

**Tourist segments for new facilities in an alpine national park area:
Profiling tourists in Norway based on psychographics and demographics****Knut Veisten¹, Berit Grue¹, Jan Vidar Haukeland^{1,2},
Heidi Degnes-Ødemark² & Sjur Baardsen²**¹ Institute of Transport Economics (TOI), Oslo, Norway² Dep. of Ecology and Natural Resource Management, Norwegian University of Life Sciences (UMB), Ås, Norway**Abstract**

The pursuit of sustainable tourism may involve development of more facilities in the buffer zones of national parks and other pristine nature areas. Two independent samples of domestic and foreign tourists in Norway were segmented based on their expressed preferences for new facilities in an alpine national park region. The proposed facilities in the survey comprised a diversity of types and sizes, potentially also involving different impacts upon the natural habitat. One sample was recruited in the alpine area while the other was recruited outside the area.

The post hoc market segmentation was carried out by a combined two-stage hierarchical and non-hierarchical clustering of facility quest factors, where factors were identified from a relatively large set of items. The stability of the cluster solutions was assessed by comparing independent sample solutions against the pooled sample. Moreover, we assessed the extent to which the segments differed significantly with respect to demographic characteristics or psychographic characteristics.

Keywords

cluster analysis, post hoc, market segmentation, two-stage clustering

Introduction

The tourism sector has experienced a substantial growth during the second half of the 20th century and the beginning of the 21st (OH et al. 1995; GIBSON & YANNAKIS 2002; UNWTO 2010), and the nature-based segment has been the most rapidly expanding market within this sector (NYAUPANE et al. 2004; MEHMETOUGLU 2007; UNWTO 2009). Currently, a larger share of tourists have travel experience and they have become more sophisticated with respect to activity organisation and facilitation (GIBSON & YANNAKIS 2002; PULIDO-FERNÁNDEZ & SÁNCHEZ-RIVERO 2010). The tourists' demand creates both challenges and opportunities for tourism business development and for the natural environment (FREDMAN & TYRVÄINEN, 2010). A better knowledge and understanding of the expanding number of different types of tourists can lead to more effective management and improved marketing strategies (LANG & O'LEARY, 1997; PARK & YOON, 2009).

In this paper we present a market segmentation analysis of domestic and foreign tourists in Norway, based on their expressed preferences for new facilities in an alpine national park region. These proposed facilities comprised a diversity of types and sizes, potentially also involving different impacts upon the natural habitat. The use of facility quest as clustering variables is close to the benefit segmentation idea from HALEY (1968), focusing on the benefits that people seek in their consumption, in our case, visiting alpine national park areas in Norway. One purpose of this paper was to test post-hoc market segmentation with the same set of clustering variables between two independent visitor samples, one recruited when leaving Norway by ferry and the other recruited in one of the alpine national park areas. The segmentation was carried out by a combined (two-stage) hierarchical (Ward, to define the number of clusters) and non-hierarchical (partitioning-method) clustering (*k*-means, to actually form these clusters). The clustering was based on facility quest factors, where factors were identified from a relatively large set of items. The stability of the cluster solutions was assessed by comparing independent sample solutions against the pooled sample. Moreover, we assessed the extent to which the segments differed significantly with respect to demographic characteristics or psychographic characteristics.

Theories and methodsMarket segmentation approaches

Market segmentation consists of dividing a heterogeneous market into a number of smaller and more homogeneous submarkets (SMITH 1956; PARK & YOON 2009). We might assume that even nature-oriented tourists have fairly heterogeneous preferences and therefore have different demands. There are two essential methodological approaches to market segmentation in the literature; *a priori* (or commonsense) and *a posteriori* (*post hoc*, or data-driven). The former utilises pre-defined segments or criteria, and is conceptual and typological,

in the sense that the criteria for grouping the respondents are known ahead and is thus the starting point (PLOG 1974; DOLNIČAR 2008); while the latter being empirically driven by the collected data (BAILEY 1994; DOLNIČAR 2002; 2008).

There are various approaches in a post hoc segmentation, with factor- and clustering techniques frequently used (WEDEL & KAMAKURA 1998). DOLNIČAR (2002) provides a review of data-driven market segmentation in tourism, and outlines critical issues that often lead to overestimation of the validity in cluster analysis (e.g. choice of algorithm, number of clusters, algorithm parameters, optimal ratio of variables to sample size, etc.). PULIDO-FERNÁNDEZ & SÁNCHEZ-RIVERO (2010) focus a criterion to ensure the usefulness of the segments obtained, that a segment should be identifiable and targetable, implying that differentiation with respect to observable tourist characteristics are needed. Regarding the use of clustering algorithms, these should be assessed carefully, and the clustering/segmentation process ought to be repeated and re-evaluated to obtain stable clustering solutions (DOLNIČAR 2002).

