

Segmentation of Online Game Market Using a Two-Phase Approach

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Abstract

The purpose of our research is to identify the critical variables and to develop a new methodology for market segmentation of online game market. Our research tested the model with Korean online game users because Korean online game industry is the frontier of global online game industries.

Conclusively, the critical variables are the suitability of feedback, the reality of design, the precision of information and the involvement of virtual community. The analysis of segmentation shows that the primary target audiences are positively influenced by the reality of design and the involvement of virtual community. To attract the primary target audiences, online game companies should develop strategies depending on the effectiveness of the variables and the demographic and behavioral characteristics of target audiences.

1. Introduction

The online game industry has been grown rapidly and has been developed into the core of the cultural industries. However, the online game industry encounters higher competition with the entrance of foreign online game competitors and substitution to video games [12, 13, 14, 23].

To survive in today's competitive online game markets, online game companies need to determine who the target customers are and what motivates them. However, previous research didn't focus on identification of critical variables for market segmentation in online game market. Additionally, the traditional clustering methodologies have not provided a unique clustering nor

determined the precise number of clusters [6, 7, 16, 19].

The purpose of our research is to identify the critical variables and to develop a new methodology for market segmentation of online game market. Our research approach is categorized into two phases. The first phase is using a statistical approach to find the critical segmentation factors. The second phase is conducted by a two-level SOM to develop the actual clusters. Finally, we develop the marketing strategies to attract target audiences by identifying the profiles of their loyal customers.

2. Theoretical Background

2.1 The variables for market segmentation

Through the review of the relevant literature, we identify the primary factors for online game from a business perspective as follows: the convenience of operator, the suitability of feedback, the reality of design, the precision of information and the involvement of virtual community. Our research hypothesizes that these determinants have a positive effect on flow.

Operators are characters and items which are used to play games [2, 10, 18, 21]. Feedback is the reaction from online games [3, 8]. The reality of design is defined as the design quality of interface making gamers feel online games as part of the real world [1, 17, 22]. Information is the contents from online game to achieve the stated goals [8, 15]. Virtual community is defined as computer-mediated spaces with potential for integration of member-generated content and communication [8, 11].

2.2 A Two-Level SOM

Hierarchical method, which build a hierarchical clustering tree (i.e. dendrogram), can not provide a unique clustering because a partitioning to cut the dendrogram at certain level is not precise [6, 20]. Partitive method (k-means), which predefines the number of clusters before performing it, can not identify the precise number of clusters [7, 16, 20]. Additionally, these algorithms are known to be sensitive to noise and outliers [4, 5, 20].

Vesanto and Alhoniemi proposed a two-level SOM combined SOM, K-means and DB Index to settle these problems. A two-level SOM was compared with SOM, where a large set of prototypes is firstly formed, instead of clustering the data directly [20]. Finally, DB index is used to determine the number of clusters and the validity of the clusters formed [9]. The proper clustering is achieved by minimizing the DB index.

3. Research methods

3.1 Research Framework

To segment the online game market and develop marketing strategies, our research approach is categorized into two phases. Firstly, the confirmatory factor analysis (CFA) and structural equation model (SEM) are used to identify the critical segmentation variables for clustering. Secondly, a two-level SOM is used to segment online game market. The first level develops the prototypes from large data set and the actual clusters are developed from the prototypes in the second level.

After segmentation of the markets, we use ANOVA to recognize the characteristics of sub-divided clusters. Finally, we target a segment market with the highest customer loyalty, and used those results as the starting point for the marketing strategies.

3.2 Data and Measurement

To test the model, a Web-based survey was employed. We developed the web-questionnaire page using a common

gateway interface (CGI). We sent a mail to customer within OZ intermedia in Korea, which explained the objectives of the research and contained the link to the Web-Survey. Conclusively, the 703 complete data is available for analysis, after elimination of missing data.

We used CFA to evaluate convergent validity for six constructs, which included five determinant and a dependent factors. The results indicated that the chi-square of the model was 133.57 with d.f. of 75, the ratio of chi-square to d.f. was 1.781, GFI was 0.975, AGFI was 0.960, RMSR was 0.033 and NFI was 0.962. All the fit statistics of the measurement model were acceptable.

