Evaluation of Shopping Items: Focused on Purchase of Foreign Tourists in South Korea*

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Abstract

Purpose – In this work, we categorize the 21 shopping items which foreign tourists purchase in South Korea and monitor the level of dissimilarity (or similarity) between each item by utilizing distance matrix, and both hierarchical and k-means cluster analyses, respectively, based on several purpose of visit attributes in 2017. In addition, multidimensional scaling (MDS) method is applied for mining visual appearance of proximities among shopping items based on purpose of visit attributes.

Research design and methodology – This study is carried out in 2017 by Ministry of Culture, Sports and Tourism and conduct a face-to-face survey of foreign tourists from 20 countries who purchase shopping items in South Korea. CLUSTER, PROXIMITIES and ALSCAL modules in IBM SPSS 23.0 are used to perform this work.

Results – We ascertain that 21 shopping items can be classified into five similar groups which have homogeneous traits by going through two-step cluster analysis. We can position homogeneous places of cluster and shopping items joining each cluster.

Conclusions – We can relatively assess patterns and characteristics of each shopping item, come by useful information in activating shopping tour based on the actual state of recognition of foreign tourists and practically apply to each tourism industry on underlying results.

Keywords: Cluster analysis, Multidimensional scaling, Shopping items

JEL Classification Code: C18, M21.

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1. Introduction

The total of foreign tourists who visited South Korea reportedly was approximately 15.4 million, which augmented fifteen percent in 2018 from a year earlier, because of a base effect after travel by Chinese tourists slumped in 2017. In addition, the number of Chinese tourists soared 14.9 percent to 4.78 million, taking up 31.2 percent of the total foreign tourists.

Almost 80 percent of foreign tourists to Seoul enjoyed going shopping the most, and about 85 percent of the respondents signed their desire to visit the Myeongdong shopping area in the city center. More than half of respondents wanted to visit N Seoul Tower on Mount Nam in central Seoul, and to spend time at four palaces of the Joseon Dynasty, Dongdaemun Market, the Insadong and Samcheongdong area with 40 percent (Yonhap).

Park et al. (2015) show business tourists' shopping traits and find out determinants of their impulse buying behaviors by comparing expenses intended before the event with the actual expenses. They find that convention participants tend to follow a similar appearance with common tourists regarding shopping items and have a tendency to perform impulsive shopping while they are on their business trip.

Yang and Yu (2015) implicate that duty-free consumers need to think over the application of information technology, shopping satisfaction for planning customer-based strategy for the purpose of promoting shopping-tour. Also, buyers need to consider diverse behavioral traits involving buying of Chinese tourists in South Korea to deeply comprehend shopping behaviors.

Lee et al. (2011) analyze the characteristics of Japanese tourists' shopping aspect in South Korea, find that women consist of mostly twenties and thirties among Japanese shopping- tourists, group tour takes up about 40%, and leading shopping items are perfume, cosmetics, groceries, clothes and kimchi. The implication of their research is to manage further tourism businesses or tourist destinations for developing diverse services, tourist roads and marketing strategies.

In this work, 21 shopping items in South Korea are classified and segmented based on the eight traits of quantitative assessment such as Leisure & Vacation, Health & Treatment, Religion & Pilgrimage, Shopping, Visit, Business, Education, and ETS. In addition, we can relatively assess patterns and characteristics of each shopping item by visualizing appearance of proximities among items based on eight attributes of purpose of visit.

We can relatively assess patterns and characteristics of each shopping item, come by useful information in activating shopping tour based on the actual state of recognition of foreign tourists and practically apply to each tourism industry on underlying results.

The remainder of this work is formed as follows: Section 2 describes data survey and summary. Section 3 shows and discusses three multivariate analyses results. Finally, we treat with concluding remarks findings in Section 4.

2. Data Collection

This data is collected in 2017 by Ministry of Culture, Sports and Tourism and conducted a face-to-face survey of foreign tourists from 20 countries who purchase shopping items in South Korea. Subjects under consideration are a total of 16,000 foreign tourists, more than 15 years of age and are all available except captains, crewpersons and soldiers. In addition, their length of stay should be ranged from one day to a year.

