport. Above all, this segment is shaped by the very core characteristic of gaining access to a certain type of service in the fastest possible manner. The pace at which such companies gain traction proves the yet unfilled needs in this field, leading to companies like car-hailing app Uber to be valued as the second most valuable start-up worldwide at \$ 41.2 billion (Kim and Rosoff, 2015). In fact, a whole new movement informally

labeled as Uber for X has been emerging, exploring new opportunities of untapped segments beyond transport along other horizontals like on-demand cleaning services, on-demand full-service butlers and many more. Likewise, hotel booking companies have recently evolved in a similar environment. Notable names include the last minute hotel-booking app HotelTonight and Booking.com's newly developed Booking Now. And while the focus on last minute deals usually lays on the attractively low prices due to selling unsold hotel rooms which otherwise would not have been sold at all, it can be clearly seen that the center of attention in terms of communication towards end-consumers from both companies is being pushed towards simplicity and speed (i.e. "Your hotel room, only two taps away").

For accommodation providers like hotels and hostels the game is fairly simple. They are dealing with a perishable product, thus an unsold night represents lost income (Werthner and Ricci, 2004) that cannot be recovered anymore. Logically, it makes sense to pass over last-minute unsold rooms to intermediaries like HotelTonight or Booking Now that will distribute them to consumers at lower prices given the fact that hotels still prefer selling at a lower margin to at least cover fix costs rather than dealing with a low occupancy rate. In fact, the apartment-renting platform Airbnb, valued as the eighth highest start-up in the world (Kim and Rosoff, 2015), recently extended the booking horizontal by also tapping into the last-minute booking game (Airbnb, 2014), thus, proving that this is definitely an increasing trend in the tourism industry, which is especially critical when considering that transportation and accommodation account for the fourth and first respectively highest expense accounts of city travellers in touristic capitals like New York City (Shankman, 2013).

All in all, on-demand (touristic) services prove to be of high importance in the very competitive booking field with two out of ten of the most valuable start-ups tapping into this branch. Indeed, the movement towards last-minute on-site booking indicates a strong shift of travel behavior and a forthcoming blur of the separations between the booking and the experiencing stage. For end-consumers this means more flexibility in terms of their booking behavior and higher empowerment to make more relevant booking decisions due to the immediate proximity, both in time and location.

Taking the thought of on-demand services used in transportation and accommodation further and applying it to other potential use cases in the on-site travel experience, travel guides and maps may be able to extend their main drivers of revenue from IAP and advertising to a third monetization source, as illustrated in figure 9, by further integrating affiliate partners in the experience stage and making use of the possibilities of reaching the user with context-relevant information during the journey. Affiliate partners may include every supplementary service that potentially makes sense to the end-consumer and serves as a springboard for further upsells. For travel guides and maps, this could cover hotel and flight booking engines, car rental services and ticket distributors.

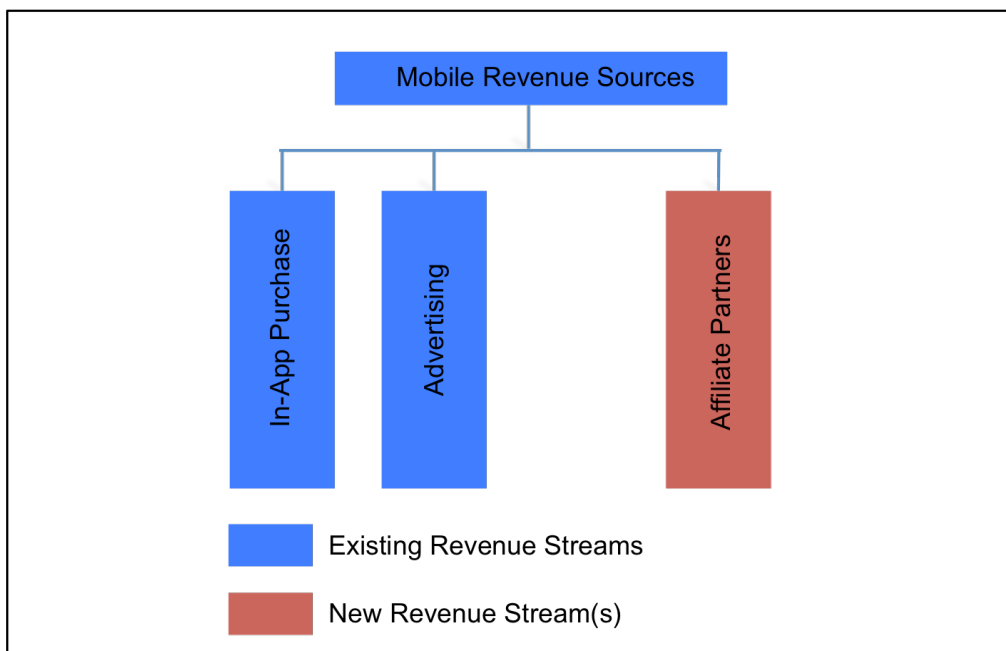


Figure 9: Mobile Revenue Sources of Travel Guides and Maps (Source: Own Source)

It is therefore argued that if additional access to context relevant information and proactive communication through mobile devices can trigger new short-notice on-site decisions from travellers, such as making a stop at a certain POI because the app informs the user about via push notification, then it is likely that the same argument also applies to purchase-related choices. In addition to being informed that a sight, for example the Sagrada Família in Barcelona, is located right next to the traveller's location, the user could also be educated about the fact that he could instantly buy a skip-the-line ticket through his mobile device. Arguably, this is something the user

would potentially not have been aware of otherwise and thus would not have spent money on. In addition to that, given that the user has already established a certain bond of trust with the mobile application – since he is entrusting the app to guide him through an unknown destination – the traveller might be more ready to transact business with a local ticket shop, which he just encountered and had no relationship with before.

In summary, the trend towards technological and economical developments in the experience stage is on the edge of innovation as companies jump into this branch, which seem to awaken enormous untapped opportunities with on-demand services given the global impact they have caused and the high level of trust investors are putting into them. In contrary to the development of touristic on-demand services, mobile travel guides, map apps and other information acquisition-related products seem to be gradually evolving from old-fashioned print travel guides and maps rather than disrupting the travel industry and only slowly integrate new monetization strategies. Furthermore, by investigating the list of relevant apps in the experiencing stage, it can be seen that for the first time in the travel cycle, there are numerous apps appearing for the second time in a stage. Examples for this are mobile travel guide apps like tripwolf or Triposo, which were already represented in the travel stage and companies like HotelTonight from the booking stage.

Table 4: Relevant Apps in the Experience Stage (Table Created Based on App Annie Store Stats Data, 2015, Using a Custom Category of Travel Experiencing Apps)

Purpose	App Typ	App Name
On-Demand Transport	Travel	Uber
On-Demand Transport	Travel	Lyft
On-Demand Transport	Travel	MyTaxi
Last Minute Hotel Booking	Travel	Booking Now
Last Minute Hotel Booking	Travel	HotelTonight
Accommodation Booking	Travel	Airbnb
Mobile Travel Guide	Travel	tripwolf
Mobile Travel Guide	Travel	Gogobot
Mobile Travel Guide	Travel	Triposo
Mobile Maps	Travel	CityMaps2Go
Mobile Maps	Travel	MAPS.ME
Tour Booking	Travel	Viator
Tour Booking	Travel	GetYourGuide
Public Transport Navigator	Travel	Citymapper

This indicates, as briefly touched upon before, the blurring of separating lines between the different stages of travel due to mediation through smartphone usage.

In the final stage, the sharing phase, users are reflecting on their undertaken experiences through the different travel cycles, usually with a heavy focus on the experiencing stage. Traditionally, post-trip behavior was coined by means of communications through which travellers were sharing their impressions. Such means usually included post cards, letters, telephone calls, slide shows and word-of-mouth. However, with the evolution of the Internet sharing became easier and more dynamic, eventually even more anonymous as social platforms emerged and made information sharing go further away from the inner friends and family circle towards openly sharing with a whole community. At this point, consumer reviews were appearing through all different verticals ranging from e-commerce (Amazon and eBay) to travel (TripAdvisor and Yelp). Importantly, reviews were never solely limited to experiences themselves but could cover anything from reviewing the physical features of a product (Amazon), the trustworthiness of a seller or buyer (eBay) up to

the emotionally perceived quality of a hotel stay (TripAdvisor). Indeed, it is not unusual, especially in tourism, that a review consists of a combination of physical and emotional attributes. An (artificial) example could be the following: “The receptionist was really nice and recommended a great restaurant nearby. Unfortunately, we had to find bed bugs in our room after coming home from our night out.” In the example stated above, the reviewer indicates that he perceived the receptionist to be friendly, clearly an emotional response, and further appeals to the soft skills of the same person in regards to having in-depth knowledge about local restaurants. Last, the physical state of the bed is being questioned.

