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Profiling business travellers who use mobile travel applications

Business travellers are increasingly using mobile devices, resulting in a need to understand who the users of this technology are and how they use it. Even though some have attempted to segment mobile travel service user groups, to date, there has been no attempt to segment business travellers in terms of their mobile travel application usage. Convenience sampling is used, and a self-administered online questionnaire completed by 232 business travellers. By means of cluster analysis four clusters are identified which share similar characteristics. The most important elements in the formation of the clusters are the type of organisation and device ownership. This research answers the call by previous researchers that further research on mobile devices should emphasise more than just the functionalities of the device.

Key words: Business travellers, business travel cycle, cluster analysis, mobile travel applications, segmentation

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Introduction

We know that travellers are using mobile devices (and applications) more and more, but even so, there is still a dearth of research in terms of the users of this technology and how they use it (Okazaki, Campo, Andreu and Romero, 2015). This need for a greater understanding of mobile travel application usage is heightened by the fact that Nielsen (in Chen, Murphy and Knecht, 2016) reported travel and entertainment applications to be the most readily discarded. This increases doubts over the efficiency of application development which may result in crucial resources (financial and technology) being exhausted by developing these applications (Chen, Murphy and Knecht, 2016). Lu, Mao, Wang and Hu (2015) confirm that vast amounts of resources have been devoted to new and untested technologies (for example mobile applications) to advance the provision of tourism services.

It is thus necessary to discover segments (profiles) of travellers who utilise mobile travel applications so that these applications could be designed to provide customized, flexible, personalized, specific tourism services as required (Budd and Vorley, 2013; Thakran and Verma, 2013; Verma, Stock and McCarthy, 2012). Sell, Carlsson and Weldon (2011) believe not enough has been done to recognize segments of mobile service users, while Eriksson (2014) goes further to say that he has found no research studies attempting to recognize distinct groups of mobile travel services users.

After Eriksson's (2014) remark, Okazaki et al. (2015) performed a latent class analysis of Spanish travellers' usage of the mobile internet to plan and execute travel. They identified four segments (based on three variables: perceived advantages of mobile internet utilization for tourism actions, demographics, and social media use patterns) namely *Savvies*, *Planners*, *Opportunists*, and *Low-techs*. To date, there has been no attempt to segment business travellers in terms of their travel application usage. This is surprising since authors have acknowledged that technology is vital for business travellers (Brey, So, Kim and

Morrison, 2007). Verma, Stock and McCarthy (2012) found that individuals whose Technology Readiness Index (TRI) scores are higher (who are in other words more probable to be accepting towards technology) are likely to be younger, travel more frequently for business purposes, are more educated, and are paid higher salaries. They concluded that business travellers are more likely to adopt new technology quicker than the remainder of the population.

For this reason, the main aim of the research is to increase our understanding of business travellers' usage of travel applications, by segmenting them based on their mobile application usage. The research contributes to the literature in the following ways. First, Lu et al. (2015) and Wang, Xiang, Law and Ki (2016) highlight that it is vital to investigate industry-specific apps (such as apps designed for the business travel market) since these should form part of the marketing strategy in communication and customer relationship management of suppliers. Our research investigates the business travel market's use of applications. Second, the study responds to previous researchers such as Wang, Xiang and Fesenmaier (2014:25) who requested that future research on mobile devices "should extend beyond the focus on functionalities".

In the next section, we provide an overview of the utilization of mobile travel applications by business travellers prior, during and after a business trip, we present an explanation of the methodology used in the analysis after which we discuss the main results. Finally, we report the main conclusions and lessons for the business travel industry as well as the limitations of our approach.

