**CHAPTER ONE**

**1.1. Background of the study**

One important decision area in operations management is capacity decision. Capacity decision in the long term may mean high new capacity addition. New capacity addition entails a decision whether to maintain existing location or considering a new location for the new capacity to be added. Firms are also required to make location decision in venturing into new investments. Existing firms relocate their business with the view to enjoying the benefits that accrue from the new location. Location impacts the cost and speed of delivery of goods and services of a firm (Sule, 2001). According to Porter, Location can be a source of competitive advantage (Porter, 1985, p105; Current et al., 1997; Goetschalckx, 2002). A good location enhances business competitiveness where as a poor location has adverse effect on the same. The increased attention to business logistics has also contributed to the interest in location decision (Ballou and Masters, 1993).Facility location decision is important both in manufacturing and service firms.

The location decision process comprises: defining location objectives, identifying the relevant decision criteria, relating the objectives to the criteria using appropriate model, collecting relevant data and use the model to evaluate the alternative locations and select the best location that satisfies the criteria.

Thuman provided us with the first theoretical frame work for location analysis (Thuman, 1875). Thuman’s approach to location analysis was a “least-cost” approach and the study was focused on economics of farms. A comprehensive theory on manufacturing location was developed by Weber in 1909(Weber, 1929, Izard 1956). According to him, transportation cost, cost of labor and agglomeration were considered important location factors. Walter Israd contributed improvements on Weber’s theory by indicating transport rates do not vary proportionally with distance ( Isard W, 1956). Improvements on this approach came through analysis of trade-offs between transportation cost and non- transport costs that influence the cost of location According to him all costs have been classified as transportation and production costs. Other theorists assume that location determines revenue rather than cost. Harold Hotelling indicated that firms tend to locate towards the center of the market area rather than disperse (Hotelling H,1929).The third group of theories analyzed the effects of location on both cost and revenue**.** According to them, the important factors are: the size of the market, the cost of transportation and the price the buyers are willing to pay for the commodity). Greenhut takes the credit for the comprehensive attempt he made in this regard (Greenhut, M. L, 1970). He developed a model for location equilibrium of firms which aims at profit maximization under conditions of cost and demand variation.

Examination of the cost structure of food processing firms suggests that the geographic location of food manufacturing establishments is related to firms' cost structure. Location choices are thus driven by a firm's dominant cost, if any (Connor and Schiek, 1997). Food manufacturing plants have been classified as ‘demand-oriented’, ‘supply-oriented’, or ‘footloose’ on the basis of their cost structure (Connor and Schiek 1997; Henderson and McNamara 1997, 2000).

Firm location choice has been analyzed as a two-stage decision process, at stage one the region will be identified (Lambert, McNamara, and Garrett 2006a). In making location decision, once the region is identified, the firm searches for a minimum cost site within the region (Kriesel and McNamara, 2000). Location factors have been addressed depending on the type of product, product life stage uniqueness of industry type (HBS, 1989). A large number of factors have been identified to influence the location decision. A recent study which reviewed critical location factors has revealed 14 critical factors ( Masood A. badri ,2007). Among these, 10 factors are regarded as general factors whereas 4 are considered to be relevant in international context. The general factors are transportation facility, labor, raw material, markets, industrial site, utilities, government attitude, tax structure, climate and community, Government regulations, Utilities, and Community environment. Several sub factors are associated with each of the factors. Location factors comprise both qualitative (subjective) and quantitative (objective) factors. The significance of a criterion may vary depending on the nature of manufacturing firm in consideration.

In supply oriented firms such as flour mills cost of input transportation is more important than cost of output transportation. Various models have been developed to evaluate economic variables of location. Linear programming and break even analysis are often used to evaluate economic variables of location. The Analytical Hierarchy Process (Saaty, 2000) is a decision approach designed to aid in the solution of complex multiple criteria problems in a number of application domains. Location decisions have a well-developed theoretical foundation for over century. Analysis of the literature, however, shows that the gap between theory and practice remains. The approaches advocated in location theory are found to be limited in application in real decisions as, in these problems, a large number of qualitative and quantitative factors are involved (e.g. Hoffman and Schniederjans, 1994; Juthrapanich and Benjamin, 1995; Badri et al., 1995; Atthirawong and MacCarthy, 2011**)**

Industrial development is at its infancy stage in Ethiopia. Recently, however, the flour milling sub sector is expanding and large number of small and medium capacity mills have been established. Presently there are over 200 flour mills in the country. The mills are scattered all over the country with some concentration in some regions (EMA, 2011). In recent years, more number of flour mills has been established close to wheat growing regions than ever. Location theory suggests that supply oriented firms such as flour mills prefer to locate in close proximity to raw material source and thus consider cost of raw material transport as an important factor in their location decision. Although literature suggests that location decisions have to be made on a rational basis, little is known whether flour mills location decisions in Ethiopia are being made on systematic evaluation of different locations based on relevant criteria as no research work has been done on the subject so far. This study tries to review the important criteria used by milling firms in their location decision and attempts to find out whether location decisions in flour milling in Ethiopia have been made as literature suggests. The fact that flour milling is expanding rapidly in Ethiopia and the researcher is a milling technologist with over 20 years of experience in the industry is the reason for an interest in the area.

**1.2. Statement of the Problem**

In recent years, the flour milling industry in Ethiopia has become increasingly competitive owing to a constant rise in the number of establishments and creation of over capacity. A major shift in locating new establishments has been observed during the last five years (EMA, 2011). This new trend of locating mills far away from the major market centers is not understood clearly. With the new trend, many flour mills have been put up closer to the source of the raw material, wheat farming areas. The situation prompts the question whether these firms are making their location decision on a rational basis to benefit from low input transportation cost. Furthermore, it prompts the question whether the importance of some location factors that used to dominate location decisions are changing over time. It may also lead us to question whether previous location decisions in the area were used to be made purely on economic rationale .This research work will investigate whether flour milling location decisions are being made on rational basis and the current move of locating more number of mills closer to wheat growing regions is with the view of obtaining a comparative location advantage from cost of transport of input. This will be investigated by raising the following basic research questions.

* What are the most important factors and sub factors that influence the location decision of industrial wheat flour mills in Ethiopia? How does the relative importance of these factors differ?
* Do flour mills located in or close to surplus wheat growing regions consider cost of transport of raw material as the most important factor in their location decisions.?
* Can we say that the importance of some of the location factors has been lessening and that of some other factors is increasing over time?
* . Do flour mills location decisions are made solely based on economic factors?

**1.3. Objectives of the research**

**1.3. 1. General Objectives**

The main purpose of the study is to identify the underling factors in location decision of industrial wheat flour mills in Ethiopia and to measure the relative importance of different location factors in sites selected for study.

**1.3.2. Specific objectives**

a. The study will investigate whether the current trend of locating more flour mills closer to raw material source is on the rational to benefit from relatively low transportation cost of input,

b. Assessment will also be made to evaluate whether economic factors are given more weight in location decisions of wheat flour milling of Ethiopia.

c. Investigation will be made to find out whether there has been any change in the significance of some location factors over time.

**1.3.3. Hypothesis Development and theory**

Good location contributes to business profitability as several costs of operation are impacted by

location (Connor and Schiek, 1997). Location decisions in flour milling significantly impact cost of production (Henderson, 1997; McNamara, 2000). The decision is, therefore, expected to be made on economic rationale. On the other hand, there is a view that businesses in the formative stage appear to locate in the area where the founder lived, implying that personal factors take precedence over strict profit maximization. However, successful locations, even if initially based on personal factors, may rest on sound location determinants: Therefore; from this we can hypothesize that:

**H1**: Financial (economic) location factors are given more weight than non- financial (non-economic) factors in flour milling location decisions

According to Weber (Weber, 1929), materials can be classified into two categories depending on their processing characteristics. The first group of materials loses significant weight upon processing. Processors who depend on such materials for their input benefit by locating their plants close to the raw material source as transport cost of raw material to the processing site will be considerably lower than that of distributing the resulting intermediate or finished product. Research works made on the impact of location on cost factors of food industries have also indicated that in supply-oriented firms such as flour mills the cost of input dominates their production cost structure and they tend to locate close to raw material source ((Henderson, 1997; McNamara, 2000) Wheat milling is a process in which the resulting standard quality flour constitutes not more than 77% of the raw wheat, meaning a minimum weight loss of 23% is expected in the milling process (Buhler, 1973). The percentage loss will increase with the impurity and moisture content of the wheat. It thus reasonable to assume that, a cost advantage is gained in transport if the influence of other factors than unit weight cost on transportation cost remains minimal. This means Flour mills are able to minimize the cost of transportation when they locate close to input sources. We can thus make the following preposition:

**H2**: Proximity to input market has positive and significant effect on location decisions of flour mills.

Location studies have shown that respondents from different regions in the same country may attach different weights to different factors in their location decision for the same industry (Hennery A.Tombari, 1979). In view of this, the study tries to investigate whether there is difference in the rating of the importance of flour mills location decision factors among respondents from the different sites considered in the study. The following proposition is thus made.

**H3­**: There is difference in the rating of the importance of factors for different regions.

**1.4. Research Methodology**

The models used by FahriKarakaya and CemCanel (FahriKarakaya and CemCanel, 1998) and Henry a. Tombari (1979**)** in their location study are adopted for this study. .Direct interviewing using questionnaire will be used to collect opinion of mill owners and executives to be drawn from three selected sites that will form the population of interest. The decision factors included in the questionnaire (see Annex-1) have been developed by reviewing industrial location theories and related empirical works [Bowersox, 1978, Levine, 1991 Mac Carthy, B. Atthirawong W. 2001, and Masood A. Badri, 2007]. The data required is the rating of the factors based on the importance given to each factor and location factor data of each site. Descriptive statistics will be used to determine the most important variable. Factor analysis will be used to identify the underling dimensions. For comparative analysis of factors by site ANOVA will be employed.

**1.4.1. Population, Sample size and Sampling Technique**

The unit of analysis will be individual existing flour mills which will be selected from three different locations. These locations are selected because the first (Hawassa and its surrounding) is close to the major surplus wheat growing areas, the second (Addis Ababa) is the capital of Ethiopia and is the major product market area, and the third location, Adama which is located 100 km south of Addis Ababa is at an intermediate location between the other two. Hawasa is located 270 km south of Addis Ababa. The population of mills is 69, 44, and 17 at Addis Ababa, Hawassa, and Adama, respectively. Thirty per cent (30%) of the population at each site will be sampled for the study. Random sampling technique will be used to obtain representative samples from each location. A total of 39 firms will be surveyed from all the sites. Each firm to be included in the sample frame must be one with a single mill that has not undergone any vertical integration. Target respondents will be Owner Managers, Chief executive Officers (General Managers) and Department Managers.

**1.4.2. Data Type and Collection Method**

The primary data required is the rating of the factors based on the importance given to each factor and location factor data of each site. The secondary data to be collected will be quantitative data on relevant costs that influence location decision, data sources will be company records. Government offices such as investment and tax authority will be approached for cost of land and tax incentives. The main instrument for primary data collection will be questionnaire. A questionnaire will be used to collect primary data on the location factors through a 5-point scale ranging from not important to extremely importance on each location factor. Financial records will be reviewed for collecting secondary data

**1.4.3. Data Analysis**

Descriptive statistics and kruskal Wallis Test are to determine the underlining dimensions in Ethiopia’s flour mill location decision and test difference in the rating of factors among sites considered in the study. For comparative analysis of factors by site ANOVA is employed .Comparative analysis of the weights given to economic and non- economic factors will be made to evaluate which category of the factors are more important in the location decision of flour mills and thus testing H1. The significance attached to cost of input transportation will be analyzed to verify whether proximity to the raw material source is an important factor or not and as a test for H2.

**1.4.4. Result**

The important location factors for each of the sites will be identified. The relative importance of each factor at each site and in all the sites will be identified. The important location factors common to all sites will be determined. Whether economic or non-economic factors dominate the decision of location of mills will be determined. Whether proximity to wheat growing region is considered an important factor or not will be ascertained

**1.5. Significance of the study**

The study could be helpful to those who want to venture in the industry as well as to those who want expand their existing flour milling business in evaluating and making appropriate location decision. The study may also be exploited by government agencies in their industrial site development efforts. The study may also be used as input to those who want to conduct detailed research work in the area.

**1.6. Limitation of the study**

The study is focused on industrial wheat mills of the country and can be generalized for this group. However, numerous cottage mills exist in the country which grinds wheat as well as other cereals. As this group will not be covered in the study, the study cannot be generalized for the milling industry as a whole. With the government regulation in place now, import of wheat into the country is not allowed. Since the study will be carried out in this situation it may not be generalized for a situation in which import of wheat to the country is permitted since mills close to the port of Djibouti may have advantage over others due to lower inland transport cost. The study cannot as well be generalized for mills that have undergone forward integration by putting up value adding processing plants such as pasta and biscuit plants. The study excludes this group to eliminate the impact of integration on the location decisions of such firms which does not apply to most flour mills.

**1.7. Delimitations of the study**

The scope of the study includes industrial wheat flour mills. These mills employ automated machines for cleaning, preparation and milling of wheat as well as their packaging of products. Regarding their cleaning and preparation system, most of them employ a wet cleaning system. Most of the mills have a compact design. Only mills with input capacity of 30 tons per day and above are considered in this study. The study also does not encompass mills which have undergone some integration, back ward or foreword.

**1.8. Organization of the paper**

The study is organized in five chapters. The first chapter deals with background of the study, statement of the problem, objective, research methodology, significance, delimitation and limitation of the study. Chapter two will present the review of literature. Chapter three explores the study area. Chapter four deals with presentations, analysis and interpretation of the data collected and chapter five with of the summary, conclusions and recommendations of the study.

**CHAPTER TWO - LITRATURE REVIEW**

**2.1. Introduction**

According to Porter, Location can be a source of competitive advantage (Porter, 1990). Stonebreaker and Leong (1994) stressed that the decision to locate a facility should be consistent with the long term strategic direction of the company. Gosh and Craig (1984 and 1986) suggest that a good location strategy should give a firm's strategic advantage that competitors may find it difficult to emulate. For a firm to gain competitive advantage over its rivals, it must have superior resources and customer satisfaction. Porter advises that a firm must perform its primary activities more efficiently and effectively than its competitors. He asserts that these primary activities are in- bound logistics, operations (manufacturing) and out- bound logistics, marketing, sales and after sales services. The location of these activities play a significant role in the success of a business as it influences labor rates, cost of inputs, cost of logistics, etc. Firms need to make location decisions in their new investment, relocation and expansion decisions. The decision to expand or relocate has a strategic bearing on the performance and growth of firms (Blair and Permus, 1987; Coohen, 2000). Firms are not as mobile as assumed in theoretical models and the opportunity cost associated with moving are high.

