

An Empirical Approach to Evaluate Management Performance Using a Trading Area Analysis: Focus on Small and Medium-sized Retail Businesses*

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Abstract

Purpose – This paper proposes measurement models to evaluate the management performance of small and medium-sized retail businesses on the basis of a trading area analysis that compares their proposed revenue to actual revenue in the trading area.

Research design, data, methodology – The study proposes measurement models consisting of five stages, namely: (1) district background survey, (2) customer survey, (3) competitor survey, (4) business district survey, and (5) business performance analysis.

Results – To identify business districts easily, this study preferred a minor-adjusted method based on the Euclidean distance, as it is simple to employ for the small and medium-sized businesses. This model was applied to select coffee shops in Daejeon. Results indicated that although the targeted shop was not located in an appropriate location, actual sales were higher than expected.

Conclusions – Small- or medium-sized retail businesses face difficulties regarding the economies of scale and brand recognition and must choose an appropriate location to ensure management stability. However, such businesses will find it difficult to evaluate their competitive edge accurately using a trading area analysis.

Keywords : Trading Area Analysis, Management Performance Evaluation, Small- or Medium-sized Businesses

JEL Classifications : L81, R12.

1. Introduction

The retail industry directly facing customers tends to grow its size and industrialize as the distribution market opens more. This makes business environment for the self-employed businesses difficult to re-

alize the scale economics even worse. However, it is true that the number of small- or medium-sized businesses foundation has gradually increased due to sagging economic recession and unstable employment. An analysis on actual conditions of small business by the SMBA (Small & Medium Business Administration, 2007) states that most people who established their own businesses with no alternative accounted for 79.3% (Table 1). An analysis on actual conditions of small business foundation and financial structure improvement fund users, published by SMBA (2001) pointed out that fewer sales because of economic stagnation and keen competition in same business type were the major difficulties in business administration. More active government supports are required because small- or medium-sized businesses have very dire environment (Yun & Jeong, 2011). Site, commodities and management capability are the three key factors for success in the retail establishment and it is known that the site is the most important (Kim, 2011). The location selection is a crucial factor in the retail industry and every more for self-employed businesses. This study analyzes the trading area easily applied for small- or medium-sized business which sell similar products and proposes methods of evaluating management performance by comparing theoretical revenue to the actual figures in the trading area.

Therefore, the study proposes an analysis model easy for small- or medium-sized businesses to adapt and investigate real cases based on the model, rather than macroscopic location analysis or precise location attractive analysis through variable sophistication. First, the study chooses small- or medium-sized private shops for analysis and determines theoretical business district ranges considering the area of the shop and the distance from competitors. Based on this, the study predicts the number of customers in a district and proposes how to evaluate competitiveness of the shop and location appropriateness by comparing the prediction to actual customers

<Table 1> Motives of Small Business Foundation

Motives of business foundation	Support living lives (no alternative available)	Judge success possibility by business foundation	Take over family business	Major areas	Miscellaneous
Proportion	79.3%	16.4%	2.1%	0.5%	1.7%

Source: An Analysis of Actual Conditions of Small Business published by Small & Medium Business Administration (2007).
 Recited from Yun & Jeong (2011).

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<Table 2> Major difficulties to run small businesses

Item	Number of business	Ratio (%)
Keen competition in same business type	111	26.0
Less sales because of economic stagnation	225	52.7
Shortage of fund in accordance with business expansion	55	12.9
Shortage of experience and knowhow	15	3.5
Others	21	4.9
Total	427	100

Source: An analysis on Actual Conditions of Small Business Foundations and Financial Structure Improvement Fund Users, published by Small & Medium Business Administration (2001).

Recited from Yun & Jeong (2011).

