Me, My Girls and the Ideal Hotel: Segmenting Motivations of the Girlfriend Getaway Market using Fuzzy *C*-Medoids for Fuzzy Data

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Abstract

Segmenting the motivation of travelers using the push and pull framework remains ubiquitous in tourism. This study segments the girlfriend getaway (GGA) market on motivation (push) and accommodation (pull) attributes and identifies relationships between these factors. Using a relatively novel clustering algorithm, the Fuzzy *C*-Medoids clustering for fuzzy data (FCM-FD), on a sample of 749 women travelers, three segments (Socializers, Enjoyers and Rejoicers) are uncovered. The results of a multinomial fractional model show relationships between the clusters of motivation and accommodation attributes as well as socio-demographic characteristics. The research highlights the importance of using a gendered perspective in applying well established motivation models such as the push and pull framework. The findings have implications for both destination and accommodation management.

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Introduction

The main purpose of this study is to segment the girlfriend getaway (GGA) market on motives and accommodation choice attributes. The GGA market is comprised of females travelling with only their female friends and families, usually in small parties of between two and four (Khoo-Lattimore and Prayag 2017). This market also include same-sex group travel that has gained momentum recently (Burns 2014) with an increase in travel tours and events targeted specifically at women travelling with other women (Bond 2017). Destinations such as Gympie in Australia (Anonymous 2017) and travel guides are increasingly promoting "top" GGA destinations (e.g.Tripadvisor 2016) to such travelers. Service providers are targeting this group of travelers better by offering female-only accommodation (e.g. Amytis 2017), all-female travel packages (e.g. JetBlue 2017) and tourism activities that are exclusive for all female travel groups (Getaways 2017). Researchers have also begun to devote academic attention to this market (Berdychevsky, Gibson, and Bell 2013; Khoo-Lattimore and Gibson 2015; Khoo-Lattimore and Prayag 2015) using diverse research methods and epistemologies.

In this study, we use the well-established push and pull framework (Dann 1977; Klenosky 2002; Prayag and Hosany 2014, Sirakaya, Uysal, and Yoshioka 2003,Tkaczynski, Rundle-Thiele, and Beaumont 2010) to identify segments within the GGA market by employing a relatively new clustering algorithm- Fuzzy C-Medoids clustering for fuzzy data (FCM-FD). FCM-FD overcomes both the persisting concern regarding the generation of random solutions in segmentation studies (Dolnicar 2002) and the growing criticism on the ability of rating scales to accurately capture the original opinion of respondents (Coppi and D'Urso 2002, D'Urso et al. 2015, Hung and Yang 2005). Significant relationships between the push and pull factors are also identified in response to the call (Khoo-Lattimore and Gibson 2015; Khoo-Lattimore and Prayag 2015) for a better understanding of the

relationship between GGA motives (e.g. bonding and socialization) and accommodation choice attributes (e.g. size of room and private conversation spaces) of this market.

The study contributes to both the tourism and hospitality literatures in four main ways. Theoretically, the study uncovers the relative influence of different accommodation attributes within the push-pull framework. Existing studies using this framework either ignore the critical role that accommodation plays in destination choice processes (e.g., Alen, Losada and Carlos 2015) or evaluate accommodation options available to travelers at the general rather than attribute specific level (Li, Meng, Uysal and Mihalik 2013; Prayag, Disegna, Cohen and Yan 2015). These approaches are insufficient for understanding the behavior of the GGA market and the corresponding implications for destination marketing and accommodation management. Second, by investigating motives and preferences of the GGA market world-wide, the study expands the narrow country focus in existing GGA studies, which are mainly from North America (Berdychevsky, Gibson, and Bell 2013) and Malaysia (Berdychevsky, Gibson, and Bell 2013, Khoo-Lattimore and Gibson 2015, Khoo-Lattimore and Prayag 2015). Third, by linking clusters of push and pull attributes, the study uncovers relationships that support Li et al.'s (2013) proposition that new and emerging markets are best understood using overlapped segmentation approaches. Related to this, the fourth contribution of the study is methodological. A common practice used in the profiling phase of a fuzzy clustering analysis is to convert the final result into crisp information (each unit is associated with one cluster) by adopting a "defuzzification" procedure (D'Urso et al. 2016) to easily understand the relationships between the clusters and the profiling variables. In this study we propose the use of the original membership degrees of the GGA clusters to more accurately describe the final clusters by employing a fractional multinomial logit model to understand the interdependencies between the push and pull attributes. By doing so, we

extend the fuzzy clustering literature (Papke and Wooldridge 1996) by showing how this approach can result in a more in depth description of clusters.

Motivation Studies in Tourism

Despite the extensive research on motivation of different tourist types (Fu, Cai, and Lehto 2015, Kozak 2002), in diverse tourism settings, across cultures, between genders, and utilizing diverse methodologies, our knowledge of what motivates people to travel remains incomplete (Battour et al. 2017). Since Plog's (1974) psychographic classification of travelers into different types, multiple theories have been applied to understand the motivation of tourists. The main theories are Maslow's need hierarchy (e.g. Crompton and McKay 1997), Iso-Ahola's (1982) escape-seeking dichotomy, Pearce and Caltabiano's (1983) travel career ladder, and Dann's (1977) push-pull framework.

Of these theories, the push-pull framework is the most popular for explaining travelers' choices of places, activities and experiences (Prayag and Hosany 2014). Dann (1977) described push motives as the specific forces that lead to the decision to take a vacation while pull factors refer to those that lead an individual to select one destination over another once the decision to travel has been made. Pull motives, in particular, have been considered in terms of destination attributes (You et al. 2000). Push and pull motives have generally been characterized as relating to two separate decisions made at two separate points in time – one focusing on whether to go, the other on where to go (Klenosky 2002) "thus, analytically and often logically and temporally, push factors precede pull factors" (Dann 1977, p.186). The interdependency between push and pull factors has been uncovered in tourism studies using the means-end-chain, which suggests that product attributes represent the "means" by which consumers obtain important benefits that reinforce important personal values or "ends" (Gutman 1982). While the objective of this study is not to link destination

(Klenosky 2002) or service quality (Frochot 2004) attributes with motives and personal values, the relationship between motives and accommodation attributes is uncovered to better understand the GGA market.

Accommodation options as a pull factor of a destination has been extensively researched but such options are often reduced to a global attribute evaluation that represents the overall summative stay using single items such as "luxury accommodation" (Prayag and Hosany 2014), "great accommodation and facilities" (Van der Merwe, Slabbert, and Saayman 2011), or "clean and comfortable accommodation" (Kim, Noh, and Jogaratnam 2007). Researchers also do not distinguish between the different facets of accommodation itself. For example, Pesonen et al. (2011) measured three accommodation attributes but all of them were confined to assessing food and beverage. Even when the primary aim has been to identify the importance of accommodation as a pull factor, researchers have prioritized destination attributes (e.g., natural attractions, wildlife and local lifestyle) (Kim and Baum 2007).

Given that destinations can use both push and pull factors to attract visitors, measuring accommodation as a pull factor using a few or one item offers limited opportunities for understanding how accommodation attributes can make a destination more attractive for a particular segment. Accommodation attributes can be used as the unique selling proposition for positioning destinations that are deemed unattractive and could potentially become the core tourism attraction of a destination (Morrison et al. 1996). For example, rural destinations may be unappealing to some travelers but when the experience is combined with luxury accommodation in farm stays, such destinations can become more attractive. Previous studies on the GGA market (Khoo-Lattimore and Prayag 2015, 2016) have alluded to the enhanced attractiveness of destinations based on accommodation attributes and the potential link between accommodation attributes and motivations for going

on a GGA (Khoo-Lattimore and Prayag 2015). However, these studies fail to empirically demonstrate any such relationships. Not much is known on whether specific push factors such as bonding and socialization have an influence on perceptions of accommodation attributes related to room amenities, safety and security, and food and beverage.

Segmenting Travel Motivations

Categorizing travelers in distinct groups based on their motives is omnipresent in tourism studies (e.g., Andreu et al. 2005; Assiouras et al. 2015; Chen, Bao, and Huang 2014; Özel and Kozak 2012). Some studies use either push (Kamata and Misui 2015) or pull factors only (Frochot and Morrison 2001, Prayag 2010) to segment markets. However, for parsimony reasons the use of both push and pull factors has been suggested (Li et al. 2013). Yet, this approach has been criticized for its low validity in different contexts (Chen, Mak, and McKercher 2011). Scholars have attempted to address this issue by employing newer segmentation methods such as bagged clustering (Dolnicar and Leisch 2003, Prayag et al. 2015) and canonical correlation analysis (Allen et al. 2015; Li et al. 2013; Sirakaya, Uysal and Yoshioka 2003). Nonetheless, using both factors for segmenting markets remain popular (see Table 1) to identify interdependencies (Paker and Vural 2016, Park and Yoon 2009).

In addition, many of the existing segmentation studies using push and pull motives, combine these factors to identify homogeneous clusters using factor-cluster analysis (Sung, Chang, and Sung 2016, Paker and Vural 2016). By doing so, there is loss of vital information about the true nature of the segments within the market and the resulting clusters are "noisier" (Dolnicar, Grün and Leisch 2016) compared to clusters that are derived from analyzing push and pull variables separately.