The location decision is made with a general objective of reducing the cost of production and profit maximization. Different types of factors influence the production cost of a particular product. These are such factors as transportation cost, raw material cost labor cost, land cost, utility cost, etc. Decision makers consider these costs and try to minimize them all. The nature of the decision however often require trade- offs as minimizing one cost factor may lead to increase in one or a number of other cost factors. Location theory helps us a frame work to analyze and explain what factors need to be considered in a particular industry or sub industry location analysis; why some factors are more important than others in a particular location decision and not otherwise. For example the importance of location factors differ from one industry to another (Greenhut, 1982). Location decisions are complex because they involve large number of factors and the significance of these factors vary depending on the type of facility, and alters with technological developments, etc. Furthermore, the complexity of location decision lies in the fact there is no one universal solutions to varying conditions.

Understanding location theory is thus important for location decision. Reviewing theories related to manufacturing location decision in general and food manufacturing industry in particular is viewed to be relevant in the context of this study. It is also believed that understanding the general location decision process is important. Furthermore, it is important to review previous empirical location studies conducted so as to enable us identify the specific relevant factors that should be considered in location decision of manufacturing firms with focus on food processing plants and sub-sector considered in this study. The literature review thus focuses on the above mentioned issues. Firstly, review of theoretical foundation of location determinants will be made. This will be followed by reviews that focus on the location decision process. The last section of the literature review will focus on assessing empirical studies on industrial location in general and food processing plants in particular.

**2.2. Industrial Location theory**

Based on the motivation attributed to the decision making entrepreneur, location theories can be grouped into three broad categories. Theories with focus on cost minimization, Theories related to revenue maximization and Theories of Maximization of profit.

**2.2.1. Theories with focus on cost minimization**

Initial works on economic analysis of location have been carried out by V. Thunen. In his work

concerned with analysis of agricultural location, Thunen provided the first theoretical frame work for location analysis (Thuman, 1875). Thuman’s approach to location analysis was a “least-cost” approach and the study was focused on economics of farms. A comprehensive theory on manufacturing location was developed by Weber in 1909 (Webber, 1929, Izard 1956). According to him, transportation cost, cost of labor and agglomeration were considered important location factors. To simplify the analysis Weber included the data for cost of fuel and raw materials under the transportation cost. In his view, the differences in the price of material deposits may be expressed as differences in the cost of transportation. The site where the cost of raw material is high is thus considered to be more remote than alternative sites. Webber's work signifies the birth of industrial location theory.

When the transportation cost is the only factor affecting the location of industry, the site with the lowest transportation cost will be selected. This site may be close to the output market, input market or in between the input market and output market depending upon the product. The industry tends to locate closer to the raw material (input) source when it is more costly to transport the raw material than the output. Conversely, the industry tends to locate closer to the final market when the cost of transportation of output is more costly than transporting input. Cost of labor is the second important location factor considered by Weber. According to him firms may chose the location where transportation cost is higher and labor cost is low when the cost advantage obtained from low labor cost outweighs the high transportation cost. Agglomeration is another important factor in industrial location decision, according to Weber. He explains that this factor can draw an industry closer together or pull them apart from each other. The agglomeration economies such as proximity to auxiliary industry, proximity to markets and economies of size attract an industry together, whereas the degglomeration factors such as land cost tends to offset the industry. But, the agglomeration economics was not dealt with in detail in Weber’s theory. He is the first, however, to emphasize the economics emerging from concentration of several plants of the same industry at one location. Institutional factors such as taxes, interest rate, insurance, etc. are excluded by Weber in his plant location theory.

Webber explained the orientation of industries on the basis of substitution between transportation costs and non-transportation cost factors. Although his location factors; transportation costs, labor costs and agglomeration forces indicate the general theory of location for all industries, his assumption of constant demand and omission of institutional factors leaves gap in the theory which must be studied to better understand the theory behind plant location.

Walter Israd contributed improvements on Weber’s theory by indicating transport rates do not vary proportionally with distance and by accommodating the zonal characteristics of transport cost in his model **(** Israd, W. ,1956**)**. Improvements on this approach came through analysis of trade-offs between transportation cost and non- transport costs that influence the cost of location.

Latter works on location analysis was concerned with location inter-dependence. The works of Weber and Israd combined can be regarded as the least cost theory of location based up on minimization of transportation cost. The next significant contribution to location theory was made by Hoover. According to him all costs have been classified as transportation and production costs. The theories discussed so far have been criticized to be of limited use as they fail to incorporate the demand and revenue aspects in their analysis.

**2.2.2. Theories Related to Revenue Maximization**

The theorists of these group advocate that maximization of revenue is major locational factor. Among

those who contributed to this theory, Harold Hottelling and Smithies are the first. This theory assumes that location determines revenue rather than cost. In his pioneer work on the subject, Harold Hoteling indicated that firms tend to locate towards the center of the market area rather than disperse (Hotelling, 1929**;**Lemer and Singar 1937), who made their study based on Hoteling’s work disputed his work that claims firms always tend to cluster. According to them, the important factors are: the size of the market, the cost of transportation and the price the buyers are willing to pay for the commodity. Access to consumers is considered a critical location factor. Other things being equal areas with higher market demand are expected to offer greater market opportunities. Balvers and Szerb, and et al., (1996) expanded Hotellimg''s theory by introducing uncertainty factor into the environment. Head and Mayer (2003) suggest location decision is a function of demand in specified area weighted by accessibility to consumers.

**2.2.3. Maximization of Profit**

The theory of location here emphasizes both cost minimization and revenue maximization. Hoover has contributed a lot in plant location theory in this regard (Greenhut, 1982). His theory of plant location deals with demand determinants as well as cost factors. Hoover separated cost factors into production factors and transportation factors. The transportation costs include the cost of procuring raw material and distributing finished products. In the production costs we find land and labor costs, agglomeration forces, differences in fuel and raw material costs and the institutional factors (Greenhut, 1982)

In estimating the transportation costs, Hoover takes a different approach. He is more concerned in the characteristics of freight costs than is Weber. According to Hoover the transportation cost does not increase proportionally with the distance; rather the addition of transition cost is less than proportional as the distance increases. This indicates that it is profitable to have long haul shipments when the terminal costs of the transport agency are high. Thus, the availability of water transport attracts firms which sell to distant markets. Rail roads and trucks attract shipments designed for and very short haul respectively (Greenhut, 1982). Hoover also explains the importance of difference of two firms selling a homogenous product, the firm which transports larger quantities enjoys car load rates. This firm can place greater emphasis on location factors other than transportation in determining the suitable site. The other firm, which can only transport a small amount at a time, should primarily consider transportation cost in its location decision than other factors. Such a firm would likely locate closer to the market in order to minimize transportation cost. Hoover also indicated that transportation costs may be less important in location decision of a firm dealing with perishable products and has to pay extra for safe handling of the product during transportation to market. This firm benefits by locating itself close to the output market (Greenhut, 1982). Hoover's analysis of agglomeration forces is more inclusive than that of Webber in that his agglomeration forces include advantages such as better transfer services, a broader, more flexible land market, more advanced banking facilities, better police and fire protection, and lower insurance costs and utility rates. Thus plant can obtain economies by locating at a site with these agglomeration forces than the alternative site without these features (Greenhut, 1982)

Hoover also included institutional factors in his location theory and hence has been concerned with all possible locational factors unlike Webber who have been concerned in general location factors only. Hoover regards the property tax burden as an element of land cost which affects the location similarity to the interest burden. According to him, tax reflects the return to investment and thus influencing the location decision. Hover also indicated the importance of climate in the location decision. In hot climates labor tends to be sluggish and labor cost will be high; if refrigeration cost is used to counteract this then land cost will be higher. Conversely, when the climate is cold, heating cost will be high, which in turn indicates high land cost (Greenhut, 1982).

Hoover's location theory is distinguished by his introduction of production cost instead of land as in Von Thunen's location theory and non-transportation costs as in Webber's location theory .The production costs in Hoover's theory involve land and labor costs, differences in fuel cost and raw material cost, agglomeration forces and costs generated by taxes and climate. It is important to note the location choice is again the problem of substitution—the transportation cost and the production cost. Hoover explained industrial location factor by integrating the cost and demand factors into location theory (Hoover1937, 1948) .He stressed that transportation costs do not vary proportionally with distance.

The theories falling in this group attempt to analyze the effects of location on both cost and revenue**.** Greenhut (1996) takes the credit for the comprehensive attempt he made in this regard. He developed a model for locational equilibrium of firms which aim at profit maximization under conditions of cost and demand variation.

In summary, a general theory of plant location was presented by Greenhut in 1956. A comprehensive theory on manufacturing location was developed by Weber in 1909(Weber, 1929, Izard 1956).The next significant contribution on location analysis theory was made by laundhardt whose work was concerned with industrial location analysis (Laundhardt, 1885, Miller, 1997). Landward used demand and cost factors to explain variations in location where he demonstrated the importance of transport cost. Webber limited his inquiry to manufacturing although Israd (1956) has described his last chapter as a first attempt to construct a general theory of location of all economic activity. Hoover explained industrial location factor by integrating the cost and demand factors into location theory (Greenhut, 1982).

Historically management decision concerning plant location have principally been considered economic in nature (Carrier, R.E. and W.R.Schriver,1969).The economic factors usually considered as most important in the location decision include the factors explained above: transportation costs, labor and supply costs, tax structures, material availability and costs, and market demand.

**2.3. Empirical studies of industrial location**

The evidence from empirical studies largely confirms that firms primarily choose locations that satisfy input requirements, access to markets and balance of costs of these factors given transport costs. This confirms the significance of profit maximization model of location analysis. The profit maximization assumption is still implicit in most approaches to locational analysis. However, studies have shown that locational studies are not on profit maximization. According to (Walter Israd, 1975), often a manager may prefer a 'safe' location with high probability of generating satisfactory profits rather than a high risk, high return location. Personal factors are also an increasingly recognized locational factor (Mark l. Goldstein, 1985)

A review of empirical studies of industrial location reveals some of the most influential factors in making a decision to locate industrial plants at particular sites (Luttrell, 1962; Smith, 1966; Karaska, 1969; Cameron and Clark, 1966; Carnoy, 1972; Keeble, 1976; Dorward, 1979; Cobb, 1982; Forbes, 1982; Lloyd and Mason, 1984; Walters and Wheeler, 1984; Brusco, 1985; and Mason and Harrison, 1985; Mazzarol and Choo, 2003; Wood and Parr, 2005).

Most often cited factors of industrial location are distance to market, distance to materials,

prevailing wage rates (labor costs), productivity of workers, availability of labor, adequacy of transportation, closeness to producers, industrial climate, taxes, anticipation of market growth, transportation costs, availability of land for future site expansions, cost and availability of utilities, political climate toward business, population growth, and income levels of consumers. The factors widely used in industrial location decision are generally categorized as Market, Transportation, Labor. A recent study made to identify critical location factors has revealed 14 critical factors. Among these 10 are regarded as general factors whereas 4 are considered to be relevant in international context. The general factors are transportation facility, labor, raw material, markets, industrial site, utilities, government attitude, tax structure, climate and community. The international factors are political situation of a foreign country, global competition and survival, government regulation and economic factors (Masod A. Badri, 2007).Several sub factors are associated with each of the factors.

The influence agglomeration economies has on industrial location decision has been emphasized by the works of Jacobs (1969), Porter (1990), Glaseser*et al* ( 992) and McCann(2011).

The works of Bartik (1989) and Woodward (1992) indicate that investment decisions are influenced by product markets, particularly when they are source of final demand. Several survey research results have shown that market factors is the most important factor that influences investment location (Muller and Morgans, 1962; Schmenner, Huber and Cook 1987; Blair and Premus, 1987; Calzonetti and Walker,1991; Crone,2000).Similar studies have also shown that cost and availability of labor are a major factor in investment location decision. After the cost of materials, labor costs, are found to be the largest component of average manufacturing plants (Crone, 1997).

Throughout location literature access to infrastructure is indicated as an important factor to attract investment (Smith, Deaton, and Ketch, 1975; Bartick, 1989; Carlson,2000; Holl,2000; Cohen and Paul ,2004; Lambert, Garnet, and McNamara,2006a). Broadly, infrastructure includes transportation system and land. Availability of land has also been cited as an important location factor (Carlson, 2000). Taxes imposed by government as investment policy are also found to affect investment location (Carlton, 1983; Plant and Pluto, 1983; Wheat,1986; Bartik,1989,192).In the context of developing countries utility service particularly electricity is found to be important in location decision of manufacturing plants. Studies conducted on Indian Industries have found that the quality and to a lesser extent the price of service provision has an important bearing on location of plants. State regulation of Electricity, and power interruptions has been indicated to affect location decision In India (Rud, 2005). Manufacturing firms concerned with land availability tend to avoid cites and densely populated locations, According to Ohlin (1931) industry location depends on transportation costs with the assumption that capital and labor flow freely. Krugmanman (1999) believes that transportation cost is the most decisive factor to select industrial location.

In explaining domestic branch plant locations across the United States metropolitan areas, Carlton (1983), established the importance of location economies (savings resulting from existing spatial clusters of the same industry which are internalized by firms of the same industry). Bartick, in his studies on domestic branch plant locations across U.S. states, found that higher urbanization economies, lower labor costs, and taxes attract new investment. Research works conducted by Coughlin *et al.(*1991),Woodward(1992) and Smith Florida's(1995) indicated that accessibility to input and output markets have a positive influence on the location of foreign owned business within U.S.

According to Smith (1971), the location pattern of an industry is the product of large number of individual decisions. This locational factors range from capital ( finance, equipment and materials) , power, labor and management, market and price, transportation and freight rates, agglomeration, linkage and external economics, public policy, planning and state, to organization, behavior and change. Smith (1971) further asserts that factors considered in industrial location do not remain constant, nor does their desirability. An initially good location does not remain so as changes are bound to occur over time. When these changes occur factories may be affected negatively and may consider relocation.

Ojany (1973) presented factors affecting industrial location as including government influence, influence of raw materials, influence of transfer costs, influence of processing costs, influence of power and water supply, and influence of agglomeration economies and/or industrial interdependence. All these factors are often put into consideration in the establishment of various industries in Nigeria( Oyebbanji and Olawepo,2006).

Traditional location factors such as market access, labor costs and raw materials which have been mentioned as most important factors that influence location decision by manufacturers prior to 1963, are becoming less important in the 1900s.In relatively recent review of literature, Blair and Premus (1987) found productivity, education, taxes, community attitudes toward business and other quality of factors are increasingly recognized as increasingly influential, although still lacked behind traditional factors on most accounts. The result of changes in production and communication technologies; faster and cheaper forms of transportation, and overall changes in the industrial composition of united states , where the study is made have been the reason for the emergence of these new factors of location. Studies have also shown that quality of life factors are of lessor importance for traditional manufacturing sectors. For example, in the study comprised largely branch plants, Hekman and Greenstein(1988) found states, local industrial climate, labor, productivity, transportation, land availability and cost to be dominant factors, while quality of life factors were given lower rankings. Quality of life factors have been frequently ranked higher than traditional factors for high-tech companies (Blair and Premus, 1987)

**2.4. The location decision process**

It is just not possible to evaluate all possible sites according to all possible operational criteria. The site selection process is designed to limit considerations to most relevant factors for the most likely candidate locations, while making sure that all viable alternatives are considered (Ritter, 1990). In the site selection process, first a list of criteria important to the successful operation of a new facility will be developed, taking into account its overall role in corporate strategy. The list is often divided into "must- haves "and "'would- have criteria (Blair and Premus, 1987). The must haves are the elements the firm cannot do without. The would-like factors are desirable, but less instrumental than the must-have factors. The next step is to gather information about potential locations and compare them against the list of both types of factors. Failure to satisfy the must –have factors will lead the elimination of a particular location from further contention. Eliminating locations because they lack essential elements is far easier than assessing and comparing perceived advantages ( Ritter, 1990**).**Decisions of business location, is viewed as a two –stage process each stage being independent of each other ( Goetz 1997,Henerson and McNamara 1997,200; Blair and Premus 1987,Alonso 1972;and Woodward 1992).