2. Related Works

The law of retail gravitation is a traditional trading area analysis based on the law of gravitation that the attractive force between two materials are proportional to the product of the masses of the two materials and inverse proportion to the square of the distance (Reilly, 1929, 1931). The law may be summarized that the portion of retail sales of a small city from two competitive cities is proportional to the population of the two and inverse proportional to the square of the distances from the small one between the two. Then, Converse developed applied the Reilly's equation to solve the boundary of the location (Converse, 1949) and Ellwood replaced the distance and the population in the Reilly's equation with the travel time and floor spaces to calculate the rate of attracting purchase from a wholesale/retail area (Ellwood, 1954). Meanwhile, Huff suggested that there needed to implement probabilistic approaches, rather than existing deterministic ones because customers tend to visit several stores, not frequently visit one store when they have a lot of alternative shops (Huff, 1962, 1964). Applebaum(1968) proposed the method of configuring business district called the C.S.T. (Customer Spotting Technique) through empirical studies on supermarkets. The Huff's probabilistic method has been developed to the MCI (Multiplicative Competitive Interaction) or the MNL (Multinomial Logit) model which evaluate utility functions by substituting attractive factors of a shop including the floor area to assortment, atmosphere, parking lot, service quality and price or the proximity shown by distance to a shop to traffic cost or convenience (Nakanish & Cooper, 1974; Arnold, Roth & Tigert, 1980; Davies & Rogers, 1984; Birkin & Clarke, 1991).

Studies related to the location analysis have been robustly performed in Korea mainly focused on large distribution channels or department stores (Lee, 1998; Lee and Kim, 2000; Lee and Park, 2004; Lee, 2004; Lee et al, 2006; Kim, 2010; Lee & Yuh, 2010; Kim & Ahn, 2010) or location analyses of restaurant franchises (Lee, 2009). These studies further categorize attractiveness and efficiency represented by floor area and distance, respectively. Measuring distances which evaluates proximity includes using the GIS (Lee & Kim, 2000; Lee et al., 2006; Kim, 2010; Beck, 2001), navigation like the Internet

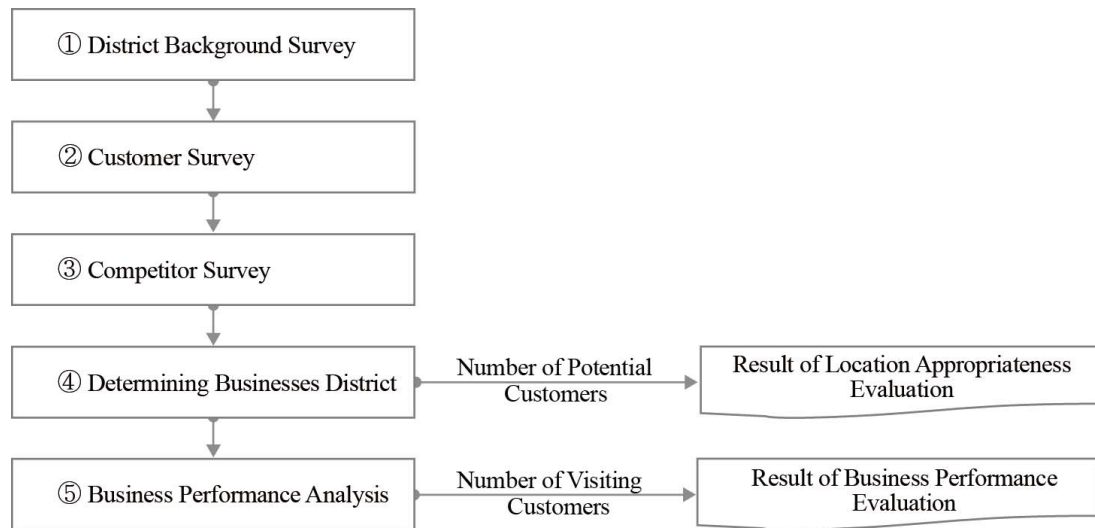
(Tae and Rhim, 2010), or more complicated parameters (Lee, 2011) is under variable sophistication. The studies may be helpful in more precisely defining trading area but are too difficult for small- or medium-sized businesses to apply. A common hypothesis found in the previous studies related to the location analysis is that each shop in a district may be selected by customers and the possibility tends to show that higher attractiveness increases selection probability and farther distance lowers efficiency, as well as the probability. In the aspect of competitiveness for each store, it means that the current competitiveness of a shop decreases if it has fewer customers than that in a theoretic business district. Meanwhile, the number of visiting customers would be larger if the shop has a high competitive edge.