One specific clustering approach, appropriate for post hoc segmentation, is a two-stage clustering, combining the hierarchical Ward's method for defining the appropriate number of clusters, and then forming these clusters by the non-hierarchical k-means method (MAZZOCCHI 2008; BURNS & BURNS 2008; see also MILLIGAN & COOPER 1985; DIMITRIADOU et al. 2002). An alternative clustering approach is two-step clustering, available in the SPSS statistical package (SPSS, 2001), which also combines partitioning and hierarchical clustering (MOOI & SAARSTEDT 2011). This clustering method is founded on a clustering algorithm presented by ZHANG et al. (1996). The two-step clustering method should not be confused with the two-stage approach (of Ward and k-means).

Basis for tourist market segmentation

Selecting clustering variables in post-hoc market segmentation

An important research task for tourism businesses is to obtain the most appropriate and effective basis for market segmentation (LANG & O'LEARY 1997). The basis for segmentation includes various tourist characteristics such as: demographics (e.g. gender, age, nationality, education and income), geographic location (country of origin), behaviour (e.g. activities, choices, habits) and psychographic identifications (e.g. motivations, attitudes, beliefs) (PARK & YOON 2009; PULIDO-FERNÁNDEZ & SÁNCHEZ-RIVERO 2010). Segmentation on the basis of tourists' quest for facilities comes close to traditional benefit segmentation (HALEY 1968), as well as yielding targetable differentiation of homogeneous submarkets (KAMAKURA & NOVAK 1992; MADRIGAL & KAHLE 1994). Segmentation based on the respondents' quest for facilities may apply items/variables like the quest for tourist facilities (QTF) scale proposed by HAUKELAND et al. (2010); to some extent building on survey elements related to visitor preferences monitoring applied to a Nordic nature tourism context (KAJALA et al. 2007). HAUKELAND et al. (2010; 2013) identified four dimensions based on their set of facility quest items, using exploratory and confirmatory factor analysis: "Tracks and signposts", "Infrastructure and service", "Food and accommodation" and "Tours and interpretation".

Profiling identified market segments

Demographics' usefulness as clustering variables in post hoc segmentation has been questioned (MADRIGAL & KAHLE 1994; MCCLEARY & CHOI 1999; PARK & YOON 2009; MEHMETOGLU et al. 2010), but demographic information is of course needed in profiling identified segments to enable targeting the segments by marketing (MADRIGAL & KAHLE 1994; PULIDO-FERNÁNDEZ & SÁNCHEZ-RIVERO 2010). Psychographic characteristics might also be relevant in profiling identified market segments, as an addition to demographics. Personal values and attitudes influence behaviour and can provide explanations of the expressed demand for facilities and the tourist behaviour (KAMAKURA & MAZZON 1991; MULLER 1991; KAMAKURA & NOVAK 1992; MADRIGAL & KAHLE 1994; MEHMETOGLU et al. 2010).¹ Segments with different values may prefer different attributes in a destination or product (MULLER 1991; MCCLEARY & CHOI 1999). Viewing nature orientations as part of the tourists' values imply that this can be applied in order to obtain an understanding of the tourists' quest for facilities. HAUKELAND et al. (2010) identified the following four nature orientation dimensions, applying explorative factor analysis (HAUKELAND et al. (2013, p. 295): "*Inspiration*" (the appreciation of nature and landscape as personal stimulation), "*Recreation*" (the enjoyment of serenity and undisturbed quality of nature), "*Challenge*" (the search for demanding physical activities) and "*Sightseeing*" (the pursuit of touring and comfort).²

Survey data

Data from two independent visitor surveys

Two data sets are combined for our analysis. The first data set (i) is based on a survey among German, Dutch and Danish motor tourists leaving Norway by ferry during the summer of 2008 (HAUKELAND et al. 2010). The second data set (ii) is based on a survey among tourists, foreign and Norwegian, recruited in the Nord-Gudbrandsdal region during the summer of 2009, and followed-up in an internet-based survey in the winter of 2009/2010 (HAUKELAND et al. 2013). Both data sets included similar questions about quest for facilities, enabling comparison of post-hoc market segmentation with the same clustering variables between the two samples. They also included similar questions about nature orientations, as well as similar registration of demographics and trip characteristics, e.g. whether they had visited national parks in Norway, most of which are alpine (Figure 1).

