

## Using Analytical Hierarchy Process (AHP) to Build Suppliers' Selection Model

Dr. Yousef A. Abu Hajar

Department of Financial & Administrative Sciences, Aqaba University College

Al-Balqa Applied University, Jordan

Email: abu\_hajar2006@yahoo.com

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### Abstract

The analytical Hierarchy process (AHP) is a multi- criteria decision making approach (MCDMA) can be used to solve complex decision problems. This study aimed to use this objective tool to build suppliers' selection model, utilizing competitive priorities "quality, cost, delivery and flexibility" as an evaluation and selection criteria. The researcher has developed an evaluation questionnaire distributed to a simple random sample of functional managers in the chemical industries sector companies enlisted in Amman Stock Exchange, the relative importance degrees were measured for main criteria "competitive priorities" from the perspective of those managers to identify their attitudes when selecting suppliers, the study concluded that the quality is the most important criterion among competitive priorities criteria for selecting and evaluating suppliers as it got a percentage of 0.53 of the general sum, followed by cost criterion that got a percentage of 0.22 so the two criteria have got 0.75 percentage. In the light of what the study has concluded, the researcher recommended the necessity of using Analytical Hierarchy Process in making decisions of selecting suppliers especially in chemical industries sector, and other industrial sectors as well, due to what this approach has of advantages and features for making complex decisions.

**Keywords:** Analytical Hierarchy Process, competitive priorities, suppliers' selection, criteria of suppliers' selection, companies of chemical industries sectors

### 1. Introduction

The process of evaluation and effective selection of suppliers is considered vital for the success of organizations, researchers agreed upon the importance of suppliers and supply resources for the living of organization. The cost of raw materials and the parts which the product is consisted of are considered the main cost in most times (Asamoah, et al. 2012), this illustrates the importance of the strong partnership between organizations and their suppliers, since selecting the appropriate suppliers who achieve lower cost ,better quality and innovation in their businesses, help Organizations achieve sustainable competitive advantage, as they give the organization many features such as getting inputs with high quality, reasonable prices and sufficient quantities. Henceforth, organizations should find ways to

evaluate suppliers and select the best among them to be their partners in the supply chain (Koufteros, 2012).

Analytical Hierarchy Process (AHP) is one of the most important methods in making the decision of selecting suppliers, as it provides a practical framework to solve many problems; it is also one of the approaches of Multi Criteria Decision Making (MCDM) which enables the decision maker of solving complex problems through analyzing and simplifying those problems, in addition to its flexibility and ability to be used in different circumstances and different industries (Golmohammadi, 2007). Competitive priorities (cost, quality, flexibility, delivery) play an important role in enhancing the competitive position of organizations, and they achieve distinctive feature that characterizes the organization from its other competitors in the industry, and supports its orientations to achieve its main goals represented by growth, survival and continuity as competitive priorities have been used among many criteria previously adopted to evaluate and select suppliers (Koufteros, 2012).

The annual report of Amman Industry Chamber 2013 has mentioned that chemical industries companies in general and the chemical industries sector in Amman stock Exchange in particular contribute to reduce the trade deficit of the Jordanian State. These companies rely on the domestic market and the global market to sell various products. They have been able to export chemicals produced to many Arab and foreign countries. This vital sector provides multiple chemical products used in construction, manufacturing and processing of metals, and in beauty products, as this sector has sub-sectors such as petrochemicals, fertilizers, pesticides, agricultural products, paint, perfumes and cosmetics, chemical salts.

## **2. Study problem:**

The contemporary business environment practically shows that a lot of organizations are selecting suppliers based on the criterion of price only. Some organizations also use other criteria depending on their policy such as the quality, capacity, reputation of the suppliers. These organizations do not consider the full competitive process, which leads these organizations not to be able to choose the right supplier in deed, thus could not achieve their strategic objectives in the long term (Aamar, 2005). The researcher has interviewed managers of chemical industry companies, reviewed the procurement policies, and noted that the supplier selection process is done through purchase committees in those organizations, and people who are concerned with the purchase process are using individual criteria in the evaluation of suppliers such as minimum price, knowledge, reputation. This means that the use of personal judgments and criteria is still the main element in the selection of suppliers. This showed that these companies need to use objective criteria and methods in the selection process; this study aims to this goal through the use of analytic hierarchy process to build a model that uses objective criteria in the selection of suppliers.