The goal of this survey is to take advantage of useful information of establishing tourism policy for the purpose of both increasing attraction of and improving preparations to receive foreign tourists, by routinely examining, comparing and analyzing propensity of travel and structural change. We can summarize the given dataset by expressing <Figures 1-8> below:
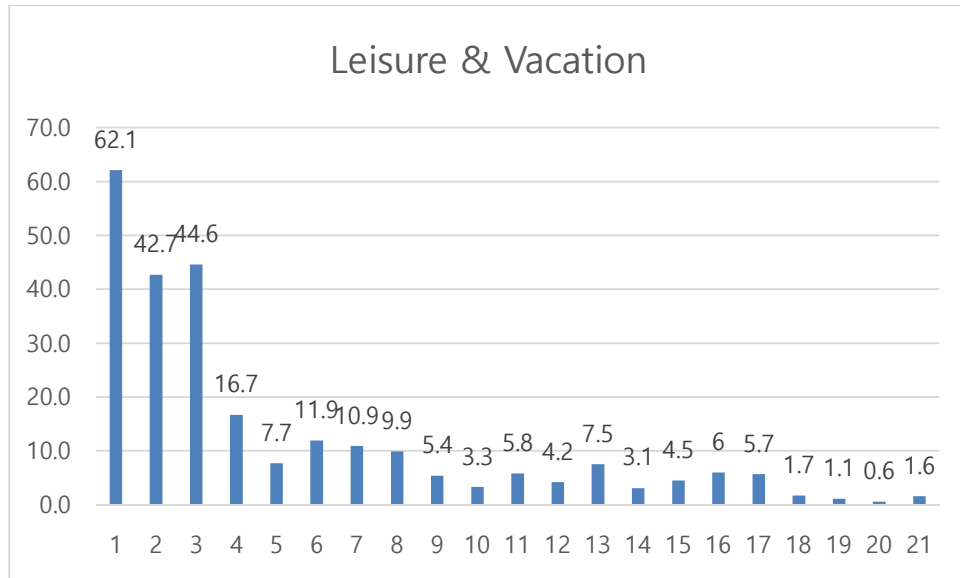
Figure 1: Bar Chart on Leisure & Vacation