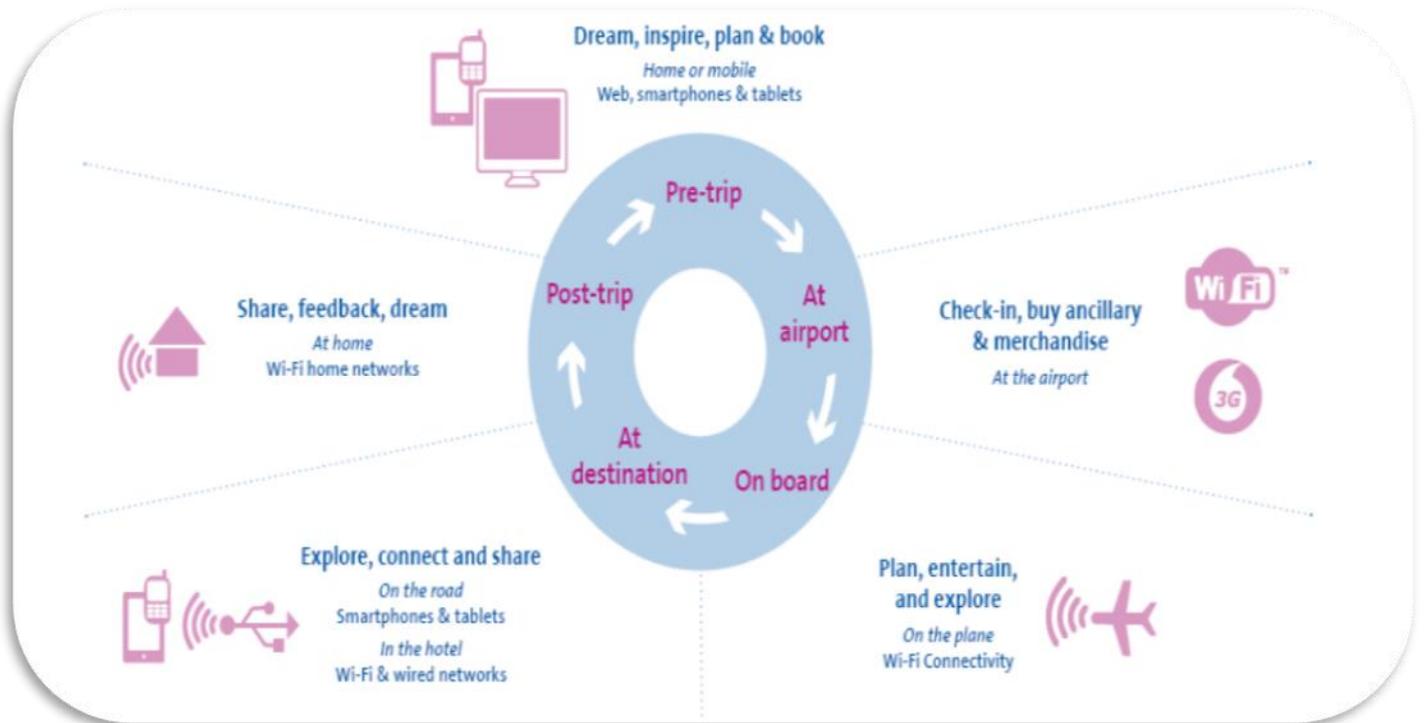
The use of mobile applications by business travellers before, during and after the business trip

According to Langelund (2007) mobiles have become a requirement for any travel experience, while Wang et al. (2012) add that it gives functionality throughout the whole travel life cycle. This is similar in the context of business travel, although the utilisation of these applications by business travellers, will often depend on their company's mobile use policy. A study completed by Airplus (2012) with the assistance of 92 corporate travel buyers, found that 52% of US companies have not implemented policies to take responsibility for mobile travel tools and applications. Of the companies that do manage mobile travel tools and applications, 24% stated that they were planning to implement and manage the use of sanctioned mobile tools. The increased use of mobile tools means that more travellers can use these tools to make travel decisions or purchases (CWT Travel Management Institute, 2013). The main reason for companies wanting to sanction tools is their duty to take care of travellers and to guard against having weaker negotiating power due to the inability to meet targets of suppliers if travel purchases are not tracked (CWT Travel Management Institute, 2013).