Today, online reviews are still the first thing that comes to a person’s mind when considering the sharing stage in the travel lifecycle, however recent technological and behavioral developments, especially in the generation x and the millennial generation, are indicating a significant change in the tourism-related sharing behavior. As such, it is argued that the increasing number of upcoming real time social media and messaging services, a phenomena almost exclusively happening on mobile, heavily influences today’s modern travel pattern. Social media sharing and messaging in particular can be divided into four major touch points: text, video, picture and location sharing, all of which share the same fundamental characteristic of being highly dynamic, happening mostly on-site and often focus on emotional aspects only. In fact, the differentiation between static and dynamic content in this context is essential as it aids in differencing the use of shared information in the various travel stages. Statically shared content here represents information shared on platforms in the form of reviews and comments attached to some sort of service or product. For instance a user posts a review of a local restaurant on Yelp after having visited it. This text information will now remain on the restaurant’s Yelp page and other users will be able to plan ahead with decisions based on the shared experience. Also, users are empowered to a minimum form of engagement by rating the usefulness of the review. These basic features are shared among various well-known review platforms such as TripAdvisor, eBay and the app store and have proven to be highly used in decision-making processes by a vast majority of online consumers, no matter whether it concerns booking a hotel room, buying a car or downloading an app.

In contrast to this rather static strategy stands real time messaging and sharing with a focus on delivering information in a timely relevant fashion. As such, users are able to share either text, video, picture or location data during their travel experience. Importantly, a fundamental aspect of this behavior is that it happens on the spot, in the experience stage, and therefore almost exclusively mobile devices are used as those empower users to be no longer tied to physical restrictions (such as laptop in the hotel room). For instance, messages in text form are preferably shared through messaging apps like SMS, What's App, Facebook Messenger, WeChat and LINE whereas video and picture information are preferably distributed through platform-like services like Instagram, Facebook or Snapchat. In addition to the first two methods but considered to be used significantly less frequent, location sharing in form of "check-ins" enables users to share content on a different level. For the most part, Facebook and Foursquare are notable companies making use of this feature.

In order to further evaluate the role of sharing in the travel cycle it is important to get an understanding of the main factors involved in users deciding to share content. To put it more simply: Why do people share? A study by The New York Times Insights (n.d.), aimed at learning the motivations that drive the act of sharing. Research suggests that there are five major forces to be considered on this very subject: To deliver entertaining content to others, to define oneself to others, to make relationships grow, self-fulfillment and to support something the users care about. In fact, further research about smartphone usage in everyday life and travel (Xiang, Wang and Fesenmaier, 2014) supported the above arguments and outlined that travellers sometimes feel isolated from their known environment during travel and use the increased connectivity to stay in touch via social media and messaging apps. Moreover, sharing the excitement of a trip and consequently receiving instant feedback from the community not only contributes to getting affirmation from friends and family but even enhances the on-site information acquisition process as the community might comment with tips and tricks on what to do at a certain destination.

It is not only because of the convenience to use social media and messaging tools during the trip due to having access through mobile devices but also because travellers are widely used to this kind of behavior in their daily lives and as such

these activities spill over to the travel stages as well (Xiang, Wang and Fesenmaier, 2014). All in all, the sharing stage represents an increasingly important part of the travel cycle. However, not necessarily because travellers tend to spend more time on reflecting on their experiences but rather due to the fact that technological and consequently behavioral developments have shifted communication channels to a digital level while providing seeming less access to the means of distribution, namely mobile devices. As a result, the experience stage in the travel process is being filled with additional actions, which actively enhances the on-site experience (through effective information acquisition) and quite naturally comes with behavioral changes in today's society. Indeed, sharing in its purest form was originally solely used to digest undertaken experiences and to put fuel into the dreaming stage to provide inspiration for new ideas for potential travellers and has significantly changed with the digital information era.

Table 5: Relevant Apps in the Sharing Stage (Table Created Based on App Annie Store Stats Data, 2015, Using a Custom Category of Travel Sharing and Social Sharing Apps)

Purpose	App Typ	App Name
Reviews	Travel	TripAdvisor
Reviews	Travel	Yelp
Location Check-In	Travel	Foursquare
Travel Journal	Travel	Journi
Location Check-In & Sharing	Social	Facebook
Picture Sharing	Social	Instagram
Messaging	Social	What's App
Messaging	Social	WeChat
Messaging	Social	LINE
Messaging	Social	Messenger

As such it is obvious that there is a critical overlap between apps used in the sharing stage and those that were used in the dreaming stage for inspirational purposes as visualized in table 5. Similarly, review platforms like TripAdvisor and Yelp make another appearing after having been present in the first and second stage.

When evaluating how the sharing stage has partially moved towards the on-site stage, it becomes clear that this in fact is true for numerous other stages of travel as

well. For the most part, this holds true for the classic models of travel stages, namely pre-trip, experience and post-trip (Brown and Chalmers, 2003). Nevertheless, by drilling into the stages more deeply and dividing them into a more modern five-stage model (Google, 2011), it becomes clear that separations between the single stages have become increasingly blurred due to shifts in the travel behavior of users.

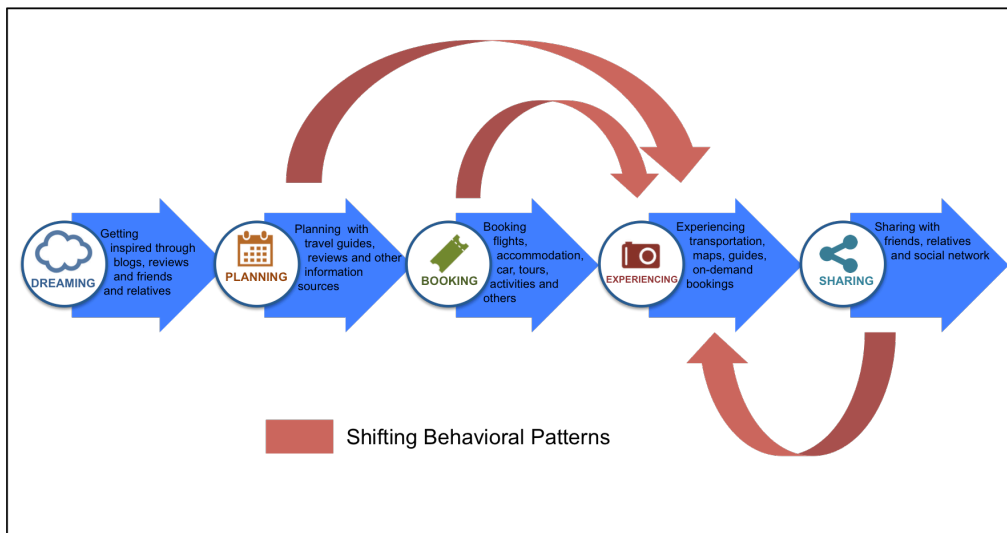


Figure 10: Five Stages of Travel Shifting towards the Experience Stage (adapted from Google 2011)

Figure 10 illustrates the current behavioral changes happening in the travel cycle where both literature and the observation of current technology and travel trends indicate a clear movement towards a more intensified on-site travel experience. Furthermore, turning to research (Wang, Xiang and Fesenmaier, 2014) which suggests that the outflow from certain activities into the experience stage results in releasing pressure from stages like planning, booking and sharing, it is crucial to note that is likely that at the same time the density of activities in the on the go experience will significantly increase. As such, travellers at first will perceive to have more flexibility during trips and to require less prior planning but eventually are posed to the threat of being too busy with extra tasks and therefore are less able to enjoy the actual trip. This factor has not been widely addressed in previous research and will need to be closely observed in the near future as the travel stages further shift towards modern travel behavior.

