Conceptual Framework on Finding Optimal Locations of Uniqlo Stores using Spatial Analysis

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Abstract. Location plays a crucial role in retail strategy. In this research, a new optimal location of Uniqlo in Greater Kuala Lumpur will be identified by using Spatial-MCDA. Spatial-MCDA combines spatial analysis and Multicriteria Decision Analysis (MCDA) where the spatial analysis will consider various criteria when conducting the analysis. The most important aspect of MCDA is deriving the weightage that will be used by spatial analysis. Various weighing techniques are available including Analytical Hierarchical Process (AHP) which will be used in this study. This paper will explain the conceptual framework of finding optimal locations of Uniqlo Stores using Spatial-MCDA. The framework started with identifying a set of criteria that influence the optimal location of the Uniqlo stores including Target Market, Facilities, Transportation, Safety and Security, and Competitor. Next, the weightage or priorities for the criteria will be computed using AHP decision rules based on their degree of importance in deciding the location of Uniqlo stores. Then, a spatial analysis will be conducted. A spatial model that will be used in finding the location will be developed by using a model builder. This stage will automate the lengthy procedure of finding the location. In this model, the weighted overlay technique will be used to identify the optimal location based on the weightage of criteria which will be represented as raster datasets. The finding of this framework will be optimal locations of the new Uniqlo stores.

1. Introduction

In business, the strategic location of a business takes place is key to its success. However, the decision-making in determining the strategic location of a facility or retail store is a very complex process. It can involve various criteria and factors in finding the best location for it [1]. But, to find the best itself is not easy as it is difficult to satisfy all factors at its best. That is why it is only possible to find an optimal location where the location found is located with all factors could be met optimally. It is one of the practices that had been implemented by many businesses for decades ago in finding their possible ‘best’ location. Uniqlo is not an exception to this.

Uniqlo is a clothing apparel store that originally founded in Yamaguchi, Japan. Nowadays, it has become globally known including Malaysia. Uniqlo spotted in a certain area in Malaysia but mostly in Kuala Lumpur and Selangor. Its success depends on its location. Having an optimal location is vital. Specifically, in Greater KL, Uniqlo has more or less of 20 stores but the location itself is very far from each other. Their customers have to travel for about an hour to get to the existing location. In addition, they also faced a new competitor which might be a more popular choice these days, which is online shopping. With this, some customer which has limited access and time to go to the retail stores opted for online shopping instead. However, there are still people who prefer to go to the physical stores to shop especially something related to apparel that they prefer to feel the materials and try to wear it at the shop before deciding to buy it. Thus, the owner of the business is responsible improve the accessibility to their businesses. Most of them work hard to keep their current customers and at the same time, attract new customers. These customers are called target markets which often represented by different demographics including age groups, gender, and income levels [2].
To make sure that their businesses run smoothly and satisfy the need of their target market, most of the retail business operators do have their standard set of criteria prepared before selecting a location to run their business. This is because the criteria could give a better perspective for the owner to choose a good location before deciding to open their business in a particular location. The criteria might include public facilities available around the location and the transportation access which later could help the business to stay longer in the market and expand more [3]. However, these factors might have a different influence on the decision-making of the site selection. Thus, a good decision-making technique that can deal with multiple techniques is needed for this purpose. A technique that has been widely implemented is the Multi-Criteria Decision Analysis (MCDA). It is also can be integrated with GIS to find a better solution as it involves the priorities of the criteria in decision-making forming Spatial-MCDA.

With this combination of GIS and MCDA, it is possible to find the optimal location for a new retail store for Uniqlo. With this technique, various criteria will be taken into consideration when selecting the location for the new stores. The criteria will have different weightage which was derived by using one of the MCDA weighing techniques which are the Analytical Hierarchical Process (AHP). The weightage will later be used by GIS in conducting spatial analysis. In this framework. It is suggested to use an automated site selection workflow developed by using a model builder. The detailed explanation about the framework is discussed in Section 3.

