

AMERICAN UNIVERSITY OF BEIRUT

AN ANALYTICAL HIERARCHY APPROACH FOR
SELECTING RESTAURANT LOCATIONS IN LEBANON

by
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AN ABSTRACT OF THE PROJECT OF

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The Fast Food industry in Lebanon is more competitive and dynamic than ever and managers as well as franchisors are increasingly faced with complicated yet vital decisions, especially when it comes to site selection. This is a particularly critical decision because of the big investment and the relatively low flexibility that this decision imposes. Add to this its tight relation with future sales generation and success. In this research, criteria that need to be considered for location selection are first identified and pulled together to produce a comprehensive set that is relevant to restaurants and applicable in Lebanon. The selected set, which is organized into a hierarchy tree, encompasses criteria that are quantitative and qualitative, both being vital and taken into account when selecting a new location. Criteria are divided between management and customers. The research then presents a multi-criteria model, the Analytic Hierarchy Process (AHP), which provides managers with quantitative synthesis of qualitative and quantitative judgments to reach the optimal choice in the selection between different location alternatives. Weights and rankings of the developed hierarchy of criteria are calculated by collecting data by interviewing 10 experts in the field and by an online questionnaire for Lebanese fast food restaurants customers. Experts ranked Visibility and Nearby Customer Base as the most important criteria, whereas for customers, Store Physical Characteristics and Area Particularity were given the highest weights.

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ABBREVIATIONS

AHP: Analytic Hierarchy Process

CI: Consistency Index

RI: Random Index

CR: Consistency Ratio

IRB: Institutional Review Board

CV: Coefficient of Variation

CHAPTER 1

INTRODUCTION

The restaurant industry is one that has been growing tremendously in the Lebanese market. It is an industry that has been booming fast in the last eight years says Paul Ariss, president of the Syndicate of Owners of Restaurants, Cafes, Night-Clubs and Pastry Shops in Lebanon (The Executive, 2012). New restaurant concepts open every month, and big restaurants chains keep on growing their branches constantly. In fact, the Lebanese restaurant market has been quite competitive the last few years, with rising rivalry, higher barriers to entry and consequently more failure risks. “Lebanon’s restaurant market is notoriously fraught with high costs and cutthroat competition” says William Long (2012) in his article about the restaurant industry in Lebanon; nevertheless “it is a sector that has already seen over \$1 billion in investment since the hey-days of 1996” (Long, 2012).

Today, players on the fast food market need to maneuver in tighter markets and on stiffer slopes. Decision making is at the heart of every successful organization and managers in this industry are not an exception: everyone needs a more careful approach for every decision they make. This research tackles one of the most important and long term strategic investment decisions in a business startup or expansion: location; or more technically site selection. It can be found in the literature different meanings for location and site selection. Location is sometimes referred to the area that will be chosen among different alternative areas for expansion or new store opening, whereas site selection means choosing a site among many in a specific area. In this research, location and site

selection have the same meaning, and the developed decision model works both ways, in choosing between expansion areas and between different sites within the same area.

1.1. Research Objective and Questions

1.1.1. Research Aim and Objectives

The aim of this research is to provide Casual and Fast Food (detailed description of the type of restaurants can be found in the introduction of chapter 4) restaurant managers in Lebanon with an easy and consistent site selection decision tool. This tool produces quantitative synthesis of qualitative and quantitative judgments to reach the best choice in the selection between different location alternatives when choosing a location for their restaurant. Defining this general statement into more specific objectives will yield the below objectives.

In considering a Fast Food restaurant site selection in Lebanon:

- Identify and pull together location factors and criteria to produce a comprehensive set that is relevant to restaurants and applicable in Lebanon. Criteria are to be organized into relevant categories and hierarchy, and to be validated according to their applicability in the Lebanese market
- Give weights and relative rankings for criteria inside each category following the Analytic Hierarchy Process (AHP) eigenvector model. Briefly stated, AHP is a method developed by Saaty (1980, 1982) that solves decision problem that have both qualitative and quantitative data using matrices of relative importance between criteria (AHP is further explained in the theoretical background of this project).

- Construct an Analytic Hierarchy Process model that will guide managers to choose the best solution among location alternatives
- Suggest further research and ideas to test and consolidate the developed work

1.1.2. Research Questions

It logically follows from our set objectives that the research addresses the below questions:

- What are the criteria that Casual and Fast Food restaurants need to take into consideration when selecting a new restaurant site?
- How can these be grouped significantly into a hierarchy tree?
- What are the criteria weights and ranking relative to each other in the Lebanese market?
- How can the decision making process be empowered with a decision tool following an AHP model?

1.2. Research Significance

1.2.1. The Importance of Location

Site selection, especially for restaurants is a pretty complicated process due to the hectic nature of the restaurant business itself. “It is an important factor leading to the success of restaurant management since it will determine the convenience of service to customers and how many are attracted” says Tzeng et al. (2002). Moreover, and much more than any other business that sells in stores, it targets customers who are not necessarily willing to make a purchase as much as customers who go there with the objective of eating. Jain and Mahajan (1979) highlight the importance of location by

saying that, “in the development of competitive strategy, price can help to cope with, service can help to expand and improve, commodity can be overlapping, promotion can be imitated, however, the benefits from the establishment location to the retailer could hardly be undermined and undervalued”.

1.2.1. Multi-criteria Modeling in Location Problems

Although the site selection science is not a newly developed one, empowering it with multi-criteria decision making models is a relatively new approach. The growing attention and interest into these multi-criteria problems is due to the recognition of the need to consider more criteria in order to achieve closer solutions to reality (Farahani et al. 2010). Decision makers are no longer contented with minimizing cost or service time or maximizing responsiveness, they want to do them altogether and add as much attributes as possible to their decision making models. Farahani et al. (2010) in their survey of the literature on multiple criteria facility location problems show this growing trend of multi-criteria decision models applied to site selection in the recent years. Furthermore, they reflect that multi-criteria site selection modeling has been applied in Engineering , Decision Sciences, Computer Science, Mathematics, Government, Waste Disposal, Public zoning, Health care and Environmental fields, with the first three being the areas most interested in this kind of modeling. Yet, few found the application of multi-criteria decision models in the food service industry.

This research addresses the site selection problem using a multi-criteria decision modeling technique – AHP – specifically for casual and fast food restaurants.

1.3. Research Organization

This research aims first at identifying a comprehensive set of location criteria that are significant to casual and fast food restaurants. Therefore it is organized as follows: chapter two introduces the theoretical background of the research, explaining the AHP approach. Chapter three tackles international literature, with both general site selection techniques and ones specifically related to restaurants. Chapter four is about the methodology used to select the criteria, construct the hierarchy tree, and validate the gathered criteria. It also explains how this is achieved through interviewing experts in the field. The second objective is to determine the relative importance weights of the criteria using the pairwise technique of the AHP, which data is gathered both from restaurant experts by an interview-administered questionnaire and from customers by an online survey. Chapter five describes and discusses the final output of the AHP model which is henceforth a validated hierarchy of restaurant location criteria with relative weights, ready to be used in comparing location alternatives in an AHP model.

CHAPTER 2

THEORETICAL BACKGROUND FOR AHP

The Analytic Hierarchy Process (AHP) was developed by Saaty (1980, 1982). It is a modeling method that can solve multi-criteria decision making problems that has both quantitative and qualitative data. Due to this special feature, AHP is an excellent approach for complex decisions that involve a lot of judgment and subjectivity, AHP has found many applications in several business fields. Fields other than site selection, as listed in Timor and Sipahi (2005), include finance (Nick et al., 1987; Rajshekhar et al., 1989; Hyung and Min, 1998; Hakan and Miranda. 2002), marketing (Wind and Saaty, 1980), education (Gülser and Alpay, 1998; Matsuda. 1996), public policy (Edward and Bruce. 1991). economics (Babic and Plazibat, 1998, Khalid et al., 2002), commerce (Yuntsai et al., 2004) health (Javalgi and Rao, 1991; Tarimcilar and Khaksari, 1991), and sports (Partovi and Corredoira, 2002).

2.1. The AHP Method and Steps

AHP can be summarized in three main steps (Saaty, 1994):

- **Problem Decomposition:** information about the problem is decomposed into a hierarchy of criteria and alternatives. The hierarchy contains all the criteria, grouped significantly into a tree with different levels and sub-levels. Each criterion or element is further broken down into sub-criteria to reach the lowest desired level of hierarchy.
- **Comparative Analysis:** information is synthesized to determine the relative rankings of criteria over each other in the first place, followed

with the relative rankings of the alternatives over each other when taken in the context of each criterion. Comparative analysis is in the form of rating the elements by means of their relative importance according to each other. This is done by a process called pairwise comparison, where each pair of criteria is given a number according to the scale of relative importance (Table 2.1).

- **Synthesis of Priorities:** both qualitative and quantitative criteria being compared, and having produced a pairwise comparison matrix for each cluster of criteria at each level of the hierarchy, information is synthesized to derive the priorities of criteria over each other, and the overall priorities for the decision alternatives. Priorities for criteria and alternatives are called weights, and are computed using the Eigenvector mathematical model which is basically a multiplication of the pairwise matrices developed in the step before.

Key elements for the three steps of AHP are therefore:

- Clustering and the grouping into a relevant hierarchy tree, with different levels and sub-levels
- The ratio scale from 1 to 9
- Group / expert judgment to derive relative ranking in the pairwise matrix
- The pairwise comparison that is used in estimating the weights of all elements

Table 2.1: Scale of Relative Importance for AHP models

Definition	Intensity of Importance	Explanation
Equal importance of both elements	1	Same Two activities contribute equally to the objective
Weak importance of one over another	3	Experience and judgment slightly favor one activity over another
Essential or strong importance of one element over another	5	
Demonstrated importance of one element over another	7	Clearly demonstrated in practice An activity is strongly favored and its dominance is demonstrated in practice
Absolute importance of one element over another	9	
2, 4, 6, 8	Intermediate values between the two adjacent judgments, used when compromise is needed between two judgments giving two adjacent intensity levels	
Reciprocals of above non-zero numbers	If one activity has one of the above non zero numbers assigned to it when compared with another activity, then the second one has the reciprocal value when compared with the first one	

Source: Saaty T.L. 1982. Decision Making for Leaders, Wadsworth, New York, p.78

2.2. AHP Consistency Checks

The last step in AHP is to evaluate the consistency of the judgments used to build the pairwise matrices and consequently to derive weights. This is done by calculating the Consistency Index (CI). CI is an indicator of whether the judgments being filled relative to each other are done in a consistent way and that there is no contradiction in the pairwise matrix. This means that if criterion A is evaluated 9 times more important than criterion B, and criterion B 9 times more important than C, then it

must be that criterion A is much more important than C. The CI automatically checks through calculations this kind of information.

$$CI = \frac{\lambda_{\max} - n}{n - 1}$$

Once CI has been calculated, the Random Index, RI, which is the CI of a randomly generated pairwise comparison matrix, is found according to table 2.2.