¹ Identified values, beliefs or attitudes might also serve as clustering variables (NOVAK & MACÉVOY 1990; KAMAKURA & MAZZON 1991; MULLER 1991; KAMAKURA & NOVAK 1992; MCCLEARY & CHOI 1999; MEHMETOGLU et al. 2010). Personal values can be defined as concepts or beliefs about desirable end states or behaviours, that transcend specific situations, guide selection or evaluation of behaviour and events, and are ordered by relative importance (SCHWARTZ & BISLKY 1987).

² HAUKELAND et al. (2013) identified the same four dimensions in a different sample (of the Norwegian population), slightly adjusting the items/questions for the purpose of obtaining more items for the latter two dimensions. They also verified the identification of the four dimensions in a confirmatory factor analysis.



Figure 1: National parks in Norway, 2008-2009 (source: www.dirnat.no)

(i) the first data set – foreign motor tourists leaving Norway by ferry

The sample from 2008 comprised Danish, German and Dutch ferry passengers leaving Norway, on seven out of eight international lines, in four Norwegian harbours (Oslo, Bergen, Kristiansand, and Langesund). The chosen category of foreign motor tourists made up approximately a fourth of all guest nights by international summer holiday visitors in Norway, in 2008. Nineteen departures dispersed throughout the summer season were included in the final sample. A total of 1048 motor tourists were asked to take part in the survey and 986 completed questionnaires were collected, resulting in a response rate of 95 per cent. Self administered fill-in questionnaires were handed out to the motorists waiting in line in their vehicles to embark the ferry, typically using 20-30 minutes to complete, and then the questionnaires were collected by a trained staff of interviewers (HAUKELAND et al. 2010).³

(ii) the second data set – domestic and foreign tourists in an alpine national park region

The sample from 2009/2010 comprised tourists of all nationalities, recruited in the Nord-Gudbrandsdal region, a main alpine national park area in the central part of Southern Norway (Figure 2). Approximately 60% were recruited using stratified sampling along the six main roads out of the Nord-Gudbrandsdal region, from the end of June until the end of September, 2009, on 18 rotating weekdays. Only two percent of the tourists refused to be recruited at this stage. The remaining 40% were recruited at 42 accommodation firms in the region (out of 84 firms approached for this purpose), applying similar recruiting forms. These latter participants can be characterised as self-selected. Both approaches provided an introduction to the project in six languages (English, German, Dutch, Swedish, Danish, and Norwegian). In total, 2,719 email addresses were collected, and adjusting for illegible and undeliverable addresses, 2,510 tourists were reached for the follow-up internet survey during the winter of 2009/2010, either in Norwegian, German (for those residing in Germany, Austria and Switzerland) or English (for all other nationalities). The response rate at this stage was 52.5% (1318), and 760 of these answered the questions related to facility quest (while the remaining 278 answered other questions and are deleted from our study). Of those 760, two thirds resided in Norway, 14 per cent in Germany, six per cent in the Netherlands, two per cent each from Denmark and from Sweden, and the remaining eight per cent primarily living in another European country (HAUKELAND et al. 2013).⁴

³ A pilot test of the sampling procedure and questionnaire was carried out among a small number of Danish motor tourists, in May 2008, and thereafter the final version of the Danish version of the questionnaire was translated into Dutch and German.

⁴ Due to a delay in the development of the internet-based survey (using SPSS Dimensions) a planned pilot test was cancelled. However, a small pre test among project partners was carried out, in the autumn of 2009, and considerable parts of the questionnaire was nearly identical to the first data set, from 2008, or copied from other visitor surveys carried out at the Institute of Transport Economics (THRANE & FARSTAD 2010; RIDENG &