When the use of mobile applications is permitted, business travellers use a variety of features. Figure 1 illustrates the usage of mobile devices in the travel life cycle from the traveller's perspective. *Before* the trip, travellers typically use the tablets, the web and smartphones to organise and reserve their travels; *at the airport* they utilise devices to check in and buy supplementary services; and once they are *on board* of the aeroplane they could make use of Wi-Fi technology to organise their trip even further or alternatively for entertainment. After arriving *at their destinations*, they use their smartphones or tablets to stay in contact with family and friends, share their experiences or further discover their

destinations with the help of their devices. *After the trip*, travellers make use of their devices to share their experiences with or provide suppliers with feedback.

Figure 1. The influence of mobile technology on the travel lifecycle



Source: Amadeus (2011)

CWT Travel Management Institute (2014) adds a few actions that must be done during every phase of the business travel life cycle. Before the trip, for example, these actions are important: planning, booking and consolidating itineraries. Furthermore, business travellers require mobile travel applications to be able to consolidate their itineraries, help change or cancel their trips, deliver on-going help while they are travelling (for example notifying them of changes to their flights) and enable them to manage the expenditure process while travelling. Other functions particularly useful to business travellers are applications allowing travellers to avoid queues, flight status updates (this limits the levels of stress experienced while travelling), mobile flight search, mobile airport navigation, mobile boarding passes and mobile itinerary to name a few (SITA, 2012). Travellers use applications to check weather conditions, directions or restaurants in the area.

Travel suppliers use mobile applications to improve and streamline the customer experience (Budd and Vorley, 2013:42-43). Anuar, Mushaireen and Khalid (2014: 552) note that hotels annually invest large sums in maintaining smartphone applications for travellers and identify several benefits that smartphone applications offer to travellers during the entire travel cycle. These include the following:

- ‘convenient access’;
- the ability to ‘reserve, modify or cancel a booking with real-time reservations’;
- ‘simple navigation system for easier and faster hotel searches’;
- ‘customer support centre’;
- ‘comprehensive property details’; and
- ‘enhanced photography presentation with high-resolution images’ and ‘tempting offers’.

In the previous discussion, we have referred to business travellers as a uniform concept, which they are not. Business travellers are often profiled according to their demographic characteristics, for example, Gustafson (2006) found business travel generally being more common among male professionals than females. Aguilera (2008) identified salary, hierarchical position, and gender to be vital (and not completely unrelated) parameters that distinguish between business travellers. In their research on segmenting the business travel market based on behavioural intent, emotions and satisfaction, Millan, Fanjul and Moital (2016) cited Chiang, King and Nguyen (2012) who stated that not enough research has been done on segmenting business travellers, even though travelling for business purposes is growing. The few existing articles have segmented the market based on different service characteristics and trip- and traveller-related attributes (Millan et al., 2016) for example, Smith and Carmichael’s study (2006) on the consumption behaviour of female business travellers in Canada and Wickham and Vecchi (2009) who developed a taxonomy of business

travellers based on travel intensity and travel reach. More recently, Davidson (2011) identified the characteristics of business travellers based on age and discovered dissimilarities between the “Generation Y” (travellers born between 1977 and 1994) and the remainder of the business traveller population. Chiang et al. (2012) studied the motivational and socio-demographic attributes of meetings, incentives, conventions and exhibitions (MICE) travellers to Taiwan. Even though these studies have made a significant contribution in helping us understand the business travel market better, research into this market remains limited, and no studies have segmented the business travel market based on their mobile travel application usage. It is thus necessary to discover segments (profiles) of travellers who utilise mobile business travel applications so that these applications could be designed to provide customized, flexible, personalized, specific tourism services as required (Budd and Vorley, 2013; Thakran and Verma, 2013; Verma, Stock and McCarthy, 2012) that would ultimately render consumer acceptance. Sell, Carlsson and Weldon (2011) believe not enough has been done to recognize segments of mobile service users, while Eriksson (2014) goes further to say that he has found no attempts in previous studies to recognise distinct groups of mobile travel services users.