2. Review of Literature

2.1. Uniqlo

On 28 July 2010, Uniqlo officially enter Malaysia’s market. Its first store was opened in the heart of Kuala Lumpur’s golden triangle. It made its debut at the Fahrenheit 88 Shopping Centre, Bukit Bintang [17]. The store occupies a three-level store with 2140 square meters which appeal stylish, high quality, and affordable Japanese modern clothing. Uniqlo has entered the joint-venture with DNP Clothing Sdn Bhd where Uniqlo owns 55% of the stocks while the remaining 45% belong to DNP Clothing. Managing Director of Uniqlo (Malaysia), Mr. Satoshi Onuguchi said that he believed that their success in Japan and worldwide will give the same result in Malaysia too as long as they hold strongly on their strength and marketing strategies [18]. Soon as the first branch opened in Malaysia, it became massively successful until they decided to offer Malaysian a wide range of high-quality products with approximately 500 Uniqlo collections from males and females similar to Japan store.

Figure 1. Study area.
Following the success of its primary store, Uniqlo had then opened more stores across the capital of Malaysia. They took a drastic measure to launch their branches in Greater Kuala Lumpur, which have become a hotspot for a retail business owner, especially in fashion retail to open their store [18]. Uniqlo also did not lose in this competition and has opened more or less 20 stores around the Greater Kuala Lumpur area. Uniqlo set most of the famous shopping malls as their target to open their stores since these malls received thousands of customers daily for example IOI Mall Puchong, Sunway Pyramid, Mid Valley Mega Mall, and Berjaya Time Square. “Having just launched South-East Asia’s largest Uniqlo store in November 2010 at Fahrenheit 88 to a crowd of 2,500 people who queued for our opening, we are very pleased and excited to bring Uniqlo to such a strategic location and internationally recognized iconic structure,” said Uniqlo (Malaysia) Sdn Bhd managing director Satoshi Onoguchi [19].

2.2. Importance of Good Location

The good location of one retail store is very important to determine the success of one retail business company. The marketing team needs to make a good decision to select a location that fits some importance so that the company could achieve maximum potential targets from the retail business. It is important for retail stores to have a good location, for example, to avoid competitors, to stay relevant in the industries, to attract customers to the outlet, make supply and distribution easy [4]. There are some reasons to prove that locations are plays a great role to determine the success of a retail business as described in Table 1.

| Author, Year/ Criteria | Target market | Transportation | Facilities | Safety and Security | Competitor |
|------------------------|---------------|----------------|------------|---------------------|------------|
| Nikola Trubint, Nebojsa Bojovic & Ljubomir Ostojic (2006) | / | / | / | / |
| Gulden Turhan & Mehmet akalin (2013) | / | / | / | |
| Norat Roig-Tierno, Amparo Baviera-Puig, Juan Buitrago-Vera & Francisco Mas-Verdu (2013) | / | / | / | |
| Tammy Drezner (2004) | / | / | / | |
| Mwafak M. Shakoor (2015) | / | / | / | / |
| Mehmet Akalin, Gulden Turhan & Azize Sahin (2013) | / | / | / | |
| Article I. Armando Mendes (2004) | / | / | / | |
| Jonathan Reynold & Steve Woods (2010) | / | / | / | |
| Dhruv Grewal, Anne L.Roggeveen & Jens Nordfalt (2017) | / | / | / | |
| Dugal Nitti (2007) | / | / | / | |

First, business location is a unique factor that cannot be imitated by other competitors [5]. Nowadays, other fashion retail stores compete in the same sector for example H&M, Brand’s Outlet Store, and PADINI. Uniqlo needs to research which location they could go and set their business...
without having the other store around or nearby. Hence, it could give strong competitive advantages. The selection of a good location is a long-term decision to stay relevant and successful in this fashion industry. They need a location that will continuously give them a good target market so that their business could continue to run [6]. Lacking in this will lead the retail store to flop and loses its target market and end up in bankruptcy. A good location also is the key element to attract customers to the outlet. In this case, a good location shall be situated not far away from facilities or the outlet can be accessed using public transport [7]. This will attract customers to attend the outlet since they are able and easy to reach the outlet without having to drive for hours or stuck in the traffic just to go shopping at the outlet. Lastly, security and safety make the customers’ convenience to shop at one store [4]. Retail stores need to make sure their security and safety are well aware to keep their business continuously running without facing any problems. The safety and security of the business owner and customer increase by having police stations, fire stations, and hospitals nearby as they can reach the store fast if the location is in a short distance.