An additional common framework assumes that location decisions of manufacturing investment occur as a two-stage process. According to McLaughlin and Robock (1949), firms select a general area on the basis of the most important advantage of location for a given type of manufacturing. His theory was empirically tested by Schmenner, Huber, and Kook( 1987). Subsequent work by Bartick ( 1919),Woodward( 1992), Henderson and McNamara(1997,2000), and Lambert, Carrot ,and McNamara,2006a,b) evidenced that manufacturing location decision process is a two stage process as well. Schmenner and his co-authors developed a conceptual model of location decisions that derived from the premise that manufacturing plant's choice is based upon consideration of long run profitability.

In the location decision, the initial step is to select regions for consideration with the second step to select certain areas for consideration in the final location decision. The first step sees regions selected that will help the firm achieve its investment criteria including proximity to raw materials, entrance into markets, or increase market share (Henderson and McNamara.1997;2000).Once those regions are selected, the second phase of the process occurs. The location-factor approach was first suggested by Frederich Hall in the 1900 census of Manufacturers (Jones and Wood, 2002).

**2.5. Location factors of food processing plants**

Location factors have been addressed depending on the type of product, product life stage uniqueness of industry type (HBS, 1989)

The result of survey conducted on food processing plants, an important sector in South Marmara Region to identify location determinants of firms have shown that firms take into consideration the market location and availability of raw material with the highest priority. The survey also revealed infrastructure possibilities as important factor in the firms location decision. Consistent with the findings of (Austin, 1992; Connor1995) labour is ranked less important in the location decision of food processors. The result of the survey also shows that. Personal factors were rated as the fifth important factor next to labor. Within the personal factor category, the fact that the investor is already residing or doing business in the city was indicated as the most important factor in locating plants ( Sule T., Barak C.O. and Bahattin C.,2007).

The study conducted to identify key factors affecting the location of Agribusiness investment with the objective of identifying factors influencing investment attraction in Oklahoma revealed that proximity of raw materials was given the highest importance in location decision of flour mills. Because of transportation needs of the business, costs can be minimized by locating near abundant supply of raw materials; grain for flour milling companies. The study also indicated that different location factors are important to varying degree for different food processors. Some factors tend to be important across the industry category, while others are important to specific sub-factors. For example availability of Utilities and its adequacy for future expansion was consistently pinpointed as highly important factor (Rodney B.H., Conrad L. Glenn M., and Mike W.; 1995).

Jason, Henderson and McNamara (2000) in their study have revealed that the location decision of large food manufacturing investments is influenced by commodity(input) market, product market demand, labor market factors, access to transportation, agglomeration economies and tax policies. According to this study, countries ( areas) with access to input and product markets, low wage labor, transportation systems, and agglomeration economies seem to be in the best position to attract investments in food processing. The same work has also indicated that factors influencing large plant investment locations varied by the type of food processor. And accordingly, they have found out that supply oriented investment locations were attracted by locations with access to input markets, demand oriented investments sensitive to product market. The study has also indicated that large supply oriented investments are related to product countries providing localization and urbanization benefits from agglomeration. The study also indicated that supply oriented investment locations are sensitive to labor characteristics.

On the basis of cost structure, food manufacturing plants can be classified as ‘demand-oriented’, ‘Supply-oriented’ or ‘Footloose’((Connor and Schiek 1997; Henderson and McNamara 1997, 2000).) . Demand oriented firms are characterized by a total costs structure dominated by high distribution costs whereas supply-oriented firms are characterized by a total cost structure dominated by the purchase of single input commodity. Flour mills come under supply oriented firms whereas Bread making falls in the demand-oriented category. Footloose firms have cost structures dominated neither by supply nor demand factors. Demand oriented firms tend to locate close to product market centers whereas supply –oriented firms tend to locate close to input material source implying that flour mills tend to locate close to surplus wheat growing regions. Footloose industries may tend to locate where there is good access to capital or transportation. Confectionaries and chocolates are examples of footloose type food industries .Table.2.1 shows examples of food manufacturing industries as categorized into three groups by Connor and Schiek).

**Table-2.1-Examples of Food Manufacturing industries categorized by three Location types**

|  |  |  |
| --- | --- | --- |
| **Supply oriented firms** | **Demand oriented firms** | **Foot loose firms** |
| Soya bean | Bread and rolls | Canned specialties |
| Meat packing | Soft drink bottling | Frozen specialties |
| Cheese | Fluid milk | Breakfast cereals |
| Flour Milling | Animal feeds | Flour mixes and dough nuts |
| Rice milling | Pasta | Pet foods |
| Poultry | Cooking oil and margarine | Cookies and crackers |
| Butter | Beer | Frozen baked goods |
| Cotton seed oil | Potato chips and snacks | Sugar confectionary |
| Cane sugar | Animal feed | Chocolate confectionary |
| Coffee | Ice cream | Nuts and seeds |
| Beet sugar | Animal feeds | Distilled sprits |

Source; Adopted from Connor and Schiek( 1997, Table 6-3)

The study implies that the importance of location cost factors vary depending the type of industry and also within the industry depending on the type of product considered .This indicates that not all different location factors have equal influence on the location decision of a particular type of product .

Jason R. Henderson and Kevin J. McNamara (2000) in their study on Location of food manufacturing plants investments have indicated that access to input and market, agglomeration economies, access to transportation system, low wage and total tax policies influence food manufacturing location.

The type of material to be processed also influences the location decision of an industry. According to Weber (Weber, 1929), materials can be classified into two categories depending on their processing characteristics. The first group of materials loses significant weight upon processing. Processors who depend on such materials for their input benefit by locating their plants close to the raw material source as transport cost of raw material to the processing site will be considerably lower than that of distributing the resulting intermediate or finished product. The second group of materials gains weight up on processing. Manufacturing industries which depend on such materials benefit by being located close to market sources. Industrial wheat flour milling is a process in which on average 23 % of the grain mass is removed as a byproduct of the milling process. In the milling process the wheat thus loses weight (E. Staudt and E.Ziegler, 1965). And hence flour mills benefit by being located close to wheat production areas. In contrast, the wheat flour gains weight, characterizing the baking process as a weight gaining one, Bakeries are thus prefer to be situated close to market source than close to raw material source. According to International Association of Operative Millers (IAOM), in industrial wheat flour milling, the cost of grain accounts for approximately 81% of the cost of flour, followed by electricity (6.5%), labor cost (4%) and expendable materials and other costs (8.5%), FAO, 2009.

**2.6. Location decision models**

Various location decision models have been developed to conduct comparative evaluation of potential location sites through examining related location factors and site requirements. Based on measurability location factors can be addressed from qualitative and quantitative categories. Qualitative factors are such factors as quality of life, labour and community attitude. These factors are not quantifiable. Hence, location decision becomes complicated when qualitative factors are included.

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The majority of research models for location selection focus on heuristics( Besman et al.,,2001) and Mathematical programming, such as integer programming (Melkote, S., &Daskin, M. S. , 2001). Dynamic programming ( Canel et al.,2001),and non-linear programming (Nanthavaij and yenradee,1999).Mathematical programming however cannot consider qualitative criteria. Moreover, the roll of experience is ignored in this models as the decision makers do not contribute to the decision making process .Others models include the mean variance approach, regression model ,Quality Function Deployment(QFD) Fuzzy logic, Conjoint analysis, etc.

Carlton(1983) used Conditional Logit model to estimate the impact of different variables on firms profits as reflected in firm location decisions. Bartick (1985), Schwrab and McConnel(1990), and Levinson (1995) followed Carlton in using logit models. Cheng and Li(2004 )used mathematical programming to identify the location selection of facility and retail stores. According to Canel and Das (2002), mixed integer programming is amenable to solution techniques such as branch and bound algorithms that are extensively used in facility location research.

Multi-objective methods are also found to be quite suitable for site selection decision. Such methods include the Analytic Hierarch Process (AHP)l, The Multi Utility Theory(MUT) and SMART(Olson,D.,1996).The AHP model has been widely applied in empirical location studies. According to Olson (1996), the AHP model is a rather easy method to use compared with other similar selection methods. AHP is flexible to be integrated with different techniques like linear programming, Quality Function Deployment (QFD), fuzzy logic, etc. (Vaidya,O.,Kumar,S.,2006)

**CHAPTER THREE – BACKGROUND OF INDUSTRY**

**3.1. The Industry Sector and the flour milling sub-sector**

The share of the industrial sector to the GDP in Ethiopia is low. In 2009, the industrial sector contributed 13% to the GDP of the country **(**NBE, 2009**).** The industrial sector is dominated by Food, Beverage, and Textile manufacturers that when combined contribute 36% of the value added to the industry sector. The food sub-sector alone contributes about 32% of gross the value added by the industrial sector(CSA,2008) .The major contributor to the food sub sector is the sugar and its allied products processing group, constituting 33% of gross value addition to the sub sector. Grain milling contributes 8.6% of gross value addition to the sub sector (CSA, 2008 LMSMI survey Reports).

The milling sector of the country is dominated by small cottage type mills which can only produce whole mill type of flour (CSA, 2008). Although there is a huge production of Maize, Sorghum and Teff in the country as indicated in Table-3.2 neither of these cereals have yet found its way to industrial milling. All the three types of cereals are solely being processed at cottage and house hold level currently. Wheat is the only cereal enjoying industrial milling in the country at present and this why this project study is focused on industrial wheat milling instead of grain milling as a whole. The first roller mill to produce sifted flour for the bakery was established in Ethiopia in 1888 with new and second hand machinery and equipment (EFC, 1991). The mill was powered by the river nearby. Since then different types of mills have been established in the country.

Most of the mills put up in the country prior to 1991 were of Italian origin with capacities ranging from 60 tons to 120 tons per day. These mills employ standard milling technology. Today we can find mills supplied from Switzerland, Italy, UK, Czechoslovakia and China. The majority of mills we find in the country today are of Chinese origin. These mills have a daily milling capacity ranging from 10 to 120 tons per day .Most of them have a capacity of 30 -60 tons per day. They use compact mill diagram and can be contained in a simple go down type building of about 10 meters height unlike standard flour mills which require a multiple floor building as high as over 20 meters . They use a wet cleaning system which require a lot of water for their operation and a waste water disposal system. The flour yield from these mills is 3-7 per cent less than what standard mills can offer for similar quality wheat. The initial investment requirement of these mills is also extremely low compared to standard mills.

Traditionally, industrial wheat flour mills have been concentrated in and around Addis Ababa, the capital of the country. Prior to the liberalization of the economy in 1997, all mills were located within 98 km radios from Addis Ababa except one mill which was situated in southern region of the country, Hawssa, 270 km away from Addis Ababa. All the mills outside Addis Ababa were located along the main Addis-Adama stretch. Adama is 98 km to the south east of Addis Ababa and links Addis Ababa with the main wheat growing regions of the country ,Bale and Arusi Zones of Oromia Regional State .During this time there were only 16 mills with the total installed capacity of around 1000 tons per day (FEC,1991)

Following the liberalization of the economy, a number of new mills were established .Most of the mills established during the early years of liberalization were low capacity (less than 10 ton per day) mills of Chinese origin. Sooner a number of medium capacity (100 to 140 tons per day)

mills were set up. Most of these new mills were located in and around Addis Ababa. The number of mills in the country today has grown up to 250 with an estimated total installed daily capacity of 8,365 tons (MOI ,2011) .Against the long standing trend where all of the mills were set up in Addis Ababa , most of the mills set up in recent time were located in the southern part of the country in areas 250 – 350 Km far from Addis Ababa ( MOI ,20100 ).These new locations are much closer to the main wheat growing regions of the country . The following tables show how a major shift in the location of flour mills has taken place during the period prior to 1997 to 2010 (MOI, 2011)

**Table.3.1- Spatial distribution of mills in Ethiopia**

|  |  |  |  |
| --- | --- | --- | --- |
| **Locations** | **Distance from Addis Ababa** | **No of establishments** | |
| **Prior to 1997** | **1997 to 2010** |
| Addis Ababa | - | 5 | 69 |
| Adha | 45 | 3 | 3 |
| Adama | 100 | 2 | 17 |
| Shashame | 255 | - | 16 |
| Dessie and Kombolcha | 300 | - | 7 |
| Arisi | 175 | - | 33 |
| Hwasaand surrounding | 270 | 1 | 44 |
| Mekele | 780 | 1 | 13 |
| Diredawa | 530 | 1 | 19 |
| Asmara | 1080 | 2 | - |
| **Total** |  | **16** | **221** |

**Source: MOI Report**

Ethiopia has a suitable climate and fertile land for growing wheat. However, owing to poor farming system, the productivity remains low, 1.5 tons per hectare (CSA, 2010). The average annual production of wheat during 2007--2009 in the country was 1.83 million tons (CSA, 2010). Import of wheat into Ethiopia is not permitted and hence all mills in the country rely fully on domestic wheat produce for their wheat supply.

Most of the domestic production of wheat flour is used for home level preparations of different traditional foods and European type of white bread. During the last a few years the price of wheat has increased dramatically. The unit cost of hauling wheat from wheat growing areas to the plant site and that of distributing milled products to different markets has also increased significantly owing to the constant rise in the price of petroleum. In the period before 1997.Ethiopia had been under command economy. All the mills were owned by government. Wheat flour price had been subsidized and used to be sold at a unit price less than that of wheat. The quality of flour supplied by these mills was very poor as all the mills had to produce same quality standard wheat flour at maximum possible yield and the prime objective of the government was just to feed the population. Investment in the sector which was only the mandate of the government was minimal and the mills had to produce very high extraction flours, which was as high as 80% (EFC, 1991). Competition among the mills was absent, as all the produce had to be supplied to government Corporation mandated for distribution at fixed price. The mushrooming of the flour mills in the country during the period following liberalization can be ascribed partly to the scarcity of the product in the market and partly to poor quality of product owing to the poor quality tradition in which the mill’s management passed through.

At this point, it would be worth noting that during the early days of liberalization, competition was absent due to scarcity of wheat flour, and as a result mills established during this time had enjoyed good profit margin. As more new establishments came into the market and the number of mills continued to rise owing to high profit margin of the sector, competition became inevitable and quality and cost of product was recognized to be an issue to be addressed in market competition. Today, the flour milling business is highly competitive and firms in the sector only enjoy a small profit margin.