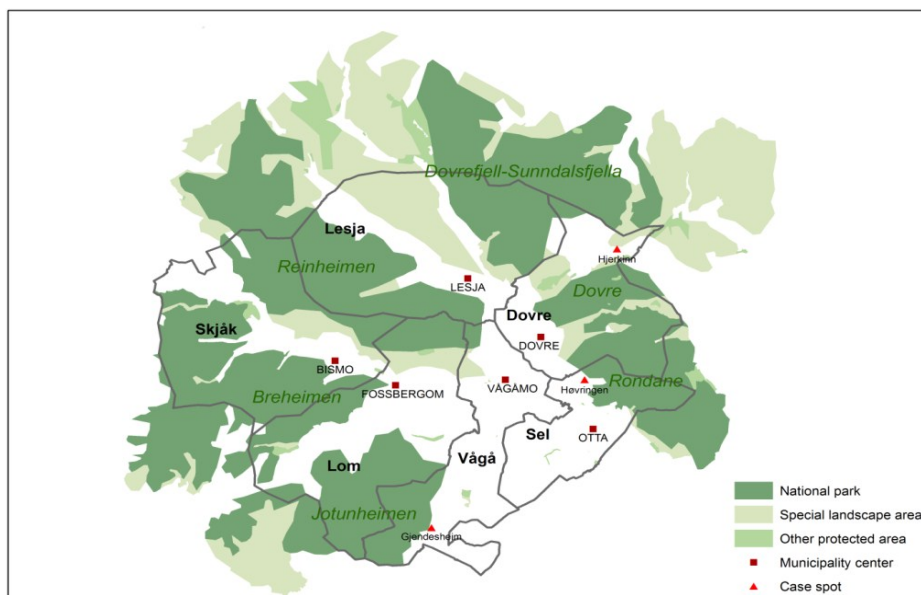


Figure 2: National parks in the Nord-Gudbrandsdal region (source: Norwegian Directorate for Nature Management, www.dirnat.no, own adaptation)

Questionnaires and utilisation of scales

The respondents' *quest for facilities* in and around Norwegian national parks was measured by a range of questions listed in batteries and presented on a five point Likert scale ranging from 1, "not important", to 5, "very important" (HAUKELAND et al. 2010). Table 1 shows the confirmatory factor analysis of the facility quest items, separately for the 2008 (i) and 2009 (ii) data (HAUKELAND et al. 2013).⁵ The surveys also included several social background characteristics, such as the respondents' nationality, level of income (qualitatively), level of education, age and gender (Tables 2a and 2b). Questions covering the respondents' *nature orientation* were also listed in batteries and presented on a five point Likert scale ranging from 1, "not important", to 5, "very important". The four dimensions identified by factor analysis will be termed "*Inspiration*", "*Recreation*", "*Challenge*" and "*Comfort*" ("Sightseeing"), following HAUKELAND et al. (2010, 2013). The most important items of the "*Inspiration*" dimension were "obtaining a deeper connection in life", "experiencing nature's magic and mysticism", "finding inspiration in natural surroundings", "feeling connectedness with landscape and nature" and "attaining a feeling of freedom". Within the "*Recreation*" dimension, the most important items were "experiencing tranquillity and peacefulness" and "fresh air, clean water and an unpolluted environment". Regarding the "*Challenge*" dimension, the important items were "searching for challenges with a certain risk" and take an interest in "demanding physical activities in nature". Finally, within the "*Comfort*" dimension the most important item was the enjoyment of "comfort in natural surroundings", but "closeness to co-travellers" and "sightseeing" interests were also important (HAUKELAND et al. 2013).

Clustering algorithms applied

The main approach selected was a two-stage clustering, first applying the hierarchical Ward method, for setting the number of clusters, and then applying the partitioning *k*-means method for forming the given number of clusters. The main clustering variables were the four principal components (factors) identified from the QTF items, where the same four factors had been identified in both datasets: "Tracks and signposts", "Infrastructure and service", "Food and accommodation" and "Tours and interpretation" (HAUKELAND et al. 2010; 2013).⁶ The identification of the cluster number was based on assessment of the agglomeration coefficients from the Ward, such that the number of clusters was based on identifying a demarcated change in the agglomeration coefficients, counting from the last step of the agglomeration (BURNS & BURNS 2008, p. 561). This is a simple "elbow test" from which a cluster number can be set. The Ward clustering was first carried out separately for the two datasets, applying the four principal components of QTF as clustering variables, which yielded a cluster number of 4 (or possibly 5) for the first dataset (i) and 5 for second dataset (ii). Then the same Ward clustering was carried out on the joint dataset, which yielded a cluster number of 4 (or possibly 5), just like the foreign ferry-travelling tourist data set.⁷ Then the *k*-means method was applied for forming the given number of clusters, for the separate

GRUE 2008). Related to the remainders some small adjustments were made, primarily amending the allocation to special treatments/questions and eliminating some questions for the sake of shortening the response task.

⁵ HAUKELAND et al. (2010) concluded that there is a market potential for developing a number of facilities inside and outside national parks, and that the segments differed in quest for facilities. Based on a *k*-means clustering analysis, they found that the largest market segment demanded all types of facilities, and was the only segment that showed an interest for "Infrastructure & service". One segment did not want any type of facilities, particular not "Infrastructure & service". The two remaining segments preferred either "Tours & interpretation" in combination with "Food & accommodation" or in combination with "Tracks & signposts".