Table 2.2. Tabulated RI by size of matrix:

<u>n</u>	<u>RI</u>
2	0.0
3	0.58
4	0.90
5	1.12
6	1.24
7	1.32
8	1.41
9	1.45
10	1.51

Finally, the Consistency Ratio, CR= CI/RI, is calculated. In practice, Saaty (1980, 1982) demonstrated that a CR of 0.1 or below is considered acceptable. And any higher value at any level indicates that the judgments warrant re-examination.

2.3. Comparative Analysis with Multiple Opinions

Two opinions are better than one and three opinions are better than two. Sometimes, when it comes to judging qualitative data, criteria that are subjective, or simply choosing priorities between a set of criteria, more than one judgment can tremendously increase the relevance of the choices, making judgments closer to reality. Another advantage of AHP is that the model can account for many judgments, coming from multiple decision makers or experts. Aggregation of such data, collected for each

pair of criteria in AHP can be based on the geometric mean. As Xu (2000) says “the geometric mean method is the most common group preference aggregation method in the Analytic Hierarchy Process”. Many researchers like Timor and Sipahi (2005), Tzeng et Al. (2002), Bahurmoz (2003), Barbarosoglu and Yazgac (1997) used this type of aggregation and all argue that it has yielded satisfying results. Xu (2000) also proves that the geometric mean judgment matrix is of acceptable consistency in AHP when dealing with aggregating group opinion. Nevertheless, one major condition has to be maintained: opinions given by experts for the same problem of decision-making are of acceptable consistency (CR less than 0.1).

CHAPTER 3

LITERATURE REVIEW

3.1. Traditional Site Selection Techniques

Location decision is a one hundred years old science, beginning with a long history of single criterion location problems (Farahani et al. 2010, 1690). Traditional methods in location decision are numerous like the center of gravity, the transportation model, the breakeven point method and the factor weight method. All these models use mathematical techniques to find the best location according to an objective or a couple of objectives. The center of gravity method for example aims at minimizing distribution cost through choosing the best location taking into account shipment costs, the distance of suppliers and customers, etc... These are nevertheless considered single criterion models, which limit the problem to one single approach, will it be to minimize cost, to minimize the breakeven point, to maximize service, to minimize distance from suppliers and customers, etc... The factor weight method is, on the other hand, a technique that enables the use of many factors or criteria and is a precursor to recent multi-criteria modeling where weights are estimated using a multitude of mathematical methods and not simply by judgmental weight allocation. It is advised to refer to authors like Mirchandani and Francis (1990), Francis et al. (1992), Daskin (1995), and Drezner (1995) whose books tackle comprehensively many traditional methods of site selection.

3.2. Multi-attribute Approaches in Location Problems

On another note, since its introduction to management sciences, the concept of multi-criteria decision making has been increasingly implemented in location problems (Farahani et al. 2010). In fact, the problem of site selection, playing such a crucial role in business, is one that is governed by a multitude of criteria and objectives in reality and can only be poorly captured by single criterion models. According to Yang and Lee (1997), location selection is one of the most famous multi-criteria decision making problems in business. This probably explains this increasing trend in the usage of multi-criteria models and the substantial growth in presenting and solving multi-criteria location problems throughout the literature. Multi-criteria location problems can be divided into two broad categories: multi-objective and multi-attribute (Farahani et al. 2010). In multi-objective, a set of well quantifiable objectives and well defined constraints are arranged into a mathematical model (Farahani et al. 2010). In multi-attribute location problems as described by Farahani et al. (2010) there are usually a limited number of predetermined alternatives. These alternatives satisfy each objective in a specified level and the decision maker selects the best solution among all alternatives, according to the priority of each objective and the interaction between them. Techniques using this approach are numerous. The following are some of these techniques among many: maximin, maximax, conjunctive method, disjunctive method, lexicographic method, elimination by aspects, permutation method, linear assignment method, simple additive weighting, hierarchical additive weighting, elimination and choice expressing reality technique for order preference by similarity to ideal solution, hierarchical tradeoffs, and linear programming techniques for multidimensional analysis of preference (Farahani et al. 2010). In many cases, these are also found to be coupled with a geographical information system such as in Higgs' review (2006). Perhaps the

biggest merit of the multi-attribute approach as stated in Farahani et al. (2010) is that “sometimes in location problems, decision makers are not dealing with numbers and mathematical findings but decisions must be based on human judgment. Therefore, multi-attribute decision making is an important part of location science and based on the data type which is sometimes vague, fuzzy multi-attribute models are used more and more”. Some criteria are quantitative and measurable, but many others qualitative but extremely vital. Take for example visibility, which is a crucial attribute for any location, but cannot be measured quantitatively. This is why multi-attribute models can be of a greater help in location problems.

3.3. AHP in Site Selection

Consequently to the above, this research tackles the location problem using a multi-attribute method, as it is justifiable that restaurant location depends on both qualitative and quantitative criteria because they involve consumers directly, unlike industrial locations, waste disposal areas or distribution centers. AHP is also opted for as a specific type of multi-attribute approaches because first, it has been widely used and recommended in site selection (Farahani et al. 2010). And most importantly because it can be easily coupled with other modeling techniques to further strengthen its results. Tremendous amount of work in site selection using an AHP approach can be found in the literature. The survey of Farahani et al. (2010) is an excellent compilation of the studies listed below. In Tuzkaya et al. (2008) for example, AHP was used to evaluate and disqualify undesirable facility locations, using qualitative and quantitative factors, and tangible and intangible criteria. In Aras et al. (2004), a high number of criteria were accounted for to choose the location of a wind observation station. In Fernández and Ruiz (2009), the selection of a location for an industrial park was solved using a 3 level

AHP. In Badri (1999), AHP was combined with a goal program modeling approach to find the best location for an international facility. In Guo and He (1999), the location of a post-harvest system was modeled, combining AHP with the Simplex Algorithm. In Chan and Chung (2004), AHP was combined with a Genetic Algorithm to plan for a distribution network in supply chain management, with results that proved the reliability and robustness of such a combination of techniques. In many cases, qualitative criteria are hard to describe and capture, and thus AHP is found to be combined with the fuzzy set theory to consolidate criteria weighting. Chou et al. (2008) and Shen and Yu (2009) are examples of such techniques. In Shen and Yu (2009), the location of an international company was solved. Another reason for choosing AHP is that it can easily account for many criteria that are both qualitative and quantitative (Saaty 1994). The Analytic Hierarchy Process, as reported by Timor and Sipahi (2005) “is a method which gives an opportunity to decision makers dealing with complex decision making problems, especially when subjectivity exists”. Another merit of the AHP is that its method is practical in nature and suitable for solving complicated and elusive decisions (Zahedi 1986). Practicality is a major argument for why AHP is the chosen model: it is one of the objectives of this research to create a tool for managers, many of whom might not appreciate another complex and highly priced decision making model or software. AHP rankings can be made in groups, easily incorporate judgments from more than one person, and it is fun and fruitful.

3.4. AHP in Restaurant Site Selection

When it comes to restaurant site selection problems, AHP was also used in a couple of studies, one in Tzeng et al. (2002) dealing with the opening of a new restaurant branch in Taipei, Taiwan. The other was to devise criteria weights for site

selection of fast food restaurants in Turkey. Both studies recommend the use of AHP for the restaurant location case and argue that it is an approach which techniques and outcomes can be easily grasped by managers, and that its practical use cover both qualitative and quantitative attributes for a restaurant location.

Tzeng et al. (2002) used what they called 5 characteristics (second level criteria) and 11 criteria (third level sub-criteria). They collected data for their pairwise comparison matrix by interviewing a small number of experts and managers in the field and taking the geometric mean of the answers to construct their matrix. Their research is also applied to a case research, where they used the identified criteria and their weights to rank 4 different alternatives for a restaurant in Taipei. The strength of their research is indeed the case research, and the usage of a compromise ranking method known as VIKOR to consolidate their alternative ranking whenever consensus in ranking alternatives was not reached. The VIKOR method has been introduced as one applicable technique to implement within Multi-criteria decision models and is used to attain compromise when conflicting objectives exist (Opricovic, 1998). The level of consensus was measured by calculating the coefficient of variation (CV) for the geometric means of the pairwise matrix. Smaller CV indicate higher consensus. One major weakness in this model is the small number of site selection criteria. Many are broad and can significantly increase the quality of the decision by adding more breakdowns. Many are missing and constitute important location quality determinants. Visibility, traffic patterns and store characteristics were not included for instance. Timor and Sipahi (2005), in their research on the Fast Food chains in Turkey, applied the AHP model, using this time 7 characteristics and 36 sub-criteria in their hierarchy tree, which covers more comprehensively the problem of site selection. Their research aimed at assessing each characteristic weight by interviews with experts to yield their pairwise comparison

matrix using the calculated geometric means. The research does not take a case research but is targeted on the fast food restaurants in Turkey. No consensus measurement or any other dispersion measures were included to discuss findings. The research takes only the point of view of the franchisors.