2.3. Factors influencing the Optimal Location of Uniqlo
The optimal location for a retail store should have their target market for their business. The target market can be divided into two which first of it is the local target and secondly tourist [11]. The marketing team needs to know what is the income range of the local target in that area to determine the possibility of them going shopping at the outlet. They need to confirm that the local target could afford to consume the product from the outlet. The marketing team also needs to know whether the location chosen include tourist or not. Tourist is the important targets to achieve more profit in sales since tourist are usually willing to pay high for good quality products. Also, they are willing to pay more for something that well knows the world widely.

Transportation is another factor required before the selection of a location to run a business [7]. In the main cities, there is always one problem that stops the consumers to go out and shopping at their favorite stores that is traffic jammed. If there are other alternatives than driving for hours from their home to the store and end up stuck in the traffic for hours could attract them frequently to the store. For example, Light Rapid Transit (LRT) that helps them to get to the store faster can attract them to visit the store often. Other transportation like e-hailing (GRAB) and free shuttle bus also could contribute.

The owner of the retail stores should know what facilities nearby that could help contribute to the business [6]. Bank or ATM is a very important facility since the customers won’t bring much cash when they need to shop. They could withdraw their cash by using this facility nearby to enjoy shopping at the store. Also, the internet connection is important too just in case they are going to use credit cards or online transferring. Besides that, the owner needs to make sure the car park system is convenient for the customer that chose to drive to the store. The lacking of a car park system will make the customers change their minds and choose to go to other stores.

Security and safety are important to the owner and customers respectively [4]. They need to make sure there are police stations, fire rescue, and hospitals around just in case something unwanted or accident might happen. If the robbery happened, the crime can be stopped and prevented easily since the police station is nearby the same goes to the fire and physical incident where the fire rescue and ambulance could access easily and shortly to the store.

Lastly, the marketing team needs to make sure there is no competitor or less-competitor retail store to avoid massive competition that causes loss to the business [21]. Competitors in the same sector nearby our retail store could affect the company economically since our target market could easily go to other retail stores if they find out lacking in our retail.

2.4. Analytical Hierarchical Process (AHP)
Finding the optimal location for a retail store is the most crucial decision to be made by retailers especially in the fashion industry. Success or failure of a retail business depends on various factors either internal factors or external factors [13]. Indeed, other factors influence the success or failure of
the business but selection of location gives the most influence as it the initial measure determining
whether the business will develop or flop. Location is vital toward retail business [9]. Selecting a
beneficial location for an existing store or new store requires a long term investment to keep the
business relevant and could compete with another brand in the same field also to maximize potential
profit. The failure of the location will give result financially because the cost of replacing the location
with the new one is high and it will damaging the brand image [10]. So, making a precise decision in
selecting store locations is very important for the retailer out there.

The selection of optimal location is one of the decisions that required a large number of criteria that
needed to be included to produce precise decisions before starting a business [11]. Like been said
earlier, location is vital toward the business in the field of fashion retail since the location of the
business determines the success or failure of the business. To make a wise and accurate decision,
Analytical Hierarchical Process is a method that can be used to make up a good decision since in the
AHP there are 3 types of method that can be used to come out with a good decision which is a
Ranking method, Rating Method and Pairwise Comparison [12]. In this case, the pairwise comparison
is the most essential method to be used by taking the criteria into account. This method helps to form
the solution to this multi-criteria decision by incorporate store selection parameters.