Methodology

South African business travellers who have travelled locally or internationally, for work-related reasons, including but not restricted to conferences, events, training, meetings, and sales are used as the target population for this study. The sample is taken from the database of a large global travel management company with South African offices with whom the travellers have reserved travel during the period from 1 August 2013 to 31 July 2014. Non-probability convenience sampling is used to make the survey available to the South African business travellers on the accessible database. Taking the scarcity of studies on

the topic into consideration and because the results of this study do not repeat earlier research studies and are not linked to other studies, a new survey is designed from a review of the literature. Some measurement scales used in previous industry questionnaires (such as CWT Travel Management Institute, 2014:52 [functions of mobile business travel applications]) and those developed by Goh et al. (2009:37) [mobile tourism services in a leisure context]; Kim et al. (2008:399), Wang et al. (2014:7) [smartphone usage in daily life]; Wang, Xiang and Fesenmaier (2016:17) [classifications of smartphone uses] are revised for use in this study.

The survey is made up of various sections. The first section covers the demographics of the traveller and asks their level of education, age, and gender. The next section relates to business travellers' general usage of mobile applications. In this section, respondents are questioned on the mobile device types that they utilise as well as how often they make use of it. Respondents are also requested to give their opinions on the importance of mobile applications in the various phases of the business travel cycle. Importance is measured on a scale from 1-4 with 1=futile and 4=very important.

To satisfactorily achieve the objectives of the study diverse data analysis techniques are utilised. The descriptive methods help in describing the data in terms of gender depictions, age segments, and levels of education, whereas inferential methods permit us to draw certain deductions about the larger population of business travellers who make use of mobile travel applications. Table 1 shows that more men participated in the survey than women. Thirty-three percent of respondents fell in the 39-48-year-old category, and the bulk of respondents had a post-graduate qualification.

Table 1. Demographic profile

Gender (n=221)	Male	68.3%
	Female	31.7%
Age (n=219)	19-38 years old	30.6%
	39-48 years old	33.3%
	49-58 years old	27.9%
	59 years and older	8.2%
Level of education (n=222)	Secondary School Qualification	11.3%
	Certificate/Diploma	25.7%
	Graduate	19.8%
	Post Graduate	43.2%
Monthly Nett Income (n=222)	Less than R20 000 (less than \$1540)	7.3%
	R20 001 to R40 000 (\$1540-\$3075)	27.8%
	R40 001 to R 60 000 (\$3075-\$4610)	24.8%
	More than R60 001 (More than \$4610)	27.9%
	I would rather not say	12.2%
Type of organisation (n=221)	Global organisation (a company with representation across most of the continents)	75.6%
	Multinational organisation (a company with representation across several countries)	17.2%
	Local organisation (a company with representation in South Africa only)	6.3%
	None of the above (please specify)	0.9%

Data analysis and results

When asked about their ownership of mobile devices and use of mobile applications, the majority (59.6%) of respondents indicated that they own both a tablet and a smartphone, while 29.6% owned just a smartphone. Only 10.3% mentioned that they do not own a smartphone or a tablet. As expected, almost 70% of respondents said that they use their mobile devices daily. Most respondents' employers (52.3%) recommended the use of particular applications. Other companies (22.1%) did not enforce, recommend or prohibit the use of mobile travel applications, while 6.5% of respondents said their employers enforced the use of specific applications, with 3.5% saying they were prohibited from using applications (table 2).

Table 2. Mobile device usage

Smartphone/Tablet ownership (n=223)	I own neither a smartphone nor a tablet	10.3%
	I own a smartphone and a tablet	59.6%
	I own a tablet	0.4%
	I own a smartphone	29.6%
Frequency of smartphone and tablet use (n=200)	Daily	68.5%
	Two to three times a week	9%
	Once a week	4.5%
	Two to three times a month	5%
	Once a month	3%
	Less than once a month	3.5%
	Never	6.5%
Corporate companies' views regarding the use of mobile travel applications (n=199)	Enforced	7%
	Recommended	51%
	Prohibited	4%
	I don't know	16%

	None of the above	22%
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Regarding respondents’ perceptions of the importance of mobile travel applications throughout the travel lifecycle, respondents indicated that mobile travel applications were ‘important’ to ‘very important’ all through the complete travel life cycle, except during the post-travel stage, during which time it was indicated as ‘not important’ by 49.0%, as shown in Table 3.