Findings regarding criteria weights of both studies were the following: for Tzeng et al (2002), transportation, area characteristics and costs were found to be the most important criteria; for Timor and Sipahi (2005), costs, area characteristics and visibility. Significant differences in rankings exist, although we cannot efficiently compare the results of the two studies because many differences in methodology and the choice of criteria exist. Nevertheless, it is clear enough that one explanation of the difference in weights is the different area characteristics governing Turkey and Taipei. The transportation weight was explained by Tzeng et al.(2002) as being the highest because Taipei is a city where traffic is very difficult to manage, and thus transportation in the minds of customers is highly problematic. This suggests that we have to inevitably limit such location studies to specific areas within a country, and thus the need to investigate criteria for the urban Lebanese market, mainly Beirut and its suburbs, and the urban coastal areas. On the other hand, and in both studies, the cost factor was not treated independently and subsequently took the highest weight. Cost is very important but it can be set aside for not coming out as the first obvious criterion to settle on. Handling benefits and costs is sometimes best when treated first separated because cost can easily shun many important and promising benefits. Besides the incompatibility with Lebanon and the cost factor, both studies do not cover a comprehensive set of location criteria. Nearby customer base and traffic jam risks were for example dismissed. Further breakdown and further width and depth can be easily given to both hierarchy trees. And last but not least, and as it is stated in but not applied

in Tzeng's research (2002): "within the restaurant location selection process, evaluation has to be both from the perspective of customers and from management". Both studies construct their criteria weights based on expert, manager, franchiser, restaurateur and scholar input. None go directly to the customer and establish weights from that perspective. These two studies will be much taken into consideration in our research, applying and taking further their many concepts while correcting some of their weak points. As it will be discussed later, many criteria are better evaluated by the customer than by the managers or experts in the field because it is the customer who chooses to prefer a location upon another, we mention parking availability as an example. Another deviation will be to exclude the cost factors and treat them independently first to better capture less obvious and more insightful parameters.

CHAPTER 4

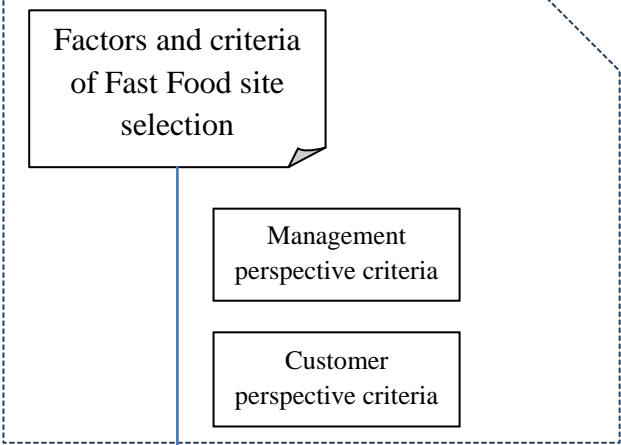
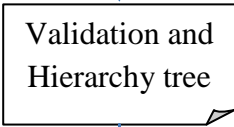
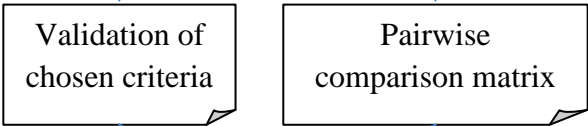
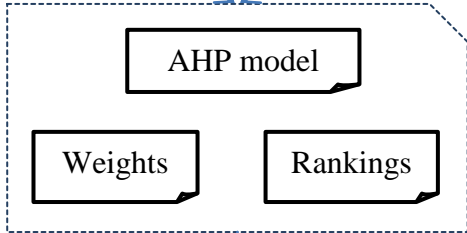
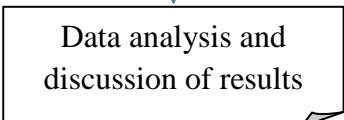
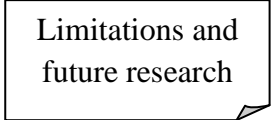
METHODOLOGY

The aim of this research is to propose a conceptual model that can be applied every time managers want to perform a site selection decision for a casual or fast food restaurant. It is designed to be applicable for the Lebanese casual and fast food restaurants that operate in the urban markets of Beirut. Practitioners in the Food Service industry categorize restaurants in three major groups: Fast Food, Casual Dining and Fine Dining, based on the level of food sophistication and the type of service. Subsequently, each category of restaurants operates in a different way and targets different segments of the customers. This research targets a restaurant segment called Casual Fast Food restaurants, which includes basically Fast Food restaurants and Casual restaurants excluding kiosks and counters that sell food.

Under this applied research type, and with the targeted restaurant segment in mind, the research unfolds into six main phases:

- Criteria identification through a literature review
- Hierarchy tree construction through a pilot research with an expert in the field
- Validation of criteria through interviews and online questionnaire
- Pairwise comparison matrix through interviews and online questionnaire
- Weights and rankings of criteria using the built AHP model

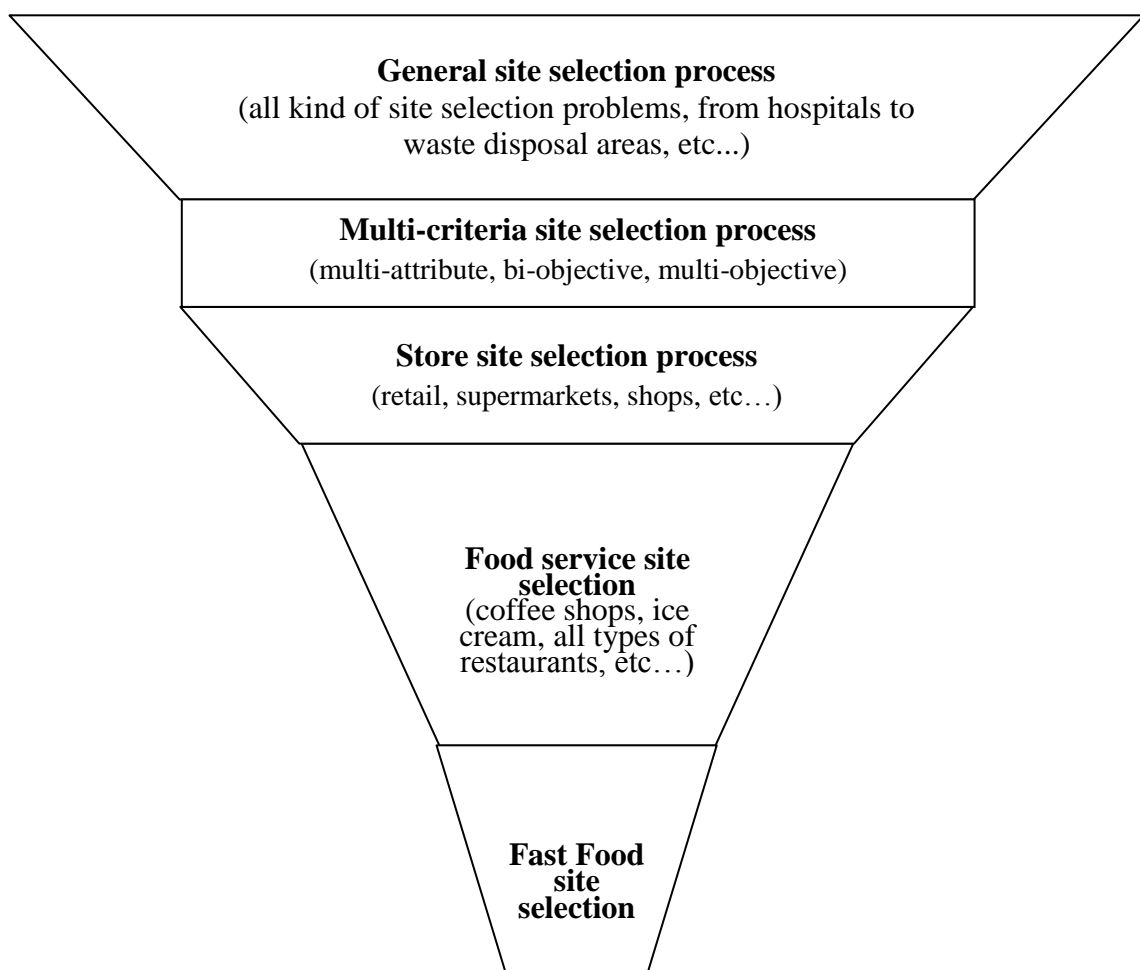
Figure 1. The 6 phases of the research:

Phase	Flow Diagram	Type of Approach
Phase 1		<p>Review of literature</p> <p>Analysis and synthesis of literature</p>
Phase 2		<p>Pilot research</p>
Phase 3		<p>Interviews with experts</p> <p>Online questionnaire</p>
Phase 4		<p>Excel matrix computation using Eigenvector</p>
Phase 5		
Phase 6		

4.1. Criteria Identification

The identification of criteria will rely on surveying the literature, capturing everything that constitutes a criterion for a restaurant location. The literature scanning technique used can be called a funnel like approach, always starting from the general site selection process and techniques, then narrowing down to the Food and Beverage industry and more specifically the Fast Food and Casual restaurant industry. This type of approach was chosen to give more comprehensive insight into the site selection process and inspires research respondents and participants in applying interesting concepts used in other industries to the Fast Food industry.

Figure 2. The Funnel-like approach



4.2. Validation and Hierarchy Tree

Identified criteria are first split into customer and management perspective criteria and then organized into a hierarchy tree. Division is based on what perspective is best to give better weights for the two groups of criteria: management perspective for example is better when dealing with the Competition Criteria, whereas Accessibility is better seen by the customer. This is the first step in the AHP, called problem decomposition, where the problem is decomposed into a hierarchy of factors or elements, which are grouped into different levels. Each level has sub-levels until we reach the lowest level of hierarchy (Saaty 1982, 68). Criteria that were found irrelevant and of low importance in previous studies will be put in the disqualified criteria table.

After pulling together from the literature all criteria that are relevant to restaurant site selection, and after regrouping them into a hierarchy tree, the first stage of criteria and tree validation will take place by means of a pilot research interview with an expert in the management of restaurants field. The expert is chosen according to his years of experience in restaurant management, which must exceed 10 years in a managerial position. The interview includes a set of close ended and open ended questions to brainstorm, discuss and validate the constructed tree with its criteria. It also aims at identifying further criteria, not extracted from the literature in case there was a need to do so. The outcome of the interview was a validated comprehensive set of criteria (including new criteria, modified criteria and criteria taken as is from the literature), to be used in pairwise comparison.

4.3. Criteria Validation and Pairwise Comparison

4.3.1. Criteria Validation

Both hierarchy tree and disqualification table were subject to another round of validation, but this time on a larger scale, using our research participants in the interviews and through the online questionnaire (discussed in the data collection section below).