4. Results

4.1 Identification of critical factors

To find the critical factors for segmentation, we used AMOS 4.0 in structural equation modeling (SEM). The structural model was well converged. The results indicated that four of the five paths were statistically significant and the path from the convenience of operator to flow was insignificant. The critical variables for marketing segmentation are the suitability of feedback, the reality of design, the precision of information and the involvement of virtual community.

4.2 Market Segmentation

To segment the Korean online game market, our research was conducted using a two-level SOM. In the experiments, the first level was SOM training. 703 data samples were collected using the test variables. A map was used by 15*9 matrix and 135 prototypes were developed. The second level was SOM clustering. The partitive clustering of 135 SOM's prototypes was carried out using batch K-means algorithm. The K-means ran multiple times for each k. The DB index was used to select the best clustering. The analysis of the DB index resulted in the development of six market segments.

4.3 Determination of target market

To identify the structure of the clusters, we conducted on the analysis of the demographic and behavioral variables: gender, age, income level, i_year (how long did gamers use the Internet), i_day (how many hours did gamer use the Internet per day), and g_day (how many hours did gamer play online games per day). The characteristics and structure of clusters are summarized in Table 1.

The analysis of customer loyalty indicated that cluster 6 was recognized as the primary target market. To attract the primary target audiences, companies should develop strategies depending on the effectiveness of the variables and the demographic and behavioral characteristics of cluster 6. The characteristics of target audiences indicate that the members are positively influenced by the reality of design and the involvement of virtual community.

5. Conclusion

The results of our research have the following implications for online game companies. Online game companies should develop diverse types of online games considering the extension of the age of online game users. Especially, our research shows that the middle-aged

and female users are classified as target customers as well as adolescents. This finding is consistent with the statistics in the Korean Game White Paper, which indicates that female users increased from 31% of the game population in 2001 to 47% in 2003 and the middle-aged users increased from 2% in 2001 to 21% in 2003.

These implications were proven to be true through NCsoft's example, which is the primary Korean online game company. They recognized that online game customers' needs have been changed and encountered higher competition with foreign online game competitors. To survive in this changing environment, they developed the games for male and female separately. For instances, the background of the recent game 'Lineage' was medieval, the type was combatable, and their target audiences were adolescents and younger male, while 'Shining Lore' is developed to target female customers who might be more interested in sweet and exciting stories [12].

The results of our study have several contributions to academia and business world. Our research identifies the new primary factors for online game markets which may not be found in the previous researches from the technological perspectives. Additionally, our research proposes a new methodology for market segmentation

	cluster1 (n=131)	cluster2 (n=85)	cluster3 (n=114)	cluster4 (n=102)	cluster5 (n=133)	cluster6 (n=138)
The suitability of feedback	3.36 (High)	2.09 (Low)	2.31 (Low)	2.98 (Middle)	1.54 (Low)	2.6 (Low)
The precision of information	3.61 (High)	2.75 (Middle)	2.49 (Low)	2.76 (Middle)	2.46 (Low)	3.21 (Middle)
The reality of design	3.32 (High)	3.22 (Middle)	2.48 (Low)	2.98 (Middle)	2.76 (Middle)	3.84 (High)
The involvement of virtual community	3.59 (High)	3.77 (High)	2.46 (Low)	3.14 (Middle)	3.25 (Middle)	3.72 (High)
gender	male	female	male	female	female	female
age	21-25	26-30	21-25	21-25	21-25	21-25
Income(1,000\)	1,010-2,000	1,010-2,000	0	510-1,000	1,010-2,000	1,010-2,000
i_year	3	4	2, 6-	3	3	6-
i_day	5	10-	0-2	3	10-	10-
G_day	1	5-	1	1	5-	5-
revisit	high	high	middle	middle	middle	high
WOM	high	high	middle	middle	middle	high
loyalty	2(3.74)	3(3.65)	6(2.99)	4(3.38)	5(3.14)	1(3.89)
Loyalty is estimated by average of revisit and WOM						

using a two-level SOM and marketing strategies for the survival in competitive online game market.

For further study, more demographic and behavioral variables might be necessary to segment the markets more precisely. Secondly, a cross-national analysis can be added to our research in order to better understand the loyal customers in different countries.

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