From the point of view of a currently underdeveloped experience stage, however, the shift of activities from revenue-generating stages such as planning and booking is a positive sign of increased future opportunities to expand new monetization channels during the trip. Indeed, the planning stage is home to a few very dominant players that have been rapidly growing with the help of mobile development in the past few years, namely Yelp and TripAdvisor. Furthermore, the booking stage hosts the biggest revenue driver in the travel industry covering anything from tickets sales to hotel rooms.

The literature and arguments outlined in the previous chapters helped to establish a baseline to better understand how the mobile app movement was originally created, what kind of significance it plays in today's economy and how travel is related to this major movement. In fact, previous coverage evaluates how smartphone usage actually alters modern travel behavior. The main players in the several stages of travel were identified and further questioned in what relation they stand to the experience stage. The on-site experience is the center of attention of recent movements and as such it is argued that these changes towards on the go will heavily influence today's travel behavior. However, by looking at the current major digital stakeholders in the experience stage, it becomes obvious that only a fraction of today's major travel players have yet actively pursued solutions to on-site travel problems. Still, those who already have jumped into untapped opportunities have proven to see massive growth, which is not to end any time soon. Both, startups and existing well-established travel companies hold responsibilities in pioneering these new movements to create a better travel experience to end-consumers. However, without a sustainable business model in this stage it is neither possible to maintain a growing business nor to fuel new innovations and ideas and consequently discourages investors to accelerate the process of modernization.

As such, the next step in this study is to find out what today's travellers actually find missing in their travel experience and how the industry can respond to that.

Research Methodology

With the example of Uber it can be seen that a significant amount of copycats have sprung out of the basic on-demand booking concept. Thus, indicating that the company revealed a highly profitable and yet widely untapped market that exposed a need that today several different verticals (travel, cleaning, etc.) are trying to fill. As such, it is likely that the global travel market holds an immense amount of yet undiscovered opportunities that require companies to address them with a solution. Correspondingly, it is the goal of this research to uncover certain wants by today's travellers to better understand how the industry can respond to that. Tourism is an industry that sees more than one billion international arrivals (UNTWO, 2014) and five to six billion domestic tourists a year (UNTWO, 2014), while mobile app downloads are estimated to have reached 138 billion in the same year in 2014 (Gartner, 2013). The untapped potential of even a niche area, such as on-site travel services, seems to be immense and misses out mentioning that this area is very risky for companies the world over. In order to further evaluate the potential need for more advanced on the go mobile travel solutions, a survey was conducted to gain new insight in this field.

The following two chapters are divided into a quantitative and a qualitative research approach. The first addresses a sample of travellers who are being questioned as to how they would like to have their on-site travel experience enhanced. Next, the latter directly refers to technology and travel experts being confronted with findings from the quantitative survey and arguments established in this paper.

1.3 Quantitative Surveys: What Do Travellers Want?

The goal of this study is to identify the mobile technology wants of travellers during their on-site experience. This research aims at getting a deeper understanding of the current on-site travel experience of users at a large scale and at exploring how to further improve this stage of mobile travelling.

In order to uncover yet unidentified potential enhancements for travellers, a web-based survey was conducted in February 2015, using closed and open-ended questions related to current mobile travel behavior, the use and impact of technology on the go and perceived potential improvements for future developments. The respondents were from tripwolf, a mobile travel guide app. The survey was communicated through tripwolf channels including social media, newsletter and mobile push notifications. Each user who successfully completed the survey was incentivized with a coupon code for a free tripwolf mobile travel guide worth up to € 6,99 to encourage survey participation.

A total of 1796 participants took part of the survey, which was carried out in English, German, French, Italian and Spanish to facilitate users' responses and were not limited to certain demographics. Upon analysis, all languages were matched back to English.

Given the mobile environment, as well as the travel component of tripwolf as a product, it is assumed that that the questioned users represent a mobile technology savvy sample, which had previous experience in the field of actively using mobile apps in some stage(s) of the travel process. Thus, interpretation must not be mistaken with producing generalized results for general travellers worldwide but rather for an overall mobile technology savvy traveller population.

Table 6: Main Survey Questions

Survey Questions
1. At which stage of travel do you use your travel app(s)?
2. Which of your devices do you use during your journey?
3. During your trip, which kind of mobile apps do you use?
4. Overall, how satisfied are you with the apps you use during your trip?
5. If you could mention what you're missing most during your journey, what would that be?
6. If you now look on your smartphone or tablet how much money did you spend on average for one travel-related app? (bookings do not count)
7. What type of features would you want to have in an ideal mobile app for travel that you use during your trip?
8. Would you prefer to have multiple single purpose apps or rather one universal app that combines all features?
9. If there were apps that would better fit your needs, how much would you be willing to spend on one app?
10. What is the main reason you're not using (that many) travel apps during your journey?
11. Would you consider buying an alternative mobile device? (Smart watch, Google glasses, ...)
12. If yes, which one?
13. If not, why?
14. What would your personal limit be in regards to what this gadget (question 19) is worth to you?

Overall, the web survey was built up with a total of twenty-five questions. The main questions were centered around subjects of at what travel stages the participants use their travel apps, which kind of apps they use, how satisfied those travellers are with the solutions currently offered and what kind of improvements they would like to see in the near future. Additionally, in an attempt to evaluate potential improvements for the customers, participants were asked to indicate how much more they would be willing to spend per travel app if said upgrades were made. Further, in order to forecast purchase behavior and potential interest of travellers in upcoming new mobile devices, participants were asked if alternate devices such as smart watches would be part of their desired travel enhancements. The main questions are listed in table 6. In addition to these points, users were asked several demographic and behavioral questions so that further relationships between factors

can be concluded to better understand the reasoning. The list of these questions can be seen in table 7.

Table 7: Supplementary Survey Questions (in no specific order)

Supplementary Survey Questions
1. How many times per year do you travel?
2. What is the main purpose of your travel?
3. What type of vacations do you go on?
4. Who do you mostly travel with?
5. Which of the following devices do you own?
6. How many travel apps do you own?
7. How many of those apps do you use while you are on vacation? (during your trip)
8. What is your primary app platform?
9. 1.3.1.1 How old are you?
10. What is your gender?
11. What is the highest level of education you have completed?

Overall, the sample showed to be quite international with 30 % German, 24 % Spanish, 19 % English, 14 % French and 13 % Italian speaking responses. Furthermore, the assumption of dealing with a frequent traveller sample proves to hold true as the overwhelming majority of participants (91,7 %) responded to the question of: How many times per year do you travel? with being away from home at least two or more times a year. In fact, more than a third of those surveyed reported travelling four times or more often. In regards to this finding, it would be fair to assume that people who are repeatedly travelling have a greater desire to reduce pre-trip travel planning efforts and to maximize their on-site experience. As can be expected, a significant amount of participants owns a smartphone (87,5 %) and tablet (71,3 %). Both are numbers, which are well ahead of Nielson's (2014) Digital Consumer Report, which estimates that 65 % and 29 % of all US adults to own a smartphone and tablet.

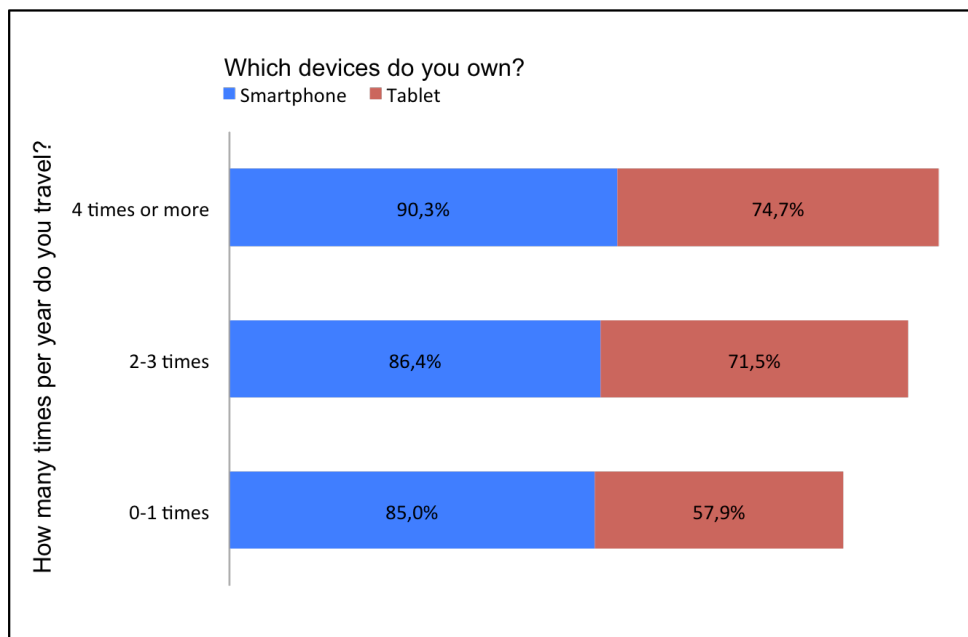


Figure 11: Share of Participants Owning a Mobile Device by Travel Frequency (Source: Own Source)