Validation took place in:

- The interview with experts for the management perspective criteria
- The online questionnaire for the customer perspective criteria

Participants were asked to:

- Designate criteria they find irrelevant, not significant enough, or inapplicable to the Lebanese case
- Designate criteria they find listed in the wrong category or hierarchy level
- Designate criteria that do not need to be part of the disqualification table

Criteria will be considered validated when at least 95% of the sample did not designate it as not relevant, in the wrong category, or not to be disqualified. Criteria that are opted to be revised will be suggested in the limitation of the research and future work section.

4.3.2. Pairwise Comparison matrix and Comparative Analysis

Weights of the criteria were calculated using the pairwise comparison matrix of the AHP model, as described by Saaty (1982, 70). And for this, data for the pairwise comparison matrix was collected using two main collectors:

- The interview with experts for the management perspective criteria
- The online questionnaire for the customer perspective criteria

Participants will be asked to rate the criteria according to their relative importance (figures 3 and 4). This is the second step of the AHP - comparative analysis - where the relative importance of each element at a particular level is measured on the 1-9 scale of relative importance for AHP models discussed in chapter II.

Figure 3. Sample of Customers Online Questionnaire

7. In Customers criteria for location

	9	7	5	3	1	3	5	7	9
Accessibility*_____Area particularity*	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Accessibility_____Distance	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Accessibility_____Store physical characteristics*	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Area particularity*_____Distance	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Area particularity_____Store physical characteristics	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Distance_____Store physical characteristics	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Area particularity_____Accessibility	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Any criteria you find irrelevant for location, or not significant enough?									
<input type="text"/>									

Question taken from the Online questionnaire for customer perspective criteria

Figure 4. Sample Question for Experts Interview Questionnaire

Left side criteria ↓ ↓ ↓	Scale of relative importance ←—————→									Right side criteria ↓ ↓ ↓	Additional relevant criteria ↓ ↓	
	In "Area's future"											
Dev. of adjacent areas	9	7	5	3	1	3	5	7	9	Future developments		
Dev. of adjacent areas	9	7	5	3	1	3	5	7	9	Zoning		
Future developments	9	7	5	3	1	3	5	7	9	Zoning		

Question taken from the Interview-administered questionnaire for experts

Ratings collected by interview and questionnaire will be:

- Filtered using the validation questions (see questionnaire design section)
- Filtered using the CR: for inconsistent CR - $CR > 0.1$ (Saaty, 1982)
 - Inconsistent online questionnaires will be discarded
 - Inconsistent interview matrices will be reconsidered with experts over the phone
- Aggregated for each pair of criteria based on the geometric mean

4.3.3. Recruitment of Research Participants

The research targeted two groups of respondents:

- Casual fast food restaurant managers / experts
- Customers of casual fast food restaurants

This is because we have divided our AHP criteria into customer criteria and management criteria. And so each category will be completing the pairwise comparison matrix of AHP for their category. In parallel, we will take the opportunity to validate the choice of the criteria and let them suggest any criterion they find missing.

4.3.3.1. Casual fast food restaurant managers / experts

Data collection method:

These were given a questionnaire (figure 4) that was interview administered for the only sake of providing accurate explanations, guidelines and appropriate thinking directions to fill in the data sheet. The questionnaire has 3 parts:

- A pairwise comparison matrix (close end question with ranking), where they rank criteria relatively to each other
- A validation for each chosen criteria

- One open-end question asking if they have any criteria we missed in their category

Sample characteristics:

The sampling technique is a non-probability judgmental sampling. Selected cases were chosen according to how much helpful they will be in answering the research questions in the context of AHP.

Sample size consists of 10 individuals with at least one the following criteria:

- Have or had the status of Restaurant branch manager or Restaurant operations manager in Lebanon for a minimum of 6 years
- Have experience of more than 8 years in food service management in the Lebanese Fast Food market
- Is or was a consultant for Lebanese fast food chains / restaurants for more than 10 years
- Any of the interviewed managers can refer us to another manager who fits the criteria

Casual fast food restaurants were chosen according to the following criteria:

- 5 restaurant chains, with more than 10 branches and more than 10 years experience in the Lebanese market
- 5 restaurants with less than 2 branches and less than 4 years experience in the Lebanese market
- Half of the concepts were Lebanese cuisine type, the other half was non Lebanese

- Half of the concepts were Lebanese owned, the other half international franchises

This sample consists of relatively varied restaurants concepts, from franchisees to franchisers, from multi-aggressive location strategists to single location entrepreneurs, from Lebanese concepts to international cuisine and fast food chains. These are also considered a relevant sample of the most popular casual fast food chains in Lebanon. Sample size was fixed to 10 experts because it has been considered that since these people are experts in their fields, with tremendous exposure and experience in site selection for restaurants, such a small sample size is fair enough to construct a significant pairwise matrix. Findings are not intended to be generalized over the entire Fast Food and Casual restaurant business population in Lebanon. This is simply a construction of an AHP model with relevant weights, to be used to aid in site selection.

Method of recruitment

The head office of the selected restaurants was contacted by phone. The phone number is the head office publicly available phone. The query was explained to the person who answers the phone and it was asked to be channeled to the adequate persons. The contact information of the researchers was left so that in case the adequate person is willing to participate, he / she will be able to contact them afterwards. Persons willing to participate in the research therefore fixed a date and time to fill in the interview based questionnaire.

4.3.3.2. Customers of interviewed restaurants

Data collection method:

The same type of questionnaire proposed in previous section is used with different and a smaller number of criteria. Questions target the customer's perspective of a restaurant location. A sample question of this online questionnaire can be found in figure 3.

Sample characteristics:

The sampling method is a probability stratified random sampling technique. Although the research is not meant to generalize over a population, it is still considered positive to be as close as generalization requirements. This is mainly why the probability or representative sampling technique is used. Stratification is also applied because the population consists of the aggregated customers of all the 10 interviewed restaurants and respondents are equally between the 10 different restaurants.

Sample size had to consist of at least 200 respondents – final results were 210, discussed in the following chapter. But it was planned not to stop when the 200 are hit because the more respondents the better. The ideal case scenario is to reach 380 to operate at 5% error for an estimated population of around 100,000. This number is an estimation of the total population count of customers of the interviewed restaurants. It is to be said again that this is not a generalization of findings up to the fast food population of Lebanon and so a relatively high margin of error can be tolerated. This questionnaire will be solely used to benchmark the judgment of the experts against a customer point of view in the criteria where both can have an opinion on. All this is aligned with the target of building a conceptual model, as discussed earlier. In the case of significant mismatch, further research will be suggested and representative population / samples will be considered. Nevertheless, the more persons we will be able to get, the better.

All participants must be 18 years old or more for IRB compliance. Another reason for such exclusion is that customers below age will not have an independent (from their parents or other adults in charge) decision when they will be considering to select the location of restaurant they want to eat in.

Method of recruitment

For each restaurant, we will randomly pick customers that have liked its Facebook page and contact them by sending an email consent script and a link to SurveyMonkey (www.surveymonkey.com). SurveyMonkey is a website that runs online surveys by routing web links and emails to an uploaded survey that can be customized by the researcher. Respondents' input is then registered and aggregated, to be downloaded and used by the researcher. Once respondents go through the SurveyMonkey link, the consent script will be on the first page on the online survey, to be approved to be eligible for participation in the research. People cannot start the survey unless they read this and click "NEXT" or leave the survey. No reminders shall be sent to persons that already get the link (it is simply not a feature of the link created survey).

4.4. Questionnaire Design

The research combines aspects of descriptive and exploratory types of research. But it is mostly descriptive in terms of trying to measure perceived importance.

- The rating scale is relatively easy to understand and quick to be filled.
- The criteria to be rated are straightforward, easy to understand and apply for all persons

This is ideal for data collection using a questionnaire.

Table 4.1. The questionnaire is used for 3 types of data collection:

Question to be answered	Type of data / question
Data for the pairwise comparison matrix	Close ended, using the Scale of Relative Importance for AHP Models (Saaty 1982, 78)
Validation of the chosen restaurant location criteria	One question that permits to designate a listed criterion that is considered irrelevant or not significant enough
Identification of further criteria, if any	Open ended, which input will reported to be used in further research

Table 4.2. Two types of questionnaires and their characteristics

	Interviewer-administered, structured questionnaire	Internet mediated questionnaire
Targeted to	Experts or managers	Customers
Characteristics of respondents	In the field of casual fast food restaurant management	Of casual fast food restaurants
	Have or had the status of Restaurant branch manager or Restaurant operations manager in Lebanon for a minimum of 6 years	Eat in a restaurant (excluding delivery) at least 1 time per week
	Have experience of more than 8 years in food service management in the Lebanese Fast Food market	Is a customer of one of the interviewed restaurants
	Is or was a consultant for Lebanese fast food chains / restaurants for more than 10 years	
Importance of reaching a particular person as respondent	It is highly important to reach a respondent fulfilling all the above characteristics	Minimal importance to reach a particular respondent
Importance of respondents'	Highly important	Minimal importance

answers not being contaminated or distorted		
Size	10	At least 200, ideally 380
Type of questions	Closed ended Validation Open ended with justification	Closed ended Validation Brief open ended
Number of questions	108 + 42 = 150 in rating 31 + 18 = 49 in validation 15 + 9 = 24 in identification	42 in rating 18 in validation 9 in identification
Time to complete questionnaire	35 minutes answering 15 minutes discussion =50 minutes	10 minutes

CHAPTER 5

RESULTS AND DISCUSSION OF RESULTS

Before tackling the practical collected data and analyze the results of the ranking, the first part of this chapter will be dedicated to the findings of the literature review for the identification of criteria.

5.1. Criteria Identification

In this research, the focus will be on identifying a comprehensive set of location criteria that are significant to casual and fast food restaurants. This is done mainly by considering international literature because unfortunately, nothing could be found on the specific case of Lebanon. Consequently, it is only logical to apply a funnel approach to identify comprehensive criteria for the location model. The surveying started with general site selection literature applicable to all sorts of fields such as hospitals, schools and waste discharge areas. Then is shifted to considering a more special case, which is a retail store location, to end up looking at site selection criteria used in AHP models specially designed for restaurant location.