Table 3. The perceived importance of the usage of mobile travel applications throughout the travel lifecycle

Variable		Percentage			
		Very important	Important	Not important	Futile
The importance of the use of mobile travel applications during the travel life cycle	Pre-travel searching phase (n=197)	32.5%	46.2%	18.3%	3%
	Pre-travel booking phase (n=197)	39.1%	45.2%	13.2%	2.5%
	During travel phase (n=199)	40.7%	48.2%	9.1%	2%
	Post-travel phase (n=198)	10.6%	31.3%	49%	9.1%

According to Pesonen (2013) cluster analysis is clearly the most used method of segmenting tourists. Cluster analysis is an explorative analysis technique that tries to find structures within the data. It performs the task of grouping a set of objects or individuals in such a way that clusters can be readily identified that show similar characteristics within the cluster. In order to determine whether a profile of users could be identified, this study followed a two-step cluster analysis approach. According to Rundle-Thiele, Kubacki,

Tkaczynski and Parkinson (2015), two-step cluster analysis allows the simultaneous analysis of both categorical and continuous data, which is highly appropriate in this study where categorical and (self-reported) behavioural data are analysed at the same time.

Two-step cluster analysis is made up of two steps. First, original cases are gathered into pre-clusters by building a cluster features tree (Okazaki, 2007). Second, the standard hierarchical clustering algorithm on the pre-clusters is utilised (Norusis, 2011). Hierarchical cluster forming lets the researcher discover a variety of solutions with diverse numbers of clusters (Norusis, 2011). This yields a series of solutions, which is then condensed to the best number of clusters based on Schwarz's Bayesian information criterion (BIC).

The BIC is seen as one of the most valuable and objective criteria for selection, as it escapes the unpredictability of traditional clustering techniques (Chiu et al., 2001; Norusis, 2011). To decide which variables to eliminate from the analysis, the one with the lowest BIC is favored (Norusis, 2011). Once the cluster solution is formed, the silhouette measure of cohesion and separation should be higher than the required level of 0.0 to show that the within-cluster distance and the between-cluster distance is valid (Norusis, 2011).

A two-step cluster analysis is conducted based on the following variables: type of organisations, device ownership, device usage, organisation's view of mobile usage, the number of trips and the level of importance of mobile travel application usage during the following four stages of travel: searching; booking; travelling; and post travel. Middleton, Fyall, Morgan and Ranchhod (2009) recommended classification of travel and tourism consumers to be conducted using consumer phases of purchasing and usage. These variables were selected as several other cluster analyses had been conducted with these and other variables (such as age, gender, income and educational level and purpose of trip), yet this analysis showed the most significant result.

Two-step cluster analysis mechanically selects the number of clusters. Four clusters were formed. The most important element in the formation of the clusters was the type of organisation. The Schwarz's Bayesian information criterion was used as clustering criteria. Cluster quality was indicated by the silhouette measure of cohesion and separation, with a value of 0.2 indicating fair quality of the cluster solution. The clusters are provided in figure 2.

In Cluster 1, which consisted of 25.4% (48) of the respondents, all (100%) belonged to global organisations. They owned only a smartphone, and their organisations recommended the use of mobile devices for business travel purposes. They use their mobile devices daily and undertook the second most business trips. This cluster perceived the usage of mobile travel applications to be the most important during the travelling stage (3.10), followed first by the booking stage (3.06) and then the searching stage (2.88). It was found to be the least important during the post-travel stage (2.48).

