

FEASIBILITY STUDY OF SITE SELECTION USING GE-MATRIX MAPPING WITH MARKET ATTRACTIVENESS PARAMETERS AND FINANCIAL PROJECTION PARAMETERS IN SMALL AND MEDIUM ENTERPRISES

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Abstract

Opening a new business network is a complicated matter, because it can affect the sustainability of the business. This is a fairly large investment decision, because in addition to being able to increase market share and grow a business, opening a business network also has a risk of failure. It depends on the ability of management to see the location potential, market potential, market competition and management ability to conduct business feasibility analysis. Therefore, a feasibility study of site selection is needed in determining business locations from alternative locations. The research method used is a case study with a qualitative approach to the research object, GE-Matrix was chosen to be a tool in decision making with parameters that have been modified using market attractiveness parameters and financial projection parameters. Feasibility studies of site selection are conducted on location aspects, market potential aspects and territory aspects, competition aspects, risk aspects, and financial projections such as: BEP, Payback Period, and Profitability Index. The study was conducted at one of the SME's in Bandung. Furthermore, the results of the feasibility study using GE-Matrix mapping obtained is positive recommendations with a high score, the business location chosen is eligible to be opened

Keywords: Feasibility Study, Site Selection, Market Attractiveness, Financial Projection, GE-Matrix Mapping

Introduction

Industrial site selection is critical point in the process of starting, expanding or changing the location of industrial systems of all kinds. One of the main objectives in industrial site selection is finding the most appropriate site with desired conditions defined by the selection criteria (Rikalovic et al., 2014). Opening a new branch in business is a major investment decision for SMEs, besides having the opportunity to increase market share and grow a business, opening a new branch also carries a risk of failure. (Alamsyah, 2019).

In this study, researchers tried to measure the feasibility of business locations for SMEs, which relatively determined decisions were not based on data. Several researchers have focused their attention on the location decision of high technology industries. In an exploratory study of Mexican and US electronic firms, De Noble and Galbraith (1992) suggest that high technology location behavior is related to the competitive strategy of a firm, the country of location, and to a certain extent, the form of ownership. Although the availability of a skilled and productive workforce was a major factor, firms competing with "differentiation" strategy looked for technical and ambiance advantages in a location, while firms competing with a "cost" strategy considered input factors more important (Karakaya & Canel, 1998).

It is generally argued that the characteristic of service business and manufacturing obviously differs. The main differences are regarding time of production and consumption considerations. Service businesses traditionally have been thought to be locationally connected to markets (Indarti, 2004).

Mac Cormack (1994) suggests that the location decision framework used by managers predominantly emphasizes quantitative analyses that trade off transport costs, scale economies, and other cost-based variables. Such a focus, while yielding short term cost benefits maybe poor in terms of other measures of competitiveness like lead time, inventory, and responsiveness. In other research, the question of how effective past location decisions are enhancing the competitiveness of global supply chains. This question is of consequence to both practitioners and academics (Bhatnagar & Sohal, 2005). There are many biases which should deter analysts from making a rigorous statistical analysis. Databases become obsolete very quickly (Moriset, 2003). Therefore, researchers try to use Market Attractiveness and Financial Projection factors to fill the gap in study.

The strategic impact of non-economic factors on business site selection is recently being recognized in domestic location decisions as well. For example, in the recent decision for Amazon's second headquarters, the company has listed both economic factors and non-economic factors such as capital and operating costs, incentives, cultural community fit, and quality of life (Dixit et al., 2019). Qualitative issues such as social and political factors are also influential in many international location decisions (MacCarthy & Atthirawong, 2003).

Developing expertise in industrial site selection is a big business when measured in terms of budgets committed, stature of decision makers involved, size of communities affected, or prosperity of the community influenced. Such optimization often involves numerous decision factors, which are frequently

contradicting, and the process often involves a number of possible sites each has advantages and limitations. (Eldin & Sui, 2003).

Investment decisions are made after a complete analysis of the investment project. One of the basic factors that influence decisions is the risk factor of investment. This risk exists because it is uncertain that investment costs will recover and profits will be obtained. (Virlics, 2013). In decision making processes, people are focused on expected utilities, rather than expected values. (Roy, 2012) Therefore, before business owners make investment decision, they should conduct a feasibility study in their investment.

Feasibility study is a tool that is able to be taken into consideration in making a decision to accept or reject an investment proposal in building or establishing a project / business plan (Aziz et al., 2017). One of the objectives of the feasibility study is to overcome the risk of loss in the future, because there are uncertain conditions that arise in the future. There are uncertainties that can be predicted will happen or things that are completely unpredictable. In this case, the function of the feasibility study is to minimize unwanted risks. In addition, the purpose of the feasibility study is to facilitate planning, implementation of work, supervision and control of the project / business undertaken.