INSERT TABLE 1

Table 1 also highlights that recent studies (Kamata and Misui 2015, Kruger, Myburgh, and Saayman 2016, Özel and Kozak 2012, Paker and Vural 2016, Prayag 2010) continue to use the much criticized factor-cluster analysis (Dolnicar and Grün 2008, Dolnicar et al. 2012, Prayag and Hosany 2014) to identify segments. Several studies use crisp algorithms such as the Ward's method and K-means for identifying clusters (see Table 1). These methods are unstable (Dolnicar and Leisch 2003), which cast doubt on the reproducibility of the clusters (Ernst and Dolnicar 2017). For this reason, we suggest the use of a fuzzy clustering algorithm which is superior to traditional crisp methods in several ways. First, the partial classification obtained through any fuzzy clustering algorithm is generally more attractive than the classification obtained from crisp clustering methods (McBratney and Moore 1985, Wedel, Kamakura, and Böckenholt 2000). Specifically, the fuzzy approach allows each unit to belong to multiple clusters simultaneously (see Figure 1), avoiding issues of boundary identification, while returning an uncertainty measurement in this assignment process. As such, the clusters can be rated for each unit on how well they represent the unit, which traditional clustering methods cannot uncover (see D'Urso and Massari 2013, Klawonn, Kruse, and Winkler 2015). Second, fuzzy clustering methods are computationally more efficient because dramatic changes in the value of cluster membership are less likely to occur in the estimation procedures (McBratney and Moore 1985). These methods are less affected by local optima problems meaning that undesired and unstable final clusters are unlikely to occur (Klawonn, Kruse, and Winkler 2015). In this study, the fuzzy C-medoids (FCM) algorithm has been adopted since it allows for the description of each final cluster on the basis of actual observed units, called medoids, rather than on the basis of "virtual" units as in the fuzzy C-means algorithm.

Segmenting markets using ordinal data

As highlighted in Table 1, Likert-type scales and the ordinal data generated from them are the most common ways to evaluate individual perceptions and remain a prominent feature of market segmentation studies in general (Grün and Dolnicar 2017). However, forcing respondents to convert their judgements into linguistic expressions, represented by numbers, increases the uncertainty that already characterizes subjective opinions (D'Urso et al. 2016). Therefore, data collected using Likert-type scales are vague, imprecise, ambiguous, and the arbitrary assumption of equidistance between consecutive terms make the adoption of metric statistics (such as the mean) inappropriate (D'Urso et al. 2016). To solve the problems arising from the use of linguistic information, several studies suggest the transformation of Likert-type scale data into fuzzy numbers (Coppi and D'Urso 2002, D'Urso et al. 2016, Hung and Yang 2005). The new fuzzy variables can then be used as input of any clustering algorithms. As described in the previous section, the FCM algorithm for fuzzy data (FCM-FD) has been adopted as described in D'Urso et al. (2016).

INSERT FIGURE 1

Segmenting Women Travelers' Motivations

While the literature on group male travel (Yang and Mura 2016) is scant, literature on female group travel is burgeoning. For example, segmentation studies on the motivation of women travelers have revealed several niche segments. Solo women travelers are different from other women travelers in that they are motivated to challenge the status quo, feel empowered, empower others (Jordan and Gibson 2005, Wilson and Little 2008), and search for the self and meaning (Wilson and Harris 2006). Within that segment, Asian solo female

travelers differ from their Western counterparts on the importance of self-transformations and the notion of Asian identity reconstructions as motives for travel (Yang 2017). In contrast, the segment of women ocean cruisers adopt the travel lifestyle because of societal status, their relationship commitments and a desire to experience new cultures, people and settings (Jennings 2005), while older women are driven to travel by the need to escape from the usual environment, and the need for greater self-worth (Stone and Nichol 1999).

Although these studies have advanced our understanding of why women from different segments travel, none of them examine whether women's push motives are in any way related to pull or accommodation attributes. Likewise, these studies do not recognize that within, for example, the solo Asian female or senior travel markets, there are potentially segments differentiated by push and/or pull motives, which are characterized by different relationships between the two types of motives. As such, the findings from these studies do not uncover new or under-represented sub-segments that can contribute to the growth of the customer base while continuing to focus on existing customers (Weaver and Oppermann 2000).

The few studies that segment the motivations of women travelers mainly focus on their push factors. For example, Pennington-Gray and Kerstetter (2001) segment North American tertiary-educated women pleasure travelers by benefits sought and identified three types: rest and relaxation seekers, family/social seekers and action seekers. In a study on Canadian female business travelers, Smith and Carmichael (2007) found three segments: those who mix business and pleasure, the directed travelers and the frequent travelers. McNamara and Prideaux (2010) identified active adventure seekers and passive risk-averse females in the solo independent women travelers market. However, their study was based on profiling these two groups rather than segmenting that market. A notable absence in the literature on women that are travelling for pleasure purposes is the role of accommodation as

pull attributes. Yet, the literature on women travelling for other purposes (e.g. business) has highlighted the importance of different accommodation attributes (Lutz and Ryan 1993, Phadungyat 2008, Sammons et al. 1999).

Accommodation Attributes of the GGA Market

One gap that remains within the women travel literature is the importance attached to different accommodation attributes when travelling with other women, thus highlighting the lack of segmentation studies. In a recent study, Khoo-Lattimore and Prayag (2015) identified five clusters of GGA travelers based on accommodation preferences: safety conscious, safety and amenities driven, food and beverage driven, safety and activities driven, and desirables. Specifically, safety and security attributes feature predominantly as an important factor of accommodation choice for the GGA market. However, this study fails to examine the push motives that underlie the accommodation preferences of the GGA market. As suggested by the means-end chain, specific pull attributes are often linked to one or more motives (Klenosky 2002). It is, therefore, possible that push factors for the GGA such as friendships and bonding (Berdychevsky, Gibson, and Bell 2013, Khoo-Lattimore and Gibson 2015), socialization, and celebrating life's milestones (Gibson, Berdychevsky, and Bell 2012) are related to a single or multiple accommodation attributes.

Empirical Illustration

Survey Instrument

The survey instrument was built from previous studies on the GGA market and women travelers. All Cronbach's alpha values reported in this section are based on the measurement items for this study. A list of 13 motivation items (α=.87) was adapted from the literature (e.g. Berdychevsky, Gibson, and Bell 2013, Durko, Stone, and Petrick 2014,

Gibson, Berdychevsky, and Bell 2012, Khoo-Lattimore and Gibson 2015, Khoo-Lattimore and Prayag 2015), and measured on a 5-point Likert-type scale (1=Strongly Disagree and 5=Strongly Agree). Respondents were asked to evaluate on a 5-point Likert-type scale (1=Not at all Important and 5=Very Important) the importance level of 37 accommodation attributes based on their most recent experience as a female who had been on a GGA. Based on previous studies (Khoo-Lattimore and Prayag 2015, 2016), the 37 accommodation attributes were classified into four categories (see Appendix 1 for a brief description of each attribute): 10 safety attributes (S1-S10); 13 core service attributes (CS1-CS13); 8 food and beverage attributes (FB1-FB8); and 6 augmented service attributes (AS1-AS6). The attributes of safety (α=.91) were identified from previous studies (Khoo-Lattimore and Gibson 2015, Khoo-Lattimore and Prayag 2015, Lutz and Ryan 1993, McCleary, Weaver, and Lan 1994). Core services (α=.91) included items such as full body mirror, high powered hair dryers, superior quality bath towels and luxury feminine toiletries as found in previous studies (Khoo-Lattimore and Gibson 2015, Khoo-Lattimore and Prayag 2015). Food and Beverage (α=.84) influences the choice of hotels for GGA customers (Khoo-Lattimore and Prayag 2015, 2016). Within the GGA literature, several studies (Khoo-Lattimore and Gibson 2015, Khoo-Lattimore and Prayag 2015) identified hotel facilities such as private areas for socialization, bonding activities for girlfriends, and loyalty cards as augmented services for this market (α=.88). Several demographic and travelling characteristics were also measured (see Table 2).The survey instrument was pilot tested on 50 GGA customers resulting in minor changes in wording of some of the items.

Sampling, Data Collection and Visualization

Data for this study were collected in January 2015 from a survey of women who had been on GGA holidays recently. Three sampling criteria were used to identify the targeted

respondent. First, these women should have stayed for at least one night on their GGA. Second, they had stayed in paid accommodation to ensure that the respondents had some level of involvement in their accommodation choice. Third, to avoid issues of translation and back-translation, only English speaking respondents were included in the sampling frame. Data collection was commissioned to Qualtrics that made available a worldwide panel of 5.5 million female travelers that are recruited by invitation-only. Without limiting the respondents to any geographical location, women that fulfilled the three criteria above were sent the survey as a Qualtrics link. At the end of data collection, which lasted one month, 749 useable questionnaires were retained for data analysis.

Unlike crisp clustering algorithms (Dolnicar et al. 2014) there is no rule of thumb for determining sample size based on fuzzy clustering algorithms. Previous studies have used sample sizes ranging from 328 (D'Urso et al. 2015) to 997 (D'Urso et al. 2016), and the general rule (Cochran 1977) to consider a sample representative of the population is approximately 600 based on convenience sampling (95% confidence interval, ±4% margin of error, and 0.5 proportion). Accordingly, we consider the sample size of this study to be adequate for the purpose of our study.

Figure 2 provides a simple visualization of the existing relationship (measured through the Kendall's correlation) between push (Mot1-Mot13) and accommodation attributes. As we can observe, the majority of variables are positively correlated suggesting that the motives are related to accommodation preferences, thus warranting further examination.