Meanwhile, small- or medium-sized businesses face fiercer competition after the distribution market opens. It is evaluated that most traditional markets, clusters of the small- or medium-sized businesses have no exception(Lee et al., 2011). Kim (2004) states that the markets show rapid downturn due to failing to face rapid environmental changes and that is why phenomena including expanding retail distribution, fierce competition by entering multi-national distributors in the Korean market and introducing advanced marketing and management methods. Traditional markets have gained supports for modernization since the Participatory Government and various studies have been performed to level out various issues (Kim, 2004; Kim et al, 2009a; Kim et al, 2009b; Lim et al, 2011; Jung et al., 2006; Choi & Yoon, 2008; Yang et al., 2011). However, supports for the self-employed small- or medium-sized businesses that fail to establish their influence areas are insufficient despite their poor environment. What is more it is difficult to find studies about trading area for small- for medium-sized business except recent few works (Kim et al., 2012; Park et al., 2012). In this paper, trading area analysis is performed for small- or medium-sized businesses which have already located in some place and no plan to move for the time being. Most simple method to evaluate management performance is also presented based on this analysis.

3. Management Performance Evaluation through Business District Analysis

3.1. Management Performance Evaluation Model through Business District Analysis

The purpose of the study is to develop a model for location appropriateness and management performance measurement model which may be easily applied to the location for small- or medium-sized businesses Therefore, the study focuses on proposing the evaluation model rather than developing a new theory or sophisticating existing theories and evaluate the properness of the model by introducing it to actual shops. The evaluation model proposed in the study uses methods easily applied to the site and begins with background investigation in which the stop is located. Then, visiting frequency, major item purchase and average money spent are collected through custom-



<Figure 1> Proposed model to evaluate business performance based on the result of trading area analysis

er survey on visiting customers evaluate outline attractiveness with residential areas. The competitor location analysis surveys locations and floor areas of the same/similar businesses in the business district. Then, the business district is outlined based on competitor locations and the study defines the districts using the Euclidean distance and floor area. For the convenience, the study utilizes the exclusive business district model rather than the Huff's probabilistic theory and visually redefines the district area using the location map after outlining the business district. Here, the study checks the number of potential customers considering the residential or floating population in the district and evaluates the location properness by reviewing break-even point of the shop. Finally, the study compares the numbers of actual visiting and potential customers and analyzes the management performance, as well as business performance. Fig. 1 below depicts the proposed model.

3.2. Major Activities of the Proposed Model for each Phase

3.2.1. District Background Survey

It is a stage which investigates general environment of a shop for analysis. Surveys on local population and ratio shall be performed because the robustness of a local business district is closely related to the population and the population ratio of the location. Also, surveys on floating population in that area shall be performed. The population or ratio means potential sales in the area and the floating population is closely linked to the current sales. The expected revenue may be calculated by introducing the population information with references like average consumption of major items in the shop. The actual revenue depends on attractiveness of the shop or local features. However, calculating sales forecast is valuable information in investigating the initial point. The study is for small- or medium-sized business and the survey range of customer visit is not relatively large. In particular, most business districts in downtown are separated by large streets when main customers visit the shop on foot. Also,

the areas under analysis shall be confirmed by site survey or maps because the categories based on administrative districts and business districts may not coincide with.

3.2.2. Customer Survey

It is the stage which investigates major inputs of the proposed model for customers of the shop. The survey investigates visiting frequency, major purchase items, average money spent and residences. The information from the phase is used for attractive evaluation, as well as a crucial input in the future business district determination. Also, the survey results of purchase characteristics of customers may be used with residing or floating population from the background stage as an important factor in evaluating expected revenue.

3.2.3. Surveying Competitors and Determining Business District

The competitor survey investigates distances between the shop and its competitors, sales revenues and areas of the competitors. The actual revenues of competitors may be very useful in evaluating business performances or location appropriateness. However, it is very difficult to achieve the information. Meanwhile, it is relatively easy to acquire external information including distances or areas of the competitors. The study focuses of achieving and utilizing external information considering availability in the site.