Note that the Arabic numbers on the horizontal axis from <Figures 1-8> show the following: 1: cosmetics & perfume 2: clothing 3: groceries 4: shoes 5: leather 6: ginseng & Asian herb 7: kimchi 8: jewel & accessory 9: folkcraft & lacquer 10: electric appliances 11: liquor 12: watch 13: tabacco 14: books & stationery 15: album & DVD 16: star related products 17: doll & toy 18: silk & textile 19: china & porcelain 20: ETS 21: nothing.
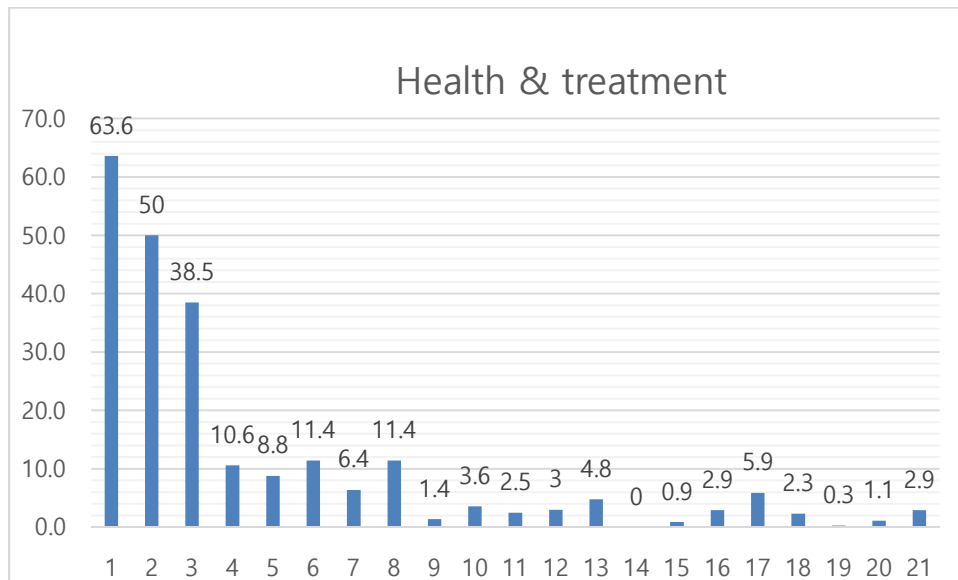
Figure 2: Bar chart on Health & Treatment
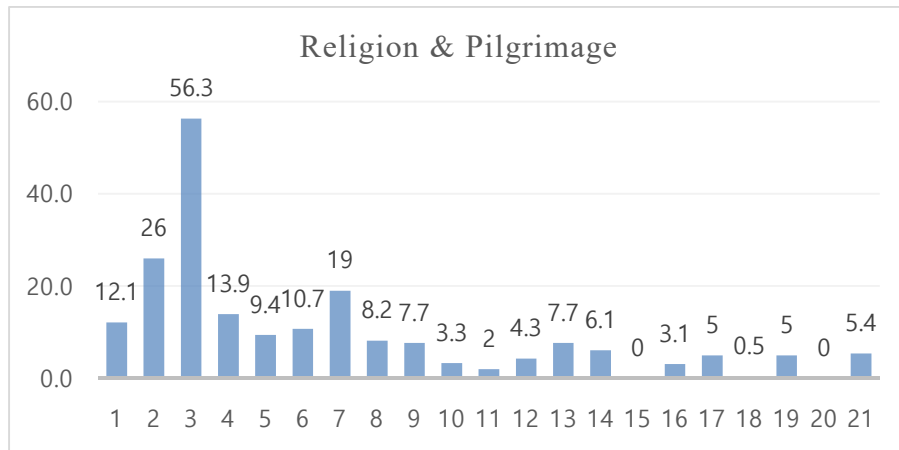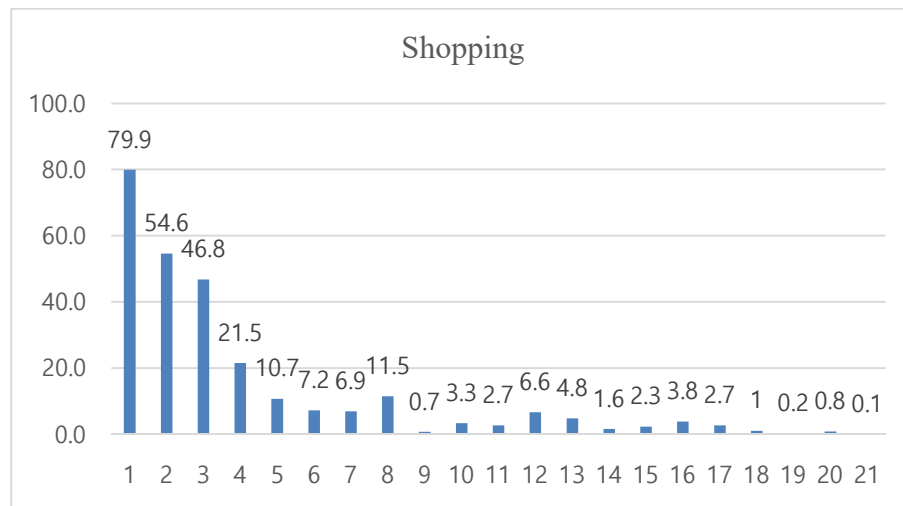
Figure 3: Bar chart on Religion & Pilgrimage
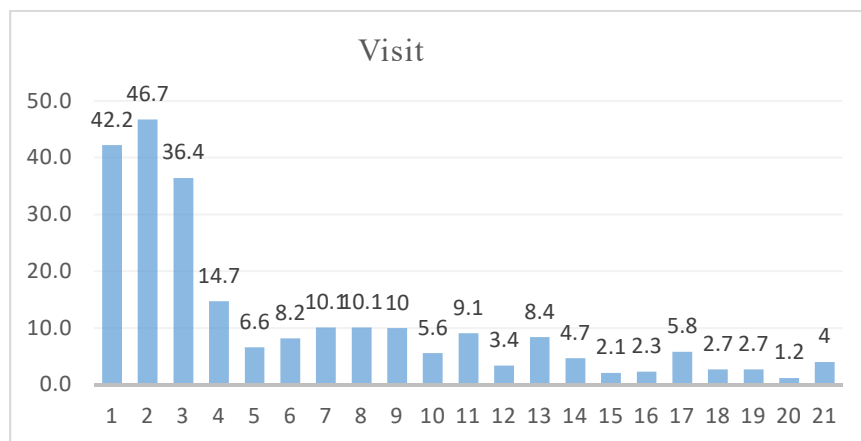