INSERT FIGURE 2

The demographic profile of the sample (see Table 2) indicated that the surveyed GGA travelers were on average older (40 years old), either married/partnered (55.3%) or single (33.2%). The sample was well educated with 39.9% and 17.6% of respondents having completed a bachelor's degree and post-graduate degree respectively. These respondents stayed mostly for either 1-2 nights (34.7%) or 3-4 nights (41.9%) on their most recent GGA trip and travelled mainly with family members (32.3%) and friends (61.4%). The type of accommodation they chose included resort hotels (21.4%), bed and breakfast (6.9%), luxury (12.6%), mid-range (44.1%) and budget (12.4%). The respondents were mainly from U.S. (38.1%), UK (17.8%), Australia (13.6%) and Malaysia (12.6%). This sample profile resonates well with previous studies on the GGA market that have shown that such women are older (Berdychevsky, Gibson, and Bell 2016), well educated (Khoo-Lattimore and Prayag 2015), married or single (Berdychevsky, Gibson, and Bell 2013, Gibson, Berdychevsky, and Bell 2012) and from both Western and Asian countries (Khoo-Lattimore and Prayag 2017).

Clustering Procedure

A five-step clustering procedure was applied (see Figure 3). The Likert data were recoded into triangular fuzzy numbers (see step 1 in Figure 3) as follows: $\tilde{x}_1 = (0,0,0.25)_T$, $\tilde{x}_2 = (0.25,0.25,0.25)_T$, $\tilde{x}_3 = (0.5,0.25,0.25)_T$, $\tilde{x}_4 = (0.75,0.25,0.25)_T$ and $\tilde{x}_5 = (1,0.25,0)_T$. FCM-FD was then applied to the motivation items and each of the four categories of accommodation attributes separately. In each analysis the weights w_M and w_S of the dissimilarity measure presented in eq. (1) in Figure 3 was set equal to $w_M = w_S = 0.5$ as suggested by D'Urso and De Giovanni (2014). The fuzziness parameter p of the fuzzy C-medoids clustering algorithm in eq. (2) in Figure 3 was set equal to 1.5 (Kamdar and Joshi (2000).

INSERT FIGURE 3

The Fuzzy Silhouette (FS) index (eq. (3), Figure 3) was used to identify the best final partition. In this respect, the FS Index was calculated for c (number of clusters) from 2 to 10 setting $\alpha = 1$ (as suggested by Campello and Hruschka 2006). The FS values are graphically displayed in Figure 4. The partition showing the highest FS value was identified as the best partition for each analysis (e.g., 3 for the motivation variables). The fuzzy results (i.e. the membership degrees) have been used in the profiling phase, to avoid the inevitable loss of information due to the adoption of a "defuzzification" procedure (see D'Urso et al. 2016). Therefore, the membership degrees were used as weights for both statistics and tests employed to describe the socio-demographic composition of each cluster (see D'Urso et al. 2016). In addition, the fractional multinomial logit (FML) model (Papke and Wooldridge, 1996) is being proposed for the first time in the fuzzy clustering literature as a means to further profile the final clusters and in the identification of the main factors affecting the membership of units to each cluster. The functional form of the FML model is specified in eq. (4), Figure 3.

INSERT FIGURE 4

Results

Segments of Travel Motivation

The clustering procedure applied to the motivation variables resulted in three clusters. The membership degrees of each respondent to the final clusters were used to label the clusters. Figure 5 shows the weighted percentage distribution (where the weights are the membership degrees) of each motivation variable for each cluster. Cluster 1 (CL1) shows the highest weighted proportion of respondents who either "strongly disagree" or "neither disagree or agree" with each motivation. Cluster 2 (CL2) shows the highest weighted

proportion of respondents that "agree" with each motivation variable. Cluster 3 (CL3) shows the highest weighted proportion of respondents who "strongly agree" with each motivation variable. The same pattern can be observed from the vector of original answers given by the medoids of each cluster (see Appendix 2). Thus, CL1 comprises women whose main reason for going on a GGA is to bond, socialize, get away from home, and have fun. This group neither agrees nor disagrees with the remaining motives and thus was labelled "Socializers". CL2 consists of women who are driven by 12 of the 13 motives, except for finding support in difficult times. CL3 comprises women that are motivated strongly by 10 factors, except for the celebration of a milestone, to travel in the safety of numbers, and to find support in difficult times (see medoids' answers in Appendix 2). Therefore, CL2 and CL3 can be labelled "Enjoyers" and "Rejoicers" respectively.

INSERT FIGURE 5

Segments of Accommodation Attributes

The same clustering procedure (Figure 3) was applied to each of the four categories of accommodation attributes. The results (Figures 6), using the weighed percentage distribution of each variable, suggest that in each category women can ideally be grouped into two clusters: Cluster 1 comprises women who consider the attributes in that particular category to range from "not at all important" to "neither unimportant or important" while Cluster 2 comprises women who consider the attributes to range from "important" to "very important". Thus, for the safety attributes, the two clusters can be labelled "Safety Conscious" (Safety CL1) and "Safety Priority" (Safety CL2). From the analysis of the medoids' answers (see Appendix 2), women who belong to the cluster of "Safety Priority" attach less importance to the accommodation offering female only staff. This is also a less important characteristic for

the cluster of "Safety Conscious", for which availability of safety deposit boxes, notification of room delivery service, and direct dial to different safety authorities are comparatively less important than other safety attributes. The two clusters of core services attributes suggest that women either assign less importance to the core services (Core service CL1), except for the comfort of the mattress/pillow and the room's scent (see medoid's answers in Appendix 2), or assign high importance to all of the core service attributes (Core service CL2). Therefore, Core Service CL1 and Core Service CL2 can be labelled as "Low Core service" and "High Core service" respectively. Similarly, for food and beverage facilities offered by the accommodation, two clusters of women were found. The first group (F&B CL1) assigns some importance to all attributes of this category, with an emphasis on the availability of both small snacks and a good breakfast. The second group (F&B CL2) assigns very high importance to all of the attributes in this category, with an emphasis on enjoyment, quality and healthiness of any meals, from breakfast to dinner. The two clusters were labelled "F&B Enthusiasts" and "F&B Lovers" respectively. For the augmented services offered by accommodation providers, the two identified clusters comprise women who assign less importance to additional services (Aug. service CL1), especially the organization of group activities and childcare service (see medoids' answers in Appendix 2), and those who perceive that all extra services are important (Aug. service CL2). Therefore, the clusters of Aug. Service CL1 and Aug. Service CL2 were labelled "Low Augmented Service" and "High Augmented service" respectively.

INSERT FIGURE 6

Profiling the Motivation Clusters

The three motivation clusters were profiled against the travel (destination, type of accommodation, travel party, duration of the trip, travel company and travel frequency) and socio-demographic characteristics (age, ethnicity, marital status, education level, and nationality). Table 2 shows the weighted proportions obtained using the membership degrees to the final clusters as weights, the sample composition, and the significance of the Chi-square and ANOVA tests. The findings reveal that the membership to the three clusters significantly depends on the type of accommodation, travel company, age and nationality of respondents. For example, the "Rejoicers" seem to prefer Bed & Breakfast as well as resort and luxury accommodation while the "Socializers" seem to be more attracted to budget/mid-range accommodation. The "Rejoicers" are mainly Americans while the "Enjoyers" had the highest proportion of Singaporeans, Malaysians and Australians. The "Socializers" are mainly from the UK and New Zealand.

INSERT TABLE 2

Motivation, Accommodation Attributes and Socio-Demographic Characteristics

To analyze the interdependency between the push (motivation) and the pull (accommodation) clusters, as well as the influence of socio-demographic characteristics, a fractional multinomial logit model was adopted. This method allows the estimation of proportions assuming that the degrees of membership to the motivational clusters are automatically (negatively) correlated (if a unit belongs more to one cluster, it belongs less to the others). Since the sum of membership degrees over all clusters equals to 1 per each observed unit, one cluster has to be chosen as a reference group (baseline cluster) and the results have to be interpreted against this group. The "Socializers" cluster (CL1) has been selected as the reference group since respondents who belong to this cluster were driven by

more clearly defined motives (i.e. to bond, socialize, get away from home, and have fun) than the other two clusters and the interpretation of the findings is more intuitive. The membership degrees to each accommodation clusters (as described in the previous section) and the socio-demographic characteristics (see Table 2) were specified as independent variables in the model. The *fmlogit* STATA module (Buis, 2008) was used for this analysis. The stepwise procedure was adopted for variable selection, which requires the model to be initially estimated using the complete set of independent variables and then re-estimated using only the independent variables significantly affecting at least the membership degrees to one of the motivational clusters (Wooldridge 2016). Table 3 shows the estimated coefficients obtained from this stepwise procedure.

INSERT TABLE 3

The results show that the higher the membership degrees to both the "Safety Priority" and "High Core Service" clusters, the lower the probability of members to belong to the "Socializers". As such "Socializers" attach less importance, compared to the other two clusters, to accommodation offerings that specify safety measures (e.g. female only staff, safety deposit boxes etc.) but assign some importance to amenities such as comfort of the mattress/pillow and room scent. The higher the membership degree to the "High Augmented Service" cluster, the higher the probability to belong to "Enjoyers" while membership to "Rejoicers" significantly increases with an increase in membership to "F&B Lovers". As such, "Enjoyers" assign higher importance to extra facilities (e.g., airport transfer, free transport to nearby shopping malls/restaurant/shops, and loyalty cards) offered by the accommodation than "Socializers" and "Rejoicers". Likewise, "Rejoicers" assign higher importance to accommodation providers that offer good quality of meals and healthy options

in restaurant menu while "Socializers" and "Enjoyers" assign higher importance to attributes such as the availability of small snacks and breakfast quality.