This paper presents a decision support system in which GE-Matrix was chosen to be a tool in decision making with parameters that have been modified using market attractiveness parameters and financial projection parameters. Feasibility studies of site selection are conducted on location aspects, market potential aspects and territory aspects, competition aspects, risk aspects, and financial projects such as: Breakeven Point (BEP), Payback Period (PP), Net Present Value (NPV), and Profitability Index (PI).

Multi-attribute decision making methods are data-oriented. Multi-attribute techniques are referred to as discrete methods because they assume that the number of alternatives is explicit. Multi-attribute decision problems require that choices be made among alternatives described by their attributes. This implies that attribute-objective relationships are specified in such a form that attributes can be regarded as both objectives and decision variables. Attributes are used as both decision variables and decision criteria. (Rikalovic et al., 2014).

Research Methods

This research is a case study in SMEs, in calculating financial projections and assessing market attractiveness, making assumptions in the business location selection plan. Planning would be impossible without assumptions. Wild guesses should never be made in formulating strategies, but reasonable assumptions based on available information must always be made. (David & David, 2017).

By identifying future occurrences that could have a major effect on the firm and by making reasonable assumptions about those factors, strategists can carry the strategic-management process forward. Assumptions are needed only for future trends and events that are most likely to have a significant effect on the company's business. Based on the best information at the time, assumptions serve as checkpoints on the validity of strategies. If future occurrences deviate significantly from assumptions, strategists know that corrective actions may be needed. Without reasonable assumptions, the strategy-formulation process could not proceed effectively. Firms that have the best information generally make the most accurate assumptions, which can lead to major competitive advantages. (David & David, 2017).

In such way, the total number of available sites, the customer is aware of a certain number of them. Of these, only a certain number of locations meets the selection criteria of the decision maker, so that makes group of sites for consideration.

The presented system benefits decision makers by providing an advisory expert system that recommends the proper values for the desired selection criteria. Parameters component considers the analyst's prioritization of the non-spatial attributes to select the most suitable site among the identified alternatives. The system produces a mapping of alternative locations that can help the owner to make a decision.

Financial condition is often considered the single-best measure of a firm's competitive position and overall attractiveness to investors. Determining an organization's financial strengths and weaknesses is essential to effectively formulating strategies. A firm's liquidity, leverage, working capital, profitability, asset utilization, cash flow, and equity can eliminate some strategies as being feasible alternatives. Financial factors often alter existing strategies and change implementation plans. (David & David, 2017).

Site selection was based almost purely on economical, and technical criteria. Today, a higher degree of sophistication is expected. Selection criteria must also satisfy a number of social and environmental requirements, which are enforced by legislations and government regulations. The process selection of industrial site means complex multi-criteria analysis which includes a complex array of factors involving economic, social, technical, environment and political issues that may result in conflicting objectives. (Rikalovic et al., 2014). The process of site selection begins with the recognition of an existing or projected need. This recognition triggers a series of actions that starts with the identification of location alternatives of interest.

Some of the issues that add to the complexity of the site selection process include existence of: a) a large number of possible sites, b) requirements that could result in contradicting objectives, c) intangible objectives that are difficult to quantify, d) diversity of stakeholders and their priorities, and f) uncertainties regarding future issues that could impact of the validity of today's decisions (Eldin & Sui, 2003).

The valuation aspect is the financial aspect, location aspect, market and marketing aspect, economic aspects and technical/operational aspects. The valuation aspect used in the business location analysis system using GE-Matrix on the X axis is the financial aspect using financial projections while on the Y axis using the business location aspects and market and marketing aspects. While economic aspects and technical / operational aspects are explained based on calculations in financial projections.

The stages in the process of site selection are data collection, making assumptions and feasibility studies, weighting, determining ratings on each aspect, scoring, mapping using GE-Matrix, and giving recommendations from the mapping results.

The process of site selection includes (Rikalovic et al., 2014):

1. Establishing a set of influential factors relevant to site selection,
2. Predicting and evaluating the intensity and direction of their effects in time and given conditions,
3. Evaluation of possible variants of solutions and selection of optimal variant.

The most significant factors that describe decision problems or affect the choice and implementation of MCDA methods the most significant: Number of decision makers, Number of objectives, Number of alternatives, Existence of constraints and Risk tolerance

Data Collection

Data collection in this study was taken from various sources information, namely: (1) Interviews conducted with SME owners, local communities, business actors, business location owners, local government parties (2) Focus Group Discussion (FGD) conducted with SME owners, to find out the plan and composition of location investment costs business (3) Field survey (4) Secondary data from the government and business owners.

Collection of information allows the generation of a potential industrial sites that can be grouped, while the use of certain criteria, through several iterations, gradually narrowing to a choice

Making Assumptions and Feasibility Studies

After data collection, assumptions are made in the calculation of financial projections and assess market attractiveness. After that, the data is processed and the location feasibility study is carried out which must cover all aspects of the assessment, namely: market and marketing aspects, business location aspects, financial aspects, technical / operational aspects and economic aspects.

Weighting, Determining Ratings on Each Aspect, Scoring

Ranking to relative attractiveness (1 = most attractive, 2 = next most attractive, etc.) is a commonly used procedure to help determine which actions to fund.