The first law of Converse (1949) or the Applebaum's C.S.T. method (1968) is widely used to estimate business district of nearby two cities of (X, Y) . As shown in the Equation (1), the first law of Converse defines a business district based on the distance $(D_{X,Y})$ and the population of the two cities (P_X, P_Y) . That is, the equation judges that the attractiveness depends on the population and the district range is expanded with more population. Meanwhile, the latter method in the Equation (2) represents the district limit as time and assumes that the attractiveness depends on the area (M_X, M_Y) . The model defines the time (H_X) to the business district in the city X based on the traffic time $(H_{X,Y})$ and the area.

$$D_X = \frac{D_{XY}}{1 + \sqrt{\frac{P_Y}{P_X}}} \quad \text{<Eq. 1>}$$

$$H_X = \frac{D_{XY}}{1 + \sqrt{\frac{M_Y}{M_X}}} \quad \text{<Eq. 2>}$$

However, the Equation (1) is not suitable because it uses the population as attractiveness and the study is not intended to define the business district among cities. Even worse, the Equation (2) defines the business district based on the traffic time among the cities and is not good for direct application to the study intended to define the district with Euclidean distance among competitors. Therefore, the study applies the Equation (3) below which uses the Euclidean distance (D_{XY}) and shop area (M_X, M_Y) to define the business district for convenience.

$$D_X = \frac{D_{XY}}{1 + \sqrt{\frac{M_Y}{M_X}}} \quad \text{<Eq. 3>}$$

Actual models which define business districts may be more sophisticated. Commonly found fact from previous studies is that the attractiveness of the shop is related to the area and the distance of the shop. The Euclidean distance among shops is used for a wide area. However, abovementioned, various measurements including the GIS or navigations have been introduced. It is known that physical, as well as psychological distance matters for the actual distance among shops. Customer routes depend on streets and it may be said that the traffic time is closer to the psychological distance. Lee (2011) states that unpleasant facilities on the route increase the psychological distance and affect establishing business districts according to the Huff's model.

The measurement is difficult to apply to individual small- or medium-sized businesses. Therefore, the study introduces the Euclidean distance but more proper to introduce accurate measurements if possible. The study applies the Euclidean distances among shops to determine business districts, as well as modifying district range visually using nearby facilities. It is because people tend to avoid obstructions (large streets, obstructions, and etc.) on their routes even though traffic time matters (Lee, 2011). Once the business district is defined through the processes, expected sales revenues for each store may be calculated using the information and it shows the location appropriateness for the shop.

3.2.4. Management Performance Analysis

The management performance may be evaluated the number of visiting customers against the potential figures. Generally, the location appropriateness depends on the number of the potential customers. Meanwhile, it is proper to measure the management performance based on how many potential customers turn into actual ones. The

location appropriateness is evaluated by residential and floating population in the business district in the abovementioned competitor survey and district determination phases. Here, the management performance is analyzed based on the actual number of visiting customers. It may be judged that the shop shows excellent management performance if it has more actual customers than the potential customers.

4. Case Analysis

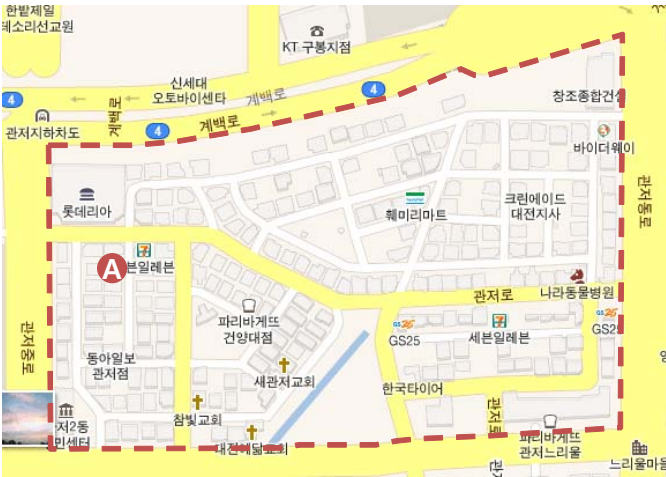
4.1. Selecting Shops for Analysis, Surveying District Background and Customers