Restaurant site selection criteria are the subject of many studies and researches throughout the literature. Khan (1992) described site selection as the the first step of building a restaurant and explains this process in detail. In his book, he considered the following factors as important factors for site analysis: zoning, area characteristics, physical characteristics, cost consideration, utilities, access, position of the site, traffic information, availability of services, visibility, competition, market and type of restaurant and service. Melaniphy (1992) emphasized the importance of geography,

sales size and trends, market size, type of location, accessibility, topography, visibility, adjacent uses, competition and demographics in location decisions. Simons (1992) surveyed the factors that may affect first-year sales of fast food restaurants. His results show that effective store performance factors could be divided into three different groups: Location factors, market area characteristics, and other factors (i.e. costs, qualified management). Min (1987), focused on multiobjective retail service location for fast food restaurants. He also considered the behavioral and spatial aspects of location.

Farahani et al. (2010), on the other hand, summarize and discuss all criteria used in multi-criteria decision models. Their survey listed cost, environmental risks, coverage, service level and effectiveness and profit as criteria used in bi-objective and multi-objective location models. On the other hand, cost, value and benefits, environmental risks, resource accessibility and utilization, public facility accessibility, political matters and regulations, competition, economical (besides costs and benefits), population, capacity, distance and suitability were identified in models with multi-attribute location models. Farahani et al. further conduct an analysis of the coverage of criteria and suggest directions for further research including criteria such reliability, sustainability, network design and supply chain, all missing in the location multi-criteria decision models literature.

On another note, the site selection problem can be more specific and considered as a retail location problem. Retail location models are surveyed in a number of papers. Timmermans (1986) for example indicates retailers' location preferences are influenced by accessibility, the size of a shopping center and presence of magnet stores. In another research made by Kumar and Karande's (2000,) "the effect of retail store environment on retail performance" has been surveyed. The research by Campo et al.

(2000) is on "the impact of store and trading area characteristics on category and store performance". Their article reports, that relevant location factors have been expressed as store characteristics (store image, format and size) and characteristics of the trading area (competition, socio-demographic characteristics of people living in trading zone, degree of urbanization).

And finally, we considered the hierarchy trees of Tzeng et al.(2002) and Timor and Sipahi (2005). Findings are summarized in Table 5.1 and Table 5.2 in the appendix.

5.2. The Hierarchy Tree and the Pilot Research

The pilot research was done after collecting all the criteria from the literature review. Researchers sat down with one expert in the management of fast food and casual dining restaurant and discussed findings. Criteria were grouped into categories, some were taken as is, some were modified (given more depth and sub-levels) and others were disqualified for being considered as of low importance to the Lebanese case or to restaurant management in general. Results are summarized in Table 5.3 and the hierarchy tree is displayed below in figure 5.

The collected criteria were grouped into 3 broad categories:

- Store characteristics
- Area characteristics
- Customer characteristics

On the other hand, as discussed in the literature review and methodology sections, one main twist of this research is that it measures the location problem from the perspective of both customers and managers. And so criteria were split into two main categories:

- Customer perspective criteria
- Management perspective criteria

Disqualified criteria, which disqualification was based either on the low score they got in previous AHP studies or on pilot testing with experts, were put altogether in a table, to be validated later in the following phase of the research.

Table 5.3. Criteria Analysis via the Pilot Research

Taken “as is”	Modified	New	Disqualified
Accessibility	Area particularity	Customer perspective	Average time to reach location
Distance to nearest highway	Distance	Management perspective	Costs
Public transportation	Physical characteristics	Valet parking	Sales
Traffic jam risks	Parking availability	Self-Parking facility	Environmental factors
Mall	Shopping area / center (not mall)	Distance from departure point	Sustainability
Distance to magnet stores / places	Touristic / historical / emblematic area	Restaurant clusters	Easiness of entrance
Distance from center of interest	Power of competitors	Average customers per day	Usability of assets
Spaciousness and comfort	Operational advantages	Number of seats	Behavioral factors
Dev. of adjacent areas	Store size	Total branches	Availability of kids playground
Future developments	Type of area	Years at location	Store image
Zoning		Floor related	Counts at meal time
Competition		Kitchen related	
Distance of competitors		Number of indissociable tables	
Number of competitors		Number of seats	
Population density			
Building conditions			
Traffic patterns			
Pedestrian traffic counts			
Vehicle traffic counts			
Visibility			

Unobstructed view to traffic			
Visibility of signs to traffic			
Demographic factors			
Nearby customer base			

Sales were dropped down because they are a logical consequence of the choice of a good location. Environmental risks were considered criteria that are not today crucial in the Lebanese scenery because they need long term thinking and planning in a politico-economic environment that favors the short and medium terms at most. Environment was also the last criteria in the ranking by Tzeng et al. (2002, 175). No criteria were judged as irrelevant for location or not significant enough.

Figure 5. The Restaurant Site Selection Hierarchy Tree: Customers' Perspective

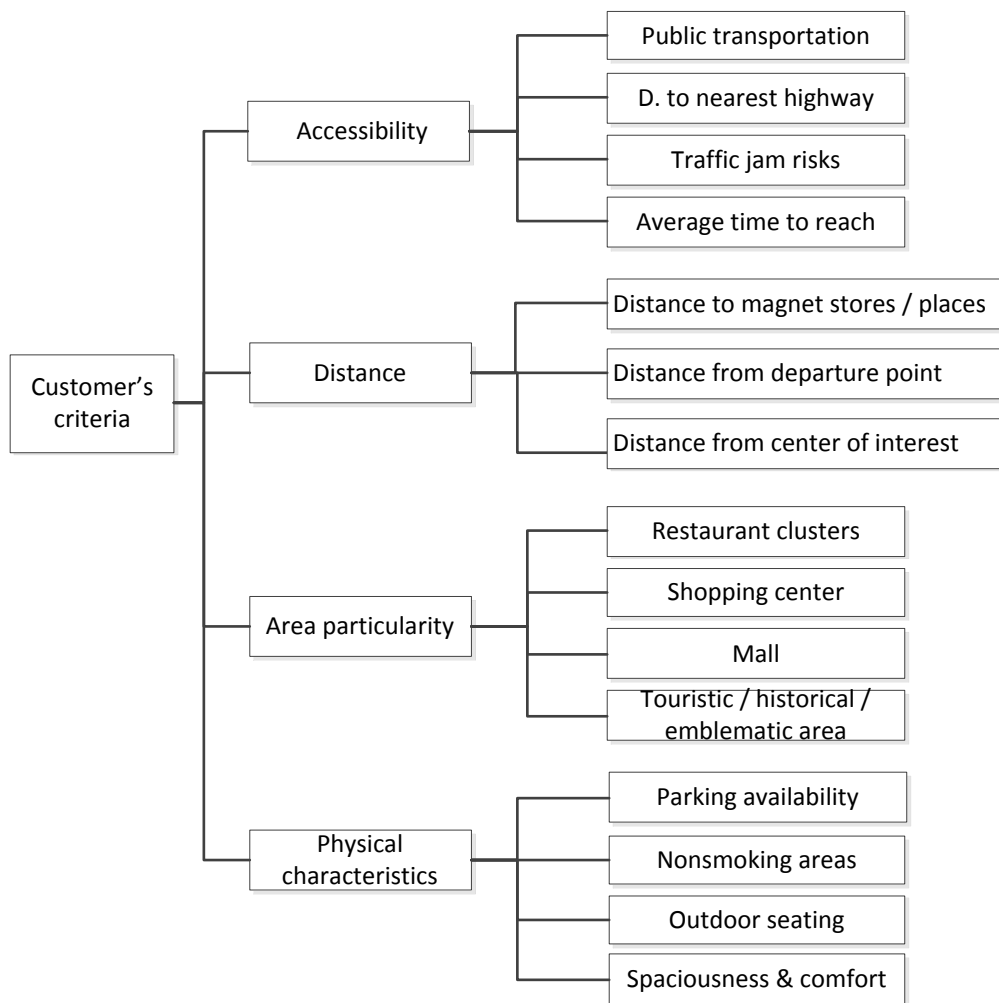
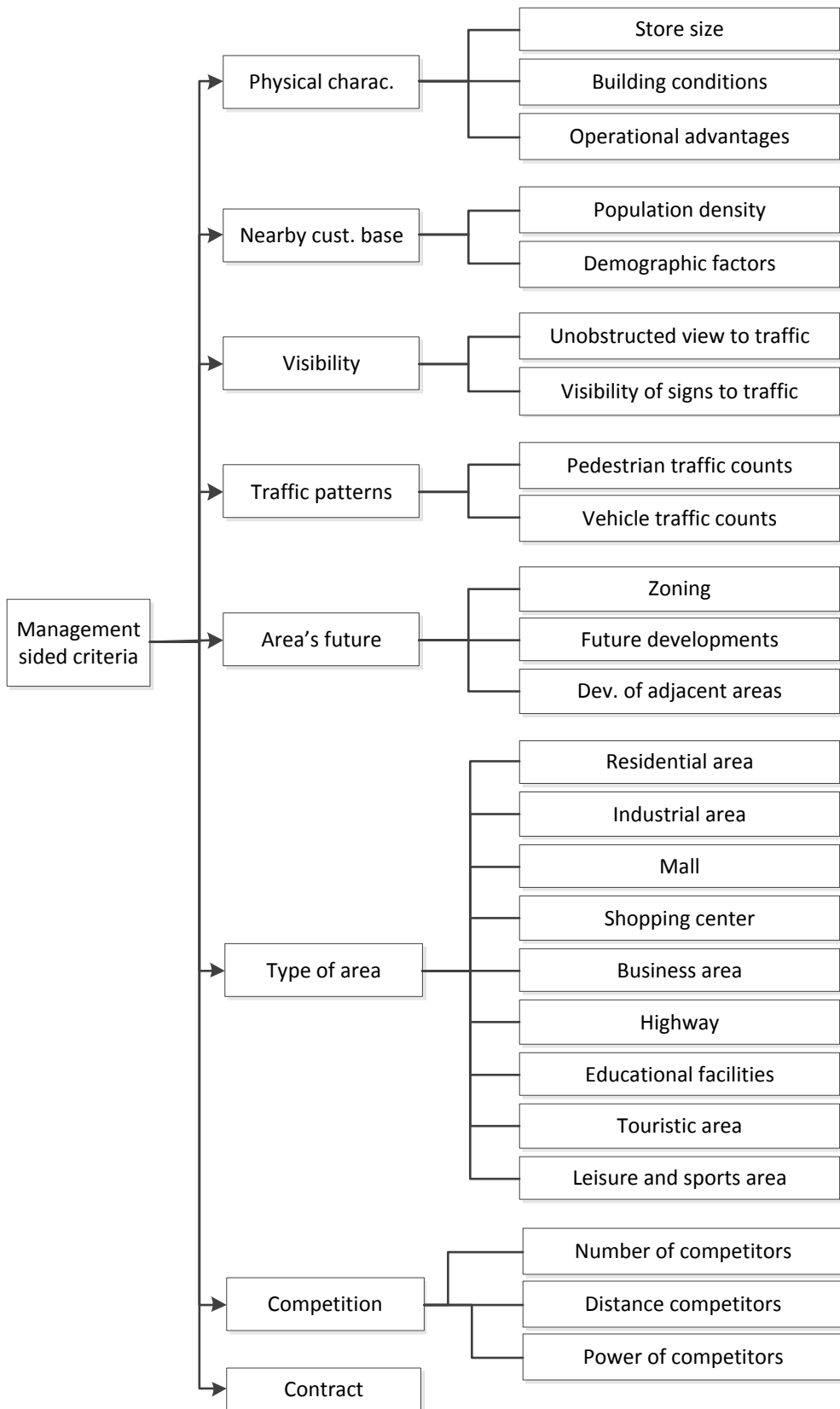