It is obvious that milling firms joining the sector at latter times need to optimize all opportunities that enable them cost competitive in the market. Concurrent to this line of argument, it would be proper to raise a question whether the significant shift observed in locating new milling plants in the southern region of the country is an economic decision

**3.2. Supply of Wheat to Ethiopia**

Supply of wheat to Ethiopia comes mainly from domestic source. Import of wheat is generally low .As location decision of flour mills is highly affected by availability of inputs and proximity to supply source an overview of the agricultural sector of Ethiopia is worth considering so as to evaluate the domestic wheat supply situation of the country .

Ethiopia is pre-dominantly an agricultural state with 85% of its population directly or indirectly dependent on agriculture. Agriculture , on average ,contributed 45% to the GDP during the years 2002 to 2009 (NBE ,2009 ).The Ethiopian agriculture sector comprises ,crops ,livestock and forestry ,and wild life and environment sub-sector; the output contribution of which are 60%,30%and 10% respectively.

The aggregate annual production of cereals and pulses in 2010 is estimated at 22 million tons (CSA ,2010 ).The share of Cereals from this figure account over 70% . The major cereals produced in the country are maize, wheat sorghum, and Teff. The following table shows annual production of each of these cereals in 2008 – 2011. As can be seen from table - 2, the size of wheat production is the second largest in the country next to Maize. Besides the information on the aggregate production of wheat, it is important to know the share of wheat production of different regions of the country as this will have direct impact on the location decision of wheat flour mills. Table -1 shows the annual production of the country for the period 2008 – 2011 by the type of cereal (CSA: 2010.)

**Table 3. 2. Cereal production of Ethiopia during the period 2007 -2010**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Type of Cereal** | **Production in million tons** | | | | **Yield ton per acre** |
| **2007** | **2008** | **2009** | **2010** |
| Maize | 3.7 | 3.93 | 3.9 | 4.9 | 2.2 |
| Sorghum | 2.7 | 2.8 | 2.97 | 3.9 | 1.8 |
| Teff | 3.0 | 3.03 | 3.18 | 3.5 | 1.2 |
| Wheat | 2.3 | 2.54 | 3.08 | 2.8 | 1.8 |
| Others | 2.0 | 2.2 | 2.4 | 2.8 | - |

CSA Agricultural sample survey, April 2011

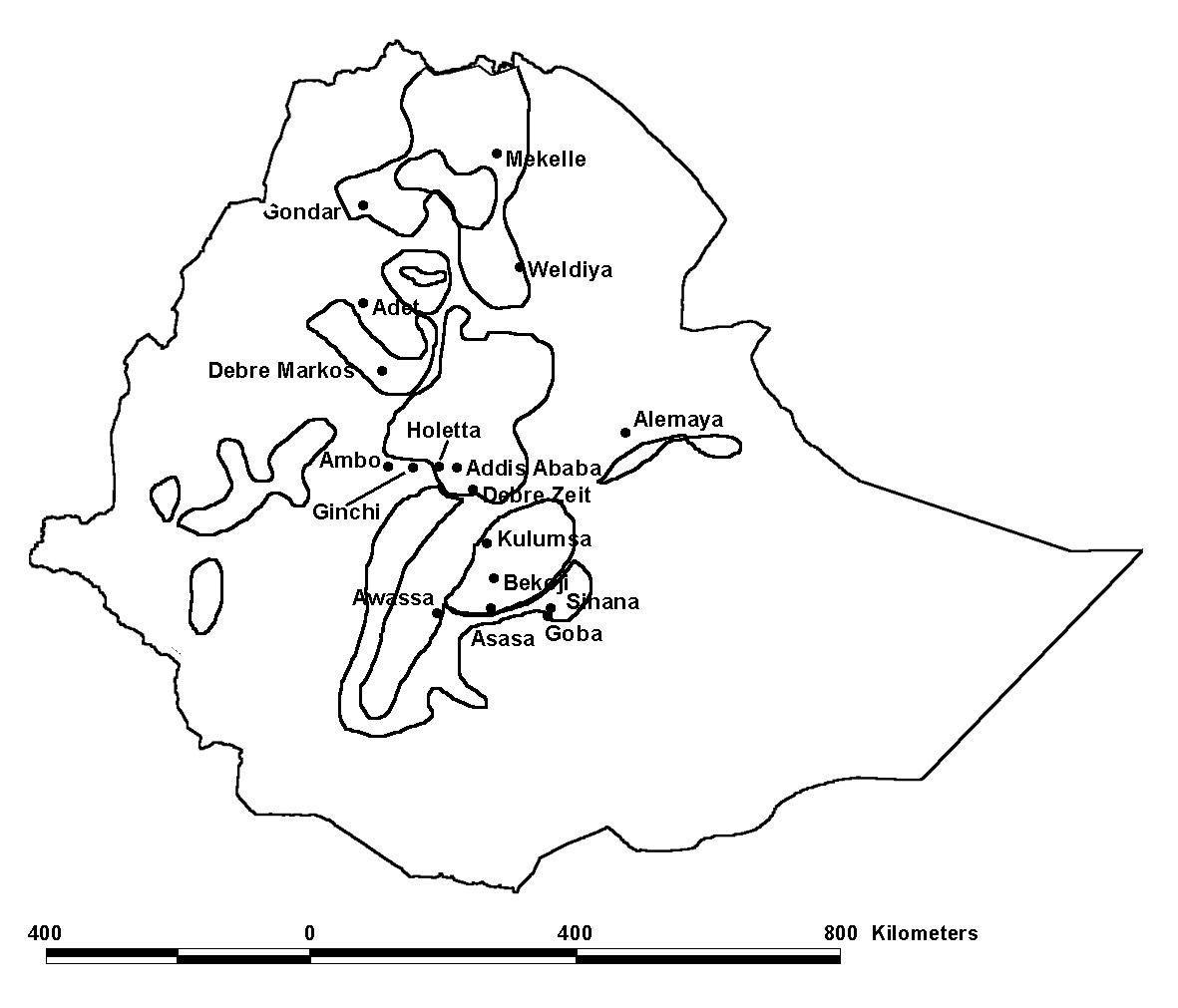
When we see the regional distribution of wheat production, we find Oromia and Amara Regional States being the major wheat producing regions. Regional distribution of wheat production is shown in Table -3. Fig.1.shows approximate distribution of traditional wheat growing areas.

**Table -3.3. Wheat production by region (% - share) in 2009**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | Tigray | Amahra | Oromia | BG | SNP | Others | Total |
| Maize | 2.1 | 20.5 | 59.7 | 2.1 | 13.8 | 1.7 | 100.0 |
| Sorghum | 9.4 | 26.6 | 49.5 | 4.4 | 7.4 | 2.7 | 100.0 |
| Teff | 6.4 | 40.3 | 45.0 | 0.6 | 7.4 | 0.5 | 100.0 |
| Wheat | 5.8 | 29.2 | 54.5 | 0.0 | 10.1 | 0.3 | 100.0 |
| Others | 9.0 | 35.8 | 47.0 | 2.6 | 5.7 | 0.0 | 100.0 |
| Total cereal | 6.2 | 29.8 | 61.8 | 1.9 | 9.3 | 1.0 | 100.0 |

CSA, Agriculture sample survey, May 2010

Figure-1-Aapproximate distribution of traditional wheat production areas of Ethiopia, from Belayetal., 1999



**Chapter FOUR- PRESENTATION, ANALYSISand interpretation of Data**

**4.1. Introduction**

Data were collected from three different locations of the country. One of the locations surveyed was Addis Ababa, capital of the country which is generally regarded as the major market area for industrially processed food. The second location, Adama is 98 km far from Addis Ababa and is located south East from it .Adama is close to Arisi one of the major wheat growing regions. The third location is Hawassa, which is located south of Addis Ababa and is 270 km away from it. Hawassa is the capital of the Southern Peoples Regional State. It is very close to the surplus wheat growing areas. The locations were selected based on their high population of mills and their importance to wheat supply and product market.

All firms included in the survey use wheat as their major input and produce flour only. Each firm had only flour mill.

Questionnaires were distributed to a total of 40 firms randomly selected from the three locations (Copy of the questionnaire is shown inAnnex-1). Fifty percent of the firms surveyed were from Addis Ababa whereas 7 and 13 firms were surveyed from Adama and Hawassa respectively. It was stated that the questionnaire was confidential and anonymous. The survey resulted in 35 replies of which 33 were usable. Out of 20 questionnaires distributed to firms in Addis, 18 were returned. All the 7 firms surveyed from Adama responded whereas only 8 of the 13 firms given the questionnaires in Hawassa responded.

**4.2. Results**

**4.2.1. Demographic Information**

The results of data collected on the demographic composition of the firms surveyed have been summarized as follows. This data were organized using descriptive statistics and cross tabulation.

The firms employed between 8 and 350 persons, the average number of employees per company being 80 persons. The milling capacity of mills surveyed ranges from 30 tons to 2000 tons of wheat per 24 hours day.

From the total of respondents, about 42.4% were owner mangers, 39.4 were professional managers, and 12.1 were department heads. Thirty per cent of the professional managers were from Addis Ababa and the remaining 9.4 per cent from Adama. The majority of owner managers were from Hawassa, 21.2%, followed by Addis ababa with 15.2%.The share of Adana is only 6.1%.

As regards to the qualification of respondents 81.8% and 12.1% of the respondents were first degree and above, and diploma holders respectively. Among the first degree and above holders, 48.5%, 18.2 % and 15.2 % were from Addis Ababa, Adama and Hawassa respectively.

Among the firms surveyed 75.8 were organized as PLC, 21.2% as sole proprietorship and the remaining 3% as Share Company.

Thirty three point three per cent of the respondents indicated that they selected their present location because it is their home place. Equal number of respondents (24.2%) indicated that closeness to raw material source or closeness to market source was the main factor used for locating their mills at the present location. The remaining 18.2% of the respondents gave other reasons than those mentioned above.

Regarding whether surveyed firms had enjoyed tax holiday 72.7%, replied that they did enjoy tax holiday while 27.3 replied they did not enjoy tax holiday. It is noted that those who responded that they did not receive tax holiday are the ones who own mills established prior to 1991, i.e., prior to change of government and change of economic policy from command to free market.

The tax holiday period varied from 1-2 year. Details of data compiled on the demographic factors is presented in Appendix-1.1

**4.2.2. Results of Questions on Market Information**

Part II, Market Information (MI) of the questionnaire contains eight questions. These questions are related to:1) Assessing major sources of wheat supply.2) Identifying the percentage share of wheat supply that comes from Bale and Arisi regions. 3) Assessing the average cost of transportation of wheat for the firm at the time of establishment and currently. 4) Identifying major product market areas.5) Indicating the average cost of transportation of wheat flour for the firm at the time of establishment and currently.6)Assessing the cost of land at the time of establishment and currently.7)Assessing the average cost of electric power, and 9) Identifying whether there is shortage of man power both skilled and non-skilled.

Part II of the survey data has been summarized using both descriptive statistics and cross tabulation(Details are shown inAppendix-1.1).

According to the survey result, the average proportion of raw materials of a company coming from Arisi and Bale areas is found to be 61.09%. The minimum share is 0% whereas the maximum is 100%.

The result of the survey indicated that at *the time of establishment*, the average cost of transportation of wheat per quintal to a company is found to be 15.17 Birr. The minimum cost of transportation at the time of establishment was 5.00 Birr per quintal while the maximum was 40.00 Birr per quintal. The standard deviation shows that there is high variability in the cost of transportation (sd = 11.39).*Currently****,*** the average cost of transportation of wheat per quintal to a company is found to be 40.42 Birr. The minimum cost of transportation is Birr 15.00 while the maximum is Birr 75.00 per ton. The standard deviation shows that there is high variability in the cost of transportation (sd = 22.44).

The survey revealed that *at the time of establishment***,** the average cost of transportation for distributing products of a company to a market per quintal is found to be Birr 12.24 . The minimum cost of transportation for distributing products of a company to a market per quintal is Birr 10.00 while the maximum is 70.00 Birr. The standard deviation shows that there is high variability in the cost of transportation (sd = 14.72). *Currently***,** the average cost of transportation for distributing products of a company to a market per quintal is found to be 24.28 Birr. The minimum cost of transportation for distributing products of a company to a market per quintal is 10.00 Birr while the maximum is 140.00 Birr. The standard deviation shows that there is high variability in the cost of transportation (sd = 29.18).

The survey response has sown that during *establishment*, the land lease cost per hectare per 50 years of lease period varied from a minimum of Birr 0, which means land was obtained free of charge to Birr 2400 with a standard deviation of 615.97 showing very high variability. According to the survey, the *current* land lease price per hectare ranges between Birr 0, again which means land was obtained free of charge and Birr 5100 with a standard deviation of 1692.05 showing extreme variability. The result of the survey has also shown that the cost of electric power per one quintal of wheat milled ranges between Birr4.38 to Birr4.5.

Among the respondents of the survey, 39% responded that they did face problems in the supply of the right man power while 60.6% of the respondents replied that they did not face problem in the supply of man power both skilled and non-skilled.

Detailed data collected from respondents for this part of the questionnaire were organized and presented in Appendix-1.1 and Appendix-2.This data have been used to supplement data obtained on Decisional Questions, to analyze the location decision of flour mills in Ethiopia.

**4.2.3. Results of Decisional Questions**

The third part of the questionnaire, Part III, contains 9 decional questions. These questions include; 1&2) Identifying whether location analysis had been made in selecting present location of firms surveyed, and if so, identifying criteria used in the selection 3) Identifying possible reasons for not making location analysis in case where no location analysis was made in selecting the present location.4&5) Revealing whether firms surveyed are satisfied with the present location or not and identifying reasons for dissatisfaction in case there is dissatisfaction with the present location.6,7 &8) Assessing whether firms would consider change of present location if expansion is sought and whether they consider location analyses in their move to change the present location and also identifying criteria, among the suggested ones, that would be used in the analysis . Question No.9. solicits the respondents to rate the importance of 9 criteria the literature suggests to be considered for location decision of food processing plants. Each of the factors constitute sub factors that were rated on 5 scales to be interpreted as: 1=Un important, 2=Little importance , 3= Moderately important 4= Important 5=Very important; the cumulative of which represents each of the 9 criteria. The rating was used to identify the most important criteria in the decision and evaluate the relative importance of each criterion. The criteria were also grouped into Economic and Non-economic factors in order to enable the researcher asses which group of factors was given more significance by the respondents in their location decision.

The results of this part of the survey showed 50.5% the respondents replied that they had made location analysis in choosing their present location while 48.5% replied that they did not make location analysis. Those who replied that they had undertaken location decision indicated that they used:

Proximity to raw material,

Proximity to market,

Availability of land, and

Power supply

as the main criteria in their decision. From those who replied that they did not make location analysis, 36.4% indicated they selected the present location because it was their home place, 18.2% were guided by the success of other mills in the area and the remaining 39.4% selected their present location because of other reasons.