Coffee shops in Daejeon are selected to apply the analysis model proposed in the study. Gwanjeo-dong, where the shops under analysis are, is located in the southwestern part of the city and a little bit far from the downtown, causing to form a relatively independent business district. During the survey, it is found that the deposit of an existing shop with 120m² size ranges 50 - 80 million KRW and monthly rental fee is between 1.50 and 2.20 million KRW. Also, the demographic figure shows that most people in the area are parents in the early 30s to early 40s and their children. However, the portion of 20s largely increases due to a medical university in the area. Table 3 below summarizes the overall demography in the area. In addition, the area is highly likely to be developed because subway line No. 2 opens, Doan New Town develops and a large mall with 350,000m² area opens.

<Table 3> Demographical profile

Age	Male	Female	Total
	16,329	17,321	33,650
Under 10	2,617	2,466	5,083
10 ~ 19	3,321	3,214	6,535
20 ~ 29	1,488	1,659	3,147
30 ~ 39	2,886	3,764	6,650
40 ~ 49	3,566	3,262	6,828
50 ~ 59	1,396	1,378	2,774
60 ~ 69	633	773	1,406
Over 70	422	805	1,227

The shop opened in 2008 as the first coffee shop here and there are a total of 9 shops including 4 individual and 2 similar shops. Therefore, it is judged to have a fierce competition overall. It is judged that the access to the shop is limited on foot because it is physically separated from large streets as shown in Figure 2. The trend is confirmed in the actual customer survey. The location is surrounded by offices and restaurants and has a constant floating population on weekdays and weekends. Ⓐ with red circle in Figure 2 is the shop for analysis and Table 4 shows the floating population from both entries of the shop during the business hour.



<Figure 2> Layout of analyzing district



<Figure 3> Illustration of branchpoint with competitors

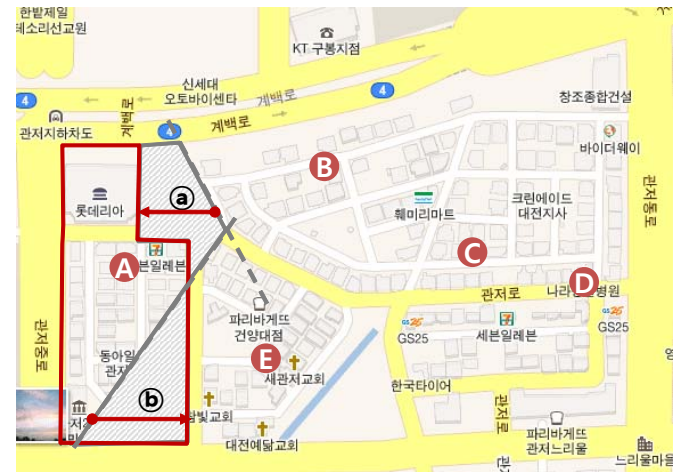
<Table 4> Profile of floating population on the target district

Standard	Floating Population	Male		Female	
		Weekend	Weekdays	Weekend	Weekdays
Entrance 1	10s	88	42	81	56
	20s	49	73	42	121
	30s	52	31	61	94
	40s	61	51	69	79
	Over 50s	37	45	37	32
Entrance 2	10s	53	42	61	49
	20s	15	27	24	27
	30s	14	33	72	51
	40s	40	41	75	63
	Over 50s	38	37	46	35

cluded because they are not direct competitors. The business district defined here contains roads avoided on actual routes and Figure 4 shows the redefined business district of the shop ① after reflecting the issue. Usually roads are major obstructions for customer's accessibility (Lee, 2011). So, the district is redefined by shrinking the area ① where people cross the road to visit the shop and expanding the area ② where people cross the road to visit its competitors.

4.2. Competitor Survey, District Determination, Management Performance Analysis

Table 5 shows the areas of and distances from the shop (unit: m) after selecting 4 competitors in the district for the survey. The actual competitors are spotted on the map based on Table 5 and Figure 3 shows nodes from the shop ①.