## **3. Literature Review**

The existence of self-sufficient organizations in absolute terms is almost impossible, so organizations generally require at varying degrees to rely on suppliers to provide them with various inputs necessary to produce products and services to customers (Arnold, et al. 2012). The dependence on foreign sources reduces the cost of inputs, helps to maintain the financial resources to be used in major activities of the organization, and help them to build a competitive advantage from those activities; it also helps the organization access to the new technologies offered by the suppliers (Hadeed, 2012).

The supply source selection process undergoes through three basic stages that is: the pre-selection stage, where procurement management in any organization seeks at this stage to look for supply sources, that can meet the needs of the organization of supplies, collect information about them, prepare a list of their names in order to contact them in preparation for their evaluation, and trade-offs them and choose the best of them (Chuang, 2004). The second stage is the evaluation of each supplier in order to discover those who professional suppliers with distinctive capabilities and narrowing this list and limiting it to a specific number of suppliers. The evaluation process is done by comparing the suppliers based on the information previously collected about them, with a set of criteria that revolve around their ability to meet the needs of the Organization with the highest possible efficiency. The third stage which is the stage of negotiations, after the decision makers in the purchasing department and other departments concerned have an opinion with whom supplier to deal with based on the evaluation process and previous selection, the purchasing department communicates with the supplier or suppliers who have been selected to negotiate with them and complete the contracting procedures for the provision of needed supplies, having it in accordance with the contract to be concluded. If it was not possible to make deal with the first supplier, the second supplier according to the previous evaluation will be negotiated with, in order to sign a contract with him (Rafati, 2008).

Suppliers vary in terms of scope and nature of the activity they perform, so suppliers can be divided into four categories: The first category is manufacturers who are suppliers producing raw materials and semi-processed materials, and sell them directly to the interested companies. The second category is distributors who buy the raw materials and store, in order to sell them later to interested companies. The third category is artisans who buy and sell materials and unique parts, where these materials are outlined in duplicate by these artisans who sell through representatives or trade shows. The fourth category is importers who import raw materials and products from external sources, then sell them to locally involved companies (Lesonsky, 2004).

The approach of Multi-criteria decision-making (MCDMA) is an essential part of the Decision theory and analysis, it is an effective tool for making critical and important decisions in a lot of areas, this approach is used when a decision-maker is faced with more than one goal or criterion that must be achieved to solve the problem facing him, by choosing the best available alternative to achieve the required criterion (Rafati, 2008).

The idea of Analytical Hierarchy Process (AHP) was developed around the concept that the world is a complex system composed of a set of overlapping and similar elements. This creates a set of problems have to be faced without possessing the necessary resources, that is why we need priorities to differentiate them . It is difficult to agree on priorities and to decide which of them has the greatest importance to be adopted in the process of selecting suppliers, especially in complex cases. There is no doubt that we need organized ways to look at problems and address them in an arranged way to lead us to a general compound and uncluttered framework that allows some sort of overlap between the elements of the problem (Chai, et al. 2013). The Analytical Hierarchy Process (AHP) provides the decision maker with a framework necessary to solve the problems, this method enables him to make effective decisions in complex matters by simplifying these things, it is mainly a way of dismantling any complex and non-structural setting to its main parts, then organize these parts or variables sequentially, After that the decision maker uses his mind and his experience to assign a numerical value to measure the importance of each variable separately, he could come up with certain provisions, that determine which of these variables has the priority and

should be discussed and studied, such that it affects the final result to resolve the status quo. Thus the analytical hierarchy process offered the groups of decision-making a practically effective structure that imposes a form and a commitment on the intellectual process of these groups, The aim of determining a numeric value for each variable of the problem is to enable decision makers to maintain a consistent conceptual model helps them to reach the summary which enhances the credibility of the analytic hierarchy process as a decision-making tool (Saaty, 2012).