⁶ HAUKELAND et al. (2013) present a confirmatory factor analysis of the four facility quest factors, from both datasets.

⁷ Although there is some loss of information from the data when applying factors (dimensions) instead of single variables (items), the selection of factors seems more appropriate if we believe factors are better representations of the constructs of interest. However, we also tested clustering based on QTF items instead of QTF factors (for sample sizes well above the 5×2^K limit, proposed by FORMANN (1984), where *K* is number of clustering variables).

datasets as well as for the joint dataset. We test for differences between the clusters (segments) with respect to nature orientations, demographics, and trip-related characteristics; and this testing is based on ANOVA.

Table 1: Quest for tourism facilities (QTF) factors and question items; foreign ferry-based sample, dataset (i), n=947; foreign and national sample in Nord-Gudbrandsdalen, dataset (ii), n=759.

Factor	Item	Dataset (i) exploratory factor analysis	Dataset (i) confirmatory factor analysis	Dataset (ii) exploratory factor analysis	Dataset (ii) confirmatory factor analysis
<i>Infra- structure & service</i>	Increased opportunities for various activities	0.656	0.665***	0.741	0.827***
	Staged experiences for a greater audience	0.666	0.766***	0.725	0.708***
	Gondolas and similar great installations	0.747	0.746***	0.683	0.704***
	Better options for motorboat trips on the lakes	0.659	0.622***	0.681	0.611***
	More service persons	0.594	0.525***	0.597	0.744***
<i>Tracks & signposts</i>	More and improved rambling tracks	0.678	0.710***	0.813	0.751***
	More nature paths for “self-guiding”	0.723	0.722***	0.728	0.740***
	More and better sign posting	0.772	0.774***	0.782	0.814***
	More cycling tracks	0.543	0.692***	0.596	0.699***
	More picnic areas	0.675	0.741***	0.439	0.310***
	More accessible information	0.681	0.622***	0.500	0.458***
<i>Tours & interpre- tation</i>	Guided tour/sightseeing to see animals/ natural attractions	0.794	0.852***	0.770	0.852***
	Guided tour/sightseeing to cultural attractions	0.755	0.842***	0.725	0.860***
	Visitor centres with exhibitions	0.689	0.496***	0.696	0.493***
<i>Food & accommo- dation</i>	Well developed food and beverage facilities	0.754	0.960***	0.719	0.986***
	Abundance of accommodation facilities	0.750	0.591***	0.760	0.585***
	Accommodation with good standard	0.785	0.779***	0.754	0.771***
	Local food specialties	0.586	0.600***	0.511	0.423***

Note: The table includes only the items that were present in both data sets. The number of factors was determined using the variance explained by retained factors. In the 2008 foreign ferry-based sample, tracks & signposts explained 37.9% of the variance, infrastructure & service 9.6%, food & accommodation 7.1%, and tours & interpretation 5.7%. In the 2009 national and foreign Nord-Gudbrandsdal sample, infrastructure & service explained 33.9% of the variance, tracks & signposts 9.1%, tours & interpretation 7.4%, and food & accommodation 6.9% (HAUKELAND et al. 2013).

*** p < .001, ** p < .01, * p < .1

Results

The identified clusters (segments) using QTF factors as clustering variables in a two-stage clustering approach

Tables 2a and 2b show the mean values of the clustering variables (QTF factors) as well as the mean values of various demographic, trip-related, and psychographic characteristics, for dataset (i) and dataset (ii). As there was an “elbow” for both four and five clusters in dataset (i), based on the Ward clustering, we present five-cluster solutions, as five clusters were also indicated for dataset (ii). Moreover, the ANOVA indicated just as good differentiation between five clusters as between four clusters for dataset (i). The k-means clustering was applied for forming the clusters, thus allocating the respondents to the five clusters.

In the sample of foreign ferry-travelling tourists, data set (i), cluster 1 is the cluster with highest factor score on “food and accommodation”, thus demanding abundant food and beverage facilities of high standard, possibly including local food specialties. Cluster 1 represents an affluent and highly educated segment, with a high share stating that their income is relatively high compared to the income level in their country, as well as a high share having carried out higher education, or more precisely, “more than four year studies at university level”. The nature orientation of the segment is towards comfort, and also recreation. It is the segment with highest share of national park visitors and longest average stay in Norway. We might term cluster 1 a segment of *affluent demanders of high quality food and accommodation* (comprising 31% of the sample). Cluster 2 is the cluster with highest factor score on “tracks & signposts”, thus demanding tracks/paths for rambling, cycling or self-guiding, as well as more accessible information and signposting. Cluster 2 has the highest scores on variables representing dimensions of nature orientation as well as relatively high share of national park visitors and relatively long average stay in Norway. It is the cluster with lowest share of university degrees and highest share of people stating relatively low income. We might term cluster 2 a segment of *nature-oriented demanders of tracks and signposts* (comprising 15% of the sample). Cluster 3 is the cluster with highest factor score on “infrastructure & services”, thus demanding new facilities/activities adjacent to the national parks (gondolas, motorboats, and staged