Figure 6. The Restaurant Site Selection Hierarchy Tree: Experts' Perspective



5.3. Validation

Validation took a second round, this time with all the interviewed experts and customer respondents. All disqualifications were validated in the interviews by all experts. Also, as discussed before, one main twist of this research is that it measures the location problem from the perspective of both customers and managers. Validation again was used to check whether a criterion was listed in the wrong category and none was judged so by all experts. Finally, no new criteria was listed by experts in the interviews or by customers in the online questionnaire, leading to the conclusion that our chosen criteria constitute a model that is proved to be enough comprehensive, with appropriate depth and width. All results are shown in Table 5.4.

Table 5.4. Second Round Validation Results

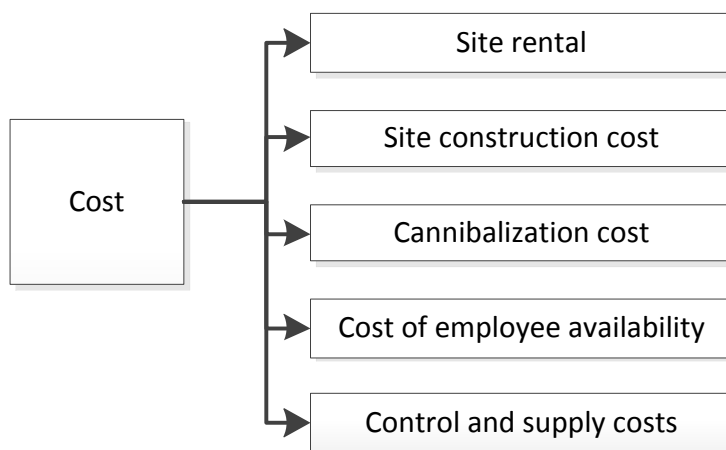
	Experts		Customers	
	Chosen criteria	None	0	Public transportation Nonsmoking area
Disqualified criteria	Costs Overpriced location Kids playground	10 1	None	0
Missed criteria	None	0		
Criteria categorization and hierarchy	None	0	None	0

As reflected in the results table above (Table 5.4), no suggestion was significant enough to be taken into consideration (all less than 5% in customers and 1 out of 10 experts indicated that “kids’ playground” should be part of the physical characteristics). We shall thus consider that our hierarchy tree, with its subsequent criteria and categories validated by both our samples.

Cost was of course a major issue in experts’ point of view. Nevertheless, we shall not include it into our hierarchy for the simple reason that it can capture too much

importance on the scale, and it has the potential to shadow the benefits of other criteria. Moreover, cost is highly linked and not independent with many of criteria in our hierarchy tree. Visibility, traffic pattern, type of area, building conditions, size, etc. are all parameters that can higher the cost of location or lower it. Overpriced location was an alternative criterion to overall cost that is significantly less related to other criteria and shall be taken into consideration in future hierarchies. Overall cost shall be accounted for in terms of benefits to cost ratio. Benefits are the aggregated eigenvectors of each alternative and cost is the normalized cost of each alternative, constituted of the below categories, presented in figure 7.

Figure 7. The Cost breakdown



5.4. The AHP Model Output: Criteria Weights and Ranking

Data collected for the pairwise matrix of both experts and managers will be plugged in the developed AHP model which will generate Eigenvectors or weights for each criterion and set of criteria.

Segment analysis will be done for the customer perspective criteria. Geometric means, CVs and criteria weights (rankings) will be compared among the segments of the bio data:

- Male versus female
- Car versus no car
- Age groups
- Frequency of dining outside home

According to dispersion and consensus (consensus being defined as the degree of homogeneity in assessing a certain criterion; for example if everyone chose Visibility or Traffic Patterns by a factor of 7, this means that consensus on this judgment is very high), data collected will be mainly analyzed with the Coefficient of Variation, CV, calculated by dividing the standard deviation of the sample over the mean. CV is chosen as a dispersion measure because of its normalized characteristic. The CV will give us insight on the consensus level of the group, smaller coefficients indicate higher consensus (Tzeng et al 2002, 175). Areas of low consensus will be suggested for further investigation in future research.

5.4.1. Results for Management Perspective Criteria

Data collected from the 10 interviews were filtered for consistency ($CR < 0.1$) and aggregated using the geometric mean. Results are shown in the table below:

Table 5.5. Criteria Rankings by Experts

	Rank	Weight	CV	Rank CV
Site selection				
Management perspective criteria	1	0.5000	0.0000	1.5
Customer perspective criteria	2	0.5000	0.0000	1.5
Management perspective criteria				
Visibility	1	0.3369	0.1848	1
Nearby cust. base	2	0.1390	0.4756	2
Traffic patterns	3	0.1377	0.7099	6
Type of area	4	0.1172	0.5139	4
Contract period and conditions	5	0.1134	1.2937	8
Competition	6	0.0598	0.7615	7
Physical charac.	7	0.0497	0.5398	5
Area's future	8	0.0462	0.4980	3
Area's future				
Future developments	1	0.3887	0.5413	1
Zoning	2	0.3886	0.6707	3
Dev. of adjacent areas	3	0.2228	0.6233	2
Competition				
Power of competitors	1	0.7482	0.5413	1
Number of competitors	2	0.1339	0.6707	3
Distance of competitors	3	0.1180	0.6233	2
Number of competitors				
Indirect competitors	1	0.5563	0.6484	1
Direct competitors	2	0.4437	0.8132	2
Power of competitors				
Total branches	1	0.4032	0.5055	2
Years at location	2	0.3551	0.5839	3
Average cust. per day	3	0.1747	0.9731	4
Number of seats	4	0.1395	0.2070	1
Nearby cust. base				
Demographic factors	1	0.6010	0.5270	1
Population density	2	0.3990	0.7936	2
Demographic factors				
Income_dem	1	0.6937	0.4050	1

Age_dem	2	0.3063	0.9173	2
Physical charac.				
Operational advantages	1	0.5444	0.3305	1
Building conditions	2	0.2459	0.8807	3
Store size	3	0.2097	0.7080	2
Operational advantages				
Floor related	1	0.7950	0.1110	1
Kitchen related	2	0.2050	0.4305	2
Traffic patterns				
Pedestrian traffic counts	1	0.5804	0.4864	1
Vehicle traffic counts	2	0.4196	0.6727	2
Pedestrian traffic counts				
Income	1	0.5470	0.1823	1
Occupation	2	0.2722	0.3527	2
Age	3	0.1317	0.5962	4
Gender	4	0.0490	0.4265	3
Visibility				
Unobstructed view to traffic	1	0.5832	0.3185	1
Visibility of signs to traffic	2	0.4168	0.4456	2
Type of area				
Mall	1	0.2727	0.5223	5
Shopping area / center (not mall)	2	0.2326	0.3633	4
Business area	3	0.1221	0.2413	2
Touristic area	4	0.1151	0.2640	3
Highway	5	0.0864	0.6157	7
Residential area	6	0.0562	2.0430	9
Educational facilities	7	0.0528	0.5983	6
Leisure and sports area	8	0.0453	0.7687	8
Industrial area	9	0.0168	0.1062	1

The table is made up of 4 columns of results. Column 1 is the rank of the criteria by its respective weight. This means that, according to the Eigenvector calculations, the criteria ranking is as in the table above. Rank number 1 means that the criterion is considered as the first priority between the other criteria in the same group

or cluster. Column number 2 is the actual weight calculated by the Eigenvector method. Column number 3 is the CV of the different criterion weights according to each single opinion. The last column is the rank of each CV relatively to the other CVs of the criteria in the same cluster. As said earlier, a lower CV means that the respondents agree more between each other on the weights given to the criterion.

Note that in general consensus is high for the first 2 criteria and for the last 2 criteria. This means that experts in general agree on what criteria are the most important and what criteria are the least important. In between is a grey area, where consensus and opinions differ more than on the extremes of the ranking list.

Site Selection:

Management perspective criteria and customer perspective criteria were the only pair that was ranked consistently by everyone. All experts agreed that both criteria groups are equally important for any location. This is logical because in location, and as we discussed earlier, both perspectives – customer and management - has to be accounted for equally.

Management Criteria:

Visibility ranked first. It has to be noted that its weight is also significantly higher than the first runner up, which is Nearby Customer Base. Another point to be raised is that it also got the lowest Coefficient of Variation, meaning that consensus on Visibility was very high among our decision makers. We therefore can say that Visibility is one of the most undisputable criteria when it comes to site selection in Lebanon.

Nearby Customer Base and Traffic Patterns both score relatively close weights. Let us note that consensus on Nearby Customer Base is much higher than on Traffic Patterns. Traffic Patterns seems an important factor in restaurants in Lebanon, nevertheless, it is controversial as many argued that in Lebanon, walk-ins are much less frequent than going to the restaurant on purpose.