Competitive priorities play a key role in strengthening the competitive position of the organization, which provide it with a competitive advantage by which it excels other competitors in the same field, it also helps the organization to reach its main objectives in the growth, survival and continuity. Various studies did not agree on determining competitive priorities of organizations, because they discuss from different angles in these studies. Some researchers believe that competitive priorities are the productive system dimensions that enable the organization to respond to the needs of the market, while others see them as elements support the strategic choice of the organizations to be able to meet the needs of the market by providing customers with products of the best quality, reliability and high flexibility. Others argue that the competitive priorities are performance targets by which operations function could contribute to achieving competitive advantage (Altalib & Alghali, 2011).

Competitive priorities are considered a crucial factor in the development of the organization's strategy, because the organization that aimed to reach a suitable position in the market should focus on some competitive priorities that is ignored or not seen by competitors. This is what done by Japanese organizations when they focused on reliability and conformity as the key dimensions of quality. The importance of competitive priorities stand out in their ability to link the strategy at business units level and operational strategy and its role in enabling the organization to reach the efficiency and effectiveness, as efficiency is represented in the success to reach the lowest cost and high productivity while by dealing effectively the organization's ability to respond to certain criteria and standards, such as : delivery, scheduling and technological capability. Researchers' opinions about the source of competitive priorities are numerous, some of them considered that distinctive and unique capabilities possessed by the organization is the main source of competitive priorities, which could be skilled and trained work force, strong distribution network, or good relationship with suppliers (Russell & Taylor, 2000).

Altalib & Alghali (2011) mentioned researchers have agreed that the most important competitive priorities are: cost, quality, flexibility, and delivery. As shown in table (1) cost gained 100%, quality 93%, flexibility 86% and Delivery has got 50%.

Table (1) Competitive Priorities adopted in Previous studies

Competitive Priorities	Cost	Time	Quality	Innovation	Flexibility	Speed	Distinctivene	Reliability	Technology	Delivery	Performance	Growth	Service	Alliances	Customer satisfaction
Numb er of Studie	28	4	26	9	24	4	3	6	3	14	2	1	5	1	2

perc enta ge	100	1 5	9 3	3 2	8 6	1 5	1 1	2 2	1 1	5 0	8	4	1 8	4	8
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Source: (Altalib & Alghali, 2011)

The researchers concern about the competitive priorities previously did not come randomly, but it was due to the large capabilities of those priorities in supporting the strategic role of operations management, supporting the organization's ability to face competition, and strengthening the competitive advantage. due to the importance of those four priorities and based on the previous information, we consider competitive priorities as follows ( Abu-Hajar, 2016):

1. Quality: It is considered one of the essential competitive priorities in managing operations, where it represents the primary goal for each manager. High quality benefits organizations in increasing the added-value for the product from the customer point of view, which in turn leads to increase the organization profitability and efficiency level, which reduces the costs associated with the production process. Quality links to the technical specifications of the product significantly, it means product conformity to the stated specifications, or to the requirements which the product was purchased for.

2. Cost: It is considered one of the necessities for the production and service process where it is defined as: "the amount of sacrifice in resources to achieve a particular goal". The cost priority is defined as: "provide products at a price less than competitors which leads to increase in organization market share". Cost is one of the critical factors in determining the competitive position of most companies, where through studies they found that increase in profits by reducing cost is easier than achieving same increase in profits through increasing sales. The competition on a cost basis requires the focus on reducing all cost elements: Costs of labor, materials, damage, and industrial costs, and it also requires tracking the sources of waste and loss and fixing them to reduce the unit cost of a product or service (Abu-Hajar, 2016).

3. Delivery: It refers to the ability of organization to provide product in the specific time and according to certain scheduling period. there are three competitive dimensions for the delivery priority: Delivery speed which means the speed of response to customer order. Time delivery or delivery dependability which means the range of compliance with the delivery of the product by the specific time agreed on. And Development speed which means the speed of organization to develop, design, and produce new products, where it prefers from organization to be able to develop its own products faster than competitors. (Krajewski et al., 2009).

4. Flexibility: It means "the organization ability to response and adopt quickly to prepare market orders and have it ready in the quantity and the quality is needed, and according to customers orders". The flexibility priority contains three competitive dimensions: Customization which means the ability of organization to change the type and product's specifications according to customers' needs following the change in market orders or demands. Variety flexibility which means the ability of organization to produce, introduce, and deliver a variety of products that meet the needs and desires of different customers. Volume flexibility which means the ability of organization to speed up or slow down the production rate to handle the large fluctuations in demand, and in the same time to keep the organization running economically and profitably (Mohsin and Alnajjar, 2012).