Staying at a Bed and Breakfast seems to increase the probability to belong to "Rejoicers" rather than "Socializers" and "Enjoyers". Travelling up to 3 times for a GGA in a year and visiting either a city or a national park diminish the probability of belonging to "Rejoicers" in comparison to "Socializers" and "Enjoyers". Women who are travelling for a mid-short stay (up to 4 nights) are more likely to belong to "Socializers" rather than "Enjoyers" and "Rejoicers". Having an associate/technical degree positively affects the probability to belong to "Enjoyers" while older travelers have a higher probability to belong to "Socializers" and "Enjoyers". Regarding nationality, the results suggest that American travelers are more likely to belong to "Rejoicers" than the other two clusters.

Discussion and implications

Segmenting motivation remains ubiquitous in tourism studies (Alén et al. 2015, Andreu et al. 2005, Assiouras et al. 2015, Battour et al. 2017, Chen et al. 2014). This study identified several relationships between push (motivation) and pull (accommodation) attributes for the GGA market using FCM-FD. The findings offer an insight into how accommodation providers can develop, segment, target and position product and services for this market to capture women's varied motives and accommodation preferences. The findings are summarized in Figure 7 and give rise to several theoretical and managerial implications.

INSERT FIGURE 7

By using the push-pull framework as the broad overarching conceptual framework in this study, we highlight the heterogeneity in the importance of accommodation attributes to different segments of the GGA market. As such, we extend existing studies on this market (Khoo-Lattimore and Gibson 2015, Khoo-Lattimore and Prayag 2015) and the literature on segmentation of motives (Assiouras et al. 2015, Li, Meng et al. 2013, Prayag and Hosany 2014, Sung et al. 2016) by showing that clusters of, rather than individual accommodation attributes are related to different clusters of motivation. In this way, we provide further empirical support for the means-end chain (Klenosky 2002) by showing for example that "Enjoyers" and "Rejoicers" are more likely to assign higher importance to safety and security attributes (e.g., secure lifts and floor access and built in peep hole) and core service attributes (e.g., comfortable mattress & pillows, high powered hair dryers, and luxury feminine toiletries) compared to "Socializers".

Such relationships between different motivation segments of the GGA market and specific accommodation amenities and facilities uncover the existence of an "ideal" hotel for each segment. For example, the "Socializers" desire specific amenities but are less concerned about safety and security at the hotel. This "ideal" hotel can fulfil motives of bonding, friendship, and socialization contributing, thus, to enhance the well-being of these women (Berdychevsky, Gibson, and Bell 2013, Gibson, Berdychevsky, and Bell 2012). Accordingly, our study bridges the theoretical divide between marketing and gender studies by highlighting that accommodation experiences can be transformative for women travelers. This is shown by the relationships uncovered between different motivations that drive the importance attached to food and beverage, socialization through hotel activities, and interactions within the hotel's servicescape (e.g., staff and amenities).

The findings in this study demonstrate that a post-modern feminist theorizing of marketing frameworks such as the push and pull dichotomy can be a powerful point of

departure from the way existing studies have investigated motivation as a psychological construct. By identifying the motivation that drives women to travel with other women only, we demonstrate not only similarities between the GGA market and the motives of the traditional pleasure travel market but also gender-based differences such as "celebration of milestone" and "travel in the safety of numbers". In this way we bring a gendered perspective to the study of travel motivation.

Previous studies (Khoo-Lattimore and Prayag 2015, 2016) have offered limited socio-economic characteristics of the GGA market, despite the call for the core characteristics to be identified (Bond 2009). Beyond age and education level, this study provides insights into the ethnicity of respondents as well as the travel characteristics such as destination types, accommodation types, accompanying person(s), and frequency of travel for GGA purposes (see Figure 7). These additional variables provide a much richer characterization of the market and can serve as a point of comparison for future studies on the GGA market.

From a methodological perspective, previous studies have mainly used canonical correlation analysis (Alén et al. 2015, Li, Meng et al. 2013) to identify the relationships between push factors and limited accommodation attributes. We extend these tourism studies and the fuzzy clustering literature (D'Urso et al. 2016) by showing how a fractional multinomial logit model can be applied to identify relationships between different clusters of variables.

The findings provide practitioners an insight into how to package and customize their products and services to the GGA market. Current industry packages for the GGA market are not necessarily aligned with their preferences. For example, a typical GGA package in Sydney, Australia (AU$ 99 per person) consists of a manicure session, a cocktail and cheese board, among others. The Doral Tesoro Hotel in the United States sells its GGA package for US $395 per room and comprises one night's accommodation, tickets to the museum, a

bucket of beers and breakfast, among others. Our findings (see Figure 7) show that "Socializers" would not find these options necessarily attractive but must also be accompanied by activities that facilitate socialization and learning about a destination. A more effective strategy would be to package offerings and/or reposition existing products based on attributes of importance to different segments as suggested in this study.

In terms of communication strategies, current industry marketing campaigns for the GGA market are stereotypical (Khoo-Lattimore and Prayag 2017) imbued in images of women not doing much, either lying on the beach, in spa bathrobes, or drinking wine. Our findings suggest that different segments have varied behaviors and preferences. For example, compared to "Rejoicers", "Socializers" and "Enjoyers" travel less frequently, prefer to visit cities or national parks, and they mainly choose budget to mid-range accommodation. Thus, promotional materials need to reflect women as active doers rather than passive observers.

In addition, for accommodation providers wanting to target "Enjoyers", they should offer GGA packages that include free transfers to/from airports, nearby shopping malls and tourist attractions, as these travelers form part of the "High Augmented Service" cluster (see Figure 7). They should organize bonding activities for the travel party such as cooking classes and wine and chocolate pairing workshops as they are likely to stay for more than four nights and are mainly Asians. The "Rejoicers" are the most challenging segment to target for traditional accommodation providers as these travelers require considerable adaptation and redesigning of services as well as infrastructural changes to the property to fulfil their needs. This segment requires considerable reassurance with respect to safety and security features at the hotel.

Safety and security features are a priority mainly to "Enjoyers" and "Rejoicers" in their accommodation choice, which echo the concerns of other female travel segments such as the business and solo independent travelers. These attributes have been identified as being

of importance to GGA participants both in the US and Malaysia (Khoo-Lattimore and Gibson 2015; Khoo-Lattimore and Prayag 2015). However, unlike what is currently popularized by the mainstream travel media (e.g. McLennan 2017), safety is not the overarching concern for women travelling together given that other aspects of the accommodation experience such as food and beverage for "Socializers" and "Enjoyers" are important too . Core services that matter to "Rejoicers" and "Enjoyers" include dressing mirror with white light, comfortable mattress and pillows, and ironing facilities. These attributes are also attractive to the general pleasure and business travel markets, irrespective of gender.

Finally, the findings have some implications for destination marketers. The motives and accommodation attributes as well as their interdependencies provide insight into how destination marketing campaigns and positioning strategies can be crafted for both established and under-performing destinations. For accommodations providers in established destinations, GGA offers a segment that can be tapped in low season given that these women travel at least once a year and are married or partnered and therefore would not travel during family or school holidays. For accommodation providers in under-performing and relatively unknown destinations, the GGA market offers the opportunity to position such accommodation (and simultaneously the destination) as women friendly by highlighting their accommodation offers to distinct segments. These accommodations and destinations can increase their visibility in the GGA market by implementing, for example, destination events and marketing campaigns with themes such as "women's retreat", "female only festivals" and "rejuvenation and pampering holidays".

Conclusions, Limitations and Areas of Further Research

As new markets such as the GGA emerge within the women travel market, scholars and practitioners need to understand both the psychological aspects driving such markets as

well as their choices, preferences and behavior. In this study, we used the push and pull framework to segment the GGA market and profiled the identified segments. However, the study is not without limitations. First, the sample was limited to English speaking women only. Given that the market is not yet mature, this was necessary to avoid confounding issues of language within cross-cultural research. Future studies can adopt a cross-cultural approach and examine the choices and preferences of women with different cultural values and how these impact their GGA behavior. Second, the study focused on only one psychological construct, motivation. Further studies should be carried out on psychological constructs other than motivation (e.g., engagement, perceived value, attitude, personality types and satisfaction). As noted in previous studies (Khoo-Lattimore and Prayag 2016), self-concept and identity has a role to play in women's GGA travel. Third, the study focuses only on accommodation attributes as pull factors and evaluates individual decision making processes with respect to those attributes. It is possible that the selection and evaluation of these accommodation attributes may be different in a group decision making process. It would be worthwhile for future studies to evaluate individual versus group accommodation selection processes for GGA experiences. Given the limited studies on the GGA market, no study has yet examined providers' perspectives of the GGA market. For example, cluster theory (Moric 2013) can be used to understand how different tourism stakeholders collaborate to tap into new markets. Finally, comparative studies with women markets other than the GGA (e.g., solo independent women, business travel and, and senior travel) are necessary to understand the heterogeneity inherent in the women travel market.