By further exploring the data and linking device ownership with travel frequency (see figure 11), a clear pattern can be detected that shows that the likelihood of users owning a mobile device grows with an increased travel frequency. This ultimately suggests a connection between travelling and the use of handheld devices. Furthermore, when asked which of their devices participants would take along their trip, an overwhelming majority of 90,6 % and 74,6 % smartphone and tablet users respectively stated that they would not travel without their mobile device. Participants named laptops and Amazon Kindle devices in selective cases in addition to smartphones and tablets. While Amazon Kindle devices are traditionally classified as tablets (together with e-readers), the rare acknowledgements of laptops (3,4 %) undermine the tertiary role when it comes to electronic devices during a trip. In fact, it is fair to assume that the high number of almost two thirds of travellers taking their tablet with them is due to tablets eating into the share of laptops and as such act as more flexible portable electronic substitutes.

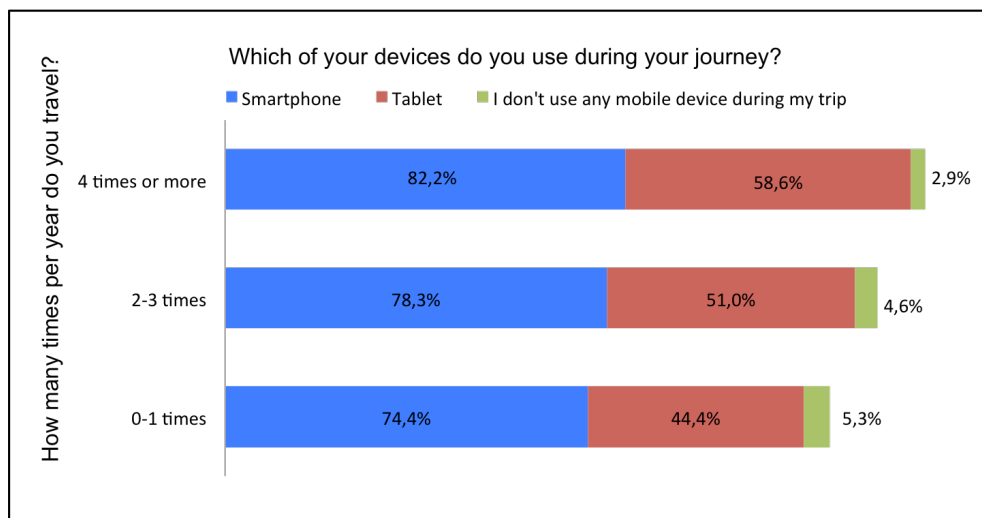


Figure 12: Share of Devices Being Used On-Site by Travel Frequency (Source: Own Source)

It follows that when further investigating the relationship between frequencies of travelling and whether travellers would use their devices on-site, a similar pattern as with device ownership appears. As seen in figure 12, the more often participants reported to travel, the higher was the likelihood that they were actively making use of their smartphones and tablets. Based on the facts, an assumption can be made that frequent travellers are generally more confident in their travel activities and thus more open to add new elements, in the form of mobile apps, to their travel activities to potentially enhance the on-site experience.

In contrast, 3,9 % of the participants explained that they do not use any mobile devices during their journey, representing a clear minority when it comes to technology on the go. The relatively low number of negating answers underpins the argument that smartphones no longer represent a foreign body, like a compass or print travel map, but have become a fully integrated part of the travel process (Wang, Xiang and Fesenmaier, 2014). In brief, the disclosed insights provide an overview of the linkage between travel and mobile technology and the generally high mobile device penetration in this sample. At this point, however, it is crucial to understand that the participants have yet not indicated their use of apps but only their devices. To put it simply, the potential baseline (that is, mobile devices) for operating mobile apps has been set.

Overall, the majority (61 %) of participants named leisure to be their main purpose of travel, whereas only 31 % and eight % stated both leisure and business, and business respectively as the major reason for the trip. Furthermore, among all those who were surveyed, city breaks (73 %) and beach vacations (48 %) accounted for the most popular type of vacation, followed by visiting friends and relatives (39 %), rural (27 %) and adventure travelling (22 %). In a follow-up question, the users were asked to report at which of the five stages of travel they use their travel apps the most in order to identify the current allocation of app usage along the various phases. The responses by the participants highlight three main pillars, planning (77,3 %), experiencing (61,9 %) and booking (50,9 %), indicating that more than half of all activities in these stages are already operated through mobile devices. On the other hand, dreaming (27,3 %) and sharing (17,3 %) are the least referred to stages. At this point, it is worth mentioning that in table 1 and 5 it has already been stated that the majority of apps used in these stages are represented in non-travel-related categories, mainly social and messaging, and, therefore, explain the underrepresentation of travel apps in this survey. Correspondingly, users were asked how many travel apps they have actively installed on their device and answered this with an overwhelming majority of 40,3 %, stating five or more while the numbers between one and four apps were ranging in the 10-15 % area, eventually representing a weighted average of 3.4 (using the value five for “five or more”). Although there is no dedicated research to showcase how many applications users have installed on average, a Nielson (2014) report states that some 29 apps are actively being used on average per month. To put this in relation with the relative high share of users owning five or more travel apps, the data implies that travel apps are making up a fair amount of active software installed on the sample’s mobile devices.

Turning to on-site specific data, respondents claimed that they would on average use 2.5 of those travel apps during their journey, indicating that from the 3.4 travel apps mentioned before, all but one app have an on-site related purpose. This statement backs up the previously made finding that almost two thirds of the participants use travel apps in the experiencing stage.

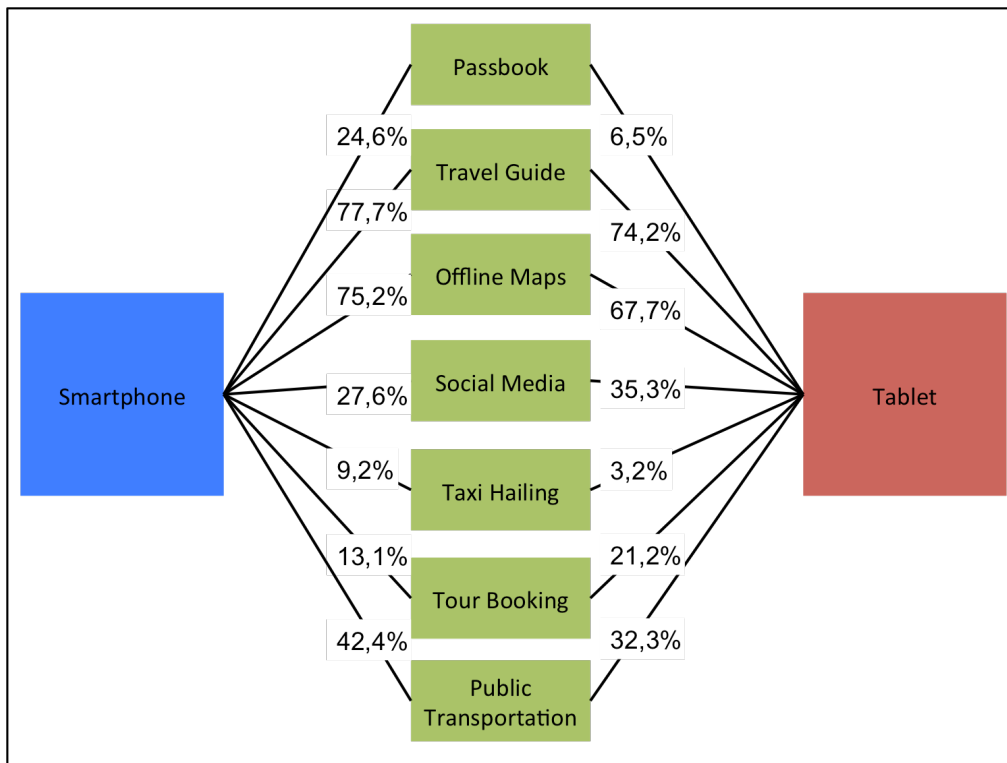


Figure 13: Mobile Apps Used by Device Type during Travelling (Source: Own Source)