Figure 4: Bar chart on Shopping

Figure 5: Bar chart on Visit

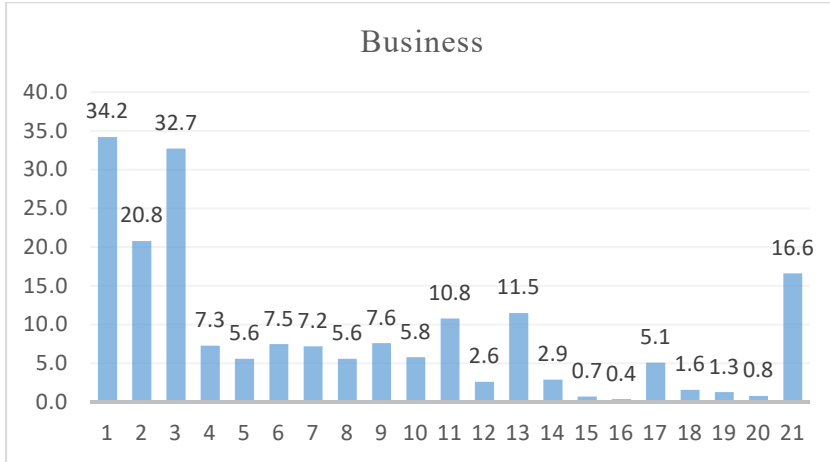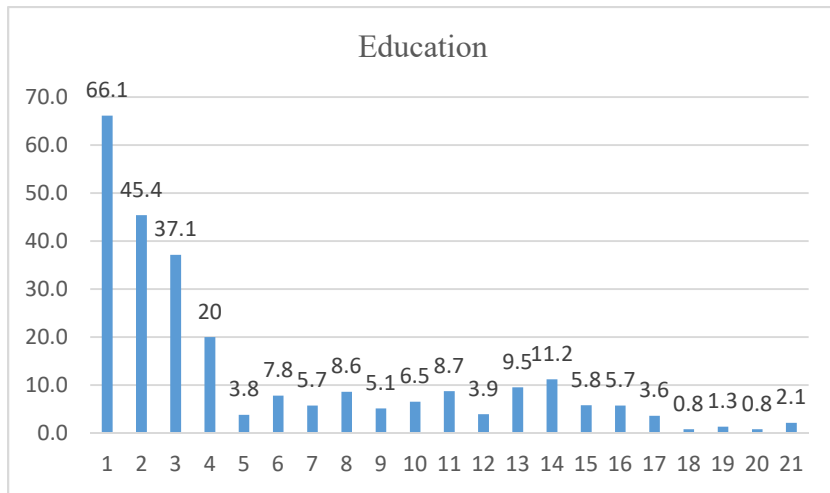**Figure 6**: Bar chart on Business

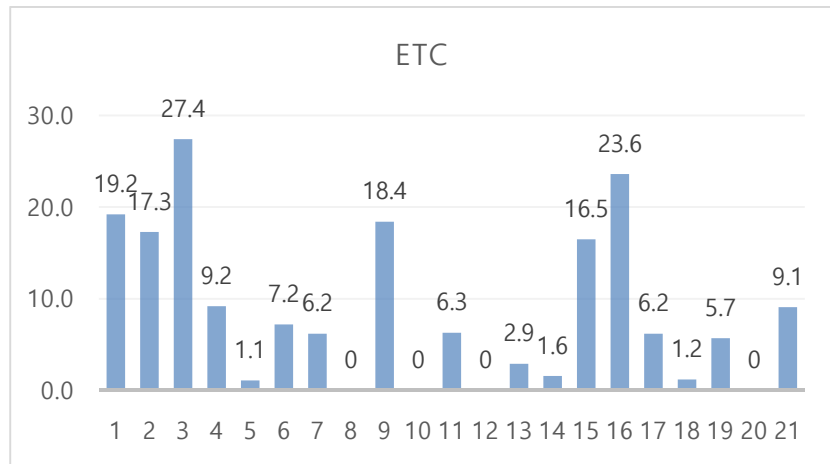**Figure 7:** Bar chart on Education

Figure 8: Bar chart on ETC

3. Research Result

3.1. Distance matrix

We can use dissimilarity distance matrix to analyze dissimilarity between every shopping item by calculating dissimilarity as a distance. Bigger numerical value shows bigger degree of dissimilarity between two shopping items.

