

# A Study on Innovators in Korean Market

Gui-Yeol Ryu<sup>a</sup> and Kichul Choi<sup>b</sup>

<sup>a</sup> Dept. of internet information, Seokyeong University  
16-1 Jungneung-dong Sungbuk-gu Seoul, 136-704 Korea  
Tel: +82-2-940-7134, Fax: +82-2-919-0345, E-mail: gyryu@skuniv.ac.kr

<sup>b</sup> Management Research Lab. KT  
Jungja-dong Bundang-gu Kyeongki Province, 463-711 Korea  
Tel: +82-31-727-0440, Fax: +82-31-727-6179, E-mail: kcchoi@kt.co.kr

## Abstract

*This paper investigates the lifestyles in Korean market. We will classify the groups using cluster analysis, and exploit the characteristics of innovators. These groups can be verified by multiple comparisons. This research is accomplished by sample survey between June 9 2003 and June 27 2003. Korean market for innovation can be classified into four groups such as innovators, early adopters, late majority, and laggards, which are similar to Rodger's classification. The ratios of four groups are 11%, 24.4%, 48.9%, 15.7% respectively. innovators, and late majority are heavy groups in that early adopter group is omitted on the contrary. Whereas innovators have a tendency to adopt the innovation quickly, rest groups have resistance for innovations and adopt slowly. The brief demographic characteristics of innovators are that the ratio of students is 44.44%, the ratio of single is 69.44%, the age between 15 and 25 is 56.95%, and the salary is relatively low compared with other cluster. The summary of lifestyle of innovators is that they are active, want to do worldwide business, want to have good relationship with high society, want to know the information of innovations, etc.*

## Keywords:

life style, clustering, eigenvalues, innovation, early adopters

## Introduction

As information infrastructure is well developed and established, people can communicate with each other anywhere and anyplace. The number of subscribers of mobile phones is 33,169,242 in July 2003, which penetration rate is about 70.57%. And the number of internet users is 26,270,000 in Dec. 2002, which penetration rate is about 56%. Korea has good systems for accepting information of innovations. Many fluctuations happen especially in telecommunications.

Many companies prepare the future eagerly, because changes will happen more fluently and widely. So the innovation in the future will be more important than the present. Rogers(1995) separated theoretically the groups of the customers for innovation using statistics, such as

innovators, early adopters, early majority, late majority, and laggards, which percentages are 2.5%, 13.5%, 34%, 34%, and 16% respectively. Research on lifestyle in Korea has been performed in two ways such as research on overall lifestyle and lifestyle based on some objects. The former research is Cheil Communications Lab. (1997), Seong-Yeon Park (1996), and Seong-Yeon Park and Shin-Ae Choi (2000) etc. The latter research is Chae, Jung Sook(2001), Hong-mie Lee (2002), and Hee Kyung Ro, Jean T Sook and Elizabeth Prater (2000), etc.

Rogers verifies the characteristics of clusters. The characteristics of innovators are that interest in new ideas leads them out of local circle of peer networks and into more composite social relationships. Communication patterns and friendships among a clique of innovators are common, even though the geographical distance between the innovators may be considerable. Being an innovator has several prerequisites such as financial resources and complex technical knowledge etc. The innovator must be able to cope with a high degree of uncertainty about an innovation at the time of adoption.

Early adopters are a more integrated part of the local system than are innovators. Whereas innovators are cosmopolitans, early adopters are localites. This adopter category, more than any other, has the greatest degree of opinion leadership in most systems. The early adopter is considered by many as "the individual to check with" before using a new idea. Because early adopters are not too far ahead of the average individual in innovativeness, they serve as a role model for many other members of a social system, and are respected by his or her peers. Early adopters decrease uncertainty about a new idea by adopting it, and then conveying a subjective evaluation of the innovation to near peers through interpersonal networks.

Early majority adopt new idea just before the average member of a system. Early majority interact frequently with their peers, but seldom hold positions of opinion leadership in a system. They are the most numerous adopter categories, making up one-third of the members of a system. They follow with deliberate willingness in adopting innovations, but seldom lead.

