

## Identifying the Relationship Between Area Characteristics by Social Class and Bank Branches Distribution using GIS - Case Study of Tokyo 23 Wards -

YoungJoo Lee, Hiromichi Fukui

Keio University, Japan

Endo5322, Fujisawa, Kanagawa, 252-8520, Japan

yjlee@sfc.keio.ac.jp , hfukui@sfc.keio.ac.jp

### 1. Introduction

Over the last few years, the financial service market has seen a proliferation of new players and channels by changes in the external environments. Banks have found themselves facing more aggressive competition, uncertainty and unlimited opportunities. Therefore, they must examine their strengths and opportunities and take a competitive position in the competitive marketplace. Furthermore, banks have to reconsider and reevaluate fundamental assumptions about how they reach their markets to build efficient branch marketing strategies. That is what market segmentation analysis is for awareness of their customers and marketplace. Specifically, GIS based these analyses by spatial data and attributes data such as demographic and socioeconomic data, and are relevant and useful to identify the area characteristics and find new market with similar characteristics. The purpose of this paper is to examine the relevance between area characteristic by social class and distribution characteristics of existing branches of five major banks in Tokyo 23 wards for making efficient bank branch strategies using GIS with socioeconomic data, major commercial banks data, and spatial data of Tokyo 23 wards.

### 2. Study Area

Segmentation involves identifying customer groups that are fairly homogeneous among themselves but are different from other customer types. Its purpose is to determine differences between customers that are of relevance to the marketing decision maker.

Wendell Smith(1956) first defined market segmentation as “viewing a heterogeneous market as a number of smaller homogeneous markets, in response to differing preferences, attributable to the desires of customers for more precise satisfaction of their varying wants”. And, Wedel and Kamakura(1998) note that “even if a market can be partitioned into homogeneous segments, market segmentation will be useful only if the effectiveness, efficiency and manageability of marketing activity are influenced substantially by discerning separate homogeneous group of customers”.

Initially, segmentation in retail financial services basically followed the demographic lines. Categories such as age, gender, education, income, family size and geographic location were used (Dickens and Chappell, 1977; Frank, 1989; Chisnall, 1992.) However, this form of segmentation is limited in solving marketing problems because, it is very general and was often used as a matter of convenience. Therefore, we implemented the segmentation analysis by social class from two approaches - geographic and demographic – to resolve the complicated problems in the financial sector using GIS in this study. GIS based analysis helps to understand how a potential new branch would perform based on the performance of a bank's best matching existing branches as well as define more precisely the target group of customers.

### 3. Methodology

The primary study was conducted in the Tokyo 23 wards, Japan. The research was conducted in two stages:

In the first stage, market segmentation was undertaken by factor analysis and cluster analysis using socioeconomic variables related to social level. We used 2000 census data, NSC2001, and 2000 high-income taxpayer list for socioeconomic data.

In the second stage, the distribution characteristic of existing branches became evident in overlay analysis with result of segmentation. We used point data of branches of five major banks made by address matching processing and base map of Tokyo 23 wards divided into 3058 towns. We used SPSS11.5 and JMP5.0 for statistical analysis and ArcGIS8.0 for spatial analysis to identify the relationship between area characteristics by social class and distribution characteristic of existing bank branches in Tokyo23 wards.

### 4. Data Analysis and Results

Market segmentation by social class

#### ·Factor Analysis

Variables : population, density, age(20's, 30's, 40's, 50's, 60's), gender, households,  
residence types (aged-households, married couple, have a children, single)  
ownership (home ownership, rent a house)  
education, job, employment,  
income, high-tax payer, consumer purchasing power

The principle components analysis was applied to the dataset to extract from the series of 38 variables a set of factors capable of capturing the main features of the responses. Prior to the

extraction of factors the Bartlett test of sphericity and the KMO measure of sampling adequacy confirmed that there was sufficient correlation among the variables to warrant the application of factor analysis. In order to simplify the factor patterns a VARIMAX rotation was conducted. In factor analysis, with a full set of 38 variables attributing to 9 factors, are defined as follows; Factor 1(purchasing power), Factor2 (social position), Factor3 (residence type), Factor 4 (the rich), Factor 5 (the elderly), Factor 6 (thirty-something), Factor 7 (the fifties vs. the twenties), Factor 8 (employment and ownership), Factor 9 (the forties)

**Cluster Analysis**

Hierarchical cluster analysis using the Ward method was applied to the dataset. Visual inspection of the dendrograms revealed a jump in error variability measures between two and nine clusters and determined to nine groups(clusters). Each clusters was described as follows: Group1 (the elderly & life style stability), Group4 (30's & life style stability), Group5 (the noble class), Group6 (instability of life), Group7 (lifestyle stability), Group8 (spending power), Group9 (wealth). Groups 2 and 3 are removed from this result because of outliers. Fig1 shows the number of towns contained by each clusters of 23 wards. Setagayaku, which is located in the west of Tokyo (Fig 1.) is the wealthiest area in Tokyo because, 65.8% of the towns in Setagayaku contained to Group 5 (High Class).