Because most of values corresponding to cosmetics & perfume (1), clothing (2) and groceries (3) are highly greater than any other shopping items, these three items can be easily differentiable from <Tables 1-2>. In addition, this implies that these three items can be considered as a cluster sharing relatively different characteristics.

Table 1: Dissimilarity distance matrix between 21 shopping items

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1	0.00													
2	2.87	0.00												
3	4.73	3.21	0.00											
4	6.73	4.68	5.80	0.00										
5	8.10	6.12	7.17	1.71	0.00									
6	7.62	5.62	6.58	1.19	.86	0.00								
7	7.83	5.67	6.38	1.33	1.07	.76	0.00							
8	7.80	5.83	7.05	1.54	.46	.93	1.21	0.00						
9	8.07	6.06	6.75	2.01	2.17	1.55	1.78	2.33	0.00					
10	8.48	6.59	7.71	2.14	.75	1.28	1.59	.89	2.24	0.00				
11	7.99	6.13	7.18	1.79	1.19	1.03	1.49	1.26	1.55	.97	0.00			
12	8.64	6.73	7.84	2.21	.73	1.37	1.62	.96	2.32	.44	1.27	0.00		
13	7.87	5.96	6.95	1.62	.83	.85	1.14	.88	1.91	.86	.64	1.16	0.00	
14	8.56	6.61	7.67	2.04	.94	1.30	1.50	1.07	2.11	.55	1.12	.58	1.04	0.00
15	8.57	6.70	7.63	2.39	2.15	1.81	2.22	2.35	1.14	2.05	1.69	2.00	2.13	1.87
16	8.45	6.56	7.31	2.65	2.81	2.29	2.61	2.99	1.19	2.85	2.37	2.80	2.77	2.65
17	8.30	6.34	7.35	1.54	.82	.81	2.25	1.06	1.53	.79	.77	.84	.91	.84
18	8.95	7.05	8.18	2.55	1.13	1.62	1.93	1.36	2.29	.67	1.34	.50	1.43	.81
19	8.89	6.90	7.85	2.31	1.17	1.38	1.61	1.47	1.77	.95	1.25	.80	1.39	.81
20	9.12	7.23	8.36	2.72	1.27	1.81	2.10	1.50	2.48	.79	1.52	.59	1.59	.89
21	8.21	6.39	7.09	2.28	1.68	1.44	1.72	1.90	1.55	1.59	.96	1.84	1.15	1.77

Note that the Arabic numbers in the first row and column above show the following:
1: cosmetics & perfume 2: clothing 3: groceries 4: shoes 5: leather 6: ginseng & Asian herb 7: kimchi 8: jewel & accessory 9: folkcraft & lacquer 10: electric appliances 11: liquor 12: watch 13: tabacco 14: books & stationery 15: album & DVD 16: star related products 17: doll & toy 18: silk & textile 19: china & porcelain 20: ETS 21: nothing

Table 2: Dissimilarity distance matrix between 21 shopping items (continued)

	15	16	17	18	19	20	21
15	0.00						
16	.89	0.00					
17	1.42	2.14	0.00				
18	1.84	2.68	.89	0.00			
19	1.38	2.16	.65	.65	0.00		
20	1.98	2.83	1.10	.22	.79	0.00	
21	1.94	2.43	1.29	1.85	1.64	2.02	0.00

On the other hand, rest of shopping items except cosmetics & perfume (1), clothing (2) and groceries (3) can be regarded as possessing similar traits in terms of purpose of visit. In particular, ginseng & Asian herb, liquor, doll & toy, silk & textile and china & porcelain have a homogeneous characteristic for foreign tourists in South Korea.

3.2. Cluster analysis

Cluster analysis is a mining technique which helps dividing objects into natural similar groups without knowing prior information of which elements belong to which similar groups. Thus, the greater the heterogeneity within a cluster or the greater the homogeneity among clusters, the easier or more noticeable the clustering (Aldenderfer & Blashfield, 1985; Kaufman & Rousseeuw, 2005; Savaresi & Boley, 2004; Shepard, 1962; Yang, 2013).