2.5. Spatial Multi-Criteria Decision Analysis (MCDA)

The Spatial-MCDA or GIS-MCDA has been derived from general decision theory and analysis.
Nowadays, Spatial-MCDA has become a trend to tackle spatial decision problems. It is however
essential to identify three distinctive approaches in GIS-MCDA before start the analysis [13]. The three
distinctive approaches are Conventional MCDA, Spatially explicit MCDA, and Spatial Multi-Criteria
Optimization. Conventional MCDA for spatial decision making involves decision rules for tackling
spatial problems like site selection problems and land use analysis. The most popular method used is
the weighted linear combination (WLC), Ideal Points, AHP/ANP, and Outranking methods [19].
A conventional MCDA approach is the continuity from existing MCDA, which is to analyze spatial
decision problems.

However, the approaches usually take in spatial variability by defining criteria based on the
concept of spatial relations for example proximity, adjacency, and contiguity and it also assumes
spatial homogeneity of decision maker’s preference or value judgment [12]. In a spatially explicit
MCDA, it uses the concept where spatial location making a distinction between conventional models
and spatially explicit models. It said to be spatially explicit when it differentiates behaviors and
predictions [12]. In this approach, four tests can be conducted to determine whether it is spatially
explicit which are the invariance test, representation test, formulation test, and outcome test. The
invariance test is considered spatially explicit if the decisions are not invariant under relocation as it
implies changes in the ranking of the feasible alternative result. Representation test must be
geographically defined where it should have at least two elements which action and location that can
be defined using a coordinate system. Formulation tests should contain spatial concepts for example
location, distance, contiguity, and connectivity, adjacency, or direction. The outcome test must
generate a different spatial form from the input itself [15]. In the Spatial Multi-Criteria Optimization,
it is designed to solve problems like land allocation, site search problems, location-allocation,
transportation, and vehicle routing problem. This model finds the best problem-solution to a well-
defined spatial decision and the distinctive features of this model have geographic meaning like
location, distance, direction, connectivity, the shape of an area, districting, and length of boundaries
[16].

Spatial-MCDA includes few elements that need to be stress in this model which are Decision
Makers, Criteria, Decision Alternatives, and Decision Matrix. First of all, decision-makers are the one
that carries responsibility in making decision and decision-maker could be an individual, a group of
individuals, or an organization. Consequently, the consistency will be lessened if the decision made by
groups of individual than an individual since they have different preferences and beliefs [13]. Second,
the criteria should include attributes and objectives. In addition, a set of criteria must be comprehensive and measurable which means it should be complete, operational, decomposable, non-redundant, and minimal [19]. The relationship between the attributes and objective should have a hierarchical structure and in the hierarchical structure must consist of four levels which are goal, objectives, attributes, and alternatives. There are two hierarchical structuring in spatial decision problem which is AHP and ANP.

### Table 2. Decision matrix for AHP.

| Alternative, $A_i$ | Criterion/Attributes, $C_k$ | Coordinates |
|--------------------|----------------------------|-------------|
| $A_1$              | $a_{11}$ | $a_{12}$ | $a_{13}$ | $a_{1n}$ | $X_1$ | $Y_1$ |
| $A_2$              | $a_{21}$ | $a_{22}$ | $a_{23}$ | $a_{2n}$ | $X_2$ | $Y_2$ |
| $A_3$              | $a_{31}$ | $a_{32}$ | $a_{33}$ | $a_{3n}$ | $X_3$ | $Y_3$ |
| $A_m$              | $a_{m1}$ | $a_{m2}$ | $a_{m3}$ | $a_{mn}$ | $X_m$ | $Y_m$ |
| Weight, $W_k$      | $w_1$ | $w_2$ | $w_3$ | $w_n$ | $W_k$ |

Meanwhile, decision alternative is best defined as alternative courses of action where decision-maker need to choose. It consists of two elements which are action and location and it can be specified explicitly or implicitly. Lastly is the decision matrix where the elements of MCDA organize in a table called a decision matrix. The row represents the alternatives and the column represents the attributes in the decision matrix as described in Figure 2 [13].