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Table 1: Summary of key quantitative segmentation studies using the push-pull framework

Author, Year	Motivation Theory	Type of Measurement for the Motivation Variable	Segmentation Algorithm	Stability
Alén et al., 2015	Push-pull	Yes/No, 4-point Likert scale	Nonlinear Canonical Correlation Analysis (OVERALS); 2-stage Cluster Analysis	N
Andreu et al., 2005	Push-pull	7-point Likert scale	Ward method; K-means	N
Assiouras et al., 2015	Push-pull	5-point Likert scale	PCA; Ward method; K-means	N
Boztug et al., 2015	Hybrid Tourist	Ratio scale	K-means	Y
Chen et al., 2014	Motivation-based Typology of Backpackers	7-point Likert scale	Factor Analysis (EFA; PCA); Cluster Analysis (K-means)	N
Dolnicar & Leisch, 2003	Push-pull	4-point Likert scale	Bagged Clustering	Y
Hodeck & Hovemann, 2016	Motivation Theory Internal Factors	Not specified	PCA; 2-step cluster analysis; Ward method	N
Jacobsen & Antonson, 2017	N/A	4-point Likert scale	PCA	N
Kamata & Misui, 2015	Push Motivations	4-point Likert scale	Factor analysis; Cluster analysis (K-means)	N
Kruger et al., 2016	Intrinsic & Extrinsic Motivation	5-point Likert scale	Factor analysis (Oblimin rotation); Ward method	N
Li, Meng, Usyal, Mihalik, 2013	Push-pull	5-point Likert scale	Canonical Correlation Analysis	N
Özel & Kozak, 2012	Motive-based Tourist Typologies	5-point Likert scale	Factor analysis; Cluster analysis (Hierarchical and non-hierarchical)	N
Paker & Vural, 2016	Push-pull	5-point Likert scale	Factor-cluster analysis; Ward method; K-means	N
Park & Yoon, 2009	Push	5-point Likert scale	PCA; Ward method; K-means	N
Prayag, 2010	Pull	5-point Likert scale	K-means	N
Prayag et al., 2015	Push-pull	7-point Likert scale	Bagged clustering	Y
Rid et al., 2014	N/A	5-point Likert scale	PCA; Ward method; K-means	N
Sarigöllü & Huang, 2005	Push-pull	5-point Likert scale	K-means	N
Sirakaya, Uysal & Yoshioka, 2003	Push-pull	5-point Likert scale	K-means	N
Sung et al., 2016	Push-pull	5-point Likert scale	Factor analysis; K-means	N
Tkaczynski, Rundle-Thiele, & Beaumont, 2010	Push-pull	Binary yes-no format	Hierarchical cluster analysis	Y

Table 2: Profiling of clusters by travel and socio-demographic characteristics.

	Socializers (CL1)	Enjoyers (CL2)	Rejoicers (CL3)	Sample	*p*-value
Weighted proportions	29.95	43.36	26.69	100.00	
Trip characteristics					
Where did you go? (%)					
Beach	29.29	29.78	38.82	32.04	
City	48.50	48.52	42.83	47.00	
Small Town	11.75	12.14	8.11	10.95	
National Park	3.87	4.07	4.55	4.14	
Other	6.59	5.50	5.69	5.87	
Type of Accommodation stayed (%)					*
B&B	5.43	6.53	9.30	6.94	
Resort	16.72	20.87	27.37	21.36	
Budget accommodation	13.72	12.86	10.24	12.42	
Mid-range accommodation	49.38	45.39	35.92	44.06	
Luxury accommodation	11.04	11.76	15.52	12.55	
Other	3.70	2.58	1.65	2.67	
How many women were there in your party, including yourself? (%)					
2 women	32.71	26.76	27.38	28.70	
3 women	24.55	27.13	21.92	24.97	
4 women	22.65	24.61	28.14	24.97	
5 women	8.01	9.37	10.81	9.35	
More than 5 women	12.09	12.13	11.75	12.02	
How many nights did you stay? (%)					
1-2 nights	38.53	34.20	31.27	34.71	
3-4 nights	41.45	42.15	42.09	41.92	
5-7 nights	14.25	17.65	19.37	17.09	
More than 7 nights	5.77	6.00	7.28	6.28	
Who did you travel with? (%)					*
Colleagues	5.34	5.01	6.38	5.47	
Family members	35.32	32.96	27.87	32.31	
Friends	58.85	61.31	64.47	61.42	
Other	0.49	0.72	1.28	0.80	
How often do you go on a GGA in a year? (%)					
1 time	59.48	52.83	49.52	53.94	
2-3 times	36.85	42.25	41.57	40.45	
More than 3 times	3.67	4.92	8.91	5.61	
Socio-demographic variables					
How old are you? (Average)	41.97	39.93	37.96	40.02	**
Ethnicity (%)					
Asian	40.95	47.94	46.74	45.53	
White	55.33	48.24	48.12	50.33	
Black	1.28	1.19	2.13	1.47	
Hispanic	0.78	1.62	2.50	1.60	
Other	1.66	1.00	0.50	1.07	
Marital Status (%)					
Single	31.69	32.96	35.46	33.24	
Married/Partnered	55.08	57.10	52.52	55.27	
Separated/Divorced	9.33	7.35	9.60	8.54	
Widowed	3.91	2.59	2.42	2.94	
Education Level (%)					
Less than high school	4.27	3.77	5.09	4.27	
High school completed/GED	25.10	22.61	19.64	22.56	
Associate/Technical Degree	12.40	16.21	18.27	15.62	
Bachelors Degree	39.35	39.84	40.68	39.92	
Graduate Degree	18.87	17.57	16.32	17.62	
Nationality (%)					**
American	34.40	34.04	48.67	38.05	
British	19.84	18.04	14.97	17.76	
Singaporeans	11.93	13.69	7.90	11.62	
Malaysians	11.28	13.46	12.50	12.55	
Australian	13.57	14.12	12.86	13.62	
New Zealanders	8.98	6.67	3.10	6.41	

Note: Weighted percentages and weighted means are reported. Significance of both the Chi-square test (for qualitative data) and the repeated measures ANOVA (for quantitative data) are reported. All test results are not significant unless indicated otherwise: **Significant at $p \leq 0.05$, *Significant at $p \leq 0.1$

Table 3: Fractional multinomial logit stepwise estimations for the membership degrees of the motivation clusters.

Explanatory variables	Enjoyers (CL2)	Rejoicers (CL3)
Safety Priority	0.396 (0.15)***	1.218 (0.24)***
High Core Service	0.907 (0.22)***	0.588 (0.35)*
F&B Lovers	-0.156 (0.16)	0.903 (0.24)***
High Augmented Service	0.371 (0.15)**	0.066 (0.24)
Trip characteristics		
How often do you go on a GGA in a year?		
1 time	-0.176 (0.19)	-0.724 (0.26)***
2-3 times	-0.052 (0.19)	-0.624 (0.27)**
Where did you go?		
Beach	-0.140 (0.16)	-0.257 (0.27)
City	-0.124 (0.15)	-0.532 (0.26)**
Small Town	0.089 (0.18)	-0.349 (0.32)
National Park	-0.236 (0.21)	-0.691 (0.38)*
Type of Accommodation stayed		
B&B	0.244 (0.32)	0.790 (0.48)*
Resort	0.286 (0.27)	0.478 (0.41)
Budget accommodation	0.173 (0.27)	0.122 (0.43)
Mid-range accommodation	0.182 (0.26)	0.250 (0.39)
Luxury accommodation	0.176 (0.29)	0.518 (0.43)
How many nights did you stay?		
1-2 nights	-0.394 (0.17)**	-0.646 (0.26)**
3-4 nights	-0.273 (0.16)*	-0.573 (0.26)**
5-7 nights	-0.118 (0.18)	-0.452 (0.28)
Socio-demographic variables		
Age	-0.004 (0.01)	-0.012 (0.01)**
Education Level		
High school completed/GED	0.128 (0.24)	-0.310 (0.34)
Associate/Technical Degree	0.525 (0.25)**	0.293 (0.35)
Bachelors Degree	0.242 (0.24)	-0.209 (0.33)
Graduate Degree	0.068 (0.25)	-0.506 (0.35)
Nationality		
American	-0.033 (0.16)	0.627 (0.24)**
British	0.007 (0.16)	0.096 (0.26)
Singaporeans	0.074 (0.19)	-0.040 (0.29)
Malaysians	0.071 (0.20)	0.324 (0.30)
Australian	0.105 (0.17)	0.347 (0.29)
Constant	-0.157 (0.45)	0.170 (0.70)

Note: Coefficients are interpreted relative to the omitted category of "Socializers" cluster. All test results are not significant unless indicated otherwise. Robust standard errors are in parentheses. N = 738; Wald $\chi2(56)$ =400.18; $p > \chi2 = 0$. ***Significant at $p \leq 0.01$, **significant at $p \leq 0.05$, *significant at $p \leq 0.1$.

Figure 1: Schematic representation of crisp (a) and fuzzy (b) assignment of respondents to two ideal clusters.
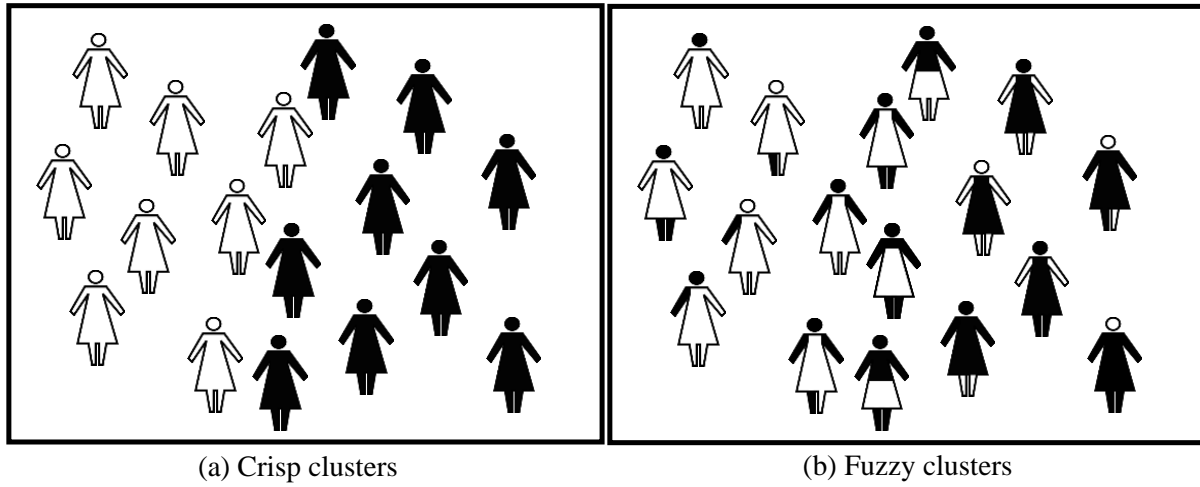

(a) Crisp clusters

(b) Fuzzy clusters

Figure 2: Heatmap of the pairwise Kendall's correlation between Likert variables.