The survey has also shown that 87.9 % of the respondents had been satisfied with the present location while 12.1 % of them were not satisfied with their present location.

In their reply to the question whether they consider other location or prefer to stay at present location if they were to expand, 45.5% replied yes while 54.5% replied no. From those who responded no 30.3% were from Addis Ababa. Forty eight and half per cent of the respondents indicated that they would consider more than one location in their future location decision while 51.5% responded they would not. In their response to the question asking to rate the importance of being located close to raw material source and market source, 30.3% preferred a location close to market while 54.5% preferred to be closer to raw material source;15.2% of the respondents considered other factors than these two.

The respondents rating of the 9 plant location decision factors studied in this research and corresponding sub- factors have been summarized and presented in the Table-4.1 ..The Kruskal-Wallis Test was used for the purpose. Mean ranks of respondents on each sub factor have also been worked out using descriptive statistics (See Appendix-1.2. for details) for further analysis.

**Table-4.1-Kruskal-Wallis Test Result**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | N | Mean | Std. Deviation | Rank |
| TR1 | 33 | 4.1515 | 0.97215 |  |
| TR2 | 33 | 3.8182 | 0.98281 |  |
| TR3 | 33 | 2.8788 | 1.21854 |  |
| **Average rating of Transportation** | | **3.61616667** |  | 7 |
| La1 | 33 | 4.0909 | 0.6784 |  |
| La2 | 33 | 3.1515 | 0.79535 |  |
| La4 | 33 | 2.7576 | 0.96922 |  |
| La3 | 33 | 2.9697 | 0.88335 |  |
| **Average rating of Labor** | | **3.242425** |  | **9** |
| RM1 | 33 | 4.0000 | 0.90139 |  |
| RM2 | 33 | 4.6061 | 0.74747 |  |
| RM3 | 33 | 3.7879 | 0.85723 |  |
| **Average rating of Raw materials** | | **4.13133333** |  | **2** |
| MA1 | 33 | 4.3333 | 0.77728 |  |
| MA2 | 33 | 4.1212 | 0.73983 |  |
| **Average rating of Markets** | | **4.22725** |  | **1** |
| In1 | 33 | 3.8182 | 1.01411 |  |
| In2 | 33 | 3.8788 | 1.05349 |  |
| In3 | 33 | 3.0606 | 0.96629 |  |
| In4 | 33 | 3.2424 | 1.00095 |  |
| **Average rating of Industrial Site** | | **3.5** |  | **8** |
| U1 | 33 | 3.8150 | 0.78093 |  |
| U2 | 33 | 3.0606 | 0.9981 |  |
| U3 | 33 | 3.9510 | 0.75126 |  |
| U4 | 33 | 3.5152 | 0.90558 |  |
| U5 | 33 | 3.3636 | 0.89506 |  |
| **Average rating of Utilities** | | **3.54** |  | **5** |
| T7 | 33 | 3.697 | 1.10354 |  |
| **Average rating of Tax Structure** | | **3.697** |  | **4** |
| C1 | 33 | 3.0909 | 0.723 |  |
| C2 | 33 | 3.5455 | 0.79415 |  |
| C3 | 33 | 3.7512 | 0.81997 |  |
| **Average rating of Community** | | **3.4625** |  | **6** |
| O1 | 33 | 3.8485 | 0.87039 |  |
| **Average rating of Others** | | **3.8485** |  | **3** |

**4.3. Analysis and Interpretation of results**

***4.3.1.*** Interpretation for the Kruskal Wallis Test Results (see Appendix- 3 for details and abbreviations each sub factor) and identifying the underlining location factors. The test was made at α=0.05.Sample calculation of mean rank is also shown in Annex-2

1. **Transportation (TR)**
   1. There is a statistically significant difference in the respondents’ rating for the importance of cost of raw material transportation (p< 0.0220) towards establishing the mill at different locations. The Hawassa group had the highest mean rank (22.75) on a scale of 1 (Unimportant) to 5 (Very important). By contrast, the Addis Ababa group had the lowest mean rank (13.11) and therefore the Addis Ababa group believed that considering cost of raw material transportation to establish the mill at Addis Ababa is not as such important issue.
   2. There is no statistically significant difference (p<0.332) in the respondents’ rating for the importance of cost of finished goods transportation towards establishing the mill at different locations. However, the descriptive part reveals that the respondents rate on the cost of finished goods transportation is an important issue (mean value = 3.8182) in establishing the mill at different locations on average.
   3. There is no statistically significant difference (p<0.164) in the respondents’ rating for the importance of cost of by product (coarse and fine bran which is used for animal feed) transportation towards establishing the mill at different locations. However, the descriptive part reveals that the respondents rate on the cost of by product transportation is a moderately important issue (mean value = 2.8788) in establishing the mill at different locations.

**II. Labor (La)**

2.1 There is no statistically significant difference (p<=0.575) in the respondents’ rating for the importance of availability of skilled labor towards establishing the mill at different locations. However, the descriptive part reveals that the respondents rate on the availability of skilled labor is an important issue (mean value = 4.0909) in establishing the mill at different locations on average.

2.2 There is no statistically significant difference (p<=0.218) in the respondents’ rating for the importance of amount of wage rate towards establishing the mill at different locations. However, the descriptive part reveals that the respondents rate on the amount of wage rate is a moderately important issue (mean value = 3.1515) in establishing the mill at different locations on average.

2.3 There is a statistically highly significant difference in the respondents’ rating for the importance of availability of unskilled labor (p<= 0.003) towards establishing the mill at different locations. The Adama group had the highest mean rank (20.14) on a scale of 1 (Unimportant) to 5 (Very important). By contrast, the Hawassa had the lowest mean rank (7.5) and therefore the Hawassa respondents believed that considering availability of unskilled labor to establish the mill at Hawassa is not as such important.

2.4 There is no statistically significant difference (p<=0.228) in the respondents’ rating for the importance of cost of living (housing) towards establishing the mill at different locations. However, the descriptive part reveals that the respondents rate on the cost of living is a moderately important issue (mean value = 2.7576) in establishing the mill at different locations on average.

**III. Raw Materials(RM)**

3.1 There is no statistically significant difference (p<=0.161) in the respondents’ rating for the importance of availability of raw materials towards establishing the mill at different locations. However, the descriptive part reveals that the respondents rate on the availability of raw materials is a very important issue (mean value =4.0000) in establishing the mill at different locations on average.

3.2 There is no statistically significant difference (p<=0.140) in the respondents’ rating for the importance of closeness to materials towards establishing the mill at different locations. However, the descriptive part reveals that the respondents rate on the closeness to materials is an important issue (mean value = 4.6061) in establishing the mill at different locations on average.

3.3 There is no statistically significant difference (p<=0.958) in the respondents’ rating for the importance of availability of storage facilities for materials towards establishing the mill at different locations. However, the descriptive part reveals that the respondents rate on the availability of storage facilities for materials is an important issue (mean value = 3.7879) in establishing the mill at different locations on average.

**IV. Market (MR)**

4.1 There is a statistically marginally significant difference in the respondents’ rating for the importance of proximity to consumer good markets (p<= 0.066) towards establishing the mill at different locations. The Adama group had the highest mean rank (20.21) on a scale of 1 (Unimportant) to 5 (Very important). By contrast, the Hawassa had the lowest mean rank (10.81) and therefore the Hawassa respondents believed that considering proximity to consumer good markets to establish the mill at Hawassa is not as such important.

4.2 There is a statistically significant difference in the respondents’ rating for the importance of anticipation of growth of markets (p<= 0.014) towards establishing the mill at different locations. The Hawassa group had the lowest mean rank (10.06) on a scale of 1 (Unimportant) to 5 (Very important). By contrast, the Adama group had the highest mean rank (20.93) and therefore the Adama respondents believed that considering the anticipation of growth of markets to establish the mill at Adama is a very important issue.

**V. Industrial Site(In)**

5.1 There is no statistically significant difference (p<=0.804) in the respondents’ rating for the importance of cost of industrial land towards establishing the mill at different locations. However, the descriptive part reveals that the respondents rate on the cost of industrial land is an important issue (mean value = 3.8182) in establishing the mill at different locations on average.

5.2 There is no statistically significant difference (p<=0.784) in the respondents’ rating for the importance of availability of space for future expansion in establishing the mill at different locations. However, the descriptive part reveals that the respondents rate on the availability of space for future expansion is an important issue (mean value = 3.8788) in establishing the mill at different locations on average.

5.3 There is a statistically marginally significant difference in the respondents’ rating for the importance of closeness to other industries (p<= 0.059) towards establishing the mill at different locations. The Adama group had the highest mean rank (24.07) on a scale of 1 (Unimportant) to 5 (Very important). By contrast, the Hawassa had the lowest mean rank (13.25) and therefore the Hawassa respondents believed that considering closeness to other industries to establish the mill at Hawassa is not as such important.

**VI. Utilities (U)**

6.1 There is no statistically significant difference (p<=0.147) in the respondents’ rating for the importance of adequacy of water supply in establishing the mill at different locations. However, the descriptive part reveals that the respondents rate on the adequacy of water supply is an important issue (mean value = 3.8150) in establishing the mill at different locations on average.

6.2 There is no statistically significant difference (p<=0.434) in the respondents’ rating for the importance of availability of disposal facilities for industrial waste in establishing the mill at different locations. However, the descriptive part reveals that the respondents rate on the availability of disposal facilities for industrial waste is a moderately important issue (mean value = 3.0606) in establishing the mill at different locations on average.

6.3 There is no statistically significant difference (p<=0.570) in the respondents’ rating for the importance of availability of electric power in establishing the mill at different locations. However, the descriptive part reveals that the respondents rate on the availability of electric power is a very important issue (mean value = 3.9510) in establishing the mill at different locations on average.

6.4 There is a statistically significant difference in the respondents’ rating for the importance of cost of electric power (p<= 0.027) towards establishing the mill at different locations. The Addis Ababa group had the highest mean rank (20.75) on a scale of 1 (Unimportant) to 5 (Very important). By contrast, the Hawassa had the lowest mean rank (10.81) and therefore the Hawassa respondents believed that considering cost of electric power to establish the mill at Hawassa is not as such important issue.

6.5 There is no statistically significant difference (p<=0.153) in the respondents’ rating for the importance of cost of water in establishing the mill at different locations. However, the descriptive part reveals that the respondents rate on the cost of water is a moderately important issue (mean value = 3.3636) in establishing the mill at different locations on average.

**VII. Tax Structure (T7)**

There is no statistically significant difference (p<=0.109) in the respondents’ rating for the importance of financial incentive or tax holiday in establishing the mill at different locations. However, the descriptive part reveals that the respondents rate on the financial incentive or tax holiday is an important issue (mean value = 3.6970) in establishing the mill at different locations on average.

**VIII. Community(C)**

8.1 There is no statistically significant difference (p<=0.978) in the respondents’ rating for the importance of availability of college in establishing the mill at different locations. However, the descriptive part reveals that the respondents rate on the availability of college is a moderately important issue (mean value = 3.0909) in establishing the mill at different locations on average.

8.2 There is no statistically significant difference (p<=0.113) in the respondents’ rating for the importance of attitude of community leaders in establishing the mill at different locations. However, the descriptive part reveals that the respondents rate on the attitude of community leaders is an important issue (mean value = 3.5455) in establishing the mill at different locations on average.

8.3 There is no statistically significant difference (p<=0.795) in the respondents’ rating for the importance of availability of banks and credit institutions in establishing the mill at different locations. However, the descriptive part reveals that the respondents rate on the availability of banks and credit institutions is an important issue (mean value = 3.7512) in establishing the mill at different locations on average.

**VIV. Others (O1)**

There is no statistically significant difference (p<=0.275) in the respondents’ rating for the importance of personal preference of top management or owners or attachment in establishing the mill at different locations. However, the descriptive part reveals that the respondents rate on the personal preference of top management or owners or attachment is an important issue (mean value = 3.8485) in establishing the mill at different locations on average.

***4.3.2. Analysis of significance of Economic and Non-economic factors***

Descriptive statistics was used to compare the relative significance attached to economic and non-economic factors by the respondents. For this purpose, data obtained on the rating of factors studied have been segregated into the two groups for each of the three locations. Detailed results are shown in Appendix-4.

The results of the study for Addis Ababa has shown that, the mean rating of economic variables (**3.513867)** was less than that of non-economic variables (**3.873021**). Accordingly, it is roughly possible to articulate that more importance is given to non-economic factors in location decisions of wheat flour milling at Addis Ababa

The result for the Adama group shows that the mean rating of economic variables (**3.7857)** is almost the same as that of non-economic variables (**3.79591)** . Accordingly, it is roughly possible to articulate that equal importance is given to economic and non-economic factors in location decisions of wheat flour milling at Adama.

The mean rating of economic variables (**3.33333)** is less than that of non-economic variables (**3.76923**) for the Hawassa group. Accordingly, it is roughly possible to articulate that more importance is given to non-economic factors in location decisions of wheat flour milling at Hawassa**.**

The average of mean ratings from all the three locations, for the economic and non-economic factors, was 54 and 3.81 respectively. The overall result shows that the economic factors are less important than non-economic factors in the location decision of firms surveyed.

**CHAPTER FIVE-SUMMARY, CONCLUSION, AND RECOMMENDATIONS**

**5.1. Summary**

Among all the sub- factors, Proximity to raw material source, proximity to consumer market, and cost of raw material transportation were rated as first, second and third most important factors in the location decision of flour mills of Ethiopia. The result of the study of Part II has also shown that 55.5 % of the respondents preferred proximity to raw material source to proximity to market source. The information on the transportation cost of raw materials and finished products indicated that the raw material cost is marginally higher than the finished product transportation cost. This difference, however, is quite big when viewed with the higher volume of raw material that needs to be transported per unit of product, the ratio of which is 1.23 to 1.

When we see the cumulative mean rating of the sub factors, we find that Market factor has been rated as the most significant factor. Next to Market factor, Closeness to raw material source is given the highest rating. The third important factor in location decision of flour mills of Ethiopia, according to the ratings of the respondents, is personal preference of top management or owners or their attachment to a particular location. But if we omit the transportation cost data of by-product, the mean (3.60) for the Raw Material transport factor would be raised to a mean value of (3.98), bringing it very close to the mean for Raw Material market factor (4.1) and placing it the third most important factor in the location decision. Tax, Utilities, and Community attitude have been rated as 4th, 5th, and 6th important factors respectively. Labor is rated as the least important factor in the decision of respondents. Industrial site and transportation costs were rated 8th and 9th respectively.

The summary of results of data compiled to test the relative significance of economic and non- economic factors have shown that the aggregate mean rating of economic and non-economic factors for three locations were 3.54 and 3.81 respectively. For respondents from Adama, the two factors have been given almost equal importance. Marginal difference has been attached to the two factors by Addis Ababa respondents while Hawassa respondents have rated non-economic factors much higher than economic factors. Respondents from Hawassa and Adama had rated transport cost of input as the most important economic factor with a mean of 4.57 while those from Addis Ababa rated it with the mean of 3.7 only. The most important non-economic factor for the Addis Ababa and ,Adama was availability of electric power which was rated with a mean of 4.6 and 4.3 respectively while personal factors of decision makers was rated as the highest mean in case of Hawasa respondents.