#### 4. Methodology

#### 4.1 Data and Sample

The population of the study consisted of all functional managers working in industrial chemical companies registered in Amman stocks exchange is illustrated in table (2).

Table (2) companies population of the study

No.	Companies' name
1	National Chlorine Industries Company
2	Industrial Commercial and Agricultural Production Company
3	Jordan Chemical Industries Company Hypix
4	Arab Company for the manufacture of pesticides and veterinary medicines
5	Intermediate petrochemical company
6	Integrated multi- projects company HOPPECKE
7	Industries and sulfur Jordanian Gemco (other business investment)
8	Jordan Industrial Resources Inc. (other investment business)
9	Premier Business and Projects (other investment business)
10	International Company for Chemical Industries

Source: Annual report of the Amman Stock Exchange for the year 2013.

Many researchers believe that the most crucial step in many decision making methods is the accurate collecting data. Often qualitative data cannot be known in terms of absolute values. For the purpose of collecting necessary data a simple random sample was selected consisting of 50 functional managers, each one of them has to fill out a complete a set of forms each form has a (1-9) scale to determine the degree of importance of each criterion when compared with another one as shown in table (3). In the same three levels of hierarchical model, namely: main criteria of competitive priorities, secondary criteria for each priority and to select between vendors based on these criteria. The purpose of this model is to perform a pair-wise comparisons to determine the relative importance of potential suppliers in terms of each competitive priority. After collecting data, 33 copies of the questionnaire have been restored with a percentage of 66%.

Table (3) Relative importance matrix of the main criteria

Second column	Ultimate importance 9	Very high importance 7	High importance 5	Moderate importance 3	Equal importance 1	Moderate importance 3	High importance 5	Very high importance 7	Ultimate importance 9	First column
Cost										Quality
Delivery										Quality
Flexibility										Quality
Delivery										Cost
Flexibility										Cost
Flexibility										Delivery

#### 4.2 suppliers' selection model

The researcher has used a multi-criteria decision making method that provides a framework to cope with multiple criteria situation, it is known as the general model of analytical hierarchy process, by using this model the decision maker could represent the problem facing him in form of Multi-level hierarchical structure as shown in Figure (1)