Late majority adopt new idea just after the average member of a system. Like early majority late majority make up one-third of the members of a system. Adoption may be both an economic necessity for late majority, and

the result of increasing network pressures from peers. Innovations are approached with a skeptical and cautious air, and late majority do not adopt until most others in their system have done so. The pressure of peers is necessary to motivate adoption. And most of the uncertainty must be removed before the late majority feel that it is safe to adopt.

Laggards are the last in social system to adopt an innovation. They possess almost no opinion leadership. Many of them are near isolates in the social networks of their system. Decisions are often made in terms of what has been done previously, and these individuals interact primarily with others who also have relatively traditional values. They tend to be suspicious of innovations and change agents. Resistance to innovations on the part of laggards may be entirely rational from laggards' viewpoint, as their resources are limited and they must be certain that a new idea will not fail before they can adopt. Their precarious economic position forces the individual to be extremely cautious in adopting innovations.

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## Methods of Cluster Analysis

Their research methods are mainly based on fixed clusters. That means they tried to make clusters theoretically, and explain the characteristics of given clusters. Cluster analysis verifies the numbers and classifies the clusters at the same time. Cluster analysis is written in Johnson and Wichern (1982). Clustering is distinct from the classification methods. Classification pertains to a known number of groups, and the operational objective is to assign new observations to one of these groups. Cluster analysis is a more primitive technique in that no assumptions are made concerning the number of groups or the group structure. Grouping is done on the basis of similarities or distances.

Types of clustering are hierarchical methods and nonhierarchical methods. There is single linkage, complete linkage, average linkage, and Ward method in hierarchical methods. The inputs to a single linkage can be distances or similarities between pairs of objects. Groups are formed from the individual entities by merging nearest neighbors, where the term nearest neighbor connotes smallest distance. Complete linkage clustering proceeds in much the same manner as single linkage, with one important exception. At each stage, the distance between clusters is determined by the distance between the two elements, one from each cluster, that are most distant. Thus complete linkage ensures that all items in a cluster are within some maximum distance of each other. Average linkage treats the distance between two clusters as the average distance between all pairs of items where one member of a pair belong to each cluster.

Ward (1963) proposed a method of performing clusters that is based on the loss information resulting from the grouping of individuals into clusters as

measured by the total sum of squared deviations of every observation from the mean of the cluster to which it belongs. The assignment rule rests on the increase in the error sum of squares induced from combining every possible pair of clusters. This value, which is denoted by Error Sum of Squares (ESS), is used as an objective function.

The grouping process begins by considering K groups of subjects, one subject per group. The first group is formed by selecting the two of these K groups that, when united, will produce the least impairment in the value of the objective function. This K-1 set of groups is then reexamined to determine the next two of these K-1 groups to unite while minimizing the increase in the objective function. The K initial groups are thus systematically reduced from K to K-1 to K-2 to ... to 1 group in the course of this hierarchical grouping procedure. At the stage of the procedure (from K to 1) the value of the objective function is assessed. Changes in this value from stage to stage provide an important clue for determination of the number of "natural" grouping for the K subjects. However, a non-optimal solution will occur only in those circumstances where the "natural" clustering of the subjects' profile is quite weak. We will use this method for clustering.

Nonhierarchical clustering techniques are designed to group items, rather than variables, into a collection of K clusters. The number of clusters, K, may either be specified in advance or determined as part of the clustering procedure. Nonhierarchical methods start from either (1) an initial partition of items into groups or (2) an initial set of seed points, which will form the nuclei of clusters. Good choices for starting configurations should be free of overt biases. One way to start is to randomly select seed points from among the items or to randomly partition the items into initial groups.

## Main Results

Research for lifestyle can be classified by objects. Rogers(1995) separated theoretically the five groups for innovation using statistics, such as innovators, early adopters, early majority, late majority, and laggards. which percentages are 2.5%, 13.5%, 34%, 34%, and 16% respectively. Our research will verify the characteristics of innovators. We analyze survey data for clustering. Nationwide survey was conducted between June 6 2003 and June 27 2003. The number of samples was 1,300, which band of sampling error with 95% confidence could be 2.7%. It means the interval estimate with 95 confidence is from -2.7% to +2.7%. Ward's minimum variance analysis will be adopted as the method of clustering.