**5.2. Conclusion**

As summarized above, the results of the survey has revealed that proximity to raw material source has been given the highest rating in this study, and 55.5 % of the respondents preferred proximity to raw material source to proximity to market source. Additionally, the transportation cost of raw materials(mean=4.15) has been rated as more important than the transportation cost of finished products(mean=3.82).The result has been found to be in agreement with what the literature suggests(flour mills tend to prefer locations closer to raw material source than location closer to product market, Connor and Schiek 1997; Henderson and McNamara 1997, 2000).The result also supports hypothesis (H2), the researcher wanted to test; which is stated as: that cost of Proximity to input market has positive and significant effect on location decisions of flour mills. But if compare the aggregate results the market factors are given more weight than the raw material factors indicating that the result does not support H2.

Furthermore, based on ratings obtained for the sub- factors studied:

Proximity to raw material source,

Proximity to product market, and

Personal factors of the decision makers

are the three *most underlining factors* in the location decision of firms surveyed while based on the aggregate rating, the underlining factors appear to be:

Market factors,

Raw material factors, and

Personal factors.

The results of the study also shows that non-economic factors are rated to be more important than economic factors in the location decision of Ethiopian flour mills. The finding thus does not support the notion that plant location decision are made on economic rational (Weber, 1929).The first hypothesis, H1,that stated financial (economic) location factors are given more weight than non- financial (non-economic) factors in flour milling location decisions is not thus supported by the results of study. *The result also gives answer to the research question raised to investigate whether location decisions were done solely on economic rational*.

The fact that the respondents from Adama and Hawasa have rated cost of transportation of wheat as the most important criteria in their location decision unlike those in Addis Ababa tend to suggest that mills located in this locations have made their choice to benefit from the relatively lower cost of raw material as they are more close to the surplus wheat growing region than Addis Ababa. Which tend to substantiate the proposition stated in the study as*: the current move to establish mills closer to wheat growing regions is to benefit from input transport cost advantage.* However, the fact that respondents from Hawassa, had rated personal factors as their most important non-economic factor of their location decision tend to weaken the proposition.

Most of the old mills were located in and around Addis Ababa, the major product market center with a population close to 5 million people, which implies product market used to be given highest importance. .The highest mean rating given to proximity to raw material source in this study, however, suggests that, product market is less important than proximity to raw material, which in turn suggests that there is change in the significance of location factors over time. *This answers the research question posed to assess whether there is change in the significance of location factors over time.*

**5.3. Recommendations**

The study has revealed shortcomings in the location decision of the flour milling of Ethiopia. These shortcomings can be grouped into two; the first group of short comings is related to managers and owners while the second group is concerned with policy makers.

The first group short comings are:

1. Location analysis has not been conducted by large number of Investors in their investment decisions and many of them even today do not see the need to conduct location analysis in their future expansion works.
2. In an industry such as flour milling, although economic factors are believed to be more important than non-economic factors, the result of the study shows otherwise. This indicates lack of proper understanding of the significance of location analysis in an investment decision by owners and managers in the industry. Such a decision has resulted in high level of concentration of flour mills in and around Addis Ababa .This in turn is believed to deprive these firms from benefiting more by selecting locations close to input source

In view of the above, I would like to advise Mill Owners and Managers' of Ethiopian flour mills that location decision has significant impact on present and future profitability of their company and needs to be conducted in a professional manner based on what the theory and practice suggests. It is important that they give due weights to economic factors that govern location decision of their industry. Furthermore, it is important to note that flour mills benefit more by locating closer to raw material source than market source

The second group shortcomings are:

1. The relatively high rating given to cost of industrial land and availability of land for expansion and availability of electric power indicates that government efforts in infrastructure development may not be adequate.
2. Tax holiday incentive as a location decision factor has been rated as the fourth important factor; however, the difference in the level of incentive between different locations is extremely narrow (1-2 years) to motivate investors.

In order to overcome these shortcomings, I would like to advise policy makers to develop industrial sites and avail power in locations which will give more economic advantage to the sector and also provide more tax holiday incentive to these locations so that investors will be attracted to these locations.

There is no or little work available on Plant location study in general and on food processing location study in particular in Ethiopia So far. This study can thus be used as reference for those who may be interested to undertake research works in the area in Ethiopia. As no other similar research work has been obtained, the results of this research work needs to be tested and verified or improved by other researchers. Future research work may focus on the following:

1. Testing of the location decision with more location factors than considered in this study by including other locations not covered by this study.
2. Inconsistency has been exhibited in the respondent's response regarding their view to consider location analysis in their future expansion programs. While 87.9% the respondents indicated that they are satisfied with their present location, in one of the question, 54.5% of them in another question indicated that they would undertake location analysis in their future expansion decision. The reason for this discrepancy needs to be investigated.
3. Because Addis Ababa is very far from the surplus wheat growing regions, it is not difficult to expect that firms consider locations close to these regions in their future expansion programs .In this regard they are expected to give more weight to cost of input transportation, but the result of the survey was shown to be otherwise. Further research is thus recommended to answer this inquiry.
4. The reason why the Hawassa respondents exceptionally rated non-economic factors much higher than economic factors and why Personal factors of decision makers have been particularly rated as the most important non-economic factor needs to be investigated.
5. The Hawassa respondent's high rating for personal factors of decision makers contradict with highest weight they gave to proximity to raw material source needs to be investigated further.

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**APPENDIX-1**

**Appendix -1.1-Descriptive Part**

| **Descriptive Statistics** | | | | | | |
| --- | --- | --- | --- | --- | --- | --- |
|  | N | Minimum | Maximum | Sum | Mean | Std. Deviation |
| Q4\_1 | 33 | 8.00 | 370.00 | 2626.00 | 79.5758 | 85.23095 |
| Valid N | 33 |  |  |  |  |  |

| **Descriptive Statistics** | | | | | | |
| --- | --- | --- | --- | --- | --- | --- |
|  | N | Minimum | Maximum | Sum | Mean | Std. Deviation |
| Q4\_2 | 33 | .00 | 200.00 | 1056.00 | 32.0000 | 41.81432 |
| Valid N | 33 |  |  |  |  |  |

| **Descriptive Statistics** | | | | | | |
| --- | --- | --- | --- | --- | --- | --- |
|  | N | Minimum | Maximum | Sum | Mean | Std. Deviation |
| Q7 | 33 | 30 | 2000 | 2970 | 90.00 | 243.95923 |
| PMI\_2 | 33 | .00 | 100.00 | 2016.00 | 61.0909 | 25.02544 |
| PMI3\_1 | 33 | 5.00 | 40.00 | 500.50 | 15.1667 | 11.38987 |
| PMI3\_2 | 33 | 15.00 | 75.00 | 1334.00 | 40.4242 | 22.43885 |
| PMI5\_1 | 33 | 10.00 | 70.00 | 404.00 | 12.2424 | 14.71984 |
| PMI5\_2 | 33 | 10.00 | 140.00 | 801.30 | 24.2818 | 29.18394 |
| PMI6\_1 | 33 | .00 | 5100.00 | 5.76E4 | 1.7461E3 | 1692.04912 |
| PMI6\_2 | 33 | .00 | 2400.00 | 1.33E4 | 4.0454E2 | 615.96792 |
| PMI7 | 33 | 4.38 | 27.00 | 300.36 | 9.1018 | 4.49961 |
| Valid N | 33 |  |  |  |  |  |

| **APPENDIX-1.2.DESCRIPTIVE PART**  **QustionNo.9** | | | |
| --- | --- | --- | --- |
|  | Residence | N | Mean Rank |
| TR1 | Addis Ababa | 18 | 13.11 |
| Adama | 7 | 20.43 |
| Hawassa | 8 | 22.75 |
| Total | 33 |  |
| TR2 | Addis Ababa | 18 | 16.31 |
| Adama | 7 | 21.36 |
| Hawassa | 8 | 14.75 |
| Total | 33 |  |
| TR3 | Addis Ababa | 18 | 14.56 |
| Adama | 7 | 22.36 |
| Hawassa | 8 | 17.81 |
| Total | 33 |  |
| La1 | Addis Ababa | 18 | 18.00 |
| Adama | 7 | 17.64 |
| Hawassa | 8 | 14.19 |
| Total | 33 |  |
| La2 | Addis Ababa | 18 | 17.56 |
| Adama | 7 | 20.57 |
| Hawassa | 8 | 12.62 |
| Total | 33 |  |
| La4 | Addis Ababa | 18 | 17.50 |
| Adama | 7 | 20.64 |
| Hawassa | 8 | 12.69 |
| Total | 33 |  |
| La3 | Addis Ababa | 18 | 20.00 |
| Adama | 7 | 20.14 |
| Hawassa | 8 | 7.50 |
| Total | 33 |  |
| RM1 | Addis Ababa | 18 | 14.92 |
| Adama | 7 | 21.50 |
| Hawassa | 8 | 17.75 |
| Total | 33 |  |
| RM2 | Addis Ababa | 18 | 15.50 |
| Adama | 7 | 22.86 |
| Hawassa | 8 | 15.25 |
| Total | 33 |  |
| RM3 | Addis Ababa | 18 | 16.58 |
| Adama | 7 | 17.36 |
| Hawassa | 8 | 17.62 |
| Total | 33 |  |
| MA1 | Addis Ababa | 18 | 18.50 |
| Adama | 7 | 20.21 |
| Hawassa | 8 | 10.81 |
| Total | 33 |  |
| MA2 | Addis Ababa | 18 | 17.78 |
| Adama | 7 | 22.93 |
| Hawassa | 8 | 10.06 |
| Total | 33 |  |
| In1 | Addis Ababa | 18 | 16.31 |
| Adama | 7 | 19.00 |
| Hawassa | 8 | 16.81 |
| Total | 33 |  |
| In2 | Addis Ababa | 18 | 17.83 |
| Adama | 7 | 17.00 |
| Hawassa | 8 | 15.12 |
| Total | 33 |  |
| In3 | Addis Ababa | 18 | 15.92 |
| Adama | 7 | 24.07 |
| Hawassa | 8 | 13.25 |
| Total | 33 |  |
| In4 | Addis Ababa | 18 | 17.28 |
| Adama | 7 | 19.43 |
| Hawassa | 8 | 14.25 |
| Total | 33 |  |
| U1 | Addis Ababa | 18 | 19.14 |
| Adama | 7 | 11.29 |
| Hawassa | 8 | 17.19 |
| Total | 33 |  |
| U2 | Addis Ababa | 18 | 17.42 |
| Adama | 7 | 19.64 |
| Hawassa | 8 | 13.75 |
| Total | 33 |  |
| U3 | Addis Ababa | 18 | 17.50 |
| Adama | 7 | 14.29 |
| Hawassa | 8 | 18.25 |
| Total | 33 |  |
| U4 | Addis Ababa | 18 | 20.75 |
| Adama | 7 | 14.43 |
| Hawassa | 8 | 10.81 |
| Total | 33 |  |
| U5 | Addis Ababa | 18 | 19.44 |
| Adama | 7 | 16.43 |
| Hawassa | 8 | 12.00 |
| Total | 33 |  |
| T7 | Addis Ababa | 18 | 18.36 |
| Adama | 7 | 10.50 |
| Hawassa | 8 | 19.62 |
| Total | 33 |  |
| C1 | Addis Ababa | 18 | 17.17 |
| Adama | 7 | 16.43 |
| Hawassa | 8 | 17.12 |
| Total | 33 |  |
| C2 | Addis Ababa | 18 | 19.50 |
| Adama | 7 | 11.21 |
| Hawassa | 8 | 16.44 |
| Total | 33 |  |
| C3 | Addis Ababa | 18 | 16.53 |
| Adama | 7 | 16.14 |
| Hawassa | 8 | 18.81 |
| Total | 33 |  |
| O1 | Addis Ababa | 18 | 16.31 |
| Adama | 7 | 14.07 |
| Hawassa | 8 | 21.12 |
| Total | 33 |  |

**Appendix-2-Cross Tabulation Part**

| **Q5 \* Residence Crosstabulation** | | | | | | |
| --- | --- | --- | --- | --- | --- | --- |
|  |  |  | Residence | | | Total |
|  |  |  | Addis Ababa | Adama | Hawassa |
| Q5 | Owner Manager | Count | 5 | 2 | 7 | 14 |
| % within Q5 | 35.7% | 14.3% | 50.0% | 100.0% |
| % within Residence | 27.8% | 28.6% | 87.5% | 42.4% |
| % of Total | 15.2% | 6.1% | 21.2% | 42.4% |
| Professional Manager | Count | 10 | 3 | 0 | 13 |
| % within Q5 | 76.9% | 23.1% | .0% | 100.0% |
| % within Residence | 55.6% | 42.9% | .0% | 39.4% |
| % of Total | 30.3% | 9.1% | .0% | 39.4% |
| Department Head | Count | 2 | 1 | 1 | 4 |
| % within Q5 | 50.0% | 25.0% | 25.0% | 100.0% |
| % within Residence | 11.1% | 14.3% | 12.5% | 12.1% |
| % of Total | 6.1% | 3.0% | 3.0% | 12.1% |
| Other | Count | 1 | 1 | 0 | 2 |
| % within Q5 | 50.0% | 50.0% | .0% | 100.0% |
| % within Residence | 5.6% | 14.3% | .0% | 6.1% |
| % of Total | 3.0% | 3.0% | .0% | 6.1% |
| Total | | Count | 18 | 7 | 8 | 33 |
| % within Q5 | 54.5% | 21.2% | 24.2% | 100.0% |
| % within Residence | 100.0% | 100.0% | 100.0% | 100.0% |
| % of Total | 54.5% | 21.2% | 24.2% | 100.0% |

| **Q6 \* Residence Cross tabulation** | | | | | | |
| --- | --- | --- | --- | --- | --- | --- |
|  |  |  | Residence | | | Total |
|  |  |  | Addis Ababa | Adama | Hawassa |
| Q6 | First Degree and Above | Count | 16 | 6 | 5 | 27 |
| % within Q6 | 59.3% | 22.2% | 18.5% | 100.0% |
| % within Residence | 88.9% | 85.7% | 62.5% | 81.8% |
| % of Total | 48.5% | 18.2% | 15.2% | 81.8% |
| Diploma | Count | 2 | 1 | 1 | 4 |
| % within Q6 | 50.0% | 25.0% | 25.0% | 100.0% |
| % within Residence | 11.1% | 14.3% | 12.5% | 12.1% |
| % of Total | 6.1% | 3.0% | 3.0% | 12.1% |
| High School Certicate | Count | 0 | 0 | 1 | 1 |
| % within Q6 | .0% | .0% | 100.0% | 100.0% |
| % within Residence | .0% | .0% | 12.5% | 3.0% |
| % of Total | .0% | .0% | 3.0% | 3.0% |
| Other | Count | 0 | 0 | 1 | 1 |
| % within Q6 | .0% | .0% | 100.0% | 100.0% |
| % within Residence | .0% | .0% | 12.5% | 3.0% |
| % of Total | .0% | .0% | 3.0% | 3.0% |
| Total | | Count | 18 | 7 | 8 | 33 |
| % within Q6 | 54.5% | 21.2% | 24.2% | 100.0% |
| % within Residence | 100.0% | 100.0% | 100.0% | 100.0% |
| % of Total | 54.5% | 21.2% | 24.2% | 100.0% |