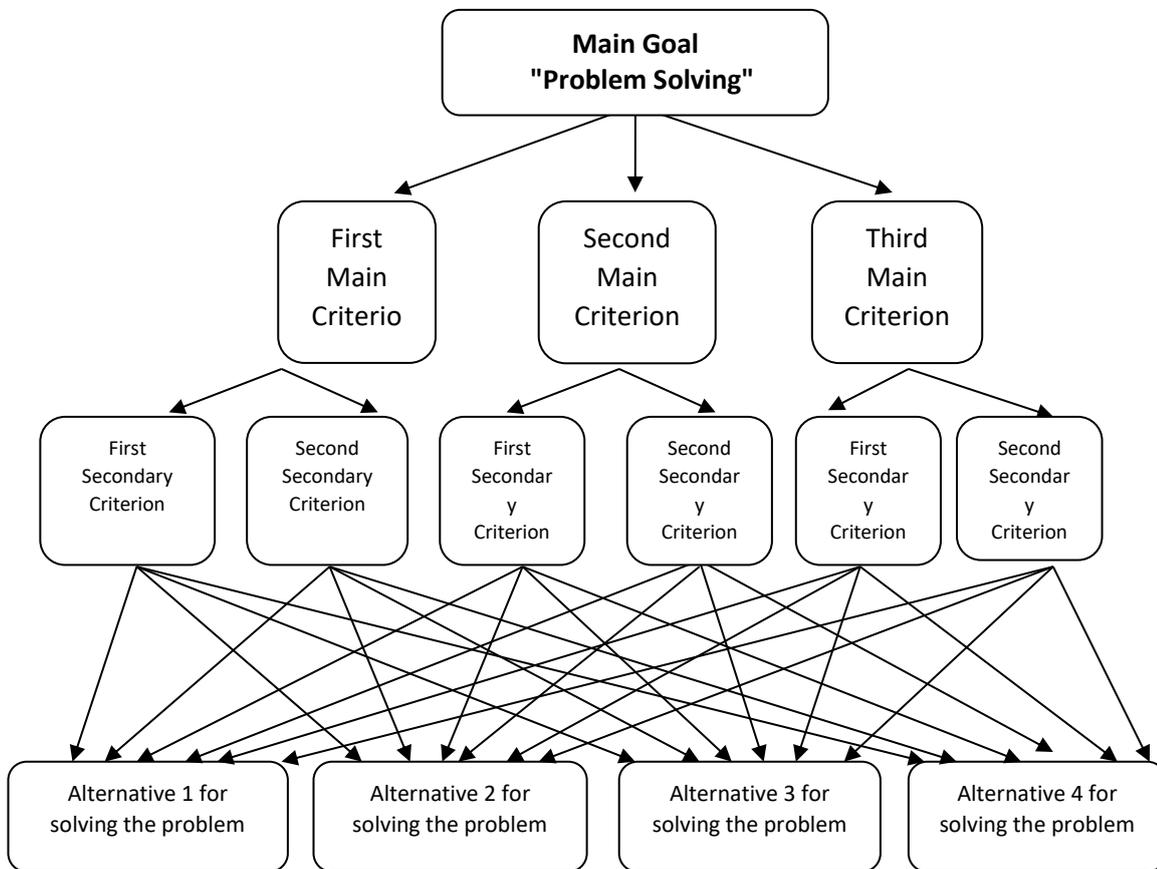


Figure (1): The general model of the Analytical Hierarchy Process (AHP)

When this model is used for solving the problem of selecting the appropriate supplier for the organization, the main desired goal to be achieved will be put in the first level of the hierarchy, the main criteria upon which the suppliers will be evaluated will be put in the second hierarchy " cost, quality, delivery, flexibility," will be in the second level, but the Secondary criteria that clarify the main criteria will be in the third level as shown in table (4).

Table (4) Main and Secondary Supplier Selection's Criteria

Main Criterion	Secondary Criterion
1. Cost	1. Price
	2. Quantity Discount
	3. Payment Facilities
	4. Services
2. Quality	1. Product Reliability
	2. Product Durability
	3. Accreditation
	4. Percent Rejection
3. Delivery	1. Delivery Speed
	2. Delivery On Time
	3. Quantity Conformance
	4. Development Speed
4. Flexibility	1. Quantity Adjustment
	2. Time Adjustment
	3. Product Specifications
	4. Technology Response

Source: Table prepared by the researcher

Pair-wise comparisons between main criteria were made to determine the local weight of each criterion; also pair-wise comparisons between secondary criteria were made to determine the local weight of each criterion so the local weight will be determined each criterion of main and secondary criteria. In this stage we will be able to determine the total weight of each criterion to achieve the general goal of this hierarchy by multiplying the local weight of main criterion by the local weight of its secondary criterion. Moreover the consistency of the decisions made will be measured using the following steps:

1. Determining the consistency ratio (CR)
2. Determine the consistency vector (CV)
3. Computing lambda and the consistency index (CI)
4. Computing the consistency ratio (CR)

According to Saaty (2012) the accepted CR is varied according to the volume of the matrix, for example; the accepted consistency ratio for a 3x3 matrix is 0.05 while a 4x4 matrix it is 0.09. In the case that the judgments made are consistent, the priorities will be synthesized to find the appropriate solution of the problem. In the fourth level there are the alternatives available to the decision maker in this case they are the potential suppliers which will be evaluated and ranked according to the secondary criteria derived from the main criteria as the supplier who is the most achieving of these criteria is the best for achieving this goal. A certain package called Expert Choice 11 could be used to facilitate this process, and the model is as shown in Figure (2).