The second cluster consisted of 27.0% (51) respondents, with most (94.1%) belonging to global organisations. They owned a smartphone and a tablet, and their organisations neither recommended nor prohibited the use of mobile devices for business travel purposes. They use their mobile devices daily and undertook the most business trips. For this cluster, mobile travel applications were perceived to be most important during the booking stage (3.33), followed first by the travelling stage (3.31) and then the searching stage (3.20). It was found to be the least important during the post-travel stage (2.29).

The third cluster consisted of 23.3% (44) respondents, with most (77.3%) belonging to multinational organisations. They owned a smartphone and a tablet, and their organisations recommended the use of mobile devices for business travel purposes. They use their mobile devices daily and were the most infrequent travellers. This cluster perceived mobile travel applications to be the most important during the travelling stage (3.18), followed first by the

booking stage (3.09) and then the searching stage (2.98). It was found to be the least important during the post-travel stage (2.48).

The fourth and final cluster consisted of 24.3% (46) respondents, with all (100 %) belonging to global organisations. They owned a smartphone and a tablet, and all (100%) their organisations recommended the use of mobile devices for business travel purposes. They use their mobile devices daily and undertook 6.72 business trips. The perception of this cluster was that mobile travel applications were the most important during the travelling stage (3.50), followed first by the booking stage (3.28) and then the searching stage (3.17). It was found to be the least important during the post-travel stage (2.43).

From the above, it is clear that respondents in cluster 1 were the least convinced about the importance of mobile applications in all the phases of travel, except the post-travel stage. They were neither frequent nor infrequent travellers. On the other hand, they were the only cluster who owned only a smartphone and could be labeled as “mid basics”. The cluster with the most frequent travellers (cluster 2), found the use of mobile travel applications to be more important in the searching and booking phase than the other clusters. They also found mobile applications to be most important in the booking stage. For this reason, cluster 2 is called “frequent bookers”. Respondents in cluster 3 travelled the least and belong to multinational organisations. They found the use of mobiles to be the most important in the travelling stage, and is termed “infrequent travellers”. Lastly, respondents in cluster 4 were neither frequent nor infrequent travellers, who found mobiles to be most important in the travelling stage. For this reason, they are termed “mid travellers”. When we compare the cluster who travels the most, “frequent bookers”, with the cluster that travels the least, “infrequent travellers”, we note that the frequent bookers find the use of mobiles more important in the all the stages of travel, except the post-travel stage.

Next, we used the nonparametric Kruskal-Wallis test (one way analysis of variance by ranks) to determine if statistically significant differences exist between travellers who travel frequently (more than 7 trips), with moderate frequency (3-7 trips) and infrequently (≤ 2) and the importance that they assign to the usage of mobile business travel applications in the various phases of the travel cycle. From the results (given in table 4) it is clear that the frequent travellers view mobile applications more important in every phase of the travel cycle than the infrequent travellers. The only significant result was shown in the booking phase ($p \leq 0.05$). This confirms the results from the cluster analysis which also indicated that the cluster who travels the most, find the use of mobiles more important in all the stages of travel, except the post-travel stage. This is consistent with the findings of Oh, Lehto and Park (2009) and Wang et al. (2016) who found frequent travellers to be more positive toward utilising mobile devices and believing more in the usefulness of these technologies.