<Figure 4> Final adjusted trading area

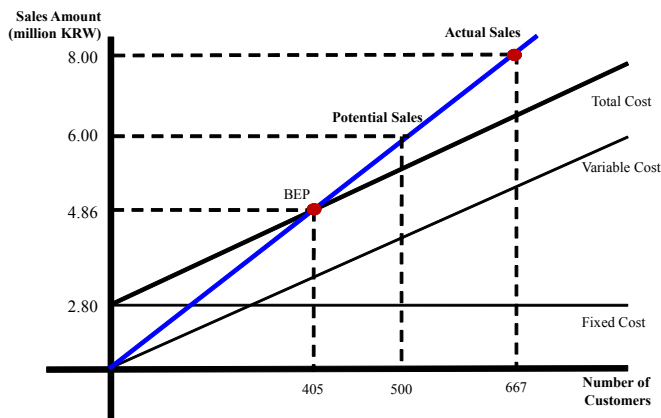
<Table 5> Calculation result of branchpoint with competitors

	Shop ① (26.4m ²)	Shop ② (33.0m ²)	Shop ③ (26.4m ²)	Shop ④ (33.0m ²)	Shop ⑤ (49.5m ²)
Shop ①	-	170 (80)	290 (145)	-	130 (55)
Shop ②	-	-	150 (79)	-	165 (74)
Shop ③	-	-	-	95 (45)	200 (84)
Shop ④	-	-	-	-	280 (126)

Then, a polygon of 1-2-3-4-5-6-7 is formed by points (1 and 7) from the large map, node from the competitor ②, points (3 and 5) from the node with the competitor ⑤ and the points (2, 4 and 6) by the perpendicular from the node. Here, competitors ③ and ④ are ex-

There are about 500 adults in the adjusted business district and 1,500 cups of coffee will be sold if they drink 3 cups of coffee a month (The trade statistics released by the Korea Customs Service shows that a Korean adult drinks 3 cups of whole bean coffee a month). As shown in figure 5, expected sales revenue would be 6 million KRW/month considering that it costs 4,000 KRW for a cup. The BEP (Break-even Point) considering fixed and variable costs for the shop is estimated 4.86 million KRW/month and the net profit would be 1.14 million KRW/month, indicating that it is not a good location. Also, the actual monthly revenue of the shop is higher than expected, 8 million KRW/month. This means that the customers consume more coffee than average or there may be additional customers outside the district. In conclusion, it suggests that the management

performance of the shop is excellent.



<Figure 5> BEP and actual sales amount

5. Conclusion

The study proposes the management performance model through the business district analysis which may be easily used by small- or medium-sized businesses and a simple analysis is performed for the actual shop. Propose method is consist of five stages which are 1) district background survey, 2) customer survey, 3) competitor survey, 4) determining business district, and 5) business performance analysis. Case study for a small-sized business is also performed. The study investigates background district where the shop is located and understands general characteristics through customer survey. Then, surveying competitors in the location define the initial district and the district is readjusted considering obstructions or unpleasant facilities in case of approaching. The number of potential customers or expected revenues is estimated using the defined business district and the location appropriateness is evaluated considering costs for the shop. Finally, the management performance is measured considering the forecast and actual revenues.

As a result, the management performance is evaluated excellent because the actual revenue highly exceeds the forecast even though the location is not good due to a small gap between the BEP and the forecast for the shop. The main difference between other works will be easiness to use. The purpose of the study is to develop a model for location appropriateness and management performance measurement model which may be easily applied to the location for small- or medium-sized businesses. Therefore, the study focuses on proposing the evaluation model rather than developing a new theory or sophisticating existing theories and evaluate the properness of the model by introducing it to actual shops.

However, the study has some limitations. There is no way to find out whether the difference between the forecast and the actual figure comes from additional customers outside or sales more than average without tight customer survey. Also, it is difficult to define accurate business district due to using the Euclidean distance, rather than actual one and the exclusive business district does not coincide with

the actual visiting frequency of customers.

However, it is meaningful that small- or medium-sized businesses which may have difficulties in evaluating their revenues and business performance under the circumstances, as well as proposing a business analysis model which may be referred to various businesses.

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