The process of determining ratings and scores is data processing according to the data that has been collected. whereas the weighting of each indicator is:

Table 1. Percentage Variable Factors for X Axis and Y Axis

	X Axis		Y Axis	
BEP	35%	RA	30%	
PP	30%	SA	15%	
NPV	25%	MF	25%	
PI	10%	SD	10%	
		CM	20%	
Total	100%	Total	100%	

Giving Recommendations From The Mapping Results

The results of mapping business locations determine alternative strategy suggestions. Furthermore, the advice is submitted to the SME owner for the decision to determine the location of his business.

Result and Discussion

In determining site selection, GE-Matrix mapping evaluates location alternatives. GE-Matrix divides mapping positions based on market attractiveness and the level of financial projections will be described in several segments and blocks.

Based on the picture above, the combination of the X-axis and Y-axis and finally produce different suggestions, namely: Location feasible to open, suggestions for reallocation, suggestions for relocation and suggestions for locations not opened.

The matrix provides a systematic approach for the multi business corporation to prioritize investments among its location alternatives.

Site selection can be done in accordance with strategic objectives and can increase profits, then the alternative location will be analyzed with market attractiveness parameters and financial projection parameters. The factors calculated in financial projections are: (1) labor costs per month (2) location Costs per

month (3) general costs per month (4) Amortization Costs for Monthly Leases (5) Depre-ciation Costs for Fixed Assets and Inventory Per Month (6) Total Investment Cost (7) Total Monthly Cost (8) Calculation of sales assumptions (9) Profit Margin Calculation (10) Breakeven Point Calcula-tion (11) Calculation of Payback Period (12) NPV and PI calculations, and then (13) Determination of X-axis and Y-axis Rating and Scoring.

The results of the mapping that have been processed can be seen in the following figure:

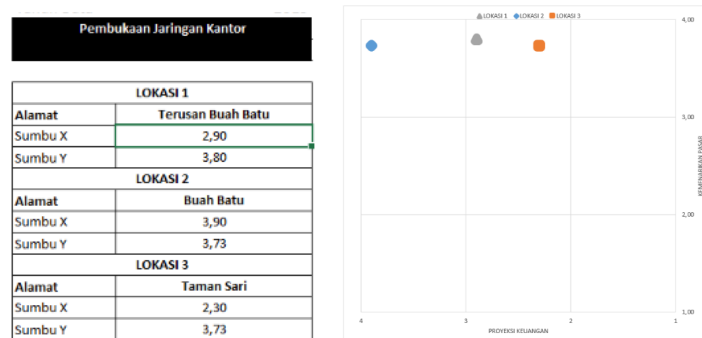


Figure 1. Result Mapping

The results of data processing and mapping of determining business locations using GE-Matrix are as follows:

Table 2. Result Mapping

LOKASI 1	
Segmen	1 Buka Cabang
Skor Kemenarikan Pasar	3,80
Skor Kekuatan Bisnis Unit	2,90
LOKASI 2	
Segmen	1 Buka Cabang
Skor Kemenarikan Pasar	3,73
Skor Kekuatan Bisnis Unit	3,90
LOKASI 3	
Segmen	1 Buka Cabang
Skor Kemenarikan Pasar	3,73
Skor Kekuatan Bisnis Unit	2,30

Conclusion

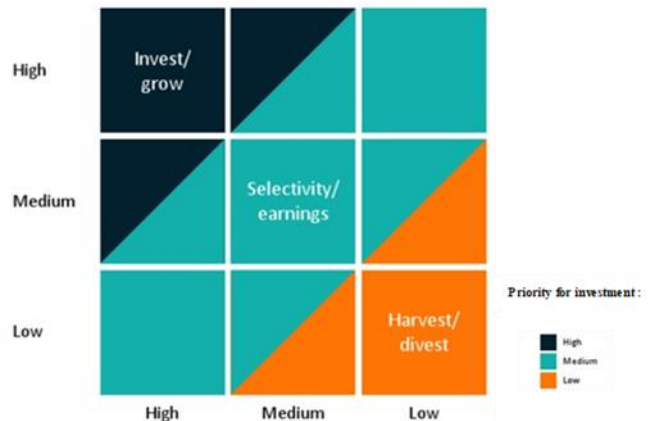


Figure 2. Conclusion

Based on the mapping results of Location 1 (Terusan Buah Batu) in segment 1 with a recommendation to "open a shop", Location 2 (Buah Batu) in segment 1 with the recommendation to "open a shop". While location 3 (Unisba Campus) in segment 2 of the "re-projection" recommendation.

Furthermore, the results of the feasibility study us-ing GE-Matrix mapping obtained is positive rec-ommendations with high, based on the score, the business location chosen is eligible to be opened.

Acknowledgment

Based on the results of data processing and mapping the determination of business locations using the BCG-Matrix, the recommended locations to open are location 1 and location 2, but based on financial projections and market potential aspects, location 2 is better than location 1.

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