Figure 3: Fuzzy C-Medoid Clustering Procedure

1. Data recoding

The Likert-type variables were recoded by means of triangular fuzzy numbers, the most commonly used among the LR-type fuzzy numbers (Hung and Yang, 2005). Let x_{ik} the k-th Likert-type variable ($k = 1,...,K$) observed for the i-th unit ($I = 1,...,n$). The triangular fuzzy variable is generally denoted by $\tilde{x}_{ik} = (m_{ik}, l_{ik}, r_{ik})_T$ where m_{ik} is the centre while l_{ik} and r_{ik} are the left and right spreads that express the uncertainty of data (l_{ik} and r_{ik} assume any real value between 0 and 1 included). The following triangular membership function describes the link between the original and the fuzzy variable:

$$\mu_{\tilde{x}_{ik}}(x_{ik}) = \begin{cases} 1 - \dfrac{m_{ik} - x_{ik}}{l_{ik}} & \text{for } x_{ik} \leq m_{ik} \\ 1 - \dfrac{x_{ik} - m_{ik}}{r_{ik}} & \text{for } x_{ik} \geq m_{ik} \end{cases}$$

2. Choice of the dissimilarity measure

Following Coppi et al. (2012), the squared triangular fuzzy distance between the i-th and j-th units (with $i \neq j$) has been computed as follows:

$$d_{ij}^2(\tilde{x}_i, \tilde{x}_j) = w_M^2 \|\mathbf{m}_i - \mathbf{m}_j\|^2 + w_S^2 \left(\|\mathbf{l}_i - \mathbf{l}_j\|^2 + \|\mathbf{r}_i - \mathbf{r}_j\|^2 \right) \tag{1}$$

where $\tilde{x}_i$ denotes the fuzzy data vector for the i-th unit; $\mathbf{m}_i$ is the vector of the centres; $\mathbf{l}_i$ and $\mathbf{r}_i$ are the vectors of the left and right spreads, respectively; $\|\mathbf{m}_i - \mathbf{m}_j\|^2$ is the squared Euclidean distances between the centres; $\|\mathbf{l}_i - \mathbf{l}_j\|^2$ and $\|\mathbf{r}_i - \mathbf{r}_j\|^2$ are the squared Euclidean distances between the left and right spread, respectively; w_M and w_S are suitable non-negative weights for the centre and the spread components. Notice that the weights w_M and w_S can be fixed a priori either subjectively or objectively. However, the normalization ($w_M + w_S = 1$) and coherence conditions ($w_M \geq w_S$) have to be verified.

3. Choice of clustering algorithm

Following Kaufman (2005), the fuzzy C-medoids clustering algorithm, can be formalized as the following minimisation problem:

$$\min_{u_{ic}} \sum_{i=1}^n \sum_{c=1}^C u_{ic}^p d_{ic}^2(\tilde{x}_i, \tilde{x}_c) \tag{2}$$

subject to $\sum_{c=1}^C u_{ic} = 1$ and $u_{ic} \geq 1$; where u_{ic} is the membership degree of the i-th unit to the c-th cluster ($c = 1,...,C$); $p > 1$ is a weighting exponent that controls the fuzziness of the obtained partition; $d_{ic}^2(\tilde{x}_i, \tilde{x}_c)$ is the squared fuzzy distance (eq. 1) between the i-th unit and the medoid of the c-th cluster, both expressed as triangular fuzzy numbers. Note that the fuzziness parameter has to be chosen in advance and accordingly to Kamdar and Joshi (2000) it should be set to $1 \leq p \leq 1.5$.

4. Selection of best partition & cluster validation

Internal validity measures provide useful guidelines in the identification of the best partition (D'Urso et al. 2016). Suitable measures for fuzzy clustering algorithm have been suggested as been suggested in the literature and, among them, the Fuzzy Silhouette (FS) index (Campello, 2006) is a popular measure that can be computed as follows:

$$FS = \frac{\sum_{i=1}^n (u_{ir} - u_{iq})^\alpha \lambda_i}{\sum_{i=1}^n (u_{ir} - u_{iq})^\alpha}, \qquad \lambda_i = \frac{b_i - a_i}{\max(b_i, a_i)} \tag{3}$$

where λ_i is the individual silhouette associated to the i-th unit that measures the closeness of the unit to the cluster with which it is associated with the highest membership degree with respect to the distance to units in other clusters. In particular, a_i is the average distance between the i-th unit and the units belonging to the cluster r ($r=1,...,C$) with which i is associated with the highest membership degree; b_i is the minimum (over clusters) average distance of the i-th unit to all units belonging to the cluster q with $q \neq r$; $(u_{ir} - u_{iq})^\alpha$ is the weight of each individual silhouette calculated upon the membership degrees of the i-th unit to the first and second best clusters, r and q respectively; α is an optional user defined weighting coefficient. Note that, the higher the value of the FS, the better the assignment of the units to the clusters obtaining simultaneously the minimisation of the intra-cluster distance and the maximisation of the inter-cluster distance.

5. Cluster Profiling

As a result, the fuzzy clustering return the values of membership degree for each unit and for each cluster, u_{ic}, with constraints $0 \leq u_{ic} \leq 1$ and $\sum_{c=1}^C u_{ic} = 1$. To identify the factors that mainly affect the membership of units to each cluster, we use of the fractional multinomial logit (FML) model (Papke and Wooldridge, 1996) suggested in the literature to analyse dependent variables characterise by fractional values, i.e. values in the interval 0 to 1. The functional form of the FML model is close to that of the multinomial logit model and it can be expressed as follows:

$$P(u_{ic'}|X_i) = G(X_i, \beta) = \frac{\exp(X_i \beta_c)}{\sum_{c=1}^C \exp(X_i \beta_c)}, \qquad c' = 1, ..., C \tag{4}$$