In order to further explore the in-site travel behavior, the survey participants were asked to state which kind of apps with their specific features they are using on the go. In this very context, it was further investigated how this pattern would differ from smartphone to tablet usage as can be seen in figure 13. Tablets are seen as secondary devices after smartphones and especially in regards to on-site travelling often underappreciated due to their size and forthcoming lack in mobility. The respondents, however, indicated that they would access travel guides and offline maps apps almost as often on tablets (74,2 % and 67,7 %) as on smartphones (77,7 % and 75,2 %). It can be argued that the potential drawback of the size of the devices during the journey in this case actually acts as a benefit, as the bigger screen enables displaying more relevant travel information and facilitates map navigation due to the same reason. In fact, probably because of similar reasons the usage ratio is turning in favor of tablets (35,3 %) because social media usage with smartphones only accounts for 27,6 %. An explanation for the shift in usage can be that due to the increased mediation of everyday habits in the travel experience (Wang, Xiang and Fesenmaier, 2014), social media is not only used to cover idle times in known habitats but also abroad. As such, it can be assumed that the consumption of social

media, which traditionally makes up a bigger part, happens mainly through tablets since they are more convenient with their bigger displays but when actively interacting, which usually happens less frequently than consuming, in the form of posting a picture, checking in or updating a status, then smartphones are being used. In fact, social media, which are only partially related to travel apps (i.e. Foursquare), rank as the fourth most used app type right after public transportation apps with a more balanced ratio between smartphones and tablets. Next, tour booking apps show a similar usage trend with one third more users actively booking tours and tickets with their tablet (21,3 %) compared to their smartphones (13,1 %).

Yet, the biggest discrepancies between devices were reported for passbook and taxi hailing apps. The first, usually used to store and display flight and event tickets, is easily explained as it is a built-in feature on iPhones and widely featured on Android smartphones and therefore barely available on tablets. As for the latter, almost only one third of the surveyed smartphone users indicated using apps like Uber or MyTaxi on tablets too, making it the least used travel tablet app type. While certain features and apps were only built to be optimized for smartphones by design, tablets have also proven to evolve from couch-surfing-only devices to convenient portable mini computers. Amid increasing demand, hardware manufacturers like Apple and Samsung introduced resized tablets like the iPad Mini to meet travellers' demands as showcased in Apple's most recent ad campaign showcasing how to use tablets during travelling. Similarly, the earlier presented results of this survey claim that more than half of all frequent travellers are actively using tablets on-site and yet half of the top 200 apps are not optimized for tablets (Ravenscraft, 2014) at all.

It is critical to mention that the lagging behind of developers towards adopting apps for tablets is harming the on-site user experience and therefore their business. This is especially true when considering that at the same time an even newer generation of new mobile devices, smart watches, is already uprising. Intelligent watches, in contrary to tablets, are bringing technology into the very background of the everyday experience by shifting mobile features onto the users' wrists and assigning them a more passive role (Parker, 2015). To put it more simply, when wishing to access information and features on smartphones or tablet, users will need to grab the device from their pockets, unlock the screen and start the app. During this

process, users are forced to move their attention from real life towards their digital gadget. Logically, considering that time is especially precious during travel, the user is caused to make a tradeoff of moving attention away from the travel experience towards the mobile device in exchange for information. Now, smart watches promise to partially solve this issue by offering viable information at a glance on the wrist and consequently removing barriers between the user and the device.

It can therefore be assumed that smart watches potentially solve a real problem in the travel industry by significantly reducing required human input for desired informational output. This assumption, however, lies in contrast with only a tenth (9,9 %) of participants citing “I want to enjoy the moment without getting distracted” as a reason for not using that many travel apps on-site whereas a clear majority claims expensive roaming fees abroad (52,2 %) and already being well-informed (31,9 %) as deciding factors when it comes to whether or not to use travel apps on the go. The question of whether smart watches are therefore potentially solving a real problem in the travel industry, at least for this very reason, therefore seems to be that of a niche market.

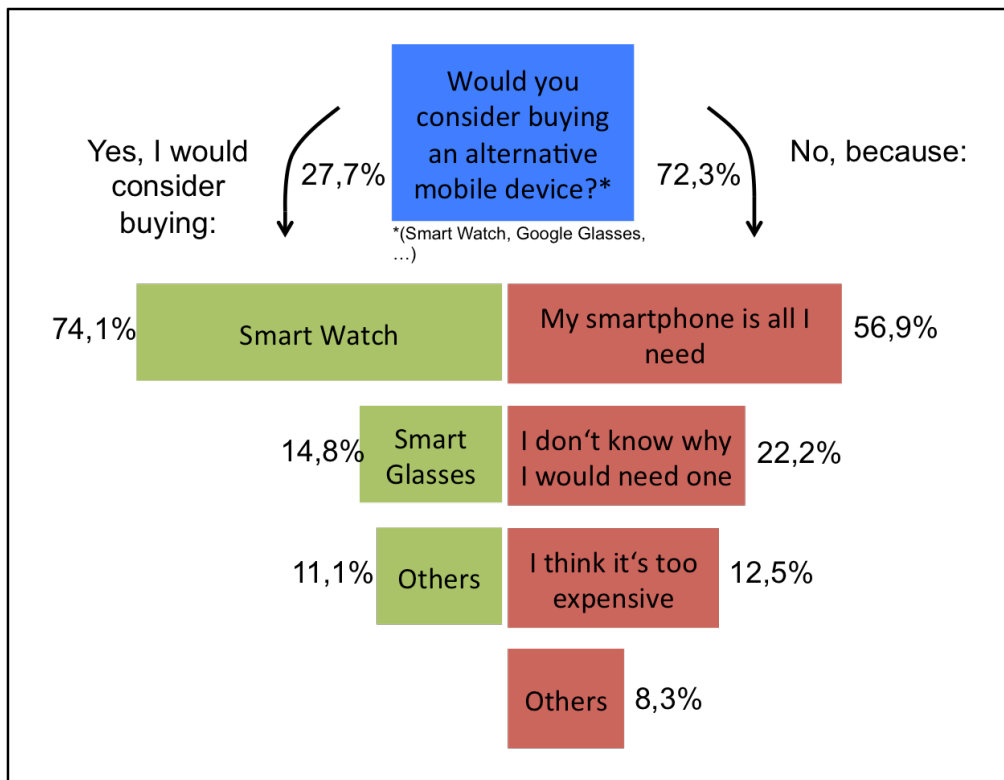


Figure 14: Decision Tree for Alternative Mobile Devices (Source: Own Source)

With regards to alternative mobile devices in general, a total of 27,7 % participants expressed interest in buying a device beyond smartphones and tablets, with the majority (74,1 %) keen on smart watches. It is worth noting that the survey was carried out two months prior to Apple's anticipated launch of the Apple Watch and therefore the awareness was generally higher regarding smart watches. However, the overall significantly lower interest (14,8 %) in its competing wearable counterpart smart glasses, also known as augmented reality glasses, comes as no surprise given that Google recently pulled back Google Glasses from its semi-public testing program (Miller, 2015) followed by comments of the Apple CEO Tim Cook about how intelligent glasses, at this point of development, simply are too intrusive. They would upstage technology and not want to be worn by users at large scale (Parker, 2015).

The fact that just about a quarter of all participants responded positively towards alternative devices further indicates the rather understated interest compared to the high penetration rates of smartphones and tablets of this target group. While the major part of surveyed users is clearly negating (72,3 %) excitement towards wearable devices, it is worth noting that smart watches are estimated to show a similar adoption rate to those of tablets (Danova, 2014) which were the fastest yet in early consumer technology adoption, even exceeding smartphone growth (Phone Arena, 2012). Eventually, consumers might be showing increasing interest as the saturation for traditional mobile devices reaches a critical point (Raymond, 2014) and therefore further opens the mindset for new mobile technology investments. Similarly to this assumption, more than two thirds of respondents indicated that their smartphones and tablets were all that they would need or that there was no direct obvious benefit to owning an alternate mobile device indicating that users do not feel like they have already unleashed the full potential of their existing mobile devices. Besides, price clearly did not seem to be a major factor in the decision process with only 12,5 % saying that they find these devices to be too expensive.