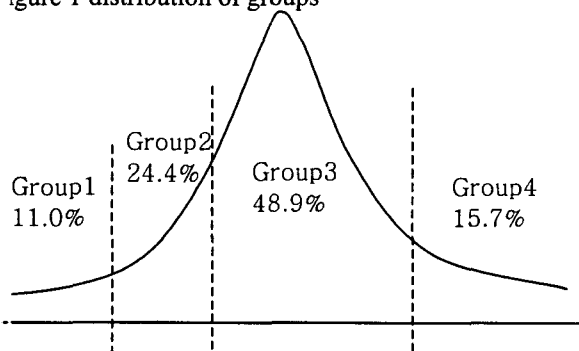
Eigenvalues of Ward's minimum variance analysis is listed in the Table1. We accept generally the number of clusters which eigenvalue is greater than 1. If we accept 9 clusters, the last cluster contain one observation. These phenomena continue until 5 clusters. So we could accept 4 clusters, and the cumulative eigenvalue is 40.8%.

Table 1 Eigenvalues of Ward's minimum variance analysis

Clusters	Eigenvalue	Difference	Proportion	Cumulative
1	5.023	2.982	0.190	0.190
2	2.041	0.096	0.077	0.267
3	1.945	0.166	0.074	0.341
4	1.779	0.212	0.067	0.408
5	1.567	0.220	0.059	0.467
6	1.347	0.067	0.051	0.518
7	1.281	0.079	0.048	0.567
8	1.202	0.061	0.045	0.612
9	1.141	0.186	0.043	0.655
10	0.955	0.043	0.036	0.691
11	0.912	0.029	0.034	0.726
12	0.883	0.102	0.033	0.759
13	0.781	0.029	0.030	0.789
14	0.751	0.013	0.028	0.817

The Korean market for innovation can be classified into four groups. The ratios of four groups are 11%, 24.4%, 48.9%, 15.7% respectively. We should check the groups are well divided using differences among groups. The significant probabilities of difference among groups are under 2%, which mean the means of groups are different. Another method for checking is multiple comparisons as noted by Yosef Hochberg, and Ajit C. Tamhane(1987). There are many methods for multiple comparisons such as Bonferroni t-test, Duncan's multiple-range test, Dunnett's two tailed t-test, Scheffe's multiple-comparison procedure, and Tukey's studentized range test. We will adopt Tukey's studentized range test as multiple comparison. Results say there is no similar group. We can see the groups are well divided.

Figure 1 distribution of groups



Comparing the Rogers' result, we can say innovators and early adopter group are combined and reduced to 11% from 16%. We can call this group innovators or early adopter. We define this group using the characteristics. The lifestyles are they are active, live with confidence compared with people, lead the fashion, enjoy sports with colleagues when time is available, spent much time in the open air, like traveling, like liquor, enjoy watching movies, dramas, and TV, and think TV give much information. Business style is they want to do

worldwide business, want to have good relationship with high society, want to know the information of innovations, have influences on purchase of others, frequently use computer at office and home. Purchase behaviors are they like to buy new products or new services, and don't want to buy on credit. It is desirable we call this group innovators rather than early adopters from table 2.

Table 2 Major differences between innovators and early adopters

Groups	Innovators	early adopters
1	Cosmopolities	Localites
2	Cope with high degree of uncertainty	Decrease uncertainty
3	Complex technical knowledge	Individual to check with