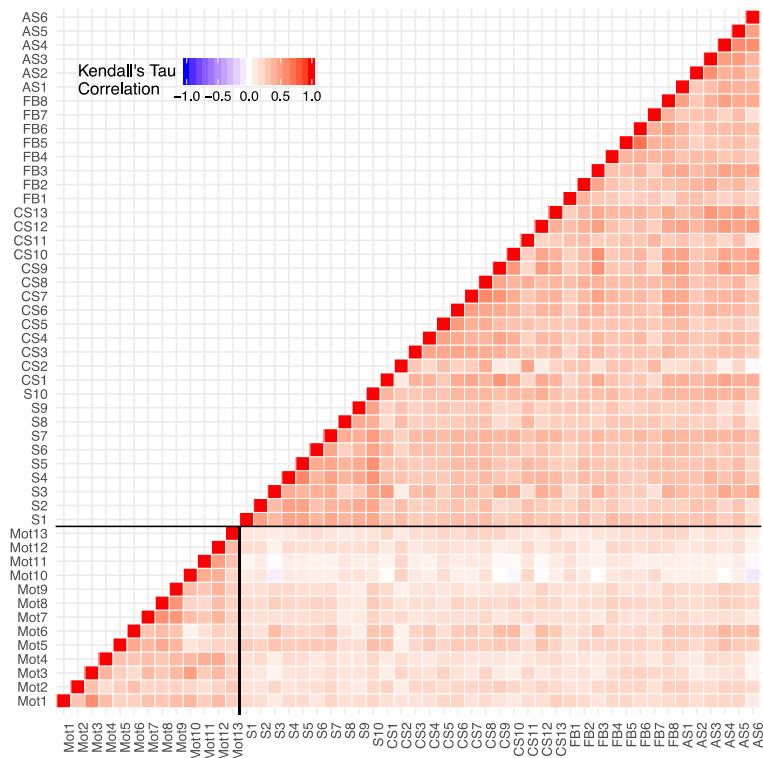where X_i represents the vector of independent variables observed for the i-th unit; and β represents the vector of model parameters.
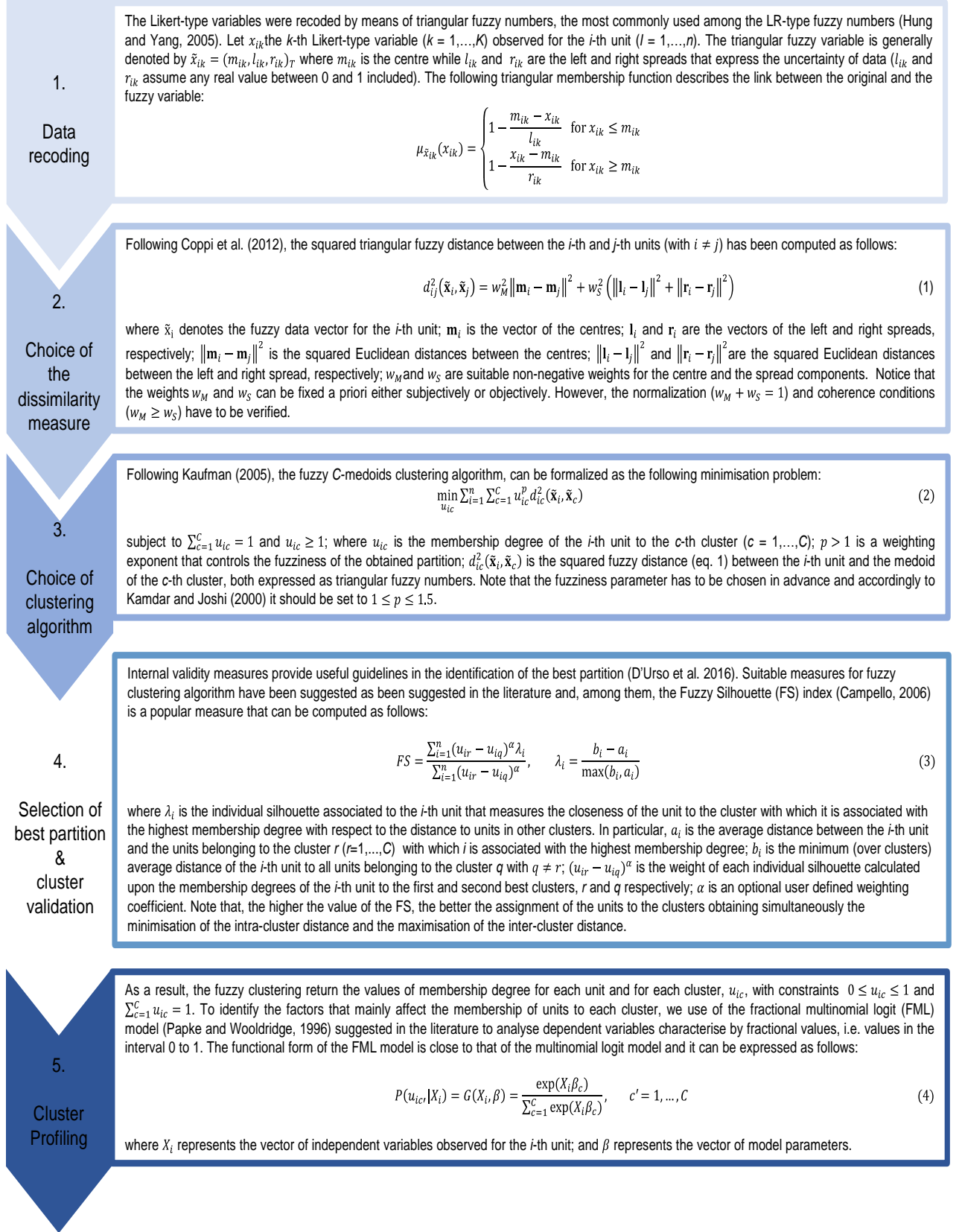
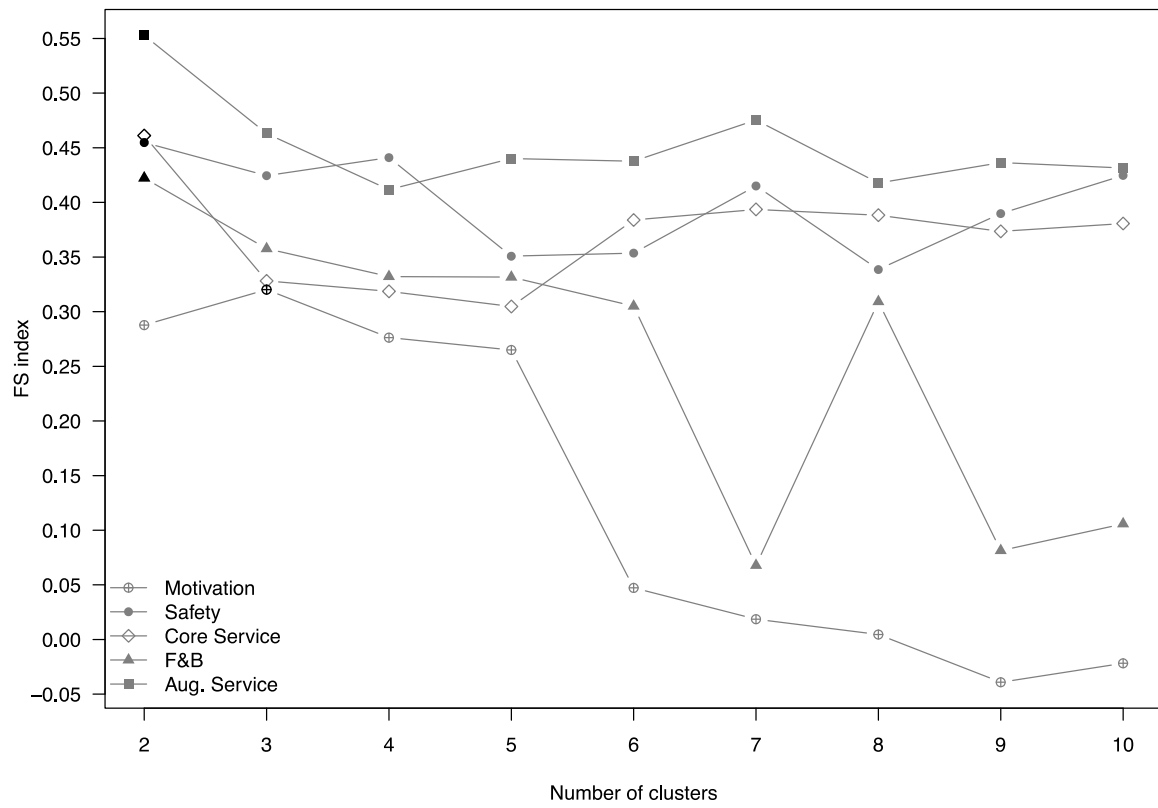Figure 4: Fuzzy Silhouette values obtained varying the number of clusters from 2 to 10 for each analysis.

Note: The best cluster solution for each analysis is highlighted in black.

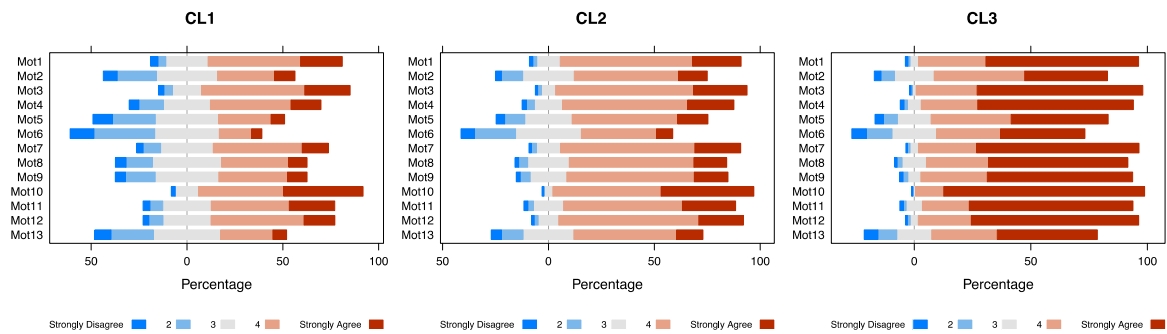Figure 5: Weighted percentage distribution for each motivation used to identify the final cluster solution

Figure 6: Weighted percentage distribution for safety, core service, food and beverage, and augmented service attributes by cluster.

Figure 7: Summary of the findings.

Socializers (CL1)

- Mainly British or New Zealanders
- On average 42 years old

- Up to 4 nights
- Mainly with family members

- Up to 3 GGA in a year
- City or National Park
- Mainly budget or mid-range accommodation

Enjoyers (CL2)

- Mainly Malaysians, Singaporeans, Australians
- On average 40 years old
- Associate/Technical Degree

✓ Safety Conscious (CL1)
✓ Low Core Service (CL1)

✓ F&B Enthusiasts (CL1)

✓ High Augmented Service (CL2)

- No associate/Technical Degree

- Mainly White
- Mainly married/Partnered
- Up to 3 women

- More than 4 nights

✓ Low Augmented Service (CL1)

✓ Safety priority (CL2)
✓ High Core Service (CL2)

- Americans
- Younger than the others (on average 38 years old)