experiences), or more service persons in the parks. Cluster 3 has the highest score on comfort and a relatively high share of people stating relatively high income. We might term cluster 3 a segment of *comfort-oriented demanders of infrastructure and services* (comprising 22% of the sample). Cluster 5 is the cluster with highest factor score on “tours & interpretation”, thus demanding guided tours/sightseeing to cultural/natural attractions or visitor centres. Cluster 5 has medium scores on most individual characteristics. We might term cluster 5 a segment of *average-type demanders of tours and interpretations* (comprising 16% of the sample). Finally, cluster 4 is a cluster with relatively low scores on all QTF factors, as well as the lowest scores on variables representing dimensions of nature orientation. Cluster 4 has relatively high average age. We might term cluster 4 a segment of *staid, satisfied and saturated* (comprising 15% of the sample).

Table 2a: Mean QTF factor scores, mean scores on variables representing dimensions of nature orientation, and mean values of demographics and trip characteristics, for the five clusters; where colour green indicates the supposedly most desirable (normally highest) value, via yellow for medium values, to red for the supposedly least desirable (normally lowest) value; foreign ferry-travelling tourists, data set (i)

	Cluster 1 n=159	Cluster 2 n=106	Cluster 3 n=222	Cluster 4 n=107	Cluster 5 n=117	Total n=711
“Tracks & signposts”	0.14	1.00	0.01	-1.44	0.21	
“Infrastructure & service”	-0.86	-0.13	1.01	-0.38	-0.28	
“Food & accommodation”	0.75	-0.18	0.38	-0.47	-1.15	
“Tours & interpretation”	0.34	-1.19	0.28	-0.93	0.93	
“Inspiration”***	2.84	2.96	2.85	2.56	2.82	
“Recreation”***	3.27	3.30	3.07	2.91	3.11	
“Challenge”***	2.27	2.50	2.31	2.03	2.21	
“Comfort”***	2.64	2.61	2.68	2.24	2.57	
Visited national park***	0.91	0.82	0.72	0.72	0.76	
Nights travelling***	15.5	14.4	11.2	13.6	13.0	
Relatively high income***	0.36	0.17	0.24	0.16	0.22	
Relatively low income*	0.05	0.14	0.09	0.06	0.06	
University*	0.65	0.48	0.53	0.55	0.52	
Age**	47.7	46.4	44.7	48.3	44.7	
Female	0.31	0.36	0.41	0.36	0.38	
German**	0.62	0.66	0.49	0.58	0.54	
Dutch*	0.25	0.19	0.30	0.18	0.28	
Danish*	0.10	0.13	0.19	0.22	0.17	
Segment	Affluent demanders of high quality food and accommodation	Nature-oriented demanders of tracks and signposts	Comfort-oriented demanders of infrastructure and services	Staid, satisfied and saturated	Average-type demanders of tours and interpretations	

*** p < .01, ** p < .05, * p < .1 (ANOVA)

Table 2b: Mean QTF factor scores, mean scores on variables representing dimensions of nature orientation, and mean values of demographics and trip characteristics, for the five clusters; where colour green indicates the supposedly most desirable (normally highest) value, via yellow for medium values, to red for the supposedly least desirable (normally lowest) value; foreign and Norwegian tourists in the Nord-Gudbrandsdal region, data set (ii)