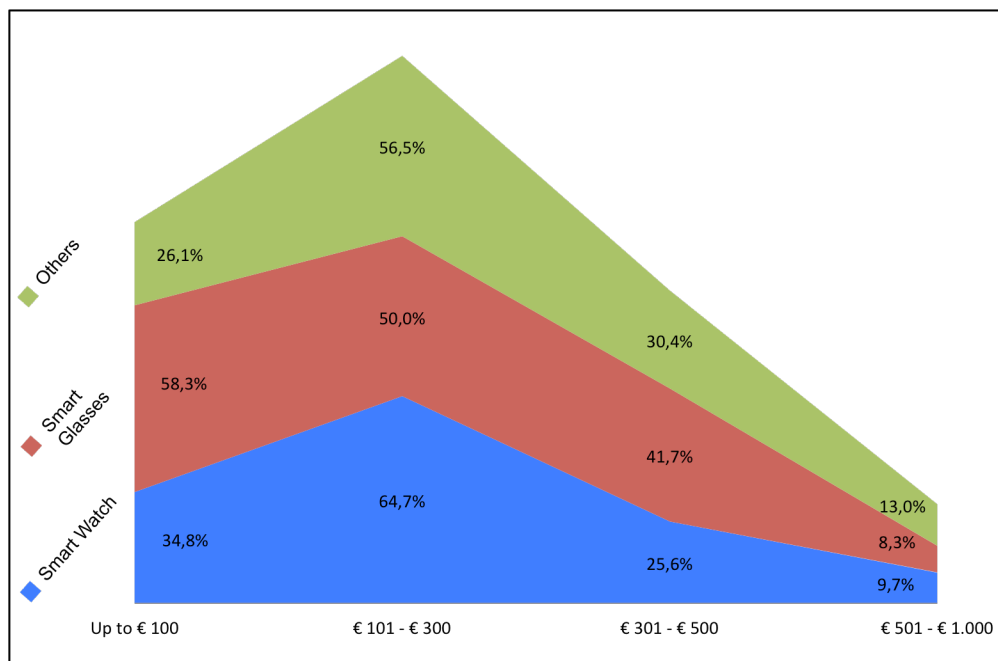


Figure 15: Amount of Money Willing to be Spent on Alternative Mobile Devices (Source: Own Source)

Overall, from those who expressed interest in wearables, the amount of money willing to spend (see figure 14) is highest in the € 100 to € 300 segment, lead by smart watches with 64,7 %. The starting prices of smart watches range from € 99 (Pebble) to € 349 (Apple Watch) but can go as high as € 18.000 for high-end devices and as such generally reflect the expectations of users of this survey.

Regardless of what type of devices apps are operated on, participants were further asked to evaluate how satisfied they are with the travel apps they are using during their journey (see Figure 15).

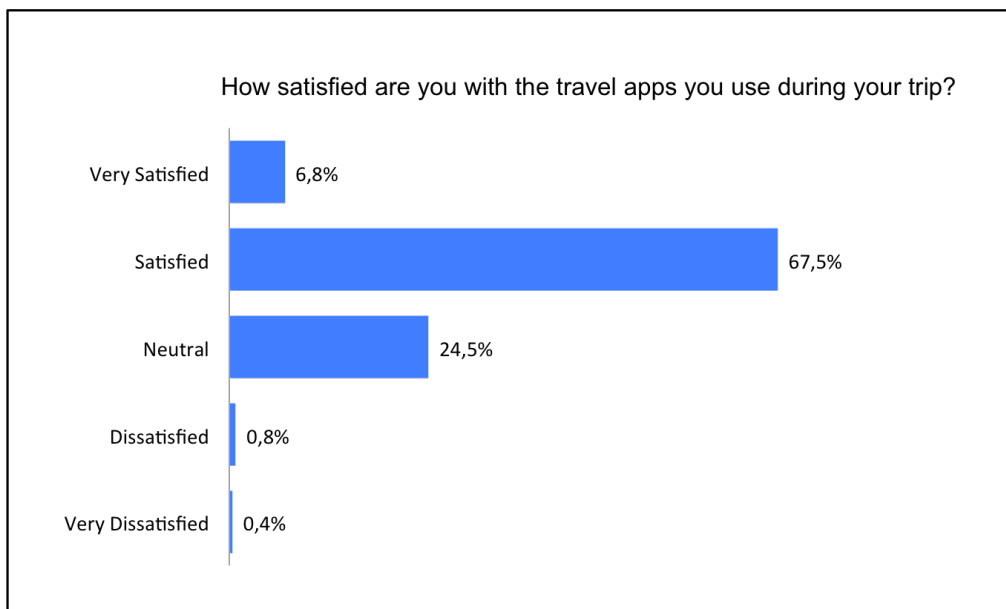


Figure 16: Satisfaction with Travel Apps Used during a Journey (Source: Own Source)

Overall, the impressions appear to be positive with only 1,2 % of participants claiming to be dissatisfied or very dissatisfied. However, it becomes clear that the share of people being very satisfied with their app during the travel experience barely exceeds one twentieth (6,8 %) of all responses. The majority of users indicated that they are generally satisfied (67,5 %) or have a neutral stand (24,5 %) towards their on-site travel apps. To put it differently, when allocating app store common metrics, which are used to determine the performance of an app, to this question by using the numbers 1 (very satisfied) to 5 (very dissatisfied), the weighted average results in 3,5. Hence, projecting on-site related travel apps as a whole to the

app store, users rated it with an average of 3,5 stars. In comparison, the top 100 apps are reported to be rated on average between 4,3 starts on the Google Play Store and 3,9 stars on the Apple Store (Walz, 2015), both of which are significantly above the on-site travel app average. On the basis of these results, it can be concluded that users are somewhat satisfied with their mobile on-site experience but definitely see room for improvements.

In order to further examine what potential negative aspects lead to this mediocre evaluation, participants were asked to express what they were most missing during their journey. The most desired feature was to have more apps available that do not require an Internet connection abroad (71,6 %), followed by two content-focused statements about having access to insider tips from locals (61,1 %) and receiving information based on their location (58,9 %). Moreover, approximately a fifth (21,1 %) of all respondents stated that they would like to see relevant information when looking through their device camera, which goes hand in hand with the rather cautious interest of users in smart glasses and augmented reality for travelling purposes in general. Other statements included finding Wi-Fi hotspots in foreign cities, offline map routing and finding people with similar interests nearby.

The final section of this survey was designed to quantify how much improvements to on-site travel apps are eventually worth to end-consumers in order to determine the potential return from investments from developers putting additional efforts into their applications. As such, participants were first asked to indicate which kind of features they would like to have in an ideal mobile app for travelling during their trip. The answers were compared the results of the previous question on which features they currently use during travelling (see table 17).

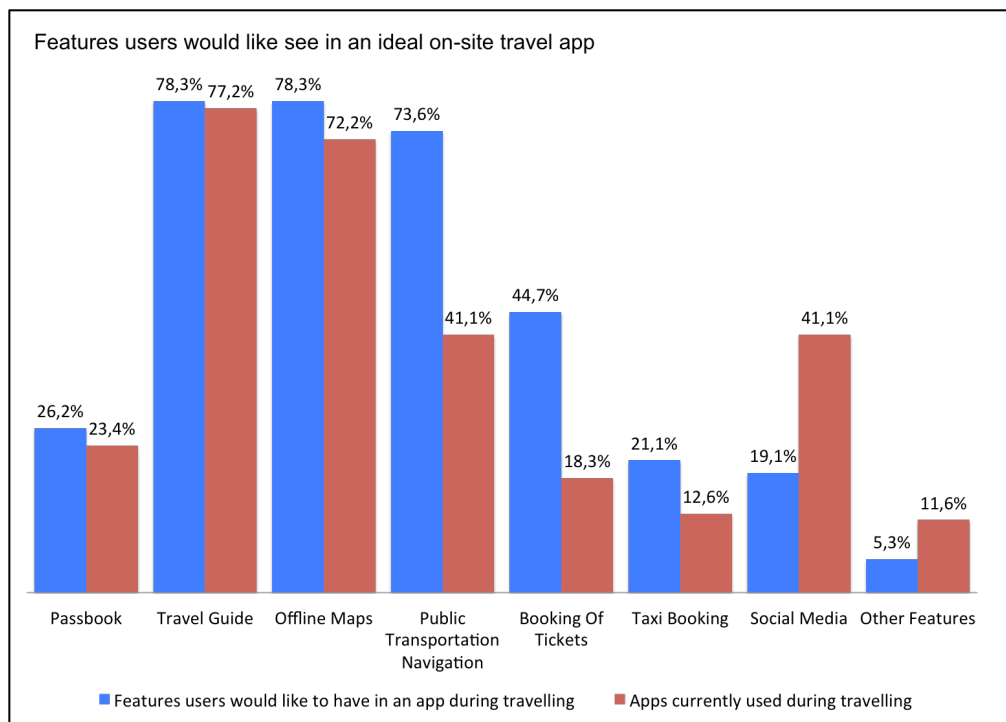


Figure 17: Features Users Would Like to See in an Ideal On-Site Travel App (Source: Own Source)