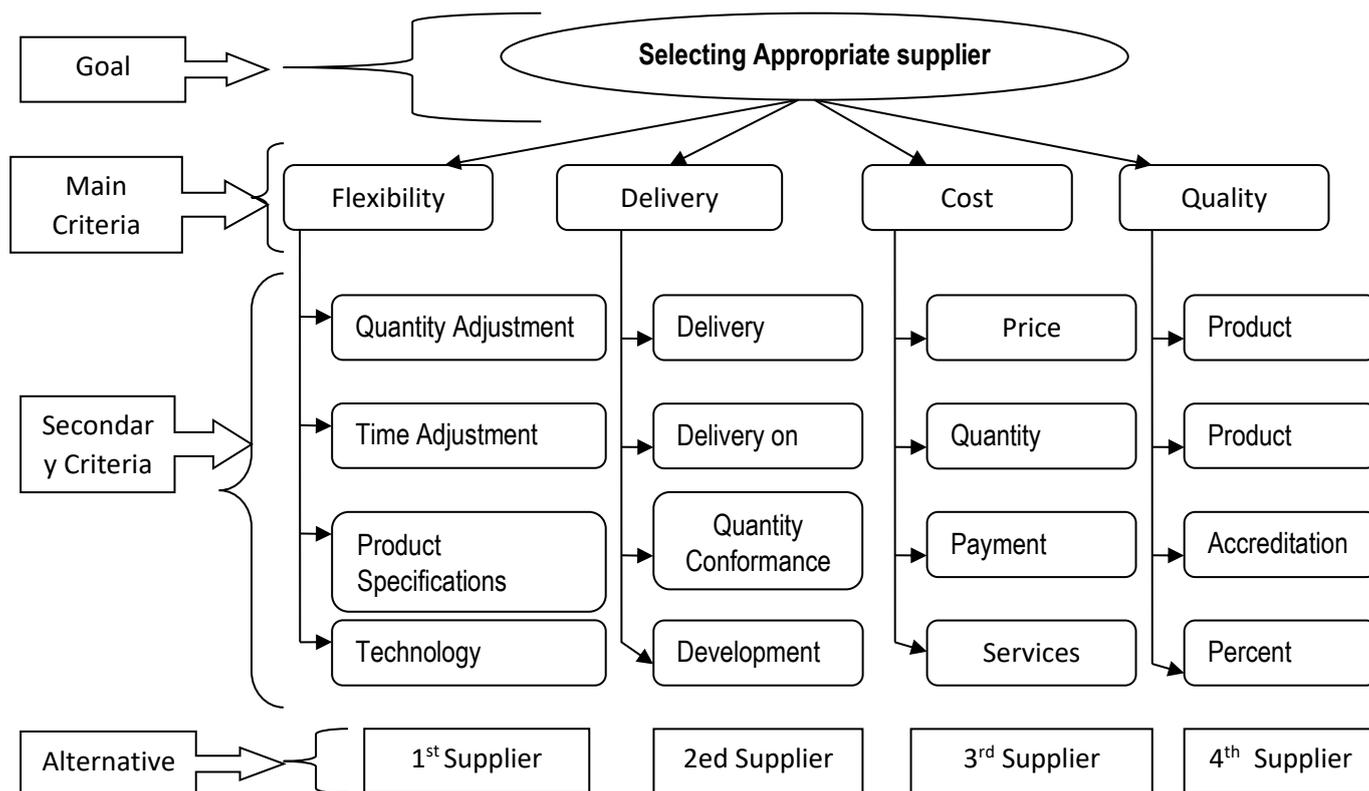


Figure 2 explanatory model of the main and secondary criteria of the study  
 Source: prepared by the researcher, depending on the Analytical Hierarchy Process (AHP) model

### 4.3. Application of suppliers' selection model

The adoption of a number of main and secondary criteria, and a number of alternatives to choose from, may complicate the selection process, especially since achieving a certain level of consistency in the judgments of the decision makers on the criteria and alternatives is essential to reach the goal. So analytical hierarchy process is based on: analyzing the problem to the initial elements, building a pyramid of these elements, arranging these judgements according to the relative importance of these elements at several levels of the pyramid.

The first and second steps of applying the model define the shape and structure of the model, and after the completion of the application form it goes through the following steps:

1. Collect data from a sample study through which functional managers in the chemical industrial companies fill pair-wise comparison forms to build trade-off matrices for the three levels of comparison: the main criteria a "competitive priorities," and secondary criteria for each priority, then for the potential suppliers. The following three tables (5, 6 and 7) are examples of trade-offs matrices that have been reconstructed from the data collected from these forms of the three levels for comparison.