- More than 3 GGA in a year
- Beach or Small Town
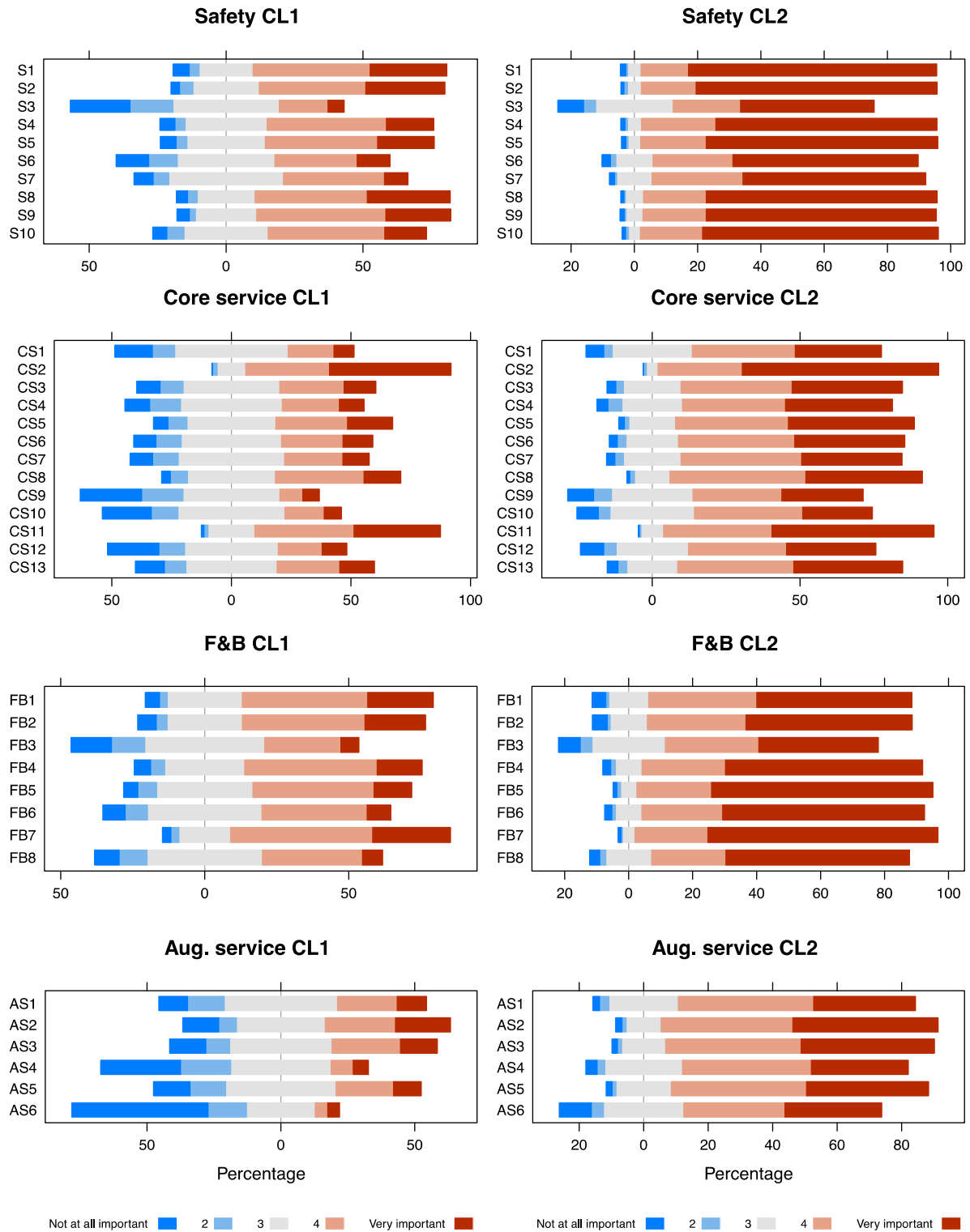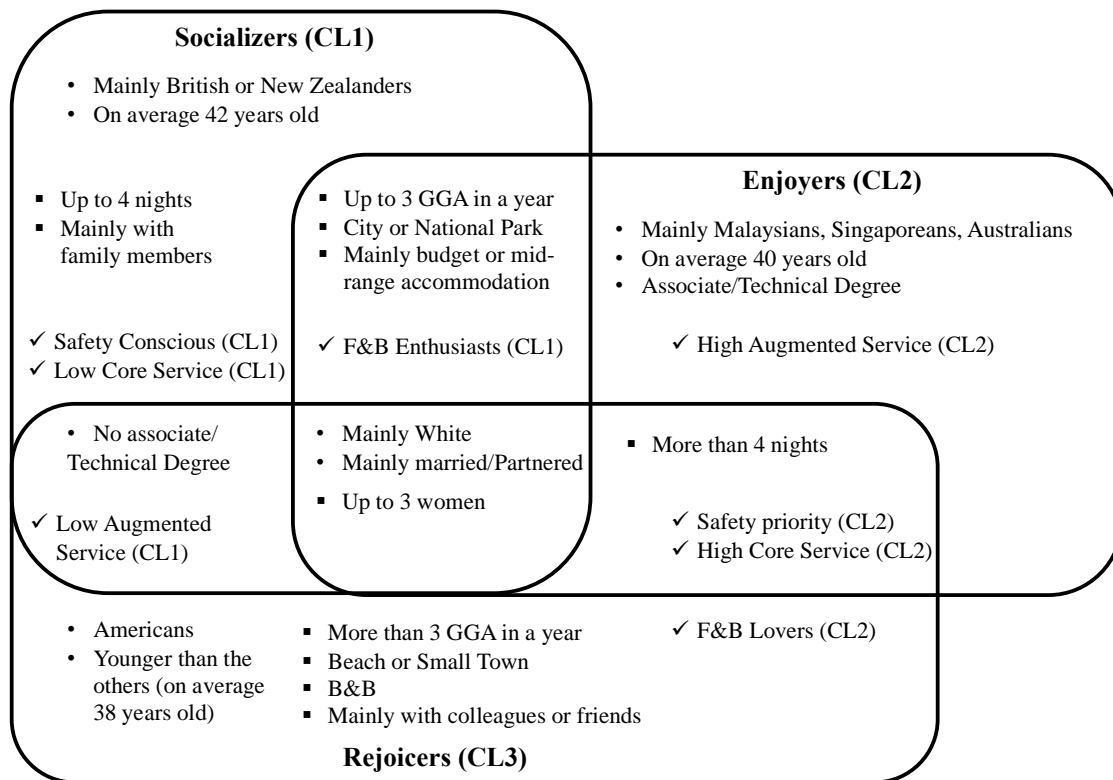- B&B
- Mainly with colleagues or friends

✓ F&B Lovers (CL2)

Rejoicers (CL3)

Appendix 1: List and brief description of the travel motivations variables and accommodation characteristics.

Label	Description
Travel Motivations	
Mot1	To bond with friends
Mot2	To celebrate a milestone
Mot3	To socialize with friends
Mot4	To escape pressures (e.g. work or home related)
Mot5	To travel in the safety of numbers
Mot6	To find support in difficult times
Mot7	To experience something new
Mot8	To increase knowledge about destinations or places
Mot9	To seek adventure
Mot10	To have fun
Mot11	To get away from home
Mot12	To be emotionally and physically refreshed
Mot13	To be spoiled
Accommodation characteristics	
Safety	
S1	Accommodation offers secure lifts and floor access
S2	Accommodation offers deadbolt/electronic door locks
S3	Accommodation offers female only staff (from housekeeping to room service)
S4	Accommodation offers surveillance/security cameras in hallways
S5	Accommodation has 24hour visible security personnel on duty
S6	Room has safety deposit boxes
S7	Accommodation notifies you before room delivery service
S8	Accommodation has brightly lit parking area
S9	Room door has peep hole built in
S10	Accommodation has a direct dial to security/police/safety authorities
Core services	
CS1	Accommodation offers a bigger room for female customers
CS2	Accommodation has comfortable mattress & pillows
CS3	Accommodation has high powered hair dryers
CS4	Accommodation has ironing board and steam iron
CS5	Accommodation has full body mirror
CS6	Accommodation has dressing mirror with white light
CS7	Accommodation offers branded amenities and luxury bath products
CS8	Accommodation offers superior quality bath towels
CS9	Accommodation offers luxury feminine toiletries (e.g. nail polish, nail polish remover)
CS10	Accommodation has a personal welcome note
CS11	Accommodation smells nice
CS12	Accommodation has sanitary pads/tampons
CS13	Accommodation offers discounts for massages and spa treatments
Food & beverages	
FB1	Accommodation has simple meal-making facilities (e.g. refrigerator, microwave oven, jug kettle)
FB2	Accommodation provides additional bottles of free drinking water
FB3	Accommodation offered with fresh fruits
FB4	Accommodation offers or is close to 24 hour restaurant and coffee shop
FB5	Accommodation offers healthy options in restaurant menu
FB6	Accommodation offers healthy options in room-service menu
FB7	Accommodation offers a good breakfast buffet
FB8	Accommodation offers F&B Lounge and Snack Menu on dedicated floor
Augmented services	
AS1	Accommodation offers private areas for socializing
AS2	Accommodation offers free airport transfers
AS3	Accommodation offers free transport to nearby shopping malls/ restaurants/shops
AS4	Accommodation organizes bonding activities with girlfriends (e.g. lunch, dinner, board games, classes, etc)
AS5	Accommodation offers loyalty cards with added value (e.g. discount on next stay or packaged offers)
AS6	Accommodation offers childcare services

Appendix 2: Vectors of the original terms stated by the identified medoids of each cluster.

Travel Motivations							**Accommodation characteristics**								
	CL 1	CL 2	CL 3	*Safety*	CL 1	CL 2	*Core services*	CL 1	CL 2	*Food & beverages*	CL 1	CL 2	*Augmented services*	CL 1	CL 2
Mot1	4	4	5	S1	4	5	CS1	3	4	FB1	4	4	AS1	3	4
Mot2	3	4	4	S2	4	5	CS2	4	4	FB2	4	4	AS2	3	4
Mot3	4	4	5	S3	3	4	CS3	3	4	FB3	3	4	AS3	3	4
Mot4	3	4	5	S4	4	5	CS4	3	4	FB4	4	5	AS4	2	4
Mot5	3	4	4	S5	4	5	CS5	3	4	FB5	3	5	AS5	3	4
Mot6	3	3	4	S6	3	5	CS6	3	4	FB6	3	5	AS6	2	4
Mot7	3	4	5	S7	3	5	CS7	3	4	FB7	4	5			
Mot8	3	4	5	S8	4	5	CS8	3	4	FB8	3	5			
Mot9	3	4	5	S9	4	5	CS9	3	4						
Mot10	4	4	5	S10	3	5	CS10	3	4						
Mot11	4	4	5				CS11	4	4						
Mot12	3	4	5				CS12	3	4						
Mot13	3	4	4				CS13	3	4						