Table 3: Agglomeration schedule

stage	cluster combined		coefficients	stage cluster first appears		next stage
	cluster 1	cluster 2		cluster 1	cluster 2	
1	18	20	.050	0	0	7
2	10	12	.196	0	0	4
3	5	8	.218	0	0	11
4	10	14	.327	2	0	7
5	11	13	.420	0	0	12
6	17	19	.426	0	0	9
7	10	18	.523	4	1	9
8	6	7	.585	0	0	11
9	10	17	.734	7	6	15
10	15	16	.790	0	0	13
11	5	6	1.067	3	8	14
12	11	21	1.132	5	0	14
13	9	15	1.373	0	10	17
14	5	11	1.780	11	12	15
15	5	10	1.887	14	9	16
16	4	5	4.000	0	15	17
17	4	9	4.918	16	13	20
18	1	2	8.270	0	0	19
19	1	3	16.385	18	0	20
20	1	4	53.791	19	17	0

From <Table 3>, we can find that five clusters may be grouped, because there are five spots where coefficients in merging steps increase markedly.

Cosmetics & perfumes (which belongs to cluster I) among 21 shopping items shows preference to other items in most of attributes of purpose of visit in South Korea except Religion & Pilgrimage. On the whole, clusters I, II and III (which consist of cosmetics & perfume, clothing, and groceries) are dominant over any other clusters because of relatively great values (see <Table 4>).

Table 4: Final clustering centers

Variables to be evaluated	Cluster				
	1	2	3	4	5
Leisure & Vacation	3.014	1.841	1.956	-.247	-.416
Health & Treatment	3.018	2.237	1.576	-.409	-.371
Religion & Pilgrimage	.186	1.306	3.748	-.292	-.291
Shopping	3.158	1.967	1.599	-.272	-.403
Visit	2.324	2.663	1.889	-.302	-.405
Business	2.612	1.224	2.457	-.516	-.302
Education	3.200	1.967	1.473	-.191	-.420
ETS	1.257	1.033	2.223	.989	-.605

From <Table 4>, both cluster 4 and cluster 5, which are composed of 18 shopping items (shoes, leather, ginseng & Asian herb, kimchi, jewel & accessory, folkcraft & lacquer, electric appliances, liquor, watch, tabacco, books & stationery, album & DVD, star related products, doll & toy, silk & textile, china & porcelain and ETS), are inferior to other clusters in terms of all attributes of visit of purpose. The only difference between cluster IV and cluster V is that cluster IV shows relative lead in 'ETS' among eight attributes.

In detail, foreign tourists for Leisure & Vacation, Health & Treatment, Shopping, Business and Education tend to prefer to purchase cosmetics & perfume, while ones for Religion & Pilgrimage do groceries. On the other hand, foreign tourists in South Korea for Business have a distaste for purchase cluster IV (shoes, folkcraft & lacquer, album & DVD and star related products) and ones for Shopping, Education, and Leisure & Vacation are reluctant to purchase cluster V (leather, ginseng & Asian herb, kimchi, jewel & accessory, electric appliances, liquor, watch, tabacco, books & stationery, doll & toy, silk & textile, china & porcelain, ETS and nothing).

Table 5: Distances between final cluster centers

Cluster	1	2	3	4	5
1		2.876	4.737	7.913	8.287
2			3.213	5.950	6.339
3				6.822	7.361
4					1.642

By looking over mean differences between clusters, we can find that there is a striking difference between cluster I and cluster V, while there is not any relatively significant difference between cluster I and cluster II (see <Table 5>).

Table 6: Variance of analysis

Variables to be evaluated	cluster		error		F	sig
	MS	df	MS	df		
Leisure & Vacation	4.742	4	.064	16	73.611	< .001
Health & Treatment	4.798	4	.050	16	95.242	< .001
Religion & Pilgrimage	4.327	4	.168	16	25.735	< .001
Shopping	4.741	4	.065	16	73.271	< .001
Visit	4.681	4	.080	16	58.704	< .001
Business	4.175	4	.206	16	20.228	< .001
Education	4.722	4	.070	16	67.924	< .001
ETS	4.158	4	.211	16	19.743	< .001

We can conclude that eight traits are all significant for assorting five different clusters by inspecting mean differences by group from <Table 6>.

3.3. Multidimensional scaling

21 shopping items are arranged within two dimensions so that points that are situated on remote location represent dissimilar items, while similar items are shown by points that are close with each other from <Figure 9> (Torgerson, 1952; Kruskal, 1964; Kruskal & Wish, 1978; Borg & Groenen, 2005; Takane et al, 1977). This graph is a scatter-plot representing coordinate of 21 shopping items in two dimensional scaling. Every point in two dimensional plane indicates strong tendency as it is remote from the origin.