Table (5) pair-wise comparisons of main criteria for suppliers' selection matrix

Main Criteria	Quality	Cost	Delivery	Flexibility
Quality	1	3	5	3
Cost	1/3	1	7	1
Delivery	1/5	1/7	1	1/3

Flexibility	1/3	1	3	1
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Table (6) pair-wise comparisons between secondary criteria of quality criterion

Secondary Criteria	Product Reliability	Product Durability	Accreditation	Percent Rejection
Product Reliability	1	3	5	3
Product Durability	1/3	1	5	1
Accreditation	1/5	1/5	1	1/5
Percent Rejection	1/3	1	5	1

Table (7) pair-wise comparisons between alternatives of the secondary criterion Product Reliability

Secondary criterion Product Reliability	First supplier	Second supplier	Third supplier	Fourth supplier
First supplier	1	1	1/5	3
Second supplier	1	1	1/5	5
Third supplier	5	5	1	5
Fourth supplier	1/3	1/5	1/5	1

2. The rest of pair-wise comparisons process have been accomplished through the use of the specialized computer package called Expert Choice (EC-11). Which has significantly contributed the wide acceptance of the AHP methodology The EC-11 completes the calculations needed to reach the consistency ratio (CR) which is used in the trade-off process between suppliers (Barford, 2014).

**5. Conclusions and discussion:**

**5.1. Prioritize the order of main criteria**

Competitive priorities were used as main criteria for evaluating suppliers in this study, where the relative importance of each criterion was determined based on the data collected from the answers of the functional managers and entered to the program. The results shown table (8) have indicated that quality is the most important of the four criteria getting the ratio of 0.53, followed by cost, which occupied the second important by 0.22 and then delivery by 0.14 and finally flexibility by 0.11. This study had agreed with the study (William, et al.2010), which considered quality criterion is the most important by 87%, as well as the study of Hsu, et al. (2006) and the study of Bello (2003). From the perspective of the researcher, this due to the importance of the quality of raw materials and inputs in the production of chemical products, since the materials used in manufacturing these products have a direct impact on the health of human beings, therefore it is subjected to instructions of regulatory authorities. The study has indicated that cost occupied the second rank by 0.22 contrary to the common belief of some people that it is the most important criterion in selecting suppliers.

Table (8) the relative importance of the key criteria for evaluating suppliers

Main criteria	Relative importance	Rank
Quality	0.53	First
Cost	0.22	Second
Delivery	0.14	Third
Flexibility	0.11	Fourth

Total	1.000	
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## 5.2. Prioritize the order of secondary criteria:

The main criteria have been divided to its secondary dimensions and the most important dimensions were adopted where each main criterion has 4 secondary criteria so the total number of the criteria equals to 16 dimensions. From table (9) entitled " local weight and total weight of the secondary criteria for suppliers' selections" it is obvious that the most important secondary criterion of the main criterion quality is product reliability with 0.33. Also, the most important secondary criterion of the main criterion cost is price with 0.45, while the most important secondary criterion of the main criterion delivery is delivery on time with 0.33 and the most important secondary criterion of the main criterion cost is rice with 0.32, while the most important secondary criterion of the main criterion flexibility is time adjustment with 0.29. The most important secondary criterion according to the functional managers was product reliability with total weight of 0.18 followed by product durability with 0.16 while the least important secondary criterion was technological response with 0.014.

**Table (9) local weight and total weight of the secondary criteria for suppliers' selections**

Main criteria	Relative importance	Secondary criteria	Local weight	Total weight
Quality	0.53	Product Reliability	0.33	0.18
		Product Durability	0.30	0.16
		Accreditation	0.13	0.07
		Percent Rejection	0.23	0.12
			<b>100%</b>	
Cost	0.22	Price	0.45	0.10
		Quantity Discount	0.17	0.04
		Payment Facilities	0.16	0.04
		Services	0.22	0.05
			<b>100%</b>	
Delivery	0.14	Delivery Speed	0.18	0.03
		Delivery On Time	0.32	0.04
		Quantity Conformance	0.29	0.04
		Development Speed	0.20	0.02
			<b>100%</b>	
Flexibility	0.11	Quantity Adjustment	0.28	0.03
		Time Adjustment	0.29	0.03
		Product Specifications	0.29	0.03
		Technology Response	0.14	0.02
			<b>100%</b>	
Sum	100%	Sum of total weights		<b>100%</b>

5.3. Suppliers' evaluation

After determining the relative importance of the main criteria and total weight of the secondary criteria, the potential alternatives have identified to achieve the goal of using Analytical Hierarchy Process (AHP), it was requested from each functional manager to specify the suppliers who mostly deal with the company in order to be evaluated, it was found the suppliers are not identical, since each company has its own nature and need different suppliers from other companies. it is obvious from table (10) entitled "local and total weight of the suppliers of National Chlorine Industries Company and their ranks, " that the 4 potential suppliers to deal with the company have been evaluated according to main and secondary criteria, that each criterion has local weight and total weight sums the main criterion and the secondary criterion at evaluation.