Demographic characteristics are follows. As for sex, the ratios of men and women are 51.39%, 48.61% respectively, which is similar to the ratio of nationwide sex. As for age, the age ratios of 15~19, 20~24, 25~29, 30~39, 40~49, and 50~59 are 30.56%, 26.39%, 11.11%, 15.28%, 13.19%, and 3.47% respectively. We can see that over the half are under 24. The number of people between 15 and 19 is 44, which proportion for their age is 34.65% and job is student except 1. The number of people between 20 and 24 is 38, which proportion for their age is 23.75% and students are 55.26%, salesmen are 13.16%, office workers are 10.53%, part timers are 5.26%, no jobs are 5.26%, manufacturer are 5.26%, and a specialist an independent management are 2.63% respectively. In thirties, office workers are 27.27%, salesmen are 22.27%, independent managements are 10.18%, housewives are 18.18%, and the others are 13.65%. In forties, independent managements are 26.32%, office workers are 26.32%, salesmen are 15.79%, housewives are 15.79%, and the others are 15.79%. Between 25 and 29, office workers are 56.25%, salesmen are 18.75%, and no job is 12.50%. Between 25 and 29, office workers are 56.25%, salesmen are 18.75%, specialists are 12.50%, and no jobs are 12.50%. Proportions of specialist, management, office worker, salesmen, manufacturer, farmer, independent management, housewives, students, part timer, no job, and no response are 2.08, 1.39, 16.67, 11.11, 4.17, 0.69, 8.33, 4.86, 44.44, 1.39, 4.17, and 0.69, respectively. About half of innovator is student.

The ratio of single life is 69.44%, which come from student. The personal income is 28 people, 11.97%, are under one million won per month, 21 people, 10.88%, are between one million won and 1.5 million won per month, 14 people, 6.83%, are between 1.5 million won and 2 million won per month, 10 people, 9.43%, are between 2 million won and 2.5 million won per month, 4 people, 4.60%, are between 2.5 million won and 3.0 million won per month, and 4 people, 4.60%, are over 3 million won per month. The average income of innovators is not high compared with other groups, which also come from students.

Table 3 Distribution of ages and jobs in innovators

(Unit: persons, %)

	15~19	20~24	25~29	30~39
Specialist	0 0.0	1 2.63	2 12.50	0 0.0
Management	0 0.0	0 0.0	0 0.0	0 0.0
Office worker	0 0.0	4 10.53	9 56.25	6 27.27
Salesmen	0 0.0	5 13.16	3 18.75	5 22.73
Manufacturer	0 0.0	2 5.26	0 0.0	1 4.55
Farmer, Fisher, etc.	0 0.0	0 0.0	0 0.0	0 0.0
Independent managements	0 0.0	1 2.63	0 0.0	4 18.18
Housewives	0 0.0	0 0.0	0 0.0	4 18.18
Students	43 97.73	21 55.26	0 0.0	0 0.0
Part timer	0 0.0	2 5.26	0 0.0	0 0.0
No Job	1 2.27	2 5.26	2 12.50	1 4.55
No response	0 0.0	0 0.0	0 0.0	1 4.55
Total	44 30.56	38 26.39	16 11.11	22 15.28

## Further Research

This research is accomplished by sample survey between June 9 2003 and June 27 2003. The Korean market for innovation can be classified into four groups such as innovators, early adopters, late majority, and laggards, which are similar to Rodger's classification. The ratios of four groups are 11%, 24.4%, 48.9%, 15.7% respectively. Early adopter group is merged into innovators, so innovators are very large compared with Rogers and other research. And late majority is also large. Whereas innovators have a tendency to adopt the innovation quickly, rest groups including early majority have resistance for innovations and adopt slowly. According to this result, over 10% of clients accept innovations quickly and diffuse innovations, and innovations will go ruin if they don't have much more advantages for costs. We have good playground for testing innovations. This could explain early success on ADSL services in Korea.

For further research, focus group interview of innovators is needed. Lifestyles are changed from environments such as economy, culture, politic, and communities. Research for causality between lifestyle and environments is also needed. Lifestyles change continuously, consistent research for lifestyle is essential for strengthening the competitiveness.

	40~49	50~59	Total
Specialist	0 0.0	0 0.0	3 2.08
Management	1 5.26	1 20.00	2 1.39
Office worker	5 26.32	0 0.0	24 16.67
Salesmen	3 15.79	0 0.0	16 11.11
Manufacturer	1 5.26	2 40.00	6 4.17
Farmer, Fisher, etc.	1 5.26	2 40.00	1 0.69
Independent managements	5 26.32	0 0.0	12 8.33
Housewives	3 15.79	0 0.0	7 4.86
Students	0 0.0	0 0.0	64 44.44
Part timer	0 0.0	0 0.0	2 1.39
No Job	0 0.0	0 0.0	6 4.17
No response	0 0.0	0 0.0	1 0.69
Total	19 13.19	5 3.47	144 100

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