### 3. Framework of Finding the Optimal Location of Uniqlo Stores using Spatial-MCDA

#### 3.1. Spatial MCDA

Spatial analysis is an analysis using raster data because raster data contain a cell unit. In this research, a spatial analysis will be conducted within a few processes as described in Figure 2.

![Figure 2. Methodology of Spatial MCDA.](image-url)

Firstly, a spatial analysis conducted using the Uniqlo Optimal Location model created by the model builder. This model will be store under the spatial analysis toolbox where this model can be used by Uniqlo to find the optimal location of their new stores. This model will include all of the parameters or input data and the tools that will be used to run every process involved in this analysis. Instead of running every analysis one by one, this model helps to run the analysis together in one time for every parameter or input data. It is a time-consuming method. Once the model has been created, all of the parameters or input data need to be derive their distance to determine the distance of the parameter to
the location of Uniqlo. The distance will be deriving using the Euclidean distance tool to get the distance of the parameter to the location of Uniqlo as shown in Figure 3.

![Figure 3. Deriving Euclidean Distance e.g. for sub-criteria of “Transportation” which is “Bus Stop”.

The distance of the parameter or input data that have been derived will be reclassified into 10 classes where class 1 will represent the lowest value and class 10 will represent higher value as illustrated in Figure 4. The value of the classes will become higher from 1 to 10. The lowest values in this class show that the longest distance of input data to the location of Uniqlo while the highest value in this class will show the shortest distance to the location of Uniqlo.

![Figure 4. Reclassifying the distance.

In weighing and combining dataset is where the weightage computed earlier in AHP added into the dataset as described in Figure 5. The weightage should be in the percentage form since spatial analysis read the weightage only in percentage and in integer. For example, if the weightage is 0.2, it should be standardizing into a percentage, which made into 20%. The weightage will be added to every dataset by using weighted overlay tools. After the weightage has been added, it will show a suitable area for Uniqlo's new optimal location. The suitable area will be shown from class 1 until class 9 where class 1 is the most unsuitable area while class 9 is the most suitable area to locate Uniqlo's new stores.

It has been decided that those sites that are considered optimal must have a suitability value of 9. The area with value 9 will be extracted using a conditional tool so that an optimal location can be chosen within that area only. The area that is less than a 30-meter cell needs to be removed because it is too small to locate a new Uniqlo store around that area. The majority filter tool will be used to filter all of the small polygons and keep the larger polygon so that Uniqlo's new stores can be locate around that area. Finally, convert the optimal location into vector through vectorization process. The vectorization process uses raster to polygon tools. Examine the area that is close to the road and
commercial area that include shopping mall in that area and choose that area as the optimal location of new Uniqlo stores.

Figure 5. Weighted Overlay Analysis.

4. Expected Outcome

Figure 6. Example of optimal location found using Spatial-MCDA.
The expected outcomes of this study are a new toolbox consist of a model builder that can be used to automated the procedure of finding optimal locations of new Uniqlo stores and a map visualizing optimal locations of new Uniqlo stores that can be opened the future. The first outcome, the toolbox can be very useful in future studies and might benefit Uniqlo themselves in deciding where to open their new store by using a better approach than before since this framework will consider various criteria when making decisions. Besides, the toolbox will also generate the output in a short amount of time. The second outcome, the map visualizing the optimal locations will be very useful in communicating the information about the optimal locations better as it will show where the new stores will be located, the distances to a target market, the access to public transport available, and also distances to their competitors.

5. Conclusion

Uniqlo is a Japanese Clothing brand wear that is famous not only in Malaysia but also globally. It has more or less 20 existing stores in Greater Kuala Lumpur where situated in distance from one to other stores. The location of retail stores is very vital to determine the success of one-retail stores including Uniqlo. Optimal Location of retail stores influenced by few criteria likes Target Market, Facilities around the location, Transportation to access the location, Safety, and security services provided around that area and competitor to that particular brand. Spatial MCDA help to find an optimal location of Uniqlo as it uses the weightage of criteria collected and computed from AHP. The weightage computed will determine the degree of importance of those particular criteria to be nearby the area to be considering as optimal location.

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