Next come Type of Area and Contract Period and Conditions, scoring again close to each other. Type of Area has a strong consensus; everyone seems to agree that it should be taken into consideration after critical factors have been accounted for. However, Contract Period and Conditions got the lowest consensus (with significantly higher number than all the others) among our interviewed experts. Many argued that this is a critical attribute because it has the power of making nothing happen when everything is just fine. The landlord can cancel a contract or not accept to renew and so many considered this a veto power. Others on the other hand argued that although this is critical, it is highly under the control of management, and can always be debated and can be influenced by management and higher rents.

It somehow not anticipated for competition to score as low as rank 6. Managers argued that competitors can have a positive impact on the whole area, in a joint effort of attracting customers to the area. Many also argued that competition can boost efforts of creativity and always shifts the boundaries of the business. Nevertheless, it is a criterion that needs to be reviewed more thoroughly because consensus was low.

Area's future got the lowest weight, with a relatively acceptable consensus. This is logical in the case of Lebanon since it can be argued that business is more oriented on the short and medium term because of the political instability.

Area's future:

Zoning and future developments of the area itself seem to have equal weights with acceptable consensus levels.

Competition:

Power of competitors is significantly more important than number and distance. Number is perceived to be more important than distance.

Number of Competitors:

Weights are almost equally shared, with a slight preference to direct competitors. This means that all decision makers consider both criteria almost equally when choosing a location. Discussion of the two was somehow very rich in perspectives were many said that direct competitors take sales away and should be considered negatively, others argued that indirect competitors make more overall turnover but again less frequency of coming at the same restaurant. Indirect competitors are desirable from one side but not desirable from another.

Power of Competitors:

The Total branches criterion was considered the most important factor to consider, with high consensus. And Number of Seats the least important with a high consensus again. This suggests that we remove this criterion from the list, but again, a powerful competitor that becomes quickly full will make customers overflow to others, and the contrary is true.

Physical Characteristics:

Operational Advantages took the highest weight and a low consensus. Store size, surprisingly enough was the least considered criterion.

In Type of Area:

The Industrial Area was the least desirable area to open a restaurant in Lebanon, with a very high consensus. Mall and shopping area were the preferred locations for a casual fast food restaurant. Residential area got the lowest consensus and a relatively high CV. This suggests that this type of area is basically very tight to the concept itself. So managers would consider taking a location there when their concept can run in such an area. Highway was not among the top 4, with business and touristic coming before in priority. This can be argued for in saying that it is not the highway itself that generates sales, but the highway combined with business areas and shopping areas, typically like the coastal highway of Metn. The Highway, mid-distance between Saida and Beirut for example is not considered an attractive location.

5.4.2. Sample Description of Online Questionnaire

Data was collected with an online survey during 4 consecutive days, achieving a response rate of 38.5% with 83% of respondents answering consistently the validation questions. The response rate is low due to the fact that it is an online questionnaire, and to the fact that data was only collected in 4 days. The collection statistics are in the table below. Online data collection is further discussed in section 5.4.3.

Table 5.6. Online Questionnaire Sample Description

Size	210		
Gender	Male	119	56.7%
	Female	91	43.3%
Car?	Yes	187	89.0%
	No	23	11.0%
Usage	Less than 1	19	9.0%
	1 to 2	84	40.0%
	2 to 5	85	40.5%
	more than 5	22	10.5%
Age	Below 18	0	0.0%
	18 to 25	96	45.7%
	26 to 35	96	45.7%
	36 to 45	12	5.7%
	Over 45	2	1.0%
Total respondents	253		
Sent questionnaires	657		
Response rate	38.5%		
Good ones	83.0%		

Sample size, taking into considerations only the ones that were filled correctly at the validation questions is 210 respondents. Sample size is representative of the population of the 10 interviewed restaurants but probably with an error exceeding 5%. As we have argued earlier, we are willing to tolerate such errors because we do not intend to generalize over the whole population.

Male versus female is somehow balanced and we will be able to compare answers of males and females alone. However, it has been found that the majority of respondents have a car. This is probably because people in Lebanon who can afford to be online and are customers of targeted restaurants can more likely afford a car.

Usage rate has been found normally distributed, with the average numbers getting the higher weights and the extremes lower weights. This is again normal, assuming that all our respondents are already customers of the restaurants in question.

Age was selective in the survey where 18 years old and below were not allowed to participate, and the ones who did were filtered. We have found that our sample consists of 2 big segments, from 18 to 25 and from 26 to 35 in equal weights. We can say it is quite expected to find most casual fast food diners that are present on the internet to fall in the 18 to 35 age range.

5.4.3. Discussion of the Facebook experience

As is has been discussed in the methodology chapter, the Online Questionnaire for customers was conducted via Facebook. This section aims at discussing major strengths and weaknesses encountered in the Facebook recruitment and data collection experience.

5.4.3.1. Accessible target respondents

The target respondents in this research were customers of the 10 interviewed restaurants. The challenge was how to reach those through an online survey. There was two options: either restaurants will give away a database of the email addresses of their customers, or to access them publicly over their publicly available pages over Facebook. The first option requires extensive public relations and accessibility to such databases will be hard, unless the questionnaire will be forwarded by the restaurant management itself. This will obviously lessens the control of the researcher over the contacted respondents. Facebook on the other hand, offers the same accessibility to an enormous database of customers in an easy and relevant way. Researchers end up gaining the time it will take to get the approval of using company databases, and will gain the control over how and whom is being contacted.

Nevertheless, not all profiles on Facebook can be accessed because of the option each Facebook member has to increase privacy. The extreme case is a profile that has no options to be contacted. And the other extreme side is a profile that has a publicly listed email, with phone number, a Facebook message button and the ability of communicating via the Facebook wall of the profile. Both scenarios were encountered in the research, but as all extremes, these occurred in very few cases. Not more than 20 out of 677 (which is 3%) profiles were inaccessible. All the others had at least one mean of contacting them, will it be an available email address, Facebook message or wall.

5.4.3.2. Speed of Collection

One of the most important advantages of Facebook is this research was the speed of getting a response from a potential respondent. Two online collectors were initiated at the beginning of the research, one by email (SurveyMonkey sends a customized email to a list of supplied email addresses), and another one by web link (SurveyMonkey creates a link to be copy pasted anywhere on the web, which is routed back to the survey). Collected emails from Facebook were contacted by email collector and profiles with no listed email address were contacted by web link collector. Results are show in the table below. What this exercise showed is that responses from the email link progressed significantly slower than those of the web link. Results are shown in the table below.

Table 5.7. Facebook Link versus Email Link

	Responses	Sent	Response Rate
Web link	208	515	40.4%
Email link	45	142	31.7%
Total	253	657	38.5%

This shows that people contacted directly through Facebook were quicker in responding. Moreover, their response rate is significantly higher. This can be interpreted in ways. One is that many email links could have been sent to the spam folder, and second is that people check their Facebook accounts much more than they check their emails.

5.4.3.3. Reliability of information

On the other hand, using Facebook as a source of sample selection based on the information available on the public profiles of people presents a significant risk of collecting wrong data. It is not uncommon for people on Facebook to use fake profiles, and to present fake and wrong information about themselves. In many cases, a fake profile can be identified from a low number of friends, no pictures of the person and contradictory information. But in many other cases, fake profiles cannot be recognized. The harder part is to recognize fake information on a non-fake account such as age or occupation. Age can be estimated from the picture if there is one, but again, this is misleading and not accurate. Nevertheless, it is considered that the risk of getting inappropriate data, even if inappropriate people (according to age for example) are contacted, is relatively low. This is because the Facebook profile is not anonymous and the faker could have reasons for faking information, whereas in the survey, respondents are assured that it is anonymous and therefore have high chances of not supplying wrong information about themselves. This way, responses can be filtered again and unwanted responses, such as below age, can be discarded.

5.4.4. Results for Customers' Perspective Criteria

Results and criteria ranking for the whole sample can be found in the table

below:

Table 5.8. Criteria Rankings by Customers

	Rank	Weight		Rank	Weight
Issue of paid or free			Public vs. private		
Free	1	0.7814	Private	1	0.5801
Paid	2	0.2186	Public	2	0.4199
Customer perspective criteria			Accessibility		
Store Physical characteristics	1	0.2873	Traffic jam risks	1	0.4168
Area particularity	2	0.2833	Distance to nearest highway	2	0.3940
Accessibility	3	0.2321	Public transportation	3	0.1891
Distance	4	0.1973			
Self-Parking facility			Parking availability		
Distance from restaurant	1	0.3847	Self-Parking facility	1	0.7524
Issue of paid or free	2	0.3335	Valet parking	2	0.2476
Distance			Store Physical characteristics		
Distance from center of interest	1	0.4351	Spaciousness and comfort	1	0.2964
Distance from departure point	2	0.2998	Parking availability	2	0.2901
Distance to magnet stores / places	3	0.2651	Availability of nonsmoking areas	3	0.2144
			Availability of	4	0.1991

Area particularity

Touristic / emblematic area	1	0.3685
Restaurant clusters	2	0.2970
Shopping area / center (not mall)	3	0.1684 51
Mall	4	0.1660

Free versus paid:

Obviously enough, people chose the free parking instead of the paid parking. This is obvious but this gives us a hint that most of the people did not answer was exactly meant in the questionnaire. The pairwise matrix question means that when you are considering picking a restaurant location, how much you would consider the parking to be free or paid. What is expected is a slight priority for free parking because a big difference in weights means that people are ready not to go dine somewhere because of the paid parking issue, which is not the case of most people. This gives us a hint that people are answering more on what they prefer, and not on what they consider to pick a location. This must be dealt with in future questionnaires.

Customer criteria:

Weights are very close to each other meaning that all criteria are equally important for the customer. Nevertheless, it can be noted that distance is the least prioritized criteria.

Self-parking facility:

Distance of the parking place is the most important factor, which is quite logical. It is to be noted that this time, people interpreted the issue of paid versus free in the context of consideration and not favoritism. Will it be not the case; we would expect that Free versus Paid would get the same priority of Free in the case of free and paid pairwise comparison.

Parking availability:

It is quite clear that people prefer to park themselves.

Area particularity:

Perhaps the most shocking result is that of the area particularity consideration. People seem not to consider malls and shopping centers as a primary destination for dining outside, which is exactly the opposite of where managers prefer their restaurants to be! This means that people are answering the question “where would you prefer to go eat” in contrast to “where do you find yourself eating most of the time”. This hypothesis has to be tested in future questionnaires because it is simply illogical that malls and shopping places are the most lucrative locations for restaurants while people prefer touristic and restaurant clusters.

