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Assessing the potential number of ATMs in banks, financial and credit institutions using Analytic Network Process (ANP) and Gray Clustering Analysis (GCA) Case study: between Enghelab Sq and Ferdowsi Sq-Enghelab Street of Tehran

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Extended abstracts

1- Introduction

Most organizations and financial institutions are facing with spatial decision makings. Optimum decision making affects the institutes' success, achievement to their objectives and attracting customers. Modern banking services have evolved by the development of modern technologies. The most sensible aspect of banking services evolution is based on using the modern technologies of ATMs. The rapid growth in application of these devices could have been

caused by the increasing acceptance of them among customers (Foukerdi, 2005: 2).

Because of the same reason, in spite of the high costs of purchase, initiation and maintenance, banks, financial and credit institutions are still interested in the development of ATMs. On the other hand, inattention and mismanagement in site selection and the number of such devices could be effective in failure of these systems. Selecting the optimum and most proper location to install the ATMs takes into account with respect to various factors that have different impact factors. Economical zoning of the cities for selecting potential and capable locations of such activities is assumed as the success agent of institutions and is a powerful method for future decisions. Therefore, the overall purpose of this research is to provide a model for economic zoning to install the services and facilities of banking system (ATMs). The research type is developmental- applied and the research

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method is descriptive-analytical. In the first step, effective economic factors in banking system were specified throughout library studies (previous studies) with respect to research purposes, then it was supplemented by expert's viewpoints, also, spatial data were obtained from area by surveying with respect to relevant criteria. Weight of each criterion was specified with Analytic Network Process (ANP) after supplement of couple comparison circular by experts and it was used in Gray cluster analysis for spatial modeling and zoning based on radius of influence. The Software "Super Decision" was used for computations of ANP mode and ArcGIS9.3 was used for spatial analysis and modeling. Then current state of bank departments' installation and their ATM numbers were analyzed and eventually the model was evaluated based on field observation and expert's viewpoints. This process was conducted on 153 branches of 22 banks in part of Tehran city, including regions 6, 11 and 12, that is focused.

2- Theoretical bases

Electronic banking is one of the substantial aspects of the revolution in ICT in economy (Goodarzi & Zobaidie, 2008: 114). Experts believe that the banks' best strategy for competition in future world is to equip with IT and electronic servicing. Over the past two decades, significant growth of the clients' welcome to the electronic banking services has forced the banks to exert and propose a new culture of banking

services in community by electronic banking. One of the most important technical innovations in this regard is the invention of Automated Teller Machines (ATMs). The importance of the applicability of these machines is due to their different financial services, from cashing to bills payment, without a fulltime cashier or other fulltime staffs (Foukerdi, 2005: 3, 4 & 15). Clients prefer to use ATMs services instead of going into bank branches because the banks are overcrowded. However, this occurs if these machines are working properly and are in the suitable location (Bamdad & Rafie, 2009: 41 & 42). The proper location has a significant role in the increasing acceptance of ATMs.

3- Discussion

The research implement stages to achieve its goals are:

The first step: In order to identify the economic criteria and sub-criteria in economic classification, some questionnaires were provided after library studies and the assessment of researchers were carried out earlier (Goli & et al, 2010: 99), then the questionnaire was supplemented by experts and their relationships was identified.

The second step: codification of the ANP model

In this step, the weight of each criterion and sub-criterion was specified using Analytic Network Process model.

Final weights of each criterion and sub-criterion using ANP model

Transport and Traffic		Municipal Services and Facilities				Demand/Consumption	
Transport	Traffic	Educational and Cultural	Administrative	Recreational	Sanitary and remedial	Population	Economic and Commercial
0.167398	0.089672	0.044711	0.113113	0.061166	0.154034	0.105218	0.264687

The third step: spatial modeling and classification using the Gray method.

In this step in order to determine the potential influence radius of an ATM in a given area a model proposed by Kyter were used to select the location of ATMs and the study area was zoned in four classes using Gray method.

4- Conclusion

Class one is the most suitable economic class for placement of bank branches and offering their services and facilities (ATMs) due to the high influence radius. Other classes are in a lower level of economic importance respectively. The results show, regardless of pathways status, more than 22 percent of study area is in class one and 21 percent is in class two and proportions of classes three and four are 31 and 27 percent, respectively. This classification helps bank managers, programmers and financial institutes to analyze the region to specify the economic proper places for construction of new branches and installation of ATMs. The results of banks and ATMs assessment in the district, by adding their information layers on the final map showed that 43 percent of banks, financial and credit institutes are in class 1 and other classes encompassed 11, 27 and 19 percent of branches respectively. Current installation of 153 branch of 22 banks and financial and credit institutions with the number of ATMs of each branch in the four classes are displayed in tables. Results from these tables help bank managers and programmers of financial and credit institutes in recognition of their current status against other competitors to current and future programming. It also helps them in allotting the ATMs to each of branches according to the location of the ATMs located or modifying them in unfavorable branches and transfer to other branches. Moreover, based

on field studies and experts' polls, the model was evaluated which 67 percent of the experts assessed it very proper (very proper) and 33 others assessed it proper (good). Furthermore, to determine the homogeneity between the results derived from the model and the field studies, the Gamma coefficient was calculated which indicated a coefficient equal to 0.893.

5- Suggestions

According to the importance of banks and financial and credit institutions and their increase along recent years and their dependence to the establishment site, few studies about the importance of location decisions and its influence on banking system and financial and credit institutions have taken place. The model presented in this study assesses the ATMs of each bank branches with regard to their installation location and determines the criteria used in it with respect to the study scale. This discussion needs to be studied in other levels such as province and then for each county to allocate banking services and facilities by identifying the effective factors in each level against other competitors while analyzing current status and gain highest profitability. Other important subject in this context is improper distribution of bank branches and facilities offered by the banks to their clients that causes a loss in their customer level. Some studies seem to be required in context of spatial distribution.

Keywords: bank and financial and credit institution, ATM, Analytic Network process (ANP) and Gray Cluster Analysis (GCA)

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