	Cluster 1 n=147	Cluster 2 n=87	Cluster 3 n=86	Cluster 4 n=281	Cluster 5 n=159	Total n=760
“Infrastructure & service”	-0.66	-0.80	0.19	0.84	-0.54	
“Tracks & signposts”	0.53	-1.52	-0.70	0.04	0.65	
“Tours & interpretation”	-0.96	0.66	-0.99	0.18	0.75	
“Food & accommodation”	0.70	0.37	-1.50	0.37	-0.69	
“Inspiration”***	3.89	4.15	3.88	3.96	4.17	
“Recreation”***	4.31	4.46	4.10	4.20	4.44	
“Challenge”*	2.74	3.01	2.87	2.99	2.90	
“Comfort”***	3.51	3.33	3.36	3.71	3.41	
Visited national park***	0.51	0.47	0.35	0.33	0.35	
Nights travelling***	7.9	10.9	11.3	9.0	14.9	
Relatively high income***	0.44	0.30	0.27	0.24	0.30	
Relatively low income	0.10	0.12	0.13	0.12	0.15	
University***	0.84	0.79	0.63	0.63	0.75	
Age**	47.5	47.7	48.6	48.8	44.8	
Female	0.44	0.41	0.33	0.36	0.39	
German***	0.07	0.20	0.15	0.07	0.30	
Dutch***	0.05	0.02	0.07	0.04	0.12	
Danish	0.02	0.01	0.05	0.01	0.03	
Swedish*	0.01	0.01	0.06	0.02	0.04	
Norwegian***	0.81	0.72	0.56	0.81	0.36	
Segment	Affluent demanders of high quality food and accommodation	Nature- oriented demanders of packages	Staid, satisfied and saturated	Comfort- oriented demanders of infrastructure and services	Nature- inspired demanders of tours and tracks	

*** p< .01, ** p< .05, * p< .1 (ANOVA)

Also in the sample of foreign and Norwegian tourists in the Nord-Gudbrandsdal region, data set (ii), cluster 1 is the cluster with highest factor score on “food and accommodation”. Also in this sample, cluster 1 represents an affluent, highly educated segment, having a nature orientation towards comfort. It is the segment with highest share of national park visitors in Nord-Gudbrandsdal, but not the longest stay in the region. We also term this cluster a segment of *affluent demanders of high quality food and accommodation* (comprising 19% of the sample). Cluster 2 is a cluster with relatively high factors scores on “tours & interpretation” and “food & accommodation”, representing components of potential tourism packages. Cluster 2 also has the highest scores on variables representing nature-orientation dimensions of challenge and recreation. We might term cluster 2 a segment of *nature-oriented demanders of packages* (comprising 11% of the sample). Cluster 4 is the cluster with highest factor score on “infrastructure & services”. Cluster 4 has the highest score on comfort. We also term this cluster a segment of *comfort-oriented demanders of infrastructure and services* (comprising 37% of the sample).

Cluster 5 is the cluster with highest factor score on “tours & interpretation” and “tracks and signposts”. Cluster 5 has the highest score on variables representing dimensions of the nature-orientation inspiration, the longest average stay in Nord-Gudbrandsdalen and the lowest average age. We might term cluster 5 a segment of *nature-inspired demanders of tours and tracks* (comprising 21% of the sample). Finally, cluster 3 is a cluster with relatively low scores on all QTF factors, as well as the lowest scores on variables representing dimensions of nature orientation. Cluster 3 has relatively high average age. We also term this cluster a segment of *staid, satisfied and saturated* (comprising 11% of the sample).

For the sample of foreign and Norwegian tourists in the Nord-Gudbrandsdal region (ii), more individual characteristics for profiling were available. These are displayed in Table 2c.

Table 2c: Mean QTF factor scores, mean scores on some additional variables representing mean values of demographics and trip characteristics, for the five clusters; where colour green indicates the supposedly most desirable (normally highest) value, via yellow for medium values, to red for the supposedly least desirable (normally lowest) value; foreign and Norwegian tourists in the Nord-Gudbrandsdal region, data set (ii)

	Cluster 1 n=147	Cluster 2 n=87	Cluster 3 n=86	Cluster 4 n=281	Cluster 5 n=159	Total n=760
“Infrastructure & service”	-0.66	-0.80	0.19	0.84	-0.54	
“Tracks & signposts”	0.53	-1.52	-0.70	0.04	0.65	
“Tours & interpretation”	-0.96	0.66	-0.99	0.18	0.75	
“Food & accommodation”	0.70	0.37	-1.50	0.37	-0.69	
Monthly household income (EUR)**	6,381	6,060	5,561	5,684	5,664	
Total trip cost per person per day (EUR)***	264	311	368	292	484	
Visits to Nord-Gudbrandsdalen**	2.3	2.2	1.9	2.3	1.9	
Nord-Gudbrandsdalen was the main destination**	0.67	0.77	0.59	0.49	0.56	
National park status decisive for choosing destination***	0.13	0.25	0.22	0.12	0.30	
Segment	Affluent demanders of high quality food and accommodation	Nature-oriented demanders of packages	Staid, satisfied and saturated	Comfort-oriented demanders of infrastructure and services	Nature-inspired demanders of tours and tracks	

*** p < .01, ** p < .05, * p < .1 (ANOVA)

The distribution of monthly household income is exactly the same as the distribution of the share stating relatively high income, yet for the foreign visitors these two variables correlated as monthly household income was estimated from the share stating relatively high income (VEISTEN et al. 2013). It is as expected that trip costs are lowest in the segment with the highest shares of Norwegians. The nature-oriented or nature-inspired segments have higher shares stating either the Nord-Gudbrandsdalen as main destination for their travel or stating that the national park status had decisive influence on their choice of travelling to the region.