Table (10) local and total weight of the suppliers of National Chlorine Industries Company and their ranks

Main criteria	Weights of Main	Secondary criteria	Local weights	Total weights	Local weights of the potential suppliers of National Chlorine Industries Company				Total weights of the potential suppliers of National Chlorine Industries Company			
Quality	<b>0.530</b>	Product Reliability	0.335	<b>0.177</b>	0.151	0.181	0.605	0.064	0.027	0.032	0.107	0.011
		Product Durability	0.305	<b>0.162</b>	0.208	0.107	0.609	0.076	0.034	0.017	0.098	0.012
		Accreditation	0.133	<b>0.071</b>	0.321	0.183	0.402	0.094	0.023	0.013	0.028	0.007
		Percent Rejection	0.227	<b>0.120</b>	0.106	0.126	0.289	0.480	0.013	0.015	0.035	0.058
		Sub-total	<b>1.00</b>									
Cost	<b>0.216</b>	Price	0.451	<b>0.097</b>	0.099	0.263	0.523	0.116	0.010	0.026	0.051	0.011
		Quantity Discount	0.167	<b>0.036</b>	0.101	0.483	0.141	0.276	0.004	0.017	0.005	0.010
		Payment Facilities	0.165	<b>0.036</b>	0.092	0.532	.0900	0.286	0.003	0.019	0.003	0.010
		Services	0.217	<b>0.047</b>	0.613	0.123	0.169	0.096	0.029	0.006	0.008	0.004
		Sub-total	<b>1.00</b>									
Delivery	<b>0.140</b>	Delivery Speed	0.185	<b>0.026</b>	0.096	0.394	0.287	0.223	0.003	0.010	0.008	0.006
		Delivery On Time	0.321	<b>0.045</b>	0.096	0.223	0.394	0.287	0.004	0.010	0.018	0.013
		Quantity Conformance	0.296	<b>0.041</b>	0.188	0.241	0.331	0.241	0.008	0.010	0.014	0.010

		Develop ment Speed	0.1 97	<b>0.0</b> <b>28</b>	0.2 50	0.2 50	0.2 50	0.2 50	0.0 07	0.0 07	0.0 07	0.0 10
		Sub-total	<b>1.0</b> <b>0</b>									
Flexibil ity	<b>0.11</b> <b>4</b>	Quantity Adjustme nt	0.2 84	<b>0.0</b> <b>32</b>	0.1 67	0.1 67	0.5 00	0.1 67	0.0 05	0.0 05	0.0 16	0.0 06
		Time Adjustme nt	0.2 87	<b>0.0</b> <b>33</b>	0.2 22	0.1 24	0.4 61	0.1 93	0.0 07	0.0 04	0.0 15	0.0 06
		Product Specificati ons	0.2 85	<b>0.0</b> <b>32</b>	0.2 76	0.1 18	0.4 87	0.1 18	0.0 09	0.0 04	0.0 16	0.0 04
		Technolo gy Response	0.1 44	<b>0.0</b> <b>16</b>	0.1 83	0.1 05	0.4 83	0.2 29	0.0 03	0.0 02	0.0 08	0.0 03
		Sub-total	<b>1.0</b> <b>0</b>									
Sum				<b>1.0</b> <b>0</b>								
Rank									<b>0.1</b> <b>87</b>	<b>0.1</b> <b>97</b>	<b>0.4</b> <b>36</b>	<b>0.1</b> <b>78</b>

The table illustrates that the third supplier has got the first rank with a total weight of 0.44 to the best among the suppliers followed by the second supplier with a total weight of 0.20 then the first supplier in the third rank with a total weight of 0.19 finally the fourth supplier occupied the last rank with a total weight of 0.18 as it shown in table (10).

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