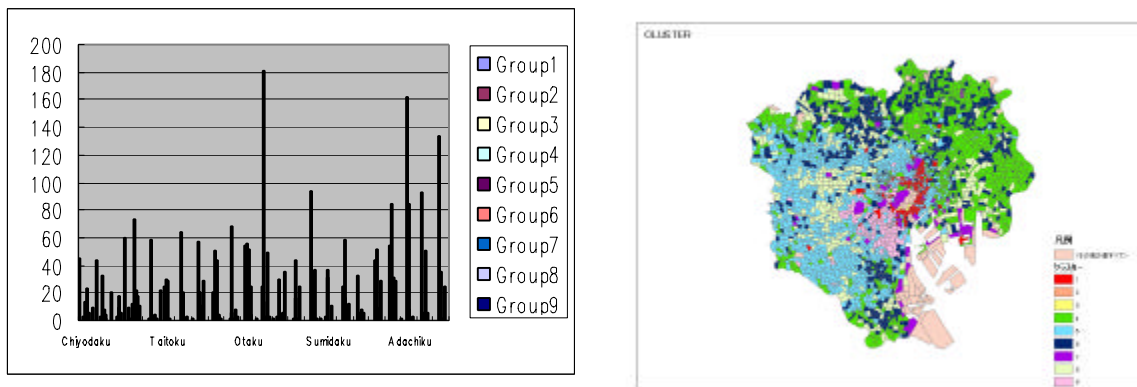


Fig1. Result of Segmentation

**Distribution characteristic of bank branches**

Point data of branches of five major banks is made by address matching processing using existing branches list overlaid with the segmented map (Fig.2). Each cluster information of polygon is integrated to bank branch information using join function as 'polygon to point' to clear the relationship of area characteristics and branch distributions. Fig.2 shows the distributions of branches of five major banks by each group. There is a trend towards that a large number of all

branches of five major banks located in Group 5, the noble class area. The next are Group 1(the aged & life style stability), Group 8(spending power), and Group 6(instability of life ) in the order named group. However, There are subtle differences of order by banks. Fig 3. gives the result of the graph, showing the relationship between area characteristic and distribution characteristics of bank branches.

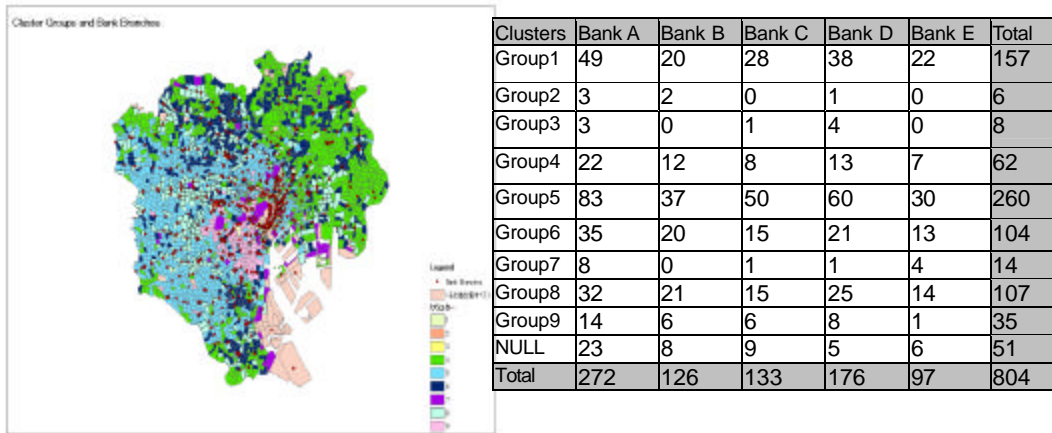


Fig 2. Result of Bank Branches Distributions

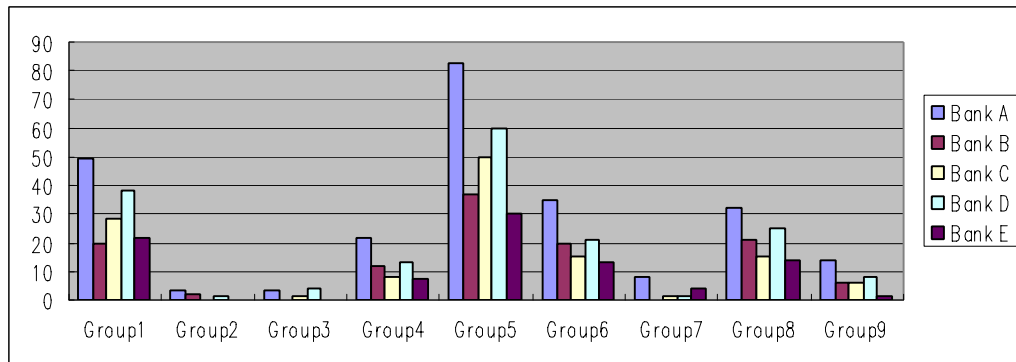


Fig 3. The graph of the relationship between area characteristic and branch distribution

**5. Conclusions and Discussions**

It is clear from the results of this study that the relevance between area characteristic by social class and distribution characteristics of existing branches of five major banks in Tokyo 23 wards. A lot of branches of five major banks are located in Group5 (high class). And, although the order is different, most of branches in five major banks are located in Group1 (the elderly & life style stability), Group8 (spending power), and Group6(instability of life ).

The result also shows that the five major banks in Tokyo 23 wards have a about the same branch

location tendency. Therefore, it can be inferred that there are active competitions in Tokyo 23 wards.

Overall, the methodology used in this study using GIS is regarded as a process that is necessary for identifying the relevance of market characteristics and bank branch location for making efficient bank branch marketing strategies; however, the second stage of this study may have some problems of overlay analysis to get an more accurate result. In other words, verification of the results of buffer analysis such as Fig.4 as well as using join function in overlay analysis better than one way or the other in more precise terms. Further work will reveal whether this is the case or not.



Fig. 4. Buffer analysis

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