| **Q8 \* Residence Cross tabulation** | | | | | | |
| --- | --- | --- | --- | --- | --- | --- |
|  |  |  | Residence | | | Total |
|  |  |  | Addis Ababa | Adama | Hawassa |
| Q8 | Sole Proprietorship | Count | 4 | 2 | 1 | 7 |
| % within Q8 | 57.1% | 28.6% | 14.3% | 100.0% |
| % within Residence | 22.2% | 28.6% | 12.5% | 21.2% |
| % of Total | 12.1% | 6.1% | 3.0% | 21.2% |
| PLC | Count | 13 | 5 | 7 | 25 |
| % within Q8 | 52.0% | 20.0% | 28.0% | 100.0% |
| % within Residence | 72.2% | 71.4% | 87.5% | 75.8% |
| % of Total | 39.4% | 15.2% | 21.2% | 75.8% |
| Share Company | Count | 1 | 0 | 0 | 1 |
| % within Q8 | 100.0% | .0% | .0% | 100.0% |
| % within Residence | 5.6% | .0% | .0% | 3.0% |
| % of Total | 3.0% | .0% | .0% | 3.0% |
| Total | | Count | 18 | 7 | 8 | 33 |
| % within Q8 | 54.5% | 21.2% | 24.2% | 100.0% |
| % within Residence | 100.0% | 100.0% | 100.0% | 100.0% |
| % of Total | 54.5% | 21.2% | 24.2% | 100.0% |

| **Q9 \* Residence Cross tabulation** | | | | | | |
| --- | --- | --- | --- | --- | --- | --- |
|  |  |  | Residence | | | Total |
|  |  |  | Addis Ababa | Adama | Hawassa |
| Q9 | Home place of owner | Count | 6 | 2 | 3 | 11 |
| % within Q9 | 54.5% | 18.2% | 27.3% | 100.0% |
| % within Residence | 33.3% | 28.6% | 37.5% | 33.3% |
| % of Total | 18.2% | 6.1% | 9.1% | 33.3% |
| Close to raw material source | Count | 1 | 4 | 3 | 8 |
| % within Q9 | 12.5% | 50.0% | 37.5% | 100.0% |
| % within Residence | 5.6% | 57.1% | 37.5% | 24.2% |
| % of Total | 3.0% | 12.1% | 9.1% | 24.2% |
| Close to market source | Count | 7 | 1 | 0 | 8 |
| % within Q9 | 87.5% | 12.5% | .0% | 100.0% |
| % within Residence | 38.9% | 14.3% | .0% | 24.2% |
| % of Total | 21.2% | 3.0% | .0% | 24.2% |
| Other | Count | 4 | 0 | 2 | 6 |
| % within Q9 | 66.7% | .0% | 33.3% | 100.0% |
| % within Residence | 22.2% | .0% | 25.0% | 18.2% |
| % of Total | 12.1% | .0% | 6.1% | 18.2% |
| Total | | Count | 18 | 7 | 8 | 33 |
| % within Q9 | 54.5% | 21.2% | 24.2% | 100.0% |
| % within Residence | 100.0% | 100.0% | 100.0% | 100.0% |
| % of Total | 54.5% | 21.2% | 24.2% | 100.0% |

| **Q10 \* Residence Cross tabulation** | | | | | | |
| --- | --- | --- | --- | --- | --- | --- |
|  |  |  | Residence | | | Total |
|  |  |  | Addis Ababa | Adama | Hawassa |
| Q10 | Yes | Count | 12 | 4 | 8 | 24 |
| % within Q10 | 50.0% | 16.7% | 33.3% | 100.0% |
| % within Residence | 66.7% | 57.1% | 100.0% | 72.7% |
| % of Total | 36.4% | 12.1% | 24.2% | 72.7% |
| No | Count | 6 | 3 | 0 | 9 |
| % within Q10 | 66.7% | 33.3% | .0% | 100.0% |
| % within Residence | 33.3% | 42.9% | .0% | 27.3% |
| % of Total | 18.2% | 9.1% | .0% | 27.3% |
| Total | | Count | 18 | 7 | 8 | 33 |
| % within Q10 | 54.5% | 21.2% | 24.2% | 100.0% |
| % within Residence | 100.0% | 100.0% | 100.0% | 100.0% |
| % of Total | 54.5% | 21.2% | 24.2% | 100.0% |

| **PMI8 \* Residence Cross tabulation** | | | | | | |
| --- | --- | --- | --- | --- | --- | --- |
|  |  |  | Residence | | | Total |
|  |  |  | Addis Ababa | Adama | Hawassa |
| PMI8 | Yes | Count | 6 | 4 | 3 | 13 |
| % within PMI8 | 46.2% | 30.8% | 23.1% | 100.0% |
| % within Residence | 33.3% | 57.1% | 37.5% | 39.4% |
| % of Total | 18.2% | 12.1% | 9.1% | 39.4% |
| No | Count | 12 | 3 | 5 | 20 |
| % within PMI8 | 60.0% | 15.0% | 25.0% | 100.0% |
| % within Residence | 66.7% | 42.9% | 62.5% | 60.6% |
| % of Total | 36.4% | 9.1% | 15.2% | 60.6% |
| Total | | Count | 18 | 7 | 8 | 33 |
| % within PMI8 | 54.5% | 21.2% | 24.2% | 100.0% |
| % within Residence | 100.0% | 100.0% | 100.0% | 100.0% |
| % of Total | 54.5% | 21.2% | 24.2% | 100.0% |

| **DC1 \* Residence Cross tabulation** | | | | | | |
| --- | --- | --- | --- | --- | --- | --- |
|  |  |  | Residence | | | Total |
|  |  |  | Addis Ababa | Adama | Hawassa |
| DC1 | Yes | Count | 9 | 5 | 3 | 17 |
| % within DC1 | 52.9% | 29.4% | 17.6% | 100.0% |
| % within Residence | 50.0% | 71.4% | 37.5% | 51.5% |
| % of Total | 27.3% | 15.2% | 9.1% | 51.5% |
| No | Count | 9 | 2 | 5 | 16 |
| % within DC1 | 56.2% | 12.5% | 31.2% | 100.0% |
| % within Residence | 50.0% | 28.6% | 62.5% | 48.5% |
| % of Total | 27.3% | 6.1% | 15.2% | 48.5% |
| Total | | Count | 18 | 7 | 8 | 33 |
| % within DC1 | 54.5% | 21.2% | 24.2% | 100.0% |
| % within Residence | 100.0% | 100.0% | 100.0% | 100.0% |
| % of Total | 54.5% | 21.2% | 24.2% | 100.0% |

DC=Decision question ,DC1=Decision question one

| **DC3 \* Residence Crosstabulation** | | | | | | |
| --- | --- | --- | --- | --- | --- | --- |
|  |  |  | Residence | | | Total |
|  |  |  | Addis Ababa | Adama | Hawassa |
| DC3 | . | Count | 2 | 0 | 0 | 2 |
| % within DC3 | 100.0% | .0% | .0% | 100.0% |
| % within Residence | 11.1% | .0% | .0% | 6.1% |
| % of Total | 6.1% | .0% | .0% | 6.1% |
| Success of other mills established in the area | Count | 4 | 1 | 1 | 6 |
| % within DC3 | 66.7% | 16.7% | 16.7% | 100.0% |
| % within Residence | 22.2% | 14.3% | 12.5% | 18.2% |
| % of Total | 12.1% | 3.0% | 3.0% | 18.2% |
| Home place of promoter | Count | 6 | 2 | 4 | 12 |
| % within DC3 | 50.0% | 16.7% | 33.3% | 100.0% |
| % within Residence | 33.3% | 28.6% | 50.0% | 36.4% |
| % of Total | 18.2% | 6.1% | 12.1% | 36.4% |
| Other | Count | 6 | 4 | 3 | 13 |
| % within DC3 | 46.2% | 30.8% | 23.1% | 100.0% |
| % within Residence | 33.3% | 57.1% | 37.5% | 39.4% |
| % of Total | 18.2% | 12.1% | 9.1% | 39.4% |
| Total | | Count | 18 | 7 | 8 | 33 |
| % within DC3 | 54.5% | 21.2% | 24.2% | 100.0% |
| % within Residence | 100.0% | 100.0% | 100.0% | 100.0% |
| % of Total | 54.5% | 21.2% | 24.2% | 100.0% |

DC3= Decision question three

| **DC4 \* Residence Crosstabulation** | | | | | | |
| --- | --- | --- | --- | --- | --- | --- |
|  |  |  | Residence | | | Total |
|  |  |  | Addis Ababa | Adama | Hawassa |
| DC4 | Yes | Count | 15 | 6 | 8 | 29 |
| % within DC4 | 51.7% | 20.7% | 27.6% | 100.0% |
| % within Residence | 83.3% | 85.7% | 100.0% | 87.9% |
| % of Total | 45.5% | 18.2% | 24.2% | 87.9% |
| No | Count | 3 | 1 | 0 | 4 |
| % within DC4 | 75.0% | 25.0% | .0% | 100.0% |
| % within Residence | 16.7% | 14.3% | .0% | 12.1% |
| % of Total | 9.1% | 3.0% | .0% | 12.1% |
| Total | | Count | 18 | 7 | 8 | 33 |
| % within DC4 | 54.5% | 21.2% | 24.2% | 100.0% |
| % within Residence | 100.0% | 100.0% | 100.0% | 100.0% |
| % of Total | 54.5% | 21.2% | 24.2% | 100.0% |

| **DC6 \* Residence Crosstabulation** | | | | | | |
| --- | --- | --- | --- | --- | --- | --- |
|  |  |  | Residence | | | Total |
|  |  |  | Addis Ababa | Adama | Hawassa |
| DC6 | Yes | Count | 10 | 3 | 2 | 15 |
| % within DC6 | 66.7% | 20.0% | 13.3% | 100.0% |
| % within Residence | 55.6% | 42.9% | 25.0% | 45.5% |
| % of Total | 30.3% | 9.1% | 6.1% | 45.5% |
| No | Count | 8 | 4 | 6 | 18 |
| % within DC6 | 44.4% | 22.2% | 33.3% | 100.0% |
| % within Residence | 44.4% | 57.1% | 75.0% | 54.5% |
| % of Total | 24.2% | 12.1% | 18.2% | 54.5% |
| Total | | Count | 18 | 7 | 8 | 33 |
| % within DC6 | 54.5% | 21.2% | 24.2% | 100.0% |
| % within Residence | 100.0% | 100.0% | 100.0% | 100.0% |
| % of Total | 54.5% | 21.2% | 24.2% | 100.0% |

| **DC7 \* Residence Crosstabulation** | | | | | | |
| --- | --- | --- | --- | --- | --- | --- |
|  |  |  | Residence | | | Total |
|  |  |  | Addis Ababa | Adama | Hawassa |
| DC7 | Yes | Count | 9 | 2 | 5 | 16 |
| % within DC7 | 56.2% | 12.5% | 31.2% | 100.0% |
| % within Residence | 50.0% | 28.6% | 62.5% | 48.5% |
| % of Total | 27.3% | 6.1% | 15.2% | 48.5% |
| No | Count | 9 | 5 | 3 | 17 |
| % within DC7 | 52.9% | 29.4% | 17.6% | 100.0% |
| % within Residence | 50.0% | 71.4% | 37.5% | 51.5% |
| % of Total | 27.3% | 15.2% | 9.1% | 51.5% |
| Total | | Count | 18 | 7 | 8 | 33 |
| % within DC7 | 54.5% | 21.2% | 24.2% | 100.0% |
| % within Residence | 100.0% | 100.0% | 100.0% | 100.0% |
| % of Total | 54.5% | 21.2% | 24.2% | 100.0% |

| **DC8 \* Residence Crosstabulation** | | | | | | |
| --- | --- | --- | --- | --- | --- | --- |
|  |  |  | Residence | | | Total |
|  |  |  | Addis Ababa | Adama | Hawassa |
| DC8 | Near market | Count | 7 | 1 | 2 | 10 |
| % within DC8 | 70.0% | 10.0% | 20.0% | 100.0% |
| % within Residence | 38.9% | 14.3% | 25.0% | 30.3% |
| % of Total | 21.2% | 3.0% | 6.1% | 30.3% |
| Near raw material | Count | 11 | 3 | 4 | 18 |
| % within DC8 | 61.1% | 16.7% | 22.2% | 100.0% |
| % within Residence | 61.1% | 42.9% | 50.0% | 54.5% |
| % of Total | 33.3% | 9.1% | 12.1% | 54.5% |
| Other | Count | 0 | 3 | 2 | 5 |
| % within DC8 | .0% | 60.0% | 40.0% | 100.0% |
| % within Residence | .0% | 42.9% | 25.0% | 15.2% |
| % of Total | .0% | 9.1% | 6.1% | 15.2% |
| Total | | Count | 18 | 7 | 8 | 33 |
| % within DC8 | 54.5% | 21.2% | 24.2% | 100.0% |
| % within Residence | 100.0% | 100.0% | 100.0% | 100.0% |
| % of Total | 54.5% | 21.2% | 24.2% | 100.0% |

|  |  |
| --- | --- |
|  |  |

**APPENDIX-3-KRUSKAL WALLLIS TEST**

| **Test Statisticsa,b** |
| --- |
|  | TR1 | TR2 | TR3 | La1 | La2 | La4 | La3 | RM1 | RM2 | RM3 | MA1 | MA2 | In1 | In2 | In3 | In4 |
| Chi-Square | 7.633 | 2.206 | 3.622 | 1.108 | 3.050 | 2.960 | 11.494 | 3.936 | 3.655 | .086 | 5.434 | 8.489 | .437 | .487 | 5.672 | 1.204 |
| Df | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Asymp. Sig. | .022 | .332 | .164 | .575 | .218 | .228 | .003 | .140 | .161 | .958 | .066 | .014 | .804 | .784 | .059 | .548 |
|  | | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  | | | |  |  |  |  |  |  |  |  |  |  |  |  |  |

| U1 | U2 | U3 | U4 | U5 | T7 | C1 | C2 | C3 | O1 |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 3.840 | 1.671 | 1.124 | 7.219 | 3.760 | 4.431 | .045 | 4.358 | .459 | 2.584 |
| 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| .147 | .434 | .570 | .027 | .153 | .109 | .978 | .113 | .795 | .275 |

a. Kruskal Wallis Testb. Grouping Variable: Residence

|  |  |
| --- | --- |
| |  | | --- | | **Legend**  TR1=Cost of Raw material Transportation,TR2= Cost of finished product Transportation, TR3= Cost of by product Transportation.  La1=Availability of skilled labor, La2=Amount of wage rate,La3=Availability of unskilled labour,La3=Cost of living(Housing)  RM1=Availability of Raw Marterial,RM2=Proximity to Raw Material source, and RM3=Availability of storage facilities for materials  MR1=Proximity to consumer goods market, and MR2=Anticipation of growth of markets  In1=Cost of industrial land, In2=Availability of land for future expansion,In3=Closeness to similar Industries, and In3=Closeness to other Industries  U1=Adequacy of water supply,U2 Availability of disposable facilities for industrial waste,U3=Availability of electric powerU4=Cost of electric power, and U5=Cost of water.  T7=Tax structure. | |
| C1=Availability of colleage,C2=Attitude of community leaders,C3=Availability of banks and credit institutions  O1=Personal preference of top management or owners or attachment to the location  **APPENDIX-4 ECONOMIC Vs. NON-ECONOMIC FACTORS** | |