Also in the five-cluster solution of the pooled sample, the largest segment was the *comfort-oriented demanders of infrastructure and services*, representing 33% of the pooled sample. The second-largest segments were the *affluent demanders of high quality food and accommodation* and *nature-inspired demanders of tours and tracks*, each representing 21% of the pooled sample. Also in the pooled sample there was a segment of *staid, satisfied and saturated* (comprising 12% of the pooled sample).

Clustering solutions using QTF items as clustering variables

We tried the two-stage clustering applying QTF items instead of QTF factors. The number of clusters defined by Ward's method was two, in the sample of foreign ferry-travelling tourists (i), as well as in the sample of foreign and Norwegian tourists in the Nord-Gudbrandsdal region (ii) and in the pooled sample. The ANOVA test of individual characteristics in the two clusters indicated that the use of QTF items instead of QTF factors yielded far less different clusters, particularly for dataset (ii).

Clustering solutions using the two-step algorithm with QTF factors as clustering variables

We also applied the two-step clustering procedure, in the SPSS software, which also combines partitioning and hierarchical clustering (MOOI & SAARSTEDT 2011). The two-step clustering was applied to the QTF factors and indicated that "tracks & signposts" was the most important clustering variable, then followed "infrastructure & services", "tours & interpretation" (second in the first sample of foreign ferry-based tourists and last in the second sample of foreign and national tourists in Nord-Gudbrandsdal), and then "food & accommodation". The two-step algorithm, like Ward, finds an "optimal" cluster number; that was six clusters for dataset (i) and four clusters for dataset (ii). For the pooled dataset, eight clusters were obtained. The profiling and ANOVA testing indicated that the two-step solution did not produce clusters that differed more clearly in terms of individual characteristics than the k-means solution (with cluster number found by Ward's method). However, for both samples a segment of *affluent demanders of high quality food and accommodation* as well as a segment of *comfort-oriented demanders of infrastructure and services* appeared. The latter constituted 33% in the foreign ferry-based tourist sample and 32% in the foreign and national sample in Nord-Gudbrandsdalen; while the *affluent demanders of high quality food and accommodation* constituted 14% in the foreign ferry-based tourist sample and 33% in the foreign and national sample in Nord-Gudbrandsdalen. However, in the foreign ferry-based tourist sample, there was an additional cluster, comprising 9%, also having high scores on the "food & accommodation" factor and a high share stating relatively high income; and if this could be added to a common segment of *affluent demanders of high quality food and accommodation*, it would reach 23%. Also in the pooled sample there were two segments with high factor scores on "food & accommodation" combined with the highest shares of "relatively high income" and "more than four year studies at university level", together reaching about 23% of the sample.

Discussion and Conclusions

In this market segmentation study, we applied a two-stage clustering, first finding an appropriate cluster (segment) number by use of Ward's hierarchical method, and then applying the partitioning k-means method for forming the clusters (MAZZOCCHI 2008; BURNS & BURNS 2008). We applied factors of quests for tourist facilities (QTF) as clustering variables (HAUKELAND et al. 2010; 2013). We also tried other clustering methods, the so-called two-step clustering of SPSS (MOOI & SAARSTEDT 2011), that mostly yielded a higher number of clusters than in our preferred approach. Finally, we also tried applying QTF items instead of QTF factors, which yielded a lower number of clusters than in our preferred approach.

Applying the two-stage clustering approach, five-cluster solutions were indicated based on an elbow test from Ward's method although a four-cluster solution could also have been applied for the sample of foreign ferry-travelling tourists. Notwithstanding the differences between this sample and the sample of foreign and Norwegian tourists in the Nord-Gudbrandsdal region, various common segment features were found. In both samples the largest segment was a comfort-oriented tourist segment demanding more/better infrastructure and services. Another relatively large segment found in both samples was an affluent and highly educated segment demanding high-quality food and accommodation. Moreover, in both samples was found a relatively small segment that can be characterised as satisfied with current facility offers, obtaining relatively low scores on all QTF factors, as well as relatively low scores on variables representing dimensions of nature orientation.

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