There have been very homogenous tendencies in the usage of passbook, travel guides and offline maps for features users are using and would like to have, indicating general satisfaction with the current status. However, interest in public transport apps saw a significant rise in interest (73,6 %) compared to how much they are currently being used (41,1 %), making them the third most demanded function. This statement indicates that the actual range of public transportation-related apps is either too small, not designed for travellers (offline usage) or generally not in a shape that satisfies user demands. Regardless of which of these reasons lie behind this movement, there is clearly a high potential to improve users' on-site travel experience.

Similarly, two booking related categories have seen massive changes with the booking of tickets increasing by 144,3 % and taxi booking by 67,5 %. The data implies strong growth opportunities for on-demand services in the travel industry. This is in particular interesting for new emerging companies and services, given that both tours and taxis represent highly monetizable fields.

In contrast, social media show a reverse movement with less than half of the users showing sympathy towards inclusion into the ideal travel app. Admittedly, the survey specifically asks for features to be included in a travel app, whereas the first question concerns general apps that are being used during the trip. In this very context, users may have deliberately excluded social-media-related features from their ideal travel app as they see social media to be a non-travel app matter. All in all, the rather mediocre rating of travel apps together with some very significant discrepancies between features users would like to have and features users actually use indicates a strong opportunity for growth on this matter.

In addition, participants were asked to state whether they would prefer to have all these features to be listed in one universal app or rather distributed among several single-purpose apps. Despite the growing trend of unbundling features into separate apps, users clearly decided for one single app (71,4 %). This direction generally goes in hand with the massive negative outcry of mobile users when Facebook decided to create a standalone chat app and remove its messenger function from the Facebook app. While the idea of a universal app may generally make more sense to users as they have to carry around less apps on their devices, developers are given the chance to greatly increase their reach by splitting up features and therefore to maximize their growth and monetization strategy (Knibbs, 2014).

Following up on the thought of the economic success of mobile apps, participants were asked to indicate how much they are currently spending per travel app compared to how much they would be willing to spend (without any bookings) on their ideal travel app which would better suit their needs (see figure 18).

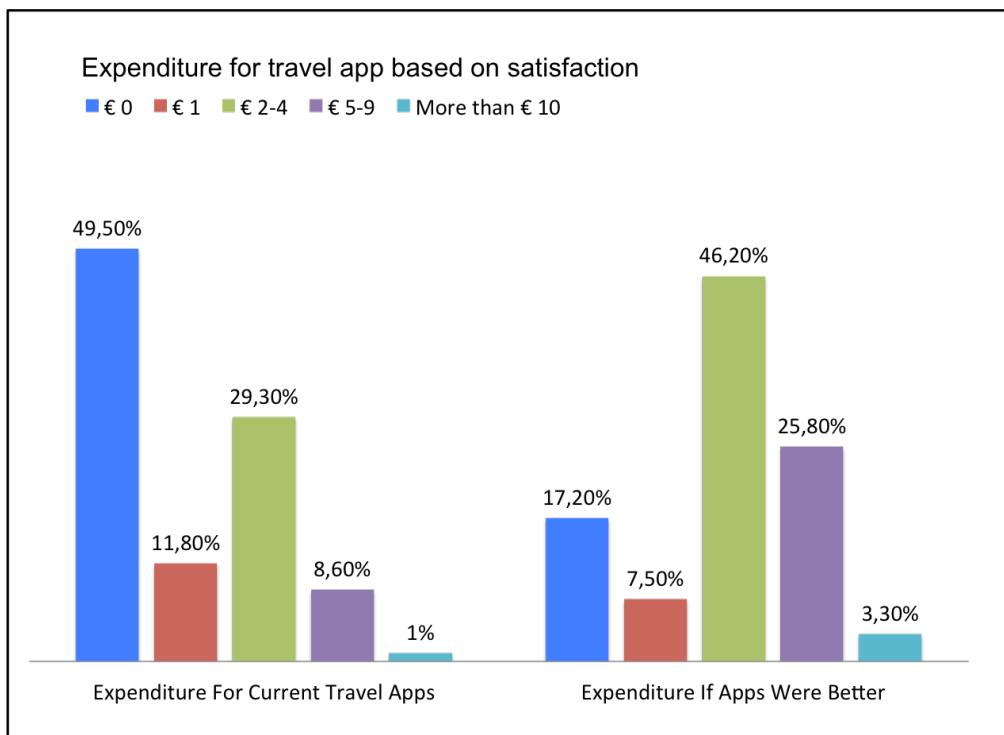


Figure 18: Expenditure for Travel Apps Based on Satisfaction (Source: Own Source)

Indeed, a striking majority of almost 50 % claimed to generally not spend any money on travel apps, indicating clear expectations to be able to obtain content and features for free. However, considering having access to their ideal travel app, this number shrunk by two thirds to 17,2 %. Similarly, the number of users being ready to spend only € one decreased by one third from 11,8 % to 7,8 %, whereas the readiness for higher prices rose significantly. In fact, the strongest price tier is no longer € zero but now represented by the € two to four segment with 46,2 % compared to 29,3 % before. Furthermore, given the increase from responses to the € five to nine price range to 25,8 %, almost two thirds of all users claim to be willing to spend between € two to € nine for a travel app meeting their exact preferences. Likewise, the strongest growth has been reported in users stating to potentially spend more than € ten. Despite more than tripling numbers, the overall segment is yet quite exclusive with only 3,3 % being represented.

In summary, the data implies that there is a strong relation between the readiness to spend more money on an on-site travel app and the desire to have an enhanced app. Hence, indicating that there is yet much room for improvements in the (on-site) travel app segment. It is worth noting that the very fact that users are ready to make

big shifts in their consumer behavior based on quality and the range of content and features should be seen as the basis for developers seeing vast potential economic opportunities. This is especially true when considering that devices like tablet and smart watches are yet far from being fully penetrated by companies.

1.4 Qualitative Interviews: What Solutions Can the Industry Provide?

This study aims at gaining in-depth insights on some of the key findings of the quantitative web survey by representatives of the travel and technology industry. Arguably, radical technological and behavioral developments come with challenges that are not sufficiently covered by consumer surveys and academic research. It is believed that only through the collective input from both end-consumers and companies a truly meaningful summary of the on-site travel momentum and its forthcoming future can be created.

Qualitative research methods, such as interviews, are considered an effective technique for exploring opinions, feelings and deeper interpretations of specific events or movements. As such, a series of six short interviews has been conducted in May 2015 consisting of two to three questions each. The interviewees were informed about the project in beforehand and asked whether they would be willing to participate. Upon positive answer, each participant received custom questions related to their field of expertise through e-mail. Each interviewee has a professional background in the travel technology industry and covers one or more aspects that are related to mobile on-site travel (see table eight).

Table 8: Profiles of Interviewees

Name	Company	Field of Expertise
James O'Brian	Skift	Wearables in Travel
Kevin May	Tnooz	Travel Technology General
Matthew Lieberman	PwC	Wearable Technology
Omid Ashtari	Citymapper	Public Transportation
Valentin Dombrovsky	Excursiopedia	Tours and Activities
Wilfried Schaffner	tripwolf	Travel Guides

The interview questions were categorized into four main sections, which were identified to be most important to further evaluate opportunities and challenges in the mobile travel ecosystem. The categories include quality of travel apps and perceived user satisfaction, on-site travel app features, monetization possibilities, the role of wearables in travel and the future of on-site travel apps.