Figure 2: Cluster analysis

Clusters

Input (Predictor) Importance
 ■ 1.0 ■ 0.8 ■ 0.6 ■ 0.4 ■ 0.2 ■ 0.0

Cluster	2	1	4	3
Label				
Description				
Size	 27.0% (51)	 25.4% (48)	 24.3% (46)	 23.3% (44)
Inputs	Type of Organisation 1.00 (94.1%)	Type of Organisation 1.00 (100.0%)	Type of Organisation 1.00 (100.0%)	Type of Organisation 2.00 (77.3%)
	Device Ownership 3.00 (98.0%)	Device Ownership 1.00 (93.8%)	Device Ownership 3.00 (100.0%)	Device Ownership 3.00 (63.6%)
	Organisational view 5 (35.3%)	Organisational view 2 (58.3%)	Organisational view 2 (100.0%)	Organisational view 2 (43.2%)
	Device Usage 7 (47.1%)	Device Usage 7 (68.8%)	Device Usage 7 (100.0%)	Device Usage 7 (68.2%)
	Travelling 3.31	Travelling 3.10	Travelling 3.50	Travelling 3.18
	Searching 3.20	Searching 2.88	Searching 3.17	Searching 2.98
	Booking 3.33	Booking 3.06	Booking 3.28	Booking 3.09
	Number of Trips 8.49	Number of Trips 6.98	Number of Trips 6.72	Number of Trips 5.73
	PostTravel 2.29	PostTravel 2.48	PostTravel 2.43	PostTravel 2.48

Table 4. Difference in frequency of trips and importance of usage

	Frequency of trips	N	Mean Rank
Searching	≤ 2	72	95.42
	3-7	61	98.96
	More than 7	64	103.07
	Total	197	
Booking*	≤ 2	73	88.08
	3-7	61	101.11
	More than 7	63	109.61
	Total	197	
Travelling	≤ 2	74	100.26
	3-7	61	97.94
	More than 7	64	101.66
	Total	199	
Post travel	≤ 2	74	94.71
	3-7	60	95.98
	More than 7	64	108.34
	Total	198	

* significant at the 0.05 level

Discussion and conclusion

Information and communication technologies could be used for market segmentation to great effect (Pesonen, 2013). Even with a wealth of academic papers on market segmentation in tourism there are only a few concentrating on ICT (Beritelli, Bieger and Laesser, 2007; Brey et al, 2007; Kim, Lehto and Morrison, 2007), and even fewer focusing on mobile travel applications (Eriksson, 2014; Okazaki et al., 2015). To date, there has been no attempt to segment business travellers in terms of their travel application usage even

though business travellers are actually more prepared to utilise mobile technology than leisure travellers (Lubbe and Louw, 2009).

The results showed by means of cluster analysis, four distinct subsets of mobile travel application users namely “mid basics”, “frequent bookers”, “infrequent travellers” and “mid travellers”. As the names assigned to the clusters suggest, the main differences between the clusters were in terms of trip frequency, and the importance of mobile applications in the different travel phases. From this, it can be concluded that frequent travellers are more convinced about mobile applications’ importance in the various phases of the business trip than infrequent travellers. The results support previous researchers who found frequent leisure travellers to be more positive toward utilising mobile devices and believing more in the usefulness of these technologies (Oh et al., 2009; Wang et al., 2016). Furthermore, the results show that the respondents in cluster 1 (mid basics) who possessed only a smartphone, ranked the importance of mobiles consistently lower than the other clusters (where respondents have possession of both a smartphone and a tablet) in all the phases of the business trip cycle, except the post-travel phase.

This research provides valuable information by subdividing the business traveller market into subsets of customers that behave in the same way or have similar needs (Benett in Pesonen, 2013) in terms of their mobile application usage. An understanding of the requirements and wants of every segment is vital for travel managers when planning interventions, since this will permit them to design travel policies that would better satisfy the needs of their travellers in terms of their mobile application usage. According to a Carlson Wagonlit Travel White Paper titled “Making connections,” this would allow organisations to tailor booking policy according to each segment (TAM, 2017). The inability to design a segmented approach is likely to disadvantage the travel management programme. Like all research studies, this study is not without limitations. The findings of this study cannot be

generalized to all business travellers who use mobile applications as the sample was non-random. The findings do nonetheless show some significant trends that could indeed probably be an indication of the needs of the global population.

Mang, Piper and Brown (2016) called for more research on specific use behaviours of travellers once mobile devices have already been adopted since an understanding of how travellers are actually utilising their mobile devices is vital because it could improve interaction between businesses and consumers resulting in a more personalised and enjoyable experience. Future research could thus examine the specific use behaviours of business travellers.

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