**Table 4.2.1Addis Ababa: Economic**

|  | N | Mean | Std. Deviation |
| --- | --- | --- | --- |
| TR1 | 18 | 3.7222 | 1.07406 |
| TR2 | 18 | 3.7222 | 1.07406 |
| TR3 | 18 | 2.6111 | 1.37793 |
| La2 | 18 | 3.2222 | .73208 |
| La4 | 18 | 2.8333 | 1.04319 |
| RM2 | 18 | 4.3889 | .91644 |
| MA2 | 18 | 4.2222 | .54832 |
| In1 | 18 | 3.7222 | 1.07406 |
| In3 | 18 | 2.9444 | .80237 |
| U4 | 18 | 3.8889 | .90025 |
| T7 | 18 | 3.8333 | 1.15045 |
| U5 | 18 | 3.6111 | 1.03690 |

**Mean = 3.513867**

**Table4. 2.2Addis Ababa: Non-economic**

|  | N | Mean | Std. Deviation |
| --- | --- | --- | --- |
| La1 | 18 | 4.1667 | .70711 |
| La3 | 18 | 3.2778 | .66911 |
| RM1 | 18 | 3.8333 | .98518 |
| RM3 | 18 | 3.7222 | .89479 |
| MA1 | 18 | 4.4444 | .78382 |
| In2 | 18 | 3.9444 | 1.10997 |
| In4 | 18 | 3.2778 | .89479 |
| U1 | 18 | 4.3889 | .77754 |
| U2 | 18 | 3.1111 | 1.23140 |
| U3 | 18 | 4.6111 | .77754 |
| C1 | 18 | 3.0556 | .53930 |
| C2 | 18 | 3.7778 | .64676 |
| C3 | 18 | 4.2778 | .46089 |
| O1 | 18 | 3.7778 | .87820 |
| Valid N (listwise) | 18 |  |  |

**Mean = 3.873021**

**Adama:Table4.2.3. Economic**

|  | N | Mean | Std. Deviation |
| --- | --- | --- | --- |
| TR1 | 7 | 4.5714 | .53452 |
| TR2 | 7 | 4.2857 | .75593 |
| TR3 | 7 | 3.5714 | 1.13389 |
| La2 | 7 | 3.4286 | .78680 |
| La4 | 7 | 3.0000 | 1.00000 |
| RM2  MA1 | 7 | 5.0000 | .78680 |
| MA2 | 7 | 4.5714 | .78680 |
| In1 | 7 | 4.0000 | 1.15470 |
| In3 | 7 | 3.8571 | .89974 |
| U4 | 7 | 3.2857 | .48795 |
| U5 | 7 | 3.2857 | .48795 |
| T7 | 7 | 3.0000 | .81650 |
| Valid N (listwise) | 7 |  |  |

**Mean = 3.7857**

**Adama: Non-economic**

|  | N | Mean | Std. Deviation |
| --- | --- | --- | --- |
| La1 | 7 | 4.1429 | .69007 |
| La3 | 7 | 3.2857 | .75593 |
| RM1 | 7 | 4.5714 | .00000 |
| RM3 | 7 | 3.8571 | .89974 |
| MA1 | 7 | 4.5714 | .53452 |
| In2 | 7 | 3.8571 | 1.21499 |
| In4 | 7 | 3.4286 | 1.27242 |
| U1 | 7 | 3.7143 | .75593 |
| U2 | 7 | 3.2857 | .75593 |
| U3 | 7 | 4.2857 | .95119 |
| C1 | 7 | 3.0000 | .57735 |
| C2 | 7 | 3.0000 | .81650 |
| C3 | 7 | 4.1429 | .89974 |
| O1 | 7 | 3.5714 | .78680 |

**Mean = 3.79591**

**Hawassa: Economic**

|  | N | Mean | Std. Deviation |
| --- | --- | --- | --- |
| TR1 | 8 | 4.7500 | .46291 |
| TR2 | 8 | 3.6250 | .91613 |
| TR3 | 8 | 2.8750 | .64087 |
| La2 | 8 | 2.7500 | .88641 |
| La4 | 8 | 2.3750 | .74402 |
| RM2 | 8 | 3.8750 | .46291 |
| MA2 | 8 | 4.7500 | .75593 |
| In1 | 8 | 3.8750 | .83452 |
| In3 | 8 | 2.6250 | 1.06066 |
| U4 | 8 | 2.8750 | .83452 |
| U5 | 8 | 2.8750 | .64087 |
| T7 | 8 | 4.0000 | 1.06904 |
| Valid N (listwise) | 8 |  |  |

**Mean = 3.33333**

**Hawassa: Non-economic**

|  | N | Mean | Std. Deviation |
| --- | --- | --- | --- |
| La1 | 8 | 3.8750 | .64087 |
| La3 | 8 | 2.0000 | .75593 |
| RM1 | 8 | 3.5000 | .83452 |
| RM3 | 8 | 3.8750 | .83452 |
| MA1 | 8 |  | .64087 |
| In2 | 8 | 3.7500 | .88641 |
| U1 | 8 | 3.8150 | .70711 |
| U2 | 8 | 2.7500 | .46291 |
| U3 | 8 | 3.9510 | .46291 |
| C1 | 8 | 3.2500 | 1.16496 |
| C2 | 8 | 3.5000 | .92582 |
| C3 | 8 | 3.6641 | 1.35620 |
| O1 | 8 | 4.2500 | .88641 |
| Valid N (listwise) | 8 |  |  |

**Mean = 3.76923**

**Annex-1**

**QUESTIONNAIRE**

The following questionnaire has been produced to collect data for a research project on location decision of Flour Mills of Ethiopia. It is a research work towards fulfilling requirements for an MBA. **All responses are confidential, so please do NOT put your name on it.** Please answer all questions as honestly as possible. Thank you for your cooperation.

**Part I. Company Information**

1. Name of the company-----------------------------------------

2. Year of establishment----------------------------------------

3. Address of the company:

Region-----------------, City-----------------,Wereda ---------.

Kebele--------------------, Tel (Office) ------------------Distance from Addis Ababa-----------

4. Please indicate the total number of employees (permanent and contract) currently working at your company. Permanent --------------------Contract---------------Total--------------

5. Which of the following most accurately describes your occupational title in your organization?

a. Owner manager b. Professional manager c. Department head d. Partner e. Other reason, please specify--------------------

6. Which of the following indicates your level of formal education and work experience a) First degree and

above b) Diploma c) High school certificate d) Other, please specify---------------------

7. What is the capacity of your mill (input):----------------------------------

8. Which of the following indicates the legal form of your organization?

a. Sole Proprietorship b. PLC c. Share Company d. Partnership e. Others, please Specify\_\_\_\_\_\_\_\_\_\_\_\_\_\_

9. What was the primary reason for locating the mill at the present place?

a. It is the home place of the owner b. close to raw material source c. close to market source d. other, please specify

10. Did your company have tax holiday or incentive? Yes **-------------** No**--------------**

If your answer is yes, it was for how many years**-----------------------------------------------**

**Part II. Product or Market Information**

1. Please list your major source of raw material--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------
2. What share, in percentage, of raw material for this company come from Arisi and Bale regions? -----------------------------
3. What was the average cost of transportation of wheat to your company per Quintal? A. At the time of establishment ----------------------------------------------- B. Currently---------------------------
4. Please list your major product market areas--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------
5. What was the average cost of transportation for distributing your products to market per quintal? A. At the time of establishment ----------------------------------------------- B. Currently---------------------------
6. If your company wants to expand and requires additional land at what unit cost per m2 can it be acquired?------------------------------------------What was the cost of land per m2 at the time of establishment?---------------------------------------.
7. What is the average electric power cost of your mill per quintal of wheat flour------------------------------------------------------
8. Does your mill face a problem of supply of man power? Yes------No-----. If your answer is yes, is it shortage of supply for skilled or for non-skilled or for both? -----------------------------------------------------

**Part III. Decisional Questions**

1. Had location analysis been made in selecting your present location?

A, Yes b. No

1. If the answer to question number one above is yes, what were the criteria employed for evaluation? Please enumerate.-----------------------------------------------------------------------------------------------------

--------------------------------------------------------------------------------------------------------------------------

1. If the answer to question No.1 is no, what were the reasons for not undertaking the analysis?
2. Success of other mills established in the area b. home place of promoter c. Other reason, please specify.

----------------------------------------------------------------------

1. Is your company satisfied with the present location?
   1. Yes b. No
2. If the answer to question No.4 is no, what is the reason for dissatisfaction with the present location

--------------------------------------------------------------------------------------------------------------------

6. If you are to expand your milling business in the future do you think you need to consider other locations or prefer to maintain the present location?

a. Yes b. No

7. If you are to consider change of location in your future expansion do you think that you have to consider more than one location as alternative for your decision?

a. Yes b. No

8. If your answer is yes, which location(s) will you consider for evaluation? a) Near market b) Near raw mat

erial c) Other ,specify-----------------------------------

9. Suppose you are to evaluate these locations on the following criteria: based on a 5 point scale to be interpreted as: as 1=Un important, 2=Little importance, 3= Moderately important 4= Important 5=Very important, please rate how important each criteria relative to others is to you for evaluating different locations by circling appropriate answer.

**Criteria Rating**

|  |
| --- |
| un important very Important |
| **Factor 1: Transportation**  1.1. Cost of raw material transportation (E). 1 2 3 4 5  1.2. Cost of finished goods transportation (E). 1 2 3 4 5  1.3 Cost of by product transportation(E) 1 2 3 4 5  **Factor 2: Labor**  2.1. Availability of skilled labor (NE). 1 2 3 4 5  2. 2.Amount of Wage rates (E). 1 2 3 4 5  2.3. Availability of unskilled labor(NE) 1 2 3 4 5  2.4. Cost of living (housing),( E) 1 2 3 4 5  **Factor 3: Raw materials**  3.1.Availability of raw materials.(NE) 1 2 3 4 5  3.2. Closeness to materials.(E) 1 2 3 4 5  3.3.Availability of storage facilities for materials (NE) 1 2 3 4 5  **Factor 4: Markets**  4.1 Proximity to consumer good markets (NE). 1 2 3 4 5  4.2.. Anticipation of growth of markets.(E) 1 2 3 4 5  **Factor 5: Industrial site**  5.1. Cost of industrial land.(E) 1 2 3 4 5  5.2Availability of space for future expansion (NE) 1 2 3 4 5  5.3. Closeness to other industries (E). 1 2 3 4 5  5.4. Closeness to other industries (NE). 1 2 3 4 5  **Factor 6: Utilities**  6.1. Adequacy of water supply.(NE) 1 2 3 4 5  6.2. Availability of disposable facilities for  industrial waste (NE) 1 2 3 4 5  6.3. Availability of electric power (NE). 1 2 3 4 5  6.4. Cost of electric power (E). 1 2 3 4 5  6.5.Cost of water (E) 1 2 3 4 5  **Factor 7: Tax structure**  Financial incentive or tax holiday (E). 1 2 3 4 5  **Factor 8: Community**  10.1. Availability of college(NE) 1 2 3 4 5  10.2. Attitude of community leaders (NE). 1 2 3 4 5  10.3. Availability of banks and credit institutions (NE). 1 2 3 4 5  **Others 9**  Personal preference of top management or owners  or attachment to the location(NE) 1 2 3 4 5 |

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **ANNEX2.SAMPLE MEAN RANK CALCULATION**  A.A | | | | | overallrank | | | final rank | |
| 4 | | | | | 11 | | | 18 | |
| 5 | | | | | 26 | | | 29 | |
| 4 | | | | | 11 | | | 18 | |
| 4 | | | | | 11 | | | 18 | |
| 1 | | | | | 1 | | | 1 | |
| 4 | | | | | 11 | | | 18 | |
| 4 | | | | | 11 | | | 18 | |
| 4 | | | | | 11 | | | 18 | |
| 5 | | | | | 26 | | | 29 | |
| 4 | | | | | 11 | | | 18 | |
| 3 | | | | | 4 | | | 7 | |
| 5 | | | | | 26 | | | 29 | |
| 3 | | | | | 4 | | | 7 | |
| 3 | | | | | 4 | | | 7 | |
| 2 | | | | | 2 | | | 2 | |
| 3 | | | | | 4 | | | 7 | |
| 4 | | | | | 11 | | | 18 | |
| 5 | | | | | 26 | | | 29 | |
| ranksum | | | | |  | | | 291 | |
| meanrank | | | | |  | | | 291/18= 16.17 | |
|  | | | | |  | | |  | |
|  | | | | | note:T2 data | | |  | |
| adama | | overallrank | final rank | | |
| 3 | | 4 | 7 | | |
| 4 | | 11 | 18 | | |
| 5 | | 26 | 29 | | |
| 5 | | 26 | 29 | | |
| 4 | | 11 | 18 | | |
| 5 | | 26 | 29 | | |
| 4 | | 11 | 18 | | |
| ranksum | |  | 148 | | |
| meanrank | |  | 148/7= 21.14 | | |
| hawassa | overall rank | | | final rank | | |  | |  | |
| 4 | 11 | | | 18 | | |  | |  | |
| 3 | 4 | | | 7 | | |  | |  | |
| 2 | 2 | | | 2 | | |  | |  | |
| 4 | 11 | | | 18 | | |  | |  | |
| 4 | 11 | | | 18 | | |  | |  | |
| 3 | 4 | | | 7 | | |  | |  | |
| 4 | 11 | | | 18 | | |  | |  | |
| 5 | 26 | | | 29 | | |  | |  | |
| ranksum |  | | | 117 | | |  | |  | |
|  |  | | |  | | |  | |  | |
| meanrank |  | | | 117/8= 14.63 | | |  | |  | |
|  |  | | |  | | |  | |  | |
| |  | | --- | |  | |  | | |  | | |  | |  | |
|  |  | | |  | | |  | |  | |
|  |  | | |  | | |  | |  | |
|  |  | | |  | | |  | |  | |
|  |  | | |  | | |  | |  | |
|  |  | | | where Xi=final rank of ith observation | | | | | | |
|  |  | | | and n is number of observations | | | | | | |