Most of attributes (Leisure & Vacation, Health & Treatment, Religion & Pilgrimage, Shopping, Visit, Business, Education and ETS) have the strong or positive inclination as shopping items lie on the right of toward the origin. And also, two attributes (Religion & Pilgrimage, ETS) may confirm strong superiority as items are located on the origin.

Therefore, groceries show strong superiority in terms of Religion & Pilgrimage and ETS, while cosmetics & perfume and clothing do in terms of the rest of six attributes. In additions, we can make distinction between cluster IV and V by checking the location of the attribute ETS.
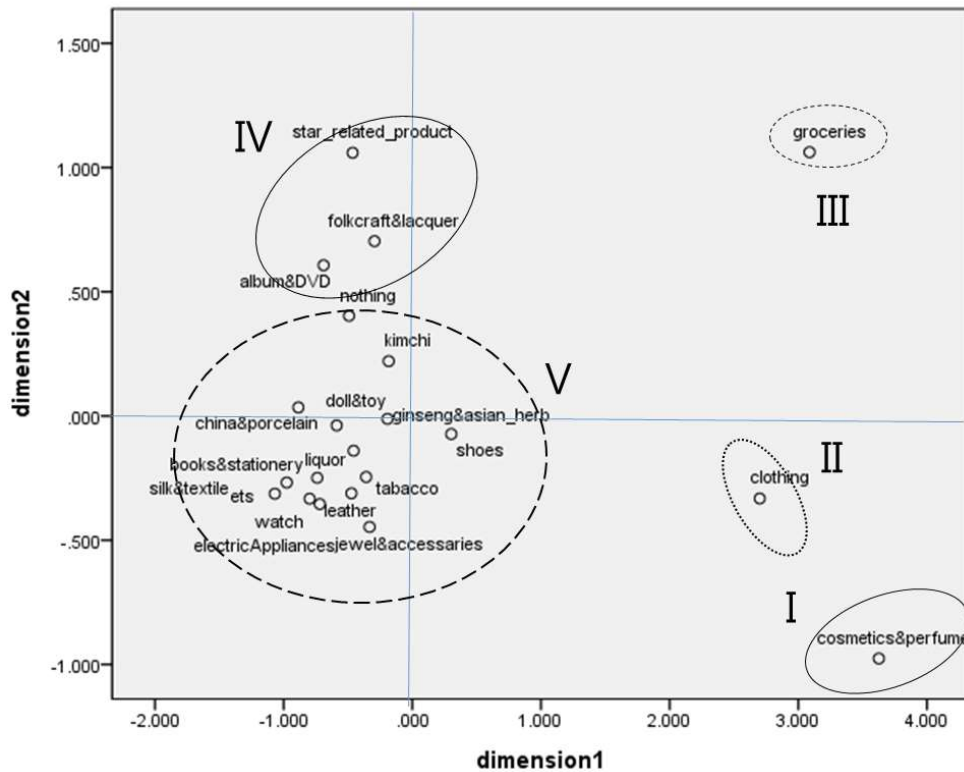

Figure 9: Derived stimulus configuration

4. Concluding Remarks

We ascertain that 21 shopping items can be classified into five similar groups (clusters) which have homogeneous traits by going through two-step cluster analysis. We can position homogeneous places of cluster and 21 shopping items joining each cluster.

This work applies two kinds of multivariate analyses on eight purpose of visit of foreign tourists based on a fact-finding survey, provided by Ministry of Culture, Sports and Tourism in South Korea.

As a result, we can make sure that 21 shopping items can be categorized into five similar groups which share homogeneous traits. In addition, multidimensional scaling is exploited to visualize the degree of similarity of each 21 shopping item belonging to each cluster and to show positioning of five grouped clusters. Distance matrix is used to compare similarity and dissimilarity between every shopping items. In particular, three shopping items such as cosmetics & perfume, clothing and groceries are key ones for foreign tourists to purchase in South Korea regardless of visit of purpose. However, clothing is the only leading item for Religion & Pilgrimage purpose.

This work suggests that we can relatively assess patterns and characteristics of each shopping item, come by useful information in activating shopping tour based on the actual state of recognition of foreign tourists and practically apply to each tourism industry on underlying results. In addition, a variety of shopping items and services are to be developed for high added –valued tourism sectors.

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