Overall, the survey implied that users were generally not majorly impressed with the performance of their travel apps and as such raised the question whether the travel vertical has not done enough in terms of innovation to revolutionize the on-site travel experience of users and is today lagging behind when it comes to the mobile experience. However, May argues that travel apps are not everyday apps and therefore are not being used as frequent as in banking, retail or grocery shopping (Email interview, May 29, 2015). Hence (on-site) travel apps give consumers fewer opportunities to sufficiently experience, understand and enjoy the services and as such may lead to only mediocre ratings. He further explains that another possible reason could be that mobile travel apps very often are designed to solve simple tasks such as checking in, booking a ticket or creating an itinerary. While the performance of these apps may be very good, there is no overwhelming positive experience associated with completing a simple task well. Schaffner examines this problem from a different angle, arguing that the amount of single purpose apps results in consumers being overwhelmed by the number of available apps and features (Email interview. May 29, 2015). Instead, he further explains, travel apps should consider adding value to multiple stages in the travel cycle so that users get

access to a broader range of functionalities in one app. This argument supports the findings of the survey implying that the majority of users prefer one multi-purpose app rather than multiple single-purpose apps. Nevertheless, a slim and clear focus of apps has proven to be a high success factor in the mobile ecosystem, which needs to be kept in mind when considering building a multi-purpose app.

In attempt to further classify which features such apps should include, in-destination booking of tours and activities, taxi hailing, travel guide content and offline maps are named most essential (Dombrovsky, email interview. May 29, 2015). Additionally, the user survey identified public transport navigation to be one of the most demanded on the go features while indicating that offline access was still a major blocker for using such services abroad. The main reason why public transport apps have yet not focused on enabling more content and functions to be accessible without Internet connection lies in the very fact that travelers are not the primary target group, Ashtari argues (Email interview. May 29, 2015). He provides further details by explaining that the strongest user base lies in commuters and that the app must not be bloated with additional features for travelers in order to stay focused on its core functionalities to remain competitive. Again, a clear focus and simple usage are major factors for developers across all segments in the mobile tourism industry.

The assumption that on-site services, ranging from ground transportation (Uber) to last-minute hotel bookings (HotelTonight), are currently forming an exciting opportunity for the industry seems to be generally accepted by all interviewees. May further implies that while it is difficult to determine which area will come along next, anything where users can obtain information and book a product via a device is set to tap into a massively growing market with good chances of success (Email interview. May 29, 2015).

New trends in digital consumer behavior were often lead by the introduction of consumer electronics such as smartphones and tablets. As such, wearable devices, in particular smart watches, were often referred to as the next big thing in (on-site) travel. At this point, however, the industry is seeing mixed signals with strong adoption rates (Danova, 2014) but rather flat exciting for travel purposes (Own source: web survey, 2015). Lieberman explains that early models of smart watches

have failed in effectively communicating their benefits, resulting in today be mainly seen as gimmicks or extra gadgets (Email interview. May 27, 2015). He further notes that both developers and wearable device manufacturers are responsible for establishing a better picture with clear benefits to users. Admittedly, Lieberman implies that while there are likely a lot of opportunities in this segment, it has yet been widely untapped by travel companies. O'Brien supports this argument, arguing that travelers generally value autonomy and accessible information relevant to their journey but rely largely upon the tools that brands supply within the channel (Email interview. May 26, 2015).

In summary, wearable devices are still in a very early stage and while Apple's smart watch seems to have significantly increased interest from both developers and consumers, it is still in an experimental stage of development. In fact, according to the collective input of expert interviewees, the real driver of innovation lies behind the opportunity of users being empowered to access real-time and context relevant information on the go. Lastly, designing mobile application in the leanest way to secure simple and clean processes plays a major role for every sub-segment in the travel and most likely every other mobile industry.

Conclusion

This paper aims at identifying the role of mobile applications in today's on-site travel stage. In particular, it examines the two main aspects of how users can benefit from an enhanced on the go travel experience and how developers can explore yet widely untapped opportunities in this very field. The very basis for the argument of why this specific niche in the mobile travel industry needs to be further investigated lies in the forecast of immense continuous growth for mobile apps (Statista, 2013) and its therefore consequent drastic impact on consumer's lives in many different appearances, including travel. In fact, a recent tourism study implies that travel in specific is in the process of being widely redefined due to mobile devices leading to softening up the boundaries in which travel traditionally was characterized (Wang, Xiang and Fesenmaier, 2014). The research further indicates that travel can no longer be seen as a completely separate entity from everyday life as smartphones aid in mediating many daily habits to the travel experience. As such, this paper argues that out of Google's (2011) five travel stages, the experience stage is affected the most, given that mobile devices with their very core characteristics of mobility (location-based) and ongoing connectivity (Internet) offer the greatest added value when being used on-site compared to other travel stages.

While the survey indicates that travel apps are still most used in the planning phase, a detailed examination of the five travel stages strongly supports the implication that activities from the planning, booking and sharing phase are sharply shifting towards the experience phase. The results support previous studies regarding travelers spending less time prior and after their trip but increasingly move their interests to the on-site experience as mobile devices empower users to research the best restaurants right on the spot, receive location-based recommendations directly at the destination or make use of GPS based navigation (Wang, Xiang and Fesenmaier, 2014). In fact, mobile on-site applications allow users to plan their trip more flexibly while making more context relevant decisions based on their immediate environment and eventually provide more choices to the user of how and when to access content and features. Overall, the study implied that on average two

out of three installed travel apps have an on-site related purpose. Hence, indicating the significance of the experience stage. However, having identified several overlaps of apps in the various stages, it is likely that certain travel apps are used in multiple travel stages. For instance, a user might be creating an itinerary in a travel guide app from home and then actively use the same app on the go in the destination. Likewise, a taxi-hailing app can be used to organize transportation to the airport but also at the destined city or a review platform serve as informational source right on the spot while being used afterwards to share the experience. It is worth noting that the additional activities flowing in from other travel stages undoubtedly lead to intensifying the on the go experience as a whole. As such, they pose a threat of missing out on the classic touristic experience due to being overwhelmed with technical tasks that otherwise would have been carried out before or after the experience stage. Yet, the survey indicates that only a fraction of travelers feels that travel apps are a distraction. Indeed, context relevant push notifications are designed to solve exactly this problem, bringing on-site information acquisition to the most effective level by empowering users to receive messages based on preferences and location. Consequently, these customized messages leave traditional travel accessories like print guidebooks or city maps way beyond them in terms of effectiveness. Indeed, mobile travel guides, offline maps and public transportation navigation are the most used features of travelers in a destination. In addition, the tourism industry's fastest growing and highest valued startups such as Uber, HotelTonight and Airbnb have actively pursued last-minute and on-demand booking strategies leading the way for a new highly profitable on-site opportunity. In fact, this study implies strong interest from users to be able to trigger context and location relevant actions such as booking tours and activities on the go. This argument is collectively backed up by numerous experts in the travel technology industry, claiming that reduced roaming fees, general better Internet access abroad and new mobile devices will further fuel growth in the following years.

However, the results of this study offer various implications that travelers' expectations of on-site travel apps are barely exceeded. In fact, this study confirms the assumption that while demand for on-site apps rose, the travel industry did not keep up with travelers evolving needs, resulting in high discrepancies between how travelers currently use apps on the go and which features they actually would like to

have. However, users also indicated significantly increased willingness to spend more money on travel apps if their needs were better matched. This is important as the development of on-site apps can greatly improve the on-site experience of mobile users, consequently enhance monetization possibilities and justify development costs. The biggest challenges to overcome for companies all over the globe will be to provide the necessary tools for travelers to enhance their travel experience with all the current technological possibilities that there are. Wearable devices extend the range of these possibilities by offering new ways of on-site information acquisition but neither consumers nor developers have yet fully unleashed their potential.

The travel industry is in the process of being massively disrupted and in the center of this movement lies the experience stage. Travelers gain seeming less access to information on the go and consequently are empowered to make decisions on the spot. It is the duty of both travelers and developers to pioneer mobile on-site experience in order to leverage on the momentum that on-demand services have created to eventually enhance the mobile travel experience at large.

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