Store physical characteristics:

People slightly preferred spaciousness and comfort over parking availability, which is not expected. Outdoor seating is not an important consideration and Availability of Non-smoking Areas is starting to take off.

5.4.5. Analysis According to Gender

When displaying results according to gender, several criteria change in priority between male and female. In grey are criteria which weights differ between male and female:

Table 5.9. Results Analysis According to Gender

Female	Rank	Male
Issue of paid or free		
Free	1	Free
Paid	2	Paid
Customer perspective criteria		
Distance	1	Store Physical characteristics
Area particularity	2	Area particularity
Store Physical characteristics	3	Distance
Accessibility	4	Accessibility
Self-Parking facility		
Distance from restaurant	1	Distance from restaurant
Issue of public vs. private restaurant parking	2	Issue of paid or free
Issue of paid or free	3	Issue of public vs. private restaurant parking
Distance		
Distance from center of interest	1	Distance from center of interest
Distance from departure point	2	Distance to magnet stores / places
Distance to magnet stores / places	3	Distance from departure point
Area particularity		
Touristic / emblematic area	1	Restaurant clusters
Restaurant clusters	2	Touristic / emblematic area
Shopping area / center (not mall)	3	Mall
Mall	4	Shopping area / center (not mall)
Issue of public vs. private restaurant parking		
Private	1	Private

Public	2	Public
Accessibility		
Traffic jam risks	1	Traffic jam risks
Distance to nearest highway	2	Distance to nearest highway
Public transportation	3	Public transportation
Parking availability		
Self-Parking facility	1	Self-Parking facility
Valet parking	2	Valet parking
Store Physical characteristics		
Spaciousness and comfort	1	Parking availability
Availability of nonsmoking areas	2	Spaciousness and comfort
Parking availability	3	Availability of outdoor seating
Availability of outdoor seating	4	Availability of nonsmoking areas

In Parking availability, Accessibility, private parking, and paid versus free, both gender have the same priorities.

However, females seem to consider distance more than males, whereas males prefer store characteristics instead. Females care less about parking places and more about spaciousness and comfort, whereas males care more about parking places. This seems logical since females in Lebanon will prefer to go out with males driving, and if they were to drive, distance is a special consideration.

5.4.6. Analysis According to Age Groups:

Only age groups 26 to 35 and 18 to 25 were taken because the other two age groups did not return a statistically significant number of responses to be able to analyze the ranks of the criteria accounting to them. (Check Table 5.6)

Table 5.10. Results Analysis According to Age Groups:

26 to 35 year old	Rank	18 to 25 years old
Issue of paid or free		
Free	1	Free
Paid	2	Paid
Customer perspective criteria		
Store Physical characteristics	1	Distance
Area particularity	2	Area particularity
Accessibility	3	Store Physical characteristics
Distance	4	Accessibility
Self-Parking facility		
Distance from restaurant	1	Distance from restaurant
Issue of paid or free	2	Issue of paid or free
Issue of public vs. private restaurant parking	3	Issue of public vs. private restaurant parking
Distance		
Distance from center of interest	1	Distance from center of interest
Distance to magnet stores / places	2	Distance from departure point
Distance from departure point	3	Distance to magnet stores / places
Area particularity		
Touristic / emblematic area	1	Restaurant clusters
Restaurant clusters	2	Touristic / emblematic area
Shopping area / center (not mall)	3	Mall
Mall	4	Shopping area / center (not mall)
Issue of public vs. private restaurant parking		
Public	1	Public
Private	2	Private
Accessibility		
Traffic jam risks	1	Distance to nearest highway
Distance to nearest highway	2	Traffic jam risks
Public transportation	3	Public transportation
Parking availability		

Self-Parking facility	1	Self-Parking facility
Valet parking	2	Valet parking
Store Physical characteristics		
Parking availability	1	Spaciousness and comfort
Spaciousness and comfort	2	Parking availability
Availability of outdoor seating	3	Availability of nonsmoking areas
Availability of nonsmoking areas	4	Availability of outdoor seating

Less pronounced differences exist between the age groups than when we compared males with females. The biggest difference found is in the distance, where the age group 18 to 25 considers it as the most important criteria and the other age group considers it as of the last important. This is logical enough where older adults care less about distance than people who are still new to driving or going out a lot. All other differences are not very different for the two age groups, with only little permutations with the ranks 1 and 2 and 3 and 4.

5.4.7. Analysis According to Usage Rate:

Usage rate is defined as how frequently one eats outside home, in a fast food or casual dining restaurant in a week time.

Table 5.11. Results Analysis According to Usage Rate:

2 to 5 times per week	Rank	1 to 2 times per week
Issue of paid or free		
Free	1	Free
Paid	2	Paid
Customer perspective criteria		
Distance	1	Area particularity
Store Physical characteristics	2	Store Physical characteristics
Area particularity	3	Distance

Accessibility	4	Accessibility
Self-Parking facility		
Distance from restaurant	1	Distance from restaurant
Issue of paid or free	2	Issue of paid or free
Issue of public vs. private restaurant parking	3	Issue of public vs. private restaurant parking
Distance		
Distance from center of interest	1	Distance from center of interest
Distance from departure point	2	Distance to magnet stores / places
Distance to magnet stores / places	3	Distance from departure point
Area particularity		
Restaurant clusters	1	Touristic / emblematic area
Touristic / emblematic area	2	Restaurant clusters
Mall	3	Shopping area / center (not mall)
Shopping area / center (not mall)	4	Mall
Issue of public vs. private restaurant parking		
Private	1	Private
Public	2	Public
Accessibility		
Traffic jam risks	1	Traffic jam risks
Distance to nearest highway	2	Distance to nearest highway
Public transportation	3	Public transportation
Parking availability		
Self-Parking facility	1	Self-Parking facility
Valet parking	2	Valet parking
Store Physical characteristics		
Parking availability	1	Spaciousness and comfort
Spaciousness and comfort	2	Parking availability
Availability of nonsmoking areas	3	Availability of outdoor seating
Availability of outdoor seating	4	Availability of nonsmoking areas

Again, the only relevant difference is distance. Heavy diners tend to prioritize distance whereas less frequent diners tend to value area particularity more than the others. This is also logical taking into consideration that people who go out a lot will typically consider distance more, and people who go out less frequently want to get advantage of their time out and value area particularity more. This is compliant with the managers' point of view, where the nearby customer base was prioritized on other things. People who eat a lot outside home consider distance a lot in their decision, and people who eat out a lot are more desirable customers for restaurants.

CHAPTER 6

CONCLUSION

This research is about developing a conceptual framework using AHP to create a tool for Fast Food and Casual restaurants managers to use when selecting their restaurant site or location. It has been shown that AHP is a good multi-criteria model for site selection purposes and can be applied specifically to restaurant site selection. On the other hand, criteria for the restaurant site selection have been pulled together from the literature, creating a comprehensive hierarchy criteria set. Some criteria were taken as is; others were modified by adding more depth and sub-levels, and other were completely new.

Two data collection methods, one was interview based and the other was an online questionnaire, derived the pairwise comparison matrix of AHP for weight calculation. Weights, and consequently criteria priorities, were derived all along the hierarchy tree. This conceptual model can be taken as it is and applied on a real case scenario, where different existing location strengths can be evaluated through the model and compared with reality. This will give insight about how much the developed model can generate value in judging what a good location is and what is not. Nevertheless, this conceptual model should be treated with care, knowing that criteria priorities can change according to specific brands. It should also be taken into consideration that integrating the consensus level to the criteria weight will give much more insight to solving the location problem.

Although this framework is created for restaurant site selection, its key ideas can easily be applied in other store site selection problems such as coffee shops and ice cream bars, and other nonfood retail outlets like clothing and electronics for example.

6.1. Limitation of the Research

Many things can be investigated applying a better approach in the future and yielding more significant insight:

- Customers' point of view is critical to measure, but the choice of an online survey is not the best option to do pairwise comparison because of the unfamiliarity of people with this type of ranking and with the relative scaling. Interview administered questionnaire is a better option. Sample size needs to be more significant.
- Dependency of criteria along the hierarchy tree can also be a major concern for this model. ANP (the Analytic Hierarchy Process of Saaty) might be a better option and it is recommended to use both ANP and AHP and compare the results.
- Criteria need to be investigated with experts independent of their restaurant's brand. Many criteria where consensus was low are in fact criteria that can differ from one brand or restaurant concept and the other. Size and proximity to educational facilities are an example. Therefore, the research needs to assess between brand versus non-brand criteria.

6.2. Suggestions for Repeating the Same Research

Remarks to be taken into consideration in the future in tackling pairwise in management's perspective:

- Reconsider competition more thoroughly, with discussion of market share and higher costs because of higher competition.

- Do not tackle all this section in the beginning of the interview. Leave it to the end (not the very end), because interviewees will have a better grasp of all the discussed concepts.
- Criteria must be discussed more thoroughly, with prepared examples and considerations to approach the criterion from all perspectives and angles
- More than one interviewee per concept is better because debate and discussion can yield better rankings. Three interviews were conducted with a group of 2 to 3 managers and results from this kind of group were more consistent (in CR) and far more interesting and logical.
- Many criteria such as Residential Area and Pedestrian Traffic Counts, the ones that got a relatively low overall consensus, need the concept itself to be taken into consideration. And thus, we recommend that this type of research will maximize its relevance if it is applied to one single concept, with interviews with many managers and experts related to this single concept. Results could be compared to the outcome of the aggregated concepts judgment in this research.

6.3. Suggestions for Future Research

Interesting future research can be done to complete and strengthen this research:

- Devise a method to integrate consensus level and weights in the AHP model so that the ranking depends of both weight and consensus, represented by the CV or any other dispersion measurement.
- Investigate brand versus non-brand criteria and account for these in the AHP model to produce a more consolidated conceptual framework that works for general Fast Food and Casual restaurant site selection.

- The next step of this model shall be a direct application - a case research - taking into consideration one single restaurant, with its customers and managers. Both new weights and weights resulting from this research are advised to be used and compared. The case research shall tackle 2 or more current locations of the restaurant chain, ones where variables other than location (example of management) are minimal. The results of the research shall coincide with